

Activity Overview

Reports of environmental tests often contain a complete list of results written by a laboratory, and a summary of the most important results written by a government agency or other consultant. In this activity, participants practice checking to see if the summary matches the lab results, or if there are mistakes.

When to Use It

When participants doubt that the summary of lab results is accurate. Also, when groups want to keep a close eye on the testing process and need tips about what to look for.

- Precede with A First Look at Technical Documents, Converting Between Units, and relevant handouts from Common Units.
- Follow up by checking your own data set, and Compare to Standards

Steps

- 1. Launch the activity:** Most regulators only read the summary of environmental test results, so it's important to make sure the summary is accurate. Mistakes are rare, so for practice, here is a sample data set that is known to have mistakes.
(Hand out Strategies for Checking Summaries of Lab Results and the Sample Pages from the consultant summary and lab results. Model the process by following the Strategies for one contaminant.)
- 2. In pairs or as a group:** Check at least two rows and make a note of any problems.
- 3. Debrief:** What did you notice? What were some of the mistakes? Any tips you want to share?

For the Facilitator

“Mistakes” in this activity include:

- the wrong soil depth is recorded in the header
- the values for 2nd and 3rd contaminants are reversed
- the value for the Benzo[b]fluoranthene standard is written as if it's the lab result
- the TPH-DRO value was “converted” to mg/kg with the other data, but it was already in mg/kg
- the digits for the naphthalene lab result are transposed
- the lab result for dibenzo[ah]anthracene is off by a factor of 10
- benzo[a]pyrene is over the standard, but is not in boldface

Smart Moves

- Slow down
- Seek verification

Skill: Identify possible discrepancies between raw lab data and summaries of that data.

Time: 20-30 minutes

Preparation

Read through the activity. Try it yourself.

Optional: If you follow this activity by looking at your own local test results, identify the summary and full lab results sections of your data.

Materials

Strategies for Checking Summaries of Lab Results Handout (1 per participant)

Sample Pages from the Summary and Lab Results (1 of each per participant, single-sided)

Highlighters, pens, or markers

Optional: The corresponding sections from your own report of lab results.

Sample ID	B-5 (0-3 feet)	Tier I SROs Residential Standards*
Depth		Ingestion
Date	2/26/10	
Acenaphthylene	<0.050	2,300
Benzo(a)anthracene	6.38 ←	1.1
Benzo(a)pyrene	6.78 ↩	1.3
Benzo(b)fluoranthene	1.5	1.5
Dibenzo(a,h)anthracene	<0.023	0.2
Fluoranthene	3.2	3,100
Indeno(1,2,3,-cd)pyrene	.0778	0.86
Naphthalene	.227	1,600
TPH-DRO	1,060	---

Strategies for Checking Summaries of Lab Results

A report of environmental test results has many pages of detailed lab results, written by lab scientists. It also usually has a short summary of the most important results, written by a consultant. Many officials will only read the summary. Vigilant community organizations should verify it really is a complete and accurate summary of the results.

Below are some tips to guide you. First, make a hard copy of the report, and separate the sections. Start reading the summary. Then...

1. Find that sample. When the summary mentions the results of a particular sample, stop. Find the page in the detailed lab results that matches that sample. Verify you have the right one: there should be a name or ID for the sample, and maybe information about sample depth and location, to help confirm it's a match.
2. Leave nothing (important) behind. Every contaminant and sample found to be above the reporting limit or detection limits should appear in the summary. If some contaminants were "not detected," it's OK if they don't appear in the summary.
3. Check the units. The person writing the summary might have converted the lab results to a different set of units in the summary (for example, from $\mu\text{g}/\text{kg}$ to mg/kg). This is OK, but make sure all the numbers were converted accurately (for example, $400 \mu\text{g}/\text{kg}$ should become $0.4 \text{ mg}/\text{kg}$.)
4. Match the numbers. If the units are the same, then the numbers for each contaminant in the lab results should match the numbers for the same contaminant in the summary. Make sure no numbers were accidentally swapped, or copied incorrectly.



Page from the Summary

Sample ID Depth Date	B-5 (0-3 feet) 2/26/10	Tier I SROs Residential Standards*
		Ingestion
Acenaphthylene	<0.050	2,300
Benzo(a)anthracene	6.38	1.1
Benzo(a)pyrene	6.78	1.3
Benzo(b)flouranthene	1.5	1.5
Dibenzo(a,h)anthracene	<0.023	0.2
Flouranthene	3.2	3,100
Indeno(1,2,3,-cd)pyrene	.0778	0.86
Naphthalene	.227	1,600
TPH-DRO	1,060	---

NOTES:

All results listed in mg/kg

"<" indicates that analyte was not detected at stated detection limit

* These standards are for the state of Illinois

Bolded, shaded print indicates analyte exceeded Tier 1 Soil Remediation Objectives

Page from Lab Results

Client Sample ID: B-5 (3-6)

Lab Sample ID: 0022603-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution
Volatile Organic Compounds				
Xylenes, total	ND	5	ug/kg dry	1
Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring				
Acenaphthene	1260	50.0	ug/kg dry	1
Acenaphthylene	ND	50.0	ug/kg dry	1
Anthracene	2690	83.0	ug/kg dry	1
Benzo (a) anthracene	6780	8.50	ug/kg dry	1
Benzo (a) pyrene	6380	15.0	ug/kg dry	1
Benzo (b) fluoranthene	10300	11.0	ug/kg dry	1
Benzo (g,h,i) perylene	2910	25.0	ug/kg dry	1
Benzo (k) fluoranthene	3300	11.0	ug/kg dry	1
Chrysene	7990	50.0	ug/kg dry	1
Dibenz (a,h) anthracene	233	20.0	ug/kg dry	1
Fluoranthene	25400	50.0	ug/kg dry	1
Fluorene	1510	33.0	ug/kg dry	1
Indeno(1,2,3-cd)pyrene	2920	25.0	ug/kg dry	1
Naphthalene	272	50.0	ug/kg dry	1
Phenanthrene	9540	33.0	ug/kg dry	1
Pyrene	19700	50.0	ug/kg dry	1
Total Petroleum Hydrocarbon				
DROs	10600	40.0	mg/kg dry wt.	1
GROs	22.4	2.00	mg/kg dry wt.	1