A. Purpose: To describe an analysis scheme for the identification of unknown substances submitted as evidence.

B. Responsibility: Analyst authorized to conduct analyses within the General Physical and Chemical Analysis category of testing

C. Safety: Always handle unknowns with proper safety equipment - lab coat, gloves etc. and good laboratory practices.

D. Procedures:

1. Chemical:

a. Perform solubility tests using water and methylene chloride and/or additional solvents, as needed. Record results (e.g. worksheet).

b. pH- if water soluble, check pH using pH paper. Record result on worksheet as above.

c. Spot tests - perform appropriate spot tests to gain information about class of compound (e.g., detect anions and cations).

2. Analytical:

a. Analyze by GC/MS if sample is soluble in organic solvent. Use appropriate instrument parameters. Document and save data.

b. If needed, perform FT/IR analysis. Document and save spectra.

c. If needed, perform SEM/EDS analysis on solid samples. Document and save spectra.

d. Analyze by other analytical methods, as appropriate.

d. Analyze appropriate negative and positive controls during each analytical technique to ensure quality.

3. Recording and Retention of Data and Case Information:

a. All materials used during an analysis (e.g., solvents, activated charcoal extraction tubes, etc.) will be recorded within examination documents.

b. Lot numbers from all solvents used during the procedure(s), as well as lot numbers and information from other appropriate materials (e.g., reagents), will be recorded within examination documents.

c. All steps performed during an analysis which are not explicitly listed in specific procedures (i.e., SOPs) will be recorded within examination documents.

d. Instrumental data parameters (e.g., GC/MS, column type, etc.) will be printed and retained within examination documents.

E. References:

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Karukstis, Kerry K., and Van Hecke, Gerald R., *Chemistry Connections, The Chemical Basis of Everyday Phenomena*, Academic Press: 2000.

Lewis, Grace Ross, *1001 Chemicals in Everyday Products*, 2nd edition, John Wiley & Sons: 1999.

O'Neil, Maryadele J., *Merck Index*, 14th edition, Merck & Co.: Whitehouse Station, NJ, 2006.

Shugar, Gerson J., and Ballinger, Jack T., *Chemical Technician's Ready Reference Handbook*, 3rd edition, McGraw-Hill: New York, 1990.

Special:

Flick, Ernest W., *Cosmetic and Toiletry Formulations*, 2nd edition, Noyes Publications: Park Ridge, NJ, 1989.

Flick, Ernest W., *Household and Automotive Cleaners and Polishes*, 3rd edition, Noyes Publications: Park Ridge, NJ, 1986.

Food and Drug Administration, Everything Added to Food in the United States, C. K. Smoley: 1993.

Standard Procedure for SEM Analysis

DSS Laboratory Safety Manual.

Guidelines for the Identification of Unknown Samples for Laboratories Performing Forensic Analyses for Chemical Terrorism, SWGFACT.

Revision #	Revision History
2	Revised the Purpose section. Added 'Recording and Retention of Data and Case Information' section which included necessary requirements for quality assurance. Added requirement for use of positive and negative controls. Added 'other analytical methods' to Procedure section. Added requirement to print out instrumental parameters. Updated references and added a 'Revised History' section to the document.