Pace Analytical Services
KU Resources

Waste Water Sampling

Itinerary

- Types of Sampling Equipment
- Composite & Grab Sampling
- Auto Sampler Set Up
- Bottles, Labels, COC's, Hold Times
- Contamination Issues
- Virtual Lab Tour

Sampling Equipment

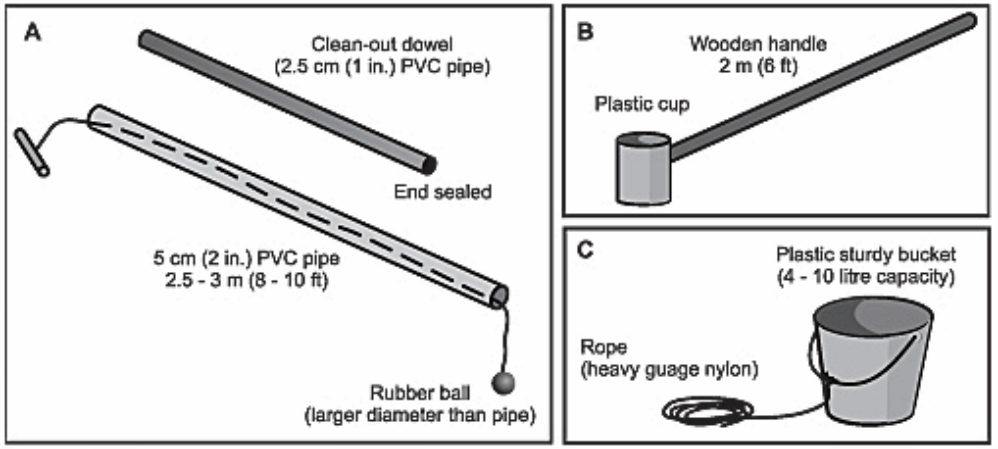
ISCO Auto sampler

Submersible Pump

Buckets

Sampling Poles

Crowbars



Sampling Equipment

Equipment Rental Companies

FIELD ENVIRONMENTAL INSTRUMENTS, INC.

Waste Water Composite Sampling

Set up Procedures

1. Check in with plant contact / safety personnel
2. Review Permit (grab, composite, time or flow)
3. Read flow meters and record readings
4. Determine duration of composite

Waste Water Composite Sampling

Set up Time Composite

1. **Place sampler near sampling point**
2. **Run new tubing from sampling point to sampler**
3. **Determine time between aliquots**
4. **Determine need volume per aliquots**

>**make sure you have enough volume but do not exceed container**<

5. **Program sampler & run a manual sample**
6. **Ice down composite sampler container**
7. **Start sampler and record field notes**

Waste Water Composite Sampling

Set up Flow Composite

1. **Determine sampler pacing volume**
2. **Determine approx 24hr flow volume**
3. **Calculate volume of composite sample needed**
4. **Program sampler for flow proportional**
5. **Run a manual sample**
6. **Ice down the composite sampler container**
7. **Start sampler and record field notes**

Waste Water Composite Sampling

Collection Composite Sample

1. Halt sampling and remove sampler container
2. Stir the container to ensure uniformity
3. Fill out bottle labels
4. Fill all bottles and do not over flow
5. Record Filed notes
6. Place samples in cooler and ice down
7. Complete chain of custody

Waste Water Composite Sampling

Collection Grab Sample

1. **Sampling equipment will depend on accessibility**
2. **Sample bottle, bailer or ISCO may be used**
3. **All equipment should be clean and appropriate for laboratory analyses**
4. **Record field data, label bottles, complete chain of custody and ice down samples in cooler**

Waste Water Composite Sampling

Cleaning Equipment

1.Clean sampling equipment with Alconox or equivalent

2. Rinse with tap water

3. Rinse again with DI water

4. Allow to dry and return to storage

Waste Water Sampling

Send Samples to the Laboratory

1. Prepare Bottle Labels
2. Fill Out Chain of Custody
3. Pack Shipping Cooler

Analytical Sampling Guide

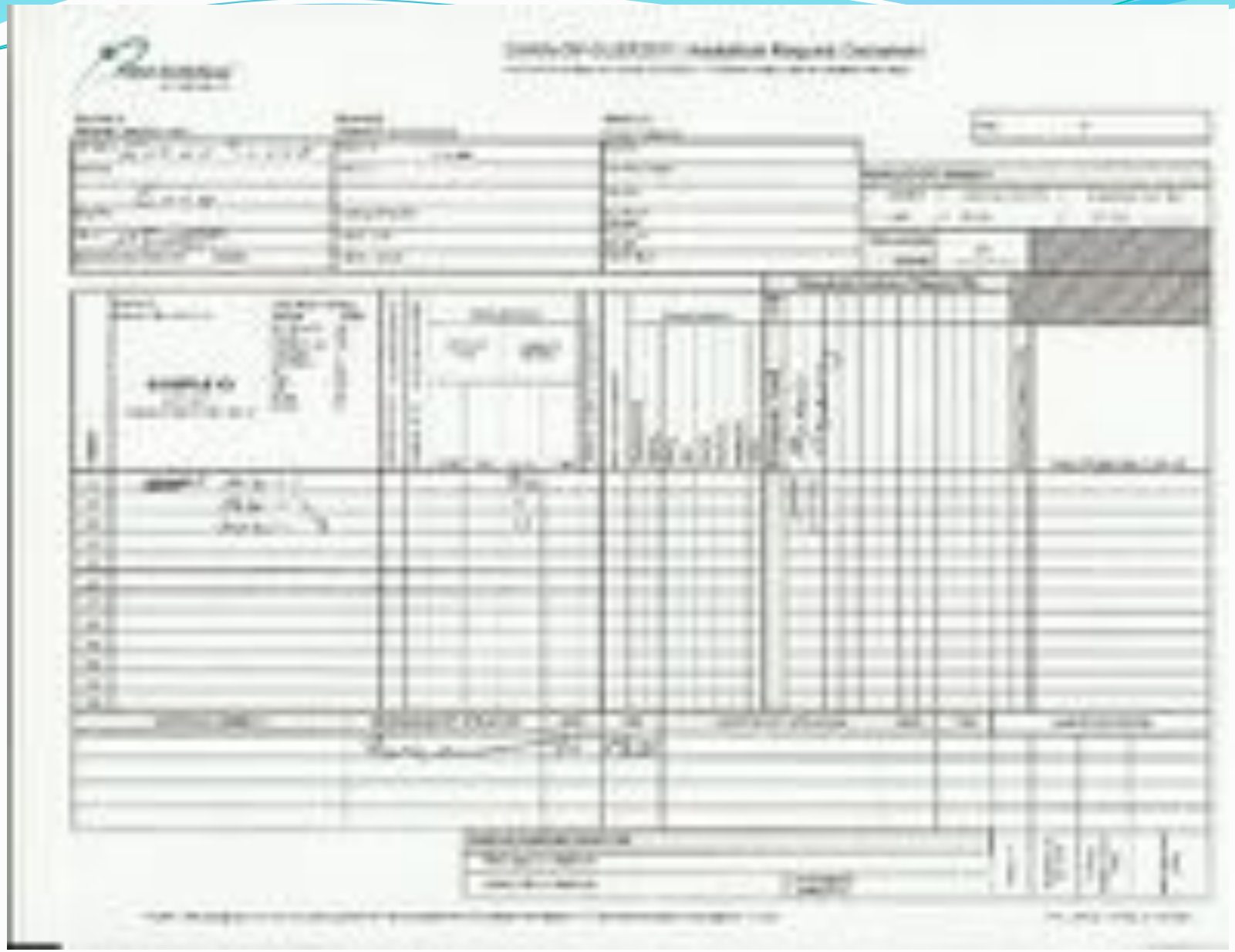
Parameter	Method	Container	Volume	Pres	Hold Time
Alkalinity	EPA 301.1	P,G	250 ml	4 C	14 Days
Metals	EPA 200.7	P,G	500 ml	HNO3 / 4 C	6 Months
Volatiles	EPA 624	40 ml vial	3 vials	HCL / 4 C	14 Days
BOD	EPA 405.1	P,G	500 ml	4 C	48 Hours
Bacteria	SM 9223	P	100 ml	Na2SO3	24 Hours

Sampling & Bottle Ware

Chain of Custody

Common Problems

- **Not Enough Information**
- **Incorrect Information**
- **Unreadable Information**
- **No Information**
- **Label information must match chain of custody**



Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	ER&R	Report To:	Your Name	Attention:	
Address:	4250 Route 6	Copy To:		Company Name:	
	Edinboro, PA 16412			Address:	
Email To:	Myemailaddress	Purchase Order No.:		Pace Quote Reference:	
Phone:	814 734-6411	Project Name:	ABC Site Assessment	Pace Project Manager:	Tim Reed
Requested Due Date/TAT:	30 day	Project Number:		Pace Profile #:	

REGULATORY AGENCY

NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐
UST ☐ RCRA ☐ OTHER ☐

Site Location STATE: PA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Target Compound VOC - 8260	Target Analyte Metals - 6010, 7470	Target Compound SVOC - 8270	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	South Core Sample	SL	G																x	x	x		
2	South Groundwater Sample	WT	G																x	x	x		
3	Trip Blank	WT	G																x				
4	Equipment Blank	WT	G																x	x	x		
5	Field Blank	WT	G																x	x	x		
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:						
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY):					

Pace Analytical's Tips for Maintaining Sample Temperatures

Keep this information handy. Please feel free to call your Project Manager if you have any additional questions about maintaining cooler and sample temperatures. Pittsburgh Lab (724) 850-5600

Field Contamination Issues

- Sub part per billion analysis
- Sampling Equipment Decon
- Gloves
- Sample from low to high contamination
- Contamination brought on site (sunscreen, tape, gasoline, WD 40, etc)
- Ice
- Mark suspected contamination on field notes

Laboratory Services

Sample Log In

- Unpack sample coolers
- Take sample temperature
- Review Chain of Custody with sample bottle labels
- Log project into LIMS

Samples are placed in cold storage

Sample Prep Group

Sample Prep Group

Prepare Samples for Various Analyses

- Digestions
- Extractions
- Leachates

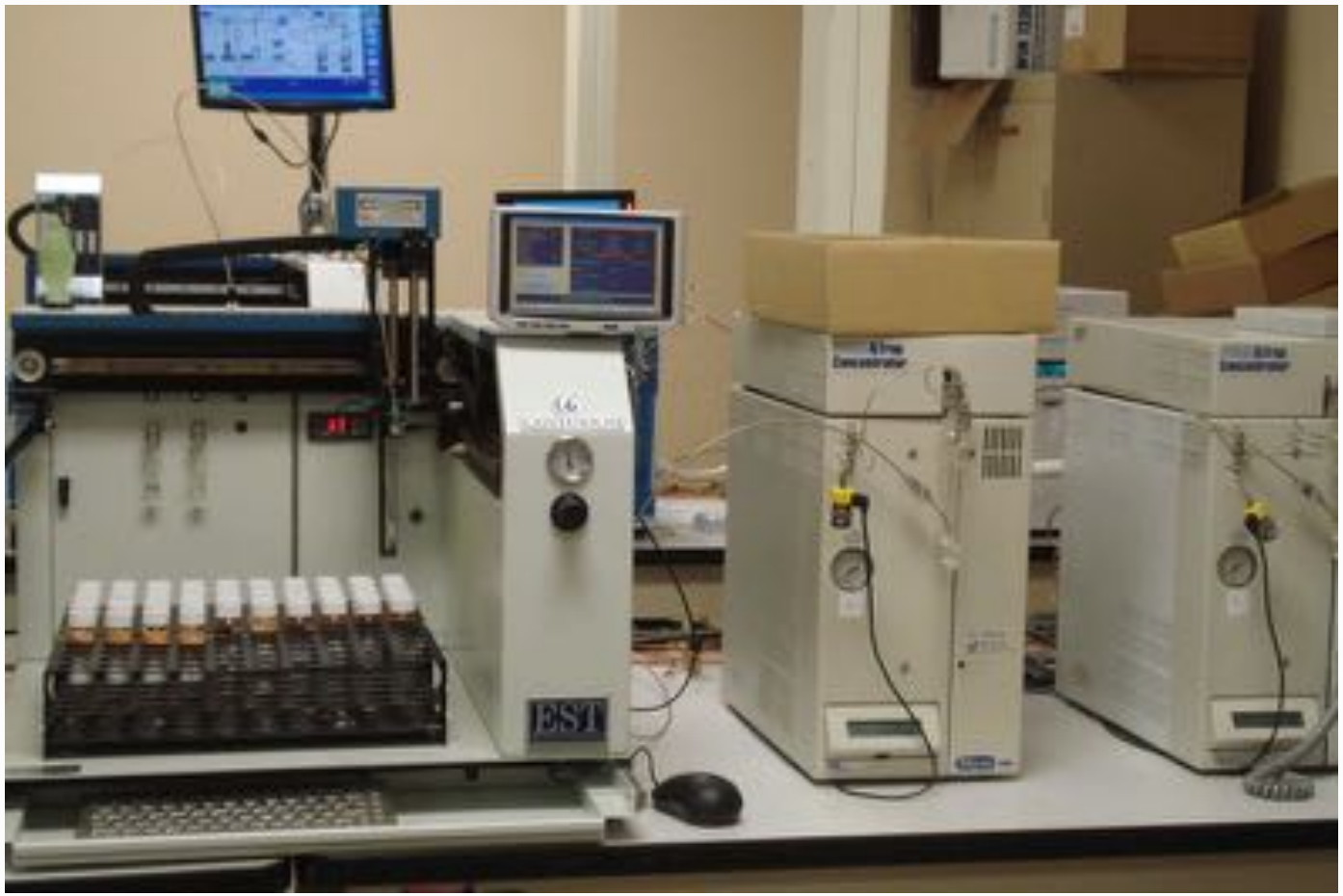
Distribution to Analytical Groups

Metals Group

Instrumentation

- ICP (Inductively Coupled Plasma)
  - As, Ba, Cd, Cr, Cr, Pb, Se, Ag……
- ICP MS (Mass Spec)
  - Lower Detection Levels
- Mercury Analyzer
- Low Level Mercury Analyzer
- Methyl Mercury Analyzer
- Other less used instruments – AA, GFAA

Volatile Organics Group



Semi Volatile Organics Group

Instrumentation

- GC (Gas Chromatograph)
- GC MS (Mass Spec)
- GC FID (Flame Ionization Detector)

Wet Chemistry Group

Instrumentation

- IC (Ion Chromatography) – fluoride, bromide, chloride
- TOC Analyzer (Total Organic Carbon)
- TOX Analyzer (Total Organic Halogens)
- Lachat Automated Analyzer
- Spectrophotometers (color metric analyses)

Common Compound Lists

Metals

Volatiles

SemiVolatiles

Pesticides

PCBs

RCRA (8) Metals

Arsenic
Barium
Cadmium
Chromium
Lead
Mercury
Selenium
Silver

Target Analyte (TAL) Metals

Aluminum
Antimony
Arsenic
Barium
Boron
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

Priority Pollutant (PP) Volatiles

Acrolein

Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Dibromochloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropene
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
4-Methyl-2-pentanone
Methylene Chloride
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl Chloride
m,p-Xylene
o-Xylene

Target Compound (TCL) VOC's

Acetone
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Dibromochloromethane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene

cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
4-Methyl-2-pentanone
Methylene Chloride
MTBE
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,2,4-Trichlrorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl Chloride
m,p-Xylene
o-Xylene

Priority Pollutant (PP) SemiVolatiles

Acenaphthene
Acenaphthylene
Anthracene
Benzidine
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Bis(2-Chloroethoxy)methane
Bis(2-Chloroethyl)ether
Bis(2-Chloroisopropyl)ether
Bis(2-Ethylhexyl)phthalate
4-Bromophenyl-phenylether
Butylbenzylphthalate
4-Chloro-3-methylphenol
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl-phenylether
Chrysene

Di-n-butylphthalate
Di-n-octylphthalate
Dibenz(a,h)anthracene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
Diethylphthalate
2,4-Dimethylphenol
Dimethylphthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
1,2-Diphenylhydrazine
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene

Target Compound (TCL) SemiVolatiles

Acenapthene
Acenaphtylene
Anthracene
Azebenzene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluroanthene
Benzo(ghi)perylene
Benzo(a)pyrene
Bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether
bis(2-Chloroisopropyl)ether
bis(Ethylhexyl)phthalate
4-Bromophenyl-phenylether
Benzoic Acid
Benzyl Alcohol
Butylbenzylphthalate
Carbazole
4-Chloro-3-methylphenol
2-Chloronapthalene
2-Chlorophenol
4-Chlorophenyl-phenylether
Chrysene
4-Chloroaniline
o-Cresol
m/p-Cresol
Dibenz(a,h)anthracene
Dibenzofuran
Di-n-butylphalate
1,2-Dichloroenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3-Dichlorobenzidine
2,4-Dichlorophenol
Diethylphthalate
2,4-Dimethylphenol
Dimethylphthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octylphthtalate

(TCL) SemiVolatiles cont.

Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
1-Methylnapthalene
2-Methylnapthalene
Napthalene
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
Nitrobenzene
2-Nitrophenol
4-Nitrophenol
N-Nitrosodimethlamine
N-Nitrosodiphenylamine
N-Nitrosodi-n-propylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
1,2,4,-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

Poly Aromatic Hydrocarbons (PAH)

Acenapthene
Acenapthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Chrysene
Dibenz(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenanthrene
Pyrene

Target Compound (TCL) Pesticides

Aldrin
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC
alpha-Chlorodane
gamma-Chlorodane
4,4'-DDD
4,4'-DDE
4,4'-DDT
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Endrin ketone
Heptachlor
Heptachlor Epoxide
Methoxychlor
Toxaphene

Target Compound (TCL) PCBs

Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260

Conclusions

- Final Reports are the summations of all sample activities:
  - Field Sampling
  - Sample Receiving
  - Sample Preparation
  - Analytical Methods
  - Data Interpretation and Verification