Pace Analytical Services KU Resources

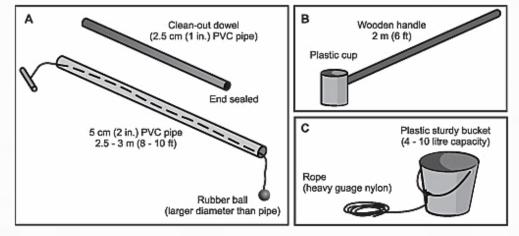
Waste Water Sampling Itinerary

- 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



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

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<</pre>
- 5. Program sampler & run a manual sample
- 6. Ice down composite sampler container
- 7. Start sampler and record field notes

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

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

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

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

Prepare Bottle Labels
 Fill Out Chain of Custody
 Pack Shipping Cooler

Analytical Sampling Guide

Parameter Alkalinity Metals Volatiles BOD Bacteria Method EPA 301.1 EPA 200.7 EPA 624 EPA 405.1 SM 9223

Container P,G P,G 40 ml vial P,G P

 Volume
 Pres

 250 ml
 4 C

 500 ml
 HNO3 / 4 C

 3 vials
 HCL / 4 C

 500 ml
 4 C

 100 ml
 Na2SO3

Hold Time 14 Days 6 Months 14 Days 48 Hours 24 Hours

Sampling & Bottle Ware



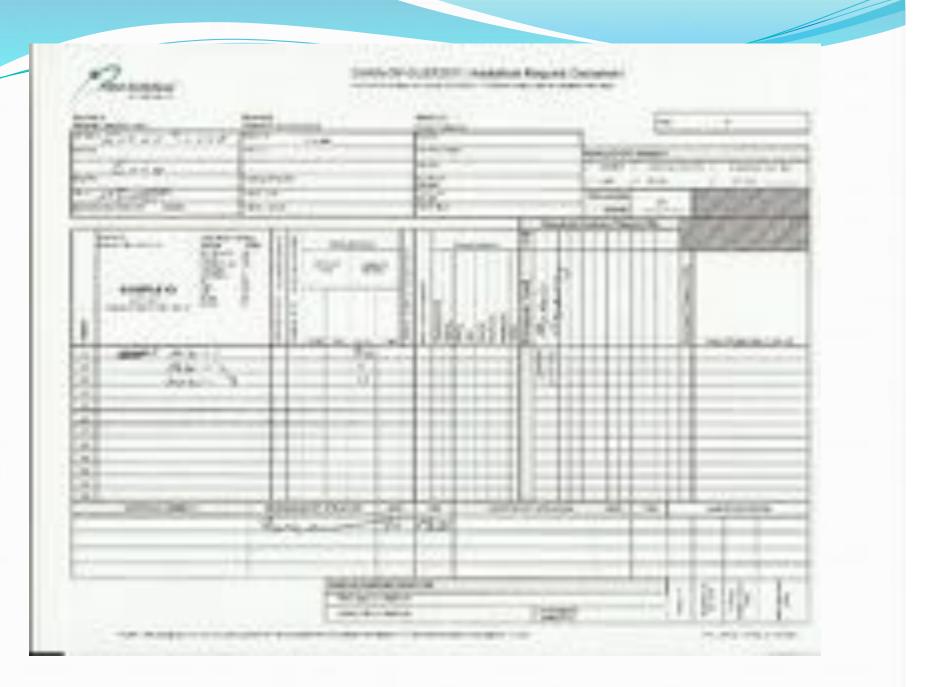
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Chain of Custody

Common Problems

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





CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

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PROTECTING OUR ENVIRONMENT

Pace Analytical's Tips for Maintaining Sample Temperatures

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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 Chlorobenzene Chloroothane Chloroothane Dibromochloromethane 1,1-Dichloroethane 1,2-Dichloroethane

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 Bromochioromethane 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-butyiphthalate 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)ovrene

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-Chlorolsopropyl)ether bis(Ethyllhexyl)phthalate 4-Bromophenyl-phenylether Benzoic Acid Benzyl Alcohol Butylbenzylphthalate Carbazole 4-Chioro-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-1254

Conclusions

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