Sampling for Environmental Enforcement Cases

Gary Steinmetz
Texas Parks & Wildlife
Find a Lab

- Cities/counties
- Wastewater
- River Authorities
- National environmental laboratory accreditation program
Lab Selection

- Find a lab before you are sampling.
- Get their protocols and requirements.
- Make sure they realize they are criminal samples.
- Meet the chemist who will testify about the results.
No Guarantee

- Intertek Testing Service Environmental Lab (ITS) between 1988 and 1997, conspired to falsify the results of environmental tests. The test results were used for decision making at Superfund sites, Department of Defense facilities and hazardous waste sites to determine site safety and to monitor the migration of hazardous waste.

- ITS was sentenced to 42 months probation, ordered to pay $9 million in federal fines and subsequently agreed to pay an $8,741,000 civil penalty.
Three Types of Sampling

- Permitted Discharges
- Planned Sampling Events
- Oh $#*@ I got to get a sample
Permitted Discharges

- Permit samples should be analyzed by method specified in permit.
- The method will require specific sample container, volume, and preservation.
- Request that QC samples be selected from your samples.
- Request a complete QC report.
Sampling Permitted Discharge

- Get a representative sample of the discharge.

- Follow the method required by the permit.

- This is the only time you do not need a background sample.
Planned Sampling Events

- Get a representative sample of the contaminant, not the area.
- Take as large a sample as practical.
- Take a background sample.
Sampling

• Get a representative sample of the contaminant, not the area.

• Take as large a sample as practical.

• Be prepared, have a kit in your vehicle with clean laboratory containers, and gloves.

• Take a background sample.
State of Texas v. Fifth Generation, Inc. aka Tito’s Distillery
What should be sampled?
Containers

- Clean laboratory glass containers are preferred.
- Use plastic for conventional analytes and metals.
- Use glass for organics and TPH.
Cross-contamination

• Sample collection
  Clean sample containers
  Clean equipment
  Fresh gloves

• Sample transport
  Sample containers
  Proximity to elevated samples
Personal Care Products in Soil Sample

Homosalate (sunscreen ingredient)

Fluoranthene @ 2 ppb

Pyrene @ 2 ppb
Personal Protection
Common Hazards

- Fire and explosions
- Gases-hydrogen sulfide, carbon monoxide, methane, cyanide
- Poisoning-pesticides, herbicides and rodenticides
- Chemical burns, contact dermatitis
- Infections
Dead Fish or Birds

- Dead animals should get your attention
- Recent wildlife kills due to anthrax
- Recent bird kill due to strychnine
Safety

• If you are not sure that an area is safe, stay away.
• Do not enter confined spaces or low-lying areas.
• Do not lean over open waste containers, or kick, rock or puncture waste containers.
• Do not track toxic material into your car.
Basic Protection

- Distance
- Time
- Shielding
- Decontamination
## How Safe Are Gloves?

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Nitrile</th>
<th>Latex</th>
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</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>3 min</td>
<td>2.4 min</td>
</tr>
<tr>
<td>Benzene</td>
<td>4.2 min</td>
<td>36 sec</td>
</tr>
<tr>
<td>Methylene Chloride</td>
<td>6 min</td>
<td>2 min</td>
</tr>
<tr>
<td>Kerosene</td>
<td>&gt;1260 min</td>
<td>&lt;5 min</td>
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</table>
After any field work do you...

- Return to your work truck and sit on the seat?
- Wear your boots/shoes into your home?
- Walk on the carpet where your children play?
- Wash work clothes in the family washer?
- Store your samples in your fridge at home?

Don’t bring your hazardous work home!
Chain of Custody

- Name of the collector and their signature.
- Date and time the samples were collected.
- Sample identification numbers.
- Where the samples were collected.
- How are they preserved.
- What are they to be analyzed for.
# Chain of Custody and Analysis Request

**Environmental Contaminants Laboratory, 505 Staples Road, San Marcos, TX 78666**  
Tel: 512-353-3486, Fax: 512-353-7329

<table>
<thead>
<tr>
<th>Sample(s) collection site:</th>
<th>Date:</th>
<th>Time: a.m. p.m.</th>
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<table>
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<th>Project name (if applicable):</th>
<th>Case number (if applicable):</th>
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<table>
<thead>
<tr>
<th>Collector’s Name:</th>
<th>Send results to (if different from Collector):</th>
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<th>Agency/Division:</th>
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<tr>
<th>Street Address or P.O. Box:</th>
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<th>City, State, Zip:</th>
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<table>
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<th>Telephone:</th>
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<th>E-mail:</th>
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## Sample Information

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Sample Description</th>
<th>Lab use only</th>
<th>Lab ID</th>
<th>Please indicate type of analysis requested and place in appropriate column(s)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Organic</strong></td>
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## Chain of Custody

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<th>Collector:</th>
<th>Date:</th>
<th>Time: a.m. p.m.</th>
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<tr>
<th>Comments:</th>
<th></th>
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</table>

**COC Example**
Holding Times Organics

- **Sample container**
  - Aqueous-1000 mL glass bottle
  - Solids-50 g glass jar
- **Preservative** Cool, on ice
- **Hold time** 7 days
Holding Times Oil & Grease

- **Sample container**
  - Aqueous - 1000 mL glass bottle
  - Solids - 20 g glass jar
- **Preservative** Cool, on ice
- **Hold time**
  - Aqueous 48 hours on ice
  - 28 days pH < 2 H₂SO₄
  - Solids 14 days on ice
Holding Times Inorganics

- **Sample container**
  - Aqueous 250 mL plastic bottle
  - Solids 20 g glass jar or zip-lock
- **Preservative** None
- **Hold time** 28 days
Holding Times Solids

- **Sample container**
  
  Aqueous 250 mL plastic

- **Preservative** Cool, on ice

- **Hold time** 7 days
Missed Holding Times

• Contamination during storage.
  Example—a cooler being stored in garage with a lawn mower or car which would be potential source of gasoline constituents.

• Sample degradation. Loss of analyte.
  Exceeding the holding time is not acceptable in establishing that a waste does not exceed the regulatory level. Exceeding the holding time will not invalidate characterization if the waste exceeds the regulatory level (EPA method 1311).
Sample Delivery to Lab

- The samples must be accompanied by the chain-of-custody record.
- If possible deliver in person to the laboratory.
- Samples can be shipped by common carrier to the laboratory.
Shipping Requires

- Must be packaged in a proper shipping container to avoid leakage and/or breakage and maintain proper temperature. Use custody seal.
- All packages must be accompanied by the chain-of-custody record.
- When sent by common carrier, obtain a copy of the bill of lading. Receipts and bill of lading copies are used as part of the chain-of-custody documentation.
What’s in This?
The Tricorder

• This is what everyone expects us to have
• Do some homework
• Know the type of chemicals
• Know the type of industry
Analysis Request

• Type of Industry will guide you on analysis.
• Here is where relationship with Chemist Helps.
• Request that QC samples be selected from your samples.
• Request a complete QC report.
• Request that samples be held for further analysis.
PAH sources

- Used motor oil
- Burned hydrocarbons, wood, plastics and trash
- Parking lot and road sealants
- Burned tires
- Coal-tar
Results

• Check the obvious
  • Do the sample ids match the COC?
  • Were the requested analysis done?
  • Concentration units given?
  • Is there a QC section?
    (Blanks, duplicates and matrix spikes)
  • Date of analysis and analyst listed?
Quality Control

- Do the numbers follow a logical pattern?
- Check the blank and background sample.
- Check the spiked sample for % recovery.
- Check the duplicates for repeatability.

More than 20 % variation should be explained acceptance limits should be on report.
Oh $#*@$ I got to get a sample

- Get a representative sample of the contaminant, not the area.

- Take as large a sample as practical.

- Take a background sample.
Alternate sample jars?
Alternative Containers

- Clean laboratory glass containers are preferred. Make sure lab will accept alternatives.
- In an emergency mason jars, zip-lock bags, water bottles can be used.
- Use plastic for conventional analytes and metals.
- Use glass for organics and TPH.
• Use glass to collect for organics (TPH, pesticides, Semi-volatiles, Volatiles).

Organics will stick to plastic and never come off. Recovery will be poor.
Hints

• Try to use 1 type of container.

• Include an empty container as a blank.
  (If using water bottles include full bottle).

• Include a background sample.
What Killed The Fish?
It Takes a Veterinarian

The Texas Veterinary Medical Diagnostic Laboratories (TVMDL)
Phone: 979-845-3414 or 1-888-646-5623
Hazardous Waste Determination
TCLP
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

• Designed to evaluate how much contamination will leach out from a pile of waste if it gets rained on by acid rain
• Uses a dilute acid solution to leach samples.
• Contaminants are slightly soluble- rarely enough to be a violation.
• Other analysis recommended…
Visuals Help
Bad Examples
Proper Labeling
Sealed Containers
Unique Identification
Labels Match Chain of Custody
Label Containers
Secure Labels
Appropriate Container
Suggestions?
Case Examples
Down the Drain
Foam on the River
Hoarder
River Runs Red
What should you do?
thorium 90
nitrogen 7
potassium 19
yttrium 39
oxygen 8
uranium 92

232.04
14.007
39.098
88.906
15.999
238.03

Th
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U