SOIL SAMPLING PROTOCOL FOR METALS (XRF)

HEALTH AND SAFETY

Follow health and safety guidelines detailed in the Investigator Handbook.

MATERIALS REQUIRED

- GPS device if available
- XRF (with Troubleshooting Guide)
- Camera
- Map of site; Notepad and pen
- Clear, polypropylene bags or other collection method as specified by lab
- Permanent marker (preferably Sharpie®)
- Sample Log
- Metal spoon (1); Spatula (1); Shovel (not usually required)
- Gloves
- Personal Protective Equipment (PPE) as needed

MAPPING

A map should be made of the site that properly indicates sampling locations and key features (Schools, homes, and the pollution source). Electronic maps are preferable, though a scan or photograph of a hand-drawn map is perfectly acceptable.

INTERVIEWING

Interviews with local residents and community leaders are key to understanding the pathways present. Try to understand which areas are commonly used and which are rarely used. This will help guide how you divide sectors.

ESTIMATING POPULATION

Estimate the approximate number of people coming into contact with the pollutant in each sector. Make note of the groups at risk (such as children, workers, elderly). Refer to Population Table in the Handbook.

XRF READINGS

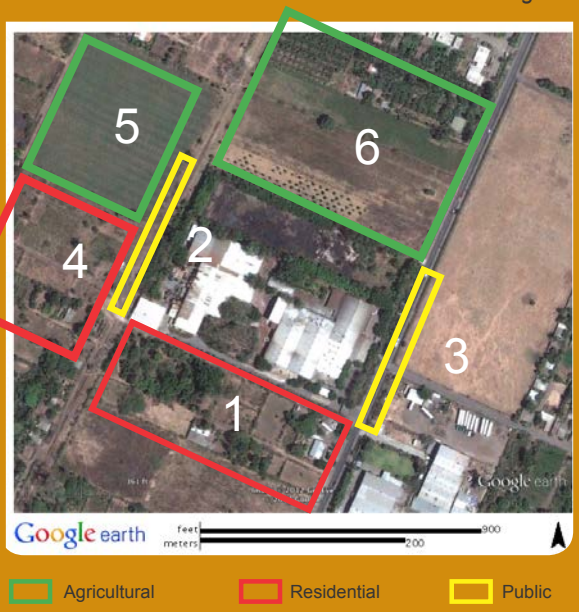
Divide the site into 'sectors' based on use (residential; public; agricultural; school; industrial). Larger sites may require as many as 6 sectors, smaller sites may be covered in as few as 2 (See Figure 1).

Sampling not only determines concentration of contamination, but it also helps to determine how far from a source contamination has spread. Thus, when possible radial sequential sampling is to be used in each sector:

•Establish lines from the source of contamination in the direction that the contamination may have been spread*

•Take readings along each line, typically one every 5 m for 50 m, for a total of 10 readings

fig. 1



•If contaminant is present in the first 50m, take 10 more readings along the same line for the next 50m, and so on until contamination is not detected or until 200 m is reached (indicating widespread contamination; going further is not recommended due to time limitations)

•Record results in Sample Log

NOTE: AT ANY SITE A MINIMUM OF 15 SAMPLE MEASUREMENTS IS REQUIRED

*Choosing the lines needs to be done with care. At a site in the open with no notable features in the area, one would choose four lines in the cardinal directions – north, south, east, west. However, other factors need to be taken into consideration:

•A village or other inhabited area nearby (beyond 100m away), in which case a line toward that village is desirable to know how close contamination comes to village

•Prevailing wind direction in areas where wind-spread dust is a concern, a line in the down-wind direction is desirable

HUMAN EXPOSURE PATHWAY

Note that samples should only be taken from areas with a potential human exposure pathway.

Samples should NOT be taken from areas without a human exposure pathway. For instance, the inside of a pesticides container is NOT an acceptable sampling location. Similarly, a secure area that is sufficiently fenced off with appropriate signage is NOT a suitable sampling location.

INVESTIGATOR PRECAUTIONS

- Wear appropriate Personal Protective Equipment (PPE) as needed
- Wash hands before eating
- Do Not - under any circumstance - enter confined areas. These are areas large enough for a person to enter but with limited ventilation and/or limited or restricted means of entry or exit (e.g. wells, tanks, pits, vessels, sewer systems, pipelines).
- Be cautious in areas that may be slippery due to water, mud or stepp slopes.
- Be cautious if using ladders or stairways.
- Be cautious in exposed elevated areas
- Be aware that hazardous material and toxic contamination may look harmless – take precautions anyway. Do not assume that because people (e.g. local community members) are living in the area without any protection or without presenting any obvious adverse health symptoms that there is no hazard.

SOIL SAMPLING PROTOCOL FOR METALS (LAB)

HEALTH AND SAFETY

Follow health and safety guidelines detailed in the Investigator Handbook.

MATERIALS REQUIRED

- GPS device if available
- Camera
- Map of site; Notepad and pen
- Clear, polypropylene bags or other collection method as specified by lab
- Permanent marker (preferably Sharpie®)
- Sample Log
- Labels for bags, printed and cut
- Metal spoon (1); Spatula (1); Shovel (not usually required)
- Gloves
- Personal Protective Equipment (PPE) as needed

MAPPING

A map should be made of the site that properly indicates sampling locations and key features (Schools, homes, and the pollution source). Electronic maps are preferable, though a scan or photograph of a hand-drawn map is perfectly acceptable.

INTERVIEWING

Interviews with local residents and community leaders are key to understanding the pathways present. Try to understand which areas are commonly used and which are rarely used. This will help guide how you divide sectors.

ESTIMATING POPULATION

Estimate the approximate number of people coming into contact with the pollutant in each sector. Make note of the groups at risk (such as children, workers, elderly). Refer to Population Table in the Handbook.

COMPOSITE SAMPLING

Divide the site into 'sectors' based on use (residential; public; agricultural; school; industrial). Larger sites may require as many as 6 sectors, smaller sites may be covered in as few as 2 (See Figure 1).

Depending on sector size, collect from 3 to 10 samples of surface soil per sector, evenly distributed. Note that larger sectors will require more samples. Each sample should be about one half teaspoon (2.5 cubic cm, 5 grams). Combine all the samples in the same bag and blend the material to form a 'composite.' Label according to Labeling Samples instructions on reverse.

For Composite Sampling, record one set of GPS coordinates using decimal degrees. Use the centermost point of your collected

fig. 1

TARGETED SAMPLING

In addition to composite sampling, up to 4 target samples should be taken (See Figure 2). Target samples should be individual surface soil samples of 25 to 30 grams* and should be taken from suspected 'hotspots,' such as residential areas adjacent to a contamination source. GPS coordinates should also be taken for each targeted sample. Label samples according to instructions below (Labels should be pre-printed and cut).

*Make sure to confirm with local lab the specified amounts and/or other special handling requirements they may have.

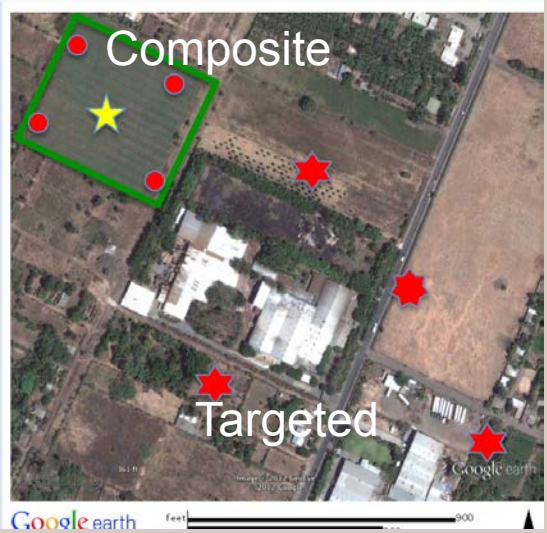


fig. 2

HUMAN EXPOSURE PATHWAY

Note that samples should only be taken from areas with a potential human exposure pathway. Samples should NOT be taken from areas without a human exposure pathway. For instance, the inside of a pesticides container is NOT an acceptable sampling location. Similarly, a secure area that is sufficiently fenced off with appropriate signage is NOT a suitable sampling location.

LABELING SAMPLES

Each sample should be labeled in the following order:

1. Sample #
2. Site Name (Town)
3. Date
4. GPS Coordinates

Labels should be pre-printed and cut. Samples should be double bagged with labels placed in between bags.

INVESTIGATOR PRECAUTIONS

- Wear appropriate Personal Protective Equipment (PPE) as needed
- Wash hands before eating
- Do Not - under any circumstance - enter confined areas. These are areas large enough for a person to enter but with limited ventilation and/or limited or restricted means of entry or exit (e.g. wells, tanks, pits, vessels, sewer systems, pipelines).
- Be cautious in areas that may be slippery due to water, mud or stepp slopes.
- Be cautious if using ladders or stairways.
- Be cautious in exposed elevated areas
- Be aware that hazardous material and toxic contamination may look harmless – take precautions anyway. Do not assume that because people (e.g. local community members) are living in the area without any protection or without presenting any obvious adverse health symptoms that there is no hazard.

WATER SAMPLING PROTOCOL

In the event that water samples are required, take 1- 2 samples from a Human Exposure Pathway (e.g. a drinking water tap or a river used for fishing).

For Semi-Volatile Organics:
Use amber glass solvent-cleaned certified bottles with Teflon lined cap (250 or 500 mL).

STEPS:

1. **Flush the tap for 1 minute**
2. **Rinse the bottle with water from the tap being sampled**
3. **Fill bottle to the brim**
4. **Cover with seal**
5. **Transfer to a lab within 2 days (keep cool if possible)**

After Your Site Screening

Step 1: **Enter Data.** Enter your notes and data into the online database as soon as possible once you return. It is best to enter you screening into the database on the same day you return. We do not want you to forget any details about the site.

Step 2: **Upload**. Upload your photos, notes from interviews, maps, reports, and any other documents into the online database.

Step 3: **Contact Laboratory**. If you took samples, contact the laboratory previously identified for use, and inform them of the number of samples collected and the contaminates for which the samples are to be analyzed. Bring or ship the samples to the laboratory according to their instructions. Confirm the cost for the analysis and how long it will take to get results. Be clear and specific as to whom the results should be sent and how (such as a specific name and email address.) Follow up with the laboratory if results are not received when expected.

Step 4: **Finalize and Notify**. Once your site screening is entered into the online database, mark “ISS Complete” in the online site screening and tell the Regional Coordinator and Regional Director that your site is complete.

Step 5: **Submit Financial Report**. At the end of each month, create a financial report showing the number of full days you worked, the number of travel days (for per diem payment), and your expenses. (See Appendix B for Financial Reporting Instructions)