ANALYTICAL SUFFICIENCY OF DRUG EVIDENCE

1 Objective

1.1 The objective of this document is to establish criteria for analytical sufficiency in the identification of controlled and non-controlled substances.

1.2 These criteria will apply to identifications of all exhibits in which the forensic chemist's report will be used for the enforcement of federal, state, local, or international laws.

2 Evidence Sampling Plan (ESP)

2.1 The DEA evidence sampling plan (*Laboratory Operations Manual-Handbook*, Appendix HA-01) provides procedures for sampling exhibits consisting of multiple units and forming composites.

2.2 Deviations from the ESP must be approved in advance by a supervisor and documented on the worksheet before a final report is issued.

2.3 Special program analyses performed at SFL1 are exempt from the provisions of the ESP.

3 Threshold Limits of Detection

3.1 There are too many variables, in terms of dosage size, concentration and multi-component mixtures, to establish practical, objective threshold limits of detection for all controlled and non-controlled substances.

3.2 Situations may occur where very low levels of a substance may be present, but further investigation is technically or administratively impractical or unnecessary. In such situations, with supervisory approval, the suspected but unconfirmed identity of the substance may be annotated on the back of the worksheet but not reported as a result on the front of the worksheet.

4 Identification of Controlled Substances

4.1 All reported identifications must be based on data which supports the identification of the controlled substance(s). Any data which does not correlate with the identification must be fully explained, or the substance cannot be reported. Analytical data obtained from confirmation techniques must be supported with corresponding data from DEA laboratory standards which have been verified as to identity. In situations where a standard is unavailable, the confirmation of identity may be accomplished by SFL1 through structural elucidation.

(b)(7)(E)

(b)(7)(E)

5 Identification of Non-Controlled Substances

5.1 All identifications of adulterants, listed chemicals, and precursors must be based on data which support the identification of a non-controlled substance. Any data which does not correlate with the identification must be fully explained, or the substance cannot be reported. Analytical data obtained from confirmation techniques must be supported with corresponding data from a reference standard or literature data.

(b)(7)(E)

6 Negative Controls (Blanks)

6.1 Negative controls will be used with instruments and chemical tests to preclude the possibility of false positives.

(b)(7)(E)

6.1.2 Negative controls must be run prior to each analysis when conducting qualitative instrumental tests. Blanks need not be run between tests when analyzing multi-unit submissions with the same exhibit number from which a composite will be formed. In the case of NMR, a blank need only be run initially with each use of the instrument and with each batch of samples generated from the same deuterated solvent source.

6.2 The use of negative controls will be documented on the back of the DEA Form-86.

6.3 Resulting hard copies of all negative controls will be properly annotated and retained in the case file.

7 Quantitative Analysis

7.1 Quantitation of controlled substances will be conducted according to the policies and procedures in the *Laboratory Operations Manual- Handbook, Analysis of Drugs Manual, Basic Training Program for Forensic Drug Chemists*, or laboratory specific validated methods.

7.2 Quantitation of non-controlled substances will be conducted when required.

(b)(7)(E)

(b)(7)(E)

11 Marijuana and related substances

11.1 The identification of marijuana will consist of a microscopic examination (which must observe plant material with cystolithic hairs), a Duquenois-Levine test, and either a chromatographic method (including, but not limited to, TLC or GC) or MS (which must include the identification of tetrahydrocannabinol).

11.2 The identification of a resinous extract of cannabis (hashish) will consist of a microscopic examination (which must observe fragments of plant material such as cystolithic hairs), a Duquenois-Levine test, and MS (which must include the identification of one or more of the tetrahydrocannabinols and at least two of the following: cannabinol, cannabidiol or cannabichromene).

11.3 The identification of hashish oil (a preparation of soluble cannabinoids derived from cannabis) will consist of a microscopic examination (in which the substance is essentially free of plant material), a Duquenois-Levine test, and MS (which must include the identification of one or more of the tetrahydrocannabinols and at least two of the following: cannabinol, cannabidiol or cannabichromene).

11.4 Single unit exhibits and A-K submissions: Each unit must be tested independently in accordance with the criteria established in paragraphs 11.1-3. It is not necessary to form a composite for further testing.

11.5 Multiple unit exhibits (excluding A-K submissions): The ESP should be applied to determine the appropriate number of units to test. Each of the selected units must be tested independently in accordance with the criteria established in paragraphs 11.1-3. It is not necessary to form a composite for further testing.

(b)(7)(E)

Thomas J. Janovsky
Deputy Assistant Administrator
Office of Forensic Sciences

5/11/09
Date

Definitions

A.1 Presumptive Techniques – Presumptive techniques provide indication of sample composition. They must be appropriate for the sample and may include, but are not limited to: commercial logo comparisons, chemical tests, color tests, microcrystal tests, optical crystallography, UV-Vis spectrophotometry, and separation techniques (without selective detection).

A.2 Separation Techniques – Separation techniques provide an indication of sample composition while evaluating for possible multi-component mixtures. These tests must be appropriate for the sample and may include: TLC, GC, LC, CE, and IMS. Some separation techniques may be interfaced with non-selective (presumptive) or selective (identification) detectors. In addition, NMR, ESI/MS/MS or DESI/MS/MS may be used to evaluate samples for possible multi-component mixtures.

A.3 Confirmation Techniques – Confirmation techniques provide distinctive structural information to identify a substance. These tests must be appropriate for the sample and may include the following: IR, MS, Raman spectroscopy, or NMR. A confirmation technique can be interfaced with a separation technique (i.e., GC/MS, GC/IRD, or LC/MS).

A.4 Residue – A residue sample consists of a small quantity of substance to be examined in which there is insufficient quantity for the practical determination of a weight. Examples of a residue include, but are not limited to, material adhering to the inside of a smoking pipe stem, a straw, a beaker from a clandestine laboratory, a plastic bag, or material from a vacuum sweep.

A.5 Trace – A trace component consists of a substance present at a low-level within an appreciable amount of material. An example of a trace component includes, but is not limited to, a sample consisting of 400 mg of a material containing 99% heroin hydrochloride and 0.50% cocaine hydrochloride or a sample consisting of 400 mg of a material containing 99% sucrose and 0.20% cocaine hydrochloride.

A.6 Adulterant – An adulterant is a pharmacologically active substance, usually added to a controlled drug to enhance the affect. For example, quinine and procaine are typical adulterants added to heroin.

A.7 Diluent – A diluent is an inert ingredient used to increase the bulk of a finished product. Typical diluents are sugars, starches, tablet binders and lubricants, and inorganic salts.

A.8 Procedural Blank – A procedural blank consists of the matrix (to include, but not limited to, the solvent for a separation technique, or KBr for IR) which has been taken through every step of the analytical protocol using the same glassware, reagents, solvents and analytical instrument. The procedural blank will be evaluated to eliminate the possibility of contamination anywhere in the analytical protocol.

Laboratory Operations Handbook

TABLE OF APPENDICES

**LIST OF TABLES

Appendix HA-01

EVIDENCE SAMPLING PLAN

CONTENTS

GENERAL COMMENTS

Objective of Sampling Plan

The objective of the Evidence Sampling Plan is to provide a statistically sound, uniform basis for DEA chemists to form conclusions, based upon random sampling. The sampling technique is based on the probability theory of the hypergeometric distribution and provides a completely consistent mathematical foundation for conclusions concerning the contents of multiple containers of controlled substances.

Judgment is often required in sampling exhibits. The analyst may decide that certain exhibits should be sampled so as to preserve some unusual feature, such as characteristic shape or an embossed design. If in doubt, the analyst should consult with his or her supervisor before proceeding.

Prior to forming the composite, selected containers (the minimum number determined from the Tables below) are to be analyzed as directed in the Analytical Sufficiency Document.

(b)(7)(E)

(b)(7)(E)

NOTE: Place notations on the reverse side of the DEA Form 86 showing the use of the sampling plan and the procedure used to obtain the composite (e.g., cone and quarter, cone and sample, etc.). Most exhibits can be sampled using the procedures in this plan. Occasionally exhibits will be encountered for which these procedures are unsuitable. In such instances, the analyst is expected to use good judgment to obtain a representative sample. If in doubt, the analyst should consult his or her supervisor before proceeding. In the event the plan is not used, that fact must also be noted, and a detailed description of the sampling procedure used must be given.

DEFINITIONS

1. Cone and Quarter -- A procedure whereby the powder in a container is mixed by shaking or stirring; large fragments or particles are reduced if necessary; the material is then poured on a flat surface to form a cone. The "cone" is flattened, and the material is then divided at right angles, forming quarters.

(b)(7)(E)

2. Cone and Sample -- A procedure whereby the powder in a container is thoroughly mixed, formed into a cone, and a composite is formed by withdrawing approximately 5-gram portions from the center and from each of the four quarters of the cone.

3. Probe Technique -- A procedure whereby containers are pierced and a small amount of powder is removed for screening.

4. Core Technique -- A procedure whereby portions are removed from various (i.e., 2-5) locations to form a composite.

5. Homogeneous Exhibit -- An exhibit that is uniform in physical appearance and the particle size of the entire exhibit is 20 mesh (0.1 cm) or less.

6. Mix Thoroughly -- Comminuting the powdered mixture until the powder appears to be uniform.

7. Gummy Exhibits -- Those which, by reason of moisture or other liquid content, are not amenable to grinding.

8. Screening -- The inspection of exhibits containing powders, tablets, capsules, and other solid dosage forms to detect differences in color, markings, and other morphological properties as appropriate. When applied to those units "selected" for screening per the Evidence Sampling Plan, screening must include a confirmatory test to identify any controlled substance present.

9. Composite -- Exemplar of an exhibit used for analysis

(b)(7)(E)

10. Representative Sample -- Exemplar for testing and a sample aggregate portion of the whole amount seized sufficient for current criminal evidentiary practice.

11. Test Portion -- Amount withdrawn from exhibit for quantitative analysis.

(b)(7)(E)

Page 005 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 006 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 007 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 008 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 009 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 010 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 011 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 012 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 013 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Appendix HA-02

QUALITY ASSURANCE GUIDELINES

DEA LABORATORY SYSTEM

1. The Analysis of Drugs Manual (ADM) contains a compilation of standardized qualitative and quantitative methods for the most common drugs analyzed in the DEA laboratories. Additionally, each laboratory has documented qualitative and quantitative methods specific to the needs of the individual laboratory. Controlled substances must be analyzed according to standardized methodology where such methods are available in the ADM or in each laboratories compilation of approved methods. The method utilized must be referenced on the back of the Forensic Chemist Worksheet. There is flexibility in the method to allow the chemist to modify parameters, i.e., concentration, wavelength, column, internal standard, etc. to obtain an accurate result. If an existing standardized method is insufficient, an alternate method may be developed and used with supervisory approval. Such a method should normally be included as a standardized method for future use.

(b)(7)(E)

Page 015 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

Page 016 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

(b)(7)(E)

Appendix HA-03

PERTINENT SECTIONS OF THE PERSONNEL MANUAL

CHAPTER 23 EMPLOYMENT (GENERAL)

2306 SELECTIVE PLACEMENT PROGRAM FOR HANDICAPPED PERSONS AND DISABLED VETERANS

2308 FEDERAL CAREER INTERN PROGRAMS

CHAPTER 24 EMPLOYEE PERFORMANCE AND UTILIZATION

2410 TRAINING

2410.1 New Employee Orientation

2430 EMPLOYEE PERFORMANCE AND EVALUATION

2430.1 Employee Performance Appraisal System

2451 INCENTIVE AWARDS

CHAPTER 25 POSITION CLASSIFICATION, PAY AND ALLOWANCES

2511 CLASSIFICATION UNDER THE GENERAL SCHEDULE

2511.1 Position Classification

2511.2 Position Classification Appeals, Policies and Procedures

2531.1 Within-Grade Increase

2550 PAY

CHAPTER 26 ATTENDANCE AND LEAVE

2630 LEAVE

CHAPTER 27 PERSONNEL RELATIONS AND SERVICES

2711 LABOR-MANAGEMENT RELATIONS

2713 DRUG ENFORCEMENT ADMINISTRATION EQUAL EMPLOYMENT OPPORTUNITY PROGRAM

2720 COLLECTION OF RACIAL AND NATIONAL ORIGIN IDENTIFICATION DATA ON APPLICANTS

2752 DISCIPLINE, ADVERSE ACTIONS AND APPEALS

2771 DEA GRIEVANCE PROCEDURES

2792 FEDERAL EMPLOYEES' OCCUPATIONAL HEALTH PROGRAM

Appendix HA-04

SAFETY PROCEDURES IN CLANDESTINE LABORATORY OPERATIONS

Planning the seizure of a clandestine laboratory should include consideration of the possible hazards that may be encountered and appropriate measures to handle them in a safe manner. A DEA forensic chemist can provide valuable help in anticipating hazards, based on information obtained in the investigation. Consequently, a forensic chemist should be consulted during the early stages of a clandestine laboratory investigation and be present at the time of seizure.

Safety is a personal responsibility. Each individual at the seizure site is responsible for knowing what hazards are present and the precautions required to avoid injury. Clearly, every safety and health hazard associated with a clandestine laboratory seizure cannot be anticipated; therefore, rules cannot be developed for every contingency that could rise. All employees must maintain a constant vigilance for unsafe or potentially hazardous conditions or practices. The DEA forensic chemist present at clandestine laboratory seizures is responsible for providing technical assistance in identifying chemical hazards, and recommending precautionary measures.

To assist in safely securing a clandestine laboratory, a properly stocked Clandestine Laboratory Truck should be present at each seizure site. It is the responsibility of the agent in charge to assure that the truck is present at the clandestine laboratory site. If a lab truck is not available, the forensic chemist should coordinate with the agent in charge to ensure that all required safety equipment is available. In these cases, the forensic chemist should be able to provide the necessary sampling supplies and equipment needed.

The forensic chemist should attend the pre-raid meeting/briefing if at all possible to provide an opportunity for the chemist to brief the other seizure team members about the hazards expected in this particular laboratory.

(b)(7)(E)

The appropriate level of personal protective equipment (PPE) will be worn during all stages of clandestine laboratory processing. Once the laboratory is secured, the site should be ventilated by opening doors and windows, at a minimum. If fans are used to assist in ventilation, they must be of the non-sparking type available on the lab truck or

from the fire department. Do not use electric fans which may be present in the clandestine laboratory.

(b)(7)(E)

The minimum level of PPE required for members of the assessment team are:

1. Chemical resistant suits, gloves and boots.
2. Nomex hood, jacket, pants, gloves and safety shoes/boots.
3. Self-contained breathing apparatus (SBA).
4. Head protection.

Any potential routes of entry of chemical vapors to exposed skin will be taped, i.e., sleeves, pants cuffs, collar.

A certified forensic chemist and fingerprint specialist, if appropriate, will be part of the clandestine lab processing team. Members of the processing team are responsible for collecting and processing of all evidentiary material found on-site. The members of the processing team will use the buddy system and adhere to safety practices and procedures set out in the Clandestine Laboratory Safety Guide.

(b)(7)(E)

Page 021 of 102

Withheld pursuant to exemption

(b)(7)(E)

of the Freedom of Information and Privacy Act

(b)(7)(E)

HAZARDOUS WASTE DISPOSAL

All equipment and apparatus are assumed to be contaminated and should be handled as evidentiary and waste management samples. Additionally, all chemicals/solvents, and reaction mixtures are considered hazardous and will be disposed of as hazardous waste after evidentiary and waste management samples have been taken.

The DEA case agent will arrange for proper disposal of all hazardous materials using the designated hazardous waste contractor in accordance with Subsection 6674.7 of the Agents Manual and other DEA policies. Questions concerning disposal of hazardous waste should be directed to Headquarters, Hazardous Waste Unit (STSH).

Appendix HA-05

DRUG ENFORCEMENT ADMINISTRATION

OFFICE OF SCIENCE AND TECHNOLOGY

MANAGEMENT DEVELOPMENT PLAN

The purpose of the Management Development Plan is to describe the means by which the Office of Science and Technology (ST) can enhance the effectiveness of its managers. Through formalized education/training, self-study and the right job experience, individuals can obtain the knowledge, skills, and abilities, needed to be effective managers.

Although current literature provides us with different definitions of leadership and management, the fact is that for managers to be effective, they must be good leaders. Therefore, this plan uses the word manager with the understanding that the manager encompasses all the traits of a leader. The effective manager leads, trains, coaches, supervises and manages resources.

This plan consists of the following:

Section	*Title*
I	Personnel Management
II	Manager Development
III	Recommended Reading List
IV	Self-Study Courses
V	Senior Level Courses and Seminars
VI	The Individual Development Plan

SECTION I: PERSONNEL MANAGEMENT

LABORATORY CAREER DEVELOPMENT SYSTEM

Purpose. This section addresses the career development of Chemists within the DEA laboratory system.

Career Ladder

A. The "career ladder" (i.e., career progression without further competition) for Chemists within the laboratory system is:

GS-5	Chemist (entry-level trainee)
GS-7	Chemist (advanced entry-level trainee)
GS-9	Forensic Chemist
GS-11	Forensic Chemist
GS-12	Forensic Chemist (journeyman)
GS-13	Senior Forensic Chemist
GS-14	Senior Research Chemist

B. Competitive procedures are required to enter the system at the grade level for which the candidate is qualified. if initial appointment is below the journeyman level (GS-12), subsequent promotions to the journeyman level (GS-12) are noncompetitive.

Promotion to GS-13 Senior Forensic Chemist (Technical Specialist) and GS-14 Senior Research Chemist positions at the Special Testing and Research Laboratory are based on individual development of specialized scientific expertise and are subject to review and approval by the Pay and Position Management Unit, Office of Personnel. Additionally, promotion to the GS-14 Senior Research Chemist position is subject to review and approval by the Career Board. Noncompetitive promotions to the GS-13 level are also subject to approval by the Position Review Committee.

C. Supervisory and Managerial Positions. Career progression into supervisory and managerial positions within the laboratory system is subject to competitive merit promotion procedures for positions up to and including GS-15.

Supervisory and managerial positions within the laboratory system are:

GS-13	Supervisory Chemist (Support Group Supervisor)
GS-13/14	Supervisory Chemist (Field Laboratory)

GS-13/14 Supervisory Chemist (Special Testing & Research Laboratory)

GS-14 Program Manager

GS-15 Laboratory Director

GS-15 Chief, Laboratory Operations Unit

ES-01/03 Associate Deputy Assistant Administrator, Office of Science and Technology

ES-01/04 Deputy Assistant Administrator, Office of Science and Technology

SECTION II: MANAGER DEVELOPMENT

Manager development is the process by which individuals develop the knowledge, skills, and abilities (KSA's) needed to lead, train, coach, supervise, and manage resources at increasing levels of responsibility. Such development is the result of progressive and sequential education, training, and experience received throughout a career. The manager development process is based on three pillars, described below:

1. The institutional training pillar provides formal education and training that all individuals receive in preparation for service as managers within DEA.
2. The self-development pillar recognizes individual initiative and self-improvement as key to continuing professional development. The formal training system is limited and individuals must act on their own to expand knowledge and experience. Reading programs, college education, and self-study programs are among the principal self-development opportunities. While all pillars are crucial, the self-development poses the greatest challenge, since the final responsibility for development rests on the individual's shoulders.
3. The developmental assignments pillar gives individuals the opportunity to build upon the knowledge, skills and abilities (KSA's) that they acquired during formal training and self-development and use them in actual management positions.

The Office of Science and Technology Management Development Plan has three levels, MDP I, II, and III, which link and cut across all manager development pillars. Candidates for supervisory and managerial positions may be evaluated, in part, based on established KSA's. Candidates acquire KSA's from formal training provided by the organization, self-development, and developmental job assignments.

LEVEL I

GS-5

GS-7

GS-9

GS-11

GS-12

A. *General.* Each level of the Management Development Plan (MDP) has four components: KSA's component; a formal training component, a self-development component; and a job assignments component. Under Level I, the KSA's component provides entry level personnel and those at the journeyman level with the critical skills and professional knowledge subject matter that they must master. To ensure that individuals have an opportunity to develop appropriate KSA's, individuals should receive institutionalized formal training. It is also incumbent upon the individual to pursue a self-development program. The foundation for a self development program is college level course work, correspondence courses and individual reading programs. Position responsibilities within the organization will provide building blocks of experience, enabling the individual to put into practice those skills he/she has learned through education and training. This training plan lists the key job assignments for which the individual should strive.

B. *Knowledge, Skills and Abilities (KSA's).*

1. Ability to perform assigned duties with appropriate degree of supervision
2. Knowledge of chemistry as applied to the analysis of drugs and related substances
3. Knowledge of chemistry to solve difficult analytical problems
4. Knowledge of instrumentation used in chemical analysis
5. Knowledge of instrumentation sufficient to effect repairs
6. Knowledge of laboratory safety/accident prevention
7. Skill and ability to conduct scientific research
8. Skill as a peer group leader in resolving problems involving interpersonal conflicts
9. Ability to be objective, fair minded in dealings with others
10. Skills in effective oral and written communication
11. Organizational skills
12. Computer literacy

C. *Formal Training.*

1. Basic Entry Level -- An on-site Basic Chemist Training Program of 4-12 months.
2. Forensic Chemist Trainee 3 weeks in Quantico -- Provides training in DEA history, rules and regulations to the new employee. Procedures in law are described in regards to the Controlled Substances Act, evidence handling, court testimony, and mock trials. Technical training on instrumentation provided with analytical methods of analysis for drugs. Forensic Chemist Trainees are required to synthesize controlled substances in a laboratory environment. Training includes some elements of GS/MS, spectroscopy, microscopy, and chromatography. A laboratory environment is required.
3. Forensic Chemist Technical Seminar -- This one week program at Quantico is designed to provide technical instrumentation training.
4. Advanced Technical Seminar -- This one week program in Quantico is designed to provide advanced training to more experienced Forensic Chemists. A more technical, advanced discussion is provided for newer analytical techniques and instrumentation.