PNNL-15042
WTP-RPT-008, Rev. 1

Organic Analysis of C-104 Tank Waste

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February 2001

Prepared for CH2M Hill Hanford Group, Inc.
under Project Number 41503

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Pacific Northwest National Laboratory
Richland, Washington, 99352

Summary

Fourteen jars of waste material from Tank C-104 were received by PNNL. The contents of all jars were mixed to provide a single composite. Each composite was homogenized and representative sub-samples extracted for organic, radiochemical, and inorganic regulatory analyses.

The representative sub-samples were analyzed for inorganic, radiochemical, and organic analyses for analytes of interest as defined in Test Plan BNFL-29953-30, Rev. 1. This report presents the organic results. The inorganic and radiochemical results are reported in report WTP-RPT-007, PNNL-13364 (formerly BNFL-RPT-043).

The organic characterization of analyses of the as received material for C-104 includes the following:

(1) Volatile Organic Analysis
(2) Semi-volatile Organic Analysis
(3) Polychlorinated biphenyls and pesticides
(4) Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans
(5) Oxalate, formate, acetate, and acrylate by ion chromatography
(6) Ethanol, methanol, 2-propanol, 1-propanol, n-butanol, triethylamine, 2-methyl-2-propanol, and 2-butanol by headspace analysis

Except for a very few cases, the characterization results met or exceeded the quality control requirements established by the governing quality assurance plan, and met or exceeded the minimum reportable quantity requirements specified by BNFL. Whenever possible the analyses were performed to SW-846 protocols so that the results can be used to support permit application, as well as provide feed envelope characterization data.

Table S.1 summarizes the results for target analytes, which produced quantifiable results. All other target analytes were either non-detects or below the quantitation limit. Numerous tentatively identified compounds with estimated quantities measured were also detected by the VOA and SVOA methods. Those data are reported in the respective sections for those two methods.

Table S.1. C-104 Summary Results - Target Analytes Detected

CAS #	Target Analyte	C-104 Supernatant			C-104 Wet Centrifuged Solids		
		Blank	Sample	Duplicate	Blank	Sample	Duplicate
		µg/L	µg/L	µg/L	µg/Kg	µg/Kg	µg/Kg
VOA Compounds							
106-35-4	3-Heptanone	U	74 J	U	U	420	800
106-97-8	Butane	U	U	U	U	2,100	3,000
107-13-1	Acrylonitrile	U	U	U	U	U	990
109-66-0	Pentane	U	U	U	U	5,600	7,400
110-43-0	2-Heptanone	U	97 J	U	U	400 J	810
110-54-3	Hexane	11	5,000	U	U	7,000	9,200
111-65-9	Octane	U	3,800	U	U	3,400	4,600
111-84-2	Nonane	U	6,200	U	U	2,900	4,500
123-38-6	Propionaldehyde	U	U	U	U	880	1,100
142-82-5	Heptane	U	1,900	U	U	5,200	6,300
67-64-1	Acetone	1.8 J	1,000	U	5.5 J	190 JB	430 JB
75-09-2	Methylene Chloride	19	8,000	U	4.3 J	880	1,900
SVOA Compounds							
126-73-8	Tributyl phosphate	2,500	2,100 B	2,000 B	5,500	57,000 B	50,000 B
62-75-9	N-Nitrosodimethylamine	U	1,300	1,900	U	U	U
88-85-7	Dinoseb	250 J	2,200 B	2,500 B	6,500	6,400 B	3,400 B
92-52-4	Biphenyl	2,600	2,000 B	2,000 B	6,200	2,100 B	1,700 B
95-48-7	2-Methylphenol	1,700	U	U	3,100	U	U
98-86-2	Acetophenone	3,000	2,300 B	2,200 B	8,800	6,300 B	6,200 B
100-02-7	4-Nitrophenol	U	290 J	U	U	U	U
109-06-8	2-Methylpyridine	U	350 J	510 J	U	U	U
534-52-1	4,6-Dinitro-2-methylphenol	U	140 J	U	U	U	U
Pesticides							
319-84-6	Alpha-BHC	U	U	1.4	U	U	5.5
319-85-7	Beta-BHC	U	3.4	U	U	U	U
58-89-9	Gamma-BHC	U	U	U	U	8.2	17.6
1024-57-3	Heptachlor Epoxide	U	U	1.6	U	2.7	U
319-86-8	delta-BHC	U	U	U	U	6.4	7.2
5103-71-9	alpha-Chlordane	U	U	U	U	U	2.2
72-55-9	4,4'-DDE	U	U	U	U	5.6	U
7421-93-4	Endrin Aldehyde	U	U	U	U	4.3	U
PCBs							
12674-11-2 53469-21-9	Aroclor 1016/1242	U	3.8	4.9	U	121	154
12672-29-6	Aroclor 1248	U	4.3	5.3	U	278	202
11097-69-1	Aroclor 1254	U	1.8	2.3	U	72.8	80.2
11096-82-5 37324-23-5	Aroclor 1260/1262	U	U	U	U	37.8	40.3
	Total PCB	U	17.9	20.6	U	522	488
Dioxins/Furans							
	None Detected						

CAS #	Target Analyte	C-104 Supernatant			C-104 Wet Centrifuged Solids		
		Blank	Sample	Duplicate	Blank	Sample	Duplicate
		µg/L	µg/L	µg/L	µg/Kg	µg/Kg	µg/Kg
Organic Anions							
144-62-7	Oxalate	U	1,090,000	980,000	U	1,230,000	3,300,000
64-18-6	Formate	U	2,670,000	2,120,000	U	750,000	2,200,000
Headspace Analysis							
67-56-1	Methanol	U	16,000	U			
64-17-5	Ethanol	2,200	8,000 B	2,900 B			
71-23-8	1-Propanol	U	2,700	U			
71-36-3	n-Butanol	U	28,000	U			
121-44-8	Triethylamine	U	15 J	U			

U flag = Compound not detected; Compound concentration less than the MDL
J flag = Compound detected, but concentration is less than the MDL
B flag = Compound was present in the method blank

Terms and Abbreviations

ASR	analytical service request
BNFL	BNFL, Inc; subsidiary of British Nuclear Fuels, Ltd.
CAS#	Chemical Abstracts Service Registry Number
CCC	Calibration check compound
CLP	Contract Laboratory Program
CoC	chain of custody
K-D	Kuderna-Danish
ECD	electron capture detector
GC/ECD	gas chromatography/electron capture detection
GC/MS	gas chromatography/mass spectrometry
HLRF	High Level Radiation Facility
IC	ion chromatography
LCS	Laboratory Control Standard
MDL	method detection limit
MRQ	minimum reportable quantity
MS	matrix spike
MSD	matrix spike duplicate
M&TE	measuring and test equipment
NPH	normal paraffin hydrocarbons
%D	percent difference
PCB	polychlorinated biphenyl
QC	quality control
RSD	relative standard deviation
SAL	Shielded Analytical Laboratory
SPCC	system performance check compound
SVOA	semi-volatile organic analysis
TCLP	Toxicity characteristic leaching procedure
TIC	tentatively identified compound
USEPA	United States Environmental Protection Agency
VOA	volatile organic analysis

Units

°C	degree Centigrade
°F	degree Fahrenheit
g	gram
Kg	kilogram
L	liter
μg	microgram
mL	milliliter
mM	millimolar
min	minute
ng	nanogram
Vol%	volume percent
Wt%	weight percent

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1.0 Introduction

This report presents the organic analytical results for "as received" C-104 tank waste materials. The organic analyses were conducted in support of BNFL Proposal No. 29274/30406 Task 5.0. The organic analysis results obtained from the "as received" tank waste materials may be used to support permitting activities, as well as to provide limited characterization information for subsequent process testing (Tasks 2 through 4). Based on the sampling and storage history of the samples, preservation or refrigeration of the "as received" samples was not performed. Also, hold times specified by SW-846 protocols had expired prior to receiving the samples. The method detection limits (MDL) for the analytes of interest were significantly impacted by the limited quantity of sample available for analysis. However, wherever possible the analytical protocols followed SW-846 guidelines. The concentrations of spiking solutions and choice of extraction solvents were based on SW-846 methods. Because of the unusual and highly hazardous nature of these samples, no attempt was made to sample or store the materials in a headspace free manner prior to analysis. Substantial loss of volatiles was thus inevitable during the storage phase. Additional losses may also have occurred during field sampling, compositing, and subsampling prior to laboratory study. Chemical transformations, which can be induced by radiolytic processes during storage of highly radioactive materials, may also be responsible for in situ formation of volatile compounds.

The organic analytes of interest (target compounds) and recommended methods are defined in the BNFL Proposal No. 29274/30406 and Test Plan BNFL-29953-30 Revision 1. Except where noted in this report, all organic target compounds defined by these documents are reported, with estimated MDLs provided where target compounds were not detected. Where detected, non-target compounds are identified, reported and quantified to the extent possible.

The composite of the C-104 as received material was prepared per Test Plan BNFL-29953-31. Appendix A contains the full text of that Test Plan. The C-104 composite (from 14 shipping jars) was prepared in a three-liter stainless steel vessel with a bottom drain spigot. A bladed stainless steel impeller was used to homogenize the material. While the composite was being stirred, it was drained into three 125-mL glass jars to evaluate representative sub-sampling. These sub-samples were allowed to settle for a minimum of 16 hours. After this settling period, the volume percent of settled solids in each of the 125-mL glass jars were similar (i.e., 88.9% to 89.9% compared to the overall average of 87% found for all 14 jars), providing indication that the sub-samples are representative of the composite. Following confirmation of representative sub-sampling, three additional 500-mL glass bottles were used to sub-sample the remainder of the C-104 composite.

Figure 1.1 provides the sample flow diagram for the preparation of the C-104 as received analytical characterization sub-samples. Two containers of C-104 composite slurry (C-104 Comp A and C-104 Comp B) and one container of composite supernatant (C-104 SUP A) were allocated for organic, inorganic, and radiochemical characterization. The compositing and sub-sampling operations were conducted in the High Level Radiation Facility (HLRF). The sub-samples were transferred under chain-of-custody (CoC) to the Shielded Analytical Laboratory (SAL) for characterization analysis preparation and distribution.

The organic results for the analytes of interest for the C-104 as received materials are typically reported in "μg/L supernatant" or "μg/Kg centrifuged wet solids". However, in some cases where the analyte concentrations are high or the method sensitivity is low, the results are reported in μg/mL or μg/g. Although the supernatants were processed by weight, the density of the supernatants has been used to provide the results in μg/L or μg/mL, as appropriate.

To evaluate the concentration of analytes of interest in the as received slurry material, estimates of the slurry concentration have been calculated from the analyte concentrations measured in the supernatant and in the wet centrifuged solids. To provide a conservative total slurry concentration, the highest measured concentration from either the sample or the duplicate for each phase is used in the calculation. Where no analyte concentration is measured (i.e., results less than MDL), the lowest MDL is used in the calculation. The "maximum" slurry concentration is calculated by Equation (1):

$$C_m = ((C_l / D_l) * W_l) + (C_s * W_s) \quad (1)$$

Where:
C_m = Maximum slurry concentration in μg/Kg
C_l = Concentration of supernatant in μg/L
D_l = Density of supernatant in g/mL (i.e. 1.161)
W_l = Weight fraction of supernatant (i.e., 0.18)
C_s = Concentration of solids in μg/Kg
W_s = Weight fraction of solids (i.e. 0.82)

Throughout this report the term method detection limit (MDL) is used. This 'estimated' MDL is the 'estimated' analytical instrument detection limit (IDL) times all processing factors, such as sample quantities used and dilutions resulting from digestion processing. For most of the methods the estimated IDLs are defined as the lowest calibration standard; however, in some cases the estimated IDL is defined as half to 2-times the lowest calibration standard. The MDLs stated in this report are nominal for each of the analysis methods and are not based on performance of the methods on LAW glass matrices. These MDLs are the best available estimate of the ability to detect and quantify the analytes of interest. No effort has been made to establish matrix-specific MDLs for any of the analyses.

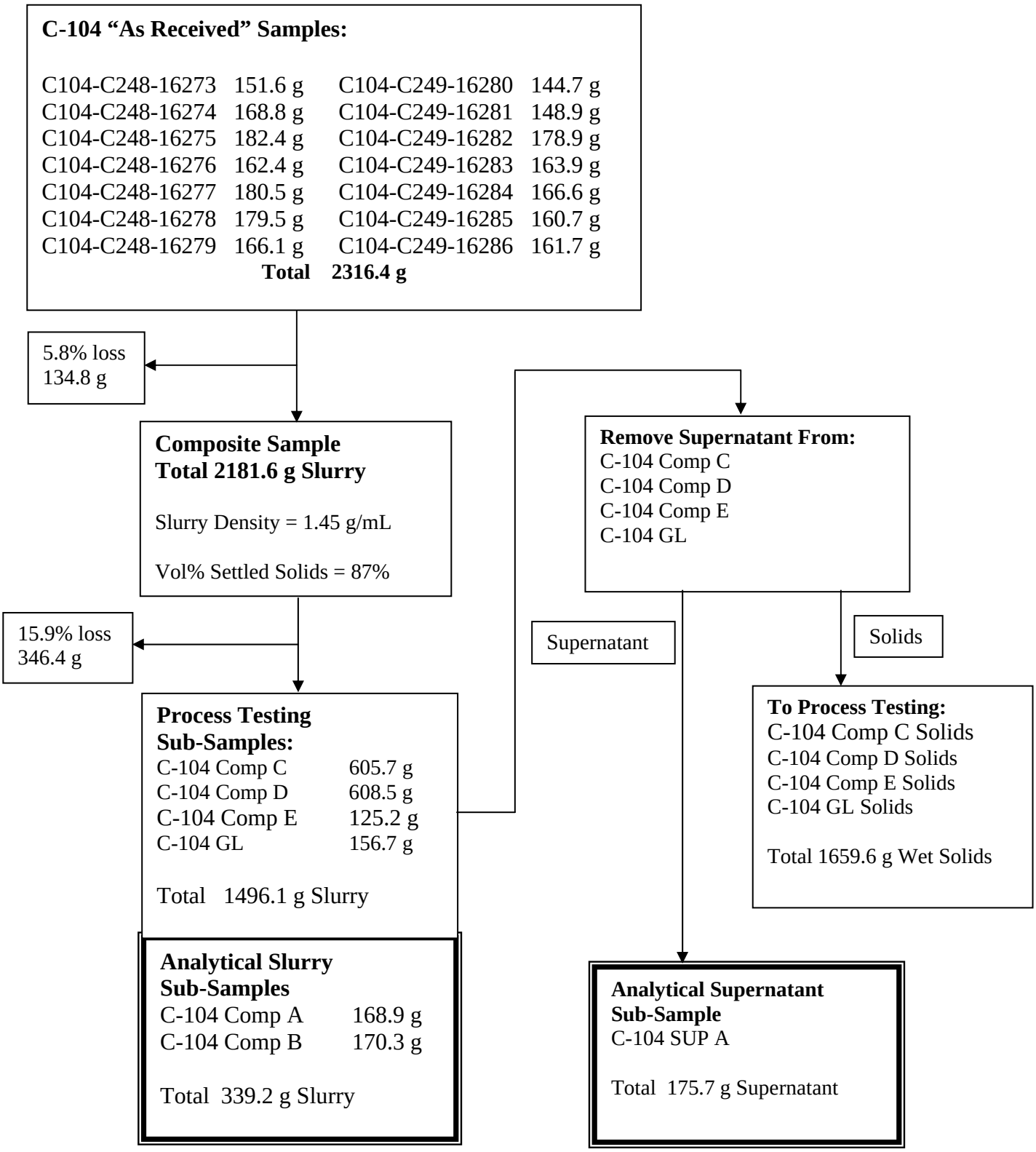


Figure 1.1. Flow Diagram for C-104 As Received Analytical Samples

2.0 Sample Processing

Sample processing instructions were provided to the SAL via special instructions included with Analytical Service Request (ASR) Number 5729 while the total dissolved solids (TDS), weight percent solids, and phase separation instructions were provided via Test Plan BNFL-TP-29953-080, Rev. 1 (Appendix B). For all organic analyses, the sample, sample duplicate, matrix spikes (MS), and matrix spike duplicates (MSD) for the supernatants and wet centrifuged solids sub-sampling was performed prior to inorganic and radiochemical sub-sampling as a precaution -to minimize loss of volatile organic compounds.

2.1 Total Dissolved Solids and Weight Percent Solids

Duplicate aliquots (approximately 3 g each) were withdrawn from C-104 Comp A for determination of centrifuged weight percent solids (wt% solids) of the composite slurry, TDS of the supernatant, and wt% solids (dry) of the centrifuged solids phase. The aliquots were withdrawn from the C-104 Comp A jar while the contents were mechanically stirred providing homogeneous sub-samples. The aliquots were placed in volume-graduated centrifuge tubes and centrifuged at 1100 rpm for about one hour. Following centrifuging, the volume percent solids and wt% solids (wet) were determined on the slurry. Following phase separation by decanting, the wt% solids (dry) of the centrifuged solids fraction and the TDS of the supernatant fraction were determined. Table 2.1 provides the results for the TDS and percent solids.

Table 2.1. Slurry Vol% and Wt% Solids, TDS, and Centrifuged Solids Wt% Solids

	Slurry		Supernatant	Centrifuged Solids
Sample ID	Volume % Centrifuged Solids (Wet)	Weight % Centrifuged Solids (Wet)	TDS (%)	Weight % Solids (Dry)
C-104 Comp A	63	81.0	16.7	58.8
C-104 Comp A Dup	60	83.0	16.8	59.4

Based on the Slurry wt% wet centrifuged solids and the Centrifuged Solids wt% dry solids, the Slurry wt% solids (dry) averages 51.5%.

2.2 Phase Separation

The contents of C-104 Comp A and C-104 Comp B were separated into solids and supernatant phases so that organic analyses could be performed on each phase (i.e., supernatant and wet solids). The phase separation was performed by centrifuging and decanting the supernatant. Each sample was centrifuged in its original jar at 1100 rpm for one hour, and the supernatant decanted and combined with C-104 SUP A. Following phase separation, the RPL Number 00-01360 was used to identify the supernatant sample and 00-01361 was used to identify the centrifuged solids sample.

2.3 Supernatant Density Measurements

Due to the viscous nature of the as received supernatant, most supernatant samples were processed by weight (i.e., most analytical sub-samples were aliquotted by weight instead of by volume). The density of the supernatant was determined by weighing 5-mL aliquots delivered from a calibrated 5-mL pipette. The delivery volume of the pipette was determined by five replicate measurement of water corrected for the SAL ambient temperature. The resulting average density was used to convert supernatant results from a per mass to a per volume basis, when necessary. Table 2.2 provides the density results obtained on the C-104 supernatant following phase separation.

Table 2.2. Density Results for C-104 Supernatant Composite

RPL Number	Sample ID	Density (g/mL)	Average Density (g/mL)
00-01360	Supernatant	1.163	1.161
	Supernatant Duplicate	1.160	
	Supernatant Triplicate	1.160	

2.4 Organic Extractions and Sub-sampling

Complete details of organic extractions and sub-sampling for organic analysis may be found in Test Plan BNFL-29953-080, Rev. 1 (Appendix B).

3.0 Volatile Organic Analysis (VOA)

3.1 Introduction

Volatile organic analyses were performed on both the supernatant and wet centrifuged solids from samples of C-104 following phase separation. The VOA samples were aliquotted, prepared for analysis and removed from the SAL hot cells prior to introducing any organic solvents (e.g., methylene chloride) into the area.

The samples, both supernatants and wet centrifuged solids, were diluted with organic-free water to a final volume of approximately 5 mL in disposable dual septa-sealed purge vessels. The volatiles were purged from the samples with helium onto a multi-bed absorbent trap using a commercial purge and trap sample concentrator and auto-sampler. The trapped volatiles were then thermally desorbed onto a 75-meter by 0.45-millimeter DB-624 column (2.55-micron film) that was directly interfaced to the mass spectrometer. The samples were analyzed using VOA method PNL-ALO-335 (per SW-846 8260B protocols).

3.2 Sample Preparation

Supernatant and solids from C-104 were prepared in the SAL by accurately weighing an aliquot of sample into pre-cleaned, 40-mL purge vessels and adding sufficient blank water diluent to achieve a final volume of 5 mL. Sample, duplicate, MS, MSD, and blank samples were prepared in this manner in the SAL. Following transfer under CoC from the SAL to the analytical laboratories, all samples were refrigerated to ensure that sample integrity was maintained. Internal standards and surrogate compounds were added to each sample (including the MS and MSD) and target spike compounds are added to the MS and MSD. Once the spikes and standards were added, the samples were loaded into the VOA auto-sampler for purging.

3.3 Instrumentation

The analytical instrumentation used for VOA assays consisted of an auto-sampler, purge and trap system, and gas chromatograph mass spectrometer system. Detailed description of the VOA system is provided in Table 3.1.

Table 3.1. VOA Instrumentation

System/Instrument	Manufacturer	Model Number	M&TE[(1)] Number
Auto-sampler	Dynatech	PTA-30	WD25729
Purge & Trap	OI	4560	WD25728
GC/MS	Hewlett Packard	5890II/5989A	WC22547/WC28119

(1) Measuring and Test Equipment

3.4 Analysis Results

The VOA target (calibrated analytes) results for C-104 supernatant and solids phases are given in Table 3.2. Additionally, the results for any VOA tentatively identified compounds (TIC) that were detected for both supernatant and solids phases are given in Table 3.3. For both target compounds and TICs, the results are given in units of μg/L for the supernatant and μg/Kg for the wet solid phase.

The MDLs provided are based upon instrument detection limits and the weight or volume of the sample used for the analysis. The MDLs are nominal, and are not based upon performance of the method on these specific sample matrices. In nearly all cases the MDLs for the wet centrifuged solids and the supernatants (after adjusting for density) meet the BNFL VOA minimum reportable quantity (MRQ) requirements as detailed in Table 3.4.

3.4.1 Results for Calibrated/Regulatory Analytes of Interest

Supernatant:
As seen in Table 3.2, target compounds detected in the C-104 supernatant were primarily limited to alkanes ranging from hexane to nonane. In addition, butanone and the ketone counterparts to hexane and heptane were also detected but at levels below the quantitation limit. Acetone and methylene chloride were found above the quantitation limits. Hexane, acetone, and methylene chloride were detected in the hot cell storage blank, but at least two orders of magnitude lower than was found in the sample. A septa on the vial containing the duplicate supernatant sample was found to be leaking. The analytical results for the supernatant duplicate sample did not detect any analytes, an outcome reflecting the compromised sample containment. Comparison of the supernatant sample data and its duplicate is thus meaningless. An attempt to reanalyze new sample aliquots is discussed later in this section.

A number of tentatively identified compounds were also detected as seen in Table 3.3. These were the heavier alkanes through tridecane and the corresponding alkenes that were not target compounds. The primary components of normal paraffin hydrocarbons (NPH), undecane, dodecane, and tridecane, commonly used at the Hanford site, were the most abundant compounds. The quantity of NPH was greater in the supernatant sample than in the solids. This indicates that the slurry was saturated with these organics otherwise their solubilities would dictate their precipitation onto the surfaces of the solid phase. There may have been an undetected separable organic layer, or micelles containing these organics, which may explain the difference between the supernatant and solid results, however, if present, it was not visible during inspection of the sample in the hot cell.

Solids:
The C-104 solid samples contained a greater variety and generally larger amount of target analytes compared to the supernatant samples. A greater range of alkanes was also detected in the solids, ranging from butane through nonane. Since the samples were obtained and stored at ambient temperatures, the presence of butane in these samples indicated that volatile compounds were likely to have been continuously generated. Acrylonitrile, propionaldehyde, and methylene chloride were found above the quantitation limits. Acrylonitrile was found above the quantitation limit in the sample duplicate, but was not detected in the sample.

Like in the supernatant samples, ketone counterparts to each of the alkanes were detected, but were found at levels below the quantitation limits. Other compounds that were detected but that were below the quantitation limit include benzene and ethyl benzene, propyl nitrate, and acetone.

A greater variety of tentatively identified compounds were found in the solid samples than in the supernatant. This result further supports the premise that continuous generation of volatile constituents was occurring in the solid material. By virtue of partitioning, these constituents would

otherwise be located preferentially where the greater quantity of organic material was present, which was determined to be in the supernatant. That may also indicate that some of the volatile constituents had been lost from the supernatant material during handling, although the relatively low volatility of NPH should be expected to act as a chemical trap or "keeper solvent."

The absence or lower concentration level of the more volatile compounds in the supernatant could also be an artifact. This could occur because of the static nature of containment and continuous production of volatile constituents in the solid samples.

Sample aliquots were obtained one week later to provide sample duplicate and spike duplicate information lost in the first analysis set. When compared to the first data set, the results indicated that major losses of volatile constituents had occurred. Therefore, the second data set is not provided in this report. However, the dissimilarity in the results indicated that the majority of difference between the supernatant and solid phases is likely due to losses rather than artificial elevation.

Table 3.2. C-104 VOA Results – BNFL & SW846 8260B Target Analyte List

CAS #		Tank Material	C-104 Supernatant			C-104 Wet Centrifuged Solids			Max. µg/Kg [1] of Slurry	LCS Rec.
		Sample ID	00-1360 HC Blank	00-1360 Sample	00-1360d Duplicate	001361 HC	00-1361 Sample	00-1361d Duplicate		
		Units	µg/L	µg/L	µg/L	µg/Kg	µg/Kg	µg/Kg		
		MDL [2]	10	1000	1000	50	400	750	36	
BNFL Target Analyte List										
100-41-4	Ethylbenzene		U	U	U	U	26 J	40 J	0.5	100%
100-42-5	Styrene		U	U	U	U	U	U	U	108%
10061-01-	cis-1,3-Dichloropropene		U	U	U	U	U	U	U	88%
10061-02-	trans-1,3-Dichloropropene		U	U	U	U	U	U	U	88%
106-35-4	3-Heptanone		U	74 J	U	U	420	800	10	112%
106-42-3	Xylene (m & p)		U	U	U	U	U	U	1	104%
106-46-7	1,4-Dichlorobenzene		U	U	U	U	U	U	U	96%
106-93-4	1,2-Dibromoethane		U	U	U	U	U	U	U	84%
106-97-8	Butane		U	U	U	U	2100	3000	149	80%
106-99-0	1,3-Butadiene		U	U	U	U	U	U	U	84%
107-02-8	Acrolein		U	U	U	U	U	U	U	88%
107-05-1	3-Chloropropene		U	U	U	U	U	U	U	96%
107-06-2	1,2-Dichloroethane		U	U	U	U	U	U	U	96%
107-13-1	Acrylonitrile		U	U	U	U	U	990	U	84%
107-87-9	2-Pentanone		U	U	U	U	40 J	99 J	U	88%
108-10-1	4-Methyl-2-pentanone		U	U	U	U	U	U	2	92%
108-87-2	Methylcyclohexane		U	U	U	U	U	U	2	92%
108-88-3	Toluene		U	U	U	U	U	U	U	92%
108-90-7	Chlorobenzene		U	U	U	U	U	U	U	88%
109-66-0	Pentane		U	U	U	U	5600	7400	24	80%
109-99-9	Tetrahydrofuran		U	U	U	U	U	U	108	84%
110-12-3	5-Methyl-2-hexanone		U	U	U	U	U	U	U	88%
110-43-0	2-Heptanone		U	97 J	U	U	400 J	810	10	96%
110-54-3	Hexane		11	5000 B	U	U	7000	9200	32	84%
110-82-7	Cyclohexane		U	U	U	U	U	U	U	104%
110-83-8	Cyclohexene		U	U	U	U	U	U	U	84%
111-65-9	Octane		U	3800	U	U	3400	4600	32	84%
111-84-2	Nonane		U	6200	U	U	2900	4500	41	92%
123-19-3	4-Heptanone		U	U	U	U	52 J	100 J	1	96%
123-38-6	Propionaldehyde		U	U	U	U	880	1100	U	72%
123-86-4	Butylacetate		U	U	U	U	U	U	U	100%
123-91-1	1,4-Dioxane		U	U	U	U	U	U	117	100%
126-98-7	2-Methyl-2-propenenitrile		U	U	U	U	U	U	U	96%
127-18-4	Tetrachloroethene		U	U	U	U	U	U	U	88%
141-78-6	Ethyl acetate		U	U	U	U	U	U	U	88%
142-82-5	Heptane		U	1900	U	U	5200	6300	34	84%
287-92-3	Cyclopentane		U	U	U	U	U	U	U	88%
170-30-3	2-Butenal		U	U	U	U	U	U	2	100%
541-73-1	1,3-Dichlorobenzene		U	U	U	U	U	U	U	96%
56-23-5	Carbon Tetrachloride		U	U	U	U	U	U	U	84%
563-80-4	3-Methyl-2-butanone		U	U	U	U	U	U	6	80%

CAS #		Tank Material	C-104 Supernatant			C-104 Wet Centrifuged Solids			Max. µg/Kg [1] of Slurry	LCS Rec.
		Sample ID	00-1360 HC Blank	00-1360 Sample	00-1360d Duplicate	001361 HC	00-1361 Sample	00-1361d Duplicate		
		Units	µg/L	µg/L	µg/L	µg/Kg	µg/Kg	µg/Kg		
		MDL [2]	10	1000	1000	50	400	750	36	
591-78-6	2-Hexanone		U	24 J	U	U	130 J	270 J	6	92%
627-13-4	Propyl nitrate		U	U	U	U	30 J	40 J	U	96%
67-64-1	Acetone		1.8 J	1000 B	U	5.5 J	190 JB	430 JB	304	76%
67-66-3	Chloroform		U	U	U	U	U	U	U	88%
71-43-2	Benzene		U	U	U	U	25 J	60 J	2	88%
71-55-6	1,1,1-Trichloroethane		U	U	U	U	U	U	U	84%
74-83-9	Bromomethane		U	U	U	U	U	U	U	96%
74-87-3	Chloromethane		U	U	U	U	U	U	U	84%
75-00-3	Chloroethane		U	U	U	U	U	U	U	92%
75-01-4	Vinyl Chloride		U	U	U	U	U	U	U	80%
75-05-8	Acetonitrile		U	U	U	U	U	U	7	88%
75-09-2	Methylene Chloride		19	8000 B	U	4.3 J	880 B	1900 B	U	84%
75-15-0	Carbon Disulfide		U	U	U	U	U	U	U	84%
75-34-3	1,1-Dichloroethane		U	U	U	U	U	U	U	88%
75-35-4	1,1-Dichloroethene		U	U	U	U	U	U	U	88%
75-43-4	Dichlorofluoromethane		U	U	U	U	U	U	U	104%
75-45-6	Chlorodifluoromethane		U	U	U	U	U	U	4	76%
75-69-4	Trichlorofluoromethane		U	U	U	U	U	U	U	76%
75-71-8	Dichlorodifluoromethane		U	U	U	U	U	U	U	76%
76-13-1	1,2,2-Trichloro-1,1,2-		U	U	U	U	U	U	U	88%
76-14-2	1,2-Dichloro-1,1,2,2-		U	U	U	U	U	U	U	80%
78-87-5	1,2-Dichloropropane		U	U	U	U	U	U	U	100%
78-93-3	2-Butanone		U	290 J	U	U	52 J	320 J	57	88%
79-00-5	1,1,2-Trichloroethane		U	U	U	U	U	U	U	88%
79-01-6	Trichloroethene		U	U	U	U	U	U	U	88%
79-34-5	1,1,2,2-Tetrachloroethane		U	U	U	U	U	U	U	92%
95-47-6	Xylene (o)		U	U	U	U	U	U	0.3	104%
95-50-1	1,2-Dichlorobenzene		U	U	U	U	U	U	U	92%
96-22-0	3-Pentanone		U	U	U	U	U	U	U	92%
SW-846 8260B Target Analyte List										
103-65-1	Propylbenzene		U	U	U	U	U	U	U	96%
104-51-8	Butylbenzene		U	U	U	U	U	U	U	84%
106-43-4	4-Chlorotoluene		U	U	U	U	U	U	U	108%
108-67-8	1,2,3-Trimethylbenzene		U	U	U	U	U	U	U	84%
108-86-1	Bromobenzene		U	U	U	U	U	U	U	92%
110-57-6	trans-1,4-Dichloro-2-butene		U	U	U	U	U	U	U	96%
120-82-1	1,2,4-Trichlorobenzene		U	U	U	U	U	U	U	92%
124-48-1	Dibromochloromethane		U	U	U	U	U	U	U	88%
135-98-8	sec-Butylbenzene		U	U	U	U	U	U	U	92%
142-28-9	1,3-Dichloropropane		U	U	U	U	U	U	U	88%
156-59-2	cis-1,2-Dichloroethene		U	U	U	U	U	U	U	88%

CAS #	Tank Material	C-104 Supernatant			C-104 Wet Centrifuged Solids			Max. µg/Kg [1] of Slurry	LCS Rec.
	Sample ID	00-1360 HC Blank	00-1360 Sample	00-1360d Duplicate	001361 HC	00-1361 Sample	00-1361d Duplicate		
	Units	µg/L	µg/L	µg/L	µg/Kg	µg/Kg	µg/Kg		
	MDL [2]	10	1000	1000	50	400	750	36	
156-60-5	trans-1,2-Dichloroethene	U	U	U	U	U	U	U	88%
563-58-6	1,1-Dichloropropene	U	U	U	U	U	U	U	84%
594-20-7	2,2-Dichloropropane	U	U	U	U	U	U	U	88%
74-95-3	Dibromomethane	U	U	U	U	U	U	U	88%
74-97-5	Bromochloromethane	U	U	U	U	U	U	U	84%
75-25-2	Bromoform	U	U	U	U	U	U	U	88%
75-27-4	Bromodichloromethane	U	U	U	U	U	U	U	88%
87-61-6	1,2,3-Trichlorobenzene	U	U	U	U	U	U	U	96%
87-68-3	Hexachloro-1,3-butadiene	U	U	U	U	U	U	U	96%
91-20-3	Naphthalene	U	U	U	U	U	U	U	96%
95-49-8	2-Chlorotoluene	U	U	U	U	U	U	U	100%
95-63-6	1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	88%
96-12-8	1,2-Dibromo-3-chloropropane	U	U	U	U	U	U	U	84%
96-18-4	1,2,3-Trichloropropane	U	U	U	U	U	U	U	104%
98-06-6	tert-Butylbenzene	U	U	U	U	U	U	U	100%
98-82-8	Isopropylbenzene	U	U	U	U	U	U	U	92%
99-87-6	4-Isopropyltoluene	U	U	U	U	U	U	U	88%

[1] Maximum slurry µg/Kg calculated using results of Tables 2.1 (weight fractions) and 2.2 (supernatant density)—See Section 1.0

[2] MDL = Method detection limit based on instrument detection limit and sample quantity

U flag = Compound not detected; Compound concentration less than the MDL

J flag = Compound detected, but concentration is less than the MDL

B flag = Compound was present in the method blank

Table 3.3. C-104 VOA Tentatively Identified Compounds

C-104 Supernatant 00-1360			Sample	Duplicate	Blank
CAS #	**TIC**	**Ret. Time (Min.)**	**µg/L**	**µg/L**	**µg/L**
124-38-9	Carbon dioxide	3.08	--	--	78 J
19689-18-0	4-Decene	19.51	5300 J	--	--
124-18-5	Decane	19.63	42000 J	--	--
1120-21-4	Undecane	21.90	93000 J	--	--
	Unknown Siloxane	22.58	--	--	23 J
7206-17-9	6-Dodecene, (E)-	23.75	8300 J	--	--
112-40-3	Dodecane	23.88	49000 J	--	--
820-29-1	5-Decanone	24.20	12000 J	--	--
928-80-3	3-Decanone	24.50	4800 J	--	--
693-54-9	2-Decanone	24.68	5100 J	--	--
629-50-5	Tridecane	25.73	3800 J	--	--
	Unknown Siloxane	25.96	--	--	3.1 J
50639-02-6	5-Undecanone, 2-methyl-	26.11	9200 J	--	--
C-104 Wet Centrifuged Solids 00-1361			**Sample**	**Duplicate**	**Blank**
CAS #	**TIC**	**Ret. Time (Min.)**	**µg/Kg**	**µg/Kg**	**µg/Kg**
592-76-7	1-Heptene	11.53	3200 J	5400 J	--
111-66-0	1-Octene	14.50	3300 J	4600 J	--
124-11-8	1-Nonene	17.17	2100 J	2900 J	--
	Unknown Siloxane	19.16	--	--	61 J
19689-18-0	4-Decene	19.61	1800 J	3100 J	--
124-18-5	Decane	19.71	13000 J	26000 J	--
111-13-7	2-Octanone	20.54	1200 J	--	--
764-96-5	5-Undecene, (Z)-	21.82	2800 J	6200 J	--
1120-21-4	Undecane	21.97	24000 J	50000 J	--
764-97-6	5-Undecene, (E)-	22.06	1600 J	--	--
19549-83-8	3-Heptanone, 2,6-dimethyl-	22.27	1900 J	--	--
	Unknown Siloxane	22.58	--	3000 J	34 J
821-55-6	2-Nonanone	22.75	2600 J	3800 J	--
124-12-9	Octanenitrile	23.09	1500 J	2200 J	--
2030-84-4	4-Dodecene	23.86	2900 J	6700 J	--
112-40-3	Dodecane	24.00	21000 J	43000 J	--
624-16-8	4-Decanone	24.31	6300 J	10000 J	--
928-80-3	3-Decanone	24.61	2700 J	4400 J	--
693-54-9	2-Decanone	24.79	3000 J	5000 J	--
2243-27-8	Nonanenitrile	25.17	1400 J	2100 J	--
629-50-5	Tridecane	25.86	1900 J	4500 J	--
33083-83-9	5-Undecanone	26.24	4400 J	9300 J	--

"-----" = Compound not detected

J Flag = Estimated quantity. TIC compounds estimated using the response factor from the closest eluting internal standard.

Table 3.4. Target VOA Minimum Reportable Quantities

CAS #	VOA Compounds	Solids Target MRQ [(1)] µg/Kg	Supernatant Target MRQ (Density = 1.161) µg/L
141-78-6	Acetic acid ethyl ester	11000	12800
75-05-8	Acetonitrile	12700	14700
107-02-8	Acrolein	-----	-----
107-13-1	Acrylonitrile	28000	32500
3825-26-1	Ammonium perfluorooctanoate	-----	-----
71-43-2	Benzene	3300	3800
74-83-9	Bromomethane	5000	5800
106-99-0	1,3-Butadiene	-----	-----
106-97-8	Butane	-----	-----
78-93-3	2-Butanone	12000	13900
4170-30-3	2-Butenaldehyde (2-Butenal)	-----	-----
71-36-3	n-Butyl alcohol	900	1050
123-86-4	Acetic acid n-butyl ester	-----	-----
75-15-0	Carbon disulfide	-----	-----
56-23-5	Carbon tetrachloride	2000	2320
108-90-7	Chlorobenzene	2000	2320
75-45-6	Chlorodifluoromethane	-----	-----
75-00-3	Chloroethane	-----	-----
75-01-4	1-Chloroethene	2000	2320
67-66-3	Chloroform	2000	2320
74-87-3	Chloromethane	10000	11600
107-05-1	3-Chloropropene	10000	11600
110-82-7	Cyclohexane	-----	-----
108-94-1	Cyclohexanone	-----	-----
110-83-8	Cyclohexene	-----	-----
287-92-3	Cyclopentane	-----	-----
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	-----	-----
75-71-8	Dichlorodifluoromethane	2400	2790
75-34-3	1,1-Dichloroethane	2000	2320
107-06-2	1,2-Dichloroethane	2000	2320
75-35-4	1,1-Dichloroethene	2000	2320
75-43-4	Dichlorofluoromethane	-----	-----
75-09-2	Dichloromethane (methylene chloride)	10000	11600
78-87-5	1,2-Dichloropropane	-----	-----
10061-01-5	Cis-1,3-Dichloropropene	6000	6970
10061-02-6	trans-1,3-Dichloropropene	6000	6970
57-14-7	1,1-Dimethylhydrazine	-----	-----
123-91-1	1,4-Dioxane	-----	-----
64-17-5	Ethyl alcohol	-----	-----
100-41-4	Ethyl benzene	3300	3830
106-93-4	Ethylene dibromide	5000	5810
142-82-5	n-Heptane	-----	-----
110-43-0	2-Heptanone	-----	-----

CAS #	VOA Compounds	Solids Target MRQ [(1)] µg/Kg	Supernatant Target MRQ (Density = 1.161) µg/L
106-35-4	3-Heptanone	-----	-----
123-19-3	4-Heptanone	-----	-----
684-16-2	Hexafluoroacetone	-----	-----
110-54-3	n-Hexane	-----	-----
591-78-6	2-Hexanone	-----	-----
67-56-1	Methyl alcohol (Methanol)	-----	-----
624-83-9	Methyl isocyanate	-----	-----
563-80-4	3-Methyl-2-butanone	-----	-----
110-12-3	5-Methyl-2-hexanone	-----	-----
108-10-1	4-Methyl-2-pentanone	11000	12800
75-65-0	2-Methyl-2-propanol	-----	-----
126-98-7	2-Methyl-2-propenenitrile	28000	32500
108-87-2	Methylcyclohexane	-----	-----
60-34-4	Methylhydrazine	-----	-----
78-92-2	1-Methylpropyl alcohol(2-butanol)	-----	-----
627-13-4	Nitric acid, propyl ester	-----	-----
111-84-2	n-Nonane	-----	-----
111-65-9	n-Octane	-----	-----
75-21-8	Oxirane	-----	-----
109-66-0	n-Pentane	-----	-----
107-87-9	2-Pentanone	-----	-----
96-22-0	3-Pentanone	-----	-----
67-64-1	2-Propanone (Acetone)	53300	61900
123-38-6	n-Propionaldehyde	-----	-----
107-12-0	Propionitrile	120000	139300
71-23-8	n-Propyl alcohol (1-propanol)	-----	-----
67-63-0	2-Propyl alcohol (Isopropanol; Propan-2-ol)	-----	-----
100-42-5	Styrene	-----	-----
79-34-5	1,1,2,2-Tetrachloroethane	2000	2320
127-18-4	1,1,2,2-Tetrachloroethene	2000	2320
109-99-9	Tetrahydrofuran	-----	-----
108-88-3	Toluene	3300	3830
76-13-1	1,2,2-Trichloro-1,1,2-trifluoroethane	10000	11600
71-55-6	1,1,1-Trichloroethane	2000	2900
79-00-5	1,1,2-Trichloroethane	2000	2320
79-01-6	1,1,2-Trichloroethylene	2000	2320
75-69-4	Trichlorofluoromethane	10000	11600
108-38-3	m-Xylene	3300	3830
95-47-6	o-Xylene	3300	3830
106-42-3	p-Xylene	3300	3830

[(1)] MRQ = Minimum Reportable Quantity. Values provided by BNFL.
"-----" = No MRQ target provided.

3.4.2 QC Evaluation

Instrument tuning check criteria and 12-hour calibration clock window criteria were met for all initial calibration and sample analysis sequences as seen in the "5A" Forms in the Appendix C. The initial calibration met the criteria of USEPA SW-846 method 8260B, as seen in the "6A" Form in the Appendix C. All five-system performance check compounds (SPCC) met the criteria for minimum response factor, and all six calibration check compounds (CCC) met the maximum relative standard deviation (RSD) criteria.

The continuing calibration check standard met the criteria of USEPA SW-846 method 8260B, as seen in the "7A" Forms in the Appendix C. All calibration check standards met the SPCC and CCC criteria. Only Acrolein at 16.7% exceeded the recommended percent difference (%D) of 15%.

The internal standards used in this study were 1,4-difluorobenzene, pentafluorbenzene, chorobenzene-d_5, and 1,4-dichorobenzene-d_4. The surrogate compounds used were toluene-d_8, bromofluorobenzene, dibromofluoromethane, and 1,2-dichloroethane-d_4. These eight compounds were added to each sample, duplicate, MS, MSD, and blank sample analyzed.

To evaluate surrogate recoveries, Contract Laboratory Program (CLP) limits for low-level soil samples were used only as a guide and are included on the "2A & 2B" Forms in Appendix C. Only the supernatant duplicate sample failed to meet the limits due to a leaking vial. Attempts to reanalyze sample aliquots obtained one week later found noticeably lower concentrations of most analytes. Therefore, reanalysis data is not presented.

The CLP criterion for internal standard response was used (±50% of the calibration check standard response). Internal standard response met the criteria for all but two of the samples, which was due to leaking vials. Both the supernatant duplicate and the supernatant matrix spike duplicate failed. The internal standard data are summarized on the each of the CLP-type "8A" Forms in the Appendix C.

Matrix spiking was performed by adding the methanolic calibration solution to the samples at a level of 250 ng per compound. As described previously, no spike duplicate data is available for the supernatant due to a leaking sample container. In general, when compounds were found in the unspiked supernatant or solid, their recoveries in the spiked samples were erratic. This is likely caused by the small sample size used which was ~0.055-0.139 grams. The small sample sizes were necessary because of the relatively high levels of NPH present. Sample aliquots of one gram or less often exhibit poor reproducibility.

Ethyl acetate and butyl acetate appear to be reacting with both matrices types. Except for the solid duplicate, 2-butenal exhibited no recovery also. The difference in recovery between the solid sample and its duplicate for 2-butenal is not understood.

Propionitrile coeluted with Cyclohexene on the DB-624 column used for this analysis and was not calibrated because the only abundant mass, m/z = 54) was common to Cyclohexene. Likewise, Cyclohexanone coeluted with methylcyclohexane and no abundant and unique masses permitted calibration of Cyclohexane using the DB-624 column.

4.0 Semi-Volatile Organic Analysis (SVOA)

4.1 Semi-Volatile Organic Analysis (SVOA)

4.1.1 Introduction

Semi-volatile organic analyses were performed on both the supernatant and wet centrifuged solids from tank C-104 samples following phase separation. Supernatants and wet centrifuged solids were extracted with methylene chloride as per Test Plan BNFL-29953-80, Revision 1. The extracted samples were reduced in volume using a Kuderna-Danish concentrator. Following volume reduction, an aliquot was prepared and analyzed for semi-volatiles by method PNL-ALO-345.

The SVOA samples were extracted at the initial starting pH of the samples and then adjusted and re-extracted for those compounds (e.g. phenols) that are not extracted at high pH. This extraction approach is fully detailed in TP BNFL-29953-80 Revision 1. The approach calls for dissolving the solids, if possible, and extracting the solution by the conventional liquid-liquid extraction procedure. However, during processing of the solids phases it was determined that a high fraction of the solids were insoluble following dilution with 0.01 N NaOH solution. Therefore, the aqueous dissolution step detailed in the Test Plan was eliminated and the solids were subjected directly to an ultra-sonication extraction using a methylene chloride combined with a desiccant.

4.1.2 Sample Preparation

Prior to performing the extraction process for the SVOA, the aliquots of the supernatants and the wet centrifuged solids (mixed with deionized water) were titrated with phosphoric acid. The resulting titration curves were used to establish the quantity of phosphoric acid required to adjust the extracting pH to level defined by the procedure (approximately 6.5).

4.1.3 Supernatants

For each supernatant sample of C-104 extracted, a known quantity (10 to 20 g) of sample was transferred into a Teflon separatory funnel. Appropriate spikes, internal standards, and surrogates were added to the samples prior to subjecting the samples to the extraction process. Each supernatant sample was extracted with three 25-mL portions of methylene chloride by subjecting the separatory funnel to mechanical shaking. Following this initial extraction, the supernatant was chilled in ice and stirred while the pH was adjusted with a predetermined quantity of phosphoric acid. Samples of C-104 formed significant precipitates that were separated from the supernatant by centrifuging and decanting. The extraction process was repeated on the pH-adjusted supernatant. The precipitates formed following acid addition were extracted (by ultrasonication) using three 25-mL portions of methylene chloride. All extracts from the supernatant sample were combined and passed through a column containing an anhydrous sodium sulfate desiccant to complete the supernatant extraction process.

4.1.4 Solids

For each of the wet centrifuged solids samples extracted, a known quantity (2.5 to 5 g) of sample was transferred to a small Teflon bottle and anhydrous sodium sulfate (pre-dried in a muffle furnace) desiccant was added. Appropriate spikes, internal standards, and surrogates were added to the samples prior to subjecting the samples to the ultra-sonication extraction process. Each sample was

ultra-sonicated with three 25-mL portions of methylene chloride. Following this initial extraction, the pH of the solids was adjusted with a predetermined quantity of phosphoric acid and the ultra-sonication extraction process repeated. All extracts from the solids sample were combined and passed through a column containing an anhydrous sodium sulfate desiccant to complete the solids extraction process.

4.1.5 Extract Volume Reduction

Once the extraction processes were completed in the SAL, the supernatant extracts and the wet centrifuged solids extracts were transferred under CoC from the SAL to the analytical laboratories and refrigerated prior to subsequent volume reduction processing. During the volume reduction processing, each extract was reduced in volume to 1 mL for each of the supernatant samples and 10 mLs for each of the solids. The solid extracts had exhibited foaming during the concentration step and were not concentrated further for that reason. The SVOA concentrated extracts were refrigerated until analysis was performed.

4.1.6 Instrumentation

The analytical instrumentation used for SVOA consists of an autosampler-injector and gas chromatograph mass spectrometer system. Detailed description of the SVOA system is provided in Table 4.1.

Table 4.1. SVOA Instrumentation

System/Instrument	Manufacturer	Model Number	M&TE[(1)] Number
Autosampler	Hewlett Packard	7673A	N/A
GC/MS	Hewlett Packard	5890II/5972	WB47238/WD25623

[(1)] Measuring and Test Equipment

4.1.7 Analysis Results

The SVOA target (calibrated analytes) results for C-104 supernatant and solids phases are given in Table 4.2. Additionally, the results for any SVOA TICs that were detected for both C-104 supernatant and solids phases are given in Tables 4.3 and 4.4. For both target compounds and TICs, the results are given in units of μg/L for the supernatant and μg/Kg for the wet solid phase.

The MDLs provided are based upon instrument detection limits that are achievable in reagent water and the weight or volume of the sample used for the analysis. The MDLs are nominal, and are not based upon performance of the method on these specific sample matrices. Minimum reported quantities specified by BNFL for a limited number of SVOA compounds are listed in Table 4.5.

4.1.8 Results for Calibrated/Regulatory Analytes of Interest

C-104 Supernatant Results

As detailed in the QC section, relatively few unspiked target compounds were detected in the C-104 supernatant. Only N-nitrosodimethylamine was found at levels greater than the MDL. Bis(2-ethylhexyl)phthalate, 2-methylpyridine, 4-nitrophenol and 4,6-dinitrophenol were detected at levels below the quantitation limit.

The TIC results contained two siloxane compounds, hexamethyl-cyclotetrasiloxane and decamethyl-cyclotetrasiloxane were found in the samples and blank, and were likely leached from the Teflon-lined, silcone rubber septum used in the I-Chem bottles that held the sample extracts prior to removal from the SAL.

Several straight chain alkanes were detected that include decane, undecane, dodecane, tridecane, tetradecane and pentadecane (components of NPH, a diluent used in the PUREX and B-Plant solvent extraction processes). A number of organic acids such as pentanoic acid, hexanoic acid, heptanoic acid, 2-ethyl hexanoic acid, octanoic acid, valproic acid, nonanoic acid, decanoic acid, undecanoic acid and dodecanoic acid were found in the C-104 supernatant. These organic acids are likely oxidation products of the alkanes in the tank waste and were generally found in higher concentrations than the alkanes in the supernatant, likely due to their greater solubility. Hexanenitrile and methylene propanedinitrile were detected. The compound 2-methoxy-2methyl butane was found in the blank and samples at similar levels. It is possible that it is an oxidation product of a free-radical scavenger, amylene, used in the residue-analysis grade methylene chloride or a reaction product of the acetone used in the spiking solution. Several alcohols, ketones, and esters such as 2,2-dimethyl-3-pentanone, 2-decanone and butyl nonanoate were identified in the samples. These compounds are likely oxidation products of the alkanes in the tank waste.

Nitric acid, propyl ester was identified in supernatant, and is likely to be the result of a reaction of the nitrous acid formed from the nitrite in the tank waste after the pH adjustment. Several nitrated phenolic compounds such as 2-fluoro-6-nitrophenol, 4-methyl-2-nitrophenol, 3-fluoro-4-nitrophenol, 3-methyl-4-nitrophenol, and 2-methyl-3,5-dinitrophenol were detected in the supernatant. These compounds are likely reaction products of the spiked phenolic compounds.

C-104 Solids Results

As detailed in the QC section, only one unspiked target compound was detected in the C-104 wet centrifuged solids, bis(2-ethylhexyl)phthalate, a common plasticizer, was detected at levels below the method quantitation limit. Tributyl phosphate was detected in the C-104 solids at levels well above the quantitation limit.

The compound 1,1,2-trichloroethane is reported in the TIC results for the blank, and is likely to be a reaction product or trace contaminant of the methylene chloride extraction solvent. The TIC results contained two siloxane compounds, octamethyl-cyclotetrasiloxane (samples) and decamethyl-cyclotetrasiloxane (blank), and were likely leached from the Teflon lined, silcone rubber septum used in the I-Chem bottles that held the sample extracts prior to removal from the SAL.

Several straight chain alkanes were detected that included decane, undecane, dodecane, tridecane, and tetradecane (components of NPH, a diluent used in the PUREX and B-Plant solvent extraction processes). These alkanes were detected in the C-104 solids at concentrations several hundred times higher than those found in the C-104 supernatant samples. A series of ketone compounds such as various undecanone, dodecanone and tridecanone compounds were detected in the C-104 solid samples. These compounds are presumed to be oxidation products of the straight chain alkanes.

A number of potentially artifact compounds such as alcohols, enols and aldol condensation products were reported in the data for the blank; these are likely to be aldol condensation products of the acetone used in the spiking solutions.

Table 4.2. C-104 SVOA Results – Project & SW846 8270C Target Analyte List

	Tank ID:	C-104 Supernatant			C-104 Wet Centrifuged Solids				Max
	RPL ID:	00-1360bl Proc Blk µg/L	00-1360 Sample µg/L	99-1360d Duplicate µg/L	00-1361bl Proc Blk µg/Kg	00-1361 Sample µg/Kg	00-1361d Duplicate µg/Kg	LCS Rec.	Slurry Conc.[1] µg/Kg
	MDL:[2]	560	560	560	2000	19000	20000		15700
Project Target Analyte List									
100-00-5	1-Chloro-4-nitrobenzene[3]	2600	2100 B	1900 B	6300	2800 BJ	2900 BJ	130%	15700
100-25-4	1,4-Dinitrobenzene[3]	1600	1500 B	1500 B	4400	2300 BJ	1500 BJ	110%	15700
100-51-6	Benzyl alcohol	U	U	U	U	U	U	--	15700
106-44-5	4-Methylphenol[3]	2900	U	U	6800	U	6100 BJ	85%	15700
106-46-7	1,4-Dichlorobenzene	U	U	U	U	U	U	61%	15700
108-95-2	Phenol	U	U	U	U	U	U	25%	15700
110-86-1	Pyridine[3]	2400	2300 B	3100 B	8200	6500 BJ	U	110%	15700
117-81-7	Bis(2-Ethylhexyl)phthalate	U	480 J	96 J	U	5900 J	U	--	15700
117-84-0	Di-n-octylphthalate	U	U	U	U	U	U	--	15700
118-74-1	Hexachlorobenzene	U	U	U	U	U	U	--	15700
120-82-1	1,2,4-Trichlorobenzene	U	U	U	U	U	U	66%	15700
122-39-4	N,N-Diphenylamine	U	U	U	U	U	U	0%	15700
126-73-8	Tributyl phosphate[3]	2500	2100 B	2000 B	5500	57000 B	50000 B	110%	15700
128-37-0	Butylated Hydroxytoluene[3]	1500	130 BJ	92 BJ	170 J	670 BJ	790 BJ	--	15700
2234-13-1	Octachloronaphthalene[3,4]	45000	38000 B	36000 B	250000	65000 B	51000 B	5500%	15700
309-00-2	Aldrin	U	U	U	U	U	U	--	15700
319-84-6	alpha-BHC	U	U	U	U	U	U	--	15700
319-85-7	beta-BHC	U	U	U	U	U	U	--	15700
465-73-6	Isodrin	U	U	U	U	U	U	--	15700
50-29-3	4,4'-DDT	U	U	U	U	U	U	--	15700
50-32-8	Benzo(a)pyrene	U	U	U	U	U	U	--	15700
53-70-3	Dibenz(a,h)anthracene	U	U	U	U	U	U	--	15700
541-73-1	1,3-Dichlorobenzene	U	U	U	U	U	U	--	15700
58-89-9	gamma-BHC (Lindane)	U	U	U	U	U	U	--	15700
60-57-1	Dieldrin	U	U	U	U	U	U	--	15700
62-75-9	N-Nitrosodimethylamine	U	1300	1900	U	U	U	--	15900
67-72-1	Hexachloroethane	U	U	U	U	U	U	--	15700
72-20-8	Endrin	U	U	U	U	U	U	--	15700
72-54-8	4,4'-DDD	U	U	U	U	U	U	--	15700
76-44-8	Heptachlor	U	U	U	U	U	U	--	15700
82-68-8	Pentachloronitrobenzene	U	U	U	U	U	U	0%	15700
87-68-3	Hexachlorobutadiene	U	U	U	U	U	U	--	15700
87-86-5	Pentachlorophenol	U	U	U	U	U	U	0%	15700
88-85-7	Dinoseb[4]	250 J	2200 B	2500 B	6500	6400 BJ	3400 BJ	160%	15900
91-20-3	Naphthalene	U	U	U	U	U	U	--	15700
92-52-4	Biphenyl[3]	2600	2000 B	2000 B	6200	2100 BJ	1700 BJ	100%	15700
95-48-7	2-Methylphenol[3]	1700	U	U	3100	U	U	76%	15700
95-50-1	1,2-Dichlorobenzene	U	U	U	U	U	U	--	15700
98-86-2	Acetophenone[3]	3000	2300 B	2200 B	8800	6300 BJ	6200 BJ	190%	15700
98-95-3	Nitrobenzene	U	U	U	U	U	U	--	15700
SW-846 8270C Target Analyte List									
100-01-6	4-Nitroaniline	U	U	U	U	U	U	--	15700
100-02-7	4-Nitrophenol	U	290 J	U	U	U	U	14%	15700
100-75-4	N-Nitrosopiperidine	U	U	U	U	U	U	--	15700
101-55-3	4-Bromophenyl-phenylether	U	U	U	U	U	U	--	15700
1024-57-3	Heptachlor Epoxide	U	U	U	U	U	U	--	15700
1031-07-8	Endosulfan Sulfate	U	U	U	U	U	U	--	15700
103-33-3	Azeobenzene	U	U	U	U	U	U	--	15700
105-67-9	2,4-Dimethylphenol	U	U	U	U	U	U	--	15700

	Tank ID:	C-104 Supernatant			C-104 Wet Centrifuged Solids				Max
	RPL ID:	00-1360bl Proc Blk µg/L	00-1360 Sample µg/L	99-1360d Duplicate µg/L	00-1361bl Proc Blk µg/Kg	00-1361 Sample µg/Kg	00-1361d Duplicate µg/Kg	LCS Rec.	Slurry Conc.[1] µg/Kg
	MDL:[2]	560	560	560	2000	19000	20000		15700
10595-95-6	N-Nitrosomethylethylamine	U	U	U	U	U	U	--	15700
106-47-8	4-Chloroaniline	U	U	U	U	U	U	--	15700
108-60-1	2,2'-oxybis(1-Chloropropane)	U	U	U	U	U	U	--	15700
109-06-8	2-Methylpyridine	U	350 J	510 J	U	U	U	--	15700
111-44-4	bis(2-Chloroethyl)ether	U	U	U	U	U	U	--	15700
111-91-1	bis(2-Chloroethoxy)methane	U	U	U	U	U	U	--	15700
119-93-7	3,3'-Dimethylbenzidine	U	U	U	U	U	U	--	15700
120-12-7	Anthracene	U	U	U	U	U	U	--	15700
120-58-1	Isosafrole	U	U	U	U	U	U	--	15700
120-83-2	2,4-Dichlorophenol	U	U	U	U	U	U	--	15700
121-14-2	2,4-Dinitrotoluene	U	U	U	U	U	U	77%	15700
129-00-0	Pyrene	U	U	U	U	U	U	89%	15700
130-15-4	1,4-Naphthoquinone	U	U	U	U	U	U	--	15700
131-11-3	Dimethylphthalate	U	U	U	U	U	U	--	15700
132-64-9	Dibenzofuran	U	U	U	U	U	U	--	15700
134-32-7	1-Naphthylamine	U	U	U	U	U	U	--	15700
143-50-0	Kepone	U	U	U	U	U	U	--	15700
1888-71-7	Hexachloropropene	U	U	U	U	U	U	--	15700
191-24-2	Benzo(g,h,i)perylene	U	U	U	U	U	U	--	15700
193-39-5	Indeno(1,2,3-cd)pyrene	U	U	U	U	U	U	--	15700
205-99-2	Benzo(b)fluoranthene	U	U	U	U	U	U	--	15700
206-44-0	Fluoranthene	U	U	U	U	U	U	--	15700
207-08-9	Benzo(k)fluoranthene	U	U	U	U	U	U	--	15700
208-96-8	Acenaphthylene	U	U	U	U	U	U	--	15700
218-01-9	Chrysene	U	U	U	U	U	U	--	15700
2303-16-4	Diallate (cis)	U	U	U	U	U	U	--	15700
2303-16-4	Diallate (trans)	U	U	U	U	U	U	--	15700
23950-58-5	Pronamine	U	U	U	U	U	U	--	15700
319-86-8	delta-BHC	U	U	U	U	U	U	--	15700
33213-65-9	Endosulfan II	U	U	U	U	U	U	--	15700
510-15-6	Chlorobenzilate	U	U	U	U	U	U	--	15700
51-28-5	2,4-Dinitrophenol	U	U	U	U	U	U	--	15700
534-52-1	4,6-Dinitro-2-methylphenol	U	140 J	U	U	U	U	--	15700
53494-70-5	Endrin Ketone	U	U	U	U	U	U	--	15700
53-96-3	2-Acetylaminofluorene	U	U	U	U	U	U	--	15700
55-18-5	N-Nitrosodiethylamine	U	U	U	U	U	U	--	15700
56-49-5	3-Methylcholanthrene	U	U	U	U	U	U	--	15700
56-55-3	Benzo(a)anthracene	U	U	U	U	U	U	--	15700
57-74-9	Chlordane (alpha)	U	U	U	U	U	U	--	15700
57-74-9	Chlordane (gamma)	U	U	U	U	U	U	--	15700
58-90-2	2,3,4,6-Tetrachlorophenol	U	U	U	U	U	U	--	15700
59-50-7	4-Chloro-3-methylphenol	U	U	U	U	U	U	44%	15700
60-11-7	p-Dimethylaminoazobenzene	U	U	U	U	U	U	--	15700
606-20-2	2,6-Dinitrotoluene	U	U	U	U	U	U	--	15700
608-93-5	Pentachlorobenzene	U	U	U	U	U	U	--	15700
621-64-7	N-Nitroso-di-n-propylamine	U	U	U	U	U	U	79%	15700
62-44-2	Phenacetin	U	U	U	U	U	U	--	15700
62-50-0	Ethyl methane sulfonate	U	U	U	U	U	U	--	15700
62-53-3	Analine	U	U	U	U	U	U	--	15700
66-27-3	Methyl methane sulfonate	U	U	U	U	U	U	--	15700
7005-72-3	4-Chlorophenyl-phenylether	U	U	U	U	U	U	--	15700
70-30-4	Hexachlorophene	U	U	U	U	U	U	--	15700
72-43-5	Methoxychlor	U	U	U	U	U	U	--	15700

	Tank ID:	C-104 Supernatant			C-104 Wet Centrifuged Solids				Max
	RPL ID:	00-1360bl Proc Blk µg/L	00-1360 Sample µg/L	99-1360d Duplicate µg/L	00-1361bl Proc Blk µg/Kg	00-1361 Sample µg/Kg	00-1361d Duplicate µg/Kg	LCS Rec.	Slurry Conc.(1) µg/Kg
	MDL:(2)	560	560	560	2000	19000	20000		15700
72-55-9	4,4'-DDE	U	U	U	U	U	U	--	15700
76-01-7	Pentachloroethane	U	U	U	U	U	U	--	15700
77-47-4	Hexachlorocyclopentadiene	U	U	U	U	U	U	--	15700
78-59-1	Isophorone	U	U	U	U	U	U	--	15700
83-32-9	Acenaphthene	U	U	U	U	U	U	74%	15700
84-66-2	Diethylphthalate	U	U	U	U	U	U	--	15700
84-74-2	Di-n-butylphthalate	U	U	U	U	U	U	--	15700
85-01-8	Phenanthrene	U	U	U	U	U	U	--	15700
85-68-7	Butylbenzylphthalate	U	U	U	U	U	U	--	15700
86-73-7	Fluorene	U	U	U	U	U	U	--	15700
86-74-8	Carbazole	U	U	U	U	U	U	--	15700
87-65-0	2,6-Dichlorophenol	U	U	U	U	U	U	--	15700
88-06-2	2,4,6-Trichlorophenol	U	U	U	U	U	U	--	15700
88-74-4	2-Nitroaniline	U	U	U	U	U	U	--	15700
88-75-5	2-Nitrophenol	U	U	U	U	U	U	--	15700
91-57-6	2-Methylnaphthalene	U	U	U	U	U	U	--	15700
91-58-7	2-Chloronaphthalene	U	U	U	U	U	U	--	15700
91-59-8	2-Naphthylamine	U	U	U	U	U	U	--	15700
91-94-1	3,3'-Dichlorobenzidine	U	U	U	U	U	U	--	15700
924-16-3	N-Nitrosodi-n-butylamine	U	U	U	U	U	U	--	15700
92-67-1	4-Aminobiphenyl	U	U	U	U	U	U	--	15700
92-87-5	Benzidine	U	U	U	U	U	U	--	15700
930-55-2	N-Nitrosopyrolidine	U	U	U	U	U	U	--	15700
94-59-7	Safrole	U	U	U	U	U	U	--	15700
95-57-8	2-Chlorophenol	U	U	U	U	U	U	42%	15700
95-94-3	1,2,4,5-Tetrachlorobenzene	U	U	U	U	U	U	--	15700
95-95-4	2,4,5-Trichlorophenol	U	U	U	U	U	U	--	15700
959-98-8	Endosulfan I	U	U	U	U	U	U	--	15700
99-09-2	3-Nitroaniline	U	U	U	U	U	U	--	15700
99-35-4	1,3,5-Trinitrobenzene	U	U	U	U	U	U	--	15700
99-55-8	5-Nitro-o-toluidine	U	U	U	U	U	U	--	15700
99-65-0	1,3-Dinitrobenzene	U	U	U	U	U	U	--	15700

Footnotes:

(1) Maximum slurry µg/Kg calculated using results of Tables 2.1 (weight fractions) and 2.2 (supernatant density)—See Section 1.0

(2) MDL = Method detection limit based on instrument detection limit and sample quantity

(3) Compound added to surrogate spiking mixture (see QC Evaluation section).

(4) Response in calibration standard low due to suspected crystallization from solution, quantitation value should be regarded as erroneously high

U flag = Compound not detected; Compound concentration less than the MDL

J flag = Compound detected, but concentration is less than the MDL

B flag = Compound was present in the method blank

Table 4.3. C-104 Supernatant SVOA Tentatively Identified Compounds

			C-104 Supernatant 00-1360		
			Sample	Duplicate	Blank
CAS #	TIC	Ret. Time (Min.)	µg/L	µg/L	µg/L
627-13-4	Nitric acid, propyl ester	3.74-3.75	230 J	370 J	--
2110-78-3	Methyl 2-hydroxy-2-isobutyrate	4.06	--	--	200 NJ
541-05-9	Cyclotrisiloxane, hexamethyl-	6.43-6.44	8200 J	9000 J	--
994-05-8	Butane, 2-methoxy-2-methyl-	7.12-7.16	3800 J	5700 J	6200 NJ
1120-64-5	Oxazole, 4,5-dihydro-2-methyl-	7.52-7.53	7000 J	8800 J	--
628-73-9	Hexanenitrile	8.29	140 J	--	--
109-52-4	Pentanoic acid	9.50	680 J	--	--
3970-62-5	3-Pentanol, 2,2-dimethyl-	9.73	510 J	--	--
556-67-2	Cyclotetrasiloxane, octamethyl-	10.85	3900 J	--	--
124-18-5	Decane	11.31-11.32	230 J	400 J	--
553-97-9	p-Benzoquinone, 2-methyl-	11.75	400 J	--	--
142-62-1	Hexanoic acid	11.91-12.11	2200 J	6300 J	--
1120-21-4	Undecane	13.52-13.54	920 J	1700 J	--
541-02-6	Cyclopentasiloxane, decamethyl-	14.13	--	--	300 J
111-14-8	Heptanoic acid	14.07-14.22	7000 J	2700 J	--
	Unknown	14.20	500 J	--	--
922-64-5	Propanedinitrile, methylene-	14.22	--	12000 J	--
149-57-5	Hexanoic acid, 2-ethyl-	14.43	160 J	--	--
1526-17-6	2-Fluoro-6-nitrophenol	14.58-14.60	380 J	750 J	--
695-06-7	2(3H)-Furanone, 5-ethyldihydro-	15.15	170 J	--	--
616-45-5	2-Pyrrolidinone	15.17	--	160 J	--
112-40-3	Dodecane	15.50-15.52	2000 J	3300 J	--
124-07-2	Octanoic Acid	15.92-16.04	9900 J	14000 J	--
99-66-1	Valproic Acid	16.19	--	170 J	--
119-33-5	Phenol, 4-methyl-2-nitro-	16.22-16.24	380 J	410 J	--
700-38-9	5-Methyl-2-nitrophenol	16.71-16.73	170 J	180 J	--
112-05-0	Nonanoic acid	17.25-17.52	3600 J	5900 J	--
629-50-5	Tridecane	17.34-17.35	2900 J	3600 J	--
101-83-7	Cyclohexanamine, N-cyclohexyl-	17.58	--	95 J	--
394-41-2	Phenol, 3-fluoro-4-nitro-	18.29-18.30	300 J	250 J	--
334-48-5	Decanoic acid	18.74-18.81	3100 J	1000 J	--
6175-49-1	2-Dodecanone	18.96	--	250 J	--
629-59-4	Tetradecane	19.01-19.03	820 J	1200 J	--
79-77-6	4-(2,6,6-trimethyl-1-cyclohexen-1-yl)- 3-Buten-2-one	20.12	270 J	--	--
112-37-8	Undecanoic acid	20.17-20.20	920 J	1100 J	--
0-00-0	Butyl nonanoate	20.41	--	130 J	--
593-08-8	2-Tridecanone	20.57	--	120 J	--
629-62-9	Pentadecane	20.61	--	120 J	--
143-07-7	Dodecanoic acid	21.60	100 J	--	--
2581-34-2	Phenol, 3-methyl-4-nitro-	22.17	89 J	--	--
497-56-3	Phenol, 2-methyl-3,5-dinitro-	22.39	--	230 J	--

Footnotes:

J flag = Estimated quantity. TIC compounds estimated using the response factor from the closest eluting internal standard.

N flag = Indicates presumptive evidence of compound based on mass spectral library search.

B flag = Compound was present in the method blank

"-----" = Compound not detected

Table 4.4. C-104 Wet Centrifuged Solids SVOA Tentatively Identified Compounds

			C-104 Wet Centrifuged Solids 00-1361		
			Sample	Duplicate	Blank
CAS #	TIC	Ret. Time (Min.)	µg/Kg	µg/Kg	µg/Kg
79-00-5	Ethane, 1,1,2-trichloro-	5.33	--	--	5100 J
2110-78-3	Methyl 2-hydroxy-2-isobutyrate -	6.201	38000 J	--	--
75-65-0	2-Propanol, 2-methyl-	6.23	--	--	10000 J
625-31-0	4-Penten-2-ol	6.29-6.33	58000 J	--	18000 J
507-45-9	Butane, 2,3-dichloro-2-methyl-	6.674	--	--	2100 J
77-74-7	3-Pentanol, 3-methyl-	7.095	--	--	7900 J
556-67-2	Cyclotetrasiloxane, octamethyl-	10.855	--	--	18000 J
124-18-5	Decane	11.32-11.34	170000 J	150000 J	--
1120-21-4	Undecane	13.58-13.62	580000 J	480000 J	--
541-02-6	Cyclopentasiloxane, decamethyl-	14.113	--	--	1400 J
112-40-3	Dodecane	15.59-15.62	820000 J	690000 J	--
33083-83-9	5-Undecanone	16.82-16.84	52000 J	44000 J	--
2216-87-7	3-Undecanone	17.10-17.13	34000 J	25000 J	--
112-12-9	2-Undecanone	17.19-17.22	37000 J	28000 J	--
629-50-5	Tridecane	17.42-17.46	980000 J	830000 J	--
19780-10-0	5-Dodecanone	18.58-18.60	67000 J	64000 J	--
1534-27-6	3-Dodecanone	18.83-18.85	23000 J	22000 J	--
6175-49-1	2-Dodecanone	18.93-18.94	14000 J	10000 J	--
629-59-4	Tetradecane	19.05-19.07	200000 J	190000 J	--
26215-90-7	4-Tridecanone	20.22-20.24	47000 J	41000 J	--
593-08-8	2-Tridecanone	20.54-20.56	18000 J	16000 J	--
26496-20-8	4-Tetradecanone	21.75-21.76	10000 J	9500 J	--

Footnotes:
J flag = Estimated quantity. TIC compounds estimated using the response factor from the closest eluting internal standard
N flag = Indicates presumptive evidence of compound based on mass spectral library search.
"-----" = Compound not detected

4.1.9 QC Evaluation

Instrument tuning check criteria and 12-hour calibration clock window criteria were met (USEPA CLP 3/90 SOW) for all initial calibration and sample analysis sequences as seen in the "5B" Forms in Appendix D. The initial calibration met the criteria of USEPA SW-846 method 8270C, as seen in the "6B & 6C" Form in the Appendix D. All four system performance compounds (SPCC) met the criteria for minimum response factor, and all 13 calibration check compounds (CCC) met the maximum relative standard deviation (RSD) criteria. Hexachlorophene had a very low response and was not used in the calibration. This compound was measured only because it was included in the commercial 8270C calibration mixture. Octachloronaphthalene was only detected in the lowest concentration standard, and had a very low response. Octachloronaphthalene is nearly insoluble in methylene chloride and requires addition of other solvents to maintain solubility. It is presumed that it precipitated out of the multi-component solution.

The continuing calibration check standard met the criteria of USEPA SW-846 method 8270C, as seen in the "7A & 7B" Forms in the Appendix D. All calibration check standards met the SPCC and CCC criteria. However, in comparison of the results for the continuing calibration standards to the initial calibration all compounds but with the exception of hexachlorophene, 1,3,5-nitrobenzene and octachloronaphthalene had relative percent differences below 30%.

The internal standards used in this study were 1,4-dichorobenzene-d_4, naphthalene-d_8, acenaphthene-$d_{10,}$ phenanthrene-$d_{10,}$ chrysene-d_{12}, and perylene-d_{12}. Each target compound was quantified using the relative response calculated from the most closely eluting internal standard. Acetophenone, nitrobenzene and nitrobenzene-d_5 where quantified using the first internal standard. An additional internal standard, pyridine-d_5, added to each sample, spike, blank and calibration standard to quantify the earliest eluting peaks. The internal standard area criteria of -50% and +100% were met for all C-104 supernatant samples, matrix spikes, and process blanks. The C-104 solids samples, matrix spike, process blank and LCS met the internal standard area criteria. Internal standard area data are found on the "8B & 8C" Forms in Appendix D.

The surrogate compounds used were 2-fluorophenol, phenol-d_5, nitrobenzene-d_5, 2-fluorobiphenyl, 2,4,6-tribromophenol, and terphenyl-d_{14}. A mixture of project specific analytes containing 2-methyl phenol, 3-methyl phenol (co-elutes with 4-methyl phenol and is reported as 4-methyl phenol in summary tables and forms), acetophenone, tributyl phosphate, pyridine, 1,1'-biphenyl, 1,4-dinitrobenzene, 2,6-bis(tert-butyl)-4-metyl phenol (butylated hydroxytoluene or BHT), octachloronaphthalene, pentachloronitrobenzene, 2-sec-butyl-4,6-dinitrotoluene (Dinoseb), 1-chloro-4-nitrobenzene, and N,N-diphenylamine was inadvertently added to the surrogate spiking solution. Since there was insufficient C-104 material available in the laboratory to perform another extraction, the decision was made to report the data set.

Evaluation of surrogate recoveries are somewhat difficult in that performance based recovery limits have not been established for this type of sample matrix. Contract Laboratory Program (CLP) limits for low-level soil samples were used as a guide and are included on the "2C & 2D" Forms in Appendix D.

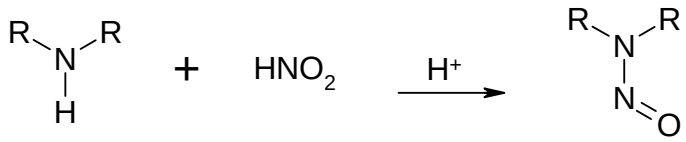
All phenolic surrogates were poorly recovered from all of the C-104 supernatant samples. It is believed this is due to the reaction of these compounds with the sample matrix. One possible reaction of these compounds is the reaction nitrous acid to form nitration products. Nitrous acid is a relatively weak acid, and some was likely formed when the pH of the samples was adjusted to 6.4 with the addition of phosphoric acid. Nitration products of 2-fluorophenol and 2-chlorophenol-d_4 were identified in the C-104 supernatant samples TIC data (Table 4.4). The base neutral surrogate compounds all have acceptable recoveries. The C-104 solids samples were not concentrated to a final volume of 1 mL due to foaming problems with the extract during the concentration step. The extracts were concentrated to 10 mL, making measurement of the surrogates difficult. However, the recoveries of the phenolic surrogates from the C-104 solids were much greater than for the supernatant. The tribromophenol recoveries were consistently low for the samples and matrix spikes. It is believed this is due to the presence of nitrite in the solids. The surrogate which were outside the QC limits are flagged with the "D" flag (for dilution) and not counted in the "total out" column in the "2C & 2D" Forms in Appendix D.

Matrix spike recovery data are found on a summary page in Appendix D. The CLP "3C & 3D" Forms could not successfully be produced using the Thru-Put system software. Each attempt resulted in program termination with an "Illegal Operation" error. In lieu of the CLP "3C & 3D" Forms, the individual matrix recovery sheets for the MS and MSD are included in Appendix D. The sheets show

the total amount of spike compounds added to the matrix spike and duplicate and include the contribution from those compounds added to the surrogate spiking solution.

The phenolic matrix spike compounds exhibited low, but acceptable, recovery in both the C-104 supernatant matrix spikes samples. In order to conserve sample and provide the lowest possible detection limit in the sample results, the matrix spike sample used approximately half the quantity of C-104 tank material as was used for the sample and sample duplicate. N,N-diphenylamine and pentachlorobenzene were not recovered in either the matrix spike or matrix spike duplicate. Octachloronathlene values are measured very high relative to the calibration standard where most of it had precipitated from solution. Its actual response was low when compared with the total peak size for the other spike compounds. The C-104 solids matrix spike data exhibit a greater number of spike failures, but since these sample are ten-fold more dilute with respect to their associated process blank, this is not unexpected. However, performance based recovery limits for these spike compounds need to be established to access these spike recoveries.

N-nitrosodimethylamine is reported in the C-104 supernatant data. The C-104 supernatant and solids samples contain large quantities of nitrite, ~3% and ~1%, respectively. Adjustment of the sample pH to 6.4 with phosphoric acid in the second part of the extraction procedure was performed in order to protonate phenolic compounds so they were extractable in the solvent. As discussed above, this pH adjustment can produce some nitrous acid. Secondary amines, both aliphatic and aromatic, react with nitrous acid to produce N-nitrosoamines:



Primary amines react with HNO_2 to form diazonium salts, however these tend to be unstable and produce alkenes, alcohols and nitrogen gas. It is not entirely clear as how to interpret the presence of N-nitroso- compounds in the samples; it is conceivable they could be present in the native tank material. Further investigation into N-nitroso- compounds in tank samples that have lesser quantities of solubilized aluminum may be useful to answer the question of artifact formation.

There is evidence that nitrosation reactions can occur in slightly alkaline buffered systems (Challis, 1994). Alkaline N_2O_4 can also nitrosate secondary amines (Camaioni, 1997), and in situations where the formed nitrosoamines can be protected by partitioning into an organic solvent phase, it is conceivable that nitrosoamines can be formed and stabilized.

4.1.10 Other Observations (or Deviations/Concerns/Issues)

Test Plan BNFL-TP-29953-80 specified a 32-component SVOA matrix spike. Several of these compounds were not included in the matrix spiking solution for various reasons. A commercial source of the various isomers of pentachloronaphthalene, hexachloronaphthalene, and heptachloronaphthalene could not be found, however octachloronaphthalene was included in the spiking solution. Equal amounts of 2-, 3-, and 4-methylphenol were used to represent cresol [CAS 1319-77-3]. Some difficulties were encountered in preparing the multi-component spiking solution. The solvent initially used to prepare the spiking solution was methanol, which is completely miscible with the aqueous sample matrix. Unfortunately, several of the spike compounds have limited solubility or are insoluble in methanol. Other solvents were added, and solvent “cocktail” consisting of methanol, methylene chloride, diethyl ether, and acetone was used to dissolve the various

compounds. After the addition of octachloronaphthalene, pentachloronitrobenzene and dinoseb, crystallization occurred. The relative amounts of the various solvents used were adjusted in order to get the crystals back into solution. It appears that the calibration solution had very low or no response for these compounds due to precipitation or recrystallization from the solution. A decision was made to limit the number of components in this spiking solution in order to avoid further problems with recrystallization from the solution. The samples were spiked with 16 of the analytes specified in the test plan, plus an additional seven that were part of the commercially available acid and base/neutral matrix spiking solutions.

Due to the inadvertent addition of one of the calibration mixtures to the surrogate spiking solution, the sample results for compounds 2-methyl phenol, 3-methyl phenol (co-elutes with 4-methyl phenol and is reported as 4-methyl phenol in summary tables and forms), acetophenone, tributyl phosphate, pyridine, 1,1'-biphenyl, 1,4-dinitrobenzene, 2,6-bis(tert-butyl)-4-metyl phenol (butylated hydroxytoluene or BHT), octachloronaphthalene, pentachloronitrobenzene, 2-sec-butyl-4,6-dinitrotoluene (Dinoseb), 1-chloro-4-nitrobenzene, and N,N-diphenylamine should be treated as having a higher quantitation limit, equal to the spiking amount.

SVOA results for tributyl phosphate in the C-104 solids were not corrected for the small relative quantity of tributyl phosphate added to the surrogate spiking solution. The C-104 solids sample extracts were ten-fold more dilute than the associated processing blank, resulting in a final spike added concentration below the minimum quantitation limit.

Table 4.5. Target SVOA Minimum Reportable Quantities

CAS #	SVOA Compounds	Solids Target MRQ [(1)] µg/Kg	Supernatant Target MRQ (Density = 1.161 g/mL) µg/L
100-25-4	1,4-Dinitrobenzene	800	930
108-95-2	Phenol	2100	2440
110-86-1	Pyridine	5300	6150
118-74-1	Hexachlorobenzene	3300	3830
122-39-4	N,N-Diphenylamine	4300	4990
50-32-8	Benzo(a)pyrene	1100	1280
53-70-3	Dibenz[a,h]anthracene	2700	3130
62-75-9	N-nitrosodimethylamine	800	930
82-68-8	Pentachloronitrobenzene (PCNB)	1600	1860
87-68-3	Hexachlorobutadiene	1900	2210
95-50-1	1,2-Dichlorobenzene	2000	2320
98-86-2	Acetophenone	3200	3720
98-95-3	Nitrobenzene	4700	5460

[(1)] MRQ = Minimum Reportable Quantity. Values provided through BNFL private communication from L. Bostic (BNFL) to G. Klinger (Battelle). No MRQ target provided in communication for other target compounds.

5.0 Polychlorinated Biphenyls/Pesticides Analysis

5.1 Introduction

For the PCB and pesticide analysis, the supernatants and solids samples were prepared and extracted in the SAL by the procedure outlined in Test Plan BNFL-29953-080, Rev. 1: Organic Extraction of C-104 Samples and Sub-sampling for VOA, Headspace, and Anions (see Appendix B). Following extraction, the resulting methylene chloride or methylene chloride/acetone residues were transferred from the SAL under CoC to the 329 laboratory. The residues were then exchanged into hexane and concentrated to 2 mL. Following residue cleanup, analysis was performed for the PCB/pesticides by gas chromatography/electron capture detection (GC/ECD). Mass spectrometry was used for confirmation of PCBs.

5.2 Sample Preparation

Cleanup of the 2-mL extract residue was performed prior to GC/ECD analysis. For the pesticide analysis, additional cleanup was performed using cartridge columns. These were typically columns employing silica gel, alumina, or Florisil. In this case, Florisil (SW-846 Method 3620) cleanups were used.

Florisil cleanup was selected because of the ease of use and removal of potential interferences. Batch to batch variation in the composition of the Florisil or overloading the column may cause a change in the distribution patterns of the organochlorine pesticides. The lot number of cartridges used for this cleanup was evaluated for recovery of pesticides and PCBs and removal of unwanted polar materials before processing samples. The resulting Florisil cleaned residues were again concentrated to 2 mL using a micro-Snyder, Kuderna-Danish (K-D) apparatus.

After analysis for pesticides, the remaining residues were treated with concentrated sulfuric acid in an effort to improve the detection of PCBs by removing additional interfering contaminants. The remaining hexane residues were once again analyzed, however, only for PCBs.

Laboratory Control Samples (LCS) were prepared in a manner identical to the samples. They were prepared in fume hoods rather than the hot cells. Both solid and liquid LCS samples were essentially blank spikes. The solid matrix consisted of granular sodium sulfate, which was used as a drying agent in the sample preparation. The liquid matrix was blank water.

5.3 Instrumentation

The instrumentation used for the analysis of pesticides and PCBs consisted of a gas chromatograph equipped with two electron capture detectors (ECD). The analytical instrumentation is identified in Table 5.1. Both of the detectors were operated at 320° C. Injections were made on-column onto a 10-m fused silica retention gap, which was split between two analytical columns: a) 0.32 mm x 30 m CLP I (0.50 µm phase, Restek Corp.) and b) 0.32 mm x 30 m CLP II (0.25 µm film thickness, Restek Corp.).

Table 5.1. PCB/Pesticides Analysis Instrumentation

System/Instrument	Manufacturer	Model Number	M&TE (1) Number
Gas Chromatograph	Hewlett-Packard	5890	WD 11127

(1) Measuring and Test Equipment

The instrumentation used for confirmation was the same gas chromatograph/high-resolution mass spectrometer (GC/HRMS) used for the dioxins analysis (see Section 6). The mass spectrometer data was obtained at a resolution of 1000.

5.4 Analysis Results

Pesticide and PCB results are presented in Table 5.2. GC/ECD analysis of the residue from the solid samples resulted in quite complex chromatograms. Although the presence of Aroclors was evident, substantial degradation of the expected response pattern was observed. The presence and approximate quantity of PCBs in the solid sample was confirmed using mass spectrometry. The concentration of PCB in the supernatant was not adequate for confirmation by mass spectrometry.

The GC/ECD chromatograms exhibited elution of compounds beyond the retention time of DCB in a pattern, which suggests the presence of polychlorinated terphenyls.

Table 5.2. PCB/Pesticides Results

CAS #	*Tank Material* / *Sample ID* / *Units*	C104 Supernatant MDL µg/L	00-1360 Proc. Blk µg/L	00-1360 Sample µg/L	00-1360 Duplicate µg/L	C104 Wet Centrifuged Solids MDL µg/Kg	00-1361 Proc. Blk µg/Kg	00-1361 Sample µg/Kg	00-1361 Duplicate µg/Kg
BNFL Pesticide Analyte List									
309-00-2	Aldrin	1.0	U	U	U	2.0	U	U	U
319-84-6	Alpha-BHC	1.0	U	U	1.4	2.0	U	U	5.5
319-85-7	Beta-BHC	1.0	U	3.4	U	2.0	U	U	U
465-73-6	Isodrin	2.0	U	U	U	4.0	U	U	U
50-29-3	4,4'-DDT	2.0	U	U	U	4.0	U	U	U
58-89-9	Gamma-BHC	1.0	U	U	U	2.0	U	8.2	17.6
60-57-1	Dieldrin	2.0	U	U	U	4.0	U	U	U
72-20-8	Endrin	2.0	U	U	U	4.0	U	U	U
72-54-8	4,4'-DDD	2.0	U	U	U	4.0	U	U	U
76-44-8	Heptachlor	1.0	U	U	U	2.0	U	U	U
8001-35-2	Toxaphene	10	U	U	U	20	U	U	U
SW-846 8081A Pesticide Analyte List									
1024-57-3	Heptachlor Epoxide	1.0	U	U	1.6	2.0	U	2.7	U
1031-07-8	Endosulfan Sulfate	2.0	U	U	U	4.0	U	U	U
319-86-8	delta-BHC	1.0	U	U	U	2.0	U	6.4	7.2
33213-65-9	Endosulfan II	2.0	U	U	U	4.0	U	U	U
5103-74-2	gamma-Chlordane	1.0	U	U	U	2.0	U	U	U
5103-71-9	alpha-Chlordane	1.0	U	U	U	2.0	U	U	2.2
53494-70-5	Endrin Ketone	2.0	U	U	U	4.0	U	U	U
72-43-5	Methoxychlor	10	U	U	U	20	U	U	U
72-55-9	4,4'-DDE	2.0	U	U	U	4.0	U	5.6	U
7421-93-4	Endrin Aldehyde	2.0	U	U	U	4.0	U	4.3	U
959-98-8	Endosulfan I	1.0	U	U	U	2.0	U	U	U
BNFL Polychlorinated Biphenyl Analyte List									
12674-11-2 53469-21-9	Aroclor 1016/1242	2.0	U	3.8	4.9	4.0	U	121	154
11104-28-2	Aroclor 1221	2.0	U	U	U	4.0	U	U	U
11141-16-5	Aroclor 1232	2.0	U	U	U	4.0	U	U	U
12672-29-6	Aroclor 1248	2.0	U	4.3	5.3	4.0	U	278	202
11097-69-1	Aroclor 1254	2.0	U	1.8	2.3	4.0	U	72.8	80.2
11096-82-5 37324-23-5	Aroclor 1260/1262	2.0	U	U	U	4.0	U	37.8	40.3
11100-14-4	Aroclor 1268	2.0	U	U	U	4.0	U	U	U
	Total PCB	14	U	17.9	20.6	24	U	522*	488*
			% Recov.	**% Recov.**	**% Recov.**		**% Recov.**	**% Recov.**	**% Recov.**
	TCX (surrogate)		34.3	74.8	78.5		5.3	32.7	41.1
	DCB (surrogate)		74.4	71.9	72.7		57.3	50.8	63.8

U = Not detected; results less than MDL

* confirmed by mass spectrometry

The pesticide results were obtained from residues that had undergone only the Florisil cleanup. The PCB results were obtained after an additional cleanup was performed using concentrated sulfuric acid.

As seen in Table 5.3, the BNFL target MRQs were met for both the wet centrifuged solids and supernatant (after adjusting for density).

Table 5.3. Target PCB/Pesticides Minimum Reportable Quantities

CAS #	Compound	Solids Target MRQ [1] µg/Kg	Supernatant Target MRQ[2] µg/L
All	Polychlorinated Biphenyls	3300	3830
309-00-2	Aldrin	22	26
319-84-6	Alpha-BHC	22	26
319-85-7	Beta-BHC	22	26
465-73-6	Isodrin	22	26
50-29-3	4,4'-DDT	----	----
58-89-9	Gamma-BHC	----	----
60-57-1	Dieldrin	43	50
72-20-8	Endrin	43	50
72-54-8	4,4'-DDD	----	----
76-44-8	Heptachlor	22	26
8001-35-2	Toxaphene	900	1050

[1] MRQ = Minimum Reportable Quantity as provided by BNFL
"-----" = No MRQ target provided.
[2] Density = 1.161 g/mL

5.5 QC Evaluation

Surrogate Recoveries:

The surrogate results for the pesticide spike samples were obtained from residues that had undergone only the Florisil cleanup. The sample surrogate results were obtained after an additional cleanup was performed using concentrated sulfuric acid. Therefore, the surrogate recoveries presented in Table 5.2 are from the PCB analysis. These are more conservative surrogate results since they were obtained from residues, which have undergone the additional handling of both cleanup procedures. Specifically, the sample residues had been concentrated twice followed by an acid cleanup. Note that the pesticide spike samples which have been concentrated only once have better surrogate recoveries. The notably low TCX surrogate recovery for the solids blank is likely due to over heating during one or both of the concentration steps. The volatility of TCX, particularly in blank samples, make it susceptible to loss during concentration.

Spike Recoveries:

Duplicate samples of both the supernatant and solids were spiked separately for each of the pesticides (Table 5.4) and for PCBs (Table 5.5). Because limited sample was available, the quantity of sample spiked was approximately half of that used for unspiked sample analysis. Laboratory control samples (LCS) consisted of PCB spiked blank water or drying agent (granulated sodium sulfate) for the solids extractions. The LCS results are presented in Table 5.5.

An unexpectedly high level of Aroclor 1254 was found in the supernatant pesticide spike sample. Correspondingly, there was a noticeably low recovery of Aroclor 1254 in the PCB spike duplicate sample. It was assumed that some inadvertent intermixing occurred during one of the sample extraction processes. The reported PCB spike recovery for sample 00-1360 is from the addition of the two results. Spike results are summarized in Tables 5.4 and 5.5 for pesticides and PCBs respectively. Concentration values are listed in the tables in parentheses following the % recovery numbers.

Table 5.4. C104 – Pesticide Spike Recoveries

		Tank Material	**C104 Supernatant**		**C104 Wet Centrifuged Solids**	
		Sample ID	**00-1360**		**00-1361**	
			MS	**MSD**	**MS**	**MSD**
		Units	**%Rec (µg/L)**	**%Rec (µg/L)**	**%Rec (µg/Kg)**	**%Rec (µg/Kg)**
CAS #		***MDL***	**2-4**	**2-4**	**4-8**	**4-8**
309-00-2	Aldrin		102 (18.4)	92.8 (17.5)	141 (113)	138 (115)
50-29-3	4,4'-DDT		106 (38.4)	99.1 (37.4)	87.8 (140)	74.7 (125)
58-89-9	Gamma-BHC		5.2 (0.93)	3.9 (0.73)	43.9 (48.0)	32.8 (40.3)
60-57-1	Dieldrin		13.0 (4.7)	8.2 (3.1)	141 (225)	146 (244)
72-20-8	Endrin		16.3 (5.9)	10.4 (3.9)	171 (274)	159 (266)
76-44-8	Heptachlor		113 (20.4)	103 (19.4)	147 (118)	121 (101)
			% Rec	**% Rec**	**% Rec**	**% Rec**
	TCX (surrogate)		65.3	55.7	63.0	64.6
	DCB (surrogate)		61.2	62.7	84.0	93.4

Table 5.5. C104 – PCB Spike Recoveries

		Tank Material	**C104 Supernatant**			**C104 Wet Centrifuged Solids**		
		Sample ID	**00-1360**		**LCS**	**00-1361**		**LCS**
			MS	**MSD**		**MS**	**MSD**	
		Units	**%Rec (µg/L)**	**%Rec (µg/L)**	**%Rec (µg/L)**	**%Rec (µg/Kg)**	**%Rec (µg/Kg)**	**%Rec (µg/Kg)**
CAS #		***MDL***	**2**	**2**	**0.2**	**8**	**8**	**4**
11097-69-1	Aroclor 1254		87.3 (19.5)	96.7 (21.4)	71.8 (1.4)	123 (172)	151 (202)	91.1 (36.5)
			% Rec	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
	TCX (surrogate)		73.9	94.6	76.1	65.5	71.7	94.2
	DCB (surrogate)		89.3	105	61.8	87.0	96.7	72.2

Chromatographic resolution and degradation of pesticide indicator analytes was affected following a number of sample residue analyses, indicating some column degradation had occurred. Reanalysis was performed on all pesticide residues. While the methods indicator compound degradation criteria were met, the observed peak broadening impacted the retention time windows to a limited extent. For both the solids and supernatant samples, some variation was observed for duplicate samples of the single component pesticide results. However, in all cases, the results were less than ten times the MDL and this is the region where the greatest error is expected to occur. None of the results exceeded the MRQ levels. In addition to the analytes of interest specified by BNFL, additional analytes normally analyzed utilizing this method have been reported.

Distinct Aroclor patterns were observed during the PCB analysis by GC/ECD. However, the congener ratios for a given Aroclor varied substantially. Also, congeners were present which could not be attributed to any particular Aroclor observed in the samples. Confirmation analysis using gas chromatography/ mass spectrometry (GC/HRMS) was performed on the C-104 solid material extract residue. The mass spectrometer was operated at a resolution of 1000 and calibrated using a standard mixture which contained ten PCB congeners. Each congener represented the ten possible PCB homologs (levels of PCB chlorination) and were used to establish chromatographic retention time windows and mass spectrometer response factors. The GC/ECD results were confirmed by the GC/HRMS. The amount found by each method was in agreement within a factor of two. Also, the GC/HRMS instrument indicated every homolog was represented in the tank sample. Since decachlorobiphenyl was added to the sample as one of the surrogate compounds, it cannot be determined if this congener was native to the original tank material.

Although the two analytical methods agreed within a factor of two, the PCB results should be considered qualitative. The congener ratio variation observed by the GC/ECD analysis demonstrated that the sample had undergone degradation or rearrangement of the PCBs. Quantitation by comparison to Aroclor standards may have substantial error associated with the result. Calibration of the GC/ECD using the congener method can be performed, however, the calibration standards must be chosen carefully so that the full chromatographic elution range and detector responses for each homolog are well represented. Existing methods do not address this issue sufficiently for adequate application to this and other highly complex samples.

In this case, the GC/HRMS calibration used only one congener to represent the entire homolog chromatographic elution and response. While the GC/HRMS data confirms the presence of PCBs, it was not intended to provide adequate quantitation based on this calibration. Further investigation is necessary to more accurately determine the quantity of PCBs present in these samples.

6.0 Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans Analysis

6.1 Introduction

For the dioxins and furans analysis, the supernatant and solid samples were prepared in the SAL by the procedure outlined in Test Plan BNFL-29953-080, Rev. 1: Organic Extraction of C-104 Samples and sub-sampling for VOA, Headspace, and Anions (see Appendix B). Following extraction, the resulting residues were transferred from the SAL under CoC to the 329 organic laboratory for analysis of dioxins and furans.

The dioxins and furans extracts were exchanged into hexane and passed through several column cleanup procedures including silica gel and alumina to remove interfering components. After column cleanup, the resulting solutions were further concentrated. Analysis was then performed using high resolution gas chromatography/low resolution mass spectrometry (HRGC/LRMS). In the event that any dioxins or furans had been detected using HRGC/LRMS, HRGC/high resolution MS would have been used for verification. However, since no dioxin or furan compounds were found, confirmation was not required and consequently only the low-resolution mode was employed. A resolution of 1000 was utilized for the initial dioxins and furans analyses.

Dioxins and furans, typically exhibit multiple isomers. Table 6.1 lists the dioxin and furan standards analyzed to establish retention time windows and used as the basis for the determination of response factors.

Table 6.1. Standard Compounds Measured Using HRGC/LRMS

CAS #	Dioxin Compounds	Report ID [(1)]
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	TCDD
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PeCDD
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	HxCDD
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	HxCDD
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	HxCDD
35822-39-4	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	HpCDD
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	OCDD
CAS #	**Furan Compounds**	**Report ID [(1)]**
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	TCDF
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	PeCDF
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	PeCDF
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	HxCDF
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	HxCDF
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	HxCDF
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	HxCDF
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	HpCDF
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	HpCDF
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	OCDF

[(1)] Report ID is shorthand notation for dioxins and furans for use in results tables

The data presented in this report were obtained utilizing procedures, instrumentation, and data systems for dioxins and furans analysis of radioactive materials.

6.2 Sample Preparation

6.2.1 Supernatants and Solids

Following methylene chloride extraction of the supernatant samples and methylene chloride-acetone extraction of the solids, the extracts for dioxins and furans analysis were exchanged into hexane. The hexane residues from both the supernatant samples and the solids samples were then processed through an extensive cleanup procedure to remove potential interfering components.

The hexane residues were first washed with concentrated sulfuric acid, 20% KOH, and 5% NaCl in a separatory funnel. The washed hexane extract was passed through a column of anhydrous sodium sulfate to remove water. The hexane extract was then applied to the top of a silica gel column and eluted with hexane. The eluate was concentrated to approximately 1 mL using a K-D apparatus, and added to an alumina column. The concentrated solution was then eluted with 60% methylene chloride in hexane (v/v) and collected. The resulting eluate was concentrated to approximately 1 mL using a K-D apparatus, and then reduced to a final volume of 200 µL using nitrogen blow-down techniques for subsequent analysis using HRGC/LRMS.

6.2.2 Laboratory Control Standard, Glassware Blank, and Silica Gel Cleanup

For the laboratory control standard (LCS), 100 mL of doubly-distilled water was spiked with a pre-measured volume of spiking materials and extracted with three 25-mL portions of methylene chloride. The LCS was extracted in like manner to the supernatants (as described above in Section 6.2.1), except that the LCS was extracted in the laboratory instead of the SAL hot cells.

A glassware blank was prepared to demonstrate that that the laboratory glassware was free of interferants under the conditions of analysis. The blank was prepared by rinsing various glassware associated with sample preparation and analysis including separatory funnels, beakers, graduated cylinders, K-D flasks, glass columns, and storage vials with 50 mL of methylene chloride. The rinsates were transferred to a K-D flask, exchanged into hexane, and reduced in volume to approximately 2 mL. The hexane extract was then further purified, concentrated, and analyzed as described under Section 6.2.1 above. The purpose of a glassware blank was to demonstrate that there was no contamination resulting from the glassware; therefore, the glassware blank was not put through the column cleanup (silica gel and alumina) procedure.

In order to confirm that the silica gel column chromatography material was contaminant free, approximately 500 g was extracted with methylene chloride-acetone. The resulting solution was concentrated to approximately 200 µL and analyzed using HRGC/LRMS.

6.2.3 Instrumentation

The analytical instrumentation used for the analysis of dioxins and furans consisted of a gas chromatograph equipped with a 5 m x 0.32 mm HP retention gap (uncoated and deactivated) column followed by an RTX-5 (60 m x 0.25 mm, 0.25 µm film thickness, Restek) column. Analyses were performed using on-column injection techniques and auto sampler injections. The JEOL high-resolution mass spectrometer (HRMS) system was operated in the low-resolution mass spectrometer (LRMS) mode. A description of the instrumentation is shown in Table 6.2.

Table 6.2. Dioxins and Furans Analysis Instrumentation

System/Instrument	Manufacturer	Model Number	M&TE Number (1)
GC	Hewlett-Packard	5890	WD11062
HRMS	JEOL	SX-102/SX-102	WD11061

(7) Measuring and Test Equipment

6.2 Analysis Results

The dioxins and furans results for C-104 are presented in Table 6.3. The CAS numbers have been omitted since there are multiple dioxin and furan isomers that are not included as standards. For example, if a peak is detected in the TCDD retention time window with a slightly different retention time than that of the standard, the exact TCDD isomer cannot be identified since it does not match the standard. Per SW-846 Method 8280 protocol, if multiple isomers are detected in the appropriate retention time window, the multiple isomers are summed to provide a single dioxin or furan result. No dioxin and furan isomers were detected in any of the samples.

Table 6.3. C-104 Dioxins and Furans Results

Tank Material	C-104 Supernatant				C-104 Wet Centrifuged Solids			
Sample ID	**MDL**	**00-01360 Proc Blk**	**00-01360 Sample**	**00-01360 Duplicate**	**MDL**	**00-01361 Proc Blk**	**00-01361 Sample**	**00-01361 Duplicate**
Units	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/Kg**	**µg/Kg**	**µg/Kg**	**µg/Kg**
TCDD	0.01	U	U	U	0.04	U	U	U
TCDF	0.01	U	U	U	0.04	U	U	U
PeCDD	0.04	U	U	U	0.08	U	U	U
PeCDF	0.04	U	U	U	0.08	U	U	U
HxCDD	0.04	U	U	U	0.08	U	U	U
HxCDF	0.04	U	U	U	0.08	U	U	U
HpCDD	0.04	U	0.002 J	U	0.08	U	U	U
HpCDF	0.04	U	U	U	0.08	U	U	U
OCDD	0.08	U	U	U	0.16	U	U	U
OCDF	0.08	U	0.005 J	U	0.16	U	U	U

(1) Multiple isomers possible in retention time window; each isomer has unique CAS #. Component represents sum of dioxins or furans meeting retention time window and ion abundance ratio criteria.
U = not detected; results less than MDL
J = detected and quantified, but results less than MDL. Analysis met ion abundance ratio and retention time criteria.

6.3 QC Evaluation

The QC evaluation focuses on: a) ion abundance ratios and response factors for the standards; b) ion abundance ratios for the samples, duplicates, MSs and MSDs; and c) the spike recovery results from the analyses of the MSs for both liquids and solids.

6.3.1 Ion Abundance Ratios and Response Factors --- Standards

The theoretical ion abundance ratios and control limits are listed in Table 6.4. These ratios are applicable to both the LRMS and HRMS. The matrix spiking solutions contained both ^{13}C-labeled

and unlabeled standards. All samples, including MSs, were spiked with labeled internal standards. The ion ratios for both the native (unlabeled) and the labeled components must meet the criteria shown in Table 6.4. The letter designations M, M+2, and M+4 refer to the parent ion (M) and the corresponding additional masses associated with the chlorine isotope pattern.

Table 6.4. Theoretical Ion Abundance Ratios and Control Limits

Number of Cl atoms	Ion Type	Theoretical Abundance Ratio	Control Limits	
			Lower	Upper
4	M/M+2	0.77	0.65	0.89
5	M+2/M+4	1.55	1.32	1.78
6	M+2/M+4	1.24	1.05	1.43
7	M+2/M+4	1.04	0.88	1.20
8	M+2/M+4	0.89	0.76	1.02

Appendix E contains the ion abundance ratio QC data for the native and labeled components of the standards.

The percent relative standard deviations for the average response factors are less than 15% as required by USEPA SW-846 Method 8280 (low resolution MS method), except for components:

OCDD for m/z 458 (RSD =22.5%) and m/z 460 (RSD = 22.3%)
OCDF for m/z 442 (RSD = 19.6%) and m/z 444 (RSD= 18.8%)
PeCDF for m/z 340 (RSD = 21.7%) and m/z 342 (RSD = 19.5%)
TCDD for m/z 320 (RSD = 18.6%)

However, the percent relative standard deviation for the average response factors are required to be less than 30% for high resolution mass spectrometry (Method 8290). The 15% criteria has been applied to data obtained from low resolution quadrupole mass spectrometry. The data obtained in this study is from a high resolution, magnetic sector mass spectrometer operated in the low resolution mode. There may be deviations from the 15% low resolution criteria using the high resolution instrument. This is an area requiring further study. In order to verify that the data are not adversely affected, a continuous calibration verification standard was analyzed during the sample set. The concentrations were calculated based on the response factors and compared with the known concentration values. The calculated concentration vs. the known concentrations agreed very well. Based on this data, it would appear that the data and the ability to measure dioxins and furans are not affected by several components with percent relative standard deviations greater than 15%.

The peak areas obtained and used in the calculations are affected by the condition of the mass spectrometry source and chromatography. This factor is discussed more thoroughly in Section 6.4.

6.3.2 Ion Abundance Ratios – Samples, Duplicates, and Matrix Spikes

The ion abundance ratios for both the native and labeled components for all samples, duplicates, MSs, MSDs, and process blanks are listed in Appendix E The ion abundance ratio is a major criteria for identifying dioxins and furans. If the ion abundance ratio is not within the control limits listed in Table 6.4, the component is not identified as a dioxin or furan even though the retention times may be consistent with dioxins and furans. Table 6.5 summarizes all of the ion abundance ratio data.

Table 6.5. Acceptance Criteria Summary of Ion Abundance Ratios

Sample ID	Compound	TCDD Native	TCDD Labeled	TCDF Native	TCDF Labeled	PeCDD Native	PeCDD Labeled	PeCDF Native	PeCDF Labeled	HxCDD Native	HxCDD Labeled	HxCDF Native	HxCDF Labeled	HpCDD Native	HpCDD Labeled	HpCDF Native	HpCDF Labeled	OCDD Native	OCDD Labeled	OCDF Native	OCDF Labeled
C-104 Supernatant	Proc Blank		p		p		p		p		p		p		p		p		p		p
	Sample		p		p		p		p		p		p		p		p		p		p
	Duplicate		p		p		p		p		p		p		p		p		p		p
	MS	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
	MSD	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
C-104 Wet Centrifuged Solids	Proc Blank		p		p		p		p		p		p		p		p		P	p	p
	Sample		p		p		p		f		p		p		p		p		p	p	p
	Duplicate		p		p		p		p		p		p		p		p		p		p
	MS	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
	MSD	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
LCS	Standard	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p

p = pass; peak detected at dioxins and furans retention time and ion abundance ratio met acceptance criteria from Table 6.4

f = fail; peak detected at dioxins/furans retention time but ion abundance ratio does not meet criteria from Table 6.4

blank = No signal or peak area detected; ion abundance ratio undefined

For C-104 supernatant and solids MS, MSD, and LCS samples, all native and labeled compounds met the ion abundance ratio acceptance criteria. For the process blanks, samples and duplicates, only one of the 110 labeled compounds analyses failed to meet the ion abundance ratio acceptance criteria; labeled PeCDF in the solids sample did not meet the ion abundance criteria. There is no simple explanation why this particular isomer did not meet the abundance ratio acceptance criteria. In previous analyses of AN-107 and AW-101, several isomers did not meet the ion abundance ratio criteria (Klinger et al., 2000).

6.3.3 Dioxins and Furans Matrix Spike Recoveries

The recoveries for the MSs and MSDs for C-104 supernatants and wet centrifuged solids are detailed in Table 6.6. The CAS numbers are included to identify the components in the matrix spiking solution. All ion abundance ratios for both the native and labeled components in the MSs and MSDs met the criteria listed in Table 6.4.

Most of the recoveries are in the range of 75-125%. An interesting but unexplainable item is the apparent lower recovery for HxCDD compared to the other components in all samples analyzed, except the LCS. At this point, there is no reasonable explanation for this observation.

Table 6.6. C-104 – Dioxins and Furans Spike Recoveries

	Tank Material	C-104 Supernatant		C-104 Wet Centrifuged Solids		LCS
	Sample ID	00-01360		00-01361		
		MS	MSD	MS	MSD	
CAS #	*Units*	Rec	Rec	Rec	Rec	Rec
1746-01-6	TCDD	115%	101%	106%	94%	108%
51207-31-9	TCDF	99%	106%	105%	88%	104%
40321-76-4	PeCDD	116%	113%	92%	78%	106%
57117-41-6	PeCDF	109%	103%	96%	92%	103%
57653-85-7	HxCDD	79%	55%	75%	65%	96%
57117-44-9	HxCDF	86%	102%	91%	83%	95%
35822-39-4	HpCDD	102%	117%	108%	77%	101%
67562-39-4	HpCDF	102%	106%	94%	89%	104%
3268-87-9	OCDD	117%	113%	89%	97%	106%
39001-02-0	OCDF	125%	124%	89%	98%	104%

6.4 Other Observations (Deviations/Concerns/Issues)

The dioxins and furans analyses were performed by LRMS. If any dioxins or furans had been detected, HRMS would have been performed for confirmation. At lower resolution, the mass spectrometer has higher sensitivity but less specificity. The resolving power of a mass spectrometer is a measure of its ability to separate two ions of any defined mass difference. Basically, for two overlapping peaks M_1 and M_2, the resolution may be defined in terms of the mass difference (M_2-M_1) between them. The resolution is then defined as $M_1/(M_2-M_1)$. The HRMS method requires a resolution of 10,000. At 10,000 resolution a mass at m/z of 300.00 is separated from a mass at m/z of 300.03. For each group of ions, a lock mass is assigned in high resolution. The analyses were performed in low-resolution mode. In low-resolution mode the resolution was set at 1,000. At 1,000 resolution a mass at m/z of 300.00 is distinguished from a mass at m/z 300.30.

A four-point calibration was performed rather than a five-point calibration as specified in SW-846 Method 8290. The concentration of the standards ranged from 0.5 to 200 μg/L for TCDD and TCDF, 5.0 to 2000 μg/L for OCDF and OCDD, and 2.5 to 1000 μg/L for all other compounds**.** The concentrations of solutions were made for detection using a quadruple mass spectrometer; the instrument used in these studies was a high resolution, magnetic sector mass spectrometer and was approximately 100 times more sensitive than the quadruple instrument. The values for the highest concentration standards were not used for calculating the average response factor due to the fact that the low-resolution mode was used for the analysis. In the low-resolution mode the concentration versus peak area response was not linear over the entire concentration range. The concentration versus peak area response for the highest concentration standard was outside the linear dynamic range of the instrument. For the highest concentration standard solution, the detector was saturated. This phenomenon was also observed in previous tank waste analyses (Klinger et al., 2000). For the highest concentration standard solutions, the detector was saturated.

Analyses of the glassware blank and silica gel extract showed no indication of potential interfering contaminants.

On-column injection was used throughout the analyses. As analyses progressed, small pieces of the septum became lodged in the retention gap. After several injections, chromatographic quality was effected by the production of irregular peak shapes. The solution to this problem used at the time was to change the septum and remove a small portion of the retention gap column each time. However, typically, after only several injections, small pieces of septum were again present in the retention gap. This problem was solved after the analyses were complete by changing the inlet configuration.

The cleanup procedure used for dioxins and furans was very labor intensive and time consuming. After following the cleanup steps listed in SW-846 method, there are several places where time could be saved and the cost greatly reduced in future work. As an example, the method states that the sample must be eluted through a silica gel column, concentrated, and then eluted through an alumina column, and then concentrated prior to analysis. An alternative approach would use one column packed with both silica gel and alumina. The sample would be eluted through one column containing the two packing materials, concentrated, and analyzed. Studies would first need to be performed to insure that the recoveries were not affected. If the recoveries were comparable (through two columns vs. one), both time for cleanup would be reduced (thus improving analytical throughput and reducing turnaround time) and a large cost savings would be realized. There are other possible areas in the sample cleanup that could be combined to provide additional economies as well.

7.0 Organic Anions Analysis

7.1 Introduction

Analyses of organic anions were performed on both the supernatant and solids from samples of tank waste material from Tank C-104 following sub-sampling in the SAL per Test Plan BNFL-29953-080 Rev. 1. The supernatant samples were passed through cation exchange resin material to reduce the radioactivity to a sufficient low level to be safely handled in the laboratory. The solid samples were leached at ambient temperature with water, filtered, and the resulting solution passed through cation exchange resin to reduce the radioactivity levels. The supernatant and solids were aliquotted and prepared in the SAL and transferred under CoC to the analytical laboratory for organic anion analysis by ion chromatography (IC).

7.2 Sample Preparation

Tank samples from C-104 were prepared in the SAL. For the supernatants, a 1-mL sample was accurately weighed and then passed through a column of cation exchange resin to reduce the radioactivity level. Similarly for the solids, an approximate 1-g sample was accurately weighed, leached at ambient temperature with a known volume (approximately 5 mL) of distilled water for 12 hours, and then filtered. The resulting solution was then passed through a cation exchange column. The activity reduction was performed as per Test Plan BNFL-29953-014, "Activity Reduction Via Cation Exchange for Carboxylate Analysis". The treatment within the SAL resulted in an approximate 20-fold dilution (weight/weight) into a dilute caustic matrix that is not significantly different from the caustic matrix of the original sample. An additional 90-fold dilution was performed to dilute the major inorganic ions (nitrate and nitrite) to levels that prevent overloading the capacity of the analytical column. Previous experience (Campbell, 1997; Sharma et al., 1998) has demonstrated that ion-exchange sites within the IC column apparently do not recover quickly from an overload of these inorganic species. That can result in non-uniform elution of the weakly retained analytes (e.g. acetate and formate).

Matrix spikes and MSDs were prepared in the laboratory after the MS and MSD samples were eluted through the cation exchange resin. Previous studies on samples from this tank have shown that organic material was neither introduced nor removed with the use of cation exchange resin (Campbell et al., 1998). Spiking solutions were prepared using oxalic acid and sodium formate, in deionized water. A laboratory control standard (LCS) was prepared from independent materials, and diluted to a value within the bounds of the calibration curve.

7.3 Instrumentation

The analytical instrumentation utilized for the analysis of low molecular weight organic acids consisted of an ion chromatograph (IC) unit equipped with a conductivity detector. A Dionex AS-11 separation column and AG-11 guard column were used at ambient temperature with a 25-µL sample loop. An anion suppressor was used. The flow rate of the mobile phase was 2.0 mL/min. A description of the IC system is provided in Table 7.1.

Table 7.1. Ion Chromatography Instrumentation

System/Instrument	Manufacturer	Model Number	M&TE [1] Number
IC System	Dionex	500 DX	WD 24293
Conductivity Detector	Dionex	CD20	WD 24295

(1) Measuring and Test Equipment

The IC gradient conditions were: (a) 0.0 min 0% 100 mM NaOH, 98.1% deionized water and 1.9% 5 mM NaOH; (b) 6.4 min 0% 100 mM NaOH, 0% deionized water and 100% 5 mM NaOH; and (c) 18.4 min 35% 100 mM NaOH, 0 % deionized water and 65% 5 mM NaOH. The mobile phase contained a gradient of deionized water and a weak solution of NaOH.

7.4 Analysis Result

The results of the analysis of the C-104 supernatant and wet centrifuged solids samples are listed below in Table 7.2.

Acetate co-elutes with glycolate under typical analysis conditions and requires the use of an alternate column for separation from glycolate. Without additional separation, one can not unequivocally state whether or not the observed peak contains only acetate, only glycolate, a combination of both anions, or a possible unknown contaminant. Tank waste and solubility studies have shown that the results are dependent on tank waste type. In other words, for tanks with different fill histories, the dominant organic anions in the waste may be primarily glycolate, primarily acetate, or a combination of both anions (Sharma et al., 1998, Camaioni et al., 1998, Barney 1997, Ashby et al., 1994.)

For C-104 analyses, no acetate/glycolate peak was detected in the supernatants or solids above the MDL. In view of the fact that acetate and glycolate have similar response factors, the reported acetate MDL can be used to bound the upper acetate/glycolate concentration. Interference from fluoride makes this determination questionable and is discussed in detail in Section 7.6.

Table 7.2. IC Organic Anion Results

Tank Material		C-104 Supernatant				C-104 Wet Centrifuged Solids				
Sample ID		MDL [1]	00-01360 Proc Blk	Sample	Duplicate	MDL [1]	00-01361 pb Proc Blk	Sample	Duplicate	*Maximum μg/g [2]*
CAS #	*Units*	μg/mL	μg/mL	μg/mL	μg/mL	μg/g	μg/g	μg/g	μg/g	*of Slurry*
144-62-7	Oxalate	780	U	1090	980	540	U	1230	3300	*1600*
64-18-6	Formate	1020	U	2670	2120	720	U	750	2200	*2300*
79-10-7	Acrylate	780	U	U	U	540	U	U	U	*U*
64-19-7	Acetate [3]	2640	U	U	U	600	U	U	U	*U*

(1) MDL = Method detection limit based on instrument detection limit and sample quantity
(2) Maximum slurry μg/g calculated using results of Tables 2.1 (weight fractions) and 2.2 (supernatant density) - See Section 1.0
(3) Acetate and glycolate are not resolved; results or MDL represent bounding upper concentration

7.5 QC Evaluation

No organic anions of interest were detected in the blank samples. The MDLs stated in Table 7.2 are assumed to be adequate, since no MRQs were established by BNFL for the organic anions measured. The sample intended as a MS was analyzed, then spiked, and then reanalyzed. Matrix spike data were collected by adding an amount of oxalate and formate, which would double the peak area of the native analyte in the sample. Table 7.3 presents the MS and MSD recoveries and LCS recovery results for the C-104 supernatants and wet centrifuged solids. Spike recoveries for LCS , MSs, and MSDs ranged from 77% to 142%; several spikes failed to meet the acceptance criteria of 75% to 125%; i.e., oxalate for the C-104 solids MSD and formate for the C-104 solids MS and MSD.

Table 7.3. IC Organic Anions Matrix Spike Recoveries

	Tank Material	**C-104 Supernatant**			**C-104 Wet Centrifuged Solids**	
	Sample ID	**00-01360**			**00-01361**	
		MS	**MSD**	**LCS**	**MS**	**MSD**
CAS #	***Units***	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
144-62-7	Oxalate	106	78	97	77	141
64-18-6	Formate	nd	91	88	127	142
79-10-7	Acrylate	U*	U*	89	U*	U*

* U -- Component not added as part of spike solution
nd -- not determined due to large interferant, possibly F^-

Acetate was not included in the MS and MSD due to interference from F^-. Formate was detected in the C-104 supernatant MSD but not in the MS and is discussed in more detail in the following section. The continuous calibration verification (CCV) solution contained all of the analytes. The CCV data collected at the start of each day gave a maximum deviation of 13% for acrylate; other analytes afforded 10% deviation or less from the expected values. The calculated values were generated from 4-point curves with multiple data collected at each dilution point. This calibration data was sufficient for calculation of all quantitative values.

7.6 Other Observations (or Deviations/Concerns/Issues)

For these samples, there was a large early eluting interfering material thought to be fluoride (F^-). Although the samples were not spiked with F^- to verify its presence, previous experience has indicated that the early eluting component is probably F^-. An experiment was conducted using purified calcium oxide as a precipitant to remove this interfering component. Preliminary indications are that calcium oxide may provide a method to improve the chromatography of samples that contain F^-. A problem arises in ion chromatography when there is a large amount of a slightly retained ion such as F^- in the matrix. All monovalent ions that elute in the timeframe close to F^- are affected in peak shape and (to a lesser extent) retention time. This effect is illustrated in Figures 7.1 through 7.4. Figure 7.1 is an IC chromatogram of a solution composed of acetate (peak 2), acrylate (peak 3) and formate (peak 4). Figure 7.2 is an IC chromatogram of a C-104 MS solids sample. Peak 2 is probably F^- and peak 3 is formate in this chromatogram. A large amount of F^- is sufficient to overlap with acetate, making a determination of acetate impossible by this IC separation. The peak shape of other monovalent anions is also severely affected, which adversely affects the quantitation and low-level detection of formate and acrylate. Thus, one of the formate spike results is not available due to the adverse affects of F^-. This is illustrated in Figures 7.3 and 7.4. Figure 7.3 is an IC chromatogram of C-104 MS supernatant sample. Peak 3 is possibly F^- and peak 4 is formate. The chromatography of formate is affected by the presence of F^-; the peak is not measurable. Figure 7.4 is an IC

chromatogram of C-104 supernatant MSD. Peak 2 is possibly F^- and peak 3 is formate. The peak broadening effect due to F^- is more severe in the MS sample; a rerun of the sample showed the same result. Later eluting ions (nitrate, oxalate, sulfate, citrate) are not subject to this loading effect by F^- since a re-focusing of the analyte is possible after F^- has been eluted from the column.

It is possible that ion chromatographic separation of carboxylates in the presence of F^- could be improved by addition of a precipitant, such as calcium ion. This treatment would necessitate determination of oxalate first, followed by analysis of samples in which F^- has been reduced or removed.

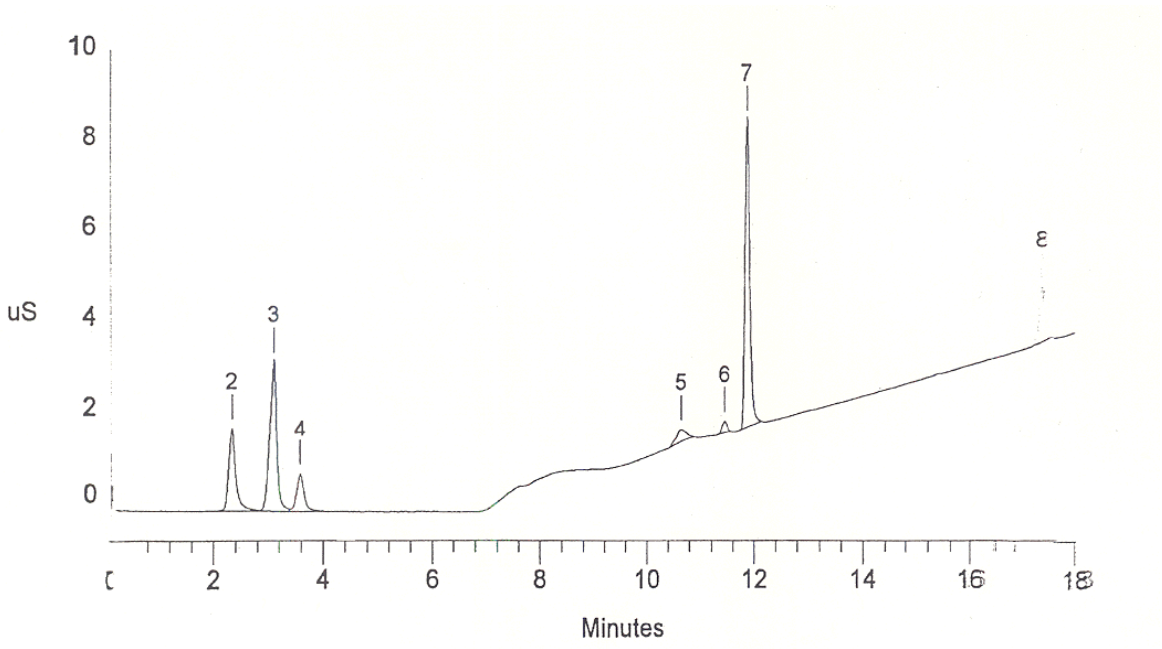


Figure 7.1. IC Chromatogram of Standard Solution. Peak 2-acetate; 3-acrylate; 4-formate; 5-carbonate; 6-sulfate; 7-oxalate

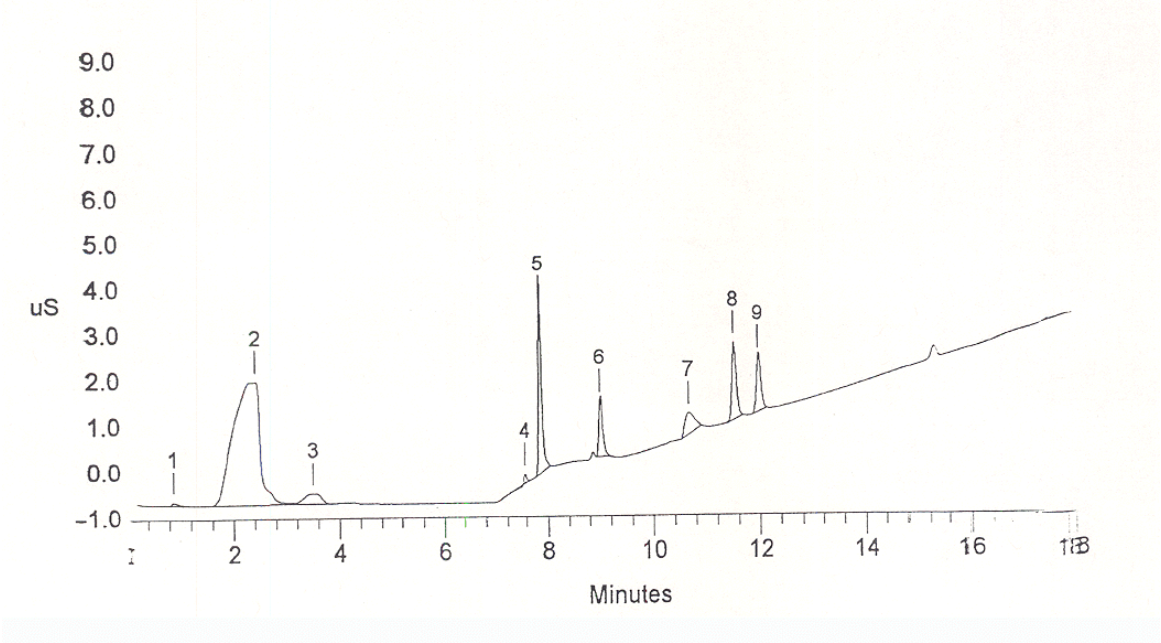


Figure 7.2. IC Chromatogram of C-104 Solids MS Sample. Peak 2-possibly F^-; Peak 3-formate; 4-chloride; 5-nitrate; 6-unknown; 7-carbonate; 8-sulfate; 9-oxalate

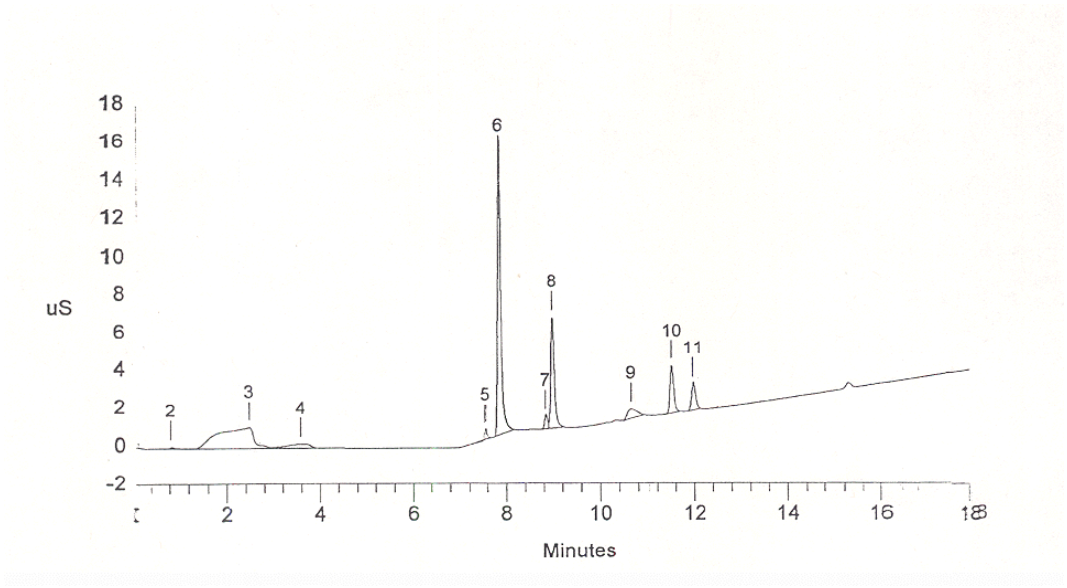


Figure 7.3. IC Chromatogram of C-104 Supernatant MS Sample. Peak 3-possibly F^-; 4-formate; 5-chloride; 6-nitrate; 7-unknown; 9-carbonate; 10-sulfate; 11-oxalate

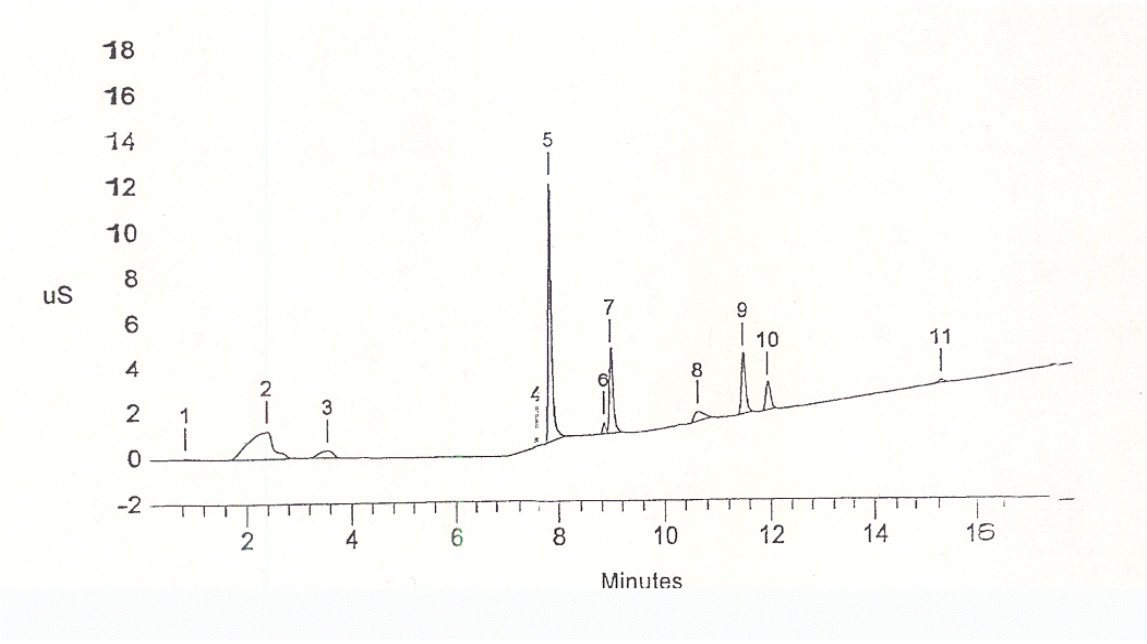


Figure 7.4. IC Chromatogram of C-104 Supernatant MSD. Peak 2-possibly F^-; 3-formate; 4-chloride; 6-nitrate; 6-unknown; 7-unknown; 8-carbonate; 9-sulfate; and 10-oxalate

8.0 Headspace Analysis

Introduction

Headspace analyses were performed on the supernatant of tank waste material from Tank C-104 following sub-sampling in the SAL per Test Plan BNFL-29953-080 Rev. 1. The samples were prepared in the SAL and transferred under CoC to the laboratory for analysis. Analyses were performed using an automated headspace sampler interfaced to a gas chromatographic/mass spectrometric (GC/MS) system. Test Plan BNFL-29953-026 Rev. 0: "Analysis for Volatile Constituents using Headspace Gas Chromatography Mass Spectrometry" provides details of the procedure used for this analysis. Analytes of interest include methanol, ethanol, 1-propanol, 2-propanol, n-butanol, 1-methylpropanol, 2-methyl-2-propanol, and triethylamine.

8.2 Sample Preparation

Tank samples from C-104 were prepared in the SAL. Sample aliquots of 1 mL were placed in 10-mL headspace vials and immediately sealed using crimp-top septa. The samples were then transported to the 329 organic laboratory for subsequent analysis. Immediately prior to analysis, internal standards and surrogate compounds were added through the septa.

8.3 Instrumentation

The analytical instrumentation utilized for the analysis of volatile components by headspace consists of an automated headspace analyzer interfaced to a GC/MS system. A description of the system is provided in Table 8.1.

Table 8.1. Headspace Instrumentation

System/Instrument	Manufacturer	Model Number	M&TE (1) Number
Headspace Sampler	Hewlett-Packard	7964	WD 25715
Gas Chromatograph	Hewlett-Packard	5890	WD 14120
Mass Spectrometer	Hewlett-Packard	5972	WD 17020

(1) Measuring and Test Equipment

8.4 Analysis Results

The headspace analysis results for BNFL specified target compounds are presented in Tables 8.2. Headspace analysis for the analytes of interest was performed on the supernatants only. As seen in Table 8.3, the target MRQ (after adjusting for density) for triethylamine was not met. There was not good comparison of the results between the sample and a duplicate. A reanalysis of the samples confirmed these results. The crimp top to the duplicate sample was found to be slightly loose and the analytes may have been lost prior to analysis.

As is typical of many Hanford tank materials, a substantial amount of normal paraffin hydrocarbons (NPH) were found to be present in the sample primarily as undecane (55 µg/mL), dodecane (90 µg/mL), tridecane (110 µg/mL), and tetradecane (30 µg/mL). These and other tentatively identified compounds (TICs) are not included in Table 8.2 because they were not part of the target list. Quantitation for the those compounds was based on an assumed response factor taken from the

internal standard and should be considered as approximate. The duplicate sample contained about twice the quantity of NPH as that found in the sample which may indicate homogeneity issues are a contributor to the poor comparability of the target analytes. NPH oxidation products were also found in lesser quantities. These constituents included unsaturated similarly sized straight chain and branched hydrocarbons, as well as ketones such as dodecanones and undecanones.

Table 8.2. C-104 Results – Headspace Analysis

Sample ID / ***Units***		**MDL** µg/mL	**00-1360 Method Blank** µg/mL	**00-1360 Process Blank** µg/mL	**00-1360 Sample** µg/mL	**00-1360 Duplicate** µg/mL
CAS #	**BNFL Compound List**					
67-56-1	Methanol	5	U	U	16	U
64-17-5	Ethanol	1	2.6	2.2 B	8.0 B	2.9 B
67-63-0	2-Propanol	1	U	U	U	U
75-65-0	2-Methyl-2-propanol	1	U	U	U	U
71-23-8	1-Propanol	1	U	U	2.7	U
78-92-2	2-Butanol	1	U	U	U	U
71-36-3	n-Butanol	1	U	U	28	U
121-44-8	Triethylamine	20	U	U	15 J	U
Surrogate Compound			**% Rec**	**% Rec**	**% Rec**	**% Rec**
Methanol-d_4			105	122	104	101

"J" = Compound was detected below the level of quantitation
"B" = Compound was present in the method blank

Table 8.3. Target Headspace Minimum Reportable Quantities

Units		**Solids Target MRQ** [(1)] µg/Kg	**Supernatant Target MRQ (Density = 1.161 g/mL)** µg/mL
CAS #	**BNFL Compound List**		
67-56-1	Methanol	-----	-----
64-17-5	Ethanol	-----	-----
67-63-0	2-Propanol	-----	-----
75-65-0	2-Methyl-2-propanol	-----	-----
71-23-8	1-Propanol	-----	-----
78-92-2	2-Butanol	-----	-----
71-36-3	n-Butanol	900	1.0
121-44-8	Triethylamine	500	0.6

(1) MRQ =Minimum Reportable Quantity
"-----" = No MRQ target provided

8.5 QC Evaluation

Response for the internal standard, ethanol-d_6, varied substantially (almost a factor of three) throughout the analytical batch. This affected the detection limits for methanol and triethylamine. In addition, the surrogate recoveries for methanol-d_4 were slightly affected. However, the surrogate recovery variation appears primarily to be attributable to variation of the internal standard response as well. Matrix spike and MSD recoveries are presented in Table 8.4. Fifty micrograms of each analyte was added to the sample.

Table 8.4. C-104 Headspace Matrix Spike Recoveries

Sample ID		**00-1360**	
		MS	**MSD**
Units		**% Rec**	**% Rec**
CAS #	**BNFL Compound List**		
67-56-1	Methanol	113	106
64-17-5	Ethanol	95.0	95.3
67-63-0	2-Propanol	98.9	100
75-65-0	2-Methyl-2-propanol	85.1	87.0
71-23-8	1-Propanol	97.8	101
78-92-2	2-Butanol	95.6	97.8
71-36-3	n-Butanol	93.8	82.7
121-44-8	Triethylamine	51.8	45.4
Surrogate Compound		**% Rec**	**% Rec**
Methanol-d_4		103	108

Recoveries were calculated after subtraction of the results from the sample analysis. The recoveries are reasonable in general with the exception of triethylamine, which had a lower recovery than expected. This method has typically performed well for methanol and shows promise as an effective technique for the analysis of triethylamine. Further development and evaluation will be necessary to improve the stability performance of this technique and sensitivity for triethylamine.

9.0 REFERENCES

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Appendix A: PNNL Test Plan For C-104 Sample Compositing, Bnfl-29953-31, Rev. 0

PNNL Test Plan	Document No.: BNFL-TP-29953-031 Rev. No.: 0

Title: C-104 Sample Compositing

Work Location: 325/SFO	**Page** 1 of 5
Author: Paul Bredt	**Effective Date: Upon Final Signature** **Supersedes Date: New**
Use Category Identification: Reference	
Identified Hazards: ___Radiological ___Hazardous Materials ___Physical Hazards ___Hazardous Environment ___Other:	**Required Reviewers:** __X__Author __X__Technical Reviewer __X__RPL Manager __X__Project Manager __X__RPG Quality Engineer ___BNFL

Are One-Time Modifications Allowed to this Procedure? __X__ Yes ___ No

NOTE: If Yes, then modifications are not anticipated to impact safety. For documentation requirements of a modification see SBMS or the controlling Project QA Plan as appropriate.

On-The Job Training Required? _____ Yes or __X__No

FOR REVISIONS:
Is retraining to this procedure required? _____Yes __X__No

Does the OJT package associated with this procedure require revision to reflect procedure changes?
_____Yes _____No __X__N/A

Approval	Signature	Date
Author	***Signature on File***	
Technical Reviewer	***Signature on File***	
RPL Manager	***Signature on File***	
Project Manager	***Signature on File***	
RPG Quality Engineer	***Signature on File***	
BNFL		

Applicability

This Test Plan describes work to be performed under Task 2.01, LAW and HLW Feed Characterization. This work is defined under BNFL letter W375-98-0018 dated September 29, 1998. Approximately 1.7 L of material from Tank 241-C-104 has been transferred from the 222-S laboratory to the 325 HLRF. All of this material is to be used to prepare a C-104 composite. Homogenous subsamples of the composite are to be collected for delisting and permitting activities as well as for select research and development activities.

Subsamples will be withdrawn from the composite in a manner which will provide representative samples for chemical and radiochemical analysis and physical testing. To support the delisting and permitting, this test plan will generate samples that will allow measurement of chemical properties of the waste that are both precise and accurate. Integrity of the subsamples will be maintained consistent with prior sampling and storage history. No preservation or temperature control of the subsamples are planned. Sampling protocols in SW-846 are not strictly applicable since these protocols are targeted at sampling in the field.

Quality Control

Quality control has been implemented in the work instructions.

Since this document will be used to record an experimental process, markups as specified in the RPL Operations manual section 16.6 will be allowed. The staff member performing the change initials markups to this Test Plan. The Cognizant Scientist overseeing the work initials and dates changes to the Test Plan. Changes made by the Cognizant Scientist do not require additional reviews or approvals. If changes occur to multiple pages then the Cognizant scientist shall note the effected pages and initialize the note. Superseded text shall be lined out, but not obscured, initialed and dated.

M&TE List:

Balance 1:

Calib ID _____ Calib Exp Date_____

Location _____

Balance 2:

Calib ID _____ Calib Exp Date _____

Location _____

Thermocouple:

Calib ID _____ Calib Exp Date_____

Location _____ Thermocouple type _____

Digital Thermometer:

Calib ID _____ Calib Exp Date_____

Location _____

Work Instructions

1) The composite is to be prepared in a 3L stainless steel vessel. Secondary containment will be used to allow recovery from a possible breach of a 3L vessel or failure of the tap valve. The recommended parts for the kettles are listed below. Viton O-rings are to be used for sealing the vessel. No grease is to be used. Assemble the vessel in the hot cell.

Description	Part	Vendor
UHMWPE packed ¾" Ball Valve	SS-63ES12	Seattle Valve and Fitting
5"ID x 9.87" pipe nipple with 6.75" Comflat flange	FNF0500	Varian
6.75" blank off flange	F06750000NC4	Varian
6.75" viton gasket	FG0675VU	Varian
Nut and bolt set	FB0600C06	Varian
Clamping ring	Z12,171-1	Sigma-Aldrich
¾" swagelok to pipe thread	SS-12-TA-1-12	Seattle Valve and Fitting
Stir rod	14-500-18	Fischer
Total		

2) Weigh the sample jars listed below to ± 0.01 g. Transfer all material from the jars to the mixing vessel. If necessary, use supernatant from the jars or vessel to rinse the solids into the vessel. Reweigh the empty jars and record the mass to ± 0.01 g in the space provided.

Sample Label	Mass (Full)	Mass (Empty)	Mass Transferred
16273			
16274			
16275			
16276			
16277			
16278			
16279			
16280			
16281			
16282			
16283			
16284			
16285			
16286			

3) The goal of this step is to homogenize the sample using as little force as possible. Stir the sample by slowly increasing the motor speed until the solids are mobilized. Given this work is being conducted in a steel vessel, observations need to be made with the lid off the vessel. Stir for a minimum of one hour. Record the hot cell temperature.

Time _____ Date _____ Temperature _____°C

4) While the solids are mobilized, collect ~50 ml of sample in a clean jar. This fraction is probably high in solids due to the geometry of the vessel, so return this sample to the vessel and continue to stir the vessel.

5) Collect 3 ~100 ml samples in volume-graduated tared bottles listed below by removing material using the ¾" ball valve located on the bottom of the vessel. Sufficient sample is to be collected in each jar as to minimize headspace in the jars. Weight the full bottles to ± 0.01 g and record the masses below.

C-104 COMP A		**C-104 COMP B**		**C-104 GL**	
Total	g	Total	g	Total	g
Tare	g	Tare	g	Tare	g
Slurry	g	Slurry	g	Slurry	g

6) Turn off the stirring motor, record the date and time. Cover the vessel using a blank flange.

Day _____ Time _____

7) Allow **C-104 COMP A**, **C-104 COMP B, and C-104 GL** to settle for a minimum of 16 hours.

8) Record the date and time, and total volume of the slurries and volume of the settled solids in **C-104 COMP A**, **C-104 COMP B, and C-104 GL**.

Day _____ Time _____

C-104 COMP A		**C-104 COMP B**		**C-104 GL**	
Total	ml	Total	ml	Total	ml
Solids	ml	Solids	ml	Solids	ml

9) If the volume percent settled solids in the 5 samples are within ~10%, then the samples are representative of the whole composite and proceed to step 10. If the volume percent settled solids vary by much more than 10%, then return the slurry samples in jars **C-104 COMP A**, **C-104 COMP B, and C-104 GL** to the kettle, increase the stirring rate and repeat steps 3 through 9.

10) Turn the stirrer on and allow the system to stir for ~10 minutes. While the stirrer is on, collect all the remaining material in 500 ml jars as labeled below. It is possible that up to 3 jars may be required. Record the time and date.

Day _____ Time _____

C-104 COMP C		**C-104 COMP D**		**C-104 COMP E**	
Total	g	Total	g	Total	g
Tare	g	Tare	g	Tare	g
Slurry	g	Slurry	g	Slurry	g

11) Allow samples **C-104 COMP C**, **C-104 COMP D, and C-104 COMP E** to settle for at least 3 days then transfer all standing liquid on samples **C-104 COMP A**, **C-104 COMP B, C-104 COMP C**, **C-104 COMP D, C-104 COMP E, and C-104 GL** to 250 ml jars as labeled below. It is possible that up to 3 jars may be required. Record the time and date.

Day _____ Time _____

C-104 SUP A		**C-104 SUP B**		**C-104 SUP C**	
Total	g	Total	g	Total	g
Tare	g	Tare	g	Tare	g
Slurry	g	Slurry	g	Slurry	g

12) Transfer sample **C-104 COMP A**, C**-104 COMP B, C-104 GL, C-104 SUP A**, **C-104 SUP B, and C-104 SUP C** to the SAL with a chain of custody**.**

Appendix B: PNNL Test Plan For Inorganic, Organic, and Radiochemical Characterization of C-104 HLW Sample – BNFL-29953-30, Rev. 1

PNNL Test Plan

Document No.: BNFL-29953-030
Rev. No.: 1

Title: Inorganic, Organic and Radiochemical Characterization of C-104 HLW Sample

Work Location:
325/SFO, 325/general labs; 329/general labs

Page 1 of 9

Author: Michael W. Urie

Use Category Identification: Reference

Effective Date: Upon final signature
Supersedes Date: New

Identified Hazards:
__ Radiological
__ Hazardous Materials
__ Physical Hazards
__ Hazardous Environment
__ Other:

Required Reviewers:
X Technical Reviewer
__ Building Manager
__ Radiological Control
__ ES&H
X Quality Engineer
X Project Manager
X RPL Manager
X SFO Manager
X AO&AM Manager

Are One-Time Modifications Allowed to this Procedure?
_X_ Yes __ No

NOTE: If Yes, then modifications are not anticipated to impact safety. For documentation requirements of a modification see SBMS or the controlling Project QA Plan as appropriate.

On-The Job Training Required? ____ Yes or __X__ No
FOR REVISIONS:
Is retraining to this procedure required? ___ Yes _X__ No
Does the OJT package associated with this procedure require revision to reflect procedure changes? __ Yes__ No
X N/A

Approval	Signature	Date
Author	***Signature on File***	
Technical Reviewer	***Signature on File***	
RPL Manager	***Signature on File***	
SFO Manager	***Signature on File***	
Project Manager	***Signature on File***	
AO&AM Manager	***Signature on File***	
Quality Engineer	***Signature on File***	
BNFL	***Signature on File***	

Applicability

This Test Plan describes work to be performed under Task 5.0, Double Shell Tank Analytical Support Change No. 1, for tank wastes from C-104. A composite generated from Test Plan TP-29953-031, "C-104 Sample Compositing", provide the starting material for the inorganic, organic, and radiochemical characterization of the "as received" tank waste material. Per TP-29953-031, two bottles containing approximately 340 grams of slurry and one jar containing approximately 175 grams of decanted supernatant are allocated to support the "as received" characterization analysis. The representative slurry and supernatant sub-samples are extracted from the C-104 HLW composite sample in the High Level Radiation Facility and transferred to the Shielded Analytical Laboratory for analytical sub-sampling, digestion, extraction, and distribution for analysis.

The characterization of the "as received" tank waste materials is conducted to provide key characterization information for processing, as well as to provide limited information for the permitting activities. This Test Plan covers the sub-sampling and processing of analytical samples, and the inorganic, organic and radiochemical analysis of these samples to provide both precise and accurate compositional results that meet, when possible, regulatory requirements.

This Test Plan does not cover physical properties testing on the C-104 material. Physical properties testing is to be conducted under an alternate test plan. Also, this Test Plan does not include analyses to support the dilution of the C-104 material for the CUF activities, nor does it include the inorganic and radiochemical analysis for the resulting diluted material.

Prerequisites

The majority of sub-sampling, analytical processing, and inorganic, organic and radiochemical analysis are being conducted per established and approved Battelle procedures or analytical test plans written specifically to support the work detailed in this Test Plan. The Battelle technical procedures and test plans supporting the characterization activity adhere to SW-846 protocols to the extent possible considering the limited sample volume, radiological condition, and extended target analyte list.

Hazards Assessment and Mitigation

All hazards associated with work conducted to this Test Plan have either been evaluated as part of each laboratory's Hazard Awareness Summary or as hazards unique to a specific analytical preparation or specific analytical procedures or test plans. The Hazard Awareness Summaries are posted for all laboratories in the Radiological Processing Laboratory. Hazards unique to analysis procedures are identified in the applicable procedures or test plans, and where applicable, specific Chemical Processing Permits are obtained.

Quality Control

Quality control is governed by Quality Assurance Planning Subject Area, including Exhibit "Conducting Analytical Work in Support of Regulatory Programs". The Subject Area Exhibit specifies calibration and verification requirements for analytical systems, as well as batch processing quality control samples to monitor preparation and extraction processing (i.e., blanks, duplicates, matrix spikes, matrix spike duplicates, and laboratory control standards). This Test Plan identifies those analyses for which duplicates and matrix spikes are to be performed, and the approximate quantity of sample to be used for each analysis.

Technical procedures used to support the characterization of the HLW material are either from Chemical Measurement Center Core Capabilities Manual or are project-specific procedures/test plans written specifically to support activities identified in this Test Plan. Necessary method modifications and deviations from technical procedures, test plans, or SW-846 protocols shall be documented in the final report.

Integrity of the sub-samples and processed samples distributed throughout the laboratory will be maintained by chain-of-custody documentation. Changes to this Test Plan (initialed markups are allowed) shall be approved by the Task Manager.

Exceptions

Based on the history of the C-104 sample, exceptions are being taken to the preservation, temperature control, and hold time requirements specified by SW-846 protocols. The samples are not preserved and no refrigeration of the samples is practical at this time. Hold times, based on sampling dates, have been exceeded prior to sample receipt and starting the analytical characterization.

In some cases, sample sizes based on SW-846 protocols are not attainable due to limited sample quantity. A limited quantity of material is available for the characterization analyses, and to the extent possible, the sample material is allocated based on the PNNL method sensitivity and ability to meet Minimum Reportable Quantities (MRQ). The sample volumes and weights used for analyses may be less than the recommended values in SW-846. The effect of small sample size on detection limits and reproducibility will be discussed in the final report. Specifically, the quantity of supernatant available for analysis is insufficient to ensure that all the MRQs are met. All the supernatant from the C-104 "as received" material is targeted to support the regulatory analyses, including inorganic, radiochemical, and organic analytes of interest.

Due to the limited sample quantity, deviations from SW-846 preparation methods may be necessary (e.g., modification to organic extraction procedure). Per the QA Planning Subject Area Exhibit, modifications (e.g., single organic extraction protocol) require Task Leader approval prior to performing the analysis. Formal method qualification of minor modifications will not be performed, but the modification will be validated by the use of duplicate, matrix spikes and surrogates. Modifications, as well as minor deviations to procedures or SW-846 protocols that do not affect data quality, will be documented in the final report.

Per discussion with WDOE and BNFL, certain analyses included in the Battelle Proposal No. 29274/30406 (for AN-107, AW-101, and C-104 tank waste materials) are not being performed, specifically, Total Oil and Grease, Sulfide, Iodide, Nitrogen, Corrosion Test, Reactive Cyanide, Reactive Sulfide, and ZHE for VOA. Also, three organic analytes (ammonium perfluorooctanoate, oxirane, and picric acid) are being omitted from the organic analysis analyte list following discussions with BNFL and WDOE. Also, per letter communication from BNFL, no TCLP extractions of the solids are being conducted for either inorganic or organic constituents.

Based on radiological dose considerations, the analytical samples may be diluted to reduce the dose to laboratory staff. This may significantly impact the ability to meet the MRQs for some analytes.

Work Instructions

A simple flowchart for the sub-sampling activity is provided in Figure A.1. The analysis methods are contained in Appendix A of the Battelle Proposal No. 29274/30406 and are not duplicated in this Test

Plan. Analytical work is either initiated by a standard Analytical Service Request that will identify each test to be performed on the various samples and sub-samples or through the implementation of an analysis-specific test plan.

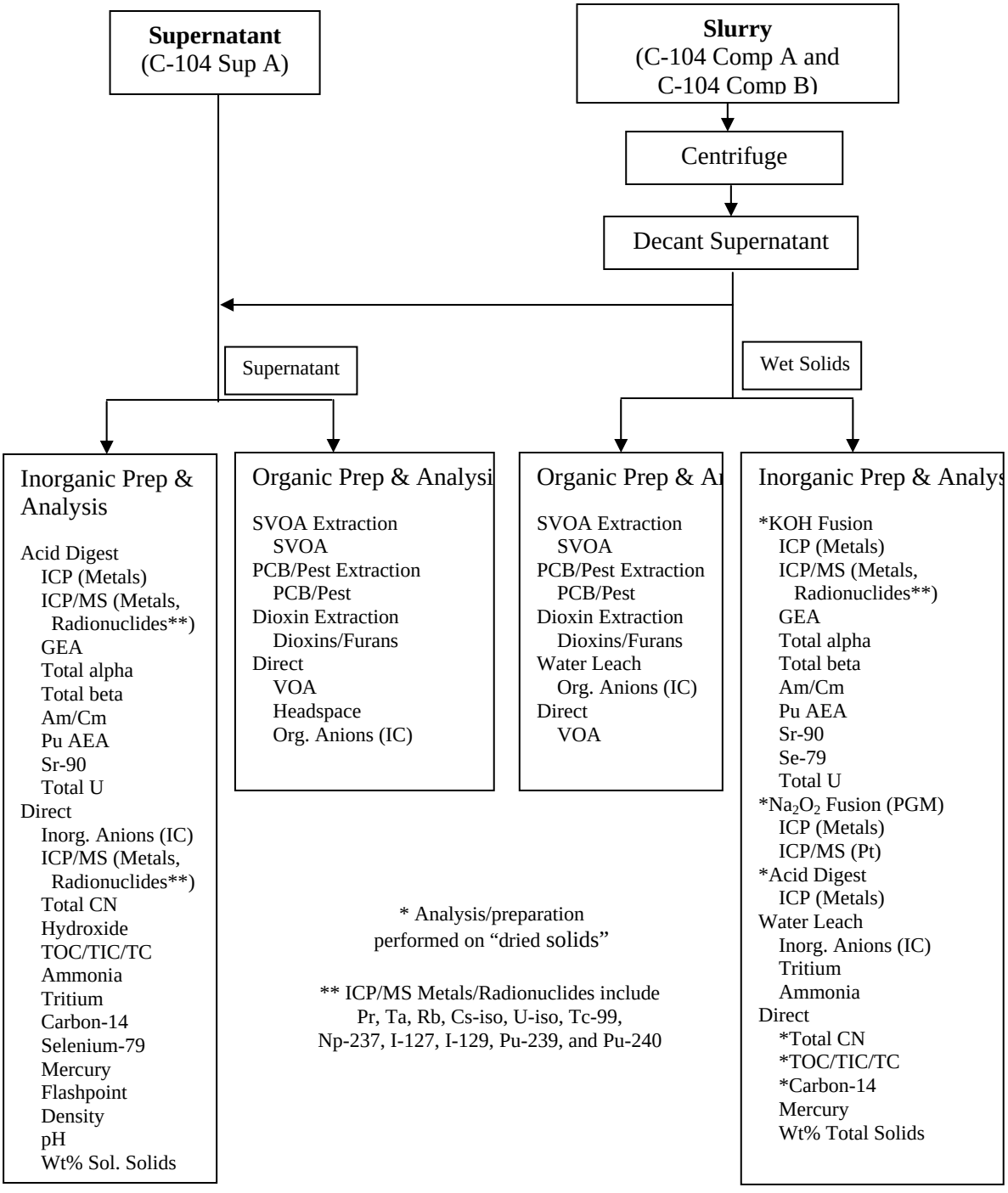

Figure B.1. Analytical Sub-Sampling Flowchart

The starting analysis material consists of two containers of representative composite slurry and one container of decanted supernatant. The supernatant from the two slurry containers and the decanted supernatant represent essentially all of the supernatant available for characterization analysis. If slurry from the two containers have to be combined prior to sub-sampling, the entire contents of the containers shall be thoroughly homogenized, by mechanical mixing, prior to extracting any sub-samples. All material sub-sampling and most analytical processing (e.g., digestions, fusions, and organic extractions) will be performed in the Shielded Analytical Laboratory due to dose levels.

Sub-Sampling and Phase Separation

The slurry and supernatant materials for "as received" characterization analysis are contained in three sample containers as described in Test Plan BNFL-29953-031. Table A.1 details the container tare values and the sample masses associated with each container.

Table B.1. "As Received" Sub-Samples for Characterization

Sample Material	Bottle ID	Bottle Tare (g)	Total Mass (g)	Supernatant or Slurry Mass (g)
Composite Slurry	C-104 Comp A	133.8	302.7	168.9
Composite Slurry	C-104 Comp B	133.5	303.8	170.3
Supernatant	C-104 Sup A	248.8	424.5	175.7

The composite slurry samples are to be centrifuged to provide solids and supernatant phase separation. The supernatant from the slurry samples is decanted from the "wet solids" and combined with the supernatant in C-104 Sup A. The "wet solids" remaining are to be sub-sampled immediately for weight percent solids (in duplicate) and then sub-sampled for all organic analyses, water leaching analyses (i.e., anions, tritium, and ammonia), and mercury analysis as soon as practical. Following the sub-sampling for organic analysis, water leaching analyses, and mercury analysis, the remaining solids are to be dried to allow representative sub-sampling for all other analyses to be performed at a later date (i.e., without the necessity of additional weight percent solids measurements).

Organic Analysis

Special care is taken handling both the supernatants and "wet solids" to ensure sample integrity is maintained and representative sub-samples are extracted for analysis. Organic analyses (either direct or following extraction processing) are performed on the supernatant and "wet solids" fractions, and Table B.2 details the estimated sub-sampling quantities for each analysis. Table B.4 identifies the organic analyte list and associates each compound with an analysis method. Organic compounds other than those listed in Appendix A that are identified during analysis will be noted in the final report.

Test plans will be used to establish the extraction protocols for each extraction process used to generate samples for organic analysis (i.e., SVOA, PCB/Pest, and/or Dioxin). In order to conserve sample material, the Matrix Spikes and Matrix Spike Duplicates may be prepared using half the sample size used for the Sample and Duplicate.

Inorganic and Radiochemistry Sub-Sampling

Where required by the analysis method, sample preparation by digestion, fusion, or leaching are performed to established and approved Battelle procedures. Table B.3 details the estimated

sub-sampling quantities of the supernatants, “wet solids”, and “dried solids”. Inorganic analytes and radionuclides of interest are included in Table B.5. Inorganic analytes and radionuclides other than those listed in Table F.5 that are identified during analysis will be noted in the final report.

Analytical Service Request and Special Laboratory Instructions

This Test Plan details the sub-sampling and sample quantity requirements for processing the HLW C-104 “as received” material for inorganic, radiochemistry, and organic analysis. The Analytical Service Request form is to be used to assign unique sample identification numbers to all samples and to identify specific analyses to be performed on each sub-sample. As part of the ASR, special laboratory instructions are to be provided to the laboratory staff to ensure that all sub-sampling and preparation activities are accomplished per this Test Plan. The ASR and the special instruction require review and approval of the Task Leader and become part of the project record once approved and implemented. Changes to the ASR or special instructions also require the approval of the Task Leader.

Table B.2. Organic Analytical Sub-Sampling Quantities Required [(1)]

Phase	Analysis or Procedure	Sample	Duplicate	MS/MSD	SW-846[(2)]
Wet Solids	VOA	0.5 g	0.5 g	0.5 g	5 g
	Water Leach (IC Org.)	1 g	1 g	1 g	n/a
	Extraction (SVOA)	5 g	5 g	5 g	30 g
	Extraction (PCB/Pest)	5 g	5 g	5 g	30 g
	Extraction (Dioxins)	5 g	5 g	5 g	30 g
	Sub Total	16.5 g	16.5 g	16.5 g	
	Total	**49.5 g**			
Supernatant	VOA	2 ml	2 ml	2 ml	5 ml
	Headspace	2 ml	2 ml	2 ml	10 g
	IC (organic anions)	1 ml	1 ml	1 ml	n/a
	Extraction (SVOA)	35 ml	35 ml	35 ml	3000 ml
	Extraction (PCB/Pest)	35 ml	35 ml	35 ml	3000 ml
	Extraction (Dioxins)	10 ml	10 ml	10 ml	3000 ml
	Sub Total	85 ml	85 ml	85 ml	
	Total	**255 ml**			

(1) Subsampling quantities are estimates; actual quantities used for the analyses will be dictated by the total quantity of material available for analysis.

(2) Typical SW-846 total volume for sample, duplicate, matrix spike, and matrix spiked duplicate extraction

Table B.3. Inorganic/Radiochemistry Analytical Sub-Sampling Quantities Required [1]

Phase	Analysis or Procedure	Sample	Duplicate	MS	SW-846[2]
Dried Solids	Acid Digest (ICP, ICP/MS)	1 g	1 g	1 g	3 g
	KOH Fusion (ICP,ICP/MS, Radiochemistry)	0.3 g	0.3 g	0.3 g	n/a
	Na_2O_2 Fusion (ICP, ICP/MS)	0.3 g	0.3 g	0.3 g	n/a
	Total CN	0.5 g	0.5 g	0.5 g	75 g
	TOC/TIC/TC	0.5 g	0.5 g	0.5 g	n/a
	Carbon-14	0.5 g	0.5 g	0.5 g	n/a
	Selenium-79	1 g	1 g	1 g	n/a
Wet Solids	Wt% Solids	3 g	3 g	n/a	n/a
	Water Leach (IC, Ammonia, H-3)	2 g	2 g	2 g	n/a
	Mercury	0.3 g	0.3 g	0.3 g	0.6 g
	Sub Totals	9.4 g	9.4 g	6.4 g	
	Total	**25.2 g**			
Supernatant	Acid Digest (ICP, ICP/MS, Radiochemistry)	8 ml	8 ml	8 ml	300 ml
	Dilution (ICP/MS)	1 ml	1 ml	1 ml	n/a
	IC (inorganic anions)	1 ml	1 ml	1 ml	n/a
	Mercury	1 ml	1 ml	1 ml	300 ml
	Total CN	1 ml	1 ml	1 ml	1500 ml
	TOC/TIC/TC	1 ml	1 ml	1 ml	n/a
	Carbon-14	1 ml	1 ml	1 ml	n/a
	Ammonia	2 ml	2 ml	n/a	n/a
	Tritium (H-3)	2 ml	2 ml	2 ml	n/a
	Hydroxide (OH) & pH	5 ml	5 ml	n/a	n/a
	Flashpoint	2 ml	2 ml	n/a	150 ml
	Total Dissolved Solids	5 ml	5 ml	n/a	n/a
	Density	2 ml	2 ml	n/a	n/a
	Sub Totals	32 ml	32 ml	16 ml	
	Total	**80 ml**			

(1) Subsampling quantities are estimates; actual quantities used for the analyses will be dictated by the total quantity of material available for analysis.

(2) Typical SW-846 total volume for sample, duplicate, and matrix spike.

Table B.4. Organic Analytes of Interest List and MRQs

CAS	Compound/Element	MRQ µg/Kg	CAS	Compound/Element	MRQ µg/Kg
PNL-ALO-346(9056)					
144-62-7	Oxalic acid	-----	64-19-7	Acetic acid	-----
64-18-6	Formic acid	-----	79-10-7	2-Propenoic acid	-----
PNL-ALO-346(3810/5021)					
121-44-8	Triethylamine	500	71-23-8	n-Propyl alcohol (1-propanol)	-----
64-17-5	Ethyl alcohol	-----	71-36-3	n-Butyl alcohol	900
67-56-1	Methyl alcohol (Methanol)	-----	75-65-0	2-Methyl-2-propanol	-----
67-63-0	2-Propyl alcohol (Isopropanol)	-----	78-92-2	1-Methylpropyl alcohol (2-butanol)	-----
PNL-ALO-346(8082)					
1336-36-3	Polychlorinated biphenyls (PCBs)	3300	58-89-9	gamma-BHC (Lindane)	----
309-00-2	Aldrin	22	60-57-1	Dieldrin	43
319-84-6	alpha-BHC	22	72-20-8	Endrin	43
319-85-7	beta-BHC	22	72-54-8	4,4'-DDD	----
465-73-6	Isodrin	22	76-44-8	Heptachlor	22
50-29-3	4,4'-DDT	----	8001-35-2	Toxaphene	900
PNL-ALO-345(8270C)					
100-00-5	p-Nitrochlorobenzene	-----	2234-13-1	Octachloronaphthalene	-----
100-25-4	1,4-Dinitrobenzene	800	50-32-8	Benzo(a)pyrene	1100
100-51-6	Benzyl alcohol	-----	53-70-3	Dibenz[a,h]anthracene	2700
106-46-7	1,4-Dichlorobenzene	-----	541-73-1	1,3-Dichlorobenzene	-----
108-95-2	Phenol	2100	62-75-9	N-Nitroso-N,N-dimethylamine	800
110-86-1	Pyridine	5300	67-72-1	Hexachloroethane	-----
1319-77-3	Cresol (1)	-----	82-68-8	Pentachloronitrobenzene (PCNB)	1600
95-48-7	2-Methylphenol (Cresol isomer)	-----	87-68-3	Hexachlorobutadiene	1900
106-44-5	4-Methylphenol (Cresol isomer)	-----	87-86-5	Pentachlorophenol	-----
117-81-7	Di-sec-octyl phthalate	-----	88-85-7	2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	-----
117-84-0	n-dioctyl phthalate	-----	91-20-3	Naphthalene	-----
118-74-1	Hexachlorobenzene	3300	92-52-4	1,1`-Biphenyl	-----
120-82-1	1,2,4-Trichlorobenzene	-----	95-50-1	1,2-Dichlorobenzene	2000
122-39-4	N,N-Diphenylamine (2)	4300	98-86-2	Acetophenone	3200
126-73-8	Tributyl phosphate	-----	98-95-3	Nitrobenzene	4700
128-37-0	2,6-Bis(tert-butyl)-4-methylphenol	-----			
TEST Plan per 8290					
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	-----	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	-----
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	-----	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	-----
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	-----	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	-----
35822-39-4	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	-----	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	-----
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	-----	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	-----
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	-----	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	-----
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	-----	70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	-----
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	-----	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	-----
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	-----			
PNL-ALO-335(8260B)					
100-41-4	Ethyl benzene	3300	141-78-6	Acetic acid ethyl ester	11000

CAS	Compound/Element	MRQ µg/Kg	CAS	Compound/Element	MRQ µg/Kg
100-42-5	Styrene	-----	142-82-5	n-Heptane	-----
10061-01-5	cis-1,3-Dichloropropene	6000	287-92-3	Cyclopentane	-----
10061-02-6	trans-1,3-Dichloropropene	6000	4170-30-3	2-Butenaldehyde (2-Butenal)	-----
106-35-4	3-Heptanone	-----	56-23-5	Carbon tetrachloride	2000
106-42-3	p-Xylene & m-Xylene	3300	563-80-4	3-Methyl-2-butanone	-----
106-93-4	Ethylene dibromide	5000	591-78-6	2-Hexanone	-----
106-97-8	Butane	-----	627-13-4	Nitric acid, propyl ester	-----
106-99-0	1,3-Butadiene	-----	684-16-2	Hexafluoroacetone (3)	-----
107-02-8	Acrolein	-----	67-64-1	2-Propanone (Acetone)	53300
107-05-1	3-Chloropropene	10000	67-66-3	Chloroform	2000
107-06-2	1,2-Dichloroethane	2000	71-43-2	Benzene	3300
107-12-0	Propionitrile	120000	71-55-6	1,1,1-Trichloroethane	2000
107-13-1	Acrylonitrile	28000	74-83-9	Bromomethane	5000
107-87-9	2-Pentanone	-----	74-87-3	Chloromethane	10000
108-10-1	4-Methyl-2-pentanone	11000	75-00-3	Chloroethane	-----
108-38-3	m-Xylene (See 106-42-3)	3300	75-01-4	1-Chloroethene	2000
108-87-2	Methylcyclohexane	-----	75-05-8	Acetonitrile	12700
108-88-3	Toluene	3300	75-09-2	Dichloromethane (Methylene Chloride)	10000
108-90-7	Chlorobenzene	2000	75-15-0	Carbon disulfide	-----
108-94-1	Cyclohexanone	-----	75-34-3	1,1-Dichloroethane	2000
109-66-0	n-Pentane	-----	75-35-4	1,1-Dichloroethene	2000
109-99-9	Tetrahydrofuran	-----	75-43-4	Dichlorofluoromethane	-----
110-12-3	5-Methyl-2-hexanone	-----	75-45-6	Chlorodifluoromethane	-----
110-43-0	2-Heptanone	-----	75-69-4	Trichlorofluoromethane	10000
110-54-3	n-Hexane	-----	75-71-8	Dichlorodifluoromethane	2400
110-82-7	Cyclohexane	-----	76-13-1	1,2,2-Trichloro-1,1,2-trifluoroethane	10000
110-83-8	Cyclohexene	-----	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	-----
111-65-9	n-Octane	-----	78-87-5	1,2-Dichloropropane	-----
111-84-2	n-Nonane	-----	78-93-3	2-Butanone	12000
123-19-3	4-Heptanone	-----	79-00-5	1,1,2-Trichloroethane	2000
123-38-6	n-Propionaldehyde	-----	79-01-6	1,1,2-Trichloroethylene	2000
123-86-4	Acetic acid n-butyl ester	-----	79-34-5	1,1,2,2-Tetrachloroethane	2000
123-91-1	1,4-Dioxane	-----	95-47-6	o-Xylene	3300
126-98-7	2-Methyl-2-propenenitrile	28000	96-22-0	3-Pentanone	-----
127-18-4	1,1,2,2-Tetrachloroethene	2000			
PNL-ALO-345(8270C) –Standards Unavailable			**PNL-ALO-346(8260B) – Very reactive**		
1321-64-8	Pentachloronaphthalene	-----	57-14-7	1,1-Dimethylhydrazine	-----
1335-87-1	Hexachloronaphthalene	-----	60-34-4	Methylhydrazine	-----
1335-88-2	Tetrachloronaphthalene	-----	624-83-9	Methyl isocyanate	-----
Deleted per BFNL					
3825-26-1	Ammonium perfluorooctanoate	-----	88-89-1	Picric acid	-----
75-21-8	Oxirane	-----			

(1) Cresol measured as independent Methylphenols.
(2) Not be distinguished from Diphenylamine
(3) Toxic gas, not previously analyzed
(4) "-----" = No MRQ provided by BNFL

Table B.5. Inorganic and Radiochemistry Analytes of Interest List
(Note: No MRQs Provided For Inorganic Analytes or Radionuclides of Interest)

ICP Analytes			
Silver	Iron		Antimony
Aluminum	Potassium		Selenium
Arsenic	Lanthanum (1)		Silicon
Boron	Lithium		Tin
Barium	Magnesium		Strontium (1)
Beryllium	Manganese		Tellurium (1)
Bismuth	Molybdenum		Thorium (1)
Calcium	Sodium		Titanium (1)
Cadmium	Neodymium (1)		Thallium
Cerium (1)	Nickel		Uranium
Cobalt	Phosphorus		Vanadium
Chromium	Lead		Tungsten
Copper	Palladium		Yttrium
Dysprosium	Rhodium		Zinc
Europium	Ruthenium (1)		Zirconium
IC Analytes			
Bromide	Nitrite	Nitrate	Phosphate
Chloride	Fluoride	Sulfate	
ICP-MS Analytes			
Iodine-127	Plutonium-240		Uranium-233
Iodine-129	Praseodymium		Uranium-234
Neptunium-237	Rubidium		Uranium-235
Platinum	Tantalum		Uranium-236
Plutonium-239	Technitium-99		Uranium-238
Radiochemistry Analytes			
Alpha, Total	Cobalt-60		Plutonium-241
Antimony-125 (GEA)	Curium-242 (AEA)		Ruthenium-106/Rhodium-106
Americium-241 (AEA)	Curium-243/244 (AEA)		Selenium-79
Americium-241 (GEA) (1)	Europium-154 (GEA)		Strontium-90/Yttrium-90
Beta, Total	Europium-155 (GEA)		Tin-126 (GEA)
Carbon-14	Niobium-94 (GEA)		Tritium
Cesium-134 (GEA)	Plutonium-238		Uranium-Fluorimetry
Cesium-137 (GEA)	Plutonium-239/240 (1)		
Other Analytes (1)			
Ammonia/Ammonium	Mercury		Wt% Dissolved Solids
Cyanide	pH (Supernatant)		Wt% Suspended Solids
Flashpoint (Supernatant)	Total Organic Carbon		
Hydroxide (Supernatant)	Total Inorganic Carbon		
Analytes Not Analyzed per Change Request Proposal			
Total Nitrogen	Total Sulfur		Total Iodine
Total Oil/Grease	Reactive Sulfur		Reactive Cyanide
SS Corrosion Testing	TCLP Extractions/Analysis		

(1) Additional Analytes of Interest Measured and Reported

Appendix C: PNNL Test Plan for Organic Extraction of C-104 Samples and Sub-sampling for VOA, Headspace, and Anions, BNFL-29953-080, Rev. No. 1

PNNL Test Plan

Document No.: BNFL-29953-080
Rev. No.: 1

Title: Organic Extraction of C-104 Samples and sub-sampling for VOA, Headspace, and Anions

Work Location:
325/SFO, 325/general labs; 329/general labs

Page 1 of 17

Author: Michael W. Urie

Use Category Identification: Reference

Effective Date: Upon final signature
Supersedes Date: New

Identified Hazards:
x Radiological
x Hazardous Materials
__ Physical Hazards
__ Hazardous Environment
__ Other:

Required Reviewers:
X Technical Reviewer
__Building Manager
__ Radiological Control
__ ES&H
X Quality Engineer
X Project Manager
X RPL Manager
X SFO Manager
X AO&AM Manager

Are One-Time Modifications Allowed to this Procedure?
X Yes __ No

NOTE: If Yes, then modifications are not anticipated to impact safety. For documentation requirements of a modification see SBMS or the controlling Project QA Plan as appropriate.

On-The Job Training Required? ____ Yes or __X__ No
FOR REVISIONS:
Is retraining to this procedure required? ___ Yes _X__ No
Does the OJT package associated with this procedure require revision to reflect procedure changes? __ Yes__ No
X N/A

pproval	Signature	Date
Author (VOA, SVOA)/Reviewer	***Signature on File***	
Author (PCB, Headspace)/Reviewer	***Signature on File***	
Author (Dioxins/Furans, Anions)/Reviewer	***Signature on File***	
RPL Manager	***Signature on File***	
SFO Manager	***Signature on File***	
Project Manager/Reviewer	***Signature on File***	
AO&AM Manager	***Signature on File***	
Quality Engineer	***Signature on File***	

Applicability

This Organic Extraction Test Plan describes work to be performed under Test Plan TP-29953-030, Inorganic, Organic and Radiochemical Characterization of C-104 Samples. These samples are slurries, which contain solids, and decanted liquid. Together these samples provide the starting material for the organic characterization of the "as received" materials. Per the TP-29953-030, two bottles containing about 340 grams of slurry and one jar containing about 175 grams of supernatant will be sub-sampled for VOA, headspace analysis, organic anions, SVOA, pesticide/PCB, and Dioxin/Furan analysis, as well as inorganic and radiochemistry analysis specified in the test plan. Sub-sampling and dilutions for VOA and headspace analysis will be performed prior to beginning extractions so as not to contaminate these sub-samples with solvent vapors.

Based on the history of the samples, and the limited quantities available, exceptions are being taken to the preservation, temperature control, sample size, and hold time requirements specified by SW-846 protocols. The choice of spiking solutions and extraction solvents is based upon SW-846 methods 8270C, 8081A/8082 and 8290 guidelines, where applicable.

This revision provides final documentation for the actual work performed for phase separation of the C-104 slurry, sub-sampling activities for the VOA and Headspace analyses, and the organic extraction process performed for preparing the SVOA, PCB, and Dioxin/Furan samples.

Hazards Assessment and Mitigation

The radioactive work conducted under this Test Plan is comprised of analytical organic analysis preparative operations that have been conducted routinely in the RPL and 329 Facilities. The organic extractions with small quantities of methylene chloride or methylene chloride/acetone mixtures have been performed in the Shielded Analytical Laboratory (SAL) many times and are included as a standard preparative activity on the RPL Analytical Service Request. The organic solvent extraction operations are included in the SAL work authorization. Since all of the analytical preparative operations fall within current work authorizations, no further assessment of the hazards is detailed in this Test Plan.

Quality Control

Per TP-29953-030, quality control is governed by PNNL's web-based Quality Assurance Planning Subject Area, "Conducting Analytical Work in Support of Regulatory Programs". The organic analyses will be performed in duplicate using a sample size that will closely meet regulatory reporting level for waste material. Sample sizes are specified in Test Plan TP-29953-030. Surrogate spike compounds will be added to the sample, sample duplicate, and matrix spikes in order to provide information on analyte recoveries. Separate laboratory control samples (LCS) will be prepared outside the hot-cell.

Integrity of the sub-samples and processed extracts distributed throughout the laboratory will be maintained by chain-of-custody documentation. The Task Manager shall approve changes to this Test Plan (initialed markups are allowed).

Work Instructions

An extraction scheme for the SVOA extraction activity is provided in Figure C.1. Extraction schemes for PCB/pesticide and dioxin extractions are provided in Figures C.2 and C.3, respectively.

Total dissolved solids of the supernatant and weight percent solids of the centrifuged solids will be determined prior to sub-sampling and extracting.

The extractions of these C-104 HLW samples will be performed in the Shielded Analytical Laboratory within the 325 facility.

Total Dissolved Solids and Weight Percent Solids Determination

Because these samples may contain reduced iron or other magnetically separable particles, a magnetic stir-bar and magnetic stir table should not be used. A better approach is to perform the stirring with an impeller-type stirrer, such as a Teflon coated spatula rotated by a variable speed drill. After a few minutes of stirring, and once the solids appear to be suspended, a 1-g to 3-g aliquot is placed in a tared graduated centrifuge tube, weighed, and centrifuged at 1000 RPM for approximately one hour. After centrifuging, note and record the volume of both the liquid and the solids in the tube. Decant the liquid into a tared beaker, weigh and dry at 105°C overnight. Weigh the beaker after at least 12 hours of drying to determine the total dissolved solids for the supernatant. Weight percent solids determination will be performed on the centrifuged solids, remaining in the centrifuge tube, in accordance with PNL-ALO-504.

Separation of the Wet Solids from the Slurry

Centrifugation of the slurry (i.e., C104 Comp A and C104 Comp B) may be more convenient than filtration for the separation of the wet solids from the slurry. In order to centrifuge the 120-mL jars, they must first be balanced to ±1 g. Weigh each jar and transfer the appropriate quantity of liquid from the heavier jar to the lighter jar to balance them. Place the jars in clean polyethylene sleeves, and centrifuge at no greater than 1000 RPM for 1 hour. *As a precaution, it is prudent to perform a "dry-run" first, using balanced jars containing approximately 100 mL of deionized water, and centrifuging at 1100 RPM.* After the jars containing the slurries have been centrifuged, carefully remove them from the centrifuge and the plastic sleeves. Carefully decant the supernatant into a clean jar or combine with the jar containing C-104 supernatant (i.e., container C104 SUP. A) if room is available in the container. Weigh the jar containing the wet centrifuged solids, and record this weight on the benchsheet. <u>In the event the total quantities of supernatant and wet solids are less than those listed in test plan BNFL-29953-30, contact Michael W. Urie, 376-9454.</u>

Sub-sampling for VOA and Headspace analysis

VOA and headspace aliquots shall be made prior to introducing methylene chloride, or other solvents, into the hot-cells.

Headspace samples should be aliquotted into clean 10-mL headspace vials and sealed with a septa-lined cap immediately afterward. A 1-mL supernatant sample, sample duplicate, sample triplicate and blank will be prepared for each sample as described in Test Plan TP-29953-030, Table C.2. (Note: The sample triplicate is an additional sub-sample not identified in TP-29953-030.) A 1-mL supernatant matrix spike and matrix spike duplicate will also be aliquotted at this time. The headspace vials should be tared on an analytical balance, and each 1-mL aliquot weighed and recorded, so that the density of the supernatant can be determined during this step. Additionally, 50-microliter aliquots each of the supernatant sample, sample duplicate, sample triplicate, matrix spike, and matrix spike duplicate shall also be prepared to permit quantitation of analytes that may be outside the calibration range for a 1-mL sample size.

VOA samples should be aliquotted into clean 40-mL VOA vials and sealed with a septa-lined cap immediately afterward. A 2-mL supernatant sample, sample duplicate and blank will be prepared for each sample as described in Test Plan TP-29953-030. A 1-mL supernatant matrix spike, and matrix spike duplicate will also be aliquotted at this time. Additionally, 50-microliter aliquots of each the supernatant sample, sample duplicate, matrix spike, matrix spike duplicate shall also be prepared to permit quantitation of analytes that maybe outside the calibration range for a 2-mL sample size.

Half gram aliquots of the wet centrifuged solids will be aliquotted into clean 40-mL VOA vials, diluted with organic-free water to a volume of 5 mL and sealed immediately with a septa-lined cap. The aliquots for the VOA MS and MSD shall be 0.25-g rather than the 0.5-g aliquots used for the sample and duplicate. In a like manner, a second set of wet centrifuged solids will be aliquotted using a 50-mg sample size for each the sample, duplicate, MS and MSD.

VOA and headspace samples will be transferred from the hot-cell immediately after preparation. For further guidance or questions regarding VOA sub-sampling contact George S. Klinger, 372-0448. For further guidance or questions regarding headspace sub-sampling contact Eric W. Hoppe, 376-2126.

Extraction Samples for SVOA, PCB/Pesticides and Dioxins Analysis

General Comments:

- The quantities of the sample, sample duplicate, matrix spike, and matrix spike duplicate are given in Table C.2 of Test Plan BNFL-29953-030 and restated in Section 2.1.

- Teflon separatory funnels, with FEP caps, are used for the liquid-liquid extraction processing and Teflon centrifuge tubes are used for the subsequent solids ultrasonic processing.

- Phosphoric acid is used to adjust the pH prior to extraction of the liquids, as appropriate.

- A small (0.5 ml) portion of the liquid is potentiometricly titrated to determine the quantity of phosphoric acid required to adjust the pH of the sample. The amount of precipitate formed during acidification will be evaluated and the precipitate extracted separately, if required.

- Spiking solutions will be added to the sample prior to extraction. If solids formed as a result of pH adjustment warrant a separate extraction step, additional spikes will not be added as these extracts will be recombined with the “like” phase extracts.

The nominal MDLs for liquids and solids are shown in Tables B.1 and B.2, respectively. The surrogate spikes and quantities added are shown in Table C.3. The appropriate spiking materials shall be provided by G. Klinger for SVOA, by E. Hoppe for pesticides/PCB, and J. Campbell for dioxins/furans.

Table C.1. Liquid portion HLW organic analysis MDLs

Analysis	MDL (ppb, 1 L water)	MDL (ppb, 25 mL sample)
Semivolatiles	10 to 25	400 to 1000
Pesticides and PCBs	0.1 to 1	4 to 40
Dibenzodioxins and Dibenzofurans	$1x10^{-4}$ to $1x10^{-3}$	4×10^{-3} to 4×10^{-2}

Table C.2. Solid Portion HLW Organic Analysis MDLs

Analysis	MDL (ppm, 1 g solid)	MDL (ppm, 5 g sample)
Semivolatiles	10 to 25	2 to 5
Pesticides and PCBs	0.1 to 1	0.02 to 0.2
Dibenzodioxins and Dibenzofurans	$1x10^{-4}$ to $1x10^{-3}$	2×10^{-5} to 2×10^{-4}

Table C.3. Surrogate Spike Compounds and Levels Added to Samples

Analysis	Spike Compounds	Amounts Added (µg)
Semivolatiles	phenol-d_5	75
	2-fluorophenol	75
	2-chlorophenol-d_4	75
	2,4,6-tribromophenol	75
	1,2-dichlorobenzene-d_4	50
	nitrobenzene-d_5	50
	2-fluorobiphenyl	50
	p-terphenyl-d_{14}	
Dibenzodioxins and Dibenzofurans	$^{13}C_{12}$-2,3,7,8 TCDD	0.05
	$^{13}C_{12}$-2,3,7,8 TCDF	0.05
	$^{13}C_{12}$-1,2,3,7,8 PeCDD	0.05
	$^{13}C_{12}$-1,2,3,7,8 PeCDF	0.05
	$^{13}C_{12}$-2,3,4,7,8 PeCDF	0.05
	$^{13}C_{12}$-1,2,3,4,7,8 HxCDD	0.05
	$^{13}C_{12}$-1,2,3,6,7,8 HxCDD	0.05
	$^{13}C_{12}$-1,2,3,4,7,8 HxCDF	0.05
	$^{13}C_{12}$-1,2,3,6,7,8 HxCDF	0.05
	$^{13}C_{12}$-1,2,3,7,8,9 HxCDF	0.05
	$^{13}C_{12}$-2,3,4,6,7,8 HxCDF	0.1
	$^{13}C_{12}$-1,2,3,4,6,7,8 HpCDD	
	$^{13}C_{12}$-1,2,3,4,6,7,8 HpCDF	
	$^{13}C_{12}$-1,2,3,4,7,8,9 HpCDF	
	$^{13}C_{12}$-OCDD	
Pesticides and PCBs	tetrachloro-m-xylene	0.040
	decachlorobiphenyl	0.040

Extraction of the supernatant portion of the HLW samples

Extractions for the SVOA supernatant sample and duplicate are performed on 20-mL aliquots, with the extractions for the SVOA matrix spike and matrix spike duplicates being performed on 10-mL aliquots.

Extractions for all pesticides and PCB supernatant samples are performed on 10-mL aliquots. And, extractions for dioxins/furans supernatant sample and duplicate are performed on 15-mL aliquots, with the extractions for the dioxins/furans matrix spike and matrix spike duplicate being performed on 7.5-mL aliquots. The quantity of matrix spike used is given in Table C.4. Extraction blanks shall be prepared using the same quantity of organic-free water as the quantity of supernatant sample. Stepwise instructions for performing the extractions are given in the appropriate sections..

Semivolatiles

As shown in Figure C.1, the supernatant portion of the as received sample is diluted with 25 mL of 0.01 N NaOH (prepared from organic-free water) prior to extraction. Following dilution the supernatant sample is extracted three times with equal portions of methylene chloride.

The supernatant sample is then pH adjusted by slow drop-wise addition of phosphoric acid while the sample is cooled in an ice-bath during the acidification. The pH-adjusted supernatant sample is extracted three times with equal portions of methylene chloride.

If during the acidification process any solids are formed at a relative quantity >1% by volume, the solids are separated, desiccated with sodium sulfate, and ultrasonic extracted three times using equal portions of methylene chloride.

All SVOA extracts from the supernatant portion of the as received sample are combined and concentrated to 1 mL outside the hot-cells.

Pesticides/PCB

As shown in Figure C.2, the supernatant portion of the as received sample is diluted with 25 mL of 0.01 N NaOH (prepared from organic-free water) prior to extraction. Following dilution the supernatant sample is extracted three times with equal portions of methylene chloride.

The supernatant sample is then pH adjusted by slow drop-wise addition of phosphoric acid while the sample is cooled in an ice-bath during the acidification. The pH-adjusted supernatant sample is extracted three times with equal portions of methylene chloride.

If during the acidification process any solids are formed at a relative quantity >1% by volume, the solids are separated, desiccated with sodium sulfate, and ultrasonic extracted three times using equal portions of a 1:1 methylene chloride/acetone mixture.

All extracts from the supernatant portion of the as received sample are combined and concentrated to 1 mL outside the hot-cells.

Dioxins/Furans

Adjustment of the pH is presumed not to be necessary for the dioxin/furan extractions. To dilute the sample, 25 mL of 0.01 N NaOH (prepared from organic-free water) will be added to the sample prior to extraction. As shown in Figure C.3, a supernatant sample is extracted (liquid-liquid) three times with equal portions of methylene chloride. The extracts from the supernatant portion of the as received sample are combined and concentrated to 1 mL outside the hot-cells.

Extraction of the centrifuged solids portion of the HLW samples

The solid sample and duplicate will be extracted using 5 g of the solids portion of the as received sample. A matrix spike and spike duplicate will be extracted using 2.5 g of sample. The quantity of matrix spike used is given in Table C.4. Leach blanks shall be prepared using the same quantity of organic-free water as the quantity of 0.01 N NaOH added to the sample. Stepwise instructions for performing the extractions are given in the appropriate sections.

SVOAs

As shown in Figure C.1, the solids portion of the as received sample is leached (with ultrasonic agitation) once with 50 mL of organic-free 0.01 N NaOH solution. Based upon the earlier dissolution test using a 0.5-g aliquot, any solids remaining at a level greater than 1% of the original solids portion are separated and extracted separately. The NaOH leachate (i.e., dissolved solids) is extracted three times with equal portions of methylene chloride.

The NaOH leachate is then pH adjusted by slow drop-wise addition of phosphoric acid while the sample is cooled in an ice-bath during the acidification. If a solid precipitate is formed at a relative quantity of >1% by volume, it is separated and extracted separately. The pH-adjusted NaOH leachate is extracted three times with equal portions of methylene chloride.

The undissolved solids and any solids formed during the acidification process are combined, desiccated with sodium sulfate, and ultrasonic extracted three times using methylene chloride.

All SVOA extracts from the solids portion of the as received sample are combined and concentrated to 1 mL outside the hot cells.

Pesticide/PCBs

As shown in Figure C.2, the solids portion of the sample is leached (with ultrasonic agitation) twice with 40 mL of organic-free 0.01 N NaOH solution. Based upon the earlier dissolution test using a 0.5-g aliquot, any solids remaining at a level greater than 1% of the original solids portion are separated and extracted separately. The NaOH leachate (i.e., dissolved solids) is extracted three times with equal portions of methylene chloride.

The NaOH leachate is then pH adjusted by slow drop-wise addition of phosphoric acid while the sample is cooled in an ice-bath during the acidification. If a solid precipitate is formed at a relative quantity of >1% by volume, it is separated and extracted separately. The pH-adjusted NaOH leachate is extracted three times with equal portions of methylene chloride.

The undissolved solids and any solids formed during the acidification process are combined, desiccated with sodium sulfate, and ultrasonic extracted three times using a 1:1 methylene chloride/acetone solution.

All pesticide/PCB extracts from the solids portion of the as received sample are combined and concentrated to 1 mL outside the hot-cells.

Dioxins/Furans

As shown in Figure C.3, no liquids will be added to the solid portion of the solids sample, as was done for the SVOA and pesticide/PCB extractions. The dioxin extractions do not require a pH adjustment of the wet centrifuged solids. A desiccant is mixed with the wet solids to retain any water, and the desiccated solids are ultrasonically extracted three times with a 1:1 methylene

chloride/acetone solution. The dioxin extracts are combined and concentrated to 1 mL outside the hot-cells.

Preparation and Extraction of Matrix Spikes and LCS for SVOA, Dioxins/Furans and pesticide/PCB analysis

A separate LCS will be prepared for each analysis outside the hot-cells using the sample reagents used for the extraction of the HLW samples. The LCS matrix will consist of 1 Liter of distilled water. The LCSs will be extracted using liquid-liquid extraction. The LCSs will be spiked with the compounds and levels listed in Table C.4. Separate LCSs will be prepared for SVOA, Dioxin/Furans, pesticides, and PCBs. The LCS will be spiked with the same surrogates as listed in Table C.3.

Table C.4. Laboratory Control Sample Spiking Level

CAS Reg. No.	Compound	µg
Semivolatile MS and LCS spike compounds		
100-51-6	Benzyl alcohol	50
106-46-7	1,4-Dichlorobenzene	50
108-95-2	Phenol	50
117-81-7	Di-sec-octyl phthalate	50
117-84-0	n-dioctyl phthalate	50
118-74-1	Hexachlorobenzene	50
120-82-1	1,2,4-Trichlorobenzene	50
50-32-8	Benzo(a)pyrene	50
53-70-3	Dibenz[a,h]anthracene	50
541-73-1	1,3-Dichlorobenzene	50
62-75-9	N-Nitroso-N,N-dimethylamine	50
67-72-1	Hexachloroethane	50
87-68-3	Hexachlorobutadiene	50
87-86-5	Pentachlorophenol	50
91-20-3	Naphthalene	50
95-50-1	1,2-Dichlorobenzene	50
98-95-3	Nitrobenzene	50
100-00-5	p-Nitrochlorobenzene	50
100-25-4	1,4-Dinitrobenzene	50
110-86-1	Pyridine	50
122-39-4	N,N-Diphenylamine	50
126-73-8	Tributyl phosphate	50
128-37-0	2,6-Bis(tert-butyl)-4-methylphenol	50
1319-77-3	Cresol	50
2234-13-1	Octachloronaphthalene	50
82-68-8	Pentachloronitrobenzene (PCNB)	50
88-85-7	2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	50
92-52-4	1,1’-Biphenyl	50
98-86-2	Acetophenone	50
PCB MS and LCS spike compounds		
11097-69-1	PCB Aroclor 1254	0.5
Pesticides MS and LCS spike compounds		
58-89-9	Gamma-BHC	0.2

CAS Reg. No.	Compound	µg
50-29-3	4, 4'-DDT	0.8
72-20-8	Endrin	0.8
76-44-8	Heptachlor	0.2
309-00-2	Aldrin	0.2
60-57-1	Dieldrin	0.8
Dioxins/Furans MS and LCS spike compounds		
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	8.0
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	40
35822-39-4	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	40
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	80
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	8.0
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	40
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	40
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	40
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	80

Preparation of Organic Anion Samples

The organic anion sample preparation uses a sodium-form of a cation exchange column to remove most of the radioactive cesium and strontium to reduce the overall radioactivity in the samples. Organic anion samples (1-mL supernatant samples and 1 g wet solids samples) are prepared in accordance with procedure AOAM-03. For further guidance and questions regarding execution of this procedure contact James A. Campbell, 376-0899.

Initial Testing

Determination of Titration Curves for Supernatants and Soluble Fraction of Wet Centrifuged Solids

1) Transfer a 0.5-mL aliquot of the supernatant (or soluble solids fraction) into a tared 100-mL beaker and weigh.

2) Add 10 mL of 0.01 N sodium hydroxide solution (prepared from organic-free water) and a clean magnetic stir bar to the beaker containing the aliquot. Measure and record the initial pH.

3) Titrate the sample to pH 2 using 0.1 N H_3PO_4 solution. Record the acid volume, temperature and pH at Δ0.1 - 0.2 pH units. Note the acid volume and pH at the point where any precipitation begins to occur, or redissolve. Repeat this titration using 0.1 N HNO_3 solution.

4) Using the titration spreadsheet, plot the curves for both the supernatant and soluble solids fraction.

5) Closely examine the curves. Find a region of the curve where the pH is near 6.5 and exhibits some buffering behavior. Calculate the quantity of acid needed per gram of sample to adjust the pH to the midpoint of this region. Review the data with the cognizant scientist prior to adjusting the pH of the extraction sample.

Determination of Insoluble Solids Content

1) Transfer a 0.5-g aliquot of the centrifuged solids into a tared centrifuge tube and weigh.

2) Add 10 mL of 0.01 N NaOH solution in 1-mL aliquots. After each addition, swirl the centrifuge tube for a few minutes and observe and record any dissolution of the solid that appears to occur after each addition. If all of the solids dissolve before 10 mL of 0.01 N NaOH solution have been added, record this volume for use in Step 1, Sections 6 and 7.

3) Centrifuge the tube at the highest safe speed for the centrifuge tube for approximately 15 minutes. Carefully decant the liquid portion and reweigh the centrifuge tube containing the residual centrifuged solids.

4) Calculate the percentage of solids remaining.

5) If the solids remaining are less than one percent of the original wet solids, 0.01 N NaOH solution water should be added to the solids and then extracted as a liquid sample. If the solids remaining are greater than 1% then the dissolved portion will be extracted as a liquid and the insoluble solids will be extracted using ultrasonication extraction.

Stepwise Instructions for Preparation of Semi-volatile Organic Samples

Note: Prior to performing SVOA extractions, perform activities defined in Sections 1.0 and 1.1 and Section 5.0. Figure C.1 provides a schematic of the following steps.

Solids

1) Transfer 5-g aliquot (2.5-g aliquot for MS and MSD) of the centrifuged solids to a tared 200-mL centrifuge tube and weigh.

2) Add the surrogate spiking solution to all samples (including blank) and the target compound spiking solution to the MS and MSD. Use the entire contents of the vial(s) provided for spiking. After transferring the contents of the spiking vial to the sample, add approximately 0.2 mL of methylene chloride to the vial(s) and transfer this rinsate to the sample.

3) Add 50 mL of organic-free 0.01 N NaOH solution to the centrifuge tube and ultrasonicate (pulsed) for 2 minutes.

4) Centrifuge the tube and decant the liquid into a tared bottle, labeled SVOA C-104 SF1, and weigh. Set aside the wet solids for ultrasonic extraction (Step 7).

5) Transfer the NaOH leachate sample to a centrifuge tube and while stirring vigorously, very slowly adjust the pH of the soluble solids to near 6.5and verify final pH. This step should be done using an ice bath to cool the sample.

   Note: The quantity of acid required for adjusting the pH to near 6.5 is determined by titrating an aliquot of the NaOH leachate (i.e., soluble solids fraction) per Section 5.1.

Note: If solids are formed that do not redissolve, centrifuge and decant the liquid into a separatory funnel. Cap the centrifuge tube containing the wet solids and set aside for ultrasonic extraction (Step 7).

6) Transfer leachate to a separatory funnel and perform a set of three sequential separatory funnel shakeout extractions of the pH-adjusted liquid using 25-mL portions of methylene chloride. Collect and combine the three extracts in the 250-mL amber bottle labeled as designated below.

C104-S-y-z

Where,

y = S for solid (centrifuged solids fraction), L for liquid (supernatant fraction)

z = B for blank, S for sample, D for sample duplicate, MS for matrix spike, MSD matrix spike duplicate

7) Combine the solids reserved in Step 4 and any solids formed in Step 5 and add 2-3 times amount of anhydrous sodium sulfate desiccant and stir with a glass or metal rod until a sandy texture is obtained.

8) Add 25 mL of methylene chloride and ultrasonicate (pulsed) for 2 minutes. Settle (or centrifuge if necessary) and decant the extract into the 250-mL amber bottle labeled in Step 6.

9) Repeat Step 8 two additional times and combine the extracts.

Supernatant

1) Transfer 20-mL aliquot (10-mL aliquot for MS and MSD) of the C-104 supernatant into a separatory funnel and dilute with 25 mL of 0.01 N NaOH.

2) Add the surrogate spiking solution to all samples (including blank) and the target compound spiking solution to the MS and MSD. Use the entire contents of the vial(s) provided for spiking. After transferring the contents of the spiking vial to the sample, add approximately 0.2 mL of methylene chloride to the vial(s) and transfer this rinsate to the sample.

3) Perform three sequential separatory funnel shakeout extractions of the supernatant using 25-mL portions of methylene chloride. Collect and combine the three extracts in a 250-mL amber bottle labeled as designated in Section 6.1 Step 6.

4) Transfer the sample to a centrifuge tube and while stirring vigorously, very slowly adjust the pH of the sample with the quantity of acid calculated in Section 5.1 for supernatant sample and verify final pH. This step should be done using an ice bath to cool the sample.

Note: If solids are formed that do not redissolve, centrifuge and decant the liquid back into the separatory funnel used in Step 1. Cap the centrifuge tube containing the wet solids and set aside for ultra-sonic extraction.

5) Transfer supernatant to the separatory funnel used in Step 1 and perform a second set of three sequential separatory funnel shakeout extractions of the pH-adjusted liquid using 25-mL portions of methylene chloride. Collect and combine the three extracts in the 250-mL amber bottle labeled in Step 3.

6) To any solids formed in Step 4, add 2-3 times amount of anhydrous sodium sulfate desiccant and stir with a glass or metal rod until a sandy texture is obtained.

7) Add 25 ml of methylene chloride and ultrasonicate (pulsed) for 2 minutes. Settle (or centrifuge if necessary) and decant the extract into the 250-mL amber bottle labeled in Step 3.

8) Repeat Step 7 two additional times and combine the extracts.

For further guidance and questions regarding execution of these steps, and those described in Appendix A, for extraction of SVOA samples contact George S. Klinger, 372-0448.

Stepwise Instructions for Preparation of Pesticide/PCB Organic Samples

Note: Prior to performing pesticide/PCB extractions, perform activities defined in Sections 1.0 and 1.1 and Section 5.0. Figure C.2 provides a schematic of the following steps.

Solids

1) Transfer 5-g aliquot (2.5-g aliquot for MS and MSD) of the centrifuged solids to a tared 200-mL centrifuge tube and weigh.

2) Add the surrogate spiking solution to all samples (including blank) and the target compound spiking solution to the MS and MSD. Use the entire contents of the vial(s) provided for spiking. After transferring the contents of the spiking vial to the sample, add approximately 0.2 mL of methylene chloride to the vial(s) and transfer this rinsate to the sample.

3) Add 40 mL of organic-free 0.01 N NaOH solution to the centrifuge tube and ultrasonicate (pulsed) for 2 minutes.

4) Centrifuge the tube and decant the liquid into a tared bottle, labeled PPCB C-104 SF1.

5) Repeats Steps 3 and 4 and weigh bottle PPCB C-104 SF1. Set aside the wet solids for ultrasonic extraction (Step 8).

6) Transfer the NaOH leachate sample to a centrifuge tube and while stirring vigorously, very slowly adjust the pH of the soluble solids to near 6.5 and verify final pH. This step should be done using an ice bath to cool the sample.

   Note: The quantity of acid required for adjusting the pH to near 6.5 is determined by titrating an aliquot of the NaOH leachate (i.e., soluble solids fraction) per Section 5.1.

   Note: If solids are formed that do not redissolve, centrifuge and decant the liquid into a separatory funnel. Cap the centrifuge tube containing the wet solids and set aside for ultrasonic extraction (Step 8).

7) Transfer leachate to a separatory funnel and perform a set of three sequential separatory funnel shakeout extractions of the pH-adjusted liquid using 25-mL portions of methylene chloride. Collect and combine the three extracts in the 250-mL amber bottle labeled as designated below.

C104-P-y-z

Where,

y = S for solid (centrifuged solids fraction), L for liquid (supernatant fraction)
z = B for blank, S for sample, D for sample duplicate, MS for PCB matrix spike, MSD for PCB matrix spike duplicate, MSP for pesticide spike, MSDP for pesticide matrix spike duplicate

8) Combine the solids reserved in Step 5 and any solids formed in Step 6 and add 2-3 times amount of anhydrous sodium sulfate desiccant and stir with a glass or metal rod until a sandy texture is obtained.

9) Add 25 ml of methylene chloride/acetone mixture (1:1) and ultrasonicate (pulsed) for 2 minutes. Settle (or centrifuge if necessary) and decant the extract into the 250-mL amber bottle labeled in Step 7.

10) Repeat Step 9 two additional times and combine the extracts.

Supernatant

1) Transfer 10-mL aliquot of the C-104 supernatant into a separatory funnel and dilute with 25 mL of 0.01 N NaOH.

2) Add the surrogate spiking solution to all samples (including blank) and the target compound spiking solution to the MS and MSD. Use the entire contents of the vial(s) provided for spiking. After transferring the contents of the spiking vial to the sample, add approximately 0.2 mL of methylene chloride to the vial(s) and transfer this rinsate to the sample.

3) Perform three sequential separatory funnel shakeout extractions of the supernatant using 25-mL portions of methylene chloride. Collect and combine the three extracts in a 250-mL amber bottle labeled as designated in Section 7.1 Step 7.

4) Transfer the sample to a centrifuge tube and while stirring vigorously, very slowly adjust the pH of the sample with the quantity of acid calculated in Section 5.1 for supernatant sample and verify final pH. This step should be done using an ice bath to cool the sample.

   Note: If solids are formed that do not redissolve, centrifuge and decant the liquid back into the separatory funnel used in Step 1. Cap the centrifuge tube containing the wet solids and set aside for ultra-sonic extraction.

5) Transfer supernatant to the separatory funnel used in Step 1 and perform a second set of three sequential separatory funnel shakeout extractions of the liquid using 25-mL portions of methylene chloride. Collect and combine the three extracts in the 250-mL amber bottle labeled in Step 3.

6) To any solids formed in Step 4. Add 2-3 times amount of anhydrous sodium sulfate desiccant and stir with a glass or metal rod until a sandy texture is obtained.

7) Add 25 ml of methylene chloride/acetone mixture (1:1) and ultrasonicate (pulsed) for 2 minutes. Settle (or centrifuge if necessary) and decant the extract into the 250-mL amber bottle labeled in Step 3.

8) Repeat Step 7 two additional times and combine the extracts.

For further guidance and questions regarding execution of these steps for pesticide/PCB extractions, contact Eric W. Hoppe, 376-2126.

Stepwise Instructions for Preparation of Dioxin/Furan Samples

Note: Prior to performing Dioxin/Furan extractions, perform activities defined in Sections 1.0 and 1.1 and Section 5.0. Figure C.3 provides a schematic of the following steps.

1) Transfer 5-g aliquots (5-g aliquot for MS and MSD) of the centrifuged solids to a tared 200-mL centrifuge tube and weigh. Add the labeled spiking solution (i.e., surrogates) to all samples (including blank) and the unlabeled spiking solution (i.e., spikes) to the MS and MSD. Use the entire contents of the vial(s) provided for spiking. After transferring the contents of the spiking vial to the sample, add approximately 0.2 mL of methylene chloride to the vial(s) and transfer this rinsate to the sample.

2) Add 2-3 times the amount of anhydrous sodium sulfate desiccant. Stir with glass or metal rod until it forms a sandy texture. Add 25 mL of methylene chloride/acetone mixture (1:1) and ultrasonicate (pulsed) for 2 minutes. Settle (or centrifuge, if necessary) and decant the extract into 250-mL amber bottle labeled as indicated below. Repeat methylene chloride/acetone extraction two more times and combine extracts.

C104-D-y-z

Where,
- y = S for solid (centrifuged solids fraction), L for liquid (supernatant fraction)
- z = B for blank, S for sample, D for sample duplicate, MS for matrix spike, MSD for matrix spike duplicate.

3) Transfer 15 mL of the C-104 supernatant (7.5 mL for MS and MSD) into a separatory funnel and add 25 mL of 0.01 N NaOH to the separatory funnel. Add the labeled spiking solution (i.e., surrogates) to all samples (including blank) and the unlabeled spiking solution (i.e., spikes) to the MS and MSD. Use the entire contents of the vial(s) provided for spiking. After transferring the contents of the spiking vial to the sample, add approximately 0.2 mL of methylene chloride to the vial(s) and transfer this rinsate to the sample.

4) Perform three sequential separatory funnel shakeout extractions of the supernatant using three 25-mL portions of methylene chloride. Collect and combine the three extracts in a 250-mL amber bottle labeled in Step 2.

For further guidance and questions regarding execution of these steps contact James A. Campbell, 376-0899.

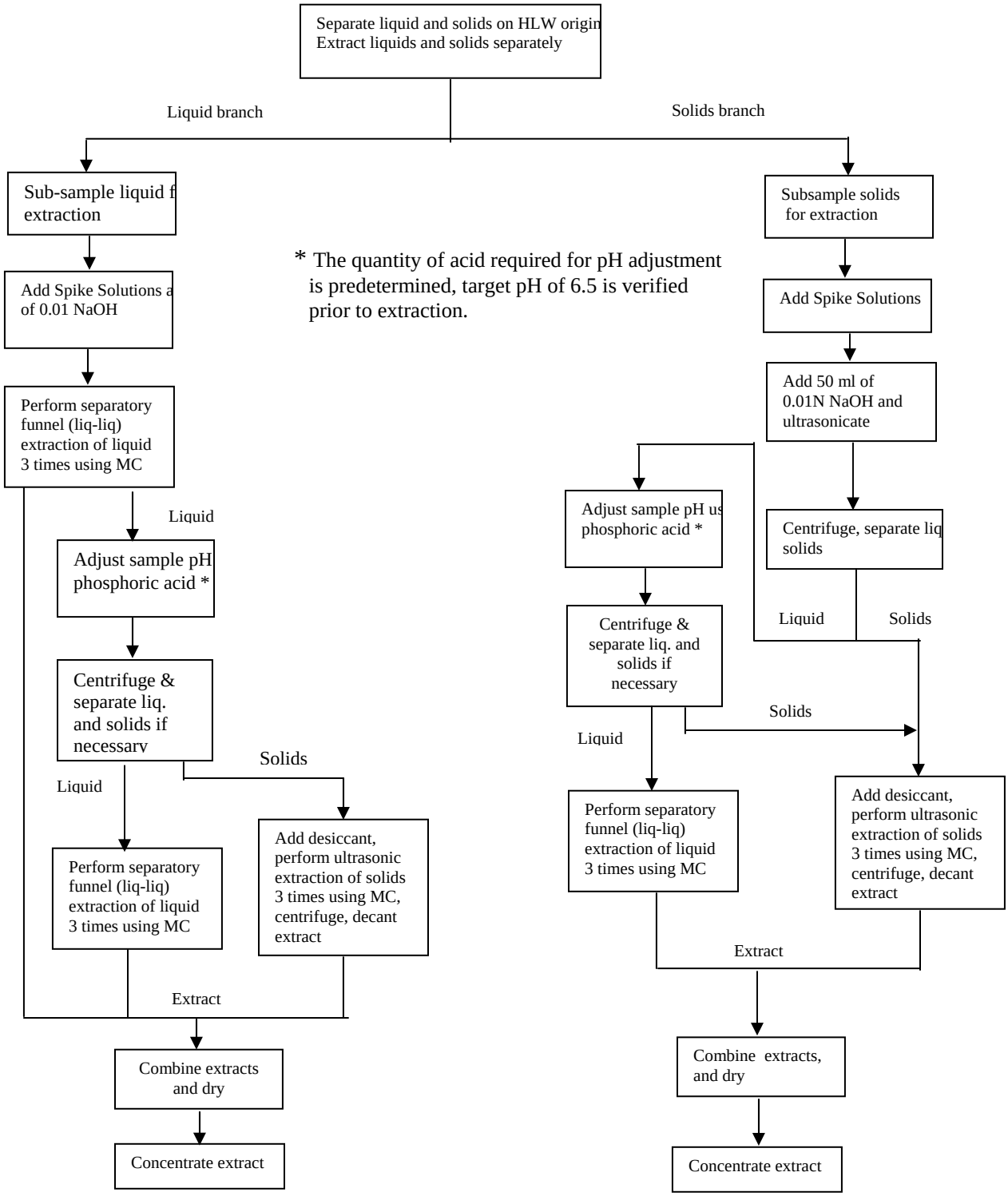

Figure C.1. SVOA Extraction Process Diagram

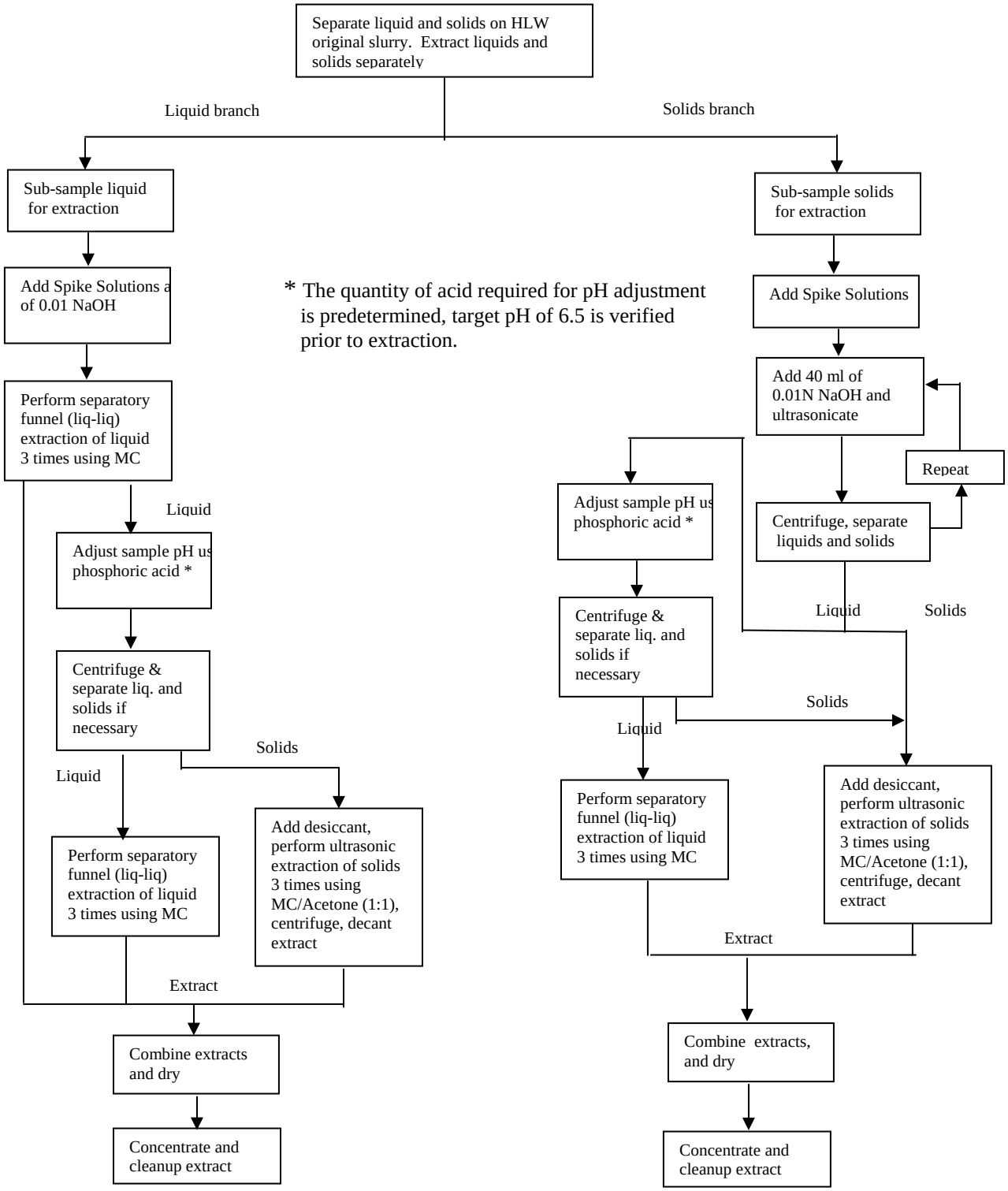

Figure C.2. Pesticide/PCB Extraction Process Diagram

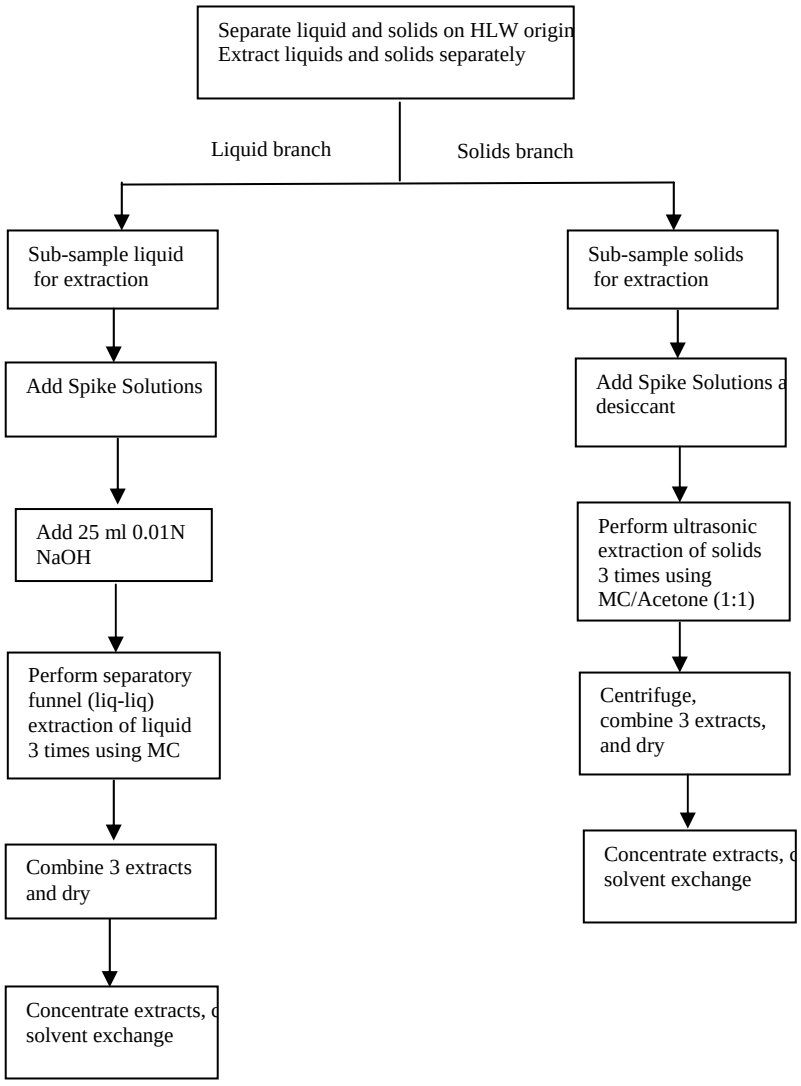

Figure C.3. Dioxin/Furan Extraction Process Diagram

Appendix A1: Semivolatile Research Sample

Prior work done on AW-101 and AN-107 samples using phosphoric acid to adjust the pH was complicated by large quantities of formed solids. It is assumed that some of the formed solids were the results of aluminum precipitation at pH less than 11 and greater than 3. It is also likely that some of the formed solids were insoluble phosphates, which were formed upon addition of the phosphoric acid.

The use of nitric acid to adjust the pH of the sample to pH 3 may have certain advantages in reducing or eliminating "formed solids" in the supernatant and the soluble portion of the centrifuged solids. Additionally, it is likely that phosphate acts in a similar fashion to sulfate in its ability to catalyze nitrate (which is present in the C-104 material at a concentration of approximately 30,000 ppm) to form the reactive nitronium ion ($^{+}NO_3$), which is a powerful nitrating agent for a variety of organics.

Nitric acid alone produces only a small quantity of "auto-catalyzed" nitronium ion. We believe that the use of nitric acid, rather than phosphoric acid, to adjust the pH of the sample may eliminate or reduce formed solids, thus reducing the number of extraction steps, and also reduce or eliminate the quantity of nitration "artifacts".

Reaction of organic amines, such as chelator fragments found in some tank samples, with nitrous acid (HONO) may also be reduced by the addition of nitric acid.

In order to test this idea for application to potential future work, one additional semivolatile sample (supernatant only) will be processed using the procedure described in Sections 5.1 and 6, using 0.1 N nitric acid, rather than phosphoric acid, for the titration of the sample and pH adjustment during the extraction.

The supernatant used for this test is to be decanted/pipetted from container "C104 COMP E".

Appendix D: Volatile Organic Analysis Result Forms

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HOTCELLBLK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360-CB

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040617

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
106-99-0	1,3-Butadiene	5	U
106-97-8	Butane	5	U
74-83-9	Bromomethane	10	U
75-35-4	1,1-Dichloroethene	10	U
75-00-3	Chloroethane	10	U
67-64-1	Acetone	2	J
109-66-0	Pentane	5	U
75-15-0	Carbon Disulfide	10	U
107-02-8	Acrolein	5	U
75-09-2	Methylene Chloride	19	B
107-13-1	Acrylonitrile	5	U
123-38-6	Propionaldehyde	5	U
156-60-5	trans-1,2-Dichloroethene	10	U
4170-30-3	2-Butenal	5	U
75-34-3	1,1-Dichloroethane	10	U
110-54-3	Hexane	11	
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
110-83-8	Cyclohexene	5	U
141-78-6	Ethyl acetate	5	U
287-92-3	Cyclopentane	5	U
74-97-5	Bromochloromethane	10	U
67-66-3	Chloroform	10	U
75-43-4	Dichlorofluoromethane	5	U
71-55-6	1,1,1-Trichloroethane	10	U
75-45-6	Chlorodifluoromethane	5	U
56-23-5	Carbon Tetrachloride	10	U
75-69-4	Trichlorofluoromethane	5	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U
79-01-6	Trichloroethene	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HOTCELLBLK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360-CB

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040617

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	5	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	5	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	5	U
75-71-8	Dichlorodifluoromethane	5	U
75-05-8	Acetonitrile	5	U
110-82-7	Cyclohexane	5	U
108-86-1	Bromobenzene	10	U
104-51-8	Butylbenzene	10	U
98-06-6	tert-Butylbenzene	10	U
135-98-8	sec-Butylbenzene	10	U
95-49-8	2-Chlorotoluene	10	U
99-87-6	4-Isopropyltoluene	10	U
106-43-4	4-Chlorotoluene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
106-93-4	1,2-Dibromoethane	10	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
142-28-9	1,3-Dichloropropane	10	U
594-20-7	2,2-Dichloropropane	10	U
563-58-6	1,1-Dichloropropene	10	U
87-68-3	Hexachloro-1,3-butadiene	10	U
98-82-8	Isopropylbenzene	10	U
91-20-3	Nathphalene	10	U
103-65-1	Propylbenzene	10	U
87-61-6	1,2,3-Trichlorobenzene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
96-18-4	1,2,3-Trichloropropane	10	U
95-63-6	1,2,4-Trimethylbenzene	10	U
108-67-8	1,2,3-Trimethylbenzene	10	U
106-35-4	3-Heptanone	5	U
110-43-0	2-Heptanone	5	U
109-99-9	Tetrahydrofuran	5	U
74-95-3	Dibromomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HOTCELLBLK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360-CB

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040617

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
106-42-3	Xylene (m & p)	10	U
95-47-6	Xylene (o)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
142-82-5	Heptane	5	U
111-65-9	Octane	5	U
111-84-2	Nonane	5	U
107-05-1	3-Chloropropene	10	U
107-87-9	2-Pentanone	5	U
108-87-2	Methylcyclohexane	5	U
110-12-3	5-Methyl-2-hexanone	5	U
123-19-3	4-Heptanone	5	U
123-86-4	Butylacetate	5	U
123-91-1	1,4-Dioxane	5	U
126-98-7	2-Methyl-2-propenenitrile	5	U
563-80-4	3-Methyl-2-butanone	5	U
627-13-4	Propyl nitrate	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HOTCELLBLKD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-1360-CBD

Sample wt/vol: _____ (g/mL) G Lab File ID: 00040623

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	50	U
75-01-4	Vinyl Chloride	50	U
106-99-0	1,3-Butadiene	50	U
106-97-8	Butane	50	U
74-83-9	Bromomethane	50	U
75-35-4	1,1-Dichloroethene	50	U
75-00-3	Chloroethane	50	U
67-64-1	Acetone	5	J
109-66-0	Pentane	50	U
75-15-0	Carbon Disulfide	50	U
107-02-8	Acrolein	50	U
75-09-2	Methylene Chloride	4	JB
107-13-1	Acrylonitrile	50	U
123-38-6	Propionaldehyde	50	U
156-60-5	trans-1,2-Dichloroethene	50	U
4170-30-3	2-Butenal	50	U
75-34-3	1,1-Dichloroethane	50	U
110-54-3	Hexane	50	U
156-59-2	cis-1,2-Dichloroethene	50	U
78-93-3	2-Butanone	50	U
110-83-8	Cyclohexene	50	U
141-78-6	Ethyl acetate	50	U
287-92-3	Cyclopentane	50	U
74-97-5	Bromochloromethane	50	U
67-66-3	Chloroform	50	U
75-43-4	Dichlorofluoromethane	50	U
71-55-6	1,1,1-Trichloroethane	50	U
75-45-6	Chlorodifluoromethane	50	U
56-23-5	Carbon Tetrachloride	50	U
75-69-4	Trichlorofluoromethane	50	U
71-43-2	Benzene	50	U
107-06-2	1,2-Dichloroethane	50	U
79-01-6	Trichloroethene	50	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HOTCELLBLKD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-1360-CBD

Sample wt/vol: _____ (g/mL) G Lab File ID: 00040623

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-87-5	1,2-Dichloropropane	50	U
75-27-4	Bromodichloromethane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
108-10-1	4-Methyl-2-pentanone	50	U
108-88-3	Toluene	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
127-18-4	Tetrachloroethene	50	U
591-78-6	2-Hexanone	50	U
124-48-1	Dibromochloromethane	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
106-42-3	Xylene (m & p)	50	U
95-47-6	Xylene (o)	50	U
100-42-5	Styrene	50	U
75-25-2	Bromoform	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
541-73-1	1,3-Dichlorobenzene	50	U
106-46-7	1,4-Dichlorobenzene	50	U
95-50-1	1,2-Dichlorobenzene	50	U
142-82-5	Heptane	50	U
111-65-9	Octane	50	U
111-84-2	Nonane	50	U
107-05-1	3-Chloropropene	50	U
107-87-9	2-Pentanone	50	U
108-87-2	Methylcyclohexane	50	U
110-12-3	5-Methyl-2-hexanone	50	U
123-19-3	4-Heptanone	50	U
123-86-4	Butylacetate	50	U
123-91-1	1,4-Dioxane	50	U
126-98-7	2-Methyl-2-propenenitrile	50	U
563-80-4	3-Methyl-2-butanone	50	U
627-13-4	Propyl nitrate	50	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HOTCELLBLKD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-1360-CBD

Sample wt/vol: _____ (g/mL) G Lab File ID: 00040623

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
96-22-0	3-Pentanone	50	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	50	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	50	U
75-71-8	Dichlorodifluoromethane	50	U
75-05-8	Acetonitrile	50	U
110-82-7	Cyclohexane	50	U
108-86-1	Bromobenzene	50	U
104-51-8	Butylbenzene	50	U
98-06-6	tert-Butylbenzene	50	U
135-98-8	sec-Butylbenzene	50	U
95-49-8	2-Chlorotoluene	50	U
99-87-6	4-Isopropyltoluene	50	U
106-43-4	4-Chlorotoluene	50	U
96-12-8	1,2-Dibromo-3-chloropropane	50	U
106-93-4	1,2-Dibromoethane	50	U
110-57-6	trans-1,4-Dichloro-2-butene	50	U
142-28-9	1,3-Dichloropropane	50	U
594-20-7	2,2-Dichloropropane	50	U
563-58-6	1,1-Dichloropropene	50	U
87-68-3	Hexachloro-1,3-butadiene	50	U
98-82-8	Isopropylbenzene	50	U
91-20-3	Nathphalene	50	U
103-65-1	Propylbenzene	50	U
87-61-6	1,2,3-Trichlorobenzene	50	U
120-82-1	1,2,4-Trichlorobenzene	50	U
96-18-4	1,2,3-Trichloropropane	50	U
95-63-6	1,2,4-Trimethylbenzene	50	U
108-67-8	1,2,3-Trimethylbenzene	50	U
106-35-4	3-Heptanone	50	U
110-43-0	2-Heptanone	50	U
109-99-9	Tetrahydrofuran	50	U
74-95-3	Dibromomethane	50	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Matrix: (soil/water) WATER Lab Sample ID: LCS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040614

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/06/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	210	
75-01-4	Vinyl Chloride	200	
106-99-0	1,3-Butadiene	210	
106-97-8	Butane	200	
74-83-9	Bromomethane	240	
75-35-4	1,1-Dichloroethene	220	
75-00-3	Chloroethane	230	
67-64-1	Acetone	190	
109-66-0	Pentane	200	
75-15-0	Carbon Disulfide	210	
107-02-8	Acrolein	220	
75-09-2	Methylene Chloride	210	B
107-13-1	Acrylonitrile	210	
123-38-6	Propionaldehyde	180	
156-60-5	trans-1,2-Dichloroethene	220	
4170-30-3	2-Butenal	250	
75-34-3	1,1-Dichloroethane	220	
110-54-3	Hexane	210	
156-59-2	cis-1,2-Dichloroethene	220	
78-93-3	2-Butanone	220	
110-83-8	Cyclohexene	210	
141-78-6	Ethyl acetate	220	
287-92-3	Cyclopentane	220	
74-97-5	Bromochloromethane	210	
67-66-3	Chloroform	220	
75-43-4	Dichlorofluoromethane	260	
71-55-6	1,1,1-Trichloroethane	210	
75-45-6	Chlorodifluoromethane	190	
56-23-5	Carbon Tetrachloride	210	
75-69-4	Trichlorofluoromethane	190	
71-43-2	Benzene	220	
107-06-2	1,2-Dichloroethane	240	
79-01-6	Trichloroethene	220	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Matrix: (soil/water) WATER Lab Sample ID: LCS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040614

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/06/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	230	
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	220	
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	200	
75-71-8	Dichlorodifluoromethane	190	
75-05-8	Acetonitrile	220	
110-82-7	Cyclohexane	260	
108-86-1	Bromobenzene	230	
104-51-8	Butylbenzene	210	
98-06-6	tert-Butylbenzene	250	
135-98-8	sec-Butylbenzene	230	
95-49-8	2-Chlorotoluene	250	
99-87-6	4-Isopropyltoluene	220	
106-43-4	4-Chlorotoluene	270	
96-12-8	1,2-Dibromo-3-chloropropane	210	
106-93-4	1,2-Dibromoethane	210	
110-57-6	trans-1,4-Dichloro-2-butene	240	
142-28-9	1,3-Dichloropropane	220	
594-20-7	2,2-Dichloropropane	220	
563-58-6	1,1-Dichloropropene	210	
87-68-3	Hexachloro-1,3-butadiene	240	
98-82-8	Isopropylbenzene	230	
91-20-3	Nathphalene	240	
103-65-1	Propylbenzene	240	
87-61-6	1,2,3-Trichlorobenzene	240	
120-82-1	1,2,4-Trichlorobenzene	230	
96-18-4	1,2,3-Trichloropropane	260	
95-63-6	1,2,4-Trimethylbenzene	220	
108-67-8	1,2,3-Trimethylbenzene	210	
106-35-4	3-Heptanone	280	
110-43-0	2-Heptanone	240	
109-99-9	Tetrahydrofuran	210	
74-95-3	Dibromomethane	220	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Matrix: (soil/water) WATER Lab Sample ID: LCS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040614

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/06/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	250	
75-27-4	Bromodichloromethane	220	
10061-01-5	cis-1,3-Dichloropropene	220	
108-10-1	4-Methyl-2-pentanone	230	
108-88-3	Toluene	230	
10061-02-6	trans-1,3-Dichloropropene	220	
79-00-5	1,1,2-Trichloroethane	220	
127-18-4	Tetrachloroethene	220	
591-78-6	2-Hexanone	230	
124-48-1	Dibromochloromethane	220	
108-90-7	Chlorobenzene	220	
100-41-4	Ethylbenzene	250	
106-42-3	Xylene (m & p)	260	
95-47-6	Xylene (o)	260	
100-42-5	Styrene	270	
75-25-2	Bromoform	220	
79-34-5	1,1,2,2-Tetrachloroethane	230	
541-73-1	1,3-Dichlorobenzene	240	
106-46-7	1,4-Dichlorobenzene	240	
95-50-1	1,2-Dichlorobenzene	230	
142-82-5	Heptane	210	
111-65-9	Octane	210	
111-84-2	Nonane	230	
107-05-1	3-Chloropropene	240	
107-87-9	2-Pentanone	220	
108-87-2	Methylcyclohexane	230	
110-12-3	5-Methyl-2-hexanone	220	
123-19-3	4-Heptanone	240	
123-86-4	Butylacetate	250	
123-91-1	1,4-Dioxane	250	
126-98-7	2-Methyl-2-propenenitrile	240	
563-80-4	3-Methyl-2-butanone	200	
627-13-4	Propyl nitrate	240	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: VBLK02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040616

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
106-99-0	1,3-Butadiene	5	U
106-97-8	Butane	5	U
74-83-9	Bromomethane	10	U
75-35-4	1,1-Dichloroethene	10	U
75-00-3	Chloroethane	10	U
67-64-1	Acetone	10	U
109-66-0	Pentane	5	U
75-15-0	Carbon Disulfide	10	U
107-02-8	Acrolein	5	U
75-09-2	Methylene Chloride	0.5	J
107-13-1	Acrylonitrile	5	U
123-38-6	Propionaldehyde	5	U
156-60-5	trans-1,2-Dichloroethene	10	U
4170-30-3	2-Butenal	5	U
75-34-3	1,1-Dichloroethane	10	U
110-54-3	Hexane	5	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
110-83-8	Cyclohexene	5	U
141-78-6	Ethyl acetate	5	U
287-92-3	Cyclopentane	5	U
74-97-5	Bromochloromethane	10	U
67-66-3	Chloroform	10	U
75-43-4	Dichlorofluoromethane	5	U
71-55-6	1,1,1-Trichloroethane	10	U
75-45-6	Chlorodifluoromethane	5	U
56-23-5	Carbon Tetrachloride	10	U
75-69-4	Trichlorofluoromethane	5	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U
79-01-6	Trichloroethene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: VBLK02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040616

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
106-42-3	Xylene (m & p)	10	U
95-47-6	Xylene (o)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
142-82-5	Heptane	5	U
111-65-9	Octane	5	U
111-84-2	Nonane	5	U
107-05-1	3-Chloropropene	10	U
107-87-9	2-Pentanone	5	U
108-87-2	Methylcyclohexane	5	U
110-12-3	5-Methyl-2-hexanone	5	U
123-19-3	4-Heptanone	5	U
123-86-4	Butylacetate	5	U
123-91-1	1,4-Dioxane	5	U
126-98-7	2-Methyl-2-propenenitrile	5	U
563-80-4	3-Methyl-2-butanone	5	U
627-13-4	Propyl nitrate	5	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: VBLK02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040616

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	5	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	5	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	5	U
75-71-8	Dichlorodifluoromethane	5	U
75-05-8	Acetonitrile	5	U
110-82-7	Cyclohexane	5	U
108-86-1	Bromobenzene	10	U
104-51-8	Butylbenzene	10	U
98-06-6	tert-Butylbenzene	10	U
135-98-8	sec-Butylbenzene	10	U
95-49-8	2-Chlorotoluene	10	U
99-87-6	4-Isopropyltoluene	10	U
106-43-4	4-Chlorotoluene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
106-93-4	1,2-Dibromoethane	10	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
142-28-9	1,3-Dichloropropane	10	U
594-20-7	2,2-Dichloropropane	10	U
563-58-6	1,1-Dichloropropene	10	U
87-68-3	Hexachloro-1,3-butadiene	10	U
98-82-8	Isopropylbenzene	10	U
91-20-3	Nathphalene	10	U
103-65-1	Propylbenzene	10	U
87-61-6	1,2,3-Trichlorobenzene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
96-18-4	1,2,3-Trichloropropane	10	U
95-63-6	1,2,4-Trimethylbenzene	10	U
108-67-8	1,2,3-Trimethylbenzene	10	U
106-35-4	3-Heptanone	5	U
110-43-0	2-Heptanone	5	U
109-99-9	Tetrahydrofuran	5	U
74-95-3	Dibromomethane	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: VBLK03

Sample wt/vol: _____ (g/mL) G Lab File ID: 00040622

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	50	U
75-01-4	Vinyl Chloride	50	U
106-99-0	1,3-Butadiene	50	U
106-97-8	Butane	50	U
74-83-9	Bromomethane	50	U
75-35-4	1,1-Dichloroethene	50	U
75-00-3	Chloroethane	50	U
67-64-1	Acetone	18	J
109-66-0	Pentane	50	U
75-15-0	Carbon Disulfide	50	U
107-02-8	Acrolein	50	U
75-09-2	Methylene Chloride	50	U
107-13-1	Acrylonitrile	50	U
123-38-6	Propionaldehyde	50	U
156-60-5	trans-1,2-Dichloroethene	50	U
4170-30-3	2-Butenal	50	U
75-34-3	1,1-Dichloroethane	50	U
110-54-3	Hexane	50	U
156-59-2	cis-1,2-Dichloroethene	50	U
78-93-3	2-Butanone	50	U
110-83-8	Cyclohexene	50	U
141-78-6	Ethyl acetate	50	U
287-92-3	Cyclopentane	50	U
74-97-5	Bromochloromethane	50	U
67-66-3	Chloroform	50	U
75-43-4	Dichlorofluoromethane	50	U
71-55-6	1,1,1-Trichloroethane	50	U
75-45-6	Chlorodifluoromethane	50	U
56-23-5	Carbon Tetrachloride	50	U
75-69-4	Trichlorofluoromethane	50	U
71-43-2	Benzene	50	U
107-06-2	1,2-Dichloroethane	50	U
79-01-6	Trichloroethene	50	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: VBLK03

Sample wt/vol: _____ (g/mL) G Lab File ID: 00040622

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-87-5	1,2-Dichloropropane	50	U
75-27-4	Bromodichloromethane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
108-10-1	4-Methyl-2-pentanone	50	U
108-88-3	Toluene	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
79-00-5	1,1,2-Trichloroethane	50	U
127-18-4	Tetrachloroethene	50	U
591-78-6	2-Hexanone	50	U
124-48-1	Dibromochloromethane	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
106-42-3	Xylene (m & p)	50	U
95-47-6	Xylene (o)	50	U
100-42-5	Styrene	50	U
75-25-2	Bromoform	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
541-73-1	1,3-Dichlorobenzene	50	U
106-46-7	1,4-Dichlorobenzene	50	U
95-50-1	1,2-Dichlorobenzene	50	U
142-82-5	Heptane	50	U
111-65-9	Octane	50	U
111-84-2	Nonane	50	U
107-05-1	3-Chloropropene	50	U
107-87-9	2-Pentanone	50	U
108-87-2	Methylcyclohexane	50	U
110-12-3	5-Methyl-2-hexanone	50	U
123-19-3	4-Heptanone	50	U
123-86-4	Butylacetate	50	U
123-91-1	1,4-Dioxane	50	U
126-98-7	2-Methyl-2-propenenitrile	50	U
563-80-4	3-Methyl-2-butanone	50	U
627-13-4	Propyl nitrate	50	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: VBLK03

Sample wt/vol: _____ (g/mL) G Lab File ID: 00040622

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
96-22-0	3-Pentanone	50	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	50	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	50	U
75-71-8	Dichlorodifluoromethane	50	U
75-05-8	Acetonitrile	50	U
110-82-7	Cyclohexane	50	U
108-86-1	Bromobenzene	50	U
104-51-8	Butylbenzene	50	U
98-06-6	tert-Butylbenzene	50	U
135-98-8	sec-Butylbenzene	50	U
95-49-8	2-Chlorotoluene	50	U
99-87-6	4-Isopropyltoluene	50	U
106-43-4	4-Chlorotoluene	50	U
96-12-8	1,2-Dibromo-3-chloropropane	50	U
106-93-4	1,2-Dibromoethane	50	U
110-57-6	trans-1,4-Dichloro-2-butene	50	U
142-28-9	1,3-Dichloropropane	50	U
594-20-7	2,2-Dichloropropane	50	U
563-58-6	1,1-Dichloropropene	50	U
87-68-3	Hexachloro-1,3-butadiene	50	U
98-82-8	Isopropylbenzene	50	U
91-20-3	Nathphalene	50	U
103-65-1	Propylbenzene	50	U
87-61-6	1,2,3-Trichlorobenzene	50	U
120-82-1	1,2,4-Trichlorobenzene	50	U
96-18-4	1,2,3-Trichloropropane	50	U
95-63-6	1,2,4-Trimethylbenzene	50	U
108-67-8	1,2,3-Trimethylbenzene	50	U
106-35-4	3-Heptanone	50	U
110-43-0	2-Heptanone	50	U
109-99-9	Tetrahydrofuran	50	U
74-95-3	Dibromomethane	50	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUP

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040618

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	1000	U
75-01-4	Vinyl Chloride	1000	U
106-99-0	1,3-Butadiene	500	U
106-97-8	Butane	500	U
74-83-9	Bromomethane	1000	U
75-35-4	1,1-Dichloroethene	1000	U
75-00-3	Chloroethane	1000	U
67-64-1	Acetone	1000	
109-66-0	Pentane	500	U
75-15-0	Carbon Disulfide	1000	U
107-02-8	Acrolein	500	U
75-09-2	Methylene Chloride	8000	B
107-13-1	Acrylonitrile	500	U
123-38-6	Propionaldehyde	500	U
156-60-5	trans-1,2-Dichloroethene	1000	U
4170-30-3	2-Butenal	500	U
75-34-3	1,1-Dichloroethane	1000	U
110-54-3	Hexane	5000	
156-59-2	cis-1,2-Dichloroethene	1000	U
78-93-3	2-Butanone	290	J
110-83-8	Cyclohexene	500	U
141-78-6	Ethyl acetate	500	U
287-92-3	Cyclopentane	500	U
74-97-5	Bromochloromethane	1000	U
67-66-3	Chloroform	1000	U
75-43-4	Dichlorofluoromethane	500	U
71-55-6	1,1,1-Trichloroethane	1000	U
75-45-6	Chlorodifluoromethane	500	U
56-23-5	Carbon Tetrachloride	1000	U
75-69-4	Trichlorofluoromethane	500	U
71-43-2	Benzene	1000	U
107-06-2	1,2-Dichloroethane	1000	U
79-01-6	Trichloroethene	1000	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUP

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040618

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	1000	U
75-27-4	Bromodichloromethane	1000	U
10061-01-5	cis-1,3-Dichloropropene	1000	U
108-10-1	4-Methyl-2-pentanone	1000	U
108-88-3	Toluene	1000	U
10061-02-6	trans-1,3-Dichloropropene	1000	U
79-00-5	1,1,2-Trichloroethane	1000	U
127-18-4	Tetrachloroethene	1000	U
591-78-6	2-Hexanone	24	J
124-48-1	Dibromochloromethane	1000	U
108-90-7	Chlorobenzene	1000	U
100-41-4	Ethylbenzene	1000	U
106-42-3	Xylene (m & p)	1000	U
95-47-6	Xylene (o)	1000	U
100-42-5	Styrene	1000	U
75-25-2	Bromoform	1000	U
79-34-5	1,1,2,2-Tetrachloroethane	1000	U
541-73-1	1,3-Dichlorobenzene	1000	U
106-46-7	1,4-Dichlorobenzene	1000	U
95-50-1	1,2-Dichlorobenzene	1000	U
142-82-5	Heptane	1900	
111-65-9	Octane	3800	
111-84-2	Nonane	6200	
107-05-1	3-Chloropropene	1000	U
107-87-9	2-Pentanone	500	U
108-87-2	Methylcyclohexane	500	U
110-12-3	5-Methyl-2-hexanone	500	U
123-19-3	4-Heptanone	500	U
123-86-4	Butylacetate	500	U
123-91-1	1,4-Dioxane	500	U
126-98-7	2-Methyl-2-propenenitrile	500	U
563-80-4	3-Methyl-2-butanone	500	U
627-13-4	Propyl nitrate	500	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUP

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040618

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	500	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	500	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	500	U
75-71-8	Dichlorodifluoromethane	500	U
75-05-8	Acetonitrile	500	U
110-82-7	Cyclohexane	500	U
108-86-1	Bromobenzene	1000	U
104-51-8	Butylbenzene	1000	U
98-06-6	tert-Butylbenzene	1000	U
135-98-8	sec-Butylbenzene	1000	U
95-49-8	2-Chlorotoluene	1000	U
99-87-6	4-Isopropyltoluene	1000	U
106-43-4	4-Chlorotoluene	1000	U
96-12-8	1,2-Dibromo-3-chloropropane	1000	U
106-93-4	1,2-Dibromoethane	1000	U
110-57-6	trans-1,4-Dichloro-2-butene	1000	U
142-28-9	1,3-Dichloropropane	1000	U
594-20-7	2,2-Dichloropropane	1000	U
563-58-6	1,1-Dichloropropene	1000	U
87-68-3	Hexachloro-1,3-butadiene	1000	U
98-82-8	Isopropylbenzene	1000	U
91-20-3	Nathphalene	1000	U
103-65-1	Propylbenzene	1000	U
87-61-6	1,2,3-Trichlorobenzene	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
96-18-4	1,2,3-Trichloropropane	1000	U
95-63-6	1,2,4-Trimethylbenzene	1000	U
108-67-8	1,2,3-Trimethylbenzene	1000	U
106-35-4	3-Heptanone	74	J
110-43-0	2-Heptanone	97	J
109-99-9	Tetrahydrofuran	500	U
74-95-3	Dibromomethane	1000	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360D

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040619

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	1000	U
75-01-4	Vinyl Chloride	1000	U
106-99-0	1,3-Butadiene	500	U
106-97-8	Butane	500	U
74-83-9	Bromomethane	1000	U
75-35-4	1,1-Dichloroethene	1000	U
75-00-3	Chloroethane	1000	U
67-64-1	Acetone	1000	U
109-66-0	Pentane	500	U
75-15-0	Carbon Disulfide	1000	U
107-02-8	Acrolein	500	U
75-09-2	Methylene Chloride	1000	U
107-13-1	Acrylonitrile	500	U
123-38-6	Propionaldehyde	500	U
156-60-5	trans-1,2-Dichloroethene	1000	U
4170-30-3	2-Butenal	500	U
75-34-3	1,1-Dichloroethane	1000	U
110-54-3	Hexane	500	U
156-59-2	cis-1,2-Dichloroethene	1000	U
78-93-3	2-Butanone	1000	U
110-83-8	Cyclohexene	500	U
141-78-6	Ethyl acetate	500	U
287-92-3	Cyclopentane	500	U
74-97-5	Bromochloromethane	1000	U
67-66-3	Chloroform	1000	U
75-43-4	Dichlorofluoromethane	500	U
71-55-6	1,1,1-Trichloroethane	1000	U
75-45-6	Chlorodifluoromethane	500	U
56-23-5	Carbon Tetrachloride	1000	U
75-69-4	Trichlorofluoromethane	500	U
71-43-2	Benzene	1000	U
107-06-2	1,2-Dichloroethane	1000	U
79-01-6	Trichloroethene	1000	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360D

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040619

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	1000	U
75-27-4	Bromodichloromethane	1000	U
10061-01-5	cis-1,3-Dichloropropene	1000	U
108-10-1	4-Methyl-2-pentanone	1000	U
108-88-3	Toluene	1000	U
10061-02-6	trans-1,3-Dichloropropene	1000	U
79-00-5	1,1,2-Trichloroethane	1000	U
127-18-4	Tetrachloroethene	1000	U
591-78-6	2-Hexanone	1000	U
124-48-1	Dibromochloromethane	1000	U
108-90-7	Chlorobenzene	1000	U
100-41-4	Ethylbenzene	1000	U
106-42-3	Xylene (m & p)	1000	U
95-47-6	Xylene (o)	1000	U
100-42-5	Styrene	1000	U
75-25-2	Bromoform	1000	U
79-34-5	1,1,2,2-Tetrachloroethane	1000	U
541-73-1	1,3-Dichlorobenzene	1000	U
106-46-7	1,4-Dichlorobenzene	1000	U
95-50-1	1,2-Dichlorobenzene	1000	U
142-82-5	Heptane	500	U
111-65-9	Octane	500	U
111-84-2	Nonane	500	U
107-05-1	3-Chloropropene	1000	U
107-87-9	2-Pentanone	500	U
108-87-2	Methylcyclohexane	500	U
110-12-3	5-Methyl-2-hexanone	500	U
123-19-3	4-Heptanone	500	U
123-86-4	Butylacetate	500	U
123-91-1	1,4-Dioxane	500	U
126-98-7	2-Methyl-2-propenenitrile	500	U
563-80-4	3-Methyl-2-butanone	500	U
627-13-4	Propyl nitrate	500	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360D

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040619

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	500	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	500	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	500	U
75-71-8	Dichlorodifluoromethane	500	U
75-05-8	Acetonitrile	0.0	J
110-82-7	Cyclohexane	500	U
108-86-1	Bromobenzene	1000	U
104-51-8	Butylbenzene	1000	U
98-06-6	tert-Butylbenzene	1000	U
135-98-8	sec-Butylbenzene	1000	U
95-49-8	2-Chlorotoluene	1000	U
99-87-6	4-Isopropyltoluene	1000	U
106-43-4	4-Chlorotoluene	1000	U
96-12-8	1,2-Dibromo-3-chloropropane	1000	U
106-93-4	1,2-Dibromoethane	1000	U
110-57-6	trans-1,4-Dichloro-2-butene	1000	U
142-28-9	1,3-Dichloropropane	1000	U
594-20-7	2,2-Dichloropropane	1000	U
563-58-6	1,1-Dichloropropene	1000	U
87-68-3	Hexachloro-1,3-butadiene	1000	U
98-82-8	Isopropylbenzene	1000	U
91-20-3	Nathphalene	1000	U
103-65-1	Propylbenzene	1000	U
87-61-6	1,2,3-Trichlorobenzene	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
96-18-4	1,2,3-Trichloropropane	1000	U
95-63-6	1,2,4-Trimethylbenzene	1000	U
108-67-8	1,2,3-Trimethylbenzene	1000	U
106-35-4	3-Heptanone	500	U
110-43-0	2-Heptanone	500	U
109-99-9	Tetrahydrofuran	500	U
74-95-3	Dibromomethane	1000	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-01360MS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040620

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	5000	U
75-01-4	Vinyl Chloride	5000	U
106-99-0	1,3-Butadiene	5700	
106-97-8	Butane	2600	
74-83-9	Bromomethane	5000	U
75-35-4	1,1-Dichloroethene	2800	J
75-00-3	Chloroethane	5000	U
67-64-1	Acetone	3200	J
109-66-0	Pentane	1600	J
75-15-0	Carbon Disulfide	5000	U
107-02-8	Acrolein	2500	U
75-09-2	Methylene Chloride	25000	B
107-13-1	Acrylonitrile	2400	J
123-38-6	Propionaldehyde	14000	
156-60-5	trans-1,2-Dichloroethene	5000	U
4170-30-3	2-Butenal	2500	U
75-34-3	1,1-Dichloroethane	5000	U
110-54-3	Hexane	5000	
156-59-2	cis-1,2-Dichloroethene	5000	U
78-93-3	2-Butanone	20000	
110-83-8	Cyclohexene	1300	J
141-78-6	Ethyl acetate	2500	U
287-92-3	Cyclopentane	3000	
74-97-5	Bromochloromethane	5000	U
67-66-3	Chloroform	5000	U
75-43-4	Dichlorofluoromethane	1900	J
71-55-6	1,1,1-Trichloroethane	5000	U
75-45-6	Chlorodifluoromethane	2100	J
56-23-5	Carbon Tetrachloride	5000	U
75-69-4	Trichlorofluoromethane	2500	U
71-43-2	Benzene	3500	J
107-06-2	1,2-Dichloroethane	5000	U
79-01-6	Trichloroethene	2500	J

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-01360MS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040620

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	5000	U
75-27-4	Bromodichloromethane	5000	U
10061-01-5	cis-1,3-Dichloropropene	5000	U
108-10-1	4-Methyl-2-pentanone	15000	
108-88-3	Toluene	2300	J
10061-02-6	trans-1,3-Dichloropropene	5000	U
79-00-5	1,1,2-Trichloroethane	5000	U
127-18-4	Tetrachloroethene	5000	U
591-78-6	2-Hexanone	3000	J
124-48-1	Dibromochloromethane	5000	U
108-90-7	Chlorobenzene	1900	J
100-41-4	Ethylbenzene	5000	U
106-42-3	Xylene (m & p)	5000	U
95-47-6	Xylene (o)	5000	U
100-42-5	Styrene	5000	U
75-25-2	Bromoform	5000	U
79-34-5	1,1,2,2-Tetrachloroethane	5000	U
541-73-1	1,3-Dichlorobenzene	5000	U
106-46-7	1,4-Dichlorobenzene	5000	U
95-50-1	1,2-Dichlorobenzene	5000	U
142-82-5	Heptane	1100	J
111-65-9	Octane	590	J
111-84-2	Nonane	420	J
107-05-1	3-Chloropropene	5000	U
107-87-9	2-Pentanone	3000	
108-87-2	Methylcyclohexane	1400	J
110-12-3	5-Methyl-2-hexanone	14000	
123-19-3	4-Heptanone	2700	
123-86-4	Butylacetate	2500	U
123-91-1	1,4-Dioxane	14000	
126-98-7	2-Methyl-2-propenenitrile	15000	
563-80-4	3-Methyl-2-butanone	14000	
627-13-4	Propyl nitrate	2200	J

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-01360MS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040620

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	15000	
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	1700	J
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	2300	J
75-71-8	Dichlorodifluoromethane	9200	
75-05-8	Acetonitrile	3200	
110-82-7	Cyclohexane	2000	J
108-86-1	Bromobenzene	5000	U
104-51-8	Butylbenzene	5000	U
98-06-6	tert-Butylbenzene	5000	U
135-98-8	sec-Butylbenzene	5000	U
95-49-8	2-Chlorotoluene	5000	U
99-87-6	4-Isopropyltoluene	5000	U
106-43-4	4-Chlorotoluene	5000	U
96-12-8	1,2-Dibromo-3-chloropropane	5000	U
106-93-4	1,2-Dibromoethane	5000	U
110-57-6	trans-1,4-Dichloro-2-butene	5000	U
142-28-9	1,3-Dichloropropane	5000	U
594-20-7	2,2-Dichloropropane	5000	U
563-58-6	1,1-Dichloropropene	5000	U
87-68-3	Hexachloro-1,3-butadiene	5000	U
98-82-8	Isopropylbenzene	5000	U
91-20-3	Nathphalene	5000	U
103-65-1	Propylbenzene	5000	U
87-61-6	1,2,3-Trichlorobenzene	5000	U
120-82-1	1,2,4-Trichlorobenzene	5000	U
96-18-4	1,2,3-Trichloropropane	5000	U
95-63-6	1,2,4-Trimethylbenzene	5000	U
108-67-8	1,2,3-Trimethylbenzene	5000	U
106-35-4	3-Heptanone	3900	
110-43-0	2-Heptanone	14000	
109-99-9	Tetrahydrofuran	690	J
74-95-3	Dibromomethane	5000	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-01360MSD

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040621

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	5000	U
75-01-4	Vinyl Chloride	5000	U
106-99-0	1,3-Butadiene	2500	U
106-97-8	Butane	2500	U
74-83-9	Bromomethane	5000	U
75-35-4	1,1-Dichloroethene	5000	U
75-00-3	Chloroethane	5000	U
67-64-1	Acetone	160000	E
109-66-0	Pentane	2500	U
75-15-0	Carbon Disulfide	5000	U
107-02-8	Acrolein	2500	U
75-09-2	Methylene Chloride	79000	B
107-13-1	Acrylonitrile	13000	
123-38-6	Propionaldehyde	120000	E
156-60-5	trans-1,2-Dichloroethene	5000	U
4170-30-3	2-Butenal	160000	E
75-34-3	1,1-Dichloroethane	5000	U
110-54-3	Hexane	23000	
156-59-2	cis-1,2-Dichloroethene	5000	U
78-93-3	2-Butanone	5000	U
110-83-8	Cyclohexene	2500	U
141-78-6	Ethyl acetate	2500	U
287-92-3	Cyclopentane	2500	U
74-97-5	Bromochloromethane	5000	U
67-66-3	Chloroform	5000	U
75-43-4	Dichlorofluoromethane	2500	U
71-55-6	1,1,1-Trichloroethane	5000	U
75-45-6	Chlorodifluoromethane	2500	U
56-23-5	Carbon Tetrachloride	5000	U
75-69-4	Trichlorofluoromethane	2500	U
71-43-2	Benzene	960	J
107-06-2	1,2-Dichloroethane	5000	U
79-01-6	Trichloroethene	5000	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-01360MSD

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040621

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
78-87-5	1,2-Dichloropropane	5000	U
75-27-4	Bromodichloromethane	5000	U
10061-01-5	cis-1,3-Dichloropropene	5000	U
108-10-1	4-Methyl-2-pentanone	16000	
108-88-3	Toluene	760	J
10061-02-6	trans-1,3-Dichloropropene	5000	U
79-00-5	1,1,2-Trichloroethane	5000	U
127-18-4	Tetrachloroethene	5000	U
591-78-6	2-Hexanone	14000	
124-48-1	Dibromochloromethane	5000	U
108-90-7	Chlorobenzene	830	J
100-41-4	Ethylbenzene	5000	U
106-42-3	Xylene (m & p)	5000	U
95-47-6	Xylene (o)	5000	U
100-42-5	Styrene	5000	U
75-25-2	Bromoform	5000	U
79-34-5	1,1,2,2-Tetrachloroethane	5000	U
541-73-1	1,3-Dichlorobenzene	5000	U
106-46-7	1,4-Dichlorobenzene	5000	U
95-50-1	1,2-Dichlorobenzene	5000	U
142-82-5	Heptane	2500	U
111-65-9	Octane	2500	U
111-84-2	Nonane	2500	U
107-05-1	3-Chloropropene	5000	U
107-87-9	2-Pentanone	15000	
108-87-2	Methylcyclohexane	2200	J
110-12-3	5-Methyl-2-hexanone	2500	U
123-19-3	4-Heptanone	12000	
123-86-4	Butylacetate	11000	
123-91-1	1,4-Dioxane	110000	E
126-98-7	2-Methyl-2-propenenitrile	15000	
563-80-4	3-Methyl-2-butanone	16000	
627-13-4	Propyl nitrate	2500	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SUPMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-01360MSD

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040621

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-22-0	3-Pentanone	17000	
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	2500	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	2500	U
75-71-8	Dichlorodifluoromethane	2500	U
75-05-8	Acetonitrile	2500	U
110-82-7	Cyclohexane	2500	U
108-86-1	Bromobenzene	5000	U
104-51-8	Butylbenzene	5000	U
98-06-6	tert-Butylbenzene	5000	U
135-98-8	sec-Butylbenzene	5000	U
95-49-8	2-Chlorotoluene	5000	U
99-87-6	4-Isopropyltoluene	5000	U
106-43-4	4-Chlorotoluene	5000	U
96-12-8	1,2-Dibromo-3-chloropropane	5000	U
106-93-4	1,2-Dibromoethane	5000	U
110-57-6	trans-1,4-Dichloro-2-butene	5000	U
142-28-9	1,3-Dichloropropane	5000	U
594-20-7	2,2-Dichloropropane	5000	U
563-58-6	1,1-Dichloropropene	5000	U
87-68-3	Hexachloro-1,3-butadiene	5000	U
98-82-8	Isopropylbenzene	5000	U
91-20-3	Nathphalene	5000	U
103-65-1	Propylbenzene	5000	U
87-61-6	1,2,3-Trichlorobenzene	5000	U
120-82-1	1,2,4-Trichlorobenzene	5000	U
96-18-4	1,2,3-Trichloropropane	5000	U
95-63-6	1,2,4-Trimethylbenzene	5000	U
108-67-8	1,2,3-Trimethylbenzene	5000	U
106-35-4	3-Heptanone	16000	
110-43-0	2-Heptanone	2100	J
109-99-9	Tetrahydrofuran	4200	
74-95-3	Dibromomethane	5000	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOL

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040624

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	400	U
75-01-4	Vinyl Chloride	400	U
106-99-0	1,3-Butadiene	400	U
106-97-8	Butane	2100	
74-83-9	Bromomethane	400	U
75-35-4	1,1-Dichloroethene	400	U
75-00-3	Chloroethane	400	U
67-64-1	Acetone	190	J
109-66-0	Pentane	5600	
75-15-0	Carbon Disulfide	400	U
107-02-8	Acrolein	400	U
75-09-2	Methylene Chloride	880	B
107-13-1	Acrylonitrile	400	U
123-38-6	Propionaldehyde	880	
156-60-5	trans-1,2-Dichloroethene	400	U
4170-30-3	2-Butenal	400	U
75-34-3	1,1-Dichloroethane	400	U
110-54-3	Hexane	7000	
156-59-2	cis-1,2-Dichloroethene	400	U
78-93-3	2-Butanone	52	J
110-83-8	Cyclohexene	400	U
141-78-6	Ethyl acetate	400	U
287-92-3	Cyclopentane	400	U
74-97-5	Bromochloromethane	400	U
67-66-3	Chloroform	400	U
75-43-4	Dichlorofluoromethane	400	U
71-55-6	1,1,1-Trichloroethane	400	U
75-45-6	Chlorodifluoromethane	400	U
56-23-5	Carbon Tetrachloride	400	U
75-69-4	Trichlorofluoromethane	400	U
71-43-2	Benzene	25	J
107-06-2	1,2-Dichloroethane	400	U
79-01-6	Trichloroethene	400	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOL

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040624

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-87-5	1,2-Dichloropropane	400	U
75-27-4	Bromodichloromethane	400	U
10061-01-5	cis-1,3-Dichloropropene	400	U
108-10-1	4-Methyl-2-pentanone	400	U
108-88-3	Toluene	400	U
10061-02-6	trans-1,3-Dichloropropene	400	U
79-00-5	1,1,2-Trichloroethane	400	U
127-18-4	Tetrachloroethene	400	U
591-78-6	2-Hexanone	130	J
124-48-1	Dibromochloromethane	400	U
108-90-7	Chlorobenzene	400	U
100-41-4	Ethylbenzene	26	J
106-42-3	Xylene (m & p)	400	U
95-47-6	Xylene (o)	400	U
100-42-5	Styrene	400	U
75-25-2	Bromoform	400	U
79-34-5	1,1,2,2-Tetrachloroethane	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
142-82-5	Heptane	5200	
111-65-9	Octane	3400	
111-84-2	Nonane	2900	
107-05-1	3-Chloropropene	400	U
107-87-9	2-Pentanone	40	J
108-87-2	Methylcyclohexane	400	U
110-12-3	5-Methyl-2-hexanone	400	U
123-19-3	4-Heptanone	52	J
123-86-4	Butylacetate	400	U
123-91-1	1,4-Dioxane	400	U
126-98-7	2-Methyl-2-propenenitrile	400	U
563-80-4	3-Methyl-2-butanone	400	U
627-13-4	Propyl nitrate	30	J

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOL

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040624

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
96-22-0	3-Pentanone	400	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	400	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	400	U
75-71-8	Dichlorodifluoromethane	400	U
75-05-8	Acetonitrile	400	U
110-82-7	Cyclohexane	400	U
108-86-1	Bromobenzene	400	U
104-51-8	Butylbenzene	400	U
98-06-6	tert-Butylbenzene	400	U
135-98-8	sec-Butylbenzene	400	U
95-49-8	2-Chlorotoluene	400	U
99-87-6	4-Isopropyltoluene	400	U
106-43-4	4-Chlorotoluene	400	U
96-12-8	1,2-Dibromo-3-chloropropane	400	U
106-93-4	1,2-Dibromoethane	400	U
110-57-6	trans-1,4-Dichloro-2-butene	400	U
142-28-9	1,3-Dichloropropane	400	U
594-20-7	2,2-Dichloropropane	400	U
563-58-6	1,1-Dichloropropene	400	U
87-68-3	Hexachloro-1,3-butadiene	400	U
98-82-8	Isopropylbenzene	400	U
91-20-3	Nathphalene	400	U
103-65-1	Propylbenzene	400	U
87-61-6	1,2,3-Trichlorobenzene	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
96-18-4	1,2,3-Trichloropropane	400	U
95-63-6	1,2,4-Trimethylbenzene	400	U
108-67-8	1,2,3-Trimethylbenzene	400	U
106-35-4	3-Heptanone	420	
110-43-0	2-Heptanone	400	J
109-99-9	Tetrahydrofuran	400	U
74-95-3	Dibromomethane	400	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361D

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040625

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	750	U
75-01-4	Vinyl Chloride	750	U
106-99-0	1,3-Butadiene	750	U
106-97-8	Butane	3000	
74-83-9	Bromomethane	750	U
75-35-4	1,1-Dichloroethene	750	U
75-00-3	Chloroethane	750	U
67-64-1	Acetone	430	J
109-66-0	Pentane	7400	
75-15-0	Carbon Disulfide	750	U
107-02-8	Acrolein	750	U
75-09-2	Methylene Chloride	1900	B
107-13-1	Acrylonitrile	990	
123-38-6	Propionaldehyde	1100	
156-60-5	trans-1,2-Dichloroethene	750	U
4170-30-3	2-Butenal	750	U
75-34-3	1,1-Dichloroethane	750	U
110-54-3	Hexane	9200	
156-59-2	cis-1,2-Dichloroethene	750	U
78-93-3	2-Butanone	320	J
110-83-8	Cyclohexene	750	U
141-78-6	Ethyl acetate	750	U
287-92-3	Cyclopentane	750	U
74-97-5	Bromochloromethane	750	U
67-66-3	Chloroform	750	U
75-43-4	Dichlorofluoromethane	750	U
71-55-6	1,1,1-Trichloroethane	750	U
75-45-6	Chlorodifluoromethane	750	U
56-23-5	Carbon Tetrachloride	750	U
75-69-4	Trichlorofluoromethane	750	U
71-43-2	Benzene	60	J
107-06-2	1,2-Dichloroethane	750	U
79-01-6	Trichloroethene	750	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361D

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040625

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-87-5	1,2-Dichloropropane	750	U
75-27-4	Bromodichloromethane	750	U
10061-01-5	cis-1,3-Dichloropropene	750	U
108-10-1	4-Methyl-2-pentanone	750	U
108-88-3	Toluene	750	U
10061-02-6	trans-1,3-Dichloropropene	750	U
79-00-5	1,1,2-Trichloroethane	750	U
127-18-4	Tetrachloroethene	750	U
591-78-6	2-Hexanone	270	J
124-48-1	Dibromochloromethane	750	U
108-90-7	Chlorobenzene	750	U
100-41-4	Ethylbenzene	40	J
106-42-3	Xylene (m & p)	750	U
95-47-6	Xylene (o)	750	U
100-42-5	Styrene	750	U
75-25-2	Bromoform	750	U
79-34-5	1,1,2,2-Tetrachloroethane	750	U
541-73-1	1,3-Dichlorobenzene	750	U
106-46-7	1,4-Dichlorobenzene	750	U
95-50-1	1,2-Dichlorobenzene	750	U
142-82-5	Heptane	6300	
111-65-9	Octane	4600	
111-84-2	Nonane	4500	
107-05-1	3-Chloropropene	750	U
107-87-9	2-Pentanone	99	J
108-87-2	Methylcyclohexane	750	U
110-12-3	5-Methyl-2-hexanone	750	U
123-19-3	4-Heptanone	100	J
123-86-4	Butylacetate	750	U
123-91-1	1,4-Dioxane	750	U
126-98-7	2-Methyl-2-propenenitrile	750	U
563-80-4	3-Methyl-2-butanone	750	U
627-13-4	Propyl nitrate	40	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361D

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040625

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
96-22-0	3-Pentanone	750	U
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	750	U
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	750	U
75-71-8	Dichlorodifluoromethane	750	U
75-05-8	Acetonitrile	750	U
110-82-7	Cyclohexane	750	U
108-86-1	Bromobenzene	750	U
104-51-8	Butylbenzene	750	U
98-06-6	tert-Butylbenzene	750	U
135-98-8	sec-Butylbenzene	750	U
95-49-8	2-Chlorotoluene	750	U
99-87-6	4-Isopropyltoluene	750	U
106-43-4	4-Chlorotoluene	750	U
96-12-8	1,2-Dibromo-3-chloropropane	750	U
106-93-4	1,2-Dibromoethane	750	U
110-57-6	trans-1,4-Dichloro-2-butene	750	U
142-28-9	1,3-Dichloropropane	750	U
594-20-7	2,2-Dichloropropane	750	U
563-58-6	1,1-Dichloropropene	750	U
87-68-3	Hexachloro-1,3-butadiene	750	U
98-82-8	Isopropylbenzene	750	U
91-20-3	Nathphalene	750	U
103-65-1	Propylbenzene	750	U
87-61-6	1,2,3-Trichlorobenzene	750	U
120-82-1	1,2,4-Trichlorobenzene	750	U
96-18-4	1,2,3-Trichloropropane	750	U
95-63-6	1,2,4-Trimethylbenzene	750	U
108-67-8	1,2,3-Trimethylbenzene	750	U
106-35-4	3-Heptanone	800	
110-43-0	2-Heptanone	810	
109-99-9	Tetrahydrofuran	750	U
74-95-3	Dibromomethane	750	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361MS

Sample wt/vol: 0.7 (g/mL) G Lab File ID: 00040626

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	20	J
75-01-4	Vinyl Chloride	71	U
106-99-0	1,3-Butadiene	280	
106-97-8	Butane	60	J
74-83-9	Bromomethane	71	U
75-35-4	1,1-Dichloroethene	31	J
75-00-3	Chloroethane	71	U
67-64-1	Acetone	28	J
109-66-0	Pentane	67	J
75-15-0	Carbon Disulfide	71	U
107-02-8	Acrolein	71	U
75-09-2	Methylene Chloride	61	JB
107-13-1	Acrylonitrile	24	J
123-38-6	Propionaldehyde	150	
156-60-5	trans-1,2-Dichloroethene	71	U
4170-30-3	2-Butenal	71	U
75-34-3	1,1-Dichloroethane	71	U
110-54-3	Hexane	100	
156-59-2	cis-1,2-Dichloroethene	71	U
78-93-3	2-Butanone	270	
110-83-8	Cyclohexene	13	J
141-78-6	Ethyl acetate	71	U
287-92-3	Cyclopentane	32	J
74-97-5	Bromochloromethane	71	U
67-66-3	Chloroform	71	U
75-43-4	Dichlorofluoromethane	20	J
71-55-6	1,1,1-Trichloroethane	71	U
75-45-6	Chlorodifluoromethane	23	J
56-23-5	Carbon Tetrachloride	71	U
75-69-4	Trichlorofluoromethane	71	U
71-43-2	Benzene	35	J
107-06-2	1,2-Dichloroethane	71	U
79-01-6	Trichloroethene	24	J

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361MS

Sample wt/vol: 0.7 (g/mL) G Lab File ID: 00040626

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-87-5	1,2-Dichloropropane	71	U
75-27-4	Bromodichloromethane	71	U
10061-01-5	cis-1,3-Dichloropropene	71	U
108-10-1	4-Methyl-2-pentanone	200	
108-88-3	Toluene	24	J
10061-02-6	trans-1,3-Dichloropropene	71	U
79-00-5	1,1,2-Trichloroethane	71	U
127-18-4	Tetrachloroethene	71	U
591-78-6	2-Hexanone	31	J
124-48-1	Dibromochloromethane	71	U
108-90-7	Chlorobenzene	17	J
100-41-4	Ethylbenzene	2	J
106-42-3	Xylene (m & p)	71	U
95-47-6	Xylene (o)	71	U
100-42-5	Styrene	71	U
75-25-2	Bromoform	71	U
79-34-5	1,1,2,2-Tetrachloroethane	71	U
541-73-1	1,3-Dichlorobenzene	71	U
106-46-7	1,4-Dichlorobenzene	71	U
95-50-1	1,2-Dichlorobenzene	71	U
142-82-5	Heptane	38	J
111-65-9	Octane	16	J
111-84-2	Nonane	10	J
107-05-1	3-Chloropropene	71	U
107-87-9	2-Pentanone	29	J
108-87-2	Methylcyclohexane	14	J
110-12-3	5-Methyl-2-hexanone	200	
123-19-3	4-Heptanone	26	J
123-86-4	Butylacetate	71	U
123-91-1	1,4-Dioxane	180	
126-98-7	2-Methyl-2-propenenitrile	200	
563-80-4	3-Methyl-2-butanone	190	
627-13-4	Propyl nitrate	21	J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361MS

Sample wt/vol: 0.7 (g/mL) G Lab File ID: 00040626

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
96-22-0	3-Pentanone	220	
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	20	J
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	24	J
75-71-8	Dichlorodifluoromethane	130	
75-05-8	Acetonitrile	35	J
110-82-7	Cyclohexane	20	J
108-86-1	Bromobenzene	71	U
104-51-8	Butylbenzene	71	U
98-06-6	tert-Butylbenzene	71	U
135-98-8	sec-Butylbenzene	71	U
95-49-8	2-Chlorotoluene	71	U
99-87-6	4-Isopropyltoluene	71	U
106-43-4	4-Chlorotoluene	71	U
96-12-8	1,2-Dibromo-3-chloropropane	71	U
106-93-4	1,2-Dibromoethane	71	U
110-57-6	trans-1,4-Dichloro-2-butene	71	U
142-28-9	1,3-Dichloropropane	71	U
594-20-7	2,2-Dichloropropane	71	U
563-58-6	1,1-Dichloropropene	60	J
87-68-3	Hexachloro-1,3-butadiene	71	U
98-82-8	Isopropylbenzene	71	U
91-20-3	Nathphalene	71	U
103-65-1	Propylbenzene	71	U
87-61-6	1,2,3-Trichlorobenzene	71	U
120-82-1	1,2,4-Trichlorobenzene	71	U
96-18-4	1,2,3-Trichloropropane	71	U
95-63-6	1,2,4-Trimethylbenzene	71	U
108-67-8	1,2,3-Trimethylbenzene	71	U
106-35-4	3-Heptanone	43	J
110-43-0	2-Heptanone	240	
109-99-9	Tetrahydrofuran	6	J
74-95-3	Dibromomethane	71	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361MSD

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040627

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	J
75-01-4	Vinyl Chloride	360	U
106-99-0	1,3-Butadiene	2900	
106-97-8	Butane	22	J
74-83-9	Bromomethane	360	U
75-35-4	1,1-Dichloroethene	28	J
75-00-3	Chloroethane	360	U
67-64-1	Acetone	33	J
109-66-0	Pentane	120	J
75-15-0	Carbon Disulfide	360	U
107-02-8	Acrolein	360	U
75-09-2	Methylene Chloride	830	B
107-13-1	Acrylonitrile	22	J
123-38-6	Propionaldehyde	680	
156-60-5	trans-1,2-Dichloroethene	360	U
4170-30-3	2-Butenal	17	J
75-34-3	1,1-Dichloroethane	360	U
110-54-3	Hexane	120	J
156-59-2	cis-1,2-Dichloroethene	360	U
78-93-3	2-Butanone	1300	
110-83-8	Cyclohexene	12	J
141-78-6	Ethyl acetate	360	U
287-92-3	Cyclopentane	15	J
74-97-5	Bromochloromethane	360	U
67-66-3	Chloroform	360	U
75-43-4	Dichlorofluoromethane	18	J
71-55-6	1,1,1-Trichloroethane	360	U
75-45-6	Chlorodifluoromethane	22	J
56-23-5	Carbon Tetrachloride	360	U
75-69-4	Trichlorofluoromethane	360	U
71-43-2	Benzene	34	J
107-06-2	1,2-Dichloroethane	360	U
79-01-6	Trichloroethene	22	J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361MSD

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040627

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-87-5	1,2-Dichloropropane	360	U
75-27-4	Bromodichloromethane	360	U
10061-01-5	cis-1,3-Dichloropropene	360	U
108-10-1	4-Methyl-2-pentanone	1000	
108-88-3	Toluene	21	J
10061-02-6	trans-1,3-Dichloropropene	82	J
79-00-5	1,1,2-Trichloroethane	360	U
127-18-4	Tetrachloroethene	360	U
591-78-6	2-Hexanone	34	J
124-48-1	Dibromochloromethane	360	U
108-90-7	Chlorobenzene	15	J
100-41-4	Ethylbenzene	11	J
106-42-3	Xylene (m & p)	360	U
95-47-6	Xylene (o)	360	U
100-42-5	Styrene	360	U
75-25-2	Bromoform	360	U
79-34-5	1,1,2,2-Tetrachloroethane	360	U
541-73-1	1,3-Dichlorobenzene	360	U
106-46-7	1,4-Dichlorobenzene	360	U
95-50-1	1,2-Dichlorobenzene	360	U
142-82-5	Heptane	41	J
111-65-9	Octane	12	J
111-84-2	Nonane	6	J
107-05-1	3-Chloropropene	360	U
107-87-9	2-Pentanone	32	J
108-87-2	Methylcyclohexane	12	J
110-12-3	5-Methyl-2-hexanone	1100	
123-19-3	4-Heptanone	27	J
123-86-4	Butylacetate	2	J
123-91-1	1,4-Dioxane	880	
126-98-7	2-Methyl-2-propenenitrile	1000	
563-80-4	3-Methyl-2-butanone	950	
627-13-4	Propyl nitrate	22	J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104SOLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361MSD

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040627

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
96-22-0	3-Pentanone	1200	
76-13-1	1,2,2-Cl3-1,1,2-F3ethane	16	J
76-14-2	1,2-Cl2-1,1,2,2-F4ethane	7	J
75-71-8	Dichlorodifluoromethane	200	J
75-05-8	Acetonitrile	14	J
110-82-7	Cyclohexane	14	J
108-86-1	Bromobenzene	360	U
104-51-8	Butylbenzene	360	U
98-06-6	tert-Butylbenzene	360	U
135-98-8	sec-Butylbenzene	360	U
95-49-8	2-Chlorotoluene	360	U
99-87-6	4-Isopropyltoluene	360	U
106-43-4	4-Chlorotoluene	360	U
96-12-8	1,2-Dibromo-3-chloropropane	360	U
106-93-4	1,2-Dibromoethane	360	U
110-57-6	trans-1,4-Dichloro-2-butene	68	J
142-28-9	1,3-Dichloropropane	360	U
594-20-7	2,2-Dichloropropane	360	U
563-58-6	1,1-Dichloropropene	360	U
87-68-3	Hexachloro-1,3-butadiene	360	U
98-82-8	Isopropylbenzene	360	U
91-20-3	Nathphalene	360	U
103-65-1	Propylbenzene	360	U
87-61-6	1,2,3-Trichlorobenzene	360	U
120-82-1	1,2,4-Trichlorobenzene	360	U
96-18-4	1,2,3-Trichloropropane	1600	
95-63-6	1,2,4-Trimethylbenzene	360	U
108-67-8	1,2,3-Trimethylbenzene	360	U
106-35-4	3-Heptanone	48	J
110-43-0	2-Heptanone	1500	
109-99-9	Tetrahydrofuran	7	J
74-95-3	Dibromomethane	360	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LCS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: LCS

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040614

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/06/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	111-65-9	OCTANE	14.50	310	NJ
2.	78-88-6	1-PROPENE, 2,3-DICHLORO-	14.71	120	NJ
3.	110-12-3	2-HEXANONE, 5-METHYL-	17.25	180	NJ
4.	526-73-8	BENZENE, 1,2,3-TRIMETHYL-	20.25	130	NJ
5.	56114-69-3	BENZALDEHYDE, 2,5-BIS[(TRIME	22.49	22	NJ
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: VBLK02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040616

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN SILOXANE	19.15	9	J
2.		UNKNOWN SILOXANE	22.57	5	J
3.					
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: VBLK03

Sample wt/vol: 0.0 (g/mL) G Lab File ID: 00040622

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN SILOXANE	19.13	48	J
2.		UNKNOWN SILOXANE	22.57	34	J
3.					
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

HOTCELLBLK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360-CB

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040617

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 3 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	124-38-9	CARBON DIOXIDE	3.08	78	NJ
2.		UNKNOWN SILOXANE	22.58	23	JB
3.		UNKNOWN SILOXANE	25.96	3	J
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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

HOTCELLBLKD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-1360-CBD

Sample wt/vol: 0.0 (g/mL) G Lab File ID: 00040623

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN SILOXANE	19.16	61	JB
2.		UNKNOWN SILOXANE	22.58	34	JB
3.					
4.					
5.					
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EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

C104SUP

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040618

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 10 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	19689-18-0	4-DECENE	19.51	5300	NJ
2.	124-18-5	DECANE	19.63	42000	NJ
3.	1120-21-4	UNDECANE	21.90	93000	NJ
4.	7206-17-9	6-DODECENE, (E)-	23.75	8300	NJ
5.	112-40-3	DODECANE	23.88	49000	NJ
6.	820-29-1	5-DECANONE	24.20	12000	NJ
7.	928-80-3	3-DECANONE	24.50	4800	NJ
8.	693-54-9	2-DECANONE	24.68	5100	NJ
9.	629-50-5	TRIDECANE	25.73	3800	NJ
10.	50639-02-6	5-UNDECANONE, 2-METHYL-	26.11	9200	NJ
11.					
12.					
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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104SUPD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) WATER Lab Sample ID: 00-1360D

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 00040619

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
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9.					
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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104SOL

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040624

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 20

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	592-76-7	1-HEPTENE	11.53	3200	NJ
2.	111-66-0	1-OCTENE	14.50	3300	NJ
3.	124-11-8	1-NONENE	17.17	2100	NJ
4.	19689-18-0	4-DECENE	19.61	1800	NJ
5.	124-18-5	DECANE	19.71	13000	NJ
6.	111-13-7	2-OCTANONE	20.54	1200	NJ
7.	764-96-5	5-UNDECENE, (Z)-	21.82	2800	NJ
8.	1120-21-4	UNDECANE	21.97	24000	NJ
9.	764-97-6	5-UNDECENE, (E)-	22.06	1600	NJ
10.	19549-83-8	3-HEPTANONE, 2,6-DIMETHYL-	22.27	1900	NJ
11.	821-55-6	2-NONANONE	22.75	2600	NJ
12.	124-12-9	OCTANENITRILE	23.09	1500	NJ
13.	2030-84-4	4-DODECENE	23.86	2900	NJ
14.	112-40-3	DODECANE	24.00	21000	NJ
15.	624-16-8	4-DECANONE	24.31	6300	NJ
16.	928-80-3	3-DECANONE	24.61	2700	NJ
17.	693-54-9	2-DECANONE	24.79	3000	NJ
18.	2243-27-8	NONANENITRILE	25.17	1400	NJ
19.	629-50-5	TRIDECANE	25.86	1900	NJ
20.	33083-83-9	5-UNDECANONE	26.24	4400	NJ
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22.					
23.					
24.					
25.					
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27.					
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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104SOLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix: (soil/water) SOLID Lab Sample ID: 00-01361D

Sample wt/vol: 0.1 (g/mL) G Lab File ID: 00040625

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 04/07/0

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 19 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	592-76-7	1-HEPTENE	11.51	5400	NJ
2.	111-66-0	1-OCTENE	14.47	4600	NJ
3.	124-11-8	1-NONENE	17.12	2900	NJ
4.	19689-18-0	4-DECENE	19.54	3100	NJ
5.	19689-18-0	4-DECENE	19.54	3100	NJ
6.	124-18-5	DECANE	19.65	26000	NJ
7.	764-96-5	5-UNDECENE, (Z)-	21.75	6200	NJ
8.	1120-21-4	UNDECANE	21.90	50000	NJ
9.		UNKNOWN SILOXANE	22.56	3000	JB
10.	821-55-6	2-NONANONE	22.67	3800	NJ
11.	124-12-9	OCTANENITRILE	23.01	2200	NJ
12.	2030-84-4	4-DODECENE	23.78	6700	NJ
13.	112-40-3	DODECANE	23.93	43000	NJ
14.	624-16-8	4-DECANONE	24.23	10000	NJ
15.	928-80-3	3-DECANONE	24.53	4400	NJ
16.	693-54-9	2-DECANONE	24.71	5000	NJ
17.	2243-27-8	NONANENITRILE	25.07	2100	NJ
18.	629-50-5	TRIDECANE	25.77	4500	NJ
19.	50639-02-6	5-UNDECANONE, 2-METHYL-	26.14	9300	NJ
20.					
21.					
22.					
23.					
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2B

SOLID VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Level: (low/med) LOW

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 #	OTHER (DCE) #	TOT OUT
01	METHOD BLANK	95	98	106	103	0
02	HOTCELLBLKD	95	99	107	102	0
03	C104SOL	100	93	86	97	0
04	C104SOLD	97	97	84	90	0
05	C104SOLMS	99	99	84	89	0
06	C104SOLMSD	96	100	78	88	0
07						
08						
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		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(84-138)
SMC2 (BFB)	= Bromofluorobenzene	(59-113)
SMC3	= Dibromofluoromethane	(0-150)
OTHER(DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 #	OTHER (DCE) #	TOT OUT
01	LCS	100	102	100	95	0
02	METHOD BLANK	94	100	106	106	0
03	HOTCELLBLK	94	97	105	104	0
04	C104SUP	102	97	89	96	0
05	C104SUPD	0*	0*	0	0*	3
06	C104SUPMS	96	98	86	92	0
07	C104SUPMSD	95	92	96	105	0
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		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(88-110)
SMC2 (BFB)	= Bromofluorobenzene	(86-115)
SMC3	= Dibromofluoromethane	(0-150)
OTHER(DCE)	= 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SUP

COMPOUND	SPIKE ADDED (ng)	SAMPLE AMOUNT (ng)	MS AMOUNT (ng)	MS % REC #	QC. LIMITS REC.
Butane	150	0.0	130	87	0-200
1,1-Dichloroethene	190	0.0	140	74	61-145
Acetone	150	50	160	73	0-200
Pentane	150	0.0	79	53	0-200
Acrylonitrile	150	0.0	120	80	0-200
2-Butenal	150	0.0	0.0	0	0-200
Hexane	150	250	250	0	0-200
Cyclohexene	150	0.0	66	44	0-200
Ethyl acetate	150	0.0	0.0	0	0-200
Cyclopentane	150	0.0	150	100	0-200
Dichlorofluoromethane	150	0.0	96	64	0-200
Chlorodifluoromethane	150	0.0	110	73	0-200
Benzene	190	0.0	180	95	76-127
Trichloroethene	190	0.0	120	63*	71-120
Toluene	190	0.0	110	58*	76-125
2-Hexanone	150	1	150	99	0-200
Chlorobenzene	190	0.0	93	49*	75-130
Heptane	150	93	56	-25*	0-200
Octane	150	190	29	-107*	0-200
Nonane	150	310	21	-193*	0-200
2-Pentanone	150	0.0	150	100	0-200
Methylcyclohexane	150	0.0	71	47	0-200
4-Heptanone	150	0.0	130	87	0-200
Butylacetate	150	0.0	0.0	0	0-200
Propyl nitrate	150	0.0	110	73	0-200
1,2,2-Cl3-1,1,2-F3ethan	150	0.0	87	58	0-200
1,2-Cl2-1,1,2,2-F4ethan	150	0.0	120	80	0-200
Acetonitrile	150	0.0	160	107	0-200

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SUP

COMPOUND	SPIKE ADDED (ng)	SAMPLE AMOUNT (ng)	MS AMOUNT (ng)	MS % REC #	QC. LIMITS REC.
Cyclohexane	150	0.0	98	65	0-200
3-Heptanone	150	4	190	124	0-200
Tetrahydrofuran	150	0.0	34	23	0-200

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SUP

COMPOUND	SPIKE ADDED (ng)	MSD AMOUNT (ng)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Butane	0.0	0.0	999*		0	0- 0
1,1-Dichloroethene	500	0.0	0*		14	61-145
Acetone	0.0	1600	999*	173*	0	0- 0
Pentane	0.0	0.0	999*		0	0- 0
Acrylonitrile	0.0	130	999*	170*	0	0- 0
2-Butenal	0.0	1600	999*		0	0- 0
Hexane	0.0	230	999*	200*	0	0- 0
Cyclohexene	0.0	0.0	999*		0	0- 0
Ethyl acetate	0.0	0.0	999*		0	0- 0
Cyclopentane	0.0	0.0	999*		0	0- 0
Dichlorofluoromethane	0.0	0.0	999*		0	0- 0
Chlorodifluoromethane	0.0	0.0	999*		0	0- 0
Benzene	500	48	10*	162*	11	76-127
Trichloroethene	500	0.0	0*		14	71-120
Toluene	500	38	8*	152*	13	76-125
2-Hexanone	0.0	140	999*	164*	0	0- 0
Chlorobenzene	500	42	8*	144*	13	75-130
Heptane	0.0	0.0	999*		0	0- 0
Octane	0.0	0.0	999*		0	0- 0
Nonane	0.0	0.0	999*		0	0- 0
2-Pentanone	0.0	150	999*	164*	0	0- 0
Methylcyclohexane	0.0	22	999*	182*	0	0- 0
4-Heptanone	0.0	120	999*	168*	0	0- 0
Butylacetate	0.0	110	999*		0	0- 0
Propyl nitrate	0.0	0.0	999*		0	0- 0
1,2,2-Cl3-1,1,2-F3ethan	0.0	0.0	999*		0	0- 0
1,2-Cl2-1,1,2,2-F4ethan	0.0	0.0	999*		0	0- 0
Acetonitrile	0.0	0.0	999*		0	0- 0

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SUP

COMPOUND	SPIKE ADDED (ng)	MSD AMOUNT (ng)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Cyclohexane	0.0	0.0	999*		0	0- 0
3-Heptanone	0.0	160	999*	156*	0	0- 0
Tetrahydrofuran	0.0	42	999*	191*	0	0- 0

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 12 out of 31 outside limits
Spike Recovery: 37 out of 62 outside limits

COMMENTS: _____

SOLID VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SOL Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ng)	SAMPLE AMOUNT (ng)	MS AMOUNT (ng)	MS % REC #	QC. LIMITS REC.
Butane	150	260	300	27	0-200
1,1-Dichloroethene	190	0.0	150	79	61-145
Acetone	150	24	140	77	0-200
Pentane	150	690	340	-233*	0-200
Acrylonitrile	150	0.0	120	80	0-200
2-Butenal	150	0.0	0.0	0	0-200
Hexane	150	870	510	-240*	0-200
Cyclohexene	150	0.0	65	43	0-200
Ethyl acetate	150	0.0	0.0	0	0-200
Cyclopentane	150	0.0	160	107	0-200
Dichlorofluoromethane	150	0.0	100	67	0-200
Chlorodifluoromethane	150	0.0	110	73	0-200
Benzene	190	3	180	93	76-127
Trichloroethene	190	0.0	120	63*	71-120
Toluene	190	0.0	120	63*	76-125
2-Hexanone	150	16	160	96	0-200
Chlorobenzene	190	0.0	87	46*	75-130
Heptane	150	640	190	-300*	0-200
Octane	150	420	79	-227*	0-200
Nonane	150	350	50	-200*	0-200
2-Pentanone	150	5	150	97	0-200
Methylcyclohexane	150	0.0	69	46	0-200
4-Heptanone	150	6	130	83	0-200
Butylacetate	150	0.0	0.0	0	0-200
Propyl nitrate	150	4	100	64	0-200
1,2,2-Cl3-1,1,2-F3ethan	150	0.0	98	65	0-200
1,2-Cl2-1,1,2,2-F4ethan	150	0.0	120	80	0-200
Acetonitrile	150	0.0	170	113	0-200

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

3B

SOLID VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SOL Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ng)	SAMPLE AMOUNT (ng)	MS AMOUNT (ng)	MS % REC #	QC. LIMITS REC.
Cyclohexane	150	0.0	99	66	0-200
3-Heptanone	150	52	210	105	0-200
Tetrahydrofuran	150	0.0	32	21	0-200

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

3B

SOLID VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SOL Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ng)	MSD AMOUNT (ng)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Butane	150	110	-100*	-348	50	0-200
1,1-Dichloroethene	190	140	74	6	14	61-145
Acetone	150	160	91	17	50	0-200
Pentane	150	600	-60*	-118	50	0-200
Acrylonitrile	150	110	73	9	50	0-200
2-Butenal	150	87	58		50	0-200
Hexane	150	620	-167*	-36	50	0-200
Cyclohexene	150	60	40	7	50	0-200
Ethyl acetate	150	0.0	0		50	0-200
Cyclopentane	150	77	51	71*	50	0-200
Dichlorofluoromethane	150	89	59	13	50	0-200
Chlorodifluoromethane	150	110	73	0	50	0-200
Benzene	190	170	88	6	11	76-127
Trichloroethene	190	110	58*	8	14	71-120
Toluene	190	100	53*	17*	13	76-125
2-Hexanone	150	170	103	7	50	0-200
Chlorobenzene	190	73	38*	19*	13	75-130
Heptane	150	210	-287*	-4	50	0-200
Octane	150	60	-240*	-6	50	0-200
Nonane	150	31	-213*	-6	50	0-200
2-Pentanone	150	160	103	6	50	0-200
Methylcyclohexane	150	61	41	11	50	0-200
4-Heptanone	150	130	83	0	50	0-200
Butylacetate	150	11	7		50	0-200
Propyl nitrate	150	110	71	10	50	0-200
1,2,2-Cl3-1,1,2-F3ethan	150	79	53	20	50	0-200
1,2-Cl2-1,1,2,2-F4ethan	150	34	23	111*	50	0-200
Acetonitrile	150	68	45	86*	50	0-200

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS: _____

3B

SOLID VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Matrix Spike - EPA Sample No.: C104SOL Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ng)	MSD AMOUNT (ng)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Cyclohexane	150	68	45	38	50	0-200
3-Heptanone	150	240	125	17	50	0-200
Tetrahydrofuran	150	35	23	9	50	0-200

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 5 out of 31 outside limits
Spike Recovery: 17 out of 62 outside limits

COMMENTS: _____

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Lab File ID: 00040616 Lab Sample ID: VBLK02

Date Analyzed: 04/07/0 Time Analyzed: 0037

GC Column: DB-624 75M X 2.55UMID: 0.45 (mm) Heated Purge: (Y/N) Y

Instrument ID: HP1

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS	LCS	00040614	2310
02	HOTCELLBLK	00-1360-CB	00040617	0120
03	C104SUP	00-1360	00040618	0204
04	C104SUPD	00-1360D	00040619	0247
05	C104SUPMS	00-01360MS	00040620	0331
06	C104SUPMSD	00-01360MSD	00040621	0414
07	HOTCELLBLKD	00-1360-CBD	00040623	0541
08	C104SOL	00-01361	00040624	0625
09	C104SOLD	00-01361D	00040625	0708
10	C104SOLMS	00-01361MS	00040626	0752
11	C104SOLMSD	00-01361MSD	00040627	0835
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COMMENTS:

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

METHOD BLANK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Lab File ID: 00040622 Lab Sample ID: VBLK03

Date Analyzed: 04/07/0 Time Analyzed: 0458

GC Column: DB-624 75M X 2.55UMID: 0.45 (mm) Heated Purge: (Y/N) Y

Instrument ID: HP1

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS	LCS	00040614	2310
02	HOTCELLBLK	00-1360-CB	00040617	0120
03	C104SUP	00-1360	00040618	0204
04	C104SUPD	00-1360D	00040619	0247
05	C104SUPMS	00-01360MS	00040620	0331
06	C104SUPMSD	00-01360MSD	00040621	0414
07	HOTCELLBLKD	00-1360-CBD	00040623	0541
08	C104SOL	00-01361	00040624	0625
09	C104SOLD	00-01361D	00040625	0708
10	C104SOLMS	00-01361MS	00040626	0752
11	C104SOLMSD	00-01361MSD	00040627	0835
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COMMENTS:

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Lab File ID: 00040601 BFB Injection Date: 04/06/0

Instrument ID: HP1 BFB Injection Time: 1345

GC Column: ID: 2.00 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	34.4
75	30.0 - 66.0% of mass 95	55.6
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	76.9
175	4.0 - 9.0% of mass 174	5.5 (7.2)1
176	93.0 - 101.0% of mass 174	71.9 (93.6)1
177	5.0 - 9.0% of mass 176	5.0 (7.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD025	VSTD025	00040602	04/06/0	1429
02	VSTD050	VSTD050	00040603	04/06/0	1513
03	VSTD100	VSTD100	00040604	04/06/0	1556
04	VSTD150	VSTD150	00040605	04/06/0	1640
05	VSTD200	VSTD200	00040606	04/06/0	1723
06					
07					
08					
09					
10					
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22					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Lab File ID: 00040612 BFB Injection Date: 04/06/0

Instrument ID: HP1 BFB Injection Time: 2143

GC Column: ID: 2.00 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	31.0
75	30.0 - 66.0% of mass 95	53.2
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	82.3
175	4.0 - 9.0% of mass 174	5.7 (6.9)1
176	93.0 - 101.0% of mass 174	80.9 (98.3)1
177	5.0 - 9.0% of mass 176	5.4 (6.7)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	00040613	04/06/0	2226
02	LCS	LCS	00040614	04/06/0	2310
03	METHOD BLANK	VBLK02	00040616	04/07/0	0037
04	HOTCELLBLK	00-1360-CB	00040617	04/07/0	0120
05	C104SUP	00-1360	00040618	04/07/0	0204
06	C104SUPD	00-1360D	00040619	04/07/0	0247
07	C104SUPMS	00-01360MS	00040620	04/07/0	0331
08	C104SUPMSD	00-01360MSD	00040621	04/07/0	0414
09	METHOD BLANK	VBLK03	00040622	04/07/0	0458
10	HOTCELLBLKD	00-1360-CBD	00040623	04/07/0	0541
11	C104SOL	00-01361	00040624	04/07/0	0625
12	C104SOLD	00-01361D	00040625	04/07/0	0708
13	C104SOLMS	00-01361MS	00040626	04/07/0	0752
14	C104SOLMSD	00-01361MSD	00040627	04/07/0	0835
15					
16					
17					
18					
19					
20					
21					
22					

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Instrument ID: HP1 Calibration Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Calibration Time(s): 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

LAB FILE ID: RRF100=00040602 RRF250=00040603
RRF500=00040604 RRF750=00040605 RRF1000=00040606

COMPOUND	RRF100	RRF250	RRF500	RRF750	RRF 1000	$\overline{RRF}$	% RSD
Chloromethane *	0.382	0.373	0.367	0.373	0.374	0.374	1.5*
Vinyl Chloride	0.264	0.257	0.231	0.246	0.223	0.244	7.1
1,3-Butadiene	0.350	0.338	0.262	0.278	0.284	0.302	13.0
Butane	0.477	0.516	0.460	0.447	0.478	0.476	5.5
Bromomethane	0.140	0.133	0.116	0.118	0.114	0.124	9.6
1,1-Dichloroethene	0.209	0.213	0.190	0.197	0.203	0.202	4.7
Chloroethane	0.124	0.100	0.087	0.091	0.096	0.100	14.4
Acetone	0.249	0.244	0.202	0.216	0.218	0.226	8.9
Pentane	0.614	0.630	0.600	0.552	0.586	0.596	4.9
Carbon Disulfide	0.049	0.044	0.047	0.048	0.048	0.047	3.8
Acrolein *	0.007	0.007	0.006	0.006	0.006	0.006	10.9*
Methylene Chloride	0.327	0.345	0.345	0.301	0.301	0.324	6.8
Acrylonitrile	0.361	0.412	0.425	0.444	0.416	0.412	7.5
Propionaldehyde	0.075	0.072	0.058	0.060	0.060	0.065	11.8
trans-1,2-Dichloroethene	0.432	0.462	0.449	0.458	0.445	0.449	2.7
2-Butenal	0.010	0.012	0.009	0.009	0.009	0.010	9.6
1,1-Dichloroethane *	0.797	0.927	0.864	0.899	0.844	0.866	5.8*
Hexane	0.740	0.802	0.741	0.756	0.701	0.748	4.9
cis-1,2-Dichloroethene	0.466	0.543	0.482	0.492	0.453	0.487	7.1
2-Butanone	0.439	0.461	0.415	0.483	0.434	0.446	5.9
Cyclohexene	0.449	0.442	0.370	0.373	0.350	0.397	11.4
Ethyl acetate	1.235	1.442	1.337	1.399	1.243	1.331	6.9
Cyclopentane	0.971	0.944	0.813	0.843	0.662	0.847	14.5
Bromochloromethane	0.224	0.289	0.225	0.231	0.208	0.235	13.2
Chloroform	0.783	0.942	0.721	0.753	0.692	0.778	12.6
Dichlorofluoromethane	0.928	0.808	0.734	0.739	0.757	0.793	10.2
1,1,1-Trichloroethane	0.486	0.541	0.456	0.502	0.469	0.491	6.7
Chlorodifluoromethane	1.107	1.240	1.154	1.196	1.282	1.196	5.8
Carbon Tetrachloride	0.529	0.545	0.454	0.440	0.464	0.486	9.8
Trichlorofluoromethane	0.310	0.304	0.253	0.282	0.259	0.282	9.1
Benzene	0.952	1.037	0.820	0.787	0.776	0.874	13.1
1,2-Dichloroethane	0.437	0.414	0.353	0.360	0.310	0.375	13.6
Trichloroethene	0.285	0.326	0.261	0.272	0.235	0.276	12.2
1,2-Dichloropropane	0.259	0.254	0.215	0.212	0.212	0.230	10.5
Bromodichloromethane	0.382	0.413	0.338	0.345	0.302	0.356	11.9
cis-1,3-Dichloropropene	0.464	0.524	0.413	0.421	0.358	0.436	14.2
4-Methyl-2-pentanone	0.825	1.016	0.773	0.792	0.704	0.822	14.2

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Instrument ID: HP1 Calibration Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Calibration Time(s): 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

LAB FILE ID: RRF100=00040602 RRF250=00040603
RRF500=00040604 RRF750=00040605 RRF1000=00040606

COMPOUND		RRF100	RRF250	RRF500	RRF750	RRF 1000	$\overline{RRF}$	% RSD
Toluene		0.703	0.828	0.685	0.680	0.636	0.706	10.2
trans-1,3-Dichloropropene		0.377	0.410	0.351	0.352	0.306	0.359	10.7
1,1,2-Trichloroethane		0.243	0.304	0.249	0.260	0.235	0.258	10.4
Tetrachloroethene		0.260	0.254	0.226	0.212	0.196	0.230	11.9
2-Hexanone		0.594	0.736	0.591	0.611	0.545	0.615	11.6
Dibromochloromethane		0.285	0.388	0.311	0.332	0.300	0.323	12.5
Chlorobenzene	*	0.747	0.784	0.699	0.675	0.577	0.696	11.4*
Ethylbenzene		0.394	0.386	0.354	0.335	0.284	0.351	12.6
Xylene (m & p)		0.787	0.764	0.628	0.637	0.559	0.675	14.3
Xylene (o)		0.476	0.443	0.373	0.371	0.339	0.400	14.1
Styrene		0.762	0.724	0.666	0.644	0.601	0.679	9.5
Bromoform	*	0.202	0.277	0.237	0.255	0.231	0.240	11.5*
1,1,2,2-Tetrachloroethane	*	0.396	0.393	0.333	0.326	0.317	0.353	10.8*
1,3-Dichlorobenzene		0.699	0.632	0.562	0.524	0.487	0.581	14.6
1,4-Dichlorobenzene		0.684	0.674	0.607	0.670	0.545	0.636	9.3
1,2-Dichlorobenzene		0.713	0.697	0.598	0.619	0.576	0.641	9.5
Heptane		0.210	0.206	0.169	0.165	0.155	0.181	13.9
Octane		0.128	0.136	0.112	0.104	0.099	0.116	13.7
Nonane		0.095	0.089	0.073	0.075	0.066	0.080	14.8
3-Chloropropene		0.489	0.459	0.426	0.438	0.448	0.452	5.3
2-Pentanone		0.097	0.114	0.090	0.093	0.079	0.095	13.3
Methylcyclohexane		0.741	0.760	0.602	0.619	0.588	0.662	12.4
5-Methyl-2-hexanone		0.523	0.561	0.540	0.520	0.523	0.533	3.3
4-Heptanone		0.976	1.146	0.906	0.888	0.768	0.937	14.8
Butylacetate		1.213	1.324	1.113	1.039	0.948	1.127	13.0
1,4-Dioxane	*	0.031	0.028	0.027	0.026	0.024	0.027	8.9*
2-Methyl-2-propenenitrile		0.425	0.469	0.381	0.386	0.333	0.399	12.8
3-Methyl-2-butanone		0.125	0.144	0.115	0.118	0.100	0.120	13.5
Propyl nitrate		0.572	0.695	0.562	0.551	0.485	0.573	13.3
3-Pentanone		0.482	0.528	0.443	0.448	0.414	0.463	9.4
1,2,2-Cl3-1,1,2-F3ethane		0.382	0.358	0.355	0.336	0.339	0.354	5.1
1,2-Cl2-1,1,2,2-F4ethane		0.447	0.406	0.395	0.407	0.381	0.407	6.1
Dichlorodifluoromethane		0.995	1.057	0.916	1.019	0.817	0.961	9.9
Acetonitrile		0.090	0.085	0.080	0.077	0.091	0.085	7.2
Cyclohexane		1.214	1.278	1.038	1.019	0.930	1.096	13.2
Bromobenzene		0.393	0.390	0.333	0.336	0.302	0.351	11.2
Butylbenzene		0.328	0.351	0.306	0.321	0.293	0.320	6.9

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Instrument ID: HP1 Calibration Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Calibration Time(s): 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

LAB FILE ID: RRF100=00040602 RRF250=00040603
RRF500=00040604 RRF750=00040605 RRF1000=00040606

COMPOUND	RRF100	RRF250	RRF500	RRF750	RRF 1000	$\overline{RRF}$	% RSD
tert-Butylbenzene	1.123	1.063	0.876	0.888	0.787	0.947	14.8
sec-Butylbenzene	1.419	1.389	1.199	1.255	1.153	1.283	9.1
2-Chlorotoluene	1.026	1.056	0.892	0.882	0.832	0.938	10.4
4-Isopropyltoluene	1.032	1.008	0.863	0.947	0.842	0.938	9.0
4-Chlorotoluene	1.207	1.166	1.015	0.925	0.989	1.060	11.4
1,2-Dibromo-3-chloropropane	0.109	0.126	0.106	0.116	0.105	0.112	7.8
1,2-Dibromoethane	0.262	0.353	0.285	0.298	0.266	0.293	12.5
trans-1,4-Dichloro-2-butene	0.024	0.023	0.020	0.020	0.022	0.022	7.9
1,3-Dichloropropane	0.525	0.546	0.444	0.408	0.414	0.467	13.7
2,2-Dichloropropane	0.344	0.389	0.320	0.321	0.292	0.333	10.9
1,1-Dichloropropene	0.597	0.689	0.532	0.540	0.474	0.566	14.4
Hexachloro-1,3-butadiene	0.338	0.342	0.289	0.281	0.276	0.305	10.6
Isopropylbenzene	1.192	1.178	1.047	0.998	0.962	1.075	9.7
Nathphalene	1.126	1.108	0.952	1.008	0.964	1.032	7.9
Propylbenzene	1.578	1.502	1.288	1.226	1.182	1.355	12.9
1,2,3-Trichlorobenzene	0.475	0.492	0.407	0.435	0.398	0.441	9.4
1,2,4-Trichlorobenzene	0.531	0.512	0.448	0.463	0.419	0.475	9.7
1,2,3-Trichloropropane	0.452	0.412	0.368	0.354	0.328	0.383	12.8
1,2,4-Trimethylbenzene	1.309	1.156	0.964	1.054	0.958	1.088	13.5
1,2,3-Trimethylbenzene	1.539	1.422	1.150	1.215	1.122	1.290	14.1
3-Heptanone	0.713	0.761	0.646	0.632	0.595	0.669	10.0
2-Heptanone	0.890	1.048	0.841	0.836	0.727	0.868	13.5
Tetrahydrofuran	1.330	1.388	1.238	1.227	1.263	1.289	5.3
Dibromomethane	0.183	0.205	0.163	0.167	0.148	0.173	12.5
Toluene-d8	1.047	1.150	1.062	1.080	1.105	1.089	3.7
Bromofluorobenzene	0.533	0.529	0.533	0.537	0.556	0.538	2.0
Dibromofluoromethane	0.501	0.493	0.490	0.492	0.507	0.497	1.4
1,2-Dichloroethane-d4	0.707	0.675	0.684	0.689	0.697	0.690	1.8

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Instrument ID: HP1 Calibration Date: 04/06/0 Time: 2226

Lab File ID: 00040613 Init. Calib. Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Init. Calib. Times: 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

COMPOUND	RRF	RRF250	MIN RRF	%D	MAX %D	
Chloromethane	0.374	0.390	0.100	-4.3	100	
Vinyl Chloride	0.244	0.260		-6.6		
1,3-Butadiene	0.302	0.296		2.0		
Butane	0.476	0.460		3.4		
Ethyl ether						<-
Bromomethane	0.124	0.117		5.6		
1,1-Dichloroethene	0.202	0.188		6.9		
Acetone	0.226	0.220		2.6		
Chloroethane	0.100	0.100		0.0		
Pentane	0.596	0.632		-6.0		
Carbon Disulfide	0.047	0.045		4.2		
Acrolein	0.006	0.007	0.001	-16.7	100	
Methylene Chloride	0.324	0.326		-0.6		
Acrylonitrile	0.412	0.428		-3.9		
trans-1,2-Dichloroethene	0.449	0.428		4.7		
Propionaldehyde	0.065	0.058		10.8		
1,1-Dichloroethane	0.866	0.893	0.100	-3.1	100	
2-Butenal	0.010	0.010		0.0		
cis-1,2-Dichloroethene	0.487	0.510		-4.7		
Hexane	0.748	0.762		-1.9		
2-Butanone	0.446	0.479		-7.4		
Cyclohexene	0.397	0.445		-12.1		
Cyclopentane	0.847	0.908		-7.2		
Ethyl acetate	1.331	1.396		-4.9		
1,1-Dimethylhydrazine						<-
Bromochloromethane	0.235	0.244		-3.8		
Chloroform	0.778	0.810		-4.1		
Methylhydrazine						<-
Dichlorofluoromethane	0.793	0.746		5.9		
1,1,1-Trichloroethane	0.491	0.516		-5.1		
Chlorodifluoromethane	1.196	1.233		-3.1		
Carbon Tetrachloride	0.486	0.487		-0.2		
Trichlorofluoromethane	0.282	0.286		-1.4		
Benzene	0.874	0.980		-12.1		
1,2-Dichloroethane	0.375	0.417		-11.2		
Trichloroethene	0.276	0.289		-4.7		
1,2-Dichloropropane	0.230	0.239		-3.9		

All other compounds must meet a minimum RRF of 0.010.

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Instrument ID: HP1 Calibration Date: 04/06/0 Time: 2226

Lab File ID: 00040613 Init. Calib. Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Init. Calib. Times: 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

COMPOUND	$\overline{RRF}$	RRF250	MIN RRF	%D	MAX %D	
Bromodichloromethane	0.356	0.406		-14.0		
cis-1,3-Dichloropropene	0.436	0.500		-14.7		
4-Methyl-2-pentanone	0.822	0.855		-4.0		
Toluene	0.706	0.761		-7.8		
trans-1,3-Dichloropropene	0.359	0.400		-11.4		
1,1,2-Trichloroethane	0.258	0.283		-9.7		
Tetrachloroethene	0.230	0.255		-10.9		
2-Hexanone	0.615	0.626		-1.8		
Dibromochloromethane	0.323	0.351		-8.7		
Chlorobenzene	0.696	0.800	0.300	-14.9	100	
Ethylbenzene	0.351	0.361		-2.8		
Xylene (m & p)	0.675	0.745		-10.4		
Xylene (o)	0.400	0.411		-2.8		
Styrene	0.679	0.699		-2.9		
Bromoform	0.240	0.264	0.100	-10.0	100	
1,1,2,2-Tetrachloroethane	0.353	0.393	0.300	-11.3	100	
1,3-Dichlorobenzene	0.581	0.660		-13.6		
1,4-Dichlorobenzene	0.636	0.687		-8.0		
1,2-Dichlorobenzene	0.641	0.721		-12.5		
Heptane	0.181	0.198		-9.4		
Octane	0.116	0.125		-7.8		
Nonane	0.080	0.088		-10.0		
3-Chloropropene	0.452	0.446		1.3		
2-Pentanone	0.095	0.102		-7.4		
Methylcyclohexane	0.662	0.686		-3.6		
5-Methyl-2-hexanone	0.533	0.600		-12.6		
4-Heptanone	0.937	1.038		-10.8		
Butylacetate	1.127	1.226		-8.8		
1,4-Dioxane	0.027	0.030	0.001	-11.1	100	
2-Methyl-2-propenenitrile	0.399	0.426		-6.8		
3-Methyl-2-butanone	0.120	0.134		-11.7		
Methylisocyanate	1.125			100.0		<-
Propyl nitrate	0.573	0.640		-11.7		
Hexafluoroacetone						<-
3-Pentanone	0.463	0.486		-5.0		
1,2,2-Cl3-1,1,2-F3ethane	0.354	0.330		6.8		
1,2-Cl2-1,1,2,2-F4ethane	0.407	0.417		-2.4		

All other compounds must meet a minimum RRF of 0.010.

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Instrument ID: HP1 Calibration Date: 04/06/0 Time: 2226

Lab File ID: 00040613 Init. Calib. Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Init. Calib. Times: 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

COMPOUND	$\overline{RRF}$	RRF250	MIN RRF	%D	MAX %D	
Dichlorodifluoromethane	0.961	0.969		-0.8		
Acetonitrile	0.085	0.082		3.5		
Cyclohexane	1.096	1.205		-9.9		
Bromobenzene	0.351	0.389		-10.8		
Butylbenzene	0.320	0.367		-14.7		
tert-Butylbenzene	0.947	1.019		-7.6		
sec-Butylbenzene	1.283	1.385		-8.0		
2-Chlorotoluene	0.938	1.000		-6.6		
4-Isopropyltoluene	0.938	1.067		-13.8		
4-Chlorotoluene	1.060	1.066		-0.6		
1,2-Dibromo-3-chloropropane	0.112	0.123		-9.8		
1,2-Dibromoethane	0.293	0.316		-7.8		
trans-1,4-Dichloro-2-butene	0.022	0.023		-4.5		
1,3-Dichloropropane	0.467	0.535		-14.6		
2,2-Dichloropropane	0.333	0.347		-4.2		
1,1-Dichloropropene	0.566	0.607		-7.2		
Hexachloro-1,3-butadiene	0.305	0.325		-6.6		
Iodomethane						<-
Isopropylbenzene	1.075	1.133		-5.4		
Nathphalene	1.032	1.128		-9.3		
Propylbenzene	1.355	1.508		-11.3		
1,2,3-Trichlorobenzene	0.441	0.478		-8.4		
1,2,4-Trichlorobenzene	0.475	0.507		-6.7		
1,2,3-Trichloropropane	0.383	0.389		-1.6		
1,2,4-Trimethylbenzene	1.088	1.214		-11.6		
1,2,3-Trimethylbenzene	1.290	1.457		-12.9		
Butanol						<-
2-Propanol						<-
1-Propanol	0.025			100.0		<-
2-Methyl-2-propanol						<-
2-Butanol						<-
3-Heptanone	0.669	0.666		0.4		
2-Heptanone	0.868	0.944		-8.8		
Tetrahydrofuran	1.289	1.453		-12.7		
Dibromomethane	0.173	0.191		-10.4		
Toluene-d8	1.089	1.061		2.6		

All other compounds must meet a minimum RRF of 0.010.

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 29274

Instrument ID: HP1 Calibration Date: 04/06/0 Time: 2226

Lab File ID: 00040613 Init. Calib. Date(s): 04/06/0 04/06/0

Heated Purge: (Y/N) Y Init. Calib. Times: 1429 1723

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm)

COMPOUND	$\overline{RRF}$	RRF250	MIN RRF	%D	MAX %D
Bromofluorobenzene	0.538	0.534		0.7	
Dibromofluoromethane	0.497	0.486		2.2	
1,2-Dichloroethane-d4	0.690	0.727		-5.4	

All other compounds must meet a minimum RRF of 0.010.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Lab File ID (Standard): 00040613 Date Analyzed: 04/06/0

Instrument ID: HP1 Time Analyzed: 2226

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Heated Purge: (Y/N) Y

		IS1(DFB) AREA #	RT #	IS2(CBZ) AREA #	RT #	IS3 AREA #	RT #
	12 HOUR STD	847750	11.76	750345	16.71	493849	10.54
	UPPER LIMIT	1695500	12.26	1500690	17.21	987698	11.04
	LOWER LIMIT	423875	11.26	375173	16.21	246925	10.04
	EPA SAMPLE NO.						
01	LCS	862174	11.77	749432	16.72	512627	10.55
02	METHOD BLANK	885464	11.84	833761	16.81	526979	10.63
03	HOTCELLBLK	923689	11.86	877895	16.82	547800	10.63
04	C104SUP	982346	11.81	895169	16.78	564946	10.59
05	C104SUPD						
06	C104SUPMS	908851	11.80	828127	16.77	567902	10.58
07	C104SUPMSD	25698*	11.80	24958*	16.78	16107*	10.57
08	METHOD BLANK	909269	11.83	842649	16.81	527570	10.61
09	HOTCELLBLKD	945470	11.86	902414	16.82	559038	10.63
10	C104SOL	998888	11.89	963170	16.87	599035	10.66
11	C104SOLD	864648	11.86	776045	16.81	536952	10.64
12	C104SOLMS	849831	11.78	744410	16.74	529662	10.57
13	C104SOLMSD	809324	11.77	738714	16.74	521123	10.55
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (DFB) = 1,4-Difluorobenzene
IS2 (CBZ) = Chlorobenzene-d5
IS3 = Pentafluorobenzene

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 2

Lab File ID (Standard): 00040613 Date Analyzed: 04/06/0

Instrument ID: HP1 Time Analyzed: 2226

GC Column: DB-624 75M X 2.55UM ID: 0.45 (mm) Heated Purge: (Y/N) Y

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	649584	20.92				
	UPPER LIMIT	1299168	21.42				
	LOWER LIMIT	324792	20.42				
	EPA SAMPLE NO.						
01	LCS	648268	20.93				
02	METHOD BLANK	667780	21.01				
03	HOTCELLBLK	732061	21.02				
04	C104SUP	636881	20.97				
05	C104SUPD						
06	C104SUPMS	659218	20.97				
07	C104SUPMSD	19029*	20.98				
08	METHOD BLANK	667213	21.01				
09	HOTCELLBLKD	746133	21.02				
10	C104SOL	716473	21.08				
11	C104SOLD	606456	21.00				
12	C104SOLMS	599096	20.93				
13	C104SOLMSD	586107	20.93				
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Appendix E: Semi-Volatile Organic Analysis Result Forms

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLB

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081904

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	560	U
111-44-4	bis(2-Chloroethyl)ether	560	U
95-57-8	2-Chlorophenol	560	U
541-73-1	1,3-Dichlorobenzene	560	U
106-46-7	1,4-Dichlorobenzene	560	U
95-50-1	1,2-Dichlorobenzene	560	U
100-51-6	Benzyl alcohol	560	U
95-48-7	2-Methylphenol	1700	
108-60-1	2,2'-oxybis(1-Chloropropane)	560	U
621-64-7	N-Nitroso-di-n-propylamine	560	U
106-44-5	4-Methylphenol	2900	
67-72-1	Hexachloroethane	560	U
98-95-3	Nitrobenzene	560	U
78-59-1	Isophorone	560	U
88-75-5	2-Nitrophenol	560	U
105-67-9	2,4-Dimethylphenol	560	U
111-91-1	bis(2-Chloroethoxy)methane	560	U
120-83-2	2,4-Dichlorophenol	560	U
120-82-1	1,2,4-Trichlorobenzene	560	U
91-20-3	Naphthalene	560	U
106-47-8	4-Chloroaniline	560	U
87-68-3	Hexachlorobutadiene	560	U
59-50-7	4-Chloro-3-methylphenol	560	U
91-57-6	2-Methylnaphthalene	560	U
77-47-4	Hexachlorocyclopentadiene	560	U
88-06-2	2,4,6-Trichlorophenol	560	U
95-95-4	2,4,5-Trichlorophenol	560	U
91-58-7	2-Chloronaphthalene	560	U
88-74-4	2-Nitroaniline	560	U
99-09-2	3-Nitroaniline	560	U
131-11-3	Dimethylphthalate	560	U
606-20-2	2,6-Dinitrotoluene	560	U
208-96-8	Acenaphthylene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLB

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081904

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	560	U
51-28-5	2,4-Dinitrophenol	560	U
132-64-9	Dibenzofuran	560	U
100-02-7	4-Nitrophenol	560	U
121-14-2	2,4-Dinitrotoluene	560	U
84-66-2	Diethylphthalate	560	U
86-73-7	Fluorene	560	U
7005-72-3	4-Chlorophenyl-phenylether	560	U
100-01-6	4-Nitroaniline	560	U
534-52-1	4,6-Dinitro-2-methylphenol	560	U
122-39-4	N,N-Diphenylamine	560	U
76-44-8	Heptachlor	560	U
319-84-6	alpha-BHC	560	U
101-55-3	4-Bromophenyl-phenylether	560	U
118-74-1	Hexachlorobenzene	560	U
319-85-7	beta-BHC	560	U
87-86-5	Pentachlorophenol	560	U
319-86-8	delta-BHC	560	U
85-01-8	Phenanthrene	560	U
120-12-7	Anthracene	560	U
58-89-9	gamma-BHC (Lindane)	560	U
86-74-8	Carbazole	560	U
84-74-2	Di-n-butylphthalate	560	U
309-00-2	Aldrin	560	U
1024-57-3	Heptachlor Epoxide	560	U
206-44-0	Fluoranthene	560	U
129-00-0	Pyrene	560	U
959-98-8	Endosulfan I	560	U
72-55-9	4,4'-DDE	560	U
60-57-1	Dieldrin	560	U
72-20-8	Endrin	560	U
33213-65-9	Endosulfan II	560	U
72-54-8	4,4'-DDD	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLB

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081904

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
85-68-7	Butylbenzylphthalate	560	U
1031-07-8	Endosulfan Sulfate	560	U
50-29-3	4,4'-DDT	560	U
53494-70-5	Endrin Ketone	560	U
56-55-3	Benzo(a)anthracene	560	U
91-94-1	3,3'-Dichlorobenzidine	560	U
218-01-9	Chrysene	560	U
72-43-5	Methoxychlor	560	U
117-81-7	Bis(2-Ethylhexyl)phthalate	560	U
117-84-0	Di-n-octylphthalate	560	U
205-99-2	Benzo(b)fluoranthene	560	U
207-08-9	Benzo(k)fluoranthene	560	U
50-32-8	Benzo(a)pyrene	560	U
193-39-5	Indeno(1,2,3-cd)pyrene	560	U
53-70-3	Dibenz(a,h)anthracene	560	U
191-24-2	Benzo(g,h,i)perylene	560	U
110-86-1	Pyridine	2400	
126-73-8	Tributyl phosphate	2500	
62-75-9	N-Nitrosodimethylamine	560	U
98-86-2	Acetophenone	3000	
100-00-5	1-Chloro-4-nitrobenzene	2600	
92-52-4	Biphenyl	2600	
100-25-4	1,4-Dinitrobenzene	1600	
128-37-0	Butylated Hydroxytoluene	1500	
82-68-8	Pentachloronitrobenzene	560	U
88-85-7	Dinoseb	250	J
2234-13-1	Octachloronaphthalene	45000	
10595-95-6	N-Nitrosomethylethylamine	560	U
55-18-5	N-Nitrosodiethylamine	560	U
62-50-0	Ethyl methane sulfonate	560	U
62-53-3	Analine	560	U
76-01-7	Pentachloroethane	560	U
930-55-2	N-Nitrosopyrolidine	560	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLB

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081904

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-75-4	N-Nitrosopiperidine	560	U
1888-71-7	Hexachloropropene	560	U
924-16-3	N-Nitrosodi-n-butylamine	560	U
94-59-7	Safrole	560	U
95-94-3	1,2,4,5-Tetrachlorobenzene	560	U
120-58-1	Isosafrole	560	U
130-15-4	1,4-Naphthoquinone	560	U
608-93-5	Pentachlorobenzene	560	U
134-32-7	1-Naphthylamine	560	U
58-90-2	2,3,4,6-Tetrachlorophenol	560	U
91-59-8	2-Naphthylamine	560	U
99-55-8	5-Nitro-o-toluidine	560	U
103-33-3	Azeobenzene	560	U
99-35-4	1,3,5-Trinitrobenzene	560	U
2303-16-4	Diallate (cis)	560	U
62-44-2	Phenacetin	560	U
2303-16-4	Diallate (trans)	560	U
92-67-1	4-Aminobiphenyl	560	U
23950-58-5	Pronamine	560	U
465-73-6	Isodrin	560	U
57-74-9	Chlordane (alpha)	560	U
92-87-5	Benzidine	2800	
60-11-7	p-Dimethylaminoazobenzene	560	U
510-15-6	Chlorobenzilate	560	U
119-93-7	3,3'-Dimethylbenzidine	560	U
53-96-3	2-Acetylaminofluorene	560	U
56-49-5	3-Methylcholanthrene	560	U
109-06-8	2-Methylpyridine	560	U
143-50-0	Kepone	560	U
57-74-9	Chlordane (gamma)	560	U
66-27-3	Methyl methane sulfonate	560	U
70-30-4	Hexachlorophene	560	U
99-65-0	1,3-Dinitrobenzene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLB

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081904

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
87-65-0	2,6-Dichlorophenol	560	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081906

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	560	U
111-44-4	bis(2-Chloroethyl)ether	560	U
95-57-8	2-Chlorophenol	560	U
541-73-1	1,3-Dichlorobenzene	560	U
106-46-7	1,4-Dichlorobenzene	560	U
95-50-1	1,2-Dichlorobenzene	560	U
100-51-6	Benzyl alcohol	560	U
95-48-7	2-Methylphenol	560	U
108-60-1	2,2'-oxybis(1-Chloropropane)	560	U
621-64-7	N-Nitroso-di-n-propylamine	560	U
106-44-5	4-Methylphenol	560	U
67-72-1	Hexachloroethane	560	U
98-95-3	Nitrobenzene	560	U
78-59-1	Isophorone	560	U
88-75-5	2-Nitrophenol	560	U
105-67-9	2,4-Dimethylphenol	560	U
111-91-1	bis(2-Chloroethoxy)methane	560	U
120-83-2	2,4-Dichlorophenol	560	U
120-82-1	1,2,4-Trichlorobenzene	560	U
91-20-3	Naphthalene	560	U
106-47-8	4-Chloroaniline	560	U
87-68-3	Hexachlorobutadiene	560	U
59-50-7	4-Chloro-3-methylphenol	560	U
91-57-6	2-Methylnaphthalene	560	U
77-47-4	Hexachlorocyclopentadiene	560	U
88-06-2	2,4,6-Trichlorophenol	560	U
95-95-4	2,4,5-Trichlorophenol	560	U
91-58-7	2-Chloronaphthalene	560	U
88-74-4	2-Nitroaniline	560	U
99-09-2	3-Nitroaniline	560	U
131-11-3	Dimethylphthalate	560	U
606-20-2	2,6-Dinitrotoluene	560	U
208-96-8	Acenaphthylene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081906

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	560	U
51-28-5	2,4-Dinitrophenol	560	U
132-64-9	Dibenzofuran	560	U
100-02-7	4-Nitrophenol	560	U
121-14-2	2,4-Dinitrotoluene	560	U
84-66-2	Diethylphthalate	560	U
86-73-7	Fluorene	560	U
7005-72-3	4-Chlorophenyl-phenylether	560	U
100-01-6	4-Nitroaniline	560	U
534-52-1	4,6-Dinitro-2-methylphenol	560	U
122-39-4	N,N-Diphenylamine	560	U
76-44-8	Heptachlor	560	U
319-84-6	alpha-BHC	560	U
101-55-3	4-Bromophenyl-phenylether	560	U
118-74-1	Hexachlorobenzene	560	U
319-85-7	beta-BHC	560	U
87-86-5	Pentachlorophenol	560	U
319-86-8	delta-BHC	560	U
85-01-8	Phenanthrene	560	U
120-12-7	Anthracene	560	U
58-89-9	gamma-BHC (Lindane)	560	U
86-74-8	Carbazole	560	U
84-74-2	Di-n-butylphthalate	560	U
309-00-2	Aldrin	560	U
1024-57-3	Heptachlor Epoxide	560	U
206-44-0	Fluoranthene	560	U
129-00-0	Pyrene	560	U
959-98-8	Endosulfan I	560	U
72-55-9	4,4'-DDE	560	U
60-57-1	Dieldrin	560	U
72-20-8	Endrin	560	U
33213-65-9	Endosulfan II	560	U
72-54-8	4,4'-DDD	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081906

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
85-68-7	Butylbenzylphthalate	560	U
1031-07-8	Endosulfan Sulfate	560	U
50-29-3	4,4'-DDT	560	U
53494-70-5	Endrin Ketone	560	U
56-55-3	Benzo(a)anthracene	560	U
91-94-1	3,3'-Dichlorobenzidine	560	U
218-01-9	Chrysene	560	U
72-43-5	Methoxychlor	560	U
117-81-7	Bis(2-Ethylhexyl)phthalate	96	J
117-84-0	Di-n-octylphthalate	560	U
205-99-2	Benzo(b)fluoranthene	560	U
207-08-9	Benzo(k)fluoranthene	560	U
50-32-8	Benzo(a)pyrene	560	U
193-39-5	Indeno(1,2,3-cd)pyrene	560	U
53-70-3	Dibenz(a,h)anthracene	560	U
191-24-2	Benzo(g,h,i)perylene	560	U
110-86-1	Pyridine	3100	B
126-73-8	Tributyl phosphate	2000	B
62-75-9	N-Nitrosodimethylamine	1900	
98-86-2	Acetophenone	2200	B
100-00-5	1-Chloro-4-nitrobenzene	1900	B
92-52-4	Biphenyl	2000	B
100-25-4	1,4-Dinitrobenzene	1500	B
128-37-0	Butylated Hydroxytoluene	92	JB
82-68-8	Pentachloronitrobenzene	560	U
88-85-7	Dinoseb	2500	B
2234-13-1	Octachloronaphthalene	36000	B
10595-95-6	N-Nitrosomethylethylamine	560	U
55-18-5	N-Nitrosodiethylamine	26	J
62-50-0	Ethyl methane sulfonate	560	U
62-53-3	Analine	560	U
76-01-7	Pentachloroethane	560	U
930-55-2	N-Nitrosopyrolidine	53	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081906

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-75-4	N-Nitrosopiperidine	560	U
1888-71-7	Hexachloropropene	560	U
924-16-3	N-Nitrosodi-n-butylamine	560	U
94-59-7	Safrole	560	U
95-94-3	1,2,4,5-Tetrachlorobenzene	560	U
120-58-1	Isosafrole	560	U
130-15-4	1,4-Naphthoquinone	10	J
608-93-5	Pentachlorobenzene	560	U
134-32-7	1-Naphthylamine	560	U
58-90-2	2,3,4,6-Tetrachlorophenol	560	U
91-59-8	2-Naphthylamine	560	U
99-55-8	5-Nitro-o-toluidine	560	U
103-33-3	Azeobenzene	560	U
99-35-4	1,3,5-Trinitrobenzene	560	U
2303-16-4	Diallate (cis)	560	U
62-44-2	Phenacetin	560	U
2303-16-4	Diallate (trans)	560	U
92-67-1	4-Aminobiphenyl	560	U
23950-58-5	Pronamine	560	U
465-73-6	Isodrin	560	U
57-74-9	Chlordane (alpha)	560	U
92-87-5	Benzidine	1900	B
60-11-7	p-Dimethylaminoazobenzene	560	U
510-15-6	Chlorobenzilate	560	U
119-93-7	3,3'-Dimethylbenzidine	560	U
53-96-3	2-Acetylaminofluorene	560	U
56-49-5	3-Methylcholanthrene	560	U
109-06-8	2-Methylpyridine	510	J
143-50-0	Kepone	560	U
57-74-9	Chlordane (gamma)	560	U
66-27-3	Methyl methane sulfonate	560	U
70-30-4	Hexachlorophene	560	U
99-65-0	1,3-Dinitrobenzene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081906

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
87-65-0	2,6-Dichlorophenol	560	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLE

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLE

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081909

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	560	U
111-44-4	bis(2-Chloroethyl)ether	560	U
95-57-8	2-Chlorophenol	560	U
541-73-1	1,3-Dichlorobenzene	560	U
106-46-7	1,4-Dichlorobenzene	560	U
95-50-1	1,2-Dichlorobenzene	560	U
100-51-6	Benzyl alcohol	560	U
95-48-7	2-Methylphenol	560	U
108-60-1	2,2'-oxybis(1-Chloropropane)	560	U
621-64-7	N-Nitroso-di-n-propylamine	560	U
106-44-5	4-Methylphenol	560	U
67-72-1	Hexachloroethane	560	U
98-95-3	Nitrobenzene	560	U
78-59-1	Isophorone	560	U
88-75-5	2-Nitrophenol	560	U
105-67-9	2,4-Dimethylphenol	560	U
111-91-1	bis(2-Chloroethoxy)methane	560	U
120-83-2	2,4-Dichlorophenol	560	U
120-82-1	1,2,4-Trichlorobenzene	560	U
91-20-3	Naphthalene	560	U
106-47-8	4-Chloroaniline	560	U
87-68-3	Hexachlorobutadiene	560	U
59-50-7	4-Chloro-3-methylphenol	560	U
91-57-6	2-Methylnaphthalene	560	U
77-47-4	Hexachlorocyclopentadiene	560	U
88-06-2	2,4,6-Trichlorophenol	560	U
95-95-4	2,4,5-Trichlorophenol	560	U
91-58-7	2-Chloronaphthalene	560	U
88-74-4	2-Nitroaniline	560	U
99-09-2	3-Nitroaniline	560	U
131-11-3	Dimethylphthalate	560	U
606-20-2	2,6-Dinitrotoluene	560	U
208-96-8	Acenaphthylene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLE

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLE

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081909

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	560	U
51-28-5	2,4-Dinitrophenol	560	U
132-64-9	Dibenzofuran	560	U
100-02-7	4-Nitrophenol	15000	
121-14-2	2,4-Dinitrotoluene	560	U
84-66-2	Diethylphthalate	560	U
86-73-7	Fluorene	560	U
7005-72-3	4-Chlorophenyl-phenylether	560	U
100-01-6	4-Nitroaniline	560	U
534-52-1	4,6-Dinitro-2-methylphenol	1800000	
122-39-4	N,N-Diphenylamine	560	U
76-44-8	Heptachlor	560	U
319-84-6	alpha-BHC	560	U
101-55-3	4-Bromophenyl-phenylether	560	U
118-74-1	Hexachlorobenzene	560	U
319-85-7	beta-BHC	560	U
87-86-5	Pentachlorophenol	560	U
319-86-8	delta-BHC	560	U
85-01-8	Phenanthrene	560	U
120-12-7	Anthracene	560	U
58-89-9	gamma-BHC (Lindane)	560	U
86-74-8	Carbazole	560	U
84-74-2	Di-n-butylphthalate	560	U
309-00-2	Aldrin	560	U
1024-57-3	Heptachlor Epoxide	560	U
206-44-0	Fluoranthene	560	U
129-00-0	Pyrene	560	U
959-98-8	Endosulfan I	560	U
72-55-9	4,4'-DDE	560	U
60-57-1	Dieldrin	560	U
72-20-8	Endrin	560	U
33213-65-9	Endosulfan II	560	U
72-54-8	4,4'-DDD	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLE

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLE

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081909

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
85-68-7	Butylbenzylphthalate	560	U
1031-07-8	Endosulfan Sulfate	560	U
50-29-3	4,4'-DDT	560	U
53494-70-5	Endrin Ketone	560	U
56-55-3	Benzo(a)anthracene	560	U
91-94-1	3,3'-Dichlorobenzidine	560	U
218-01-9	Chrysene	560	U
72-43-5	Methoxychlor	560	U
117-81-7	Bis(2-Ethylhexyl)phthalate	58	J
117-84-0	Di-n-octylphthalate	560	U
205-99-2	Benzo(b)fluoranthene	560	U
207-08-9	Benzo(k)fluoranthene	560	U
50-32-8	Benzo(a)pyrene	560	U
193-39-5	Indeno(1,2,3-cd)pyrene	560	U
53-70-3	Dibenz(a,h)anthracene	560	U
191-24-2	Benzo(g,h,i)perylene	560	U
110-86-1	Pyridine	240	JB
126-73-8	Tributyl phosphate	2300	B
62-75-9	N-Nitrosodimethylamine	4900	
98-86-2	Acetophenone	1300	B
100-00-5	1-Chloro-4-nitrobenzene	1100	B
92-52-4	Biphenyl	240000	B
100-25-4	1,4-Dinitrobenzene	430000	B
128-37-0	Butylated Hydroxytoluene	560	U
82-68-8	Pentachloronitrobenzene	560	U
88-85-7	Dinoseb	2600	B
2234-13-1	Octachloronaphthalene	0.0	JB
10595-95-6	N-Nitrosomethylethylamine	64	J
55-18-5	N-Nitrosodiethylamine	560	U
62-50-0	Ethyl methane sulfonate	560	U
62-53-3	Analine	560	U
76-01-7	Pentachloroethane	560	U
930-55-2	N-Nitrosopyrolidine	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLE

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLE

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081909

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-75-4	N-Nitrosopiperidine	560	U
1888-71-7	Hexachloropropene	560	U
924-16-3	N-Nitrosodi-n-butylamine	560	U
94-59-7	Safrole	560	U
95-94-3	1,2,4,5-Tetrachlorobenzene	560	U
120-58-1	Isosafrole	560	U
130-15-4	1,4-Naphthoquinone	560	U
608-93-5	Pentachlorobenzene	560	U
134-32-7	1-Naphthylamine	560	U
58-90-2	2,3,4,6-Tetrachlorophenol	560	U
91-59-8	2-Naphthylamine	560	U
99-55-8	5-Nitro-o-toluidine	560	U
103-33-3	Azeobenzene	560	U
99-35-4	1,3,5-Trinitrobenzene	560	U
2303-16-4	Diallate (cis)	560	U
62-44-2	Phenacetin	560	U
2303-16-4	Diallate (trans)	560	U
92-67-1	4-Aminobiphenyl	560	U
23950-58-5	Pronamine	560	U
465-73-6	Isodrin	560	U
57-74-9	Chlordane (alpha)	560	U
92-87-5	Benzidine	560	U
60-11-7	p-Dimethylaminoazobenzene	560	U
510-15-6	Chlorobenzilate	560	U
119-93-7	3,3'-Dimethylbenzidine	560	U
53-96-3	2-Acetylaminofluorene	560	U
56-49-5	3-Methylcholanthrene	560	U
109-06-8	2-Methylpyridine	560	U
143-50-0	Kepone	560	U
57-74-9	Chlordane (gamma)	560	U
66-27-3	Methyl methane sulfonate	560	U
70-30-4	Hexachlorophene	560	U
99-65-0	1,3-Dinitrobenzene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLE

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLE

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081909

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
87-65-0	2,6-Dichlorophenol	560	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081907

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	1800	
111-44-4	bis(2-Chloroethyl)ether	560	U
95-57-8	2-Chlorophenol	1800	
541-73-1	1,3-Dichlorobenzene	560	U
106-46-7	1,4-Dichlorobenzene	1100	
95-50-1	1,2-Dichlorobenzene	560	U
100-51-6	Benzyl alcohol	560	U
95-48-7	2-Methylphenol	2900	B
108-60-1	2,2'-oxybis(1-Chloropropane)	560	U
621-64-7	N-Nitroso-di-n-propylamine	2200	
106-44-5	4-Methylphenol	4800	B
67-72-1	Hexachloroethane	560	U
98-95-3	Nitrobenzene	560	U
78-59-1	Isophorone	560	U
88-75-5	2-Nitrophenol	560	U
105-67-9	2,4-Dimethylphenol	560	U
111-91-1	bis(2-Chloroethoxy)methane	560	U
120-83-2	2,4-Dichlorophenol	560	U
120-82-1	1,2,4-Trichlorobenzene	1600	
91-20-3	Naphthalene	560	U
106-47-8	4-Chloroaniline	560	U
87-68-3	Hexachlorobutadiene	560	U
59-50-7	4-Chloro-3-methylphenol	2000	
91-57-6	2-Methylnaphthalene	560	U
77-47-4	Hexachlorocyclopentadiene	560	U
88-06-2	2,4,6-Trichlorophenol	560	U
95-95-4	2,4,5-Trichlorophenol	560	U
91-58-7	2-Chloronaphthalene	560	U
88-74-4	2-Nitroaniline	560	U
99-09-2	3-Nitroaniline	560	U
131-11-3	Dimethylphthalate	560	U
606-20-2	2,6-Dinitrotoluene	560	U
208-96-8	Acenaphthylene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081907

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	2400	
51-28-5	2,4-Dinitrophenol	560	U
132-64-9	Dibenzofuran	560	U
100-02-7	4-Nitrophenol	840	
121-14-2	2,4-Dinitrotoluene	2600	
84-66-2	Diethylphthalate	560	U
86-73-7	Fluorene	560	U
7005-72-3	4-Chlorophenyl-phenylether	560	U
100-01-6	4-Nitroaniline	560	U
534-52-1	4,6-Dinitro-2-methylphenol	560	U
122-39-4	N,N-Diphenylamine	560	U
76-44-8	Heptachlor	560	U
319-84-6	alpha-BHC	560	U
101-55-3	4-Bromophenyl-phenylether	560	U
118-74-1	Hexachlorobenzene	560	U
319-85-7	beta-BHC	560	U
87-86-5	Pentachlorophenol	960	
319-86-8	delta-BHC	560	U
85-01-8	Phenanthrene	560	U
120-12-7	Anthracene	560	U
58-89-9	gamma-BHC (Lindane)	560	U
86-74-8	Carbazole	560	U
84-74-2	Di-n-butylphthalate	560	U
309-00-2	Aldrin	560	U
1024-57-3	Heptachlor Epoxide	560	U
206-44-0	Fluoranthene	560	U
129-00-0	Pyrene	2700	
959-98-8	Endosulfan I	560	U
72-55-9	4,4'-DDE	560	U
60-57-1	Dieldrin	560	U
72-20-8	Endrin	560	U
33213-65-9	Endosulfan II	560	U
72-54-8	4,4'-DDD	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081907

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
85-68-7	Butylbenzylphthalate	560	U
1031-07-8	Endosulfan Sulfate	560	U
50-29-3	4,4'-DDT	560	U
53494-70-5	Endrin Ketone	560	U
56-55-3	Benzo(a)anthracene	560	U
91-94-1	3,3'-Dichlorobenzidine	560	U
218-01-9	Chrysene	560	U
72-43-5	Methoxychlor	560	U
117-81-7	Bis(2-Ethylhexyl)phthalate	560	U
117-84-0	Di-n-octylphthalate	560	U
205-99-2	Benzo(b)fluoranthene	560	U
207-08-9	Benzo(k)fluoranthene	560	U
50-32-8	Benzo(a)pyrene	560	U
193-39-5	Indeno(1,2,3-cd)pyrene	560	U
53-70-3	Dibenz(a,h)anthracene	560	U
191-24-2	Benzo(g,h,i)perylene	560	U
110-86-1	Pyridine	5400	B
126-73-8	Tributyl phosphate	4700	B
62-75-9	N-Nitrosodimethylamine	760	
98-86-2	Acetophenone	5700	B
100-00-5	1-Chloro-4-nitrobenzene	4900	B
92-52-4	Biphenyl	4600	B
100-25-4	1,4-Dinitrobenzene	3600	B
128-37-0	Butylated Hydroxytoluene	2700	B
82-68-8	Pentachloronitrobenzene	560	U
88-85-7	Dinoseb	4100	B
2234-13-1	Octachloronaphthalene	94000	B
10595-95-6	N-Nitrosomethylethylamine	560	U
55-18-5	N-Nitrosodiethylamine	560	U
62-50-0	Ethyl methane sulfonate	560	U
62-53-3	Analine	560	U
76-01-7	Pentachloroethane	560	U
930-55-2	N-Nitrosopyrolidine	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081907

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-75-4	N-Nitrosopiperidine	560	U
1888-71-7	Hexachloropropene	560	U
924-16-3	N-Nitrosodi-n-butylamine	560	U
94-59-7	Safrole	560	U
95-94-3	1,2,4,5-Tetrachlorobenzene	560	U
120-58-1	Isosafrole	560	U
130-15-4	1,4-Naphthoquinone	560	U
608-93-5	Pentachlorobenzene	560	U
134-32-7	1-Naphthylamine	560	U
58-90-2	2,3,4,6-Tetrachlorophenol	560	U
91-59-8	2-Naphthylamine	2	J
99-55-8	5-Nitro-o-toluidine	560	U
103-33-3	Azeobenzene	560	U
99-35-4	1,3,5-Trinitrobenzene	560	U
2303-16-4	Diallate (cis)	560	U
62-44-2	Phenacetin	560	U
2303-16-4	Diallate (trans)	560	U
92-67-1	4-Aminobiphenyl	560	U
23950-58-5	Pronamine	560	U
465-73-6	Isodrin	560	U
57-74-9	Chlordane (alpha)	560	U
92-87-5	Benzidine	2500	B
60-11-7	p-Dimethylaminoazobenzene	560	U
510-15-6	Chlorobenzilate	560	U
119-93-7	3,3'-Dimethylbenzidine	560	U
53-96-3	2-Acetylaminofluorene	560	U
56-49-5	3-Methylcholanthrene	560	U
109-06-8	2-Methylpyridine	160	J
143-50-0	Kepone	560	U
57-74-9	Chlordane (gamma)	560	U
66-27-3	Methyl methane sulfonate	560	U
70-30-4	Hexachlorophene	560	U
99-65-0	1,3-Dinitrobenzene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081907

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
87-65-0	2,6-Dichlorophenol	560	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMSD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081908

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	1600	
111-44-4	bis(2-Chloroethyl)ether	560	U
95-57-8	2-Chlorophenol	1700	
541-73-1	1,3-Dichlorobenzene	560	U
106-46-7	1,4-Dichlorobenzene	990	
95-50-1	1,2-Dichlorobenzene	560	U
100-51-6	Benzyl alcohol	560	U
95-48-7	2-Methylphenol	2300	B
108-60-1	2,2'-oxybis(1-Chloropropane)	560	U
621-64-7	N-Nitroso-di-n-propylamine	1700	
106-44-5	4-Methylphenol	4200	B
67-72-1	Hexachloroethane	560	U
98-95-3	Nitrobenzene	560	U
78-59-1	Isophorone	560	U
88-75-5	2-Nitrophenol	560	U
105-67-9	2,4-Dimethylphenol	560	U
111-91-1	bis(2-Chloroethoxy)methane	560	U
120-83-2	2,4-Dichlorophenol	560	U
120-82-1	1,2,4-Trichlorobenzene	1400	
91-20-3	Naphthalene	560	U
106-47-8	4-Chloroaniline	560	U
87-68-3	Hexachlorobutadiene	560	U
59-50-7	4-Chloro-3-methylphenol	1900	
91-57-6	2-Methylnaphthalene	560	U
77-47-4	Hexachlorocyclopentadiene	560	U
88-06-2	2,4,6-Trichlorophenol	560	U
95-95-4	2,4,5-Trichlorophenol	560	U
91-58-7	2-Chloronaphthalene	560	U
88-74-4	2-Nitroaniline	560	U
99-09-2	3-Nitroaniline	560	U
131-11-3	Dimethylphthalate	560	U
606-20-2	2,6-Dinitrotoluene	560	U
208-96-8	Acenaphthylene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMSD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081908

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	2100	
51-28-5	2,4-Dinitrophenol	560	U
132-64-9	Dibenzofuran	560	U
100-02-7	4-Nitrophenol	1500	
121-14-2	2,4-Dinitrotoluene	2400	
84-66-2	Diethylphthalate	560	U
86-73-7	Fluorene	560	U
7005-72-3	4-Chlorophenyl-phenylether	560	U
100-01-6	4-Nitroaniline	560	U
534-52-1	4,6-Dinitro-2-methylphenol	560	U
122-39-4	N,N-Diphenylamine	560	U
76-44-8	Heptachlor	560	U
319-84-6	alpha-BHC	560	U
101-55-3	4-Bromophenyl-phenylether	560	U
118-74-1	Hexachlorobenzene	560	U
319-85-7	beta-BHC	560	U
87-86-5	Pentachlorophenol	1100	
319-86-8	delta-BHC	560	U
85-01-8	Phenanthrene	560	U
120-12-7	Anthracene	560	U
58-89-9	gamma-BHC (Lindane)	560	U
86-74-8	Carbazole	560	U
84-74-2	Di-n-butylphthalate	560	U
309-00-2	Aldrin	560	U
1024-57-3	Heptachlor Epoxide	560	U
206-44-0	Fluoranthene	560	U
129-00-0	Pyrene	2300	
959-98-8	Endosulfan I	560	U
72-55-9	4,4'-DDE	560	U
60-57-1	Dieldrin	560	U
72-20-8	Endrin	560	U
33213-65-9	Endosulfan II	560	U
72-54-8	4,4'-DDD	560	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMSD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081908

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
85-68-7	Butylbenzylphthalate	560	U
1031-07-8	Endosulfan Sulfate	560	U
50-29-3	4,4'-DDT	560	U
53494-70-5	Endrin Ketone	560	U
56-55-3	Benzo(a)anthracene	560	U
91-94-1	3,3'-Dichlorobenzidine	560	U
218-01-9	Chrysene	560	U
72-43-5	Methoxychlor	560	U
117-81-7	Bis(2-Ethylhexyl)phthalate	560	U
117-84-0	Di-n-octylphthalate	560	U
205-99-2	Benzo(b)fluoranthene	560	U
207-08-9	Benzo(k)fluoranthene	560	U
50-32-8	Benzo(a)pyrene	560	U
193-39-5	Indeno(1,2,3-cd)pyrene	560	U
53-70-3	Dibenz(a,h)anthracene	560	U
191-24-2	Benzo(g,h,i)perylene	560	U
110-86-1	Pyridine	5000	B
126-73-8	Tributyl phosphate	3900	B
62-75-9	N-Nitrosodimethylamine	510	J
98-86-2	Acetophenone	4600	B
100-00-5	1-Chloro-4-nitrobenzene	4000	B
92-52-4	Biphenyl	3800	B
100-25-4	1,4-Dinitrobenzene	3200	B
128-37-0	Butylated Hydroxytoluene	1300	B
82-68-8	Pentachloronitrobenzene	560	U
88-85-7	Dinoseb	3500	B
2234-13-1	Octachloronaphthalene	76000	B
10595-95-6	N-Nitrosomethylethylamine	560	U
55-18-5	N-Nitrosodiethylamine	560	U
62-50-0	Ethyl methane sulfonate	560	U
62-53-3	Analine	560	U
76-01-7	Pentachloroethane	560	U
930-55-2	N-Nitrosopyrolidine	560	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMSD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081908

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-75-4	N-Nitrosopiperidine	560	U
1888-71-7	Hexachloropropene	560	U
924-16-3	N-Nitrosodi-n-butylamine	560	U
94-59-7	Safrole	560	U
95-94-3	1,2,4,5-Tetrachlorobenzene	560	U
120-58-1	Isosafrole	560	U
130-15-4	1,4-Naphthoquinone	560	U
608-93-5	Pentachlorobenzene	560	U
134-32-7	1-Naphthylamine	560	U
58-90-2	2,3,4,6-Tetrachlorophenol	560	U
91-59-8	2-Naphthylamine	560	U
99-55-8	5-Nitro-o-toluidine	560	U
103-33-3	Azeobenzene	560	U
99-35-4	1,3,5-Trinitrobenzene	560	U
2303-16-4	Diallate (cis)	560	U
62-44-2	Phenacetin	560	U
2303-16-4	Diallate (trans)	560	U
92-67-1	4-Aminobiphenyl	560	U
23950-58-5	Pronamine	560	U
465-73-6	Isodrin	560	U
57-74-9	Chlordane (alpha)	560	U
92-87-5	Benzidine	2000	B
60-11-7	p-Dimethylaminoazobenzene	560	U
510-15-6	Chlorobenzilate	560	U
119-93-7	3,3'-Dimethylbenzidine	560	U
53-96-3	2-Acetylaminofluorene	560	U
56-49-5	3-Methylcholanthrene	560	U
109-06-8	2-Methylpyridine	140	J
143-50-0	Kepone	560	U
57-74-9	Chlordane (gamma)	560	U
66-27-3	Methyl methane sulfonate	560	U
70-30-4	Hexachlorophene	560	U
99-65-0	1,3-Dinitrobenzene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLMSD

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081908

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
87-65-0	2,6-Dichlorophenol	560	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	560	U
111-44-4	bis(2-Chloroethyl)ether	560	U
95-57-8	2-Chlorophenol	560	U
541-73-1	1,3-Dichlorobenzene	560	U
106-46-7	1,4-Dichlorobenzene	560	U
95-50-1	1,2-Dichlorobenzene	560	U
100-51-6	Benzyl alcohol	560	U
95-48-7	2-Methylphenol	560	U
108-60-1	2,2'-oxybis(1-Chloropropane)	560	U
621-64-7	N-Nitroso-di-n-propylamine	560	U
106-44-5	4-Methylphenol	560	U
67-72-1	Hexachloroethane	560	U
98-95-3	Nitrobenzene	560	U
78-59-1	Isophorone	560	U
88-75-5	2-Nitrophenol	560	U
105-67-9	2,4-Dimethylphenol	560	U
111-91-1	bis(2-Chloroethoxy)methane	560	U
120-83-2	2,4-Dichlorophenol	560	U
120-82-1	1,2,4-Trichlorobenzene	560	U
91-20-3	Naphthalene	560	U
106-47-8	4-Chloroaniline	560	U
87-68-3	Hexachlorobutadiene	560	U
59-50-7	4-Chloro-3-methylphenol	560	U
91-57-6	2-Methylnaphthalene	560	U
77-47-4	Hexachlorocyclopentadiene	560	U
88-06-2	2,4,6-Trichlorophenol	560	U
95-95-4	2,4,5-Trichlorophenol	560	U
91-58-7	2-Chloronaphthalene	560	U
88-74-4	2-Nitroaniline	560	U
99-09-2	3-Nitroaniline	560	U
131-11-3	Dimethylphthalate	560	U
606-20-2	2,6-Dinitrotoluene	560	U
208-96-8	Acenaphthylene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	560	U
51-28-5	2,4-Dinitrophenol	560	U
132-64-9	Dibenzofuran	560	U
100-02-7	4-Nitrophenol	290	J
121-14-2	2,4-Dinitrotoluene	560	U
84-66-2	Diethylphthalate	560	U
86-73-7	Fluorene	560	U
7005-72-3	4-Chlorophenyl-phenylether	560	U
100-01-6	4-Nitroaniline	560	U
534-52-1	4,6-Dinitro-2-methylphenol	140	J
122-39-4	N,N-Diphenylamine	560	U
76-44-8	Heptachlor	560	U
319-84-6	alpha-BHC	560	U
101-55-3	4-Bromophenyl-phenylether	560	U
118-74-1	Hexachlorobenzene	560	U
319-85-7	beta-BHC	560	U
87-86-5	Pentachlorophenol	560	U
319-86-8	delta-BHC	560	U
85-01-8	Phenanthrene	560	U
120-12-7	Anthracene	560	U
58-89-9	gamma-BHC (Lindane)	560	U
86-74-8	Carbazole	560	U
84-74-2	Di-n-butylphthalate	560	U
309-00-2	Aldrin	560	U
1024-57-3	Heptachlor Epoxide	560	U
206-44-0	Fluoranthene	560	U
129-00-0	Pyrene	560	U
959-98-8	Endosulfan I	560	U
72-55-9	4,4'-DDE	560	U
60-57-1	Dieldrin	560	U
72-20-8	Endrin	560	U
33213-65-9	Endosulfan II	560	U
72-54-8	4,4'-DDD	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
85-68-7	Butylbenzylphthalate	560	U
1031-07-8	Endosulfan Sulfate	560	U
50-29-3	4,4'-DDT	560	U
53494-70-5	Endrin Ketone	560	U
56-55-3	Benzo(a)anthracene	560	U
91-94-1	3,3'-Dichlorobenzidine	560	U
218-01-9	Chrysene	560	U
72-43-5	Methoxychlor	560	U
117-81-7	Bis(2-Ethylhexyl)phthalate	480	J
117-84-0	Di-n-octylphthalate	560	U
205-99-2	Benzo(b)fluoranthene	560	U
207-08-9	Benzo(k)fluoranthene	560	U
50-32-8	Benzo(a)pyrene	560	U
193-39-5	Indeno(1,2,3-cd)pyrene	560	U
53-70-3	Dibenz(a,h)anthracene	560	U
191-24-2	Benzo(g,h,i)perylene	560	U
110-86-1	Pyridine	2300	B
126-73-8	Tributyl phosphate	2100	B
62-75-9	N-Nitrosodimethylamine	1300	
98-86-2	Acetophenone	2300	B
100-00-5	1-Chloro-4-nitrobenzene	2100	B
92-52-4	Biphenyl	2000	B
100-25-4	1,4-Dinitrobenzene	1500	B
128-37-0	Butylated Hydroxytoluene	130	JB
82-68-8	Pentachloronitrobenzene	560	U
88-85-7	Dinoseb	2200	B
2234-13-1	Octachloronaphthalene	38000	B
10595-95-6	N-Nitrosomethylethylamine	560	U
55-18-5	N-Nitrosodiethylamine	25	J
62-50-0	Ethyl methane sulfonate	560	U
62-53-3	Analine	560	U
76-01-7	Pentachloroethane	560	U
930-55-2	N-Nitrosopyrolidine	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-75-4	N-Nitrosopiperidine	560	U
1888-71-7	Hexachloropropene	560	U
924-16-3	N-Nitrosodi-n-butylamine	560	U
94-59-7	Safrole	560	U
95-94-3	1,2,4,5-Tetrachlorobenzene	560	U
120-58-1	Isosafrole	560	U
130-15-4	1,4-Naphthoquinone	560	U
608-93-5	Pentachlorobenzene	560	U
134-32-7	1-Naphthylamine	560	U
58-90-2	2,3,4,6-Tetrachlorophenol	560	U
91-59-8	2-Naphthylamine	560	U
99-55-8	5-Nitro-o-toluidine	560	U
103-33-3	Azeobenzene	560	U
99-35-4	1,3,5-Trinitrobenzene	560	U
2303-16-4	Diallate (cis)	560	U
62-44-2	Phenacetin	560	U
2303-16-4	Diallate (trans)	560	U
92-67-1	4-Aminobiphenyl	560	U
23950-58-5	Pronamine	560	U
465-73-6	Isodrin	560	U
57-74-9	Chlordane (alpha)	560	U
92-87-5	Benzidine	2100	B
60-11-7	p-Dimethylaminoazobenzene	560	U
510-15-6	Chlorobenzilate	560	U
119-93-7	3,3'-Dimethylbenzidine	560	U
53-96-3	2-Acetylaminofluorene	560	U
56-49-5	3-Methylcholanthrene	560	U
109-06-8	2-Methylpyridine	350	J
143-50-0	Kepone	560	U
57-74-9	Chlordane (gamma)	560	U
66-27-3	Methyl methane sulfonate	560	U
70-30-4	Hexachlorophene	560	U
99-65-0	1,3-Dinitrobenzene	560	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATAN Lab Sample ID: 00-1360-SLS

Sample wt/vol: _____ (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
87-65-0	2,6-Dichlorophenol	560	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081913

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	2000	U
111-44-4	bis(2-Chloroethyl)ether	2000	U
95-57-8	2-Chlorophenol	2000	U
541-73-1	1,3-Dichlorobenzene	2000	U
106-46-7	1,4-Dichlorobenzene	2000	U
95-50-1	1,2-Dichlorobenzene	2000	U
100-51-6	Benzyl alcohol	2000	U
95-48-7	2-Methylphenol	3100	
108-60-1	2,2'-oxybis(1-Chloropropane)	2000	U
621-64-7	N-Nitroso-di-n-propylamine	2000	U
106-44-5	4-Methylphenol	6800	
67-72-1	Hexachloroethane	2000	U
98-95-3	Nitrobenzene	2000	U
78-59-1	Isophorone	2000	U
88-75-5	2-Nitrophenol	2000	U
105-67-9	2,4-Dimethylphenol	2000	U
111-91-1	bis(2-Chloroethoxy)methane	2000	U
120-83-2	2,4-Dichlorophenol	2000	U
120-82-1	1,2,4-Trichlorobenzene	2000	U
91-20-3	Naphthalene	2000	U
106-47-8	4-Chloroaniline	2000	U
87-68-3	Hexachlorobutadiene	2000	U
59-50-7	4-Chloro-3-methylphenol	2000	U
91-57-6	2-Methylnaphthalene	2000	U
77-47-4	Hexachlorocyclopentadiene	2000	U
88-06-2	2,4,6-Trichlorophenol	2000	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	2000	U
88-74-4	2-Nitroaniline	2000	U
99-09-2	3-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	2000	U
606-20-2	2,6-Dinitrotoluene	2000	U
208-96-8	Acenaphthylene	2000	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081913

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	2000	U
51-28-5	2,4-Dinitrophenol	2000	U
132-64-9	Dibenzofuran	2000	U
100-02-7	4-Nitrophenol	2000	U
121-14-2	2,4-Dinitrotoluene	2000	U
84-66-2	Diethylphthalate	2000	U
86-73-7	Fluorene	2000	U
7005-72-3	4-Chlorophenyl-phenylether	2000	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-methylphenol	2000	U
122-39-4	N,N-Diphenylamine	2000	U
76-44-8	Heptachlor	2000	U
319-84-6	alpha-BHC	2000	U
101-55-3	4-Bromophenyl-phenylether	2000	U
118-74-1	Hexachlorobenzene	2000	U
319-85-7	beta-BHC	2000	U
87-86-5	Pentachlorophenol	2000	U
319-86-8	delta-BHC	2000	U
85-01-8	Phenanthrene	2000	U
120-12-7	Anthracene	2000	U
58-89-9	gamma-BHC (Lindane)	2000	U
86-74-8	Carbazole	2000	U
84-74-2	Di-n-butylphthalate	2000	U
309-00-2	Aldrin	2000	U
1024-57-3	Heptachlor Epoxide	2000	U
206-44-0	Fluoranthene	2000	U
129-00-0	Pyrene	2000	U
959-98-8	Endosulfan I	2000	U
72-55-9	4,4'-DDE	2000	U
60-57-1	Dieldrin	2000	U
72-20-8	Endrin	2000	U
33213-65-9	Endosulfan II	2000	U
72-54-8	4,4'-DDD	2000	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081913

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	2000	U
1031-07-8	Endosulfan Sulfate	2000	U
50-29-3	4,4'-DDT	2000	U
53494-70-5	Endrin Ketone	2000	U
56-55-3	Benzo(a)anthracene	2000	U
91-94-1	3,3'-Dichlorobenzidine	2000	U
218-01-9	Chrysene	2000	U
72-43-5	Methoxychlor	2000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	2000	U
117-84-0	Di-n-octylphthalate	2000	U
205-99-2	Benzo(b)fluoranthene	2000	U
207-08-9	Benzo(k)fluoranthene	2000	U
50-32-8	Benzo(a)pyrene	2000	U
193-39-5	Indeno(1,2,3-cd)pyrene	2000	U
53-70-3	Dibenz(a,h)anthracene	2000	U
191-24-2	Benzo(g,h,i)perylene	2000	U
110-86-1	Pyridine	8200	
126-73-8	Tributyl phosphate	5500	
62-75-9	N-Nitrosodimethylamine	2000	U
98-86-2	Acetophenone	8800	
100-00-5	1-Chloro-4-nitrobenzene	6300	
92-52-4	Biphenyl	6200	
100-25-4	1,4-Dinitrobenzene	4400	
128-37-0	Butylated Hydroxytoluene	170	J
82-68-8	Pentachloronitrobenzene	2000	U
88-85-7	Dinoseb	6500	
2234-13-1	Octachloronaphthalene	250000	
10595-95-6	N-Nitrosomethylethylamine	2000	U
55-18-5	N-Nitrosodiethylamine	2000	U
62-50-0	Ethyl methane sulfonate	2000	U
62-53-3	Analine	2000	U
76-01-7	Pentachloroethane	2000	U
930-55-2	N-Nitrosopyrolidine	2000	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081913

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	2000	U
1888-71-7	Hexachloropropene	2000	U
924-16-3	N-Nitrosodi-n-butylamine	2000	U
94-59-7	Safrole	2000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	2000	U
120-58-1	Isosafrole	2000	U
130-15-4	1,4-Naphthoquinone	2000	U
608-93-5	Pentachlorobenzene	2000	U
134-32-7	1-Naphthylamine	2000	U
58-90-2	2,3,4,6-Tetrachlorophenol	2000	U
91-59-8	2-Naphthylamine	2000	U
99-55-8	5-Nitro-o-toluidine	2000	U
103-33-3	Azeobenzene	2000	U
99-35-4	1,3,5-Trinitrobenzene	2000	U
2303-16-4	Diallate (cis)	2000	U
62-44-2	Phenacetin	2000	U
2303-16-4	Diallate (trans)	2000	U
92-67-1	4-Aminobiphenyl	2000	U
23950-58-5	Pronamine	2000	U
465-73-6	Isodrin	2000	U
57-74-9	Chlordane (alpha)	2000	U
92-87-5	Benzidine	2000	U
60-11-7	p-Dimethylaminoazobenzene	2000	U
510-15-6	Chlorobenzilate	2000	U
119-93-7	3,3'-Dimethylbenzidine	2000	U
53-96-3	2-Acetylaminofluorene	2000	U
56-49-5	3-Methylcholanthrene	2000	U
109-06-8	2-Methylpyridine	2000	U
143-50-0	Kepone	2000	U
57-74-9	Chlordane (gamma)	2000	U
66-27-3	Methyl methane sulfonate	2000	U
70-30-4	Hexachlorophene	2000	U
99-65-0	1,3-Dinitrobenzene	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081913

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	2000	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSD

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 00081915

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	20000	U
111-44-4	bis(2-Chloroethyl)ether	20000	U
95-57-8	2-Chlorophenol	20000	U
541-73-1	1,3-Dichlorobenzene	20000	U
106-46-7	1,4-Dichlorobenzene	20000	U
95-50-1	1,2-Dichlorobenzene	20000	U
100-51-6	Benzyl alcohol	20000	U
95-48-7	2-Methylphenol	20000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	20000	U
621-64-7	N-Nitroso-di-n-propylamine	20000	U
106-44-5	4-Methylphenol	6100	JB
67-72-1	Hexachloroethane	20000	U
98-95-3	Nitrobenzene	20000	U
78-59-1	Isophorone	20000	U
88-75-5	2-Nitrophenol	20000	U
105-67-9	2,4-Dimethylphenol	20000	U
111-91-1	bis(2-Chloroethoxy)methane	20000	U
120-83-2	2,4-Dichlorophenol	20000	U
120-82-1	1,2,4-Trichlorobenzene	20000	U
91-20-3	Naphthalene	20000	U
106-47-8	4-Chloroaniline	20000	U
87-68-3	Hexachlorobutadiene	20000	U
59-50-7	4-Chloro-3-methylphenol	20000	U
91-57-6	2-Methylnaphthalene	20000	U
77-47-4	Hexachlorocyclopentadiene	20000	U
88-06-2	2,4,6-Trichlorophenol	20000	U
95-95-4	2,4,5-Trichlorophenol	20000	U
91-58-7	2-Chloronaphthalene	20000	U
88-74-4	2-Nitroaniline	20000	U
99-09-2	3-Nitroaniline	20000	U
131-11-3	Dimethylphthalate	20000	U
606-20-2	2,6-Dinitrotoluene	20000	U
208-96-8	Acenaphthylene	20000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSD

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 00081915

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	20000	U
51-28-5	2,4-Dinitrophenol	20000	U
132-64-9	Dibenzofuran	20000	U
100-02-7	4-Nitrophenol	20000	U
121-14-2	2,4-Dinitrotoluene	20000	U
84-66-2	Diethylphthalate	20000	U
86-73-7	Fluorene	20000	U
7005-72-3	4-Chlorophenyl-phenylether	20000	U
100-01-6	4-Nitroaniline	20000	U
534-52-1	4,6-Dinitro-2-methylphenol	20000	U
122-39-4	N,N-Diphenylamine	20000	U
76-44-8	Heptachlor	20000	U
319-84-6	alpha-BHC	20000	U
101-55-3	4-Bromophenyl-phenylether	20000	U
118-74-1	Hexachlorobenzene	20000	U
319-85-7	beta-BHC	20000	U
87-86-5	Pentachlorophenol	20000	U
319-86-8	delta-BHC	20000	U
85-01-8	Phenanthrene	20000	U
120-12-7	Anthracene	20000	U
58-89-9	gamma-BHC (Lindane)	20000	U
86-74-8	Carbazole	20000	U
84-74-2	Di-n-butylphthalate	20000	U
309-00-2	Aldrin	20000	U
1024-57-3	Heptachlor Epoxide	20000	U
206-44-0	Fluoranthene	20000	U
129-00-0	Pyrene	20000	U
959-98-8	Endosulfan I	20000	U
72-55-9	4,4'-DDE	20000	U
60-57-1	Dieldrin	20000	U
72-20-8	Endrin	20000	U
33213-65-9	Endosulfan II	20000	U
72-54-8	4,4'-DDD	20000	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSD

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 00081915

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	20000	U
1031-07-8	Endosulfan Sulfate	20000	U
50-29-3	4,4'-DDT	20000	U
53494-70-5	Endrin Ketone	20000	U
56-55-3	Benzo(a)anthracene	20000	U
91-94-1	3,3'-Dichlorobenzidine	20000	U
218-01-9	Chrysene	20000	U
72-43-5	Methoxychlor	20000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	20000	U
117-84-0	Di-n-octylphthalate	20000	U
205-99-2	Benzo(b)fluoranthene	20000	U
207-08-9	Benzo(k)fluoranthene	20000	U
50-32-8	Benzo(a)pyrene	20000	U
193-39-5	Indeno(1,2,3-cd)pyrene	20000	U
53-70-3	Dibenz(a,h)anthracene	20000	U
191-24-2	Benzo(g,h,i)perylene	20000	U
110-86-1	Pyridine	20000	U
126-73-8	Tributyl phosphate	50000	B
62-75-9	N-Nitrosodimethylamine	20000	U
98-86-2	Acetophenone	6200	JB
100-00-5	1-Chloro-4-nitrobenzene	2900	JB
92-52-4	Biphenyl	1700	JB
100-25-4	1,4-Dinitrobenzene	1500	JB
128-37-0	Butylated Hydroxytoluene	790	JB
82-68-8	Pentachloronitrobenzene	20000	U
88-85-7	Dinoseb	3400	JB
2234-13-1	Octachloronaphthalene	51000	B
10595-95-6	N-Nitrosomethylethylamine	20000	U
55-18-5	N-Nitrosodiethylamine	20000	U
62-50-0	Ethyl methane sulfonate	20000	U
62-53-3	Analine	20000	U
76-01-7	Pentachloroethane	20000	U
930-55-2	N-Nitrosopyrolidine	20000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSD

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 00081915

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	20000	U
1888-71-7	Hexachloropropene	20000	U
924-16-3	N-Nitrosodi-n-butylamine	840	J
94-59-7	Safrole	20000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	20000	U
120-58-1	Isosafrole	20000	U
130-15-4	1,4-Naphthoquinone	20000	U
608-93-5	Pentachlorobenzene	20000	U
134-32-7	1-Naphthylamine	20000	U
58-90-2	2,3,4,6-Tetrachlorophenol	20000	U
91-59-8	2-Naphthylamine	20000	U
99-55-8	5-Nitro-o-toluidine	20000	U
103-33-3	Azeobenzene	20000	U
99-35-4	1,3,5-Trinitrobenzene	20000	U
2303-16-4	Diallate (cis)	20000	U
62-44-2	Phenacetin	20000	U
2303-16-4	Diallate (trans)	20000	U
92-67-1	4-Aminobiphenyl	20000	U
23950-58-5	Pronamine	20000	U
465-73-6	Isodrin	20000	U
57-74-9	Chlordane (alpha)	20000	U
92-87-5	Benzidine	20000	U
60-11-7	p-Dimethylaminoazobenzene	20000	U
510-15-6	Chlorobenzilate	20000	U
119-93-7	3,3'-Dimethylbenzidine	20000	U
53-96-3	2-Acetylaminofluorene	20000	U
56-49-5	3-Methylcholanthrene	20000	U
109-06-8	2-Methylpyridine	20000	U
143-50-0	Kepone	20000	U
57-74-9	Chlordane (gamma)	20000	U
66-27-3	Methyl methane sulfonate	20000	U
70-30-4	Hexachlorophene	20000	U
99-65-0	1,3-Dinitrobenzene	20000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSD

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 00081915

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	20000	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMS

Sample wt/vol: 2.7 (g/mL) G Lab File ID: 00081916

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	7500	J
111-44-4	bis(2-Chloroethyl)ether	37000	U
95-57-8	2-Chlorophenol	7000	J
541-73-1	1,3-Dichlorobenzene	37000	U
106-46-7	1,4-Dichlorobenzene	4200	J
95-50-1	1,2-Dichlorobenzene	37000	U
100-51-6	Benzyl alcohol	37000	U
95-48-7	2-Methylphenol	5600	JB
108-60-1	2,2'-oxybis(1-Chloropropane)	37000	U
621-64-7	N-Nitroso-di-n-propylamine	6900	J
106-44-5	4-Methylphenol	16000	JB
67-72-1	Hexachloroethane	37000	U
98-95-3	Nitrobenzene	37000	U
78-59-1	Isophorone	37000	U
88-75-5	2-Nitrophenol	37000	U
105-67-9	2,4-Dimethylphenol	37000	U
111-91-1	bis(2-Chloroethoxy)methane	37000	U
120-83-2	2,4-Dichlorophenol	37000	U
120-82-1	1,2,4-Trichlorobenzene	5800	J
91-20-3	Naphthalene	37000	U
106-47-8	4-Chloroaniline	37000	U
87-68-3	Hexachlorobutadiene	37000	U
59-50-7	4-Chloro-3-methylphenol	6500	J
91-57-6	2-Methylnaphthalene	37000	U
77-47-4	Hexachlorocyclopentadiene	37000	U
88-06-2	2,4,6-Trichlorophenol	37000	U
95-95-4	2,4,5-Trichlorophenol	37000	U
91-58-7	2-Chloronaphthalene	37000	U
88-74-4	2-Nitroaniline	37000	U
99-09-2	3-Nitroaniline	37000	U
131-11-3	Dimethylphthalate	37000	U
606-20-2	2,6-Dinitrotoluene	37000	U
208-96-8	Acenaphthylene	37000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMS

Sample wt/vol: 2.7 (g/mL) G Lab File ID: 00081916

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	6800	J
51-28-5	2,4-Dinitrophenol	37000	U
132-64-9	Dibenzofuran	37000	U
100-02-7	4-Nitrophenol	4100	J
121-14-2	2,4-Dinitrotoluene	8700	J
84-66-2	Diethylphthalate	37000	U
86-73-7	Fluorene	37000	U
7005-72-3	4-Chlorophenyl-phenylether	37000	U
100-01-6	4-Nitroaniline	37000	U
534-52-1	4,6-Dinitro-2-methylphenol	37000	U
122-39-4	N,N-Diphenylamine	37000	U
76-44-8	Heptachlor	37000	U
319-84-6	alpha-BHC	37000	U
101-55-3	4-Bromophenyl-phenylether	37000	U
118-74-1	Hexachlorobenzene	37000	U
319-85-7	beta-BHC	37000	U
87-86-5	Pentachlorophenol	37000	U
319-86-8	delta-BHC	37000	U
85-01-8	Phenanthrene	37000	U
120-12-7	Anthracene	37000	U
58-89-9	gamma-BHC (Lindane)	37000	U
86-74-8	Carbazole	37000	U
84-74-2	Di-n-butylphthalate	37000	U
309-00-2	Aldrin	37000	U
1024-57-3	Heptachlor Epoxide	37000	U
206-44-0	Fluoranthene	37000	U
129-00-0	Pyrene	7800	J
959-98-8	Endosulfan I	37000	U
72-55-9	4,4'-DDE	37000	U
60-57-1	Dieldrin	37000	U
72-20-8	Endrin	37000	U
33213-65-9	Endosulfan II	37000	U
72-54-8	4,4'-DDD	37000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMS

Sample wt/vol: 2.7 (g/mL) G Lab File ID: 00081916

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	37000	U
1031-07-8	Endosulfan Sulfate	37000	U
50-29-3	4,4'-DDT	37000	U
53494-70-5	Endrin Ketone	37000	U
56-55-3	Benzo(a)anthracene	37000	U
91-94-1	3,3'-Dichlorobenzidine	37000	U
218-01-9	Chrysene	37000	U
72-43-5	Methoxychlor	37000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	37000	U
117-84-0	Di-n-octylphthalate	37000	U
205-99-2	Benzo(b)fluoranthene	37000	U
207-08-9	Benzo(k)fluoranthene	37000	U
50-32-8	Benzo(a)pyrene	37000	U
193-39-5	Indeno(1,2,3-cd)pyrene	37000	U
53-70-3	Dibenz(a,h)anthracene	37000	U
191-24-2	Benzo(g,h,i)perylene	37000	U
110-86-1	Pyridine	2700	JB
126-73-8	Tributyl phosphate	92000	B
62-75-9	N-Nitrosodimethylamine	37000	U
98-86-2	Acetophenone	5000	JB
100-00-5	1-Chloro-4-nitrobenzene	6900	JB
92-52-4	Biphenyl	11000	JB
100-25-4	1,4-Dinitrobenzene	7100	JB
128-37-0	Butylated Hydroxytoluene	2900	JB
82-68-8	Pentachloronitrobenzene	37000	U
88-85-7	Dinoseb	14000	JB
2234-13-1	Octachloronaphthalene	400000	B
10595-95-6	N-Nitrosomethylethylamine	37000	U
55-18-5	N-Nitrosodiethylamine	37000	U
62-50-0	Ethyl methane sulfonate	37000	U
62-53-3	Analine	37000	U
76-01-7	Pentachloroethane	37000	U
930-55-2	N-Nitrosopyrolidine	37000	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMS

Sample wt/vol: 2.7 (g/mL) G Lab File ID: 00081916

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	37000	U
1888-71-7	Hexachloropropene	37000	U
924-16-3	N-Nitrosodi-n-butylamine	37000	U
94-59-7	Safrole	37000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	37000	U
120-58-1	Isosafrole	37000	U
130-15-4	1,4-Naphthoquinone	37000	U
608-93-5	Pentachlorobenzene	37000	U
134-32-7	1-Naphthylamine	37000	U
58-90-2	2,3,4,6-Tetrachlorophenol	37000	U
91-59-8	2-Naphthylamine	37000	U
99-55-8	5-Nitro-o-toluidine	37000	U
103-33-3	Azeobenzene	37000	U
99-35-4	1,3,5-Trinitrobenzene	37000	U
2303-16-4	Diallate (cis)	37000	U
62-44-2	Phenacetin	37000	U
2303-16-4	Diallate (trans)	37000	U
92-67-1	4-Aminobiphenyl	37000	U
23950-58-5	Pronamine	37000	U
465-73-6	Isodrin	37000	U
57-74-9	Chlordane (alpha)	37000	U
92-87-5	Benzidine	37000	U
60-11-7	p-Dimethylaminoazobenzene	37000	U
510-15-6	Chlorobenzilate	37000	U
119-93-7	3,3'-Dimethylbenzidine	37000	U
53-96-3	2-Acetylaminofluorene	37000	U
56-49-5	3-Methylcholanthrene	37000	U
109-06-8	2-Methylpyridine	37000	U
143-50-0	Kepone	37000	U
57-74-9	Chlordane (gamma)	37000	U
66-27-3	Methyl methane sulfonate	37000	U
70-30-4	Hexachlorophene	37000	U
99-65-0	1,3-Dinitrobenzene	37000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMS

Sample wt/vol: 2.7 (g/mL) G Lab File ID: 00081916

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	37000	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMSD

Sample wt/vol: 2.5 (g/mL) G Lab File ID: 00081917

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	10000	J
111-44-4	bis(2-Chloroethyl)ether	40000	U
95-57-8	2-Chlorophenol	9200	J
541-73-1	1,3-Dichlorobenzene	40000	U
106-46-7	1,4-Dichlorobenzene	40000	U
95-50-1	1,2-Dichlorobenzene	40000	U
100-51-6	Benzyl alcohol	40000	U
95-48-7	2-Methylphenol	4200	JB
108-60-1	2,2'-oxybis(1-Chloropropane)	40000	U
621-64-7	N-Nitroso-di-n-propylamine	6300	J
106-44-5	4-Methylphenol	19000	JB
67-72-1	Hexachloroethane	40000	U
98-95-3	Nitrobenzene	40000	U
78-59-1	Isophorone	40000	U
88-75-5	2-Nitrophenol	40000	U
105-67-9	2,4-Dimethylphenol	40000	U
111-91-1	bis(2-Chloroethoxy)methane	40000	U
120-83-2	2,4-Dichlorophenol	40000	U
120-82-1	1,2,4-Trichlorobenzene	5000	J
91-20-3	Naphthalene	40000	U
106-47-8	4-Chloroaniline	40000	U
87-68-3	Hexachlorobutadiene	40000	U
59-50-7	4-Chloro-3-methylphenol	11000	J
91-57-6	2-Methylnaphthalene	40000	U
77-47-4	Hexachlorocyclopentadiene	40000	U
88-06-2	2,4,6-Trichlorophenol	40000	U
95-95-4	2,4,5-Trichlorophenol	40000	U
91-58-7	2-Chloronaphthalene	40000	U
88-74-4	2-Nitroaniline	40000	U
99-09-2	3-Nitroaniline	40000	U
131-11-3	Dimethylphthalate	40000	U
606-20-2	2,6-Dinitrotoluene	40000	U
208-96-8	Acenaphthylene	40000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMSD

Sample wt/vol: 2.5 (g/mL) G Lab File ID: 00081917

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	6400	J
51-28-5	2,4-Dinitrophenol	40000	U
132-64-9	Dibenzofuran	40000	U
100-02-7	4-Nitrophenol	4100	J
121-14-2	2,4-Dinitrotoluene	9600	J
84-66-2	Diethylphthalate	40000	U
86-73-7	Fluorene	40000	U
7005-72-3	4-Chlorophenyl-phenylether	40000	U
100-01-6	4-Nitroaniline	40000	U
534-52-1	4,6-Dinitro-2-methylphenol	40000	U
122-39-4	N,N-Diphenylamine	40000	U
76-44-8	Heptachlor	40000	U
319-84-6	alpha-BHC	40000	U
101-55-3	4-Bromophenyl-phenylether	40000	U
118-74-1	Hexachlorobenzene	40000	U
319-85-7	beta-BHC	40000	U
87-86-5	Pentachlorophenol	40000	U
319-86-8	delta-BHC	40000	U
85-01-8	Phenanthrene	40000	U
120-12-7	Anthracene	40000	U
58-89-9	gamma-BHC (Lindane)	40000	U
86-74-8	Carbazole	40000	U
84-74-2	Di-n-butylphthalate	40000	U
309-00-2	Aldrin	40000	U
1024-57-3	Heptachlor Epoxide	40000	U
206-44-0	Fluoranthene	40000	U
129-00-0	Pyrene	7000	J
959-98-8	Endosulfan I	40000	U
72-55-9	4,4'-DDE	40000	U
60-57-1	Dieldrin	40000	U
72-20-8	Endrin	40000	U
33213-65-9	Endosulfan II	40000	U
72-54-8	4,4'-DDD	40000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMSD

Sample wt/vol: 2.5 (g/mL) G Lab File ID: 00081917

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	40000	U
1031-07-8	Endosulfan Sulfate	40000	U
50-29-3	4,4'-DDT	40000	U
53494-70-5	Endrin Ketone	40000	U
56-55-3	Benzo(a)anthracene	40000	U
91-94-1	3,3'-Dichlorobenzidine	40000	U
218-01-9	Chrysene	40000	U
72-43-5	Methoxychlor	40000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	40000	U
117-84-0	Di-n-octylphthalate	40000	U
205-99-2	Benzo(b)fluoranthene	40000	U
207-08-9	Benzo(k)fluoranthene	40000	U
50-32-8	Benzo(a)pyrene	40000	U
193-39-5	Indeno(1,2,3-cd)pyrene	40000	U
53-70-3	Dibenz(a,h)anthracene	40000	U
191-24-2	Benzo(g,h,i)perylene	40000	U
110-86-1	Pyridine	3300	JB
126-73-8	Tributyl phosphate	90000	B
62-75-9	N-Nitrosodimethylamine	40000	U
98-86-2	Acetophenone	6000	JB
100-00-5	1-Chloro-4-nitrobenzene	7600	JB
92-52-4	Biphenyl	10000	JB
100-25-4	1,4-Dinitrobenzene	11000	JB
128-37-0	Butylated Hydroxytoluene	1800	JB
82-68-8	Pentachloronitrobenzene	40000	U
88-85-7	Dinoseb	20000	JB
2234-13-1	Octachloronaphthalene	340000	B
10595-95-6	N-Nitrosomethylethylamine	40000	U
55-18-5	N-Nitrosodiethylamine	40000	U
62-50-0	Ethyl methane sulfonate	40000	U
62-53-3	Analine	40000	U
76-01-7	Pentachloroethane	40000	U
930-55-2	N-Nitrosopyrolidine	40000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMSD

Sample wt/vol: 2.5 (g/mL) G Lab File ID: 00081917

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	40000	U
1888-71-7	Hexachloropropene	40000	U
924-16-3	N-Nitrosodi-n-butylamine	820	J
94-59-7	Safrole	40000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	40000	U
120-58-1	Isosafrole	40000	U
130-15-4	1,4-Naphthoquinone	40000	U
608-93-5	Pentachlorobenzene	40000	U
134-32-7	1-Naphthylamine	40000	U
58-90-2	2,3,4,6-Tetrachlorophenol	40000	U
91-59-8	2-Naphthylamine	40000	U
99-55-8	5-Nitro-o-toluidine	40000	U
103-33-3	Azeobenzene	40000	U
99-35-4	1,3,5-Trinitrobenzene	40000	U
2303-16-4	Diallate (cis)	40000	U
62-44-2	Phenacetin	40000	U
2303-16-4	Diallate (trans)	40000	U
92-67-1	4-Aminobiphenyl	40000	U
23950-58-5	Pronamine	40000	U
465-73-6	Isodrin	40000	U
57-74-9	Chlordane (alpha)	40000	U
92-87-5	Benzidine	40000	U
60-11-7	p-Dimethylaminoazobenzene	40000	U
510-15-6	Chlorobenzilate	40000	U
119-93-7	3,3'-Dimethylbenzidine	40000	U
53-96-3	2-Acetylaminofluorene	40000	U
56-49-5	3-Methylcholanthrene	40000	U
109-06-8	2-Methylpyridine	40000	U
143-50-0	Kepone	40000	U
57-74-9	Chlordane (gamma)	40000	U
66-27-3	Methyl methane sulfonate	40000	U
70-30-4	Hexachlorophene	40000	U
99-65-0	1,3-Dinitrobenzene	5500	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSMSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSMSD

Sample wt/vol: 2.5 (g/mL) G Lab File ID: 00081917

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	40000	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSS

Sample wt/vol: 5.3 (g/mL) G Lab File ID: 00081914

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	19000	U
111-44-4	bis(2-Chloroethyl)ether	19000	U
95-57-8	2-Chlorophenol	19000	U
541-73-1	1,3-Dichlorobenzene	19000	U
106-46-7	1,4-Dichlorobenzene	19000	U
95-50-1	1,2-Dichlorobenzene	19000	U
100-51-6	Benzyl alcohol	19000	U
95-48-7	2-Methylphenol	19000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	19000	U
621-64-7	N-Nitroso-di-n-propylamine	19000	U
106-44-5	4-Methylphenol	19000	U
67-72-1	Hexachloroethane	19000	U
98-95-3	Nitrobenzene	19000	U
78-59-1	Isophorone	19000	U
88-75-5	2-Nitrophenol	19000	U
105-67-9	2,4-Dimethylphenol	19000	U
111-91-1	bis(2-Chloroethoxy)methane	19000	U
120-83-2	2,4-Dichlorophenol	19000	U
120-82-1	1,2,4-Trichlorobenzene	19000	U
91-20-3	Naphthalene	19000	U
106-47-8	4-Chloroaniline	19000	U
87-68-3	Hexachlorobutadiene	19000	U
59-50-7	4-Chloro-3-methylphenol	19000	U
91-57-6	2-Methylnaphthalene	19000	U
77-47-4	Hexachlorocyclopentadiene	19000	U
88-06-2	2,4,6-Trichlorophenol	19000	U
95-95-4	2,4,5-Trichlorophenol	19000	U
91-58-7	2-Chloronaphthalene	19000	U
88-74-4	2-Nitroaniline	19000	U
99-09-2	3-Nitroaniline	19000	U
131-11-3	Dimethylphthalate	19000	U
606-20-2	2,6-Dinitrotoluene	19000	U
208-96-8	Acenaphthylene	19000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSS

Sample wt/vol: 5.3 (g/mL) G Lab File ID: 00081914

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	19000	U
51-28-5	2,4-Dinitrophenol	19000	U
132-64-9	Dibenzofuran	19000	U
100-02-7	4-Nitrophenol	19000	U
121-14-2	2,4-Dinitrotoluene	19000	U
84-66-2	Diethylphthalate	19000	U
86-73-7	Fluorene	19000	U
7005-72-3	4-Chlorophenyl-phenylether	19000	U
100-01-6	4-Nitroaniline	19000	U
534-52-1	4,6-Dinitro-2-methylphenol	19000	U
122-39-4	N,N-Diphenylamine	19000	U
76-44-8	Heptachlor	19000	U
319-84-6	alpha-BHC	19000	U
101-55-3	4-Bromophenyl-phenylether	19000	U
118-74-1	Hexachlorobenzene	19000	U
319-85-7	beta-BHC	19000	U
87-86-5	Pentachlorophenol	19000	U
319-86-8	delta-BHC	19000	U
85-01-8	Phenanthrene	19000	U
120-12-7	Anthracene	19000	U
58-89-9	gamma-BHC (Lindane)	19000	U
86-74-8	Carbazole	19000	U
84-74-2	Di-n-butylphthalate	19000	U
309-00-2	Aldrin	19000	U
1024-57-3	Heptachlor Epoxide	19000	U
206-44-0	Fluoranthene	19000	U
129-00-0	Pyrene	19000	U
959-98-8	Endosulfan I	19000	U
72-55-9	4,4'-DDE	19000	U
60-57-1	Dieldrin	19000	U
72-20-8	Endrin	19000	U
33213-65-9	Endosulfan II	19000	U
72-54-8	4,4'-DDD	19000	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSS

Sample wt/vol: 5.3 (g/mL) G Lab File ID: 00081914

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	19000	U
1031-07-8	Endosulfan Sulfate	19000	U
50-29-3	4,4'-DDT	19000	U
53494-70-5	Endrin Ketone	19000	U
56-55-3	Benzo(a)anthracene	19000	U
91-94-1	3,3'-Dichlorobenzidine	19000	U
218-01-9	Chrysene	19000	U
72-43-5	Methoxychlor	19000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	5900	J
117-84-0	Di-n-octylphthalate	19000	U
205-99-2	Benzo(b)fluoranthene	19000	U
207-08-9	Benzo(k)fluoranthene	19000	U
50-32-8	Benzo(a)pyrene	19000	U
193-39-5	Indeno(1,2,3-cd)pyrene	19000	U
53-70-3	Dibenz(a,h)anthracene	19000	U
191-24-2	Benzo(g,h,i)perylene	19000	U
110-86-1	Pyridine	6500	JB
126-73-8	Tributyl phosphate	57000	B
62-75-9	N-Nitrosodimethylamine	19000	U
98-86-2	Acetophenone	6300	JB
100-00-5	1-Chloro-4-nitrobenzene	2800	JB
92-52-4	Biphenyl	2100	JB
100-25-4	1,4-Dinitrobenzene	2300	JB
128-37-0	Butylated Hydroxytoluene	670	JB
82-68-8	Pentachloronitrobenzene	19000	U
88-85-7	Dinoseb	6400	JB
2234-13-1	Octachloronaphthalene	65000	B
10595-95-6	N-Nitrosomethylethylamine	19000	U
55-18-5	N-Nitrosodiethylamine	19000	U
62-50-0	Ethyl methane sulfonate	19000	U
62-53-3	Analine	19000	U
76-01-7	Pentachloroethane	19000	U
930-55-2	N-Nitrosopyrolidine	19000	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSS

Sample wt/vol: 5.3 (g/mL) G Lab File ID: 00081914

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	19000	U
1888-71-7	Hexachloropropene	19000	U
924-16-3	N-Nitrosodi-n-butylamine	1100	J
94-59-7	Safrole	19000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	19000	U
120-58-1	Isosafrole	19000	U
130-15-4	1,4-Naphthoquinone	19000	U
608-93-5	Pentachlorobenzene	19000	U
134-32-7	1-Naphthylamine	19000	U
58-90-2	2,3,4,6-Tetrachlorophenol	19000	U
91-59-8	2-Naphthylamine	19000	U
99-55-8	5-Nitro-o-toluidine	19000	U
103-33-3	Azeobenzene	19000	U
99-35-4	1,3,5-Trinitrobenzene	19000	U
2303-16-4	Diallate (cis)	19000	U
62-44-2	Phenacetin	19000	U
2303-16-4	Diallate (trans)	19000	U
92-67-1	4-Aminobiphenyl	19000	U
23950-58-5	Pronamine	19000	U
465-73-6	Isodrin	19000	U
57-74-9	Chlordane (alpha)	19000	U
92-87-5	Benzidine	4700	J
60-11-7	p-Dimethylaminoazobenzene	19000	U
510-15-6	Chlorobenzilate	19000	U
119-93-7	3,3'-Dimethylbenzidine	19000	U
53-96-3	2-Acetylaminofluorene	19000	U
56-49-5	3-Methylcholanthrene	19000	U
109-06-8	2-Methylpyridine	19000	U
143-50-0	Kepone	19000	U
57-74-9	Chlordane (gamma)	19000	U
66-27-3	Methyl methane sulfonate	19000	U
70-30-4	Hexachlorophene	19000	U
99-65-0	1,3-Dinitrobenzene	19000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C104-SSS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSS

Sample wt/vol: 5.3 (g/mL) G Lab File ID: 00081914

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	19000	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081918

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	2000	U
111-44-4	bis(2-Chloroethyl)ether	2000	U
95-57-8	2-Chlorophenol	2000	U
541-73-1	1,3-Dichlorobenzene	2000	U
106-46-7	1,4-Dichlorobenzene	2000	U
95-50-1	1,2-Dichlorobenzene	2000	U
100-51-6	Benzyl alcohol	2000	U
95-48-7	2-Methylphenol	5200	B
108-60-1	2,2'-oxybis(1-Chloropropane)	2000	U
621-64-7	N-Nitroso-di-n-propylamine	2000	U
106-44-5	4-Methylphenol	8000	B
67-72-1	Hexachloroethane	2000	U
98-95-3	Nitrobenzene	2000	U
78-59-1	Isophorone	2000	U
88-75-5	2-Nitrophenol	2000	U
105-67-9	2,4-Dimethylphenol	2000	U
111-91-1	bis(2-Chloroethoxy)methane	2000	U
120-83-2	2,4-Dichlorophenol	2000	U
120-82-1	1,2,4-Trichlorobenzene	2000	U
91-20-3	Naphthalene	2000	U
106-47-8	4-Chloroaniline	2000	U
87-68-3	Hexachlorobutadiene	2000	U
59-50-7	4-Chloro-3-methylphenol	2000	U
91-57-6	2-Methylnaphthalene	2000	U
77-47-4	Hexachlorocyclopentadiene	2000	U
88-06-2	2,4,6-Trichlorophenol	2000	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	2000	U
88-74-4	2-Nitroaniline	2000	U
99-09-2	3-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	2000	U
606-20-2	2,6-Dinitrotoluene	2000	U
208-96-8	Acenaphthylene	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081918

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	2000	U
51-28-5	2,4-Dinitrophenol	2000	U
132-64-9	Dibenzofuran	2000	U
100-02-7	4-Nitrophenol	2000	U
121-14-2	2,4-Dinitrotoluene	2000	U
84-66-2	Diethylphthalate	2000	U
86-73-7	Fluorene	2000	U
7005-72-3	4-Chlorophenyl-phenylether	2000	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-methylphenol	2000	U
122-39-4	N,N-Diphenylamine	2000	U
76-44-8	Heptachlor	2000	U
319-84-6	alpha-BHC	2000	U
101-55-3	4-Bromophenyl-phenylether	2000	U
118-74-1	Hexachlorobenzene	2000	U
319-85-7	beta-BHC	2000	U
87-86-5	Pentachlorophenol	2000	U
319-86-8	delta-BHC	2000	U
85-01-8	Phenanthrene	2000	U
120-12-7	Anthracene	2000	U
58-89-9	gamma-BHC (Lindane)	2000	U
86-74-8	Carbazole	2000	U
84-74-2	Di-n-butylphthalate	2000	U
309-00-2	Aldrin	2000	U
1024-57-3	Heptachlor Epoxide	2000	U
206-44-0	Fluoranthene	2000	U
129-00-0	Pyrene	2000	U
959-98-8	Endosulfan I	2000	U
72-55-9	4,4'-DDE	2000	U
60-57-1	Dieldrin	2000	U
72-20-8	Endrin	2000	U
33213-65-9	Endosulfan II	2000	U
72-54-8	4,4'-DDD	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081918

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	2000	U
1031-07-8	Endosulfan Sulfate	2000	U
50-29-3	4,4'-DDT	2000	U
53494-70-5	Endrin Ketone	2000	U
56-55-3	Benzo(a)anthracene	2000	U
91-94-1	3,3'-Dichlorobenzidine	2000	U
218-01-9	Chrysene	2000	U
72-43-5	Methoxychlor	2000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	260	J
117-84-0	Di-n-octylphthalate	200	J
205-99-2	Benzo(b)fluoranthene	2000	U
207-08-9	Benzo(k)fluoranthene	2000	U
50-32-8	Benzo(a)pyrene	2000	U
193-39-5	Indeno(1,2,3-cd)pyrene	2000	U
53-70-3	Dibenz(a,h)anthracene	2000	U
191-24-2	Benzo(g,h,i)perylene	2000	U
110-86-1	Pyridine	6100	B
126-73-8	Tributyl phosphate	5600	B
62-75-9	N-Nitrosodimethylamine	2000	U
98-86-2	Acetophenone	8800	B
100-00-5	1-Chloro-4-nitrobenzene	6300	B
92-52-4	Biphenyl	5200	B
100-25-4	1,4-Dinitrobenzene	4500	B
128-37-0	Butylated Hydroxytoluene	4400	B
82-68-8	Pentachloronitrobenzene	2000	U
88-85-7	Dinoseb	6300	B
2234-13-1	Octachloronaphthalene	320000	B
10595-95-6	N-Nitrosomethylethylamine	2000	U
55-18-5	N-Nitrosodiethylamine	2000	U
62-50-0	Ethyl methane sulfonate	2000	U
62-53-3	Analine	2000	U
76-01-7	Pentachloroethane	2000	U
930-55-2	N-Nitrosopyrolidine	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081918

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	2000	U
1888-71-7	Hexachloropropene	2000	U
924-16-3	N-Nitrosodi-n-butylamine	2000	U
94-59-7	Safrole	2000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	2000	U
120-58-1	Isosafrole	2000	U
130-15-4	1,4-Naphthoquinone	2000	U
608-93-5	Pentachlorobenzene	2000	U
134-32-7	1-Naphthylamine	2000	U
58-90-2	2,3,4,6-Tetrachlorophenol	2000	U
91-59-8	2-Naphthylamine	2000	U
99-55-8	5-Nitro-o-toluidine	2000	U
103-33-3	Azeobenzene	2000	U
99-35-4	1,3,5-Trinitrobenzene	2000	U
2303-16-4	Diallate (cis)	2000	U
62-44-2	Phenacetin	2000	U
2303-16-4	Diallate (trans)	2000	U
92-67-1	4-Aminobiphenyl	2000	U
23950-58-5	Pronamine	2000	U
465-73-6	Isodrin	2000	U
57-74-9	Chlordane (alpha)	2000	U
92-87-5	Benzidine	9000	
60-11-7	p-Dimethylaminoazobenzene	2000	U
510-15-6	Chlorobenzilate	2000	U
119-93-7	3,3'-Dimethylbenzidine	2000	U
53-96-3	2-Acetylaminofluorene	2000	U
56-49-5	3-Methylcholanthrene	2000	U
109-06-8	2-Methylpyridine	2000	U
143-50-0	Kepone	2000	U
57-74-9	Chlordane (gamma)	2000	U
66-27-3	Methyl methane sulfonate	2000	U
70-30-4	Hexachlorophene	2000	U
99-65-0	1,3-Dinitrobenzene	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081918

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	2000	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSMS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081919

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3800	
111-44-4	bis(2-Chloroethyl)ether	2000	U
95-57-8	2-Chlorophenol	6300	
541-73-1	1,3-Dichlorobenzene	2000	U
106-46-7	1,4-Dichlorobenzene	6100	
95-50-1	1,2-Dichlorobenzene	2000	U
100-51-6	Benzyl alcohol	2000	U
95-48-7	2-Methylphenol	7600	B
108-60-1	2,2'-oxybis(1-Chloropropane)	2000	U
621-64-7	N-Nitroso-di-n-propylamine	7900	
106-44-5	4-Methylphenol	17000	B
67-72-1	Hexachloroethane	2000	U
98-95-3	Nitrobenzene	2000	U
78-59-1	Isophorone	2000	U
88-75-5	2-Nitrophenol	2000	U
105-67-9	2,4-Dimethylphenol	2000	U
111-91-1	bis(2-Chloroethoxy)methane	2000	U
120-83-2	2,4-Dichlorophenol	2000	U
120-82-1	1,2,4-Trichlorobenzene	6600	
91-20-3	Naphthalene	2000	U
106-47-8	4-Chloroaniline	2000	U
87-68-3	Hexachlorobutadiene	2000	U
59-50-7	4-Chloro-3-methylphenol	6600	
91-57-6	2-Methylnaphthalene	2000	U
77-47-4	Hexachlorocyclopentadiene	2000	U
88-06-2	2,4,6-Trichlorophenol	2000	U
95-95-4	2,4,5-Trichlorophenol	2000	U
91-58-7	2-Chloronaphthalene	2000	U
88-74-4	2-Nitroaniline	2000	U
99-09-2	3-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	2000	U
606-20-2	2,6-Dinitrotoluene	2000	U
208-96-8	Acenaphthylene	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSMS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081919

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
83-32-9	Acenaphthene	7400	
51-28-5	2,4-Dinitrophenol	2000	U
132-64-9	Dibenzofuran	2000	U
100-02-7	4-Nitrophenol	2100	
121-14-2	2,4-Dinitrotoluene	7700	
84-66-2	Diethylphthalate	2000	U
86-73-7	Fluorene	2000	U
7005-72-3	4-Chlorophenyl-phenylether	2000	U
100-01-6	4-Nitroaniline	2000	U
534-52-1	4,6-Dinitro-2-methylphenol	2000	U
122-39-4	N,N-Diphenylamine	2000	U
76-44-8	Heptachlor	2000	U
319-84-6	alpha-BHC	2000	U
101-55-3	4-Bromophenyl-phenylether	2000	U
118-74-1	Hexachlorobenzene	2000	U
319-85-7	beta-BHC	2000	U
87-86-5	Pentachlorophenol	2000	U
319-86-8	delta-BHC	2000	U
85-01-8	Phenanthrene	2000	U
120-12-7	Anthracene	2000	U
58-89-9	gamma-BHC (Lindane)	2000	U
86-74-8	Carbazole	2000	U
84-74-2	Di-n-butylphthalate	2000	U
309-00-2	Aldrin	2000	U
1024-57-3	Heptachlor Epoxide	2000	U
206-44-0	Fluoranthene	2000	U
129-00-0	Pyrene	8900	
959-98-8	Endosulfan I	2000	U
72-55-9	4,4'-DDE	2000	U
60-57-1	Dieldrin	2000	U
72-20-8	Endrin	2000	U
33213-65-9	Endosulfan II	2000	U
72-54-8	4,4'-DDD	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSMS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081919

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
85-68-7	Butylbenzylphthalate	2000	U
1031-07-8	Endosulfan Sulfate	2000	U
50-29-3	4,4'-DDT	2000	U
53494-70-5	Endrin Ketone	2000	U
56-55-3	Benzo(a)anthracene	2000	U
91-94-1	3,3'-Dichlorobenzidine	2000	U
218-01-9	Chrysene	2000	U
72-43-5	Methoxychlor	2000	U
117-81-7	Bis(2-Ethylhexyl)phthalate	2000	U
117-84-0	Di-n-octylphthalate	2000	U
205-99-2	Benzo(b)fluoranthene	2000	U
207-08-9	Benzo(k)fluoranthene	2000	U
50-32-8	Benzo(a)pyrene	2000	U
193-39-5	Indeno(1,2,3-cd)pyrene	2000	U
53-70-3	Dibenz(a,h)anthracene	2000	U
191-24-2	Benzo(g,h,i)perylene	2000	U
110-86-1	Pyridine	11000	B
126-73-8	Tributyl phosphate	11000	B
62-75-9	N-Nitrosodimethylamine	2000	U
98-86-2	Acetophenone	19000	B
100-00-5	1-Chloro-4-nitrobenzene	13000	B
92-52-4	Biphenyl	10000	B
100-25-4	1,4-Dinitrobenzene	11000	B
128-37-0	Butylated Hydroxytoluene	8800	B
82-68-8	Pentachloronitrobenzene	2000	U
88-85-7	Dinoseb	16000	B
2234-13-1	Octachloronaphthalene	550000	B
10595-95-6	N-Nitrosomethylethylamine	2000	U
55-18-5	N-Nitrosodiethylamine	2000	U
62-50-0	Ethyl methane sulfonate	2000	U
62-53-3	Analine	2000	U
76-01-7	Pentachloroethane	2000	U
930-55-2	N-Nitrosopyrolidine	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSMS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081919

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
100-75-4	N-Nitrosopiperidine	2000	U
1888-71-7	Hexachloropropene	2000	U
924-16-3	N-Nitrosodi-n-butylamine	2000	U
94-59-7	Safrole	2000	U
95-94-3	1,2,4,5-Tetrachlorobenzene	2000	U
120-58-1	Isosafrole	2000	U
130-15-4	1,4-Naphthoquinone	2000	U
608-93-5	Pentachlorobenzene	2000	U
134-32-7	1-Naphthylamine	2000	U
58-90-2	2,3,4,6-Tetrachlorophenol	2000	U
91-59-8	2-Naphthylamine	2000	U
99-55-8	5-Nitro-o-toluidine	2000	U
103-33-3	Azeobenzene	2000	U
99-35-4	1,3,5-Trinitrobenzene	2000	U
2303-16-4	Diallate (cis)	2000	U
62-44-2	Phenacetin	2000	U
2303-16-4	Diallate (trans)	2000	U
92-67-1	4-Aminobiphenyl	2000	U
23950-58-5	Pronamine	2000	U
465-73-6	Isodrin	2000	U
57-74-9	Chlordane (alpha)	2000	U
92-87-5	Benzidine	8800	
60-11-7	p-Dimethylaminoazobenzene	2000	U
510-15-6	Chlorobenzilate	2000	U
119-93-7	3,3'-Dimethylbenzidine	2000	U
53-96-3	2-Acetylaminofluorene	2000	U
56-49-5	3-Methylcholanthrene	2000	U
109-06-8	2-Methylpyridine	2000	U
143-50-0	Kepone	2000	U
57-74-9	Chlordane (gamma)	2000	U
66-27-3	Methyl methane sulfonate	2000	U
70-30-4	Hexachlorophene	2000	U
99-65-0	1,3-Dinitrobenzene	2000	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LCSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSMS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081919

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
87-65-0	2,6-Dichlorophenol	2000	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATANT Lab Sample ID: 00-1360-SLB

Sample wt/vol: 0.000 (g/mL) ML Lab File ID: 00081904

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	2110-78-3	PROPANOIC ACID, 2-HYDROXY-2-	4.06	200	NJ
2.	994-05-8	BUTANE, 2-METHOXY-2-METHYL-	7.12	6200	NJ
3.	541-02-6	CYCLOPENTASILOXANE, DECAMETH	14.13	300	NJ
4.					
5.					
6.					
7.					
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104-SLD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATANT Lab Sample ID: 00-1360-SLD

Sample wt/vol: 0.000 (g/mL) ML Lab File ID: 00081906

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 29

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	627-13-4	NITRIC ACID, PROPYL ESTER	3.74	370	NJ
2.	541-05-9	CYCLOTRISILOXANE, HEXAMETHYL	6.44	9000	NJ
3.	994-05-8	BUTANE, 2-METHOXY-2-METHYL-	7.16	5700	NJB
4.	1120-64-5	OXAZOLE, 4,5-DIHYDRO-2-METHY	7.53	8800	NJ
5.	124-18-5	DECANE	11.32	400	NJ
6.	142-62-1	HEXANOIC ACID	12.11	6300	NJ
7.	1120-21-4	UNDECANE	13.54	1700	NJ
8.	922-64-5	PROPANEDINITRILE, METHYLENE-	14.22	12000	NJ
9.	111-14-8	HEPTANOIC ACID	14.22	2700	NJ
10.	1526-17-6	2-FLUORO-6-NITROPHENOL	14.60	750	NJ
11.	616-45-5	2-PYRROLIDINONE	15.17	160	NJ
12.	112-40-3	DODECANE	15.52	3300	NJ
13.	124-07-2	OCTANOIC ACID	16.04	14000	NJ
14.	99-66-1	VALPROIC ACID	16.19	170	NJ
15.	119-33-5	PHENOL, 4-METHYL-2-NITRO-	16.24	410	NJ
16.	700-38-9	5-METHYL-2-NITROPHENOL	16.73	180	NJ
17.	629-50-5	TRIDECANE	17.35	3600	NJ
18.	112-05-0	NONANOIC ACID	17.52	5900	NJ
19.	101-83-7	CYCLOHEXANAMINE, N-CYCLOHEXY	17.58	95	NJ
20.	0-00-0	PHENOL, 2-FLUORO-4-NITRO-	18.30	250	NJ
21.	334-48-5	DECANOIC ACID	18.74	1000	NJ
22.	6175-49-1	2-DODECANONE	18.96	250	NJ
23.	629-59-4	TETRADECANE	19.03	1200	NJ
24.	25013-16-5	BUTYLATED HYDROXYANISOLE	20.05	990	NJ
25.	112-37-8	UNDECANOIC ACID	20.20	1100	NJ
26.	0-00-0	BUTYL NONANOATE	20.41	130	NJ
27.	593-08-8	2-TRIDECANONE	20.57	120	NJ
28.	629-62-9	PENTADECANE	20.61	120	NJ
29.	497-56-3	PHENOL, 2-METHYL-3,5-DINITRO	22.39	230	NJ
30.					

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104-SLE

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATANT Lab Sample ID: 00-1360-SLE

Sample wt/vol: 0.000 (g/mL) ML Lab File ID: 00081909

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 30

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	3457-91-8	1,4-BUTANEDIOL, DINITRATE	3.73	1800	NJ
2.	79-09-4	PROPANOIC ACID	4.96	2800	NJ
3.	4911-70-0	2-PENTANOL, 2,3-DIMETHYL-	6.23	3500	NJ
4.	107-92-6	BUTANOIC ACID	8.23	720	NJ
5.		UNKNOWN	8.55	860	J
6.		UNKNOWN	9.24	5900	J
7.	615-29-2	3-HEXANOL, 4-METHYL-	10.00	20000	NJ
8.	109-52-4	PENTANOIC ACID	10.44	9600	NJ
9.	3404-73-7	1-PENTENE, 3,3-DIMETHYL-	10.51	1800	NJ
10.	503-60-6	2-BUTENE, 1-CHLORO-3-METHYL-	11.18	850	NJ
11.	124-18-5	DECANE	11.32	2600	NJ
12.	142-62-1	HEXANOIC ACID	12.44	19000	NJ
13.		UNKNOWN	13.01	720	J
14.	1120-21-4	UNDECANE	13.56	9000	NJ
15.	111-14-8	HEPTANOIC ACID	14.19	11000	NJ
16.		UNKNOWN ORGANIC ACID	14.53	4000	J
17.	112-40-3	DODECANE	15.57	13000	NJ
18.	124-07-2	OCTANOIC ACID	15.76	5600	NJ
19.	33083-83-9	5-UNDECANONE	16.86	450	NJ
20.	112-05-0	NONANOIC ACID	17.19	2600	NJ
21.	629-50-5	TRIDECANE	17.39	16000	NJ
22.	104-61-0	2(3H)-FURANONE, DIHYDRO-5-PE	18.47	250	NJ
23.	334-48-5	DECANOIC ACID	18.70	680	NJ
24.	6175-49-1	2-DODECANONE	18.95	310	NJ
25.	629-59-4	TETRADECANE	19.04	4800	NJ
26.	589-63-9	4-OCTANONE	20.23	2700	NJ
27.	1534-26-5	3-TRIDECANONE	20.47	350	NJ
28.	593-08-8	2-TRIDECANONE	20.57	340	NJ
29.	56196-67-9	ACETIC ACID, (3-METHYL-4-OXO	20.80	1200	NJ
30.		UNKNOWN	22.06	790	J

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATANT Lab Sample ID: 00-1360-SLS

Sample wt/vol: 0.000 (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 31

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	3457-92-9	1,5-PENTANEDIOL, DINITRATE	3.75	230	NJ
2.	541-05-9	CYCLOTRISILOXANE, HEXAMETHYL	6.43	8200	NJ
3.	994-05-8	BUTANE, 2-METHOXY-2-METHYL-	7.13	3800	NJB
4.	1120-64-5	OXAZOLE, 4,5-DIHYDRO-2-METHY	7.52	7000	NJ
5.	628-73-9	HEXANENITRILE	8.29	140	NJ
6.	109-52-4	PENTANOIC ACID	9.50	680	NJ
7.	3970-62-5	3-PENTANOL, 2,2-DIMETHYL-	9.73	510	NJ
8.	556-67-2	CYCLOTETRASILOXANE, OCTAMETH	10.85	3900	NJ
9.	124-18-5	DECANE	11.31	230	NJ
10.	553-97-9	P-BENZOQUINONE, 2-METHYL-	11.75	400	NJ
11.	142-62-1	HEXANOIC ACID	11.91	2200	NJ
12.	1120-21-4	UNDECANE	13.52	920	NJ
13.	111-14-8	HEPTANOIC ACID	14.07	7000	NJ
14.		UNKNOWN	14.20	500	J
15.	149-57-5	HEXANOIC ACID, 2-ETHYL-	14.43	160	NJ
16.	1526-17-6	2-FLUORO-6-NITROPHENOL	14.58	380	NJ
17.	695-06-7	2(3H)-FURANONE, 5-ETHYLDIHYD	15.15	170	NJ
18.	112-40-3	DODECANE	15.50	2000	NJ
19.	124-07-2	OCTANOIC ACID	15.92	9900	NJ
20.	119-33-5	PHENOL, 4-METHYL-2-NITRO-	16.22	380	NJ
21.	700-38-9	5-METHYL-2-NITROPHENOL	16.71	170	NJ
22.	112-05-0	NONANOIC ACID	17.24	3600	NJ
23.	629-50-5	TRIDECANE	17.34	2900	NJ
24.	394-41-2	PHENOL, 3-FLUORO-4-NITRO-	18.29	300	NJ
25.	334-48-5	DECANOIC ACID	18.81	3100	NJ
26.	629-59-4	TETRADECANE	19.01	820	NJ
27.	25013-16-5	BUTYLATED HYDROXYANISOLE	20.04	900	NJ
28.	79-77-6	3-BUTEN-2-ONE, 4-(2,6,6-TRIM	20.12	270	NJ
29.	112-37-8	UNDECANOIC ACID	20.17	920	NJ
30.	143-07-7	DODECANOIC ACID	21.60	100	NJ

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

C104-SLS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SUPERNATANT Lab Sample ID: 00-1360-SLS

Sample wt/vol: 0.000 (g/mL) ML Lab File ID: 00081905

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 31

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	2581-34-2	PHENOL, 3-METHYL-4-NITRO-	22.17	89	NJ
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081913

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	79-00-5	ETHANE, 1,1,2-TRICHLORO-	5.33	5100	NJ
2.	75-65-0	2-PROPANOL, 2-METHYL-	6.23	10000	NJ
3.	625-31-0	4-PENTEN-2-OL	6.33	18000	NJ
4.	507-45-9	BUTANE, 2,3-DICHLORO-2-METHY	6.67	2100	NJ
5.	77-74-7	3-PENTANOL, 3-METHYL-	7.10	7900	NJ
6.	556-67-2	CYCLOTETRASILOXANE, OCTAMETH	10.85	18000	NJ
7.	541-02-6	CYCLOPENTASILOXANE, DECAMETH	14.11	1400	NJ
8.	25013-16-5	BUTYLATED HYDROXYANISOLE	19.98	1200	NJ
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104-SSD

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSD

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 00081915

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 14

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	124-18-5	DECANE	11.32	150000	NJ
2.	1120-21-4	UNDECANE	13.58	480000	NJ
3.	112-40-3	DODECANE	15.59	690000	NJ
4.	33083-83-9	5-UNDECANONE	16.82	44000	NJ
5.	2216-87-7	3-UNDECANONE	17.10	25000	NJ
6.	112-12-9	2-UNDECANONE	17.19	28000	NJ
7.	629-50-5	TRIDECANE	17.42	830000	NJ
8.	19780-10-0	5-DODECANONE	18.58	64000	NJ
9.	1534-27-6	3-DODECANONE	18.83	22000	NJ
10.	6175-49-1	2-DODECANONE	18.93	10000	NJ
11.	629-59-4	TETRADECANE	19.05	190000	NJ
12.	26215-90-7	4-TRIDECANONE	20.22	41000	NJ
13.	593-08-8	2-TRIDECANONE	20.54	16000	NJ
14.	26496-20-8	4-TETRADECANONE	21.75	9500	NJ
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C104-SSS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: 00-1361-SSS

Sample wt/vol: 5.3 (g/mL) G Lab File ID: 00081914

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 16

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	2110-78-3	PROPANOIC ACID, 2-HYDROXY-2-	6.20	38000	NJ
2.	625-31-0	4-PENTEN-2-OL	6.29	58000	NJB
3.	124-18-5	DECANE	11.34	170000	NJ
4.	1120-21-4	UNDECANE	13.62	580000	NJ
5.	112-40-3	DODECANE	15.62	820000	NJ
6.	33083-83-9	5-UNDECANONE	16.84	52000	NJ
7.	2216-87-7	3-UNDECANONE	17.13	34000	NJ
8.	112-12-9	2-UNDECANONE	17.22	37000	NJ
9.	629-50-5	TRIDECANE	17.46	980000	NJ
10.	19780-10-0	5-DODECANONE	18.60	67000	NJ
11.	1534-27-6	3-DODECANONE	18.85	23000	NJ
12.	6175-49-1	2-DODECANONE	18.94	14000	NJ
13.	629-59-4	TETRADECANE	19.07	200000	NJ
14.	26215-90-7	4-TRIDECANONE	20.24	47000	NJ
15.	593-08-8	2-TRIDECANONE	20.55	18000	NJ
16.	26496-20-8	4-TETRADECANONE	21.76	10000	NJ
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LCSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081918

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 23

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	7.23	4900	NJ
2.	541-02-6	CYCLOPENTASILOXANE, DECAMETH	14.12	240	NJB
3.		UNKNOWN, TRIBROMO-CMPD	25.23	540	NJ
4.		UNKNOWN PHTHALATE	34.50	140	J
5.		UNKNOWN PHTHALATE	34.60	300	J
6.		UNKNOWN PHTHALATE	34.66	460	J
7.		UNKNOWN PHTHALATE	34.74	140	J
8.		UNKNOWN PHTHALATE	34.81	810	J
9.		UNKNOWN PHTHALATE	34.86	1100	J
10.		UNKNOWN PHTHALATE	34.98	210	J
11.		UNKNOWN PHTHALATE	35.09	330	J
12.		UNKNOWN PHTHALATE	35.16	600	J
13.		UNKNOWN PHTHALATE	35.20	130	J
14.		UNKNOWN PHTHALATE	35.39	630	J
15.		UNKNOWN PHTHALATE	35.48	2100	J
16.		UNKNOWN PHTHALATE	35.57	2600	J
17.		UNKNOWN PHTHALATE	35.73	3400	J
18.		UNKNOWN PHTHALATE	35.81	5200	J
19.		UNKNOWN PHTHALATE	35.96	3400	J
20.		UNKNOWN PHTHALATE	36.05	4400	J
21.		UNKNOWN PHTHALATE	36.20	2000	J
22.		UNKNOWN PHTHALATE	36.28	1400	J
23.		UNKNOWN PHTHALATE	36.42	700	J
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LCSMS

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Matrix: (soil/water) SOLID Lab Sample ID: LCSMS

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 00081919

Level: (low/med) LOW Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/20/0

Injection Volume: _____(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	7.23	490	NJ
2.		UNKNOWN, TRIBROMO-CMPD	25.22	340	NJ
3.	1825-21-4	BENZENE, PENTACHLOROMETHOXY-	26.06	680	NJ
4.	29366-00-5	MESITOL, .ALPHA.4-(4-HYDROXY	29.89	770	NJ
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2C

SUPERNATANT SEMIVOLATILE SURROGATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

	EPA SAMPLE NO.	S1 (2FP) #	S2 (PHL) #	S3 (NBZ) #	S4 (FBP) #	S5 (TBP) #	S6 (TPH) #	S7 #	S8 #	TOT OUT
01	C104-SLB	37	44	98	105	29	138			0
02	C104-SLS	0*	0*	73	77	0*	104			3
03	C104-SLD	0*	0*	70	72	0*	93			3
04	C104-SLMS	34	39	90	93	30	128			0
05	C104-SLMSD	31	35	74	77	30	103			0
06	C104-SLE	0*	1*	44	10952*	0*	20*			5
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		QC LIMITS
S1 (2FP)	= 2-Fluorophenol	(21-110)
S2 (PHL)	= Phenol-d5	(10-110)
S3 (NBZ)	= Nitrobenzene-d5	(35-114)
S4 (FBP)	= 2-Fluorobiphenyl	(43-116)
S5 (TBP)	= 2,4,6-Tribromophenol	(10-123)
S6 (TPH)	= Terphenyl-d14	(33-141)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

2D

SOLID SEMIVOLATILE SURROGATE RECOVERY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Level: (low/med) LOW

	EPA SAMPLE NO.	S1 (2FP) #	S2 (PHL) #	S3 (NBZ) #	S4 (FBP) #	S5 (TBP) #	S6 (TPH) #	S7 #	S8 #	TOT OUT
01	C104-SSB	30	34	80	81	23	109			0
02	C104-SSS	30	36	74	38	14D	48			0
03	C104-SSD	26	31	60	30D	15D	39			0
04	C104-SSMS	26	26	29	43	15D	49			0
05	C104-SSMSD	26	31	18D	37	17D	42			0
06	LCSB	30	26	78	66	26	116			0
07	LCSMS	28	24D	75	52	27	114			0
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		QC LIMITS
S1 (2FP)	= 2-Fluorophenol	(25-121)
S2 (PHL)	= Phenol-d5	(24-113)
S3 (NBZ)	= Nitrobenzene-d5	(23-120)
S4 (FBP)	= 2-Fluorobiphenyl	(30-115)
S5 (TBP)	= 2,4,6-Tribromophenol	(19-122)
S6 (TPH)	= Terphenyl-d14	(18-137)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

Pacific Northwest National Laboratory - RPL

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: 00-1360-SLMS
Level: LOW
Data Type: MS DATA
SpikeList File: BNFL.spk
Sublist File: BNFL.sub
Method File: \HPCHEM\1\DATA\000819.b\SV5972.M
Misc Info:

Client SDG: 000819
Fraction: SV
Client Smp ID: C104-SLMS
Operator: GS Klinger
SampleType: MS
Quant Type: ISTD

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
13 Phenol	4200	1800	43.80	12-110
20 1,4-Dichlorobenzen	2800	1100	39.81	36-97
28 N-Nitroso-di-n-pro	2800	2200	81.27	41-116
51 4-Chloro-3-methylp	4200	2000	48.39	23-97
73 Acenaphthene	2800	2400	85.27	46-118
78 4-Nitrophenol	4200	840	20.28	10-80
80 2,4-Dinitrotoluene	2800	2600	93.97	24-96
102 Pentachlorophenol	4200	960	22.93	9-103
125 Pyrene	2800	2700	97.40	26-127
40 1,2,4-Trichloroben	2800	1600	57.75	39-98
17 2-Chlorophenol	4200	1800	42.72	27-
3 Pyridine	5600	5400	97.95	1-
24 2-Methylphenol	5600	2900	52.70	1-150
27 Acetophenone	5600	5700	102.84	1-150
29 4-Methylphenol	11000	4800	43.06	1-150
49 1-Chloro-4-nitrobe	5600	4900	88.35	1-150
62 Biphenyl	5600	4600	83.86	1-150
66 1,4-Dinitrobenzene	5600	3600	65.30	1-150
90 N,N-Diphenylamine	5600	0.0	*	1-150
92 Tributyl phosphate	5600	4700	85.40	1-150
103 Pentachloronitrob	5600	0.0	*	1-150
109 Dinoseb	5600	4100	73.46	1-150
160 Octachloronaphthal	5600	94000	1694.38*	1-150

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 7 2-Fluorophenol	4200	1400	33.51	21-110
$ 11 Phenol-d5	4200	1600	39.49	10-110
$ 31 Nitrobenzene-d5	2800	2500	90.26	35-114

MS recovery data in lieu of CLP form 3C

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 59 2-Fluorobiphenyl	2800	2600	93.30	43-116
$ 93 2,4,6-Tribromophen	4200	1200	29.56	10-123
$ 130 Terphenyl-d14	2800	3600	128.17	33-141

MS recovery data in lieu of CLP form 3C

Pacific Northwest National Laboratory - RPL

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: 00-1360-SLMSD
Level: LOW
Data Type: MS DATA
SpikeList File: BNFL.spk
Sublist File: BNFL.sub
Method File: \HPCHEM\1\DATA\000819.b\SV5972.M
Misc Info:

Client SDG: 000819
Fraction: SV
Client Smp ID: C104-SLMSD
Operator: GS Klinger
SampleType: MSD
Quant Type: ISTD

	SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
13	Phenol	4200	1600	38.99	12-110
20	1,4-Dichlorobenzen	2800	990	35.64*	36-97
28	N-Nitroso-di-n-pro	2800	1700	60.64	41-116
51	4-Chloro-3-methylp	4200	1900	45.26	23-97
73	Acenaphthene	2800	2100	74.96	46-118
78	4-Nitrophenol	4200	1500	36.28	10-80
80	2,4-Dinitrotoluene	2800	2400	88.26	24-96
102	Pentachlorophenol	4200	1100	27.09	9-103
125	Pyrene	2800	2300	81.98	26-127
40	1,2,4-Trichloroben	2800	1400	49.28	39-98
17	2-Chlorophenol	4200	1700	39.95	27-
3	Pyridine	5600	5000	90.69	1-150
24	2-Methylphenol	5600	2300	41.76	1-150
27	Acetophenone	5600	4600	83.01	1-150
29	4-Methylphenol	11000	4200	37.40	1-150
49	1-Chloro-4-nitrobe	5600	4000	71.58	1-150
62	Biphenyl	5600	3800	69.48	1-150
66	1,4-Dinitrobenzene	5600	3200	56.85	1-150
90	N,N-Diphenylamine	5600	0.0	*	1-150
92	Tributyl phosphate	5600	3900	70.08	1-150
103	Pentachloronitrob	5600	0.0	*	1-150
109	Dinoseb	5600	3500	63.75	1-150
160	Octachloronaphthal	5600	76000	1364.91*	1-150

	SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 7	2-Fluorophenol	4200	1300	31.04	21-110
$ 11	Phenol-d5	4200	1400	34.80	10-110
$ 31	Nitrobenzene-d5	2800	2000	74.10	35-114

MSD recovery data in lieu of CLP form 3C

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 59 2-Fluorobiphenyl	2800	2100	76.65	43-116
$ 93 2,4,6-Tribromophen	4200	1200	30.04	10-123
$ 130 Terphenyl-d14	2800	2900	103.06	33-141

MSD recovery data in lieu of CLP form 3C

Pacific Northwest National Laboratory - RPL

RECOVERY REPORT

Client Name:
Sample Matrix: SOLID
Lab Smp Id: 00-1361-SSMS
Level: LOW
Data Type: MS DATA
SpikeList File: BNFL.spk
Sublist File: BNFL.sub
Method File: \HPCHEM\1\DATA\000819.b\SV5972b.M
Misc Info:

Client SDG: 000819
Fraction: SV
Client Smp ID: C104-SSMS
Operator: GS Klinger
SampleType: MS
Quant Type: ISTD

SPIKE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
13 Phenol	14000	7500	54.10	12-110
20 1,4-Dichlorobenzen	9300	4200	45.79	36-97
28 N-Nitroso-di-n-pro	9300	6900	74.17	41-116
51 4-Chloro-3-methylp	14000	6500	47.01	23-97
73 Acenaphthene	9300	6800	73.90	46-118
78 4-Nitrophenol	14000	4100	29.19	10-80
80 2,4-Dinitrotoluene	9300	8700	93.82	24-96
102 Pentachlorophenol	14000	0.0	*	9-103
125 Pyrene	9300	7800	84.66	26-127
40 1,2,4-Trichloroben	9300	5800	62.68	39-98
17 2-Chlorophenol	14000	7000	50.48	27-
3 Pyridine	9300	2700	29.04	1-
24 2-Methylphenol	9300	5600	60.66	1-150
27 Acetophenone	9300	5000	53.46	1-150
29 4-Methylphenol	18000	16000	86.55	1-150
49 1-Chloro-4-nitrobe	9300	6900	74.16	1-150
62 Biphenyl	9300	11000	122.80	1-150
66 1,4-Dinitrobenzene	9300	7100	76.81	1-150
90 N,N-Diphenylamine	9300	0.0	*	1-150
92 Tributyl phosphate	9300	92000	989.65*	1-150
103 Pentachloronitrob	9300	0.0	*	1-150
109 Dinoseb	9300	14000	151.54*	1-150
160 Octachloronaphthal	9300	400000	4367.89*	1-150

SURROGATE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 7 2-Fluorophenol	28000	7200	25.85	25-121
$ 11 Phenol-d5	28000	7400	26.44	24-113
$ 31 Nitrobenzene-d5	18000	5400	28.87	23-120

MS recovery data in lieu of CLP form 3D

SURROGATE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 59 2-Fluorobiphenyl	18000	7900	42.62	30-115
$ 93 2,4,6-Tribromophen	28000	4200	15.24*	19-122
$ 130 Terphenyl-d14	18000	9100	49.12	18-137

MS recovery data in lieu of CLP form 3D

Pacific Northwest National Laboratory - RPL

RECOVERY REPORT

Client Name:
Sample Matrix: SOLID
Lab Smp Id: 00-1361-SSMSD
Level: LOW
Data Type: MS DATA
SpikeList File: BNFL.spk
Sublist File: BNFL.sub
Method File: \HPCHEM\1\DATA\000819.b\SV5972b.M
Misc Info:

Client SDG: 000819
Fraction: SV
Client Smp ID: C104-SSMSD
Operator: GS Klinger
SampleType: MSD
Quant Type: ISTD

SPIKE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
13 Phenol	15000	10000	68.52	12-110
20 1,4-Dichlorobenzen	9900	3700	37.16	36-97
28 N-Nitroso-di-n-pro	9900	6300	63.98	41-116
51 4-Chloro-3-methylp	15000	11000	74.12	23-97
73 Acenaphthene	9900	6400	64.94	46-118
78 4-Nitrophenol	15000	4100	27.31	10-80
80 2,4-Dinitrotoluene	9900	9600	97.08*	24-96
102 Pentachlorophenol	15000	0.0	*	9-103
125 Pyrene	9900	7000	70.85	26-127
40 1,2,4-Trichloroben	9900	5000	50.10	39-98
17 2-Chlorophenol	15000	9200	62.04	27-
3 Pyridine	9900	3300	33.27	1-
24 2-Methylphenol	9900	4200	42.12	1-150
27 Acetophenone	9900	6000	60.76	1-150
29 4-Methylphenol	20000	19000	97.02	1-150
49 1-Chloro-4-nitrobe	9900	7600	76.98	1-150
62 Biphenyl	9900	10000	101.77	1-150
66 1,4-Dinitrobenzene	9900	11000	111.10	1-150
90 N,N-Diphenylamine	9900	0.0	*	1-150
92 Tributyl phosphate	9900	90000	903.21*	1-150
103 Pentachloronitrob	9900	0.0	*	1-150
109 Dinoseb	9900	20000	207.37*	1-150
160 Octachloronaphthal	9900	340000	3390.78*	1-150

SURROGATE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 7 2-Fluorophenol	30000	7700	25.99	25-121
$ 11 Phenol-d5	30000	9100	30.69	24-113
$ 31 Nitrobenzene-d5	20000	3600	18.34*	23-120

MSD recovery data in lieu of CLP form 3D

SURROGATE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 59 2-Fluorobiphenyl	20000	7300	36.91	30-115
$ 93 2,4,6-Tribromophen	30000	5200	17.35*	19-122
$ 130 Terphenyl-d14	20000	8400	42.44	18-137

MSD recovery data in lieu of CLP form 3D

4B

SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

C104-SLB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID: 00081904 Lab Sample ID: 00-1360-SLB

Instrument ID: HP1 Date Extracted:

Matrix: (soil/water) SUPERNATANT Date Analyzed: 08/19/0

Level: (low/med) LOW Time Analyzed: 1738

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	C104-SLS	00-1360-SLS	00081905	08/19/0
02	C104-SLD	00-1360-SLD	00081906	08/19/0
03	C104-SLMS	00-1360-SLMS	00081907	08/19/0
04	C104-SLMSD	00-1360-SLMSD	00081908	08/19/0
05	C104-SLE	00-1360-SLE	00081909	08/19/0
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COMMENTS:

4B
SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

C104-SSB

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID: 00081913 Lab Sample ID: 00-1361-SSB

Instrument ID: HP1 Date Extracted:

Matrix: (soil/water) SOLID Date Analyzed: 08/20/0

Level: (low/med) LOW Time Analyzed: 0220

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	C104-SSS	00-1361-SSS	00081914	08/20/0
02	C104-SSD	00-1361-SSD	00081915	08/20/0
03	C104-SSMS	00-1361-SSMS	00081916	08/20/0
04	C104-SSMSD	00-1361-SSMSD	00081917	08/20/0
05	LCSB	LCSB	00081918	08/20/0
06	LCSMS	LCSMS	00081919	08/20/0
07				
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COMMENTS:

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000811

Lab File ID: 00081101 DFTPP Injection Date: 08/14/0

Instrument ID: HP1 DFTPP Injection Time: 1642

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	33.5
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	38.7
70	Less than 2.0% of mass 69	0.1 (0.3)1
127	25.0 - 75.0% of mass 198	46.1
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.6
275	10.0 - 30.0% of mass 198	26.3
365	Greater than 0.75% of mass 198	4.57
441	Present, but less than mass 443	7.4
442	40.0 - 110.0% of mass 198	52.3
443	15.0 - 24.0% of mass 442	10.2 (19.5)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	STD020	STD020	00081102	08/14/0	1734
02	STD050	STD050	00081103	08/14/0	1827
03	STD080	STD080	00081104	08/14/0	1919
04	STD120	STD120	00081105	08/14/0	2012
05	STD160	STD160	00081106	08/14/0	2104
06	QSTD020	QSTD020	00081107	08/14/0	2157
07	QSTD050	QSTD050	00081108	08/14/0	2249
08	QSTD080	QSTD080	00081109	08/14/0	2342
09	QSTD120	QSTD120	00081110	08/15/0	0035
10	QSTD160	QSTD160	00081111	08/15/0	0127
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5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID: 00081910 DFTPP Injection Date: 08/19/0

Instrument ID: HP1 DFTPP Injection Time: 2254

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	31.7
68	Less than 2.0% of mass 69	0.1 (0.3)1
69	Mass 69 relative abundance	38.0
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	25.0 - 75.0% of mass 198	44.2
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.8
275	10.0 - 30.0% of mass 198	28.6
365	Greater than 0.75% of mass 198	4.64
441	Present, but less than mass 443	11.0
442	40.0 - 110.0% of mass 198	76.7
443	15.0 - 24.0% of mass 442	14.4 (18.8)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD050	SSTD050	00081911	08/19/0	2347
02	QSTD050	QSTD050	00081912	08/20/0	0127
03	C104-SSB	00-1361-SSB	00081913	08/20/0	0220
04	C104-SSS	00-1361-SSS	00081914	08/20/0	0312
05	C104-SSD	00-1361-SSD	00081915	08/20/0	0405
06	C104-SSMS	00-1361-SSMS	00081916	08/20/0	0458
07	C104-SSMSD	00-1361-SSMSD	00081917	08/20/0	0550
08	LCSB	LCSB	00081918	08/20/0	0643
09	LCSMS	LCSMS	00081919	08/20/0	0736
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5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID: 00081901 DFTPP Injection Date: 08/19/0

Instrument ID: HP1 DFTPP Injection Time: 1500

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	34.9
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	40.3
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	25.0 - 75.0% of mass 198	44.9
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.5
275	10.0 - 30.0% of mass 198	28.7
365	Greater than 0.75% of mass 198	5.03
441	Present, but less than mass 443	10.9
442	40.0 - 110.0% of mass 198	75.7
443	15.0 - 24.0% of mass 442	14.6 (19.2)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD050	SSTD050	00081902	08/19/0	1553
02	QSTD050	QSTD050	00081903	08/19/0	1645
03	C104-SLB	00-1360-SLB	00081904	08/19/0	1738
04	C104-SLS	00-1360-SLS	00081905	08/19/0	1831
05	C104-SLD	00-1360-SLD	00081906	08/19/0	1923
06	C104-SLMS	00-1360-SLMS	00081907	08/19/0	2016
07	C104-SLMSD	00-1360-SLMSD	00081908	08/19/0	2108
08	C104-SLE	00-1360-SLE	00081909	08/19/0	2201
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6B

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000811

Instrument ID: HP1 Calibration Date(s): 08/14/0 08/15/0

Calibration Time(s): 1734 0127

LAB FILE ID: RRF20 =00081107 RRF50 =00081108
RRF80 =00081109 RRF120=00081110 RRF160=00081111

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD	
Phenol	1.345	1.732	1.819	1.698	1.704	1.660	11.0	*
bis(2-Chloroethyl)ether	1.266	1.411	1.503	1.391	1.498	1.414	6.9	*
2-Chlorophenol	1.316	1.426	1.512	1.420	1.557	1.446	6.4	*
1,3-Dichlorobenzene	1.585	1.743	1.805	1.643	1.813	1.718	5.9	*
1,4-Dichlorobenzene	1.736	1.944	1.935	1.718	1.930	1.853	6.2	*
1,2-Dichlorobenzene	1.505	1.668	1.736	1.544	1.716	1.634	6.4	*
Benzyl alcohol	1.160	0.950	1.045	1.090	1.186	1.086	8.7	*
2-Methylphenol	2.401	2.871	2.914	2.647	2.948	2.756	8.4	*
2,2'-oxybis(1-Chloropropane)	1.292	1.309	1.372	1.251	1.330	1.311	3.4	
N-Nitroso-di-n-propylamine	0.852	0.980	1.073	0.905	0.916	0.945	9.0	*
4-Methylphenol	1.026	1.436	1.457	1.323	1.535	1.355	14.7	*
Hexachloroethane	0.681	0.820	0.818	0.726	0.724	0.754	8.2	*
Nitrobenzene	1.323	1.350	1.476	1.439	1.575	1.433	7.1	*
Isophorone	0.608	0.669	0.670	0.624	0.702	0.655	5.8	*
2-Nitrophenol	0.197	0.222	0.241	0.227	0.256	0.229	9.8	*
2,4-Dimethylphenol	0.310	0.352	0.371	0.360	0.363	0.351	6.8	*
bis(2-Chloroethoxy)methane	0.362	0.404	0.426	0.384	0.410	0.397	6.2	*
2,4-Dichlorophenol	0.274	0.299	0.338	0.331	0.366	0.322	11.2	*
Benzoic acid								*<-
1,2,4-Trichlorobenzene	0.377	0.428	0.454	0.410	0.453	0.424	7.6	*
Naphthalene	1.126	1.313	1.388	1.234	1.337	1.280	8.0	*
4-Chloroaniline	0.371	0.449	0.429	0.371	0.335	0.391	11.9	
Hexachlorobutadiene	0.245	0.280	0.301	0.285	0.314	0.285	9.2	
4-Chloro-3-methylphenol	0.249	0.296	0.314	0.312	0.342	0.303	11.3	*
2-Methylnaphthalene	0.726	0.857	0.879	0.791	0.856	0.822	7.7	*
Hexachlorocyclopentadiene	0.397	0.412	0.476	0.468	0.514	0.453	10.7	
2,4,6-Trichlorophenol	0.368	0.425	0.467	0.456	0.524	0.448	12.8	*
2,4,5-Trichlorophenol	0.442	0.373	0.406	0.450	0.487	0.432	10.1	*
2-Chloronaphthalene	1.176	1.396	1.484	1.285	1.462	1.361	9.5	*
2-Nitroaniline	0.273	0.302	0.332	0.294	0.338	0.308	8.7	
3-Nitroaniline	0.310	0.343	0.340	0.308	0.339	0.328	5.4	*
Dimethylphthalate	1.292	1.528	1.634	1.469	1.345	1.454	9.5	*
2,6-Dinitrotoluene	0.318	0.393	0.436	0.407	0.433	0.397	12.0	*
Acenaphthylene	1.717	2.124	2.338	2.170	2.428	2.155	12.7	*
Acenaphthene	1.075	1.268	1.390	1.319	1.496	1.310	11.9	*
2,4-Dinitrophenol	0.170	0.184	0.210	0.206	0.248	0.204	14.7	
Dibenzofuran	1.500	1.760	1.947	1.788	2.047	1.808	11.5	*

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000811

Instrument ID: HP1 Calibration Date(s): 08/14/0 08/15/0

Calibration Time(s): 1734 0127

LAB FILE ID: RRF20 =00081107 RRF50 =00081108
RRF80 =00081109 RRF120=00081110 RRF160=00081111

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
4-Nitrophenol	0.130	0.174	0.183	0.188	0.184	0.172	14.0
2,4-Dinitrotoluene *	0.396	0.433	0.467	0.440	0.472	0.442	7.0*
Diethylphthalate	1.314	1.503	1.561	1.497	1.713	1.518	9.4
Fluorene *	1.187	1.385	1.527	1.493	1.722	1.463	13.4*
4-Chlorophenyl-phenylether *	0.605	0.712	0.786	0.759	0.874	0.747	13.3*
4-Nitroaniline	0.282	0.294	0.315	0.322	0.361	0.315	9.7
4,6-Dinitro-2-methylphenol	0.240	0.270	0.297	0.300	0.340	0.289	12.8
N,N-Diphenylamine	0.659	0.782	0.859	0.803	0.927	0.806	12.4
Heptachlor *	0.138	0.178	0.187	0.169	0.187	0.172	11.8*
alpha-BHC *	0.202	0.236	0.261	0.227	0.249	0.235	9.5*
4-Bromophenyl-phenylether *	0.258	0.323	0.380	0.322	0.335	0.324	13.5*
Hexachlorobenzene *	0.314	0.393	0.444	0.416	0.456	0.405	13.9*
beta-BHC *	0.150	0.176	0.190	0.177	0.201	0.179	10.8*
Pentachlorophenol *	0.157	0.174	0.199	0.211	0.230	0.194	14.9*
delta-BHC *	0.150	0.176	0.190	0.177	0.201	0.179	10.8*
Phenanthrene *	1.074	1.301	1.438	1.311	1.470	1.319	11.8
Anthracene *	1.074	1.301	1.438	1.311	1.470	1.319	11.8
gamma-BHC (Lindane) *	0.133	0.154	0.165	0.154	0.170	0.155	9.3*
Carbazole	0.939	1.137	1.237	1.124	1.272	1.142	11.4
Di-n-butylphthalate	1.374	1.732	1.848	1.671	1.895	1.704	12.0
Aldrin *	0.136	0.169	0.177	0.162	0.177	0.164	10.4*
Heptachlor Epoxide	0.076	0.081	0.093	0.095	0.105	0.090	12.9
Fluoranthene *	1.128	1.424	1.538	1.391	1.587	1.414	12.6*
Pyrene *	1.447	1.418	1.428	1.218	1.374	1.377	6.7*
Endosulfan I	0.066	0.068	0.068	0.060	0.065	0.065	5.3
4,4'-DDE *	0.283	0.285	0.292	0.293	0.333	0.297	6.9*
Dieldrin *	0.196	0.196	0.194	0.162	0.167	0.183	9.4*
Endrin *	0.058	0.056	0.057	0.056	0.066	0.059	7.3*
Endosulfan II	0.046	0.045	0.044	0.043	0.050	0.046	5.8
4,4'-DDD *	0.441	0.439	0.448	0.482	0.552	0.472	10.1*
Butylbenzylphthalate	0.598	0.585	0.588	0.571	0.651	0.599	5.2
Endosulfan Sulfate	0.084	0.080	0.064	0.065	0.071	0.073	12.3
4,4'-DDT *	0.368	0.407	0.396	0.394	0.447	0.402	7.2*
Endrin Ketone *	0.068	0.063	0.063	0.058	0.066	0.064	6.0*
Benzo(a)anthracene *	1.370	1.030	1.067	1.047	1.218	1.146	12.7*
3,3'-Dichlorobenzidine	0.358	0.427	0.399	0.358	0.388	0.386	7.6
Chrysene *	1.024	1.030	1.067	1.047	1.218	1.077	7.5*

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000811

Instrument ID: HP1 Calibration Date(s): 08/14/0 08/15/0

Calibration Time(s): 1734 0127

LAB FILE ID: RRF20 =00081107 RRF50 =00081108
RRF80 =00081109 RRF120=00081110 RRF160=00081111

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD	
Methoxychlor *	1.106	1.106	1.092	0.910	0.930	1.029	9.7*	
Bis(2-Ethylhexyl)phthalate	0.829	0.863	0.854	0.843	0.952	0.868	5.6	
Di-n-octylphthalate	2.071	2.042	2.187	1.776	2.156	2.046	8.0	
Benzo(b)fluoranthene *	1.872	1.734	2.062	1.735	2.175	1.916	10.3*	
Benzo(k)fluoranthene *	1.653	1.734	2.062	1.735	2.175	1.872	12.4*	
Benzo(a)pyrene *	1.462	1.277	1.412	1.122	1.393	1.333	10.2*	
Indeno(1,2,3-cd)pyrene *	1.308	1.106	1.454	1.218	1.421	1.301	11.0*	
Dibenz(a,h)anthracene *	1.357	1.174	1.262	1.078	1.428	1.260	11.1*	
Benzo(g,h,i)perylene *	1.363	1.132	1.211	1.024	1.141	1.174	10.6*	
Pyridine	0.882	0.979	0.957	1.106	0.911	0.967	9.0	
Undecane								<-
Dodecane								<-
Tridecane								<-
Tetradecane								<-
Pentadecane								<-
Tributyl phosphate	1.548	1.776	1.766	1.739	1.555	1.677	6.9	
Bis(2-Ethylhexyl)phosphate								<-
N-Nitrosodimethylamine	0.549	0.445	0.488	0.591	0.550	0.525	11.0	
tetrachlorobiphenyl(peak 2)								<-
tetrachlorobiphenyl(peak 1)								<-
pentachlorobiphenyl(peak 3)								<-
pentachlorobiphenyl(peak 4)								<-
pentachlorobiphenyl(peak 5)								<-
pentachlorobiphenyl(peak 6)								<-
hexachlorobiphenyl(peak 7)								<-
pentachlorobiphenyl(peak 8)								<-
hexachlorobiphenyl(peak 9)								<-
hexachlorobiphenyl(peak10)								<-
AROCLOR 1254								<-
2-Butoxyethanol								<-
Acetophenone	1.702	1.850	1.871	1.705	1.947	1.815	5.9	
1-Chloro-4-nitrobenzene	0.200	0.236	0.240	0.258	0.264	0.240	10.4	
Biphenyl	2.703	2.880	2.949	3.003	2.774	2.862	4.3	
1,4-Dinitrobenzene	0.262	0.281	0.309	0.298	0.335	0.297	9.4	
Butylated Hydroxytoluene	1.793	2.120	2.114	1.916	1.897	1.968	7.3	
Pentachloronitrobenzene	0.141	0.174	0.188	0.176	0.194	0.175	11.7	
Dinoseb	0.227	0.264	0.302	0.285	0.339	0.283	14.7	

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000811

Instrument ID: HP1 Calibration Date(s): 08/14/0 08/15/0

Calibration Time(s): 1734 0127

LAB FILE ID: RRF20 =00081107 RRF50 =00081108
RRF80 =00081109 RRF120=00081110 RRF160=00081111

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD	
Octachloronaphthalene	0.001					0.001	0.0	<-
N-Nitrosomethylethylamine	0.492	0.382	0.423	0.482	0.482	0.452	10.6	
N-Nitrosodiethylamine	0.607	0.614	0.616	0.559	0.622	0.604	4.2	
Ethyl methane sulfonate	0.829	0.840	0.859	0.751	0.781	0.812	5.5	
Analine	1.336	1.481	1.483	1.393	1.497	1.438	4.9	
Pentachloroethane	0.640	0.754	0.763	0.676	0.736	0.714	7.5	
N-Nitrosopyrolidine	0.608	0.718	0.750	0.640	0.559	0.655	12.0	
N-Nitrosopiperidine	0.162	0.182	0.190	0.174	0.189	0.179	6.6	
Hexachloropropene	0.300	0.362	0.378	0.342	0.367	0.350	8.7	
N-Nitrosodi-n-butylamine	0.206	0.235	0.238	0.220	0.234	0.227	5.9	
Safrole	0.277	0.317	0.329	0.298	0.331	0.310	7.4	
1,2,4,5-Tetrachlorobenzene	0.676	0.791	0.880	0.827	0.962	0.827	12.8	
Isosafrole	0.720	0.554	0.715	0.726	0.679	0.679	10.6	
1,4-Naphthoquinone	0.048	0.053	0.058	0.053	0.055	0.053	7.0	
Pentachlorobenzene	0.517	0.613	0.675	0.644	0.733	0.636	12.6	
1-Naphthylamine	0.364	0.402	0.397	0.309	0.313	0.357	12.5	
2,3,4,6-Tetrachlorophenol	0.319	0.326	0.363	0.372	0.426	0.361	11.6	
2-Naphthylamine	0.364	0.408	0.397	0.309	0.311	0.358	13.1	
5-Nitro-o-toluidine	0.307	0.352	0.361	0.328	0.356	0.341	6.7	
Azeobenzene	0.884	0.895	1.032	1.053	1.181	1.009	12.2	
1,3,5-Trinitrobenzene								<-
Diallate (cis)	0.234	0.314	0.345	0.296	0.310	0.300	13.7	
Phenacetin	0.421	0.534	0.560	0.448	0.470	0.487	12.0	
Diallate (trans)	0.234	0.314	0.345	0.296	0.310	0.300	13.7	
4-Aminobiphenyl	0.280	0.345	0.335	0.331	0.354	0.329	8.8	
Pronamine	0.347	0.425	0.443	0.408	0.453	0.415	10.1	
Isodrin	0.147	0.175	0.187	0.178	0.200	0.177	11.0	
Chlordane (alpha)	0.095	0.116	0.129	0.127	0.139	0.121	13.8	
Benzidine	0.021	0.022	0.023	0.019	0.020	0.021	7.2	
p-Dimethylaminoazobenzene	0.338	0.319	0.318	0.301	0.338	0.323	4.8	
Chlorobenzilate	0.425	0.431	0.428	0.422	0.487	0.439	6.2	
3,3'-Dimethylbenzidine	0.261	0.247	0.204	0.207	0.211	0.226	11.5	
2-Acetylaminofluorene	0.238	0.234	0.239	0.219	0.256	0.237	5.5	
3-Methylcholanthrene	0.751	0.649	0.731	0.575	0.712	0.684	10.5	
2-Methylpyridine	0.984	0.831	0.874	0.768	0.888	0.869	9.1	
Kepone	0.064	0.062	0.064	0.058	0.053	0.060	8.2	
Chlordane (gamma)	0.095	0.116	0.129	0.127	0.139	0.121	13.8	

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

6C

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000811

Instrument ID: HP1 Calibration Date(s): 08/14/0 08/15/0

Calibration Time(s): 1734 0127

LAB FILE ID: RRF20 =00081107 RRF50 =00081108
RRF80 =00081109 RRF120=00081110 RRF160=00081111

COMPOUND		RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD	
Methyl methane sulfonate		0.154	0.124	0.125	0.149	0.150	0.140	10.3	
Hexachlorophene									<-
1,3-Dinitrobenzene		0.235	0.275	0.309	0.293	0.340	0.290	13.4	
2,6-Dichlorophenol		0.327	0.386	0.402	0.373	0.404	0.378	8.3	
2-Fluorophenol	*	2.283	2.634	2.678	2.538	2.762	2.579	7.1	*
Phenol-d5	*	2.989	3.663	3.622	3.237	3.520	3.406	8.4	*
2-Chlorophenol-d4	*								*<-
1,2-Dichlorobenzene-d4	*								*<-
Nitrobenzene-d5		1.272	1.294	1.339	1.319	1.446	1.334	5.1	*
2-Fluorobiphenyl	*	1.371	1.522	1.670	1.529	1.749	1.568	9.3	*
2,4,6-Tribromophenol		0.298	0.304	0.360	0.348	0.387	0.339	11.3	
Terphenyl-d14	*	0.926	0.975	1.014	0.878	0.953	0.949	5.4	*

* Compounds with required minimum RRF and maximim %RSD values.
All other compounds must meet a minimim RRF of 0.010.

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 1553

Lab File ID: 00081902 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	RRF	RRF25	MIN RRF	%D	MAX %D	
Methoxychlor	1.029	1.084	0.050	-5.3	40.0	
Bis(2-Ethylhexyl)phthalate	0.868	0.869		-0.1		
Di-n-octylphthalate	2.046	1.827		10.7		
Benzo(b)fluoranthene	1.916	1.813	0.700	5.4	25.0	
Benzo(k)fluoranthene	1.872	1.856	0.700	0.8	25.0	
Benzo(a)pyrene	1.333	1.347	0.700	-1.0	25.0	
Indeno(1,2,3-cd)pyrene	1.301	1.155	0.500	11.2	25.0	
Dibenz(a,h)anthracene	1.260	1.126	0.400	10.6	25.0	
Benzo(g,h,i)perylene	1.174	1.048	0.500	10.7	25.0	
Pyridine	0.967	0.937		3.1		
Tributyl phosphate	1.677	1.489		11.2		
N-Nitrosodimethylamine	0.525	0.538		-2.5		
Acetophenone	1.815	1.848		-1.8		
1-Chloro-4-nitrobenzene	0.240	0.184		23.3		
Biphenyl	2.862	2.300		19.6		
1,4-Dinitrobenzene		0.135				<-
Butylated Hydroxytoluene	1.968	1.653		16.0		
Pentachloronitrobenzene	0.175	0.156		10.8		
Dinoseb	0.283	0.258		8.8		
Octachloronaphthalene	0.001	0.002		-99.9		<-
N-Nitrosomethylethylamine	0.452	0.458		-1.3		
N-Nitrosodiethylamine	0.604	0.675		-11.8		
Ethyl methane sulfonate	0.812	0.862		-6.2		
Analine	1.438	1.539		-7.0		
Pentachloroethane	0.714	0.672		5.9		
N-Nitrosopyrolidine	0.655	0.700		-6.9		
N-Nitrosopiperidine	0.179	0.180		-0.6		
Hexachloropropene	0.350	0.314		10.3		
N-Nitrosodi-n-butylamine	0.227	0.238		-4.8		
Safrole	0.310	0.294		5.2		
1,2,4,5-Tetrachlorobenzene	0.827	0.742		10.3		
Isosafrole	0.679	0.661		2.6		
1,4-Naphthoquinone	0.053	0.052		1.9		
Pentachlorobenzene	0.636	0.618		2.8		
1-Naphthylamine	0.357	0.392		-9.8		
2,3,4,6-Tetrachlorophenol	0.361	0.334		7.5		

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 1553

Lab File ID: 00081902 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	RRF	RRF25	MIN RRF	%D	MAX %D	
2-Naphthylamine	0.358	0.392		-9.5		
5-Nitro-o-toluidine	0.341	0.347		-1.8		
Azeobenzene	1.009	0.917		9.1		
1,3,5-Trinitrobenzene		0.166				<-
Diallate (cis)	0.300	0.293		2.3		
Phenacetin	0.487	0.437		10.3		
Diallate (trans)	0.300	0.293		2.3		
4-Aminobiphenyl	0.329	0.318		3.3		
Pronamine	0.415	0.387		6.7		
Isodrin	0.177	0.160		9.6		
Chlordane (alpha)	0.121	0.108		10.7		
Benzidine	0.021	0.023		-9.5		
p-Dimethylaminoazobenzene	0.323	0.347		-7.4		
Chlorobenzilate	0.439	0.431		1.8		
3,3'-Dimethylbenzidine	0.226	0.247		-9.3		
2-Acetylaminofluorene	0.237	0.241		-1.7		
3-Methylcholanthrene	0.684	0.663		3.1		
2-Methylpyridine	0.869	0.927		-6.7		
Kepone	0.060	0.063		-5.0		
Chlordane (gamma)	0.121	0.124		-2.5		
Methyl methane sulfonate	0.140	0.136		2.8		
Hexachlorophene						<-
1,3-Dinitrobenzene	0.290	0.271		6.6		
2,6-Dichlorophenol	0.378	0.339		10.3		
2-Fluorophenol	2.579	2.544	0.600	1.4	25.0	
Phenol-d5	3.406	3.279	0.800	3.7	25.0	
Nitrobenzene-d5	1.334	1.418	0.200	-6.3	25.0	
2-Fluorobiphenyl	1.568	1.470	0.700	6.2	25.0	
2,4,6-Tribromophenol	0.339	0.304		10.3		
Terphenyl-d14	0.949	1.004	0.500	-5.8	25.0	

All other compounds must meet a minimum RRF of 0.010.

7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 1645

Lab File ID: 00081903 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	$\overline{RRF}$	RRF25	MIN RRF	%D	MAX %D
Phenol	1.660	1.659	0.800	0.1	25.0
bis(2-Chloroethyl)ether	1.414	1.480	0.700	-4.7	25.0
2-Chlorophenol	1.446	1.398	0.800	3.3	25.0
1,3-Dichlorobenzene	1.718	1.636	0.600	4.8	25.0
1,4-Dichlorobenzene	1.853	1.810	0.500	2.3	25.0
1,2-Dichlorobenzene	1.634	1.580	0.400	3.3	25.0
Benzyl alcohol	1.086	0.988	0.100	9.0	25.0
2-Methylphenol	2.756	2.547	0.700	7.6	25.0
2,2'-oxybis(1-Chloropropane)	1.311	1.419		-8.2	
N-Nitroso-di-n-propylamine	0.945	1.013	0.500	-7.2	25.0
4-Methylphenol	1.355	1.268	0.600	6.4	25.0
Hexachloroethane	0.754	0.736	0.300	2.4	25.0
Nitrobenzene	1.433	1.464	0.200	-2.2	25.0
Isophorone	0.655	0.706	0.400	-7.8	25.0
2-Nitrophenol	0.229	0.222	0.100	3.0	25.0
2,4-Dimethylphenol	0.351	0.329	0.200	6.3	25.0
bis(2-Chloroethoxy)methane	0.397	0.406	0.300	-2.3	25.0
2,4-Dichlorophenol	0.322	0.293	0.200	9.0	25.0
1,2,4-Trichlorobenzene	0.424	0.398	0.200	6.1	25.0
Naphthalene	1.280	1.220	0.700	4.7	25.0
4-Chloroaniline	0.391	0.393		-0.5	
Hexachlorobutadiene	0.285	0.267		6.3	
4-Chloro-3-methylphenol	0.303	0.282	0.200	6.9	25.0
2-Methylnaphthalene	0.822	0.770	0.400	6.3	25.0
Hexachlorocyclopentadiene	0.453	0.433		4.4	
2,4,6-Trichlorophenol	0.448	0.411	0.200	8.2	25.0
2,4,5-Trichlorophenol	0.432	0.443	0.200	-2.5	25.0
2-Chloronaphthalene	1.361	1.439	0.800	-5.7	25.0
2-Nitroaniline	0.308	0.323		-4.9	
3-Nitroaniline	0.328	0.317	0.050	3.4	40.0
Dimethylphthalate	1.454	1.564	0.050	-7.6	25.0
2,6-Dinitrotoluene	0.397	0.377	0.200	5.0	25.0
Acenaphthylene	2.155	2.014	1.300	6.5	25.0
Acenaphthene	1.310	1.250	0.800	4.6	25.0
2,4-Dinitrophenol	0.204	0.200		2.0	
Dibenzofuran	1.808	1.739	0.800	3.8	25.0
4-Nitrophenol	0.172	0.167		2.9	

All other compounds must meet a minimum RRF of 0.010.

7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 2347

Lab File ID: 00081911 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	$\overline{RRF}$	RRF25	MIN RRF	%D	MAX %D
Phenol	1.660	1.742	0.800	-4.9	25.0
bis(2-Chloroethyl)ether	1.414	1.520	0.700	-7.5	25.0
2-Chlorophenol	1.446	1.487	0.800	-2.8	25.0
1,3-Dichlorobenzene	1.718	1.731	0.600	-0.8	25.0
1,4-Dichlorobenzene	1.853	1.836	0.500	0.9	25.0
1,2-Dichlorobenzene	1.634	1.631	0.400	0.2	25.0
Benzyl alcohol	1.086	1.009	0.100	7.1	25.0
2-Methylphenol	2.756	2.711	0.700	1.6	25.0
2,2'-oxybis(1-Chloropropane)	1.311	1.423		-8.5	
N-Nitroso-di-n-propylamine	0.945	1.036	0.500	-9.6	25.0
4-Methylphenol	1.355	1.418	0.600	-4.6	25.0
Hexachloroethane	0.754	0.729	0.300	3.3	25.0
Nitrobenzene	1.433	1.436	0.200	-0.2	25.0
Isophorone	0.655	0.700	0.400	-6.9	25.0
2-Nitrophenol	0.229	0.234	0.100	-2.2	25.0
2,4-Dimethylphenol	0.351	0.352	0.200	-0.3	25.0
bis(2-Chloroethoxy)methane	0.397	0.429	0.300	-8.1	25.0
2,4-Dichlorophenol	0.322	0.313	0.200	2.8	25.0
1,2,4-Trichlorobenzene	0.424	0.415	0.200	2.1	25.0
Naphthalene	1.280	1.266	0.700	1.1	25.0
4-Chloroaniline	0.391	0.381		2.6	
Hexachlorobutadiene	0.285	0.271		4.9	
4-Chloro-3-methylphenol	0.303	0.310	0.200	-2.3	25.0
2-Methylnaphthalene	0.822	0.791	0.400	3.8	25.0
Hexachlorocyclopentadiene	0.453	0.428		5.5	
2,4,6-Trichlorophenol	0.448	0.434	0.200	3.1	25.0
2,4,5-Trichlorophenol	0.432	0.402	0.200	6.9	25.0
2-Chloronaphthalene	1.361	1.422	0.800	-4.5	25.0
2-Nitroaniline	0.308	0.327		-6.2	
3-Nitroaniline	0.328	0.335	0.050	-2.1	40.0
Dimethylphthalate	1.454	1.552	0.050	-6.7	25.0
2,6-Dinitrotoluene	0.397	0.394	0.200	0.8	25.0
Acenaphthylene	2.155	2.120	1.300	1.6	25.0
Acenaphthene	1.310	1.288	0.800	1.7	25.0
2,4-Dinitrophenol	0.204	0.211		-3.4	
Dibenzofuran	1.808	1.797	0.800	0.6	25.0
4-Nitrophenol	0.172	0.161		6.4	

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 2347

Lab File ID: 00081911 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	$\overline{RRF}$	RRF25	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.442	0.460	0.200	-4.1	25.0
Diethylphthalate	1.518	1.475		2.8	
Fluorene	1.463	1.392	0.900	4.8	25.0
4-Chlorophenyl-phenylether	0.747	0.721	0.400	3.5	25.0
4-Nitroaniline	0.315	0.301		4.4	
4,6-Dinitro-2-methylphenol	0.289	0.293		-1.4	
N,N-Diphenylamine	0.806	0.747		7.3	
Heptachlor	0.172	0.167	0.050	2.9	40.0
alpha-BHC	0.235	0.213	0.050	9.4	40.0
4-Bromophenyl-phenylether	0.324	0.320	0.100	1.2	25.0
Hexachlorobenzene	0.405	0.383	0.100	5.4	25.0
beta-BHC	0.179	0.180	0.050	-0.6	40.0
Pentachlorophenol	0.194	0.179	0.050	7.7	25.0
delta-BHC	0.179	0.165	0.050	7.8	40.0
Phenanthrene	1.319	1.262	0.700	4.3	25.0
Anthracene	1.319	1.220	0.700	7.5	25.0
gamma-BHC (Lindane)	0.155	0.141	0.050	9.0	40.0
Carbazole	1.142	1.057		7.4	
Di-n-butylphthalate	1.704	1.590		6.7	
Aldrin	0.164	0.156	0.050	4.9	40.0
Heptachlor Epoxide	0.090	0.090		0.0	
Fluoranthene	1.414	1.301	0.600	8.0	25.0
Pyrene	1.377	1.415	0.600	-2.8	25.0
Endosulfan I	0.065	0.066		-1.5	
4,4'-DDE	0.297	0.304	0.050	-2.4	40.0
Dieldrin	0.183	0.204	0.050	-11.5	40.0
Endrin	0.059	0.060	0.050	-1.7	40.0
Endosulfan II	0.046	0.047		-2.2	
4,4'-DDD	0.472	0.478	0.050	-1.3	40.0
Butylbenzylphthalate	0.599	0.632		-5.5	
Endosulfan Sulfate	0.073	0.080		-9.6	
4,4'-DDT	0.402	0.399	0.050	0.7	40.0
Endrin Ketone	0.064	0.070	0.050	-9.4	40.0
Benzo(a)anthracene	1.146	1.258	0.800	-9.8	25.0
3,3'-Dichlorobenzidine	0.386	0.434		-12.4	
Chrysene	1.077	1.122	0.700	-4.2	25.0

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 2347

Lab File ID: 00081911 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	RRF	RRF25	MIN RRF	%D	MAX %D	
Methoxychlor	1.029	0.993	0.050	3.5	40.0	
Bis(2-Ethylhexyl)phthalate	0.868	0.900		-3.7		
Di-n-octylphthalate	2.046	1.915		6.4		
Benzo(b)fluoranthene	1.916	1.776	0.700	7.3	25.0	
Benzo(k)fluoranthene	1.872	1.829	0.700	2.3	25.0	
Benzo(a)pyrene	1.333	1.278	0.700	4.1	25.0	
Indeno(1,2,3-cd)pyrene	1.301	1.175	0.500	9.7	25.0	
Dibenz(a,h)anthracene	1.260	1.251	0.400	0.7	25.0	
Benzo(g,h,i)perylene	1.174	1.063	0.500	9.4	25.0	
Pyridine	0.967	0.988		-2.2		
Tributyl phosphate	1.677	1.888		-12.6		
N-Nitrosodimethylamine	0.525	0.528		-0.6		
Acetophenone	1.815	1.873		-3.2		
1-Chloro-4-nitrobenzene	0.240	0.227		5.4		
Biphenyl	2.862	2.862		0.0		
1,4-Dinitrobenzene		0.142				<-
Butylated Hydroxytoluene	1.968	1.904		3.2		
Pentachloronitrobenzene	0.175	0.157		10.3		
Dinoseb	0.283	0.265		6.4		
Octachloronaphthalene	0.001	0.001		0.0		<-
N-Nitrosomethylethylamine	0.452	0.499		-10.4		
N-Nitrosodiethylamine	0.604	0.627		-3.8		
Ethyl methane sulfonate	0.812	0.888		-9.4		
Analine	1.438	1.488		-3.5		
Pentachloroethane	0.714	0.690		3.4		
N-Nitrosopyrolidine	0.655	0.730		-11.4		
N-Nitrosopiperidine	0.179	0.196		-9.5		
Hexachloropropene	0.350	0.312		10.8		
N-Nitrosodi-n-butylamine	0.227	0.244		-7.5		
Safrole	0.310	0.304		1.9		
1,2,4,5-Tetrachlorobenzene	0.827	0.795		3.9		
Isosafrole	0.679	0.642		5.4		
1,4-Naphthoquinone	0.053	0.054		-1.9		
Pentachlorobenzene	0.636	0.636		0.0		
1-Naphthylamine	0.357	0.401		-12.3		
2,3,4,6-Tetrachlorophenol	0.361	0.343		5.0		

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 2347

Lab File ID: 00081911 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	$\overline{RRF}$	RRF25	MIN RRF	%D	MAX %D	
2-Naphthylamine	0.358	0.401		-12.0		
5-Nitro-o-toluidine	0.341	0.370		-8.5		
Azeobenzene	1.009	0.926		8.2		
1,3,5-Trinitrobenzene		0.192				<-
Diallate (cis)	0.300	0.290		3.3		
Phenacetin	0.487	0.449		7.8		
Diallate (trans)	0.300	0.290		3.3		
4-Aminobiphenyl	0.329	0.301		8.5		
Pronamine	0.415	0.389		6.3		
Isodrin	0.177	0.159		10.2		
Chlordane (alpha)	0.121	0.114		5.8		
Benzidine	0.021	0.021		0.0		
p-Dimethylaminoazobenzene	0.323	0.343		-6.2		
Chlorobenzilate	0.439	0.441		-0.4		
3,3'-Dimethylbenzidine	0.226	0.205		9.3		
2-Acetylaminofluorene	0.237	0.248		-4.6		
3-Methylcholanthrene	0.684	0.617		9.8		
2-Methylpyridine	0.869	0.902		-3.8		
Kepone	0.060	0.059		1.7		
Chlordane (gamma)	0.121	0.134		-10.7		
Methyl methane sulfonate	0.140	0.126		10.0		
Hexachlorophene						<-
1,3-Dinitrobenzene	0.290	0.284		2.1		
2,6-Dichlorophenol	0.378	0.342		9.5		
2-Fluorophenol	2.579	2.689	0.600	-4.3	25.0	
Phenol-d5	3.406	3.346	0.800	1.8	25.0	
Nitrobenzene-d5	1.334	1.432	0.200	-7.3	25.0	
2-Fluorobiphenyl	1.568	1.562	0.700	0.4	25.0	
2,4,6-Tribromophenol	0.339	0.326		3.8		
Terphenyl-d14	0.949	1.056	0.500	-11.3	25.0	

All other compounds must meet a minimum RRF of 0.010.

7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 1553

Lab File ID: 00081902 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	$\overline{RRF}$	RRF25	MIN RRF	%D	MAX %D
Phenol	1.660	1.659	0.800	0.1	25.0
bis(2-Chloroethyl)ether	1.414	1.480	0.700	-4.7	25.0
2-Chlorophenol	1.446	1.398	0.800	3.3	25.0
1,3-Dichlorobenzene	1.718	1.636	0.600	4.8	25.0
1,4-Dichlorobenzene	1.853	1.810	0.500	2.3	25.0
1,2-Dichlorobenzene	1.634	1.580	0.400	3.3	25.0
Benzyl alcohol	1.086	0.988	0.100	9.0	25.0
2-Methylphenol	2.756	2.547	0.700	7.6	25.0
2,2'-oxybis(1-Chloropropane)	1.311	1.419		-8.2	
N-Nitroso-di-n-propylamine	0.945	1.013	0.500	-7.2	25.0
4-Methylphenol	1.355	1.268	0.600	6.4	25.0
Hexachloroethane	0.754	0.736	0.300	2.4	25.0
Nitrobenzene	1.433	1.464	0.200	-2.2	25.0
Isophorone	0.655	0.706	0.400	-7.8	25.0
2-Nitrophenol	0.229	0.222	0.100	3.0	25.0
2,4-Dimethylphenol	0.351	0.329	0.200	6.3	25.0
bis(2-Chloroethoxy)methane	0.397	0.406	0.300	-2.3	25.0
2,4-Dichlorophenol	0.322	0.293	0.200	9.0	25.0
1,2,4-Trichlorobenzene	0.424	0.398	0.200	6.1	25.0
Naphthalene	1.280	1.220	0.700	4.7	25.0
4-Chloroaniline	0.391	0.393		-0.5	
Hexachlorobutadiene	0.285	0.267		6.3	
4-Chloro-3-methylphenol	0.303	0.282	0.200	6.9	25.0
2-Methylnaphthalene	0.822	0.770	0.400	6.3	25.0
Hexachlorocyclopentadiene	0.453	0.433		4.4	
2,4,6-Trichlorophenol	0.448	0.411	0.200	8.2	25.0
2,4,5-Trichlorophenol	0.432	0.443	0.200	-2.5	25.0
2-Chloronaphthalene	1.361	1.439	0.800	-5.7	25.0
2-Nitroaniline	0.308	0.323		-4.9	
3-Nitroaniline	0.328	0.317	0.050	3.4	40.0
Dimethylphthalate	1.454	1.564	0.050	-7.6	25.0
2,6-Dinitrotoluene	0.397	0.377	0.200	5.0	25.0
Acenaphthylene	2.155	2.014	1.300	6.5	25.0
Acenaphthene	1.310	1.250	0.800	4.6	25.0
2,4-Dinitrophenol	0.204	0.200		2.0	
Dibenzofuran	1.808	1.739	0.800	3.8	25.0
4-Nitrophenol	0.172	0.167		2.9	

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Instrument ID: HP1 Calibration Date: 08/19/0 Time: 1553

Lab File ID: 00081902 Init. Calib. Date(s): 08/14/0 08/15/0

Init. Calib. Times: 1734 0127

COMPOUND	$\overline{RRF}$	RRF25	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.442	0.441	0.200	0.2	25.0
Diethylphthalate	1.518	1.443		4.9	
Fluorene	1.463	1.357	0.900	7.2	25.0
4-Chlorophenyl-phenylether	0.747	0.698	0.400	6.6	25.0
4-Nitroaniline	0.315	0.302		4.1	
4,6-Dinitro-2-methylphenol	0.289	0.280		3.1	
N,N-Diphenylamine	0.806	0.730		9.4	
Heptachlor	0.172	0.166	0.050	3.5	40.0
alpha-BHC	0.235	0.212	0.050	9.8	40.0
4-Bromophenyl-phenylether	0.324	0.290	0.100	10.5	25.0
Hexachlorobenzene	0.405	0.362	0.100	10.6	25.0
beta-BHC	0.179	0.161	0.050	10.0	40.0
Pentachlorophenol	0.194	0.187	0.050	3.6	25.0
delta-BHC	0.179	0.166	0.050	7.3	40.0
Phenanthrene	1.319	1.206	0.700	8.6	25.0
Anthracene	1.319	1.184	0.700	10.2	25.0
gamma-BHC (Lindane)	0.155	0.139	0.050	10.3	40.0
Carbazole	1.142	1.048		8.2	
Di-n-butylphthalate	1.704	1.534		10.0	
Aldrin	0.164	0.162	0.050	1.2	40.0
Heptachlor Epoxide	0.090	0.080		11.1	
Fluoranthene	1.414	1.254	0.600	11.3	25.0
Pyrene	1.377	1.421	0.600	-3.2	25.0
Endosulfan I	0.065	0.066		-1.5	
4,4'-DDE	0.297	0.301	0.050	-1.3	40.0
Dieldrin	0.183	0.202	0.050	-10.4	40.0
Endrin	0.059	0.060	0.050	-1.7	40.0
Endosulfan II	0.046	0.047		-2.2	
4,4'-DDD	0.472	0.457	0.050	3.2	40.0
Butylbenzylphthalate	0.599	0.614		-2.5	
Endosulfan Sulfate	0.073	0.080		-9.6	
4,4'-DDT	0.402	0.426	0.050	-6.0	40.0
Endrin Ketone	0.064	0.070	0.050	-9.4	40.0
Benzo(a)anthracene	1.146	1.233	0.800	-7.6	25.0
3,3'-Dichlorobenzidine	0.386	0.415		-7.5	
Chrysene	1.077	1.118	0.700	-3.8	25.0

All other compounds must meet a minimum RRF of 0.010.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID (Standard): 00081903 Date Analyzed: 08/19/0

Instrument ID: HP1 Time Analyzed: 1645

		IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
	12 HOUR STD	405874	11.65	1550257	15.30	822337	20.48
	UPPER LIMIT	811748	12.15	3100514	15.80	1644674	20.98
	LOWER LIMIT	202937	11.15	775129	14.80	411169	19.98
	EPA SAMPLE NO.						
01	C104-SLB	508801	11.67	1837266	15.31	995635	20.50
02	C104-SLS	501731	11.66	1849797	15.31	1018382	20.49
03	C104-SLD	639416	11.68	2388827	15.31	1293409	20.51
04	C104-SLMS	500483	11.65	1895372	15.30	1007930	20.48
05	C104-SLMSD	501643	11.66	1908361	15.30	976494	20.49
06	C104-SLE	537135	11.67	1955787	15.33		
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IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID (Standard): 00081903 Date Analyzed: 08/19/0

Instrument ID: HP1 Time Analyzed: 1645

		IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
	12 HOUR STD	1370495	24.88	1200694	32.73	1290210	36.62
	UPPER LIMIT	2740990	25.38	2401388	33.23	2580420	37.12
	LOWER LIMIT	685248	24.38	600347	32.23	645105	36.12
	EPA SAMPLE NO.						
01	C104-SLB	1669795	24.89	1492438	32.73	1608864	36.64
02	C104-SLS	1773468	24.89	1455859	32.73	1444697	36.63
03	C104-SLD	2205207	24.91	1887770	32.74	1835689	36.64
04	C104-SLMS	1640035	24.88	1431404	32.72	1553972	36.63
05	C104-SLMSD	1647350	24.89	1451327	32.73	1557285	36.62
06	C104-SLE	1635345	24.89	1347035	32.73		
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IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID (Standard): 00081903 Date Analyzed: 08/19/0

Instrument ID: HP1 Time Analyzed: 1645

		IS7 AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	606704	4.19				
	UPPER LIMIT	1213408	4.69				
	LOWER LIMIT	303352	3.69				
	EPA SAMPLE NO.						
01	C104-SLB	631260	4.23				
02	C104-SLS	656348	4.30				
03	C104-SLD	610012	4.34				
04	C104-SLMS	667879	4.20				
05	C104-SLMSD	641620	4.20				
06	C104-SLE	65566*	4.46				
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IS7 = Pyridine-d5

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID (Standard): 00081912 Date Analyzed: 08/20/0

Instrument ID: HP1 Time Analyzed: 0127

		IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
	12 HOUR STD	931070	11.66	3493620	15.32	1889843	20.50
	UPPER LIMIT	1862140	12.16	6987240	15.82	3779686	21.00
	LOWER LIMIT	465535	11.16	1746810	14.82	944922	20.00
	EPA SAMPLE NO.						
01	C104-SSB	729054	11.65	2591441	15.30	1429683	20.48
02	C104-SSS	745533	11.67	2783562	15.30	1567965	20.50
03	C104-SSD	655203	11.66	2371540	15.29	1340805	20.49
04	C104-SSMS	823709	11.66	3030189	15.31	1705499	20.49
05	C104-SSMSD	1138134	11.67	4086660	15.30	2251435	20.50
06	LCSB	1066862	11.67	3839133	15.31	2076670	20.50
07	LCSMS	960285	11.66	3445517	15.31	1857146	20.49
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IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID (Standard): 00081912 Date Analyzed: 08/20/0

Instrument ID: HP1 Time Analyzed: 0127

		IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
	12 HOUR STD	3154078	24.90	2814819	32.75	3126724	36.66
	UPPER LIMIT	6308156	25.40	5629638	33.25	6253448	37.16
	LOWER LIMIT	1577039	24.40	1407410	32.25	1563362	36.16
	EPA SAMPLE NO.						
01	C104-SSB	2294301	24.88	1912595	32.73	1973546	36.63
02	C104-SSS	2590384	24.89	2294909	32.73	2442441	36.65
03	C104-SSD	2191288	24.88	1841527	32.72	1944279	36.63
04	C104-SSMS	2725666	24.89	2424394	32.74	2596812	36.65
05	C104-SSMSD	3724929	24.89	3171350	32.74	3343028	36.65
06	LCSB	3432859	24.90	2859302	32.74	2900655	36.67
07	LCSMS	3024823	24.89	2525369	32.74	2620336	36.64
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IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: PNNL Contract: C104

Lab Code: PNNL Case No.: SAS No.: SDG No.: 000819

Lab File ID (Standard): 00081912 Date Analyzed: 08/20/0

Instrument ID: HP1 Time Analyzed: 0127

		IS7 AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	1185309	4.19				
	UPPER LIMIT	2370618	4.69				
	LOWER LIMIT	592655	3.69				
	EPA SAMPLE NO.						
01	C104-SSB	887076	4.26				
02	C104-SSS	940267	4.23				
03	C104-SSD	961822	4.21				
04	C104-SSMS	1118906	4.18				
05	C104-SSMSD	1466057	4.23				
06	LCSB	1347406	4.25				
07	LCSMS	1181009	4.26				
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IS7 = Pyridine-d5

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

Appendix F: Dioxins and Furans Ion Abundance Ratios and Response Factors

Table F.1. Ion Abundance Ratios and Response Factors for Standards

Compound	Native Conc. µg/L	Mass m/z	Native Ion Ratio	Labeled Ion Ratio [1]	RRF	Average RRF	%RSD
HpCDD	2.5	424	1.06	1.08	1.08	0.96	10.2
	10.0		1.04	1.06	0.94		
	50.0		1.05	1.07	0.96		
	200.0		1.03	1.06	0.85		
HpCDD	2.5	426			1.11	0.98	9.8
	10.0				0.96		
	50.0				0.97		
	200.0				0.88		
HpCDF	2.5	408	0.95	1.07	1.06	0.98	13.1
	10.0		1.06	1.04	1.07		
	50.0		1.07	1.07	1.06		
	200.0		0.88	1.05	0.86		
HpCDF	2.5	410			1.19	1.05	11.8
	10.0				1.05		
	50.0				1.05		
	200.0				0.89		
HxCDD	2.5	390	1.06	1.28	1.20	1.19	11.9
	10.0		1.31	1.27	1.32		
	50.0		1.25	1.27	1.26		
	200.0		1.13	1.27	0.99		
HxCDD	2.5	392			1.42	1.28	9.9
	10.0				1.27		
	50.0				1.29		
	200.0				1.15		
HxCDF	2.5	374	1.29	1.24	1.06	1.16	12.3
	10.0		1.10	1.25	1.10		
	50.0		1.27	1.18	1.11		
	200.0		1.18	1.28	1.40		
HxCDF	2.5	376			1.20	1.13	7.7
	10.0				1.04		
	50.0				1.06		
	200.0				1.21		
OCDD	5.0	458	0.93	0.90	1.21	0.98	22.5
	20.0		0.91	0.92	0.95		
	100.0		1.00	1.00	1.05		
	400.0		0.98	0.95	0.69		

Compound	Native Conc. µg/L	Mass m/z	Native Ion Ratio	Labeled Ion Ratio [1]	RRF	Average RRF	%RSD
OCDD	5.0	460			1.18	0.97	22.3
	20.0				0.96		
	100.0				1.05		
	400.0				0.67		
OCDF	5.0	442	0.95	0.90	1.36	1.15	19.6
	20.0		0.92	0.92	1.20		
	100.0		0.92	0.93	1.24		
	400.0		0.96	0.95	0.90		
OCDF	5.0	444			1.29	1.14	18.8
	20.0				1.18		
	100.0				1.25		
	400.0				0.83		
PeCDD	2.5	356	1.43	1.61	0.92	0.89	14.6
	10.0		1.43	1.55	0.81		
	50.0		1.63	1.57	1.08		
	200.0		1.39	1.62	0.74		
PeCDD	2.5	358			1.03	0.96	9.5
	10.0				0.88		
	50.0				1.04		
	200.0				0.90		
PeCDF	2.5	340	1.38	1.67	1.13	1.02	21.7
	10.0		1.53	1.63	1.04		
	50.0		1.58	1.69	1.11		
	200.0		1.32	1.64	0.81		
PeCDF	2.5	342			1.40	1.15	19.5
	10.0				1.16		
	50.0				1.19		
	200.0				0.85		
TCDD	0.5	322	0.83	0.89	1.06	1.05	18.6
	2.0		0.67	0.79	0.82		
	10.0		0.70	0.80	1.02		
	40.0		0.82	0.80	1.30 1.30		
TCDD	0.5	324			1.13	1.14	9.5
	2.0				1.00		
	10.0				1.15		
	40.0				1.26		

Compound	Native Conc. µg/L	Mass m/z	Native Ion Ratio	Labeled Ion Ratio [1]	RRF	Average RRF	%RSD
TCDF	0.5	304	0.78	0.80	1.02	1.02	4.1
	2.0		0.78	0.70	1.07		
	10.0		0.75	0.73	0.96		
	40.0		0.82	0.82	1.03		
TCDF	0.5	306			1.04	0.99	4.9
	2.0				0.96		
	10.0				0.94		
	40.0				1.02		

Concentration of labeled compounds: OCDD and OCDF = 200 µg/L, all other labeled compounds at 100 µg/L

Table F.2. Ion Abundance Ratios for Supernatant Matrix Spikes

Tank Material	C-104 Supernatant					
Sample ID	00-01360 MS		00-01360 MSD		LCS	
Ion Ratios	Native	Labeled	Native	Labeled	Native	Labeled
Analyte						
HpCDD	1.03	1.08	1.07	1.03	1.04	1.08
HpCDF	1.01	1.02	1.04	1.07	1.06	1.04
HxCDD	1.07	1.26	1.21	1.27	1.27	1.10
HxCDF	1.31	1.32	1.08	1.38	1.28	1.19
OCDD	0.81	0.92	0.87	0.89	0.89	0.90
OCDF	0.89	0.92	0.80	0.89	0.91	0.90
PeCDD	1.56	1.53	1.53	1.60	1.55	1.60
PeCDF	1.58	1.47	1.59	1.71	1.57	1.70
TCDD	0.77	0.76	0.75	0.66	0.89	0.75
TCDF	0.72	0.76	0.86	0.76	0.76	0.80

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Table F.3. Ion Abundance Ratios for Solids Matrix Spikes

Tank Material	C-104 Wet Centrifuged Solids			
Sample ID	00-01361 MS		00-01361 MSD	
Ion Ratios	Native	Labeled	Native	Labeled
Analyte				
HpCDD	1.09	1.14	1.05	1.17
HpCDF	1.08	0.89	1.06	0.91
HxCDD	1.07	1.33	1.26	1.29
HxCDF	1.21	1.28	1.18	1.29
OCDD	0.79	0.98	0.92	1.02
OCDF	0.80	0.98	0.92	1.02
PeCDD	1.62	1.40	1.67	1.64
TCDF	1.63	1.52	1.55	1.46
PeCDF	0.85	0.82	0.73	0.71
TCDD	0.78	0.79	0.81	0.79

Table F.4. Ion Abundance Ratios for Supernatant Samples, Duplicates, and Process Blanks

Tank Material	C-104 Supernatant					
Sample ID	00-01360		00-01360		00-01360	
	Proc. Blk		Sample		Duplicate	
Ion Ratios	Native	Labeled	Native	Labeled	Native	Labeled
Analyte						
HpCDD		1.10		1.10		1.14
HpCDF		1.18		1.07		1.12
HxCDD		1.21		1.27		1.23
HxCDF		1.11		1.42		1.28
OCDD		1.00		092		0.91
OCDF		1.00		0.92		0.90
PeCDD		1.58		1.58		1.76
PeCDF		1.46		1.33		1.53
TCDD		0.84		0.85		0.79
TCDF		0.82		0.77		0.72

"Blanks" = No signal or peak area detected; ion abundance ratio is zero (0) or undefined.

Table F.5. Ion Abundance Ratios for Solids Samples, Duplicates, and Process Blanks

Tank Material	C-104 Wet Centrifuged Solids					
Sample ID	00-01361		00-01361		00-01361	
	Proc. Blank		Sample		Duplicate	
Ion Ratios	Native	Labeled	Native	Labeled	Native	Labeled
Analyte						
HpCDD		1.06		1.20		1.11
HpCDF		1.00		1.08		1.06
HxCDD		1.33		1.30		1.17
HxCDF		1.24		1.16		1.27
OCDD		0.97		1.02		0.98
OCDF		0.97		1.02		0.98
PeCDD		1.57		1.45		1.58
PeCDF		1.43		*		1.57
TCDD		0.75		0.67		0.82
TCDF		0.88		0.82		0.86

"*" = Ion abundance ratio does not meet QC criteria shown in Table 6.4
"Blanks" = No signal or peak area detected; ion abundance ratio is zero (0) or undefined.

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