

**\*\*\* Technical Fact Sheet \*\*\***

**Understanding Types and Sources of Sample Contamination**

One of the most common concerns associated with sample collection and analysis is the possibility of sample contamination, either in the field or the laboratory. Laboratories are frequently requested to report data at the lowest possible detection limit, i.e., parts per billion or even in parts per trillion. It doesn't take much to contaminate a sample at this level. At EnviroMatrix Analytical, Inc. (EMA), we utilize every possible means to control sample contamination and we suggest that our clients do too. Having a good sampling strategy can often eliminate unforeseen headaches.

The laboratory rarely oversees the sample collection process. What the laboratory receives in the sample bottle from the client is what we are going to analyze. It is the sampler's responsibility to use proper techniques to avoid the possibility of sample contamination in the field. The following describes the possible sources and ways to prevent sample contamination.

**Sample bottles:** The containers you use to collect samples may contain trace amounts of analytes if obtained from an unreliable source. All sample bottles provided by EMA are certified clean of all analytes of concern. EMA also performs secondary analysis to verify that there are no contaminants in the pre-preserved containers we provide to our clients. If you are unsure of the cleanliness of your container it is always best to get a new one. Never rinse out the preservatives that are in the containers provided.

**Sample Collection:** Consider anything that touches the inside of the bottle other than the sample itself, a possible contaminant. This includes fingers, gloves, sampling devices, faucets, bailers or hoses. If you must use a sampling device to obtain the sample, ensure that it has been properly decontaminated by washing with phosphate free soapy water, rinsing with tap or de-ionized water, and then a final rinse with de-ionized water. Do not dry off the device with paper towels as this may introduce artificial contamination.

For volatile organic samples, never expose samples to equipment exhaust fumes during sampling or transit to the lab. It is best to use trip and field blanks if this is a concern. In addition, samples that contain high and low level concentrations should not be sent in the same shipping container or cooler. Volatile compounds present in high concentrations have been shown to contaminate low-level samples during transport. Never use electrical or duct tape to seal VOA containers and minimize the use of indelible ink markers.

For metals sampling, always consider using non-metallic sampling devices. Also consider where the sample is being collected and take field notes to document blowing dust, rusty metal structures, or the type of sampling device used. For metals analysis, it has been shown that even microscopic flakes of a metal can greatly elevate metals results. Even latex gloves and kim wipes have been shown to cause zinc contamination of samples.

**At The Lab:** Sample contamination of volatile samples is a big concern at the laboratory due to the frequent use of extraction solvents for various methods. The solvents of concern at EMA include ether, freon-113, acetone, and methylene chloride. Seldom do volatile or semi-volatile samples become contaminated at the lab.

**At The Lab (Continued):** Strict sample contamination controls are employed at EMA as well as requiring that a method blank be analyzed in every analytical batch. If an analyte is detected in the method blank, the value is reported and the data is flagged appropriately.

EMA also analyzes refrigerator blanks to verify that volatile samples are not being cross-contaminated during sample storage.

It is very uncommon that samples for inorganic analyses to become contaminated at or above our method detection limit. However, contamination concerns do tend to elevate when clients request extremely low detection limits. The most common low-level metal contaminants in decreasing order are zinc, followed by barium, and then copper. As previously stated, if an analyte is detected in the method blank, the value is reported and the data is flagged appropriately.

If you have any questions regarding sample collection strategies or sample contamination, please do not hesitate to give us a call.

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***EnviroMatrix Analytical, Inc.***

*4340 Viewridge Avenue, Suite*

*San Diego, California 92123*

*Phone: (858) 560-7717*

*Fax: (858) 560-7763*