## VII. CUSTOM SERVICES PROVIDED BY SLTC

The following services are available on a case-by-case basis at the SLTC. Concurrence from the Area Director in an email (or via other means) sent to the SLTC management must be received before the SLTC can commit to providing some of these services.

### 1. Mass Spectrometry

The mass spectrometry laboratory at the SLTC has a number of unique tools to help CSHOs resolve difficult field sampling and analytical issues. For example, mass spectrometry can be used to identify unknown or suspected organic substances found in industrial processes, indoor air quality complaints, and contaminated water. It can also be used to identify secondary substances that are given off from a heated material (i.e., thermal decomposition products).

One of the major functions of the mass spectrometry laboratory is identification and confirmation of analytes measured in gas chromatography (GC) analysis performed at the SLTC. The same separation and identification techniques used to confirm the identity of known analytes are also useful to identify an unknown material, investigate possible contamination or batch uniformity in a material from an industrial process, or to check for conformity with a Safety Data Sheet. Volatile organic chemicals in contaminated water can be quantitated by several different processes, including purge and trap, equilibrium headspace analysis, or a novel approach involving thermal desorption called "Twister." The "Twister" technology is simple to use and highly sensitive.

Thermal Desorption/Gas Chromatography/Mass Spectrometry (TD/GC/MS) is also useful for investigation of low-level or transient odors, and indoor air quality-type complaints. The SLTC can provide sampling tubes containing three resin beds designed to collect a broad range of volatile analytes. The entire collected sample is thermally desorbed into the GC column, providing analysis with maximum sensitivity.

Using a device called a direct insertion probe and a technique called pyrolysis, some thermally labile compounds can be introduced directly into the mass spectrometer source before heat is applied. With another instrument called a Pyroprobe™, materials can be heated to temperatures as high as 1,400°C, with subsequent introduction of decomposition products into the GC column. Products released from materials involved in a fire, heated by a welder or blowtorch, or from any process involving heating can be studied in this way.

### 2. Materials Analysis

The SLTC provides a variety of services to determine the cause of materials failure. Materials failure analysis examines the extent to which the properties of materials or their use contribute to significant investigations, including fatalities. This procedure often involves collaboration of experts in multiple disciplines including metallurgical engineering, materials science, explosibility, and both organic and inorganic chemistry.

The SLTC has assisted in the investigation of several diverse catastrophes. These investigations have included chemical, gas, and dust explosions and disasters caused by incompatible chemicals and processes; metal and plastic failures; wire, synthetic and natural fiber rope failure; scaffold

planking failure; plastic, fiberglass and metal piping failure; radio tower support failure; safety equipment failure; and chain and equipment overloading.

SLTC's services include assistance in searching for industry standards that help support citations, and assistance with finding an accredited laboratory to perform any analysis that is not done at the SLTC. The SLTC tailors the assistance to the particular investigation. The SLTC can either arrange to fully investigate the accident on site, or to review results from an independent laboratory.

### 3. Sampling for Biological Pathogens

SLTC provides biological (both organism and chemical by-product) sampling and analysis coordination as a service to CSHOs. The SLTC has developed a standard operating procedure to assure consistent sample handling and analysis. Samples collected and analyzed through this procedure are compliant with the SLTC quality control system and chain-of-custody requirements. SLTC offers contracting services for fungi, bacteria such as Legionella, and endotoxin analysis. Other services can be arranged on a case-by-case basis.

Again, before collecting samples for microbiological analysis, CSHOs are requested to contact the SLTC for sampling requirements, technical support, assessment, and analytical coordination. The SLTC staff will review sampling and analysis plans with CSHOs and make recommendations where appropriate. The purpose of this process is to ensure that prudent sampling is performed.

### 4. Explosibility Analysis

Because of the complexity of this field, it is strongly recommended that CSHOs contact the SLTC before taking explosibility samples. Doing this allows the explosibility experts to assist CSHOs in taking appropriate samples, and in tailoring the analysis to provide support for the specific inspection.

The SLTC provides an assortment of analytical and technical information services in support of inspections involving potential explosion hazards. Analytical testing is performed in support of OSHA inspections pertaining to hazardous classified locations, grain handling, dust collection systems, confined spaces, and housekeeping. Informational support is offered for litigation, interpretation of analytical results (both in-house testing results and results from contract laboratories), and guidance for sampling and standard applicability. Explosibility experts can help investigate industrial incidents involving explosions. This help may include normal explosibility testing, and research into the reactive nature of the materials in question.

The SLTC can provide analyses for flash points, energetic reactivity of chemicals, and autoignition temperatures. This testing is useful in support of a wide variety of inspections. Procedures for combustible dust sampling are discussed in detail in Appendix D.