

Trace Metal Sampling

General Rules:

1. No metal used at any stage; no bare hands or 'unclean' surfaces to touch the sample water at any stage of collection or filtration.
2. Keep lids on and sample bottles in sealed plastic bags when not in use.
3. When using gloves, take care to keep the gloves clean and if possible dry. Only use them for touching relevant equipment and take them off sealed in a plastic bag when not in use. DO NOT use them on any unnecessary surfaces e.g. door handles.
4. Only use clinical tissues if tissues required; never use around the sample bottle top or the lid.
5. Keep lids face-up when removed, preferably on a clean surface (e.g. plastic sheet) and don't touch the bottle top (e.g. with bare hands or dirty/wet gloves). Never touch inside the lid or bottle. Try to prevent sample touching lid as this is generally hardest part to keep clean.
6. Clean = acid washed
 - a. Acid wash = soak in 0.1M HCl (at least reagent grade) for as long as possible, minimum overnight, if possible somewhere warm e.g. by a heater/in the sun to speed up.
 - b. Should apply to all equipment that comes into contact with sample (e.g. sample bottles, filtration rig and even plastic tweezers to place filter papers should be acid washed before use and stored in sealed new Ziploc bags – not re-used bags.)

When things are acid washed they become 'activated' and require rinsing in sample to equilibrate the walls of the container with the sample metal concentration before being used. Needs to be rinsed with the relevant sample – i.e. for the filtering rig, the top part should be well rinsed with the unfiltered sample about to be filtered, the bottom part rinsed with filtered sample. Approx. 50mL should be sufficient; swill around to make sure all surfaces are rinsed.

When sampling:

1. When collecting sample, attempt to be as far from the boat or dock as possible, especially from the engine, pointing boat upstream (or towards flow of water).
2. Sample upstream from any obstacles in the water (especially metal ones).
3. Sample with the clean water running toward the sample bottle, with hands and boat away from/behind the flow of water being sampled. Wear long gloves if possible.

During filtration:

1. Filter in order of (suspected) lowest Cu concentration first, followed by samples of increasing Cu concentration. Typically low salinity, high O.M. or industrial areas will be higher in Cu. (I can provide initial values for these stations, so for future sampling, you will know the rough Cu from previous measurements).
2. Wear clean, dry gloves when filtering and touching filtration equipment.
3. Rinse filtration rig with small vol. of sample and pour away before beginning filtration.
4. Use 0.2 μ m filter if possible, 0.45 μ m is also acceptable if necessary. Cellulose nitrate membrane filters. Keep a record of the filter type and size used.
5. Never use same filter for different samples. Rinse any new filter with small vol. of sample and throw away this vol. before beginning to filter sample to keep.
6. Use clean (Nalgene) plastic filtration rig, never glass.
7. Only open (our) sample bottle immediately before required. Empty out acid down sink (they will contain small vol. of 0.1M HCl) and rinse bottle with relevant filtered sample, swill a few times shaking with lid on, before filling bottle with same filtered sample. Only fill to 20% < bottle volume to allow room for expansion on freezing.
8. Try to keep sample bottles upright if possible to prevent sample water from touching lid before freezing.
9. Freeze as soon as reasonably possible and attempt to keep frozen.
10. Keep notes on any possible contamination or difference in sampling/filtration with bottle.

If possible: keep filtering environment clean. Switch off air circulation or use a plastic sheet to prevent dust getting in sample. Place a plastic sheet on the work surface to keep sampling equipment clean. Assume everything is dirty.