Samples should be collected and containerized in the following order of volatilization sensitivity (U.S. EPA, 1986a):

- Volatile organic compounds (VOCs).
- Purgeable organic carbon.
- Purgeable organic halogens.
- Total organic halogens (TOX).
- Total organic carbon (TOC).
- Extractable organics.
- Total metals.
- Dissolved metals.
- Phenols.
- Cyanide.
- Sulfate and chloride.
- Nitrate and ammonia.
- Radionuclides.

In addition to the sensitivity, the relative importance of each parameter should be evaluated on a site-by-site basis to establish sampling order protocol. Therefore, when a low-yielding well is being sampled, it may be necessary to change the order of sampling to ensure that a representative sample is collected for the most important constituents for a particular site.

Sample Splitting

Samples are often split into two separate portions and submitted to different laboratories to determine the accuracy of lab results. The proper procedure is to fill the two containers alternately until both are filled. However, if samples for VOC analysis are being collected, the first container should be completely filled, followed by filling of the split container.

Sample Preservation

Preservation is an important step that should be conducted to stabilize the collected sample and prevent physical and chemical changes from occurring during transport to the laboratory and storage before analysis. Preservation is intended to retard biological action, prevent hydrolysis of chemical compounds and complexes, and reduce volatility of constituents (U.S. EPA, 1982). Preservation methods generally are generally limited to pH control, chemical addition, refrigeration, and protection from light. Appropriate techniques(see Table 10.7), generally should be implemented immediately upon collection (and after filtration) to minimize changes that begin when a sample is exposed to the atmosphere. Any preservation used should be reported to the appropriate regulatory agency when submitting analytical results.

Sample preservation usually involves reducing or increasing the pH by adding an acid or a base. For example, acids are added to samples submitted for dissolved metals analysis because most metals exist in the dissolved state at low pH. If not preserved, most metals will oxidize and precipitate, which prevents representative analysis. If preserved in the field, the chemical preservative should be obtained from the laboratory contracted to analyze the sample and the appropriate aliquot placed in the sample container, preferably before entering the field. Many laboratories will provide sample bottles containing the appropriate amount