

**FCU Quality Assurance Manual** 

**DISTRICT OF COLUMBIA  
DEPARTMENT OF FORENSIC SCIENCES  
FORENSIC CHEMISTRY UNIT  
QUALITY ASSURANCE MANUAL  
(ISO/IEC 17025:2005 STANDARDS)**

---

# TABLE OF CONTENTS

---

Introduction .....	4
Scope .....	5
Goals and Objectives .....	6
Quality Terminology .....	7
Part 4 Management requirements .....	19
<i>Section 4.1 Organization</i> .....	19
<i>Section 4.2 Management System</i> .....	21
<i>Section 4.3 Document Control</i> .....	25
<i>Section 4.4 Examination Requests</i> .....	26
<i>Section 4.5 Subcontracting of Examinations</i> .....	27
<i>Section 4.6 Purchasing of Services and Supplies</i> .....	28
<i>Section 4.7 Service to the Customer</i> .....	28
<i>Section 4.8 Complaints</i> .....	29
<i>Section 4.9 Control of Nonconforming Tests</i> .....	29
<i>Section 4.10 Improvement</i> .....	30
<i>Section 4.11 Quality Corrective Action</i> .....	31
<i>Section 4.12 Quality Preventive Action</i> .....	32
<i>Section 4.13 Control of Records</i> .....	32
<i>Section 4.14 Internal Audits</i> .....	36
<i>Section 4.15 Management Review</i> .....	37
PART 5 TECHNICAL REQUIREMENTS .....	38
<i>Section 5.1 General Requirements</i> .....	38
<i>Section 5.2 Personnel</i> .....	38
<i>Section 5.3 Facilities and Environmental Conditions</i> .....	42
<i>Section 5.4 Test and Calibration Methods and Method Validation</i> .....	43
<i>Section 5.5 Equipment</i> .....	47
<i>Section 5.6 Measurement Traceability</i> .....	49
<i>Section 5.7 Sampling</i> .....	51

*Section 5.8 Handling of Test Items* ..... 52  
*Section 5.9 Assuring the Quality of Test Results* ..... 54  
*Section 5.10 Results Reporting* ..... 57  
REFERENCES..... 59  
APPENDIX A..... 61

## INTRODUCTION

---

Quality performance, conforming to recognized standards of good laboratory practice, is the most important goal of the Public Health Laboratory (PHL) within the D.C. Department of Forensic Sciences (DFS), Forensic Chemistry Unit (FCU). Just as new and improved methods of forensic analysis are developed to meet the expanding needs of the criminal justice system, it is essential for laboratory quality standards to progress in parallel. The FCU is committed to diligently implementing policy and procedure changes to ensure quality in all facets of laboratory operations.

The FCU quality system, represented by the DFS Departmental Operations Manual (DOM), the Quality Assurance Manual (QAM) and the Laboratory Operations Manual (LOM), provides a mechanism for identifying and implementing the practices that support excellent performance. The FCU is responsible for the incorporation of quality practices and procedures consistent with the requirements of the quality system into daily unit functions.

All FCU employees share in the responsibility for adherence to the established quality measures as well as the overall success of the quality program.

The continued development and improvement of the FCU quality system serves to increase confidence in the resulting work product while strengthening the professional integrity of the FCU and its employees. Through the use of recognized quality practices and procedures, the FCU will continue to produce high quality work and meet the challenges of future laboratory accreditations.

## SCOPE

---

The purpose of the FCU's quality management system is to ensure quality forensic services are provided to the District of Columbia's Criminal Justice System. This quality assurance manual contains or references the policies, practices and procedures of the FCU quality system that ensure technical competence and valid forensic examination results. The Quality Assurance Manual (QAM), the DFS Departmental Operations Manual, and the Laboratory Operations Manual (LOM) facilitate achieving this goal and meeting the ISO/IEC 17025:2005 Accreditation requirements.

Accreditation requirements are based on the International Organization for Standardization/International Electrotechnical Commission International Standard 17025 General Requirements for the Competence of Calibration and Testing Laboratories (ISO/IEC 17025:2005) and any supplemental requirements for Accreditation of Forensic Testing Laboratories. The combined requirements of ISO/IEC 17025:2005 and any Supplemental Requirements are hereafter referred to as ISO/IEC 17025:2005. The QAM, DOM and LOM also facilitate internal and external audits of the quality system to evaluate the FCU's conformance with ISO/IEC 17025:2005 standards.

---

## GOALS AND OBJECTIVES

---

It is the objective of the FCU to provide meaningful, timely and effective forensic analysis and interpretation of evidentiary materials when requested by the District of Columbia's Criminal Justice System. In order to meet this objective, the following specific goals have been established:

1. An ongoing dialogue with the law enforcement and legal communities regarding services provided by the FCU. This includes maintaining open lines of communication on active casework as well as the transmittal of policies, procedures and new forensic technology which impact evidence processing and analysis.
2. A case prioritization system which takes into account the needs of the District of Columbia's Criminal Justice System. It is the intent of the FCU to meet court and investigative time frames regarding the processing of evidentiary items. The analysis of specific items will be given priority when needed to answer particular legal or investigative issues.
3. The management and staff commit to providing a work product which is unbiased, scientifically objective and responsive to the needs of the District of Columbia's Criminal Justice System. To this end, each staff member will undergo training and demonstrate competency specific to any analysis before engaging in casework. It is incumbent upon each staff member to maintain currency in the specific forensic disciplines within which s/he is working. Each case will undergo a review process before a report is issued. Proficiency will be demonstrated on an ongoing basis by all analysts through a series of proficiency tests.
4. All personnel work to maintain an integrated approach to the evaluation of case material. To this end, a cooperative spirit and working environment will be maintained between each discipline and unit of the laboratory. The laboratory management will seek to provide a harmonious working environment where a healthy exchange of forensic information is shared amongst all staff members. Frequent staff meetings and technical exchange of information will be encouraged. Each staff member will cooperate in maintaining a safe and secure work environment for themselves and others.

---

# QUALITY TERMINOLOGY

---

**Accountability:** The quality of subordinate workers by which they are responsible for their own work and answerable to a superior.

**Acquisition:** The input of images into a forensic computer imaging system.

**Accreditation:** A process by which an authoritative body gives formal recognition that an entity is competent to carry out specific tasks.

**Adequate:** The principle of being sufficient for a specific requirement.

**Administrative documentation:** All case related documents that are not technical examination documentation, such as the *Activity Communication Log* documenting case related conversations, test item (evidence) chain-of-custody receipts, submission paperwork / incident reports, the *Schedule of Analysis* documenting service request documentation, correspondence received/sent, the *Administrative Review Checklist* and other pertinent information.

**Administrative error:** A clerical error, such as a typographical error, that may occur in an examination report or in the preparation of a proficiency test.

**Administrative personnel:** Staff who provide administrative/clerical support.

**Administrative review:** A procedure used to check case file documentation and case reports for consistency with laboratory policy and for editorial correctness.

**Administrative reviewer:** The Laboratory Manager, designated Technical Leader or qualified designee who conducts an administrative review.

**ANAB:** American National Standards Institute (ANSI)-American Society for Quality (ASQ) National Accreditation Board. ANAB provides ISO/IEC 17025 accreditation for forensic testing laboratories. Formerly FQS.

**Analyst:** An employee or contract employee who conducts and/or directs the analysis of forensic casework samples. Some analysts also interpret data and reach conclusions. Used interchangeably with the term “examiner”.

**Analytical/Interpretative error:** An error in the examination process that produces an incorrect result or conclusion.

**ANSI-ASQ National Accreditation Board:** The signatory of the International Accreditation Forum (IAF) multilateral recognition arrangements for quality management systems and environmental management systems; One of two brands of the ANSI-

ASQ National Accreditation Board, a non-profit, non-governmental organization that provides accreditation services to public- and private-sector organizations and is jointly owned by the American National Standards Institute and the American Society for Quality.

**Approved Test Provider:** A proficiency test provider that has complied with the test manufacturing guidelines established by an accrediting body's Proficiency Review Committees.

**Assessment:** A review conducted to compare the various aspects of the laboratory's quality system with criteria for that performance. Also referred to as an audit.

**Assessor:** A person who conducts assessments.

**Audit:** A review conducted to compare the various aspects of the laboratory's quality system with criteria for that performance. Also referred to as an assessment.

**Auditor:** A person who conducts audits.

**Authority:** The power to influence, or command thought, opinion and behavior.

**Blind sample:** A proficiency test sample for which the analyst is unaware of the test nature of the sample at the time of analysis.

**Calibration:** The adjusting or standardizing of any instrument and/or equipment to ensure agreement with a reference standard or working standard of known value.

**Case Documentation:** All administrative and technical examination documentation for a given case.

**Case File:** Files containing administrative and technical examination documentation generated or received by a laboratory pertaining to a particular case.

**Case Identification Number:** A unique alphanumeric identifier that is assigned to an FCU case submission.

**Casework:** Laboratory activities concerning the examination of evidence and/or crime scenes.

**Certified reference material:** Reference material accompanied by a certificate, whose property values are certified by a procedure, which establishes its traceability to an accurate realization of the units in which the property values are expressed and for which each certified value is accompanied by an uncertainty at a stated level of confidence.

**CEU:** Central Evidence Unit. An operational unit of the DFS.



**Chain-of-custody log:** A form, or electronic equivalent, used to document all transfers of evidence.

**Comparison:** The evaluation of two or more chemical samples to determine whether or not there are any similarities or dissimilarities.

**Competency test:** The evaluation of a person's ability to perform work in a functional area prior to the performance of independent casework. Expected test results are known to the laboratory but not the test taker.

**Competent:** Possessing the requisite knowledge, skills and abilities to perform a job.

**Computer systems:** A complete, working computer to include any software and peripheral devices.

**Conclusion:** The outcome reached following an examination and comparison of unknown sample with a known standard (e.g., a finding of identification, non-identification or inconclusive).

**Condition adverse to quality:** An all-inclusive term used in reference to any of the following: failures, malfunctions, deficiencies, defective items and nonconformity issues.

**Contributor:** law enforcement agencies that submits evidence to the laboratory.

**Control (control sample):** A sample analyzed in parallel with experimental samples that is designed to demonstrate that a procedure worked correctly; a standard of comparison for verifying or checking the finding of an experiment.

**Controlled document:** A document that is tracked when issued and/or distributed.

**Controlling:** Establishing standards of performance, measuring current performance in relation to established standards, and taking Quality Corrective Action as required.

**Court official:** An individual such as a prosecutor, defense attorney or judge who completes an external testimony evaluation form.

**Crime/forensic laboratory:** A laboratory (with at least one full-time scientist) which examines physical evidence in criminal matters and provides opinion testimony with respect to such physical evidence in a court of law.

**Crime scene:** An area, object or person, from which evidence is identified, documented, collected and/or interpreted.

**Crime scene personnel:** Individuals who perform the identification, documentation, collection and/or interpretation of material at a location external to the laboratory.

**Critical reagent:** A reagent that requires special attention because of the impact of the reagent on the quality of testing. Failure of the reagent due to improper preparation or degradation would affect the testing process.

**Custody:** The care and control of an item implying responsibility for its protection and preservation.

**Deficiency:** An inadequacy; lacking in some necessary quality of an element. Deficiencies include missing data, incomplete data, inaccurate data and/or incomplete reports.

**Delegation:** The act of empowering a person to act for another person.

**Deviation:** An authorized variance from a documented policy, practice, or procedure. A deviation can be major or minor depending on the circumstances.

**DEU:** Digital Evidence Unit. An operational unit of the DFS.

**DFS:** Department of Forensic Sciences, Washington D.C.

**Digital evidence:** Information of probative value stored or transmitted in binary form.

**Directing:** The process of motivating, leading, guiding, stimulating, and activating people.

**Discipline:** A major area of casework for which a laboratory may seek accreditation.

**Discrepancy:** Being at variance or different from the accepted consensus.

**Document:** Information in any medium including, but not limited to, paper copy, computer disk or tape, audio or video tape, electronic file, compact or digital video disc, photograph, overhead, or photographic slide.

**Document control:** The process of ensuring that controlled documents prescribing quality-affecting activities or specifying quality requirements, including revisions, are reviewed for adequacy, approved for release by authorized personnel and distributed for use to the personnel performing the prescribed activities.

**DOM:** Agency Departmental Operations Manual

**Elimination:** Significant disagreement of discernible class characteristics and/or individual characteristics.

**Environmental conditions:** Any characteristic of the facilities that could reasonably be expected to impact the quality of the laboratory's work product.

**Evidence:** An item submitted for examination(s).

**Examination:** An analysis of an item or comparison of items; The procedure utilized by the laboratory analyst to obtain information from evidence in order to reach conclusions concerning the nature of and/or associations related to evidence received by the laboratory. The term examination is equivalent to the term "test" as used in this manual.

**Examination documentation:** Documents that are technical in nature and support the results and/or conclusions presented in a laboratory report. Examples of documents include diagrams, printouts, photographs, observations, and results of examinations.

**Examiner:** An employee or contract employee who conducts and/or directs the analysis of forensic casework samples. Some examiners also interpret data and reach conclusions. Used interchangeably with the term "analyst".

**Exclusion:** The determination by an analyst that there is sufficient quality and quantity of detail / information to conclude the items being compared did not originate from the same source (i.e., non-identification / exclusion).

**Exemplar:** A known sample from an object or an individual that serves as the reference or standard to identify that object or individual (i.e., DNA buccal swab, ten-print card, test-fire cartridges, etc.).

**External proficiency test:** A test provided by a source external to the laboratory.

**F.B.I. Number:** A unique number within the Criminal Justice Information Services (CJIS) Division files assigned to an individual.

**Finding:** A nonconformity identified during an audit with documented requirements.

**Follow-up action:** Action to eliminate the cause of a detected Level 2 non-conformity. This is documented on as action steps on the *Quality Corrective Action Report*.

**FSL:** Forensic Science Laboratory. A division under the DFS, alongside the Public Health Laboratory and the division of Crime Scene Sciences, responsible for processing forensic evidence.

**Forensic Science:** The application of scientific knowledge and methodology to legal problems and criminal investigations.

**Goal:** A statement of purpose that defines the mission of an organization.

**Good laboratory practice:** Operating practices and procedures for promoting quality and ensuring the integrity of the work product.

**Identification:** The determination that separate items originated from the same source to the exclusion of all others.

**Inconsistency:** Any reported results that differ from the consensus results. Inconsistencies may be classified as administrative, systemic, analytical or interpretive.

**Individual characteristic database:** A collection, in computerized searchable form, of features associated with an object or person uniquely or with a high degree of probability.

**Individual characteristic database sample:** A specimen of known origin from which individual characteristic information originates (e.g., reference chemical sample or standard).

**Individualization:** The decision that two separate items originated from the same source (identification).

**Internal proficiency test:** Proficiency testing program managed and controlled within the laboratory system.

**Item Identifier:** An alphanumeric designator assigned to an item submitted.

**Known sample:** A specimen of an identified source acquired for the purpose of comparison with an evidence sample; synonymous with exemplar.

**Laboratory Director:** The highest ranking manager within the Division.

**Laboratory Support Personnel:** Employees or contract employees who perform laboratory duties exclusive of analytical techniques on forensic or database samples.

**Lead Auditor:** An experienced auditor who is assigned the responsibility of leading a team of auditors to conduct a portion of an audit.

**LOM:** Division Laboratory Operations Manual

**Major deviation:** A deviation that has the potential to impact the quality systems, may affect multiple cases, or is applicable over an extended period of time.

**Management System:** The organizational structure, responsibilities, procedures, processes, and resources for implementing quality management; includes all activities which contribute to quality, directly or indirectly.

**Manager:** A person with the responsibility for directing and controlling an organizational unit or program.

**May:** A word used when an element of the quality system is optional or discretionary.

**Measurement of uncertainty:** A parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed.

**Media:** Objects on which electronic data can be stored.

**Method:** The course of action or technique followed in conducting a specific analysis or comparison leading to an analytical result.

**Minor deviation:** A deviation that is not expected to impact the quality system and generally will not have an extended duration.

**Must:** A word used when an element of the quality system is required.

**National Measurement Standards:** May be primary standards, which are primary realizations of the SI units or agreed representations of SI units based on fundamental physical constants, or they may be secondary standards which are standards calibrated by another national metrology institute such as the National Institute of Standards and Technology (NIST).

**Natural science:** Chemistry, biology and physics.

**Nonconformity, Level 1:** A situation or condition that directly affects and has a fundamental impact on the quality of the work product or the integrity of the evidence (see Quality Corrective Action).

**Nonconformity, Level 2:** A situation or condition which may affect the quality of the work but does not, to any significant degree, affect the fundamental reliability of the work product or the integrity of the evidence (see Follow-up Action).

**Non-identification:** see definition for “Elimination”

**Notes:** The documentation of procedures, standards, controls and instruments used, observations made, results of tests performed, charts, graphs, photos, and other documents generated that are used to support an analyst’s conclusions.

**Objective:** A measurable, definable accomplishment that furthers the goals of the organization.

**Objective Test:** A test which, having been documented and validated, is under control so that it can be demonstrated that all appropriately trained staff will obtain the same

results within defined limits. These defined limits relate to expressions of measurement uncertainty.

**Open proficiency test:** A proficiency test, known to the participant as such, prepared to evaluate the participant's competence related to casework.

**Organizing:** The process of identifying, specifying and assigning work, grouping work and resources into a structure and establishing a chain of command between individuals and groups.

**Performance Check:** A verification that the equipment, instrument, or process is working as expected. Analysis of a control may be used as a performance check.

**Planning:** The analysis of relevant information from the past and present and the assessment of probable future developments so that a course of action may be determined that enables the organization to meet its stated objectives.

**Policy:** A guiding principle, operating practice, or plan of action governing decisions made on behalf of an organization.

**Practices:** In this manual, a term used to describe laboratory quality affecting processes that are used by the DFS.

**Primary Standard:** A standard designated or widely acknowledged as having the highest metrological qualities and whose value is accepted without reference to other standards of the same quantity.

**Principle:** A basic rule, assumption or quality; a fixed or predetermined policy or mode of action.

**Procedure:** The manner in which an operation is performed; a set of directions for performing an examination or analysis – the actual parameters of the methods employed.

**Proficiency Review Committee (PRC):** A committee appointed by an accrediting body, whose role is to evaluate the performance of accredited laboratories in proficiency tests.

**Proficiency tests:** Tests to evaluate the continuing capability of analysts and the performance of the laboratory. The expected results of the test are unknown to those individuals taking the test.

**Proper seal:** A seal that prevents loss, cross-transfer or contamination while ensuring that attempted entry into the container is detectable. A compliant seal may include a heat seal, tape seal, or a lock with, at minimum, the initials of the person creating the seal being placed across the seal onto the container when possible.

**Protocol:** A directive listing the procedures to be followed in performing a particular laboratory examination or operation; the overall plan for analysis of a particular item of evidence.

**Qualified:** A term used to identify personnel who successfully complete a training program, pass a competency test and participate in the proficiency testing program.

**Qualitative:** The clarity of the information contained within a friction ridge impression.

**Qualitative Analysis:** Procedures that use visual, microscopic, or instrumental methods to determine the characteristics or constituents of a sample or specimen without regard to quantity.

**Quality assurance:** The planned and systematic actions necessary to provide sufficient confidence that a laboratory's product or service will satisfy given requirements for quality.

**Quality audit:** A management tool used to evaluate and confirm activities related to quality. Its primary purpose is to verify compliance with the operational requirements of the quality system.

**Quality control:** Activities conducted according to established standards used to monitor the quality of analytical data and to ensure that it satisfies specific criteria.

**Quality Corrective Action (Q-CAR):** Action put in place *after* a nonconformity event to identify and eliminate the cause of the undesirable situation, and to bring the deficiency into conformity with a required standard. This is documented in a *Quality Corrective Action Report* (Q-CAR).

**Quality documentation:** Documents of records pertaining to the quality system such as audit reports, Quality Corrective Action forms, deviation forms and testimony evaluations.

**Quality manager:** An individual designated by management who, irrespective of other responsibilities, has the defined authority and obligation to ensure that the quality requirements of the management system are implemented and maintained.

**Quality manual:** A document stating the quality policy and describing the various elements of the quality system and quality practices of the organization or unit.

**Quality Preventive Action (Q-PAR):** Action put in place *before* a potential nonconformity occurs in order to eliminate the cause of an identified undesirable situation and to bring the deficiency into conformity with a required standard. This is documented in a *Quality Preventive Action Report* (Q-PAR).

**Quality records:** Documents pertaining to the quality system such as audit reports, Quality Corrective Action reports and testimony evaluations.

**Quality system:** The organizational structure, responsibilities, procedures, processes, and resources for implementing quality management; includes all activities that contribute to quality, directly or indirectly. This term is equivalent to “management system” as used in ISO 17025:2005.

**Quantitative Analysis:** Analysis of a substance that determines the amount or proportion of its constituents.

**Questioned sample:** An evidence sample to be examined for the purpose of comparison or identification.

**Reagent:** A substance used because of its chemical or biological activity.

**Record:** A document that provides evidence of a condition, work performed, activities conducted, and/or quality for archival purposes.

**Re-exam technique:** A quality assurance technique whereby a previously examined sample is re-examined by a different analyst.

**Reference material:** A material or substance having known properties. These materials may be used for the identification of unknown substances, calibration of instruments, assessments of a measurement method, or assigning value to materials.

**Reference standard:** An acquired or prepared sample that has known properties for the purpose of calibrating equipment and/or for use as a control in examinations.

**Reliability:** Possessing the quality of being dependable; may refer to personnel, materials or equipment.

**Request:** The act or an instance of a contributor asking for the examination of evidence by the laboratory.

**Root cause:** The fundamental reason for a condition adverse to quality, that, if corrected or precluded, would minimize or prevent that condition, and/or similar conditions, from occurring.

**Routine Process/Procedure:** A process or procedure that is performed on an on-going basis.

**Safety manual:** A document stating the safety policy and describing the various elements of the safety system of the organization.



**Sampling:** A process or procedure whereby a part of a substance, material or item is taken to provide for testing of a representative sample of the whole.

**Scientist:** A person who employs scientific methods in the examination of evidence in a forensic laboratory.

**Secondary evidence:** Material derived from an item of evidence.

**Secured area:** Locked or otherwise limited access space under laboratory control that has access restricted to personnel authorized by the Laboratory Director.

**Shall:** A word used when an element of the quality system is required.

**Should:** A word used when an element of the quality system is recommended, but not required.

**SI Units:** The International System of Units consisting of seven base units that have been adopted by the General Conference on Weights and Measures.

**Standard Operating Procedure (SOP):** A document that specifies the steps, methods, equipment, and materials necessary to perform a task properly. SOP's are written to provide instruction and standardization of activities affecting quality.

**Standards:** Something established by authority, custom, or general consent as a model or example.

**Sub-discipline:** A specific type of analysis within an accredited discipline.

**Supervisor:** A person directly responsible for overseeing the work in an organizational unit.

**Technical Leader:** A designated employee who is responsible for the technical operations of a laboratory unit and who may be able to stop or suspend unit operations.

**Technical procedures:** Of or relating to a practical subject organized on scientific principles.

**Technical review:** The review of notes, data, and other documents that form the basis for a scientific conclusion.

**Technical reviewer:** An employee or contract employee who is a current or previously qualified analyst in the methodology being reviewed that performs a technical review of, and is not an author of, the applicable report or its contents.

**Technical support personnel:** A person or contract employee who performs casework related duties within the laboratory at the direction of an analyst.

**Testimony:** The firsthand authentication of a fact.

**Trace evidence:** Physical evidence from a crime that is present either in minute quantities or is physically minute as to require magnification, microscopy, and sensitive techniques in order to identify. See also, *Materials science*.

**Traceability:** Property of the result of a measurement or the value of a standard whereby it can be related to state references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.

**Unsuitable:** Not suitable for examination.

**Validation:** The process of performing a set of experiments that establish the efficacy and reliability of a technique or procedure or modification thereof.

**Value:** The determination “of value” by the examiner indicated that sufficient reliable details are present in the print such that, when compared to another print, any of the three conclusions can be reached.

**Verification:** Confirmation of an examiner’s conclusion by another qualified examiner.

**Will:** A word used when an element of the quality system is required.

---

## PART 4 MANAGEMENT REQUIREMENTS

---

### SECTION 4.1 ORGANIZATION

4.1.1 The Department of Forensic Sciences (DFS) is a public government agency that performs both state and municipal forensic investigations and examinations for the District of Columbia. The Public Health Laboratory (PHL) is a division of the DFS. The Forensic Chemistry Unit (FCU) is a functional unit within the PHL. The FCU Manager has the responsibility and authority for all FCU functions and personnel. The FCU Manager reports to the PHL Director.

4.1.2 The FCU provides forensic testing services to address a contributor's request for examination of evidence. These testing activities are conducted in such a way as to conform to the requirements of ISO/IEC 17025:2005 standards.

4.1.3 The FCU Manager oversees forensic examinations conducted by FCU personnel. The FCU quality system shall cover work performed by FCU personnel in the Consolidated Forensic Laboratory facility, or in associated temporary or mobile facilities.

4.1.4 The FCU Manager is a manager and reports directly to PHL Director, who in turn reports to the DFS Director. FCU personnel encountering situations or conditions that could cause undue pressure and adversely affect the quality of the work will inform the FCU Manager.

4.1.4.1 In general, the FCU Director is charged with the executive and administrative responsibilities for the operation of the FCU. The FCU Manager maintains administrative control and governs the laboratory's activities directly or through subordinates. The FCU Manager's responsibilities and authorities are defined in the associated job description.

4.1.4.1.1 The FCU Manager has the authority to make and enforce decisions affecting the FCU.

4.1.5 The FCU:

- a) Provides its personnel the authority and resources needed to carry out their duties including the implementation, maintenance and improvement of the quality system. Laboratory employees will identify departures from the quality system and initiate actions to prevent or minimize any conditions adversely affecting the quality system, as per DOM08 – *Practices for Quality Preventive Action*;
- b) Has policies to ensure that all personnel are free from any undue pressures and influences that may negatively impact the quality of their

work (District Personnel Manual, Chapter 18, Employee Conduct, part 1 – Supplemental Document). All laboratory personnel are responsible for ensuring the integrity of the examination process;

- c) Has policies and practices to protect contributors' confidential information. These policies and practices include guidance for protecting the electronic storage and transmission of laboratory reports as well as access to test data in examination areas;
- d) Has policies that provide guidance concerning any situations that could lessen confidence in the competence, impartiality, judgment or operational integrity of the FCU (District Personnel Manual, Chapter 18, Employee Conduct, part 1 – Supplemental Document);
- e) Has organizational chart(s) which show the structure and the relationships between management, casework units and support services. The FCU position in the DFS is shown in the PHL Organizational Chart (Supplemental Document);
- f) Defines the responsibility and authority of all FCU personnel in the FCU QAM – *Section 4.2.6* and the organizational chart(s), respectively (Supplemental Document).
- g) The FCU Manager will ensure analysts, including trainees, are adequately supervised. Employees responsible for supervising personnel will be familiar with the purposes, methods and standard operating procedures of examinations conducted in their unit and will be knowledgeable in the evaluation of assessment of the examination results;
- h) The FCU Manager have overall responsibility for the technical operations and the provision of the resources needed to ensure the required quality of FCU operations.
  - 1. The FCU Manager will ensure technical responsibility is designated for each discipline. The designation shall be to an individual(s) who has (have) appropriate technical training and technical experience for that discipline;
- i) The Deputy Director will ensure that the FCU quality system's effectiveness is continuously monitored, implemented and followed at all times. The Deputy Director reports directly to the DFS Director and works with the PHL Director, QA Specialists, and FCU Manager regarding quality assurance policies and issues for accredited disciplines.
- j) As needed, executive management will appoint deputies for key managerial personnel;
- k) The FCU Manager will ensure that FCU personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the objectives of the quality system.

4.1.6 The FCU Manager will communicate with FCU members through meetings, written communications or other means concerning the effectiveness of the quality system.

- 4.1.7 The FCU performs forensic testing at the Consolidated Forensic Laboratory (CFL) facility dedicated to the DFS. The FCU adheres to the safety procedures outlined in the DFS Health and Safety Manual. The FCU manager and FCU Lead Chemist ensure the FCU program and personnel are in compliance with FCU health and safety programs.
- 4.1.8 Key management and top personnel are identified on the DFS and PHL organizational charts.

## SECTION 4.2 MANAGEMENT SYSTEM

- 4.2.1 The FCU has established, implemented and maintained a quality system appropriate to its scope of activities and testing methods. The quality system is comprised of a quality assurance manual (QAM), the Departmental Operations Manual (DOM), standard operating procedures (SOP), training manuals and instructions that assure the quality of test results. All laboratory personnel are required to read and become familiar with this *Quality Assurance Manual*, the *Departmental Operations Manual*, the *Laboratory Operations Manual*, the *Standard Operating Procedures*, as well as all pertinent documents of the quality system within the discipline or area of employment. This review is documented in administrative records within the Qualtrax Document Control and Compliance System.
- 4.2.2 The FCU Manager is dedicated to good laboratory practice and to the quality of the forensic services provided to contributors. The quality system of the FCU ensures that functions are performed as intended and conform to the requirements of ISO/IEC 17025:2005 standards. FCU employees are responsible for ensuring that they understand and apply the quality system to their daily activities.

With the support of the FCU Manager and input from personnel, new policies, practices and procedures are developed and implemented when necessary. All quality system documents are reviewed annually and updated as necessary to continuously improve the effectiveness of the quality system. If conditions or situations having an adverse impact on the quality system are identified, appropriate changes will be made and/or Quality Corrective Actions will be implemented.

### 4.2.2.1 Quality System Goals and Objectives

The FCU quality system goals and objectives are as follows:

- To assure that FCU results provided to contributors are reliable and scientifically sound.
- To establish formal methods of quality assurance within the FCU through the implementation of recognized standards for good laboratory practice.

- To use procedures which are valid, dependable, reproducible, and adequate for their intended purpose.
- To monitor the routine operational performance of units within the FCU.
- To periodically audit all areas of the quality system for FCU management to ensure that policies, practices, and procedures are being followed.
- To maintain quality, excellence and integrity.
- To conform to the requirements of ISO/IEC 17025:2005 standards.
- To provide the necessary training for personnel to carry out the provisions of the quality system.

4.2.2.2 The laboratory staff shall maintain knowledge, skills, and abilities through required readings, training, and continuing education. This will be documented by each staff member to ensure that a minimum level of such professional involvement is met every year.

4.2.3 The FCU Manager will communicate with FCU personnel by memorandum(s), meetings or other means regarding the development, implementation and continuous improvement of the quality system.

4.2.4 The FCU Manager will advise FCU personnel of the importance of addressing contributor requests and complying with any relevant statutory and regulatory requirements.

#### 4.2.5 Documentation Hierarchy

The FCU's quality system documentation is comprised of laboratory policies and practices, and unit policies and procedures. The authority to implement change within each category is described below.

FCU policy is set forth in this *FCU Quality Assurance Manual* and the *DFS Quality Policy Statement*. The PHL policy statements and any subsequent revisions are approved by the PHL Director and the DFS Deputy Director, and issued by the designated Quality personnel. DFS policy statements are approved by the DFS Director.

FCU practices are found in the *FCU Standard Operating Procedures*. Practices are used to implement FCU policies. These practices and any subsequent revisions are approved by PHL Director and/or the FCU Manager and issued by the designated DFS Quality personnel.

Laboratory policies and procedures supplement the FCU policies and practices. Laboratory policies and procedures, and any subsequent revisions are approved by the PHL Director and/or the FCU Manager and issued by the designated DFS Quality personnel.

#### 4.2.6 Authority and Responsibility for the Quality System

The FCU Manager shall:

- Promote and support the quality system.
- Provide and promote dedicated resources to perform annual review (once per calendar year) of the laboratory's general quality system.
- Ensure that FCU personnel understand and apply current Quality Assurance policies and practices to appropriate situations.
- Appropriately delegate authority to the Laboratory Managers within the laboratory units to implement the quality system.
- Initiate a Quality Corrective Action (Q-CAR) (or delegate initiation) when a nonconformity has been identified and monitor that the selected corrective action team in a timely manner performs the Quality Corrective Action root cause analysis, appropriately documents and carries out all action steps, and closes-out the Q-CAR to ensure deficiencies found in the quality system and/or standardized operating procedures are resolved.
- Initiate a Quality Preventative Action (Q-PAR) (or delegate initiation) when an undesirable situation has been identified and monitor that the selected preventative action team in a timely manner appropriately documents and carries out all action steps and closes-out the Q-PAR to ensure undesirable situations that have the potential to lead to nonconformities are resolved.

The DFS Deputy Director shall:

- Promote and maintain the quality system
- Ensure conformance with ISO/IEC 17025:2005 standards and supplemental guidelines.
- Ensure that policies and practices within the quality system are documented and implemented.
- Track reported FCU Quality Corrective Actions and Quality Preventative Actions and ensure timely reporting and subsequent review of root cause analyses.
- Initiate a FCU Quality Corrective Action or Quality Preventative Action, as needed.
- Ensure that the laboratory specific quality system is reviewed once per calendar year.
- Ensure that the management system is reviewed once per calendar year.
- Communicate the quality system and related policies, practices, and procedures to all employees within the laboratory.

The Lead Chemist shall:

- Support the quality system.
- Ensure that all unit personnel receive necessary training and are qualified for their assigned duties.

- Recommend and approve the selection and use of technical procedures within the unit; establish criteria for technical procedure validations; and as necessary, review and update technical procedures.
- Ensure the completeness of FCU reports and supporting case documentation.
- Initiate a Quality Corrective Action (Q-CAR) (or delegate initiation) when a nonconformity has been identified and monitor that the selected corrective action team in a timely manner performs the Quality Corrective Action root cause analysis, appropriately documents and carries out all action steps, and closes-out the Q-CAR to ensure deficiencies found in the quality system and/or standardized operating procedures are resolved.
- Initiate a Quality Preventative Action (Q-PAR) (or delegate initiation) when an undesirable situation has been identified and monitor that the selected preventative action team in a timely manner appropriately documents and carries out all action steps and closes-out the Q-PAR to ensure undesirable situations that have the potential to lead to nonconformities are resolved.
- Document review and approval of all unit-associated Q-CARs and Q-PARs.

The Laboratory Quality Specialist shall:

- Promote and maintain the quality system for the laboratory units.
- Ensure conformance with ISO/IEC 17025 standards and supplemental guidelines.
- Ensure that FCU personnel understand and apply current quality assurance policies and practices to appropriate situations.
- Ensure that policies and practices within the laboratory units are documented and implemented.
- Ensure that unit personnel understand and apply current quality assurance policies and practices to appropriate situations.
- Initiate a Quality Corrective Action (Q-CAR) (or delegate initiation) when a nonconformity has been identified and ensure that the selected corrective action team in a timely manner performs the Quality Corrective Action root cause analysis, appropriately documents and carries out all action steps, and closes-out the Q-CAR to ensure deficiencies found in the quality system and/or standardized operating procedures are resolved.
- Initiate a Quality Preventative Action (Q-PAR) (or delegate initiation) when an undesirable situation has been identified and ensure that the selected preventative action team in a timely manner appropriately documents and carries out all action steps and closes-out the Q-PAR to ensure undesirable situations that have the potential to lead to nonconformities are resolved.
- Keep the DFS Deputy Director, the Laboratory Director, the FCU Manager and the Lead Chemist apprised of the status of all open Q-CARs and Q-PARs.
- Communicate the quality system and related policies, practices, and procedures to all employees within the laboratory units.



- Liaise with the DFS Deputy Director.

Analysts shall:

- Ensure compliance with current policies, practices, and procedures.
- Ensure that laboratory procedures are performed in a careful and responsible manner in accordance with current policies and practices.
- Make recommendations and suggestions for improving the FCU quality system as appropriate.
- Coordinate initiation of / initiate a Quality Corrective Action (Q-CAR) when a nonconformity has been identified.
- Coordinate initiation of / initiate a Quality Preventative Action (Q-PAR) when an undesirable situation has been identified that has the potential to lead to a nonconformity.

4.2.7 The FCU Manager shall ensure that the integrity of the quality system is maintained when changes to the quality system are planned and implemented. All quality system changes will be comprehensively reviewed and be clearly articulated to laboratory personnel for their understanding and acknowledgement.

## SECTION 4.3 DOCUMENT CONTROL

### 4.3.1 General

The FCU manages the documents that comprise its quality system according to the Department of Forensic Sciences Department Operations Manual *DOM02 – Practices for Document Control*. Controlled document distribution will be accomplished by the use of the Qualtrax Compliance Software.

### 4.3.2 Document Approval and Issue

4.3.2.1 Prior to implementation, all FCU quality system documents will be thoroughly reviewed, approved for release by authorized personnel, and made available for use by employees. The *DOM02 – Practices for Document Control* contains provisions for identifying the current revision of documents, for distributing quality system documents, and to preclude the use of invalid and/or obsolete documents.

4.3.2.2 The *DOM02 – Practices for Document Control* ensures that:

- a) Current revisions of appropriate practices, procedures and instrumentation manuals will be available where critical operations are performed;
- b) Quality system documents will be reviewed once per calendar year and revised as necessary to comply with applicable requirements;
- c) Invalid or obsolete documents will be promptly removed;

d) Archived quality system documents will be marked as such to preclude their use.

4.3.2.3 The FCU prepared quality system documents are uniquely identified according to the requirements of the *DOM02 – Practices for Document Control*. This identification includes the document title, date of issue, revision number, and page numbering including total number of pages. The approving and issuing authorities are also identified in the document.

#### 4.3.3 Document Changes

4.3.3.1 Revisions to FCU prepared quality system documents will be subject to the same review, approval, documentation and issuance requirements as the original document. Revisions to instrumentation manuals or externally produced quality documents will be subject to the same review and approval as the original document. Changes to policies, practices, procedures and training program manuals will be described in the history of the document within the Qualtrax Compliance Software and will be formally re-issued as soon as practical. Additionally, appropriate personnel will have access to any information necessary to conduct the review and approve the revision. *DOM02 – Practices for Document Control*

4.3.3.2 Altered or new text will be outlined in the history of the document contained within the Qualtrax Compliance System. Comparisons between versions of current and prior documents is capable by Qualtrax administrators to show which changes occurred between versions of the documents.

4.3.3.3 The FCU quality system does not permit the amendment of documents by hand for internally prepared documents. Amendments by hand to externally prepared documents will be performed according to *DOM02 – Practices for Document Control*.

4.3.3.4 The *DOM02 – Practices for Document Control* also applies to documents maintained in computerized systems.

### SECTION 4.4 EXAMINATION REQUESTS

4.4.1 *FCS02 – SOP for General Laboratory Procedures for FCU* provides guidance for the review of requests for examinations. These practices ensure that the:

- Requirements, including the methods to be used, are adequately defined, documented and understood;
- FCU has the capability and resources to meet the requirements;

- Analyst selects an appropriate technical procedure, to the extent possible, that is dictated by the nature of the evidence and a contributor's request;
  - Unanswered issues in the request are reconciled by the appropriate discipline's Laboratory Manager/Technical Leader or designee of the FCU Director prior to any work being performed.
- 4.4.2 The FCU maintains all records related to the contributor's request, including case-related discussions with the contributor in the case file. An *Activity Communication Log* will be used to document discussions with a contributor relating to their request(s). Printouts of electronic mail may also be maintained for this purpose in the case file (or their electronic equivalent).
- 4.4.3 Reviews of requests on any work that is subcontracted by the FCU will be conducted by the appropriate laboratory manager, and decisions will be made on a case by case basis.
- 4.4.4 Any significant deviations from a contributor's request, such as conducting additional examinations that were not requested, will be communicated to the contributor by the FCU Manager, or designee. This communication will be documented in the *Activity Communication Log* in accordance with *FCS02 – SOP for General Laboratory Procedures for FCU*.
- 4.4.5 Changes in requested examinations will be communicated to the respective laboratory personnel. If a change is necessitated by the laboratory, the customer will be notified as soon as practicable.

## **SECTION 4.5 SUBCONTRACTING OF EXAMINATIONS**

- 4.5.1 The FCU will select competent subcontractors to conduct forensic examinations when necessary. The FCU Manager and DFS Deputy Director, or designee, is responsible for evaluating the competency of subcontractors. A subcontractor's competence can be demonstrated by their accreditation by an appropriate forensic accrediting body and/or by satisfactory results of an audit conducted by FCU personnel. The FCU Manager or designee may also determine a subcontractor to be competent, on a case-by-case basis, if the subcontractor is accredited by another ISO 17025:2005 accrediting body or by accepting the results of an independent audit.
- 4.5.2 When the FCU subcontracts work, the Laboratory Manager or designee will advise the contributor of the arrangement in writing. This will be documented via memorandum and in the *Activity Communication Log* in the FCU case file.
- 4.5.3 The FCU is responsible for the quality of a subcontractor's work product, unless the contributor specifies the subcontractor.

- 4.5.4 The FCU Manager, or designee, is responsible for maintaining a list of all competent subcontractors who are approved for conducting forensic examinations. Documentation will be maintained, via a departmental memorandum, of the subcontractor's conformance with the requirements of the ISO 17025:2005 standard for the work in question.

## **SECTION 4.6 PURCHASING OF SERVICES AND SUPPLIES**

- 4.6.1 The District of Columbia Office of Contracts and Procurements (OCP) policies and regulations govern the procurement of products and services from external sources. The procedures for the reception and storage of reagents, chemicals, standards and consumable materials necessary for forensic examinations are set forth in *Appendix B*.
- 4.6.2 The FCU will evaluate quality affecting supplies, reagents and consumables purchased by the FCU to ensure that they comply with specifications defined in the appropriate standard operating procedure (SOP). These materials will not be used until their compliance is verified. Verification will be performed against appropriate reference materials and documented. Laboratory units will maintain quality records of steps taken to check conformance of these materials.
- 4.6.3 The FCU will ensure that purchase request documents contain information describing the supplies and services ordered if they affect the quality of examinations. These requests will be reviewed and approved for technical content by the FCU Manager, or designee, prior to ordering.
- 4.6.4 The FCU will evaluate suppliers of critical consumables, supplies and services and maintain records of these evaluations. The FCU will maintain a list identifying approved suppliers.
- 4.6.5 The FCU will review documentation of supplies and services, *e.g., packing slips*, as appropriate, and will indicate confirmation of receipt by highlighting or other marks with initials to indicate acceptance. This document shall be provided to the purchasing staff for purchasing close out.
- 4.6.6 The FCU shall ensure that all consumables that affect quality meet the requirements of the unit prior to being used in case work. As appropriate, standards shall be monitored via control charts. Whenever possible, standards shall be acquired from ISO Guide 34 sources to ensure quality, and do not require further material verification.

## **SECTION 4.7 SERVICE TO THE CUSTOMER**

- 4.7.1 FCU employees will communicate with contributors as needed to clarify their requests and to answer any questions concerning the status of the requests.

The laboratory will maintain open channels of communication with contributors during lengthy or complex testing processes. All communications will be documented on an *Activity Communication Log* and maintained in the case file. Printouts of electronic mail may also be maintained in the case file for documenting communications.

- 4.7.2 The FCU seeks feedback from its customers regarding the quality of the laboratory's work product and its service as a method of quality review. The laboratory will periodically survey customers regarding the level of satisfaction with the services provided. The results of these surveys will be reviewed by the FCU Manager and/or DFS Deputy Director, or designee, and will be used to improve the quality system, testing activities and customer service. The survey results will be maintained for at least one ISO/IEC 17025:2005 accreditation cycle or for five years, whichever is longer.

## SECTION 4.8 COMPLAINTS

As part of the FCU's commitment to provide reliable forensic examinations, employees will take appropriate steps to address valid complaints regarding its services. Any employee receiving a complaint will notify the FCU Manager and/or DFS Deputy, or designee. The FCU Manager and/or DFS Deputy Director, or designee, are responsible for investigating a complaint. When necessary, the FCU will address complaints by implementing the *DOM07 – Practices for Quality Corrective Action*. Records will be maintained of all complaints, any relevant investigations and responses. Records of root cause analyses and Quality Corrective Actions implemented by the Laboratory will be maintained in accordance with the *DOM07 – Practices for Quality Corrective Action*.

- 4.8.1 FCU employee complaints concerning the quality system are also governed by this policy and the *DOM07 – Practices for Quality Corrective Action*.

## SECTION 4.9 CONTROL OF NONCONFORMING TESTS

- 4.9.1 The *FCU QAM – Section 4.11* and the *DOM07 – Practices for Quality Corrective Action* will be followed when a nonconformity occurs during the examination process. This policy and practice:
- Designates the actions to be taken and the individual responsible for managing the nonconformity;
  - Provides guidance to determine the frequency and impact of the nonconformity;
  - Ensures that Quality Corrective Actions are implemented in a timely manner and the acceptability of the nonconformity will be evaluated;
  - Ensures that, when necessary, the contributor is notified and results of the examination are amended;

e) Defines the responsibility for authorizing the resumption of work.

4.9.2 Where the evaluation indicates that the nonconformity could recur or that there is doubt about the compliance of the laboratory's operations with its own policies and procedures, the *FCU QAM – Section 4.11* and the *DOM07 – Practices for Quality Corrective Action* will be promptly followed.

#### 4.9.3 Practices for Authorizing Deviations

There are times when deviating from policies, practices and/or procedures is necessary. It is the policy of the FCU that deviations will be controlled to ensure that quality is not compromised.

**Minor Deviation:** When there is a need for a minor deviation from a policy, practice, or procedure, the requestor's designated Technical Leader and/or Laboratory Unit Manager will consider the suitability and risks of a minor deviation before approving or rejecting a proposed deviation. The requestor will submit in writing the name of the policy, practice or procedure from which the deviation is sought, and a statement of the specific deviation requested. The designated Technical Leader (Lead Chemist) and/or FCU Manager will acknowledge his/her approval by signing and dating the deviation request. If the deviation is case-related, the deviation and its approval for deviation will be documented in the examination documentation. If the deviation is not case-related, the deviation and approval for deviation will be documented via memorandum. The original will be retained in the quality records and a copy will be returned to the requestor.

**Major Deviation:** When there is a need for a major deviation from a policy, practice, or procedure, the requestor will submit a *Major Deviation Request* form to the designated Technical Leader and/or Laboratory Unit Manager. The designated Technical Leader and/or Laboratory Manager will evaluate the merit and risks of the deviation as well as the impact on the quality of work and the quality system. The designated Technical Leader and/or Laboratory Unit Manager will document the approval or rejection of the request. The original will be retained in the quality records and a copy will be returned to the requestor. If the deviation is case related, a copy of the form will be placed in the case file and any related communications will be documented in the *Activity Communication Log*. When approved major deviations have an impact within the FCU beyond the requestor's unit, the appropriate discipline FCU Manager and/or PHL Director will notify the affected units and the DFS Deputy Director.

## SECTION 4.10 IMPROVEMENT

The FCU uses policies, objectives, audit results, data analysis, Quality Corrective Actions, Quality Preventive Actions and management reviews to continuously improve the effectiveness of the quality system.

## SECTION 4.11 QUALITY CORRECTIVE ACTION

### 4.11.1 General

The laboratory Quality Corrective Action process is implemented and documented whenever nonconformities from accepted laboratory practice are identified, including those identified by external auditors. All FCU personnel, either independently or as part of an audit, may identify nonconforming work or departures from policies and procedures in the management system or in technical operations. Once nonconforming work is reported, it is evaluated for frequency and impact. The documentation of the nonconforming work will following occur in accordance with the *DOM07 – Practices for Quality Corrective Action* and will consist of an entry to the nonconformity tracker or a *Quality Corrective Action Report* will be initiated. The intent of the Quality Corrective Action is to prevent recurrence of the nonconformity that affects the quality of work performed within the FCU. It is important that the Quality Corrective Actions are immediately initiated to minimize the impact of the nonconformity.

- Quality Corrective Action as defined and used in this manual is separate and distinct from “Corrective Action” as defined in the DC Government District Personnel Manual.

### 4.11.2 Root Cause Analysis

Determining causation is an important first step in the Quality Corrective Action procedure. Root cause analysis requires an in-depth investigation of the underlying causation factors rather than cursory symptom analysis. A process review to include technical procedures, instrumentation utilization and maintenance, controls and standards requirements and employee performance may be required. The *DOM07 – Practices for Quality Corrective Action* includes initiating an investigation to determine the root cause(s) of the nonconformity.

### 4.11.3 Selection and Implementation of Quality Corrective Actions

The *DOM07 – Practices for Quality Corrective Action* provides guidance for determining the level of the nonconformity (Level 1 or Level 2). Once the level is determined, the appropriate personnel will select, document and implement the action(s) most likely to eliminate the nonconformity and to prevent recurrence. Quality Corrective Actions will be appropriate to the magnitude and risk of the nonconformity. The FCU will document and implement any required changes resulting from Quality Corrective Action investigations.

### 4.11.4 Monitoring of Quality Corrective Actions

The DFS Deputy Director will monitor and verify the results of Quality Corrective Actions to ensure that they have been effectively resolved. Documentation will be kept of all Quality Corrective Action processes for auditing compliance [*DOM07 – Practices for Quality Corrective Action*] by the Laboratory Quality Assurance Liaison.

#### 4.11.5 Additional Audits

Situations that bring into question compliance with established policies or procedures may necessitate audits of the appropriate area(s) or of the entire quality system. These audits will be conducted and documented as set forth in Section 4.14 of this manual. If required, notification of Quality Corrective Action measures and findings will be communicated to any affected contributor. All Quality Corrective Action processes will be documented and maintained within the laboratory [*DOM07 – Practices for Quality Corrective Action*].

### SECTION 4.12 QUALITY PREVENTIVE ACTION

4.12.1 Quality Preventive Actions are taken to prevent occurrence whereas Quality Corrective Actions are taken to prevent recurrence. FCU personnel, either independently or as part of an audit, may identify needed improvements, opportunities for improvement and potential sources of nonconformity. If a Quality Preventive Action is warranted, the *DOM08 – Practices for Quality Preventive Action* will be followed.

4.12.2 The *DOM08 – Practices for Quality Preventive Action* includes measures for verifying the effectiveness of any Quality Preventive Actions that are implemented.

### SECTION 4.13 CONTROL OF RECORDS

#### 4.13.1 General

4.13.1.1 The FCU has policies and standard operating procedures for the identification, collection, organization, accessibility, filing, storage, maintenance and disposal of quality and technical records [*LOM02 – Practices for Case Documentation and Report Writing*]. Quality records include items such as internal audit reports, management reviews, Quality Corrective Action forms and Quality Preventive Action forms.

4.13.1.2 All FCU quality and technical records will be legible and readily retrievable from storage in appropriate DFS facilities. Retention times for records will be determined by DFS and/or ISO/IEC 17025:2005 requirements.



4.13.1.3 Access to FCU files is controlled according to DFS policies.

4.13.1.4 All electronically stored documentation must be capable of instant retrieval and stored in such a manner as to prevent unauthorized access, destruction or deterioration. The laboratory has back-up measures to ensure that electronic documents are not lost in the event of a failure of the primary storage medium. Each laboratory unit will protect and back-up records stored electronically and have procedures to prevent unauthorized access to or amendment of these records. Each unit is responsible for documenting the procedures for record protection and back-up of electronic records. The DFS follows DC Government Information Technology guidelines as governed by the *Enterprise Cloud and Infrastructure Services (ECIS) agreement*.

#### 4.13.2 Technical Records

4.13.2.1 The FCU will retain technical examination and administrative documentation as part of the case file for a defined period of time in accordance with DFS requirements. The appropriate SOPs will contain adequate information to identify factors affecting the uncertainty of measurement, if applicable. Examination documents will be such that another qualified analyst could repeat the examination under conditions as close as possible to the original [See Section 7.2, *FCS06 – SOP for Reviewing Reports*]. Personnel responsible for the examination of evidence, the verifier, the technical reviewer and the administrative reviewer will be identified in the case file. [*FCS06 – SOP for Reviewing Reports*]

4.13.2.1.1 When appropriate, observations and test results may be captured by photography, digital capture, or scanning to preserve a record of the evidence. Photocopies, tracings, and hand-drawn sketches may also be suitable when necessary [See Section 7.1, *FCS06 – SOP for Reviewing Reports*].

4.13.2.1.2 Reasons for rejecting test results or observations shall be included within the instrument injection sequence log, when applicable.

4.13.2.1.3 When calculations and/or data transfers occur in the case file, which are not part of a validated process, a second analyst must check the results and record their finding within the case documentation [*FCS06 – SOP for Reviewing Reports*].

- 4.13.2.1.4 When calculations are made in a non-permanent fashion, e.g., simple addition with a calculator, the result will be evaluated by the analyst to ensure the number is reasonable.
- 4.13.2.2 Examination (technical) notes will include observations, data and calculations. These notes will be recorded contemporaneously with, and will be identifiable to, the specific examination performed by a specific analyst. [FCS02 – SOP for General Laboratory Procedures for FCU]
- 4.13.2.2.1 Each page will be numbered, dated, marked with the laboratory case number and initialed by the analyst. Refer to Section 7.10 of FCS02 – SOP for General Laboratory Procedures for FCU.
- 4.13.2.3 Mistakes which occur in case documentation or records will be corrected with an initialed and dated single strike-out and the correction entered alongside. No part of case documentation or records can be erased or otherwise made illegible. In the case of electronically stored records, equivalent measures will be taken to avoid loss or change of original data. [FCS02 – SOP for General Laboratory Procedures for FCU].
- 4.13.2.3.1 Any changes (additions or strikeouts) made to case documentation will be initialed and dated by the person making the change. [FCS02 – SOP for General Laboratory Procedures for FCU]
- 4.13.2.3.2 Any change made to completed examination records generated and/or maintained in an electronic form shall be tracked by archiving the original copy with the archive date attached to the file name. The final valid examination records shall be considered completed prior to any technical or administrative review of the records. All electronic records will be stored within the file structure of the secure computer network. This network file structure undergoes a routine scheduled backup of the data, to form a redundant copy to act as an historical/archival record, which can be accessed and retrieved when necessary.
- 4.13.2.4 The FCS02 – SOP for General Laboratory Procedures for FCU, FCS06 - SOP for Reviewing Reports, and this quality manuals will identify what documents will be maintained in the case file.

- 4.13.2.5 Examination documentation will be such that, in the absence of the analyst, another competent reviewer could evaluate the examinations performed and interpret the data. [*FCS06 - SOP for Reviewing Reports*]
- 4.13.2.5.1 Records to support conclusions in all disciplines shall meet all applicable requirements addressed in ISO/IEC 17025:2005 materials.
- 4.13.2.5.2 When instrumental analyses are conducted, operating parameters shall be recorded. The laboratory may document operating parameters in their procedures, examination documents, log book, etc.
- 4.13.2.6 The FCU case number and the analyst's initials (or signature), or their electronic equivalent, will be on each page of the examination documentation [*FCS02 – SOP for General Laboratory Procedures for FCU*].
- 4.13.2.7 When examination documentation is prepared by an individual(s) other than the analyst who interprets the findings, prepares the report and/or testifies concerning the documentation, the initials (or secure electronic equivalent of initials or signature) of that individual(s) will be on each page(s) of the examination documentation representing his/her work [*FCS02 – SOP for General Laboratory Procedures for FCU*].
- 4.13.2.8 All administrative documents received or generated by the FCU for a specific case, will be identified with the FCU case number on each page.
- 4.13.2.9 The FCU case number for each case for which data was generated shall be appropriately recorded on the printout when data from multiple cases is recorded on a single printout.
- 4.13.2.10 Every effort will be made to avoid having information recorded on the front and back of an examination document. However, when this is necessary, each side will be identified as an individual page. Each side of the page will be labeled with the FCU case number, date (for technical documents) and analyst's initials.
- 4.13.2.11 Handwritten case documentation will be in ink. Exceptions will be made when environmental conditions, such as extreme cold or rain, prevent the use of inks. Pencil (including color) may be used for diagrams or tracings. Computer generated notes are acceptable,

and will be retained within the file system of the secure computer network.

- 4.13.2.12 Abbreviations and notations will be acceptable if they are clearly documented and readily comprehensible to the technical and/or administrative reviewer. A list of common abbreviations and/or symbols used will be found in the *FCU Quality Assurance Manual – Appendix A*.
- 4.13.2.13 All technical pages within the DFS case records must be paginated using the procedure set forth in *FCS02 – SOP for General Laboratory Procedures for FCU*.

## SECTION 4.14 INTERNAL AUDITS

- 4.14.1 The *DOM06 – Practice for Internal and External Audits* will be followed when conducting scheduled audits to verify that operations conform to the requirements of the FCU quality system and ISO/IEC 17025:2005. Audits are performed to measure and evaluate the effectiveness of the quality system, to verify the effectiveness of Quality Corrective Actions, and to recommend improvements for FCU operations. The DFS Deputy Director is responsible for planning and organizing annual audits as required and as requested by the FCU Manager. DFS Quality personnel may also conduct periodic audits of its activities to verify that its operations continue to comply with requirements of the management system and as requested by FCU manager.
  - 4.14.1.1 Internal audits will be conducted, at minimum, once per calendar year according to the *DOM06 – Practices for Internal and External Audits*. The audits shall be carried out by trained/qualified personnel who are, wherever resources permit, independent of the activity being audited.
  - 4.14.1.2 Internal audit records will be retained for at least one ISO/IEC 17025:2005 accreditation cycle or five years, whichever is longer.
- 4.14.2 When an audit identifies a nonconformity, the DFS Deputy Director or Lead Auditor will address the nonconformity according to the *DOM06 – Practices for Internal and External Audits*. When necessary, the FCU will notify contributors, in writing, if FCU results have been affected.
- 4.14.3 An audit report will be issued for every internal audit according to the *DOM06 – Practices for Internal and External Audits*.
- 4.14.4 The effectiveness of a Quality Corrective Action resulting from an audit finding will be verified within a reasonable timeframe period [*DOM07 – Practices for Quality Corrective Action*] and written notification provided to the auditee when the nonconformities have been adequately remediated. [*DOM06 – Practices for Internal and External Audits*]

- 4.14.5 The DFS Deputy Director will submit an Annual Accreditation Audit Report to the accrediting body as soon as practicable following the laboratory's accreditation anniversary date.

## **SECTION 4.15 MANAGEMENT REVIEW**

- 4.15.1 The FCU Manager, and DFS Deputy Director, or designee, will periodically evaluate the quality system and examination activities to ensure their continued suitability and effectiveness. This management review will be used as the foundation for future development of FCU goals and objectives as well as any necessary changes or improvements to the quality system.

This review shall assess:

- The suitability, adequacy and completeness of FCU policies, practices and procedures for meeting the quality objectives of the FCU and the standards of ISO/IEC 17025:2005.
  - Any reports from technical management;
  - The outcome of recent internal audits;
  - Any preventive, follow-up and/or Quality Corrective Actions;
  - Any external assessments;
  - The proficiency testing program;
  - Changes in the volume and type of work being performed by the FCU;
  - Any feedback or complaints from contributors and FCU personnel;
  - Any recommendations for improvement;
  - The adequacy of the organizational structure, staff training and resources to implement the FCU quality system.
- 4.15.1.1 Management reviews will be conducted at least once per calendar year.
- 4.15.1.2 Management reviews will be documented and retained for at least one ISO/IEC 17025:2005 accreditation cycle or five years, whichever is longer.
- 4.15.2 Findings from management reviews and the actions that arise from them shall be documented. Management will ensure that these actions are carried out within an appropriate and agreed timescale. Any nonconformities identified through the management review process will be appropriately documented and remediated by implementing the *DOM07 – Practices for Quality Corrective Action*.

---

## PART 5 TECHNICAL REQUIREMENTS

---

### SECTION 5.1 GENERAL REQUIREMENTS

- 5.1.1 The FCU ensures correct and reliable forensic examinations by using adequately trained personnel, appropriate facilities, validated standard operating procedures, properly maintained and calibrated equipment and instrumentation, the uncertainty of measurement, and by maintaining the integrity of evidence. When applicable, traceable reference standards and materials and suitable sampling procedures are utilized.
- 5.1.2 The FCU will consider the factors cited in the *FCU QAM – Section 5.1.1* when developing and validating standard operating procedures, in the training and qualification of personnel, and in the calibration and maintenance of the equipment that is being utilized in the laboratory.
- 5.1.3 The FCU will have procedures for routinely checking the reliability of their reagents (FCS02 – SOP for General Laboratory Procedures for FCU).
- 5.1.3.1 Refer to Section 7.7 of *FCS02 – SOP for General Laboratory Procedures for FCU* for information regarding the labeling of reagents prepared in the FCU as well as what information is recorded and maintained. Reliability testing of critical reagents shall occur before use or, if appropriate, concurrent with the test. Unit specific procedures may establish additional requirements regarding the preparation of reagents.

### SECTION 5.2 PERSONNEL

- 5.2.1 The designated Technical Leader or FCU Manager will ensure that only qualified technical personnel conduct forensic examinations, operate specific equipment, confirm identifications and associations, review results and issue examination reports. Personnel who are undergoing training will be appropriately supervised. Sufficiently detailed training records of personnel can demonstrate the successful completion of a specific training program.
- 5.2.1.1 Each casework unit within the FCU will have a documented training program that is used to develop an individual's knowledge, skills, and abilities required to perform forensic examinations. The designated Technical Leader or FCU Manager, with approval of the Deputy Director, will ensure that, at a minimum, each trainee successfully completes a competency test in the relevant discipline or sub-discipline prior to conducting independent casework. The Unit specific training manuals outline the acceptance criteria for each training module, where applicable. A trainee's successful completion of the training program will be documented by the FCU Manager, DFS Deputy Director, or

designee identifying the discipline(s) or sub-discipline(s) a trainee is qualified in. Such documentation will be maintained in the employee's training documentation file.

- 5.2.1.2 Where applicable, training programs will include training in the presentation of evidence in court.
  - 5.2.1.3 Training should include the application of ethical practices in forensic sciences, a general knowledge of forensic science, and applicable criminal and civil law procedures.
  - 5.2.1.4 The re-training of an analyst may occur when findings from a Quality Corrective Action or preventative action indicate that it is necessary. The DFS Deputy Director, or designee, shall be notified when an employee must undergo re-training. The DFS Deputy Director, with designated subject matter experts, will establish a training plan for the individual based on the root cause findings of deficiencies and develop a re-training program to address those discrepancies. This will be followed with a competency test, which must be successfully completed prior to the scientist being allowed to perform casework. For all documented instances of re-training, there will be a 60-day evaluation, unless otherwise specified, of the re-trained analyst following the return to casework duties.
- 5.2.2 Initial training and continuing education of laboratory personnel is an ongoing function of the laboratory. Specific analytical disciplines will list any special educational class requirements or certifications in their individual job descriptions. Analytical unit training programs are structured to provide the highest level of education to the staff. The training program comprehensively covers all work performed by the unit and requires competency testing upon its conclusion.

Continuing education and professional development are extremely important and strongly encouraged.

The DFS Deputy Director, or designee, will (at least annually) provide a survey to staff members. The survey will seek feedback from DFS scientists on individual and unit specific training needs. The survey is an opportunity for the scientists to describe any training needs that that will assist them in successfully performing the duties of their position. In addition, staff members are encouraged to provide all training desires to their unit supervisor, laboratory director, and/or the DFS Deputy Director as training needs arise. Requests will be granted in accordance with needs, requirements, and budget when necessary.

Laboratory management encourages membership for scientists in professional organizations as a means of continued professional development. The laboratory encourages scientists to attend meetings and seminars presented by professional organizations and will attempt to give duty time, travel, per diem and lodging for the scientist if funds are available to help defray their expense to attend. Staff members presenting technical papers at recognized symposiums, requiring specialized technical training, or training to maintain certifications will be given due consideration. The DFS may provide opportunities for external training from vendors or other agencies or internal training using DFS resources. Formal requests for training must follow the procedures outlined in the DFS Training and Travel Request Policy.

Some disciplines are required by standards to have at least eight (8) hours of continuing education in their discipline. These hours may be completed at external or internal training sessions. If training occurs internally, the resume of the individual presenting the training, the topic, content and date it occurred, along with the duration of training shall be documented. Such documentation will be maintained in an employee's training file.

When internal training is provided to DFS staff the effectiveness of that training will be addressed through the customer feedback survey. Each scientist should take time to read periodicals, journals, articles, and in order to remain proficient in the field. The review of scientific periodicals and journals is an important step in the continuing education and professional development of employees.

The FCU also ensures the development of employees via annual performance evaluations which begin and end with each fiscal year. It is the responsibility of both supervisor and staff to meet to establish goals, objectives and/or projects for an employee to complete. Mid-year meetings occur to allow for the supervisor and employee to discuss the progress of the employee or to determine if any areas warrant improvement. The FCU uses the performance evaluation system from the District of Columbia Department of Human Resources.

- 5.2.3 The FCU uses qualified technical personnel who are employed by, or under contract to, the DFS. Unit management will ensure that competent contractors and key support personnel are supervised and that they work in accordance with the FCU's quality system.
- 5.2.4 Current job descriptions for all FCU personnel are maintained in the DFS Human Resources Department administrative records.
- 5.2.5 The FCU Manager issues competency memorandums that clearly identifies the jobs and/or sub-disciplines FCU employees are approved to conduct. The appropriate manager authorizes qualified personnel to perform forensic examinations and particular types of sampling. Each unit will compile records of



an employee's qualifications to include education, professional experience, competency test results, proficiency test results and memos documenting successful completion of the training program(s). All records will be held by the DFS Deputy Director regarding training. The above requirements also apply to contractors.

## 5.2.6 Scientist Qualifications

### 5.2.6.1 Education

5.2.6.1.1 Scientists working in FCU shall possess a baccalaureate or an advanced degree in a natural science or a closely related field.

### 5.2.6.2 Competency Testing

5.2.6.2.1 All scientists, regardless of academic qualifications or past work experience, must complete a competency test by achieving the intended results prior to assuming casework responsibilities in the FCU.

5.2.6.2.2 Technical support personnel, regardless of academic qualifications or past work experience, shall satisfactorily complete a competency test prior to assuming independent responsibility for any task that could reasonably be expected to affect the outcome of any examination reported by the laboratory.

5.2.6.2.3 All scientists working in any sub-discipline of forensic science must satisfactorily complete competency testing in each sub-discipline prior to assuming casework responsibility in a sub-discipline.

5.2.6.2.4 Successful and/or unsuccessful completion of competency testing will be documented by the designated Technical Leader or FCU Manager of such (sub)discipline. Documentation will be forwarded to the scientist and the original copy will be maintained by the DFS Deputy Director.

5.2.6.2.4.1 Unsuccessful completion of competency testing will be further documented through a Quality Corrective Action with a mandatory requirement of retraining and re-assessment of the analyst following the re-training.

5.2.7 The FCU maintains relevant books, journals and articles dealing with its accredited disciplines. Literature is available in hard and electronic form. Employees have access to the internet to search and read relevant information in the forensic field.

## SECTION 5.3 FACILITIES AND ENVIRONMENTAL CONDITIONS

5.3.1 The DFS Forensic Chemistry Unit (FCU) is housed within the Consolidated Forensic Laboratory (CFL) at 401 E Street SW, Washington D.C. 20024. The laboratory facility permits the correct performance of forensic examinations. Casework units will ensure that the environmental conditions do not adversely affect the quality required of any measurement. Any environmental conditions that can affect the results of examinations will be documented in the appropriate standard operating procedure. All examinations require normal laboratory environmental conditions unless noted in a standard operating procedure. Extreme care will be taken when sampling and/or examinations are undertaken at sites other than the CFL facility.

5.3.2 If environmental conditions affect the quality of an examination, casework units will monitor, control and record those conditions as required by a standard operating procedure. Examinations will be stopped when the environmental conditions jeopardize the results or evidence.

5.3.3 FCU will be responsible for maintaining effective separation between incompatible activities to prevent cross-contamination. [See section 7.5 of *FCS02 – SOP for General Laboratory Procedures for FCU*]

5.3.4 Access to and use of all FCU examination and technical records areas in the CFL facility are controlled and limited. [*DOM01 – Security Procedures*]

5.3.4.1 The disciplines of the FCU located in the CFL facility conform to the policies and/or practices for security which are found in the *DOM01 – Security Procedures*. These policies and practices ensure that:

- Visitors have restricted access to the operational areas of the FCU.
- All exterior entrance/exit points have proximity badge readers.
- FCU internal areas requiring limited/controlled access have a key lock system, biometric scanners and/or access badge card readers.
- Accountability of all FCU access is documented.
  - ⊖ The DFS Security Office, under control of the PSPD, maintains documentation of assigned access badges.
  - ⊖ The DGS Facilities Manager maintains documentation and control over the physical keys for the CFL.

- ⊖ The FCU Manager acts as the security access coordinator and authorizes access to all unit areas within the CFL.
  - ⊖ Keys and access badges are limited to those individuals designated by the FCU Manager to have access to the FCU laboratory in the CFL facility.
  - Evidence storage areas are secured and the storage conditions are such as to prevent loss, deterioration and contamination as well as to maintain the integrity of the evidence. This applies both before and after examinations have been performed.
- 5.3.5 The *DFS Health and Safety Manual* requires good housekeeping in the CFL facility. FCU personnel who perform work in the CFL facility must follow housekeeping procedures in the *DFS Health and Safety Manual*. When necessary, FCU will create special housekeeping procedures to ensure the quality of examinations.
- 5.3.6 The FCU personnel performing work in the CFL facility shall follow and adopt the DFS health and safety program. The *DFS Health and Safety Manual* outlines the health and safety program and DFS personnel must demonstrate adherence to this program. The FCU personnel performing work in the CFL facility must follow the *DFS Health and Safety Manual*.

## **SECTION 5.4 TEST AND CALIBRATION METHODS AND METHOD VALIDATION**

### 5.4.1 General

Standard operating procedures (SOPs), including validated technical procedures, are a key element in establishing and maintaining quality within the FCU. Thus, it is the policy of the FCU for casework units to have and use written procedures for all examinations within their scope. [*DOM03 – Practices for Writing Standard Operating Procedures*]. These procedures include, when necessary, handling, transfer, storage and preparation of evidence to be examined. Where applicable, SOPs will have sections for the estimation of the measurement of uncertainty; sampling; calculations, including any statistical techniques for the analysis of examination data; and limitations of the procedure including any quality affecting environmental conditions. All SOPs used in the FCU will be reviewed and authorized prior to implementation according to the *DOM03 – Practices for Writing Standard Operating Procedures*.

Casework units will have procedures for operating all FCU equipment and for handling and preparing evidence for examination to ensure the quality of the results. Any deviations from a standard operating procedure will be documented, justified and authorized according to *FCU QAM Section 4.9.3*.

5.4.1.1 The Laboratory Manager or designee will be responsible for maintaining standard operating procedures and ensuring that procedures are readily available to appropriate personnel through the use of the Qualtrax Compliance Software and other sources.

5.4.1.2 Standard operating procedures specify the use of appropriate standards and controls. Any standards or controls used will be recorded in the examination documentation. [*DOM03 – Practices for Writing Standard Operating Procedures; FCS02 – SOP for General Laboratory Procedures for FCU*]

#### 5.4.2 Selection of Technical Procedures

When the contributor does not specify the method to be used, the laboratory shall select the appropriate analytical method(s). The Laboratory Manager or designee shall inform the contributor when the method proposed by the contributor is considered to be inappropriate or out of date. Analysts will select appropriate technical procedures to meet the needs of the contributor while taking into account the nature of the evidence and the facts of the case. These technical procedures should be published either in international, regional or national standards, or by reputable technical organizations, or in relevant scientific texts or journals, as specified by the manufacturer of the equipment or developed by the FCU. If the FCU uses a standard procedure, it will use the latest edition when possible. The standard procedure will be supplemented with additional details to ensure consistent application. The FCU will confirm that it can properly use a standard procedure prior to introducing it for forensic examinations. If the standard procedure changes the confirmation will be repeated. FCU-developed technical procedures or procedures adopted by the FCU, including standard procedures, are used as appropriate.

5.4.2.1 The reliability of a validated technical procedure that is new to the FCU will be confirmed in-house against any documented performance characteristics of that procedure prior to use on casework. Records of performance checks conducted during the validation process will be maintained in the casework units for future reference.

5.4.2.2 If within a 6-month window a validated test or analysis has not been performed, it will be considered an infrequently utilized process within the FCU.

5.4.2.2.1 If an infrequently utilized process is needed for casework, the analyst shall: (1) Review the pertinent SOP, (2) review the operation of the equipment, and (3) test the method with a known reference standard prior to testing the casework sample.

5.4.2.3 The quality of all reference materials and reagents must be successfully verified and documented before they are used in casework. Documentation must include, at a minimum, the lot number or batch number associated with the reference material or reagent.

5.4.2.4 Each lot of critical reagent must be successfully tested and documented at least once every ninety days against a reference material before used in casework. Documentation must include, at a minimum, the lot number or batch number associated with the reference material and the critical reagent.

5.4.2.5 All reference materials and reagents must be labeled with the following: name, concentration (when appropriate), preparation date, expiration date (where appropriate), initials of the preparer, storage conditions (where applicable), and hazard warnings (where applicable).

#### 5.4.3 FCU Developed Technical Procedures

When a casework unit develops a technical procedure, it will be a planned activity that is performed by qualified personnel with adequate resources. Any significant changes occurring during the development of the procedure will be effectively communicated to all personnel involved in the development process. See *DOM04 – Practices for Validating Technical Procedures*.

#### 5.4.4 Deviation from Technical Procedures

Casework units will use validated technical procedures; however, this does not prevent the analyst from deviating from a procedure if the nature of the evidence precludes the use of a standard operating procedure. Changes to or deviations from a technical procedure must be within the bounds of good laboratory practice, documented, justified and authorized according to *FCU QAM Section 4.9.3*. Methods that deviate from standard operating procedures shall be subject to agreement with the contributor and shall include a clear specification of the contributor's requirements and the purpose of the test. The method must be validated appropriately before use.

#### 5.4.5 Validation of Technical Procedures

5.4.5.1 Appropriate validation studies will be conducted on all new technical procedures used for the analysis of evidence.

5.4.5.1.1 If in extraordinary cases when circumstances of the case and the analytical processes used are fully documented but where methods are employed without prior performance verification, the agency cannot claim accredited status for test results obtained through the use of the non-validated procedure(s).

- 5.4.5.2 Validations for new technical procedures will be performed according to the *DOM04 – Practices for Validating Technical Procedures* to ensure the procedure produces reliable results. The validation process determines the limitations of the procedure, the conditions under which reliable results can be obtained, and the critical aspects of the procedure that must be carefully controlled and monitored. Units will maintain records of the validation including, but not limited to, the procedure used, the results, and a statement as to whether the technical procedure is fit for its intended use.
- 5.4.5.3 When validating a technical procedure, the scope and accuracy will be assessed to ensure that the procedure meets the requirements of a given application and shall be relevant to the contributor's needs.
- 5.4.5.4 Prior to implementation of a validated method new to the laboratory, the reliability of the method shall be demonstrated in-house against any documented performance characteristics of that method. Records of performance verification shall be maintained for future reference.

#### 5.4.6 Estimation of Uncertainty of Measurement

- 5.4.6.1 The FCU is not a calibration laboratory or a testing laboratory that performs its own calibrations. The laboratory uses outside vendors to perform calibrations. These vendors shall have and apply a procedure to estimate the uncertainty of measurement for all calibrations and types of calibrations. Conformance shall be accomplished as per FCU-specific SOP's.
- 5.4.6.2 Standard operating procedures, when applicable, will include considerations for estimating the uncertainty of measurement. If the nature of the examination procedure precludes a metrologically and statistically valid calculation of uncertainty of measurement, the units will attempt to identify all the components of uncertainty and produce a reasonable estimate.

The FCU will identify each SOP in which uncertainty of measurement may be reported. If a quantitative numerical measurement result is included in a *FCU Report of Examination*, the uncertainty of measurement must be reported. Additionally, a *FCU Report of Examination* must not give a wrong impression of the uncertainty of measurement.

Records will be maintained by the casework units to describe the process used to develop the estimation of uncertainty. Estimates of

uncertainty of measurement must be available for review when any of the following conditions exist:

- The measurement of uncertainty is relevant to the validity or interpretation of the examination results.
- The measurement of uncertainty is required by the contributor.
- The measurement of uncertainty affects compliance to a specific limit.

5.4.6.3 Estimation of measurement of uncertainty will be based on knowledge of the performance of the method, previous experience and validation data as well as any significant parameters that affect the measurement result as per unit-specific SOP's.

#### 5.4.7 Control of Data

5.4.7.1 Where appropriate, analysts will ensure that calculations and data transcriptions are systematically checked for accuracy via technical review of the casework, as per *FCS06 - SOP for Reviewing Reports*. To minimize transcription errors, worksheets and data shall be directly scanned into the case file. Analysts shall review all calculations for reasonableness prior to recording values.

5.4.7.2 When computers or automated equipment are used for forensic examinations, acquisition, processing, recording, reporting, storage, or retrieval of test data, the casework units will ensure that:

- Computer software developed in-house is documented, evaluated and validated prior to use;
- Procedures for protecting test data maintain the integrity and confidentiality of the data;

5.4.7.2.1 Operating and environmental conditions are maintained such that computers and automated equipment function properly to maintain the integrity of the test data (See NTI Now Technologies Inc. *FiiS Back-up Procedure, April 10, 2013*, and the *Enterprise Cloud Infrastructure Services (ECIS)* agreement.

## SECTION 5.5 EQUIPMENT

5.5.1 The FCU is furnished with, or has access to, all items needed for the correct performance of forensic examinations. All instruments and equipment having an effect on the accuracy or validity of forensic examination results will be properly maintained and calibrated. Requirements for instrument calibration and maintenance are specified in the *DOM05 – Procedures for Instrument Checks and Maintenance*. In those cases where a casework unit needs to use equipment outside its permanent control, it will ensure that the requirements of ISO/IEC 17025:2005 are met as per unit specific SOP's.

- 5.5.2 Equipment and its software used for the examination of evidence must meet the requirements of the relevant standard operating procedure. Before being placed into service, equipment will be calibrated and/or checked by the casework unit to verify that it meets the unit's specifications. Units will, as appropriate, establish calibration programs for equipment having a significant effect on the results. Equipment will also be calibrated and/or checked before use in accordance with a unit specific SOP. [*DOM05 – Procedures for Instrument Checks and Maintenance*]
- 5.5.3 FCU equipment will be operated by qualified personnel. [*FCU QAM – Section 5.2*] Units will keep up-to-date instructions for the use and maintenance of equipment. The manufacturer's manuals for equipment will also be available to the appropriate personnel.
- 5.5.4 FCU instruments, equipment and their associated software used for forensic examinations will be uniquely identified.
- 5.5.5 The FCU will maintain records of each instrument and its associated software used for forensic examinations according to the *DOM05 – Practices for Instrument Calibration and Maintenance*.
- 5.5.6 Casework units will have procedures for appropriate storage, transportation, use and planned maintenance of portable equipment to ensure proper functioning. [*DOM05 – Procedures for Instrument Checks and Maintenance*]
- 5.5.7 Any instrumentation that is malfunctioning will be taken out of service and clearly labeled to prevent use until repairs are completed. Only when it is shown by calibration or a performance check to operate correctly will the instrument be returned to service. [*DOM05 – Procedures for Instrument Checks and Maintenance*] Units will determine the effect of the malfunction, if any, on test results and implement "Control of Nonconforming Testing" in the *FCU QAM – Section 4.9*, when necessary.
- 5.5.7.1 As appropriate, control charts shall be used to track the performance of equipment via specific metrics, e.g., voltage, signal intensity, etc., and these values will be maintained in an instrumental control chart for historical and current performance monitoring.
- 5.5.7.2 As appropriate, control charts may be used to evaluate the return to service of equipment that was taken off line due to non-conforming performance checks.
- 5.5.8 FCU instrumentation requiring calibration will be labeled or otherwise identified to indicate the calibration status, when practicable. [*DOM05 – Procedures for Instrument Checks and Maintenance*] All analytical instruments generating data



shall undergo an annual preventative maintenance to ensure reliability, as resources permit. This does not apply towards microscopy or photography.

- 5.5.9 Calibration procedures or performance checks must be satisfactorily completed by the appropriate casework unit on any instrument that goes outside the control of the FCU prior to its return to service. [DOM05 – Procedures for Instrument Checks and Maintenance]
- 5.5.10 When necessary, performance checks will be carried out on calibrated equipment according to the appropriate SOP. [DOM05 – Procedures for Instrument Checks and Maintenance]
- 5.5.11 Where instrument calibrations or performance checks produce a set of correction factors, the casework units will have measures to ensure that the correction factors are made available to appropriate personnel.
- 5.5.12 Casework units will ensure that instrumentation used for forensic examinations, including both hardware and software, will be safeguarded from adjustments which would invalidate the test results. These measures may include the use of passwords.
- 5.5.13 Disposable equipment shall not be reused and shall be disposed of after use to ensure reuse and/or contamination does not accidentally occur.
- 5.5.14 General service equipment not directly used for making measurements shall be visual examined and cleaned as necessary prior to use, and where appropriate a safety checks performed.

## **SECTION 5.6 MEASUREMENT TRACEABILITY**

### **5.6.1 General**

The FCU requires that instrumentation will be calibrated prior to being put into service for forensic examinations according to the *DOM05 – Procedures for Instrument Checks and Maintenance*.

- 5.6.1.1 FCU-specific SOP's will document established calibration or performance check intervals for each instrument requiring calibration. Intervals will generally not be longer than the manufacturer's recommendations. However, instruments that are not calibrated or performance checked according to the manufacturer's recommended interval will be calibrated or performance checked prior to use. If an instrument can be affected by a power interruption, unit personnel will check the calibration after a shutdown, whether deliberate or otherwise. Instrument calibration will be checked following service or other

substantial maintenance. [DOM05 – Procedures for Instrument Checks and Maintenance]

## 5.6.2 Specific Requirements

### 5.6.2.1 Calibration

The FCU is not a calibration laboratory.

5.6.2.1.1 The FCU uses outside vendors for equipment calibration. The traceability of measurement shall be assured by using vendors that can demonstrate competence, measurement capability and traceability. The calibration certificates issued by these laboratories shall contain the measurement results, including the measurement of uncertainty and/or a statement of compliance with an identified metrological specification. If the outside vendor is conducting a calibration on instrumentation that has a significant effect on the accuracy or validity of sampling or test results, the outside vendor must be accredited to ISO/IEC 17025:2005.

### 5.6.2.2 Testing

5.6.2.2.1 If it has been established that an instrument's calibration contributes little to the total uncertainty of the test result, casework units will ensure that the instrument used can provide the necessary uncertainty of measurement. If the calibration is a significant component of the measurement uncertainty, casework units must establish traceability to the International System of Units (SI units) for the calibration as per unit specific SOP's.

5.6.2.2.2 Measurements made by casework units should be traceable to SI units. The link to SI units may be achieved by reference to national measurement standards.

Where traceability of measurements to SI units is not possible and/or not relevant, casework units will establish traceability to other appropriate measurement standards such as certified reference materials or reference standards.

## 5.6.3 Reference Standards and Reference Materials

### 5.6.3.1 Reference Standards

The FCU will have procedures for the calibration of their reference standards to ensure that the calibrating organization provides traceability

to SI Units by a means of an unbroken chain of calibrations or comparisons linking the reference standards to the relevant primary standards of the SI units of measurement. The FCU will only use a reference standard for calibration purposes unless it can be shown that any additional use will not invalidate it. When appropriate, reference standards will be calibrated before and after any adjustment (see unit specific SOP's).

#### 5.6.3.2 Reference Materials

Reference materials, where possible, will be traceable to SI units or to certified reference materials. Internal reference materials will be checked to verify their suitability.

5.6.3.2.1 When utilizing reference collections for identification, comparison or interpretation purposes will document, uniquely identify and properly control such references. These references may include infrared spectra, mass spectra, (see specific SOP's).

#### 5.6.3.3 Intermediate Checks

Casework units will perform checks on reference, primary, or working standards as well as reference materials to maintain confidence in their calibration status in accordance with the appropriate SOPs.

#### 5.6.3.4 Transport and Storage

To protect the integrity of reference standards and materials, casework units will have procedures for their handling, transport, storage and use.

## SECTION 5.7 SAMPLING

Sampling plans are required when taking part of a representative sample of a substance, material or item to provide for testing and reporting on the whole substance, material or item.

5.7.1 Each casework unit, when necessary, will have plans and procedures for the sampling of evidence included in the appropriate SOPs (see *FCS02 – SOP for General Laboratory Procedures for FCU*). Sampling plans will be based on statistical methods when reasonable. The sampling plans will address the factors to be controlled to ensure the validity of the examination results.

5.7.2 If the contributor or the nature of the evidence requires deviation or exclusion from the sampling plan described in the appropriate SOP, the deviation will be approved by the FCU Manager or designated Technical Leader and documented

by the analyst. This deviation will be recorded in detail in the examination documentation and follow policies addressed in FCU QAM Section 4.9.3.

5.7.3 As applicable, FCU will document appropriate sampling data and activities relating to the forensic examination process. Records maintained in the FCU case file will include the sampling procedure used, the identification of the individual performing the sampling, any relevant environmental conditions, diagrams of the sampling location as necessary and, if relevant, the statistical basis for the sampling procedures.

## SECTION 5.8 HANDLING OF TEST ITEMS

5.8.1 The FCU maintains practices for the transportation, receipt, handling, protection, storage, retention and/or disposal of items of evidence. These practices give guidance for protecting the integrity of evidence, protecting the interest of the FCU and the interests of the contributor. [*DOM10 – Evidence Handling Procedures; FCU11- Procedure for Evidence Handling*]

5.8.1.1 The FCU uses a *Chain-of-Custody Log* to document all internal transfers of evidence in chronological order from the time of receipt. This documentation illustrates that the evidence examined and reported on was that which was submitted to the FCU. The *Chain-of-Custody Log* identifies each person taking possession of an item of evidence or the location of that item. This log includes:

- A signature, or equivalent identification, of the person/location receiving evidence;
- The date of receipt or transfer;
- The unique identifier of the evidence.

5.8.1.1.1 When evidence is sub-divided within the FCU, sub-items will be tracked on the *Chain-of-Custody Log*. Pre-existing sub-itemization of evidence will not be subject to this rule.

5.8.1.1.2 The laboratory shall ensure that the evidence accepted and stored in the laboratory is properly sealed according to the *DOM10 – Evidence Handling Procedures*.

5.8.2 The FCU will identify evidence items using a laboratory number and item number. The identification of evidence will remain in place while the items are in the FCU. These practices ensure that items of evidence are uniquely identified and provide for subdivided and secondary evidence. Evidentiary items will be transferred within and from the FCU according to the *DOM10 – Evidence Handling Procedures*.

5.8.3 Upon receipt of the evidence, the condition of the evidence will be evaluated and any conditions adverse to quality will be recorded. When the suitability of an item of evidence for examination is questionable, or there is a discrepancy between the evidence and the request for examination, or the request for examination is unclear, the FCU Manager, or designee, will contact the contributor for clarification prior to proceeding with any testing. This communication will be documented in the *Activity/Communication Log*. Print-outs (or electronic equivalent) of electronic communications may supplement the *Activity/Communication Log* in the case file.

5.8.4 The FCU will ensure the integrity of evidence by protecting items from loss, cross-transfer or deleterious change during storage, handling and preparation according to the *DOM10 – Evidence Handling Procedures* and *FCU11-Procedure for Evidence Handling*. Appropriate handling instructions provided with an item will be followed. When evidentiary items have to be stored or handled under specified environmental conditions, these conditions will be maintained, monitored and recorded. The *DOM10 – Evidence Handling Procedures* describes how drug and valuable evidence will be stored and handled.

5.8.4.1 Any evidence not in the process of examination must be placed in a container to protect it from loss, cross-transfer or contamination and will be stored under proper seal. [*DOM10 – Evidence Handling Procedures*]

5.8.4.1.1 All evidence not in the process of examination will be maintained in an appropriate storage area according to the *DOM10 – Evidence Handling Procedures*.

5.8.4.2 The *DOM10 – Evidence Handling Procedures* describes the measures taken to secure unattended evidence which is in the process of being examined. All evidence not in the process of examination will be maintained in an appropriate storage area.

5.8.4.2.1 Evidence in the process of examination/analysis will not be open-ended. Scientists will make every effort to complete analyses within 30 days from beginning their examinations/analysis. Circumstances to which this time frame might need to be extended will be brought to the attention of the FCU Manager.

5.8.4.3 Each item of evidence will be marked to ensure that it is uniquely identified and traceable to the FCU number. If the evidence does not lend itself to marking, its proximal container or identifying tag will be marked.

- 5.8.4.4 When evidence, such as latent prints and impressions, can only be recorded or collected by photography or digital capture and the print or impression itself is not recoverable, the photograph, negative or digital image of the print or impression will be treated as evidence.
- 5.8.4.5 Evidence collected by FCU personnel from a crime scene will be protected from loss, cross-transfer, contamination and/or deleterious change whether in a sealed or unsealed container during transfer to the FCU or appropriate evidence facility. Where appropriate, further processing to preserve, evaluate, document, or render evidence safe shall be accomplished prior to final packaging. Crime scene evidence will be properly identified, packaged and entered into the evidence control system as soon as possible.
- 5.8.4.6 Appropriate casework units will have procedures for the operation of individual characteristic databases (ICD).
- 5.8.4.6.1 Appropriate casework units will establish whether individual characteristic database samples are treated as evidence, reference materials, or examination documentation.
- 5.8.4.6.2 ICD samples under the control of the laboratory shall be uniquely identified.
- 5.8.4.6.3 ICD samples not treated as evidence and under control of the FCU will be uniquely identified. They will also be protected from loss, cross transfer, contamination and/or deleterious change.
- 5.8.4.6.4 Access to ICD samples will be restricted to those persons authorized by the FCU Manager, or designee.

## **SECTION 5.9 ASSURING THE QUALITY OF TEST RESULTS**

5.9.1 The FCU will have quality control procedures for monitoring the reliability of forensic examinations (see individual method SOPs and relevant control charts). The resulting data will be recorded in such a way that trends are detectable. Where practicable, statistical techniques will be applied when reviewing the results. Quality control measures may include, but are not limited to, the following:

- Routine use of certified reference materials and/or secondary reference materials;
- Participation in proficiency testing programs;
- Replicate tests using the same or different methods;
- Retesting of retained items;
- Correlation of results for different characteristics of an item of evidence.

- 5.9.1.1 Appropriate controls and standards shall be specified in the methods and their use recorded in the case record.
- 5.9.2 The FCU will have procedures for evaluating quality control data against best professional practice. When the data is found to be outside the defined criteria, appropriate actions will be taken to correct the problem to prevent incorrect results from being reported.
  - 5.9.2.1 If quality control data (recorded in the method-specific control charts), are not conforming to the acceptance parameters, the Lead Chemist or designee shall be notified and a review of the instrument and method shall ensue. The source of the non-conformity will be evaluated and addressed in the control chart log, and if deemed appropriate, a corrective action will be taken.
- 5.9.3 Proficiency testing is an integral part of the FCU quality system. It is one of many quality control measures used to monitor the FCU's own performance as well as identify areas where improvement may be needed. The FCU proficiency testing program is documented in the *FCS12 – Procedures for Proficiency Testing*. In addition, each casework unit quality manual will contain procedures, as appropriate, for both internal and external proficiency testing. Proficiency testing applies to analysts and technicians in each discipline and sub-discipline in which casework is performed.
  - 5.9.3.1 Casework units will follow the appropriate SOP(s) when participating in proficiency testing programs. [*FCS12 – Procedures for Proficiency Testing*]
  - 5.9.3.2 The FCU proficiency testing program will comply with the ISO/IEC 17025:2005 Proficiency Review Program.
  - 5.9.3.3 All scientists and technical support personnel in casework units will successfully complete at least one internal or external proficiency test per calendar year in his/her forensic science discipline(s) or sub-discipline(s). [*FCS12 – Procedures for Proficiency Testing*]
    - 5.9.3.3.1 All scientists and technical support personnel engaged in testing activities shall be proficiency tested at least once during each five-year accreditation cycle, in each category of testing appearing on the laboratory's Scope of Accreditation, in which the individual performs testing. The DFS Deputy Director maintains a schedule for proficiency testing followed by each scientist and technical support person.

- 5.9.3.4 The FCU scientific personnel will participate annually in at least one external proficiency test for each forensic science discipline in which it conducts examinations. [*FCS12 – Procedures for Proficiency Testing*] Approved proficiency test providers will be used where available. If there is not an approved test provider available for a particular discipline or sub-discipline, the FCU will administer a proficiency test according to the [*FCS12 – Procedures for Proficiency Testing*].
- 5.9.3.5 The DFS Deputy Director maintains proficiency testing records according to the *FCS12 – Procedures for Proficiency Testing*.
- 5.9.3.6 Proficiency testing records will be retained not less than one full ISO/IEC 17025:2005 accreditation cycle or five years, whichever is longer, by the DFS Deputy Director.
- 5.9.4 Technical reviews of examination documentation and *Reports of Examination* will be conducted according to the *FCS06 - SOP for Reviewing Reports*.
  - 5.9.4.1 The *FCS06 - SOP for Reviewing Reports* delineates the scope of the technical review.
  - 5.9.4.2 Technical reviews will be conducted by individuals having expertise gained through training and experience in the discipline being reviewed, as well individuals having knowledge of the laboratory's technical procedures. The designated Technical Leader or FCU Manager will maintain a list of approved technical reviewers.
  - 5.9.4.3 Technical reviews shall not be conducted by the author or co-author(s) of the examination records or test report(s) under review. Individuals who perform verifications are not considered as authoring examination records and therefore, if approved as a technical reviewer, can perform technical reviews.
- 5.9.5 Administrative reviews will be conducted on all documentation in the FCU file as well as the FCU *Report of Examination* prior to its release according to the *FCS06 - SOP for Reviewing Reports*. Individuals will be trained to gain the necessary expertise to perform administrative reviews on casework. The designated Technical Leader or FCU Manager will maintain a list of approved administrative reviewers. Administrative reviews shall be conducted by someone other than the author(s) of the report.
  - 5.9.5.1 The scope, content of and documentation of an administrative review is defined according to the *FCS06 - SOP for Reviewing Reports*.
- 5.9.6 The FCU will follow the *DOM16 – Procedures for Monitoring Court Testimony* whereby the testimony of all testifying personnel is monitored and evaluated at



least once per year. Each individual will be given feedback by the Laboratory Manager or designated Technical Leader. If the evaluation is less than satisfactory, the Laboratory Manager, or designated Technical Leader may initiate remedial action(s) according to the *DOM16 – Procedures for Monitoring Court Testimony*.

- 5.9.7 Records on testimony monitoring will be retained in the employee's personnel file according to *DOM16 – Procedures for Monitoring Court Testimony*. Records will be retained not less than one full ISO/IEC 17025:2005 accreditation cycle or five years, whichever is longer.

## SECTION 5.10 RESULTS REPORTING

### 5.10.1 General Requirements

FCU personnel will accurately, clearly, unambiguously and objectively report the results of each examination according to Section 7.10 of *FCS02 – SOP for General Laboratory Procedures for FCU*. *FCU Reports of Examination* will include information regarding the examinations conducted and any information necessary for the interpretation of the examination results.

- 5.10.1.1 The FCU shall have a policy describing reasons or conditions for not producing a test report of examination results.

### 5.10.2 Content of Reports of Examination

*Section 7.10 of FCS02 – SOP for General Laboratory Procedures for FCU* provides guidance for the content of an *FCU Report of Examination*. Analysts must limit their conclusions to those that logically follow from the underlying data and analytical results, and cannot base conclusions on unstated assumptions or information that is collateral to the examinations performed. Also, an analyst must not draw conclusions that overstate the significance of the technical or scientific examinations.

### 5.10.3 Additional Report of Examination Guidelines

- 5.10.3.1 A *FCU Report of Examination* may include additional information, deviations from, additions to, or exclusions from the test method and information on specific test conditions such as statement on the uncertainty of measurement or a statement of the compliance / non-compliance to the standards when it is necessary for the interpretation of the examination results according *FCS02 – SOP for General Laboratory Procedures for FCU*.

- 5.10.3.2 An *FCU Report of Examination* may include additional information regarding sampling, when it is necessary for the interpretation of the

examination results according to the *FCS02 – SOP for General Laboratory Procedures for FCU*.

5.10.3.2.1 Sampling details may include, but are not limited to, the date of sampling, the identification of the substance, material, or product sampled, the location of sampling, a reference to the sampling plan, environmental conditions, and any other standards or specifications, or deviations, additions, or exclusions from such specifications, when present.

5.10.3.3 *FCU Reports of Examination* are issued according to the *FCS02 – SOP for General Laboratory Procedures for FCU*.

5.10.3.4 Analysts who issue findings, including writing reports and providing testimony, based on examination documentation generated by another person will document the review of examination documentation according to the *FCS02 – SOP for General Laboratory Procedures for FCU*.

5.10.3.5 The significance of an association will be included in the *FCU Report of Examination*.

5.10.3.6 When a definitive conclusion cannot be reached, the reason will be clearly stated, as applicable, in the *FCU Report of Examination (FCS02 – SOP for General Laboratory Procedures for FCU)*.

5.10.3.7 Analysts who prepare a *FCU Report of Examination* will have participated in, observed, supervised, or technically reviewed the examination(s) being reported.

5.10.3.8 A *FCU Report of Examination* may include additional information required by specific methods or contributors.

#### 5.10.4 Calibration Certificates

The FCU does not issue calibration certificates.

#### 5.10.5 Opinions and Interpretations

Opinions and interpretations are identified in *FCU Reports of Examination* according to the *FCS02 – SOP for General Laboratory Procedures for FCU*. An analyst will document the basis for his/her opinions and/or interpretations in the examination documentation [*FCU QAM – Section 5.10.2*].

#### 5.10.6 Testing Results Obtained from Subcontractors

When the FCU subcontracts or facilitates forensic examinations, the entity conducting the examinations will provide a report of their results, in writing or electronically, to the appropriate casework unit. A copy of this report will be retained within the FCU. When an FCU *Report of Examination* contains results of tests performed by an expert outside the FCU, those results will be clearly identified. If the examination results are not included in the *Report of Examination*, the FCU Manager, or designee, will ensure that the contributor receives a copy of the subcontractor's report.

#### 5.10.7 Electronic Transmission of Results

ISO/IEC 17025:2005 requirements apply to the transmission of FCU Reports of Examination and examination results by telephone, facsimile or other electronic or electromagnetic means.

#### 5.10.8 Format of Report of Examination

An FCU Report of Examination is formatted according to the *LOM02 – Practices for Case Documentation and Report Writing*.

#### 5.10.9 Amendments to Reports of Examination

Once a FCU Report of Examination has been issued, any amendments must be made in the form of an Amended Report of Examination according to the *FCS02 – SOP for General Laboratory Procedures for FCU*. An Amended Report of Examination will meet all requirements of the FCU QAM – Section 5.10.1, 5.10.2, 5.10.3. An Amended Report of Examination will be uniquely identified and will contain a reference to the original Report of Examination it is replacing.

---

## REFERENCES

---

*ISO/IEC 17025 – General Requirements for the Competence of Testing and Calibration Laboratories*, International Organization for Standardization, Geneva, Switzerland (current revision).

*ANAB™ ISO/IEC 17025 Accreditation Requirements for Forensic Testing Laboratories*, ANSI-ASQ Accreditation Board, Alexandria, VA (current revision)

*Departmental Operations Manuals (DOMs)* (current revisions)

*FCU Quality Assurance Manuals* (current revisions)

*FCU Standard Operating Procedures* (current revisions)



## APPENDIX A

This is the approved list of common abbreviations used by the employees of the FCU. Other abbreviations used should have the approval of the FCU Manager. This list does not purport to include all abbreviations used and new approved abbreviations will be added to the list no later than the annual quality audit. Capitalization of any of the letters in the abbreviation is not mandatory.

<u>ABBREVIATION</u>	<u>MEANING</u>
~ or ≈ or approx	Approximately
+ or pos	Positive
+	And
=	Equals, consistent with
≠	Does not equal, not consistent with
>	Greater than
<	Less than
?	Don't know
(-) or neg	Negative
#	number
2° evid or 2°	Secondary evidence

A	ABBREVIATION	MEANING
	AAFS	American Academy of Forensic Sciences
	ABRA	DC Alcoholic Beverage Regulation Administration
	Acq	Acquired
	Acr	acrylic
	Als or ALS	Alternate light source
	Amp	amplification
	Amt	amount
	ANSI	American National Standards Institute
	AP	Assault Pistol
	AR	Assault Rifle
	AS	Assault Shotgun
	Admin Rev.	Administrative review
	a/s	Adhesive-sealed
	ASCII	American Standard Code for Information Interchange
	ASTM	American Society for Testing and Materials

	<u>ABBREVIATION</u>	<u>MEANING</u>
B	BA	Blood alcohol
	BACU	Biomonitoring and Analytical Chemistry Unit
	Bit	Binary data
	Blk	Black
	Bp	Boiling point
	Bpb	Brown paper bag
	Brn	Brown
	bt#	Bottle number
C	<i>c/ or cont</i>	Containing
	CD	Compact Disk
	CDR	Compact Disk-Recordable
	CDROM	Compact Disk-Read Only Memory/Compact Disk Drive
	CDS	Controlled Dangerous Substance
	CEU	Central Evidence Unit
	cm <sup>-1</sup> or cm <sup>^-1</sup>	Wavenumber
	Com	Compare <i>or</i> comparison
	Comp	Component
	cont. subs. <i>or</i> cs	Controlled substances
	cont'd <i>or</i> cont.	Continued
	Cor	Coroner
	CSS	Crime Scene Sciences Division
	Ctfg	Centrifuge
	Ctl <i>or</i> ctrl	Control
D	DC	District of Columbia
	DI H2O	Distilled water
	DFS	Department of Forensic Sciences
	Dia	Diameter
	Diff	Differential <i>or</i> different
	Dil	Dilution
	Dispo	disposition
	Dist	distal
	Dk	dark

	<u>ABBREVIATION</u>	<u>MEANING</u>
	DOC	DC Department of Corrections
	DOM	Department Operational Manual
E	Ea	each
	EIC	Extracted ion chromatogram
	Env	Envelope
	EtOH	Ethanol
	Evid	Evidence
	E or Exp	Expiration
	Ext	Extract or Extraction
F	FID	Flame ionization detector
	frz. <i>or</i> fzr.	Freezer
	FSL	Forensic Science Laboratory
	FT-IR	Fourier Transform Infrared Spectroscopy
	FTP	File Transfer Protocol
G	GC	Gas Chromatography
	GC-MS	Gas Chromatography Mass Spectroscopy
	GC-MSD	Gas Chromatograph - Mass Spectrometer detector
	Grn	Green
	GUI	Graphical User Interface
	Gw	Gross weight
H	HC	Hydrocarbon
	HDD	Hard disk drive/Hard drive
	HP	Hewlett-Packard Company
	HPLC	High Pressure Liquid Chromatography
	Hr	Hour
	Hrs	Hours
	hs <i>or</i> h/s <i>or</i> h-s	Heat sealed
	HTML	Hypertext Markup Language
I	IBM	International Business Machines
	ID	identification
	IM	Insufficient Marks
	immed.	Immediately
	IMP	Impression

	<u>ABBREVIATION</u>	<u>MEANING</u>
	Inc	Inconclusive
	Indiv or ind.	Individual
	Int	Interference
	IP	Internet Protocol
	ISP	Internet Service Provider
	ISTD	Internal standard
J	juv. or juv	Juvenile
K	K or Kn	Known
	kg	Kilogram or one thousand grams
L	L or lft	Left
	L/	Labeled
	Lab	Laboratory
	LAN	Local Area Network
	LC-MS	Liquid Chromatography Mass Spectrometer
	Lg	Large
	LOD	Limit of detection
	LOQ	Limit of quantitation
	Lt	Light
M	μ	Micro or one millionth of a quantity
	MB	Mega-byte
	Mb	Mega-bit
	MeOH	Methanol
	mg	Milligram (one-thousandths of a gram)
	mL	Milliliter or one-thousandths of a liter
	MLE	Medical-Legal exam
	Mod	Moderate or modified
	Mp	Melting point
	MPD	Metropolitan Police Department
	Ms	Millisecond
	Mted	mounted
	MW	Molecular weight
	m/z	Mass-to-charge ratio (in mass spectrometry)
N	N/A	Not applicable



	<u>ABBREVIATION</u>	<u>MEANING</u>
	N/R or NR	No results obtained
	NAS	Nothing of apparent significance
	NA	Not analyzed
	ND	Not detected
	NE	Not examined
	Neg	Negative
	NFE	No further examination
	NFT	No further testing
	ng	Nanogram or one billionth of a gram
	NIST	National Institute of Standards and Technology
	NR	No reaction <i>or</i> no results
	NR	No Results
	Nsfcpc	Not suitable for comparison purposes
	NT	Not tested
	Num	numerous
	NV <i>or</i> no val	No value
	Nw	Net weight
	$n_{\parallel}$	Refractive index parallel to plane of polarized light
	$n_{\perp}$	Refractive index perpendicular to plane of polarized light
	$n_{iso}$	Isotropic refractive index
O	OCME	Office of the Chief Medical Examiner
	O/N	Overnight
	OD	Optical density
	Opag	Opaque
	Orig	Original
	OS	Operating System
	Ø	Identification Symbol
	oz	Ounce
P	p.frz <i>or</i> PF	Personal freezer
	PB	Plastic Bag
	Pb	Plastic bag
	PBS	Phosphate buffered saline
	PC	Personal Computer

	<u>ABBREVIATION</u>	<u>MEANING</u>
	PCR	Polymerase Chain Reaction
	PD	Position Description
	PDA	Personal Digital Assistant
	Pers	Personal
	Pet	Petroleum
	phr or PHR	Peak height ratio
	PLM	Polarized light microscopy
	Poly	Polyester
	Poss	possible
	Pp	Polypropylene
	Prob	Probably
	Prox	Proximal
	PT	Point or Proficiency Test
	PVC	Poly-vinyl Chloride
Q	Q	Question
	Q value	Quantitation value
	QA	Quality Assurance
	QC	Quality control
	QNS	Quantity not sufficient
	Qty	Quantity
	Quant or QT	Quantitation
	R or Rt	Right or retention time
	RT	Room temperature
	RAM	Random Access Memory
	Rded	Rounded
	Ref	Reference
	Refrig	Refrigerator
	Rep samp or rs	Representative sample
	Resp	Response
	ret'd	Returned
	RF	Response factor
	ROM	Read Only Memory
	Rxn	Reaction

	<u>ABBREVIATION</u>	<u>MEANING</u>
S	S	Suspect <i>or</i> subject
	Sec	Second
	Samp	Samples
	SDS	Safety Data Sheet
	SEM	Scanning Electron Microscopy
	Sec	Second
	SIM	Selected Ion Monitoring
	Sl <i>or</i> sld	slide
	Sm	Small
	SN <i>or</i> S/N	Serial number
	Soln <i>or</i> sol	Solution
	Std	Standard
	Stn	Stain
	Sub	Subtracted
	Subj	Subject
	Substr	Substrate
	Suit	Suitable
	Susp	Suspect
	Svt	Small volume transfer
	Syn	Synthetic
SWG	Scientific working group	
SWGDRUG	Scientific Working Group for the Analysis of Seized Drugs	
T	T	Temperature
	Tc <i>or</i> t/c	To contain <i>or</i> tape closed
	TD	To deliver
	TE	Tris EDTA buffer
	Tgt	Target
	TIC	Total ion chromatography
	Tis	tissue
	TI	Tape lifts
	TR	Technical review
	T <sub>R</sub>	Room temperature
	Ts <i>or</i> t/s	Tape seal/tape-sealed

	<u>ABBREVIATION</u>	<u>MEANING</u>
U	UPS	Uninterruptible Power Supply
	UPLC	Ultra-high Pressure Liquid Chromatography
	UV	Ultraviolet
V	V or vic	Victim
	V	Volt
	Val	value
	Vol	Volume
W	w/	With
	w/o	Without
	WIF or Wkfrz	Walk-in freezer
	Wk	Weak
	Wmt	Wet mount
	Wpb	White paper bag
	Wt	Weight
X	XB	Blank
	x-over	Cross-over electrophoresis
	x-ref	Cross-reference
	Xs	Cross-section
Z	Zplb or zlpb or Z/L	Ziplock plastic bag