

**National Fish and Wildlife Forensic Laboratory
QUALITY ASSURANCE MANUAL**

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TABLE OF CONTENTS

1.	INTRODUCTION	5
1.1	The Purpose of This Manual	5
1.2	Scope of the National Fish and Wildlife Forensic Laboratory (NFWFL)	5
1.3	The NFWFL Objectives	5
1.4	ASCLD/LAB Accreditation	5
1.5	Quality Assurance Defined	5
1.6	Quality Assurance Manual Review	6
1.7	Employee Responsibility	6
2.	NFWFL ORGANIZATION AND PERSONNEL	6
2.1	National Fish and Wildlife Forensic Laboratory Organizational Chart	6
2.2	Position Descriptions	6
2.3	Technical Qualifications Files	6
3.	LABORATORY FUNCTION ISSUES	6
3.1	Acceptance Criteria for Casework	6
3.2	Laboratory Security System	6
3.3	Case Coordinator	7
3.4	Turn Around Time	7
4.	LEGAL COMPLIANCE	7
4.1	Discovery Procedures	7
4.2	Freedom Of Information Act Request (FOIA)	7
4.3	Subpoenas	8
4.4	Depositions	8
4.5	Court Presentation	8
5.	TRAINING GUIDELINES	8
5.1	Introduction	8
5.2	New Employees	9
5.3	Maintenance of Technical Competence	9
5.4	New Protocols and Proficiency Testing	9
5.5	Literature Awareness	9
6.	INSTRUMENT CALIBRATION AND MAINTENANCE	9
6.1	Introduction	9
6.2	Instrument Calibration	9
6.3	Instrument Performance Verification	9
6.4	Instrument Maintenance/Repair	9
7.	PROTOCOLS	10
7.1	Introduction	10
7.2	Analytical Protocol Validation Criteria	10
7.3	Departures from NFWFL Analytical Protocols	12
7.4	Protocol Filing/Distribution	13
8.	ROUTINE QUALITY CONTROL MEASURES	13
8.1	Good Housekeeping	13
8.2	Control Standards	13
8.3	Evidence Label/Identification Verification	13

8.4	Evidence Examinations in Progress	13
8.5	Evidence Re-examination Policy	14
8.6	Documentation of Analytical Results	14
8.7	Accuracy and Consistency of Analysis	14
8.8	Technical and Administrative Reviews of Case Reports	14
8.9	Proficiency Testing	14
8.10	Laboratory Services Evaluation	14
8.11	Courtroom Testimony Evaluation	14
8.12	Annual Quality Audits	14
9.	EVIDENCE CONTROL	15
9.1	Introduction	15
9.2	Chain of Custody	15
9.3	Evidence Storage & Handling	15
9.4	Laboratory Information Management System (LIMS)	16
9.5	Successive Submissions for a Single Case	16
9.6	Case Segments	16
9.7	Evidence Sent Out for Analysis	16
9.8	Conservation of Evidence	16
9.9	Returning Evidence to the Client	17
9.10	Releasing Evidence for Disposition	17
10.	MASTER CASE FILE DOCUMENTATION GUIDELINES	17
10.1	Introduction	17
10.2	Evidence Submittal Form	17
10.3	External Chain of Custody	17
10.4	Internal Chain of Custody	17
10.5	Evidence Release Form	18
10.6	Analytical Documentation	18
10.7	Written Correspondence	18
10.8	Digital Images	18
10.9	Phone Calls	18
10.10	Court Deposition Requests and Release of NFWFL Laboratory Notes	18
10.11	Master Case File Organization	19
11.	ANALYTICAL DOCUMENTATION GUIDELINES	19
11.1	Introduction	19
11.2	General Criteria for Documentation	19
11.3	Specific Criteria for Documentation	20
12.	REPORT CONTENT, REVIEW AND HANDLING PROCEDURES	20
12.1	Report Contents	20
12.2	Technical Review of Case Reports	21
12.3	Administrative Review of Case Reports	21
12.4	Report Amendments	21
12.5	Final Report Processing	22
12.6	Client Confidentiality	22
12.7	Report Storage and Handling	23
12.8	Report Duplication Issues	23
12.9	Successive Submissions of Evidence for a Single Case	23
13.	CORRECTIVE ACTION PLAN	23

13.1	Introduction	23
13.2	Corrective Action Process	23
13.3	Master Case File Documentation	24
14.	CODE OF ETHICS	24

1. INTRODUCTION

1.1 The Purpose of This Manual - The purpose of this manual is to provide a written directive which is intended to 1) promote an effective quality assurance environment within the National Fish and Wildlife Forensic Laboratory (NFWFL); 2) assist members of the laboratory in performing their duties; and 3) ensure that information generated by the laboratory is reliable, precise and accurate.

1.2 Scope of the National Fish and Wildlife Forensic Laboratory - The National Fish and Wildlife Forensic Laboratory is part of the Office of Law Enforcement of the U.S. Fish and Wildlife Service; a bureau of the U.S. Department of the Interior. The NFWFL offers analytical capabilities for the investigation of wildlife crimes by Federal and State law enforcement agencies. In addition, the NFWFL will assist law enforcement agencies from CITES member countries in the analysis of evidence items as needed. These entities will be referred to as 'client' throughout this document.

1.3 The NFWFL Objectives - The following NFWFL objectives are considered to be relevant to our client base, and are understood and supported by the NFWFL staff:

1.3.1 The NFWFL staff intends to provide service in responding to the client needs.

1.3.2 The NFWFL staff will maintain a quality control program that ensures that analytical services are reliable, precise and accurate.

1.3.3 The NFWFL staff will maintain a high level of professional integrity by following the ethical standards required in this manual.

1.3.4 The NFWFL will maintain a technical staff that is well-trained and competent.

1.3.5 The NFWFL will maintain a properly functioning and safe facility in which to perform analyses.

1.4 ASCLD/LAB Accreditation - The NFWFL was accredited on June 27, 1997 and June 28, 2002 by the American Society of Crime Laboratory Directors, Laboratory Accreditation Board (ASCLD/LAB).

1.5 Quality Assurance Defined - A quality assurance program includes the systematic monitoring and evaluation of forensic laboratory activities to ensure that standards of quality are being met. Quality assurance activities include preventative activities - the quality control (QC) program, assessment activities - the quality assessment (QA) program, and corrective activities.

1.5.1 Preventative activities include tasks undertaken prior to the examination of evidence samples that are intended to validate analytical tests. These include:

- The development and consistent use of standard operating procedures
- Instrument preventative maintenance, calibration of instruments

- Testing of materials
- Training of personnel

1.5.2 Assessment activities are those functions undertaken during testing to determine if the control systems are performing correctly. Assessment activities include the use of controls and proficiency testing.

1.5.3 Corrective activities are performed if a discrepancy is detected in an analytical result. Examples include instrument troubleshooting, instrument recalibration, and personnel retraining, etc.

1.6 Quality Assurance Manual Review - The review and amendment of this manual is the responsibility of the NFWFL Lab Director in conjunction with senior laboratory management. NFWFL analysts may propose amendments of the quality assurance document at any time. It is the responsibility of all supervisors to ensure that each current and new employee reads and understands the requirements set forth in this document. This quality assurance document is a public document. It is open to inspection by any interested party.

1.7 Employee Responsibility - This manual must be read and followed by each employee. Suggestions for improvements should be made to their supervisors.

2. NFWFL ORGANIZATION AND PERSONNEL

2.1 National Fish and Wildlife Forensic Laboratory Organizational Chart - The organizational chart is maintained with the NFWFL Personnel Office.

2.2 Position Descriptions - Official Position Descriptions are maintained with the NFWFL Personnel Office.

2.3 Technical Qualifications Files - Technical qualifications are maintained for each laboratory staff member. Technical qualifications files include the following items:

- Curriculum Vitae
- References to training classes, seminars, short courses, and conferences attended
- Copies of diplomas, college transcripts, and other pertinent information
- A list of laboratory disciplines and subdisciplines which the individual is qualified to perform

3. LABORATORY FUNCTION ISSUES

3.1 Acceptance Criteria for Casework - NFWFL will accept case work only from recognized law enforcement entities.

3.2 Laboratory Security System

3.2.1 Introduction - Strict policies for security have been implemented and will be maintained. Visitors and volunteers will not be permitted into the laboratory area where evidence is being examined unless a member of the NFWFL staff is present and is in a position to ensure that evidence will not be lost, altered or corrupted.

3.2.2 Laboratory Access - Access into and through the laboratory is controlled through locked doors. There is controlled access to the evidence storage unit. NFWFL staff are assigned access only into their respective operational areas. All keys are accounted for by the Technical Support Branch Chief, and their distribution is limited. The laboratory is secured during vacant hours by monitored alarm systems.

3.2.3 Volunteers - The laboratory uses volunteers to assist in the processing of standards materials, and with ongoing research. Volunteers will never handle evidence, or participate in the examination of evidence. Volunteers will not be left alone in an area when evidence is accessible. Volunteers will never be issued keys.

3.2.4 Visitors - Visitors are defined as any person who is not a volunteer or NFWFL staff. This includes personnel from other laboratories or agencies, and the general public. Visitors must be accompanied by a NFWFL staff member when in areas of evidence examination. Opposing experts in the laboratory are considered visitors.

3.2.5 Visitors/Volunteers Roster - All visitors and volunteers must sign a roster when entering and leaving the laboratory. The roster must include the name of the person, the date/time of entry, the date/time of exit, and the name of an analyst, or number of the case when the purpose of the visit is to view any evidence.

3.3 Case Coordinator - Case evidence submissions may require analysis by more than one analyst. In these cases, the responsibilities of the Case Coordinator are to oversee the complete processing of the case, function as the main contact with the client and to collate all case documentation after analysis.

3.4 Turn Around Time - Turn around time begins when evidence has been received in the laboratory. The NFWFL will make every effort to process evidence efficiently. In no instance, however, will the quality of the work performed be compromised to meet a specified turn around time.

4. LEGAL COMPLIANCE

4.1 Discovery Procedures - A request for discovery made directly to this laboratory will require consultation with the client attorney. Only copies of documents will be provided upon a request for discovery. Original documents will not leave the laboratory.

4.2 Freedom Of Information Act Request (FOIA) - The Chief of Law Enforcement is the official custodian of all investigative records of the Office of Law Enforcement (U.S. Fish and Wildlife Service). All FOIA requests must be directed to that office (Chief, Office of Law

Enforcement, U.S. Fish and Wildlife Service, P.O. Box 3247, Arlington, Virginia 22203-3247). A copy of all documents requested through the FOIA process will be maintained in the Administrative Support Branch. The Laboratory Director is to be notified immediately of all incoming FOIA requests upon their arrival.

4.3 Subpoenas - Forensic Scientists must respond to subpoenas. If there is a scheduling conflict, it is the responsibility of the Forensic Scientist to notify the client or the subpoenaing party.

4.4 Depositions - In rare instances an expert witness may be deposed prior to trial. The purpose of deposing a witness is to determine, before the time of trial, what testimony the witness would give and the basis for that testimony. The testimony is given under oath, the witness is cross-examined, and the same measure of scientific rigor applies. The analyst should, at the end of the deposition (but while the record is still being taken), ask for the details of how the transcript is to be sent for review and the time allowed for the review.

4.5 Court Presentation - Testifying Forensic Scientists must abide by the rules of the court as they apply to appearances in court and courtroom testimony. The testimony must be presented in a professional and technically competent manner. Court testimony will be monitored on occasion. Monitoring may be accomplished through direct observation or by obtaining input from trial participants. NFWFL Forensic Scientists are responsible for the following situations:

4.5.1 Complying with a subpoena directive regarding the place and time of the appearance.

4.5.2 Dealing with scheduling conflicts.

4.5.3 Maintain a professional demeanor at all times, to include:

- Being organized
- Providing a current Curriculum Vitae
- Providing appropriate court displays
- Providing fair and impartial testimony
- Not testifying beyond their area of expertise

4.5.4 Being technically prepared for testimony. The Forensic Scientist must be prepared to discuss the contents of their laboratory notes and final report.

4.5.5 Analysts should be familiar with those sections of the Code of Ethics of the California Association of Criminalists dealing with courtroom testimony. (See Section 14)

5. TRAINING GUIDELINES

5.1 Introduction - It is the intent of the NFWFL to ensure that all Forensic Scientists are properly trained, acquire an adequate amount of experience prior to performing case-related

analyses, and maintain technical competence. These factors are essential parts of the laboratory quality assurance program.

5.2 New Employees - New employees must undergo a training period, following the training manuals for each discipline, and proficiency testing prior to conducting independent casework. The amount of training will depend upon previous experience the new employee brings into the position. In addition to acquiring competence in conducting forensic analysis using specific protocols, aspects of the training will include, but not be limited to, an understanding of the elements of the Quality Assurance Manual.

5.3 Maintenance of Technical Competence - Employees are encouraged to maintain their technical competency, in part by attending training courses and conferences and participating in professional organizations. Presentation of research findings at meetings or professional organizations is encouraged.

5.4 New Protocols and Proficiency Testing - All analysts who have completed training on new protocols must successfully complete a proficiency test prior to conducting casework.

5.5 Literature Awareness - Team Leaders will ensure that every NFWFL analyst on their team will exert an effort to keep reasonably abreast of current developments within his\her area of responsibility. This requirement may be satisfied in part by being familiar with current forensic science literature, and with the literature of other disciplines as appropriate.

6. INSTRUMENT CALIBRATION AND MAINTENANCE

6.1 Introduction - All analytical instruments will be accurately calibrated and maintained.

6.2 Instrument Calibration - Some instruments require calibration by a qualified service technician. Other instruments can be calibrated by laboratory personnel. The frequency of calibration will depend on specific analytical protocol requirements or as needed based on calibration verification data. Calibration is checked using a standard. Calibration verification data will be maintained in calibration verification logs specific to each instrument.

6.3 Instrument Performance Verification - Instrument performance verification is generally checked by using known standards during each evidence run to verify that they are working properly. Performance verification data generated during the analysis of evidence is maintained in the Master Case File.

6.4 Instrument Maintenance/Repair - Properly maintained instruments are a critical aspect of the quality assurance system. The interval between maintenance and/or calibrations should be guided by the manufacturer's instructions or as often as needed based on individual instrument performance. It may however, be modified by user experience and frequency of use. If an instrument is found to be out of working order, out of calibration, or in need of repair, the instrument must be repaired, adjusted and calibrated as soon as possible. Calibration is necessary after instrument repair and prior to putting any new instrument into service. Each analytical

instrument will have a maintenance log which identifies the instrument name, manufacturer, model number, and NFWFL identification number. All routine and non-routine maintenance activities must be entered in chronological order and identify what was done and who did the work.

7. PROTOCOLS

7.1 Introduction - The National Fish and Wildlife Forensic Laboratory uses two types of protocols: 1) Procedural and 2) Analytical.

7.1.1 Procedural Protocols Procedural Protocols are non-analytical procedures such as how to collect blood samples or how to decontaminate workbenches, etc. They do not need to be submitted to blind proficiency tests. New and revised procedural protocols will be reviewed by the Protocol Validation Review board. The board is composed of the Team Leaders of each analytical unit (Genetics, Morphology, Criminalistics, Chemistry, Pathology and Digital Forensics). After review, the signatures the Team Leader of the unit which will use the protocol, the Deputy Director and the Director indicate acceptance of a protocol.

7.1.2 Analytical Protocols are those methods that require interpretive knowledge and are the basis for the examination of evidentiary items.

7.2 Analytical Protocol Validation Criteria

The Scope of Protocol Validation

Protocol validation is the process of demonstrating that an analytical method is acceptable for its intended purpose. In general, methods should include studies on accuracy, specificity, precision, reproducibility, detection limit, linearity, range, and robustness.

This document presents an approach to performing validation studies that encompasses much of the current literature and provides practical guidance for the Method Validation at the National Fish and Wildlife Forensic Laboratory. This document should be viewed with the understanding that validation requirements are subject to change as new technology develops.

The NFWFL Director and Protocol Review Board must approve protocols prior to their inclusion in the protocol manual.

7.2.1 Protocol Validation Requirements. Before a new protocol is used for evidentiary casework, the protocol in question will be validated. The following validation criteria must be considered:

- Literature review of the relevant issue
- Accuracy of the analysis
- Specificity of the analysis
- Precision and reproducibility of the analysis
- Limit of detection
- Linearity

- Range of detection
- Robustness

7.2.1.1 Literature Review - A literature review of the study subject must be undertaken. An Executive summary of the literature review will be included in the Protocol Validation file.

7.2.1.2 Accuracy - Accuracy is the ability to obtain a correct result. Accuracy can be determined by analyzing a traceable reference standard.

7.2.1.3 Specificity - Developing an analysis involves demonstrating specificity, which is the ability of the method to define a character/analyte in the presence of sample contaminants (i.e. blood mixtures, pesticides in soil, etc.).

7.2.1.4 Precision and Reproducibility - Precision is determined by the ability to get the same results when measurements are repeated. The precision of an analytical method is the amount of variability in the results obtained from multiple analyses of a homogeneous sample. For assessing the reproducibility of an analytical protocol it is generally recognized that at least seven test measurements need to be carried out.

7.2.1.5 Limit of Detection - The limit of detection is the smallest amount or concentration of analyte in the test sample that can be reliably distinguished from the background or blank level.

7.2.1.6 Linearity - Linearity of response to an analyte is an important property where methods are used to quantify at a range of concentrations. Linear response to pure standards and to realistic samples may be determined.

A linearity study verifies that the sample solutions are in a concentration range where analyte response is linearly proportional to concentration. For assay methods, preparing standard solutions at five concentration levels, from 0% to 150% of the target analyte concentration is generally preferred.

Acceptability of linearity data is often judged by examining the correlation coefficient and y-intercept of the linear regression line for the response versus concentration plot. A correlation coefficient of > 0.95 is generally considered as evidence of acceptable fit of the data to the regression line.

7.2.1.7 Range of Detection - The range of an analytical method is the interval over which acceptable accuracy, linearity, and precision are obtained. In practice, the range is determined using data from the linearity and accuracy studies.

7.2.1.8 Robustness - The robustness of a method is its ability to remain unaffected by small changes in parameters such as percent organic content, pH, buffer concentration, temperature, or template quantity.

7.2.2 Protocol Validation File Documentation - All records pertaining to each Protocol Validation are to be maintained in a Protocol Validation File. The Quality Assurance Office will assign a unique Protocol Number.

The Protocol Validation file will contain documentation for each of the applicable elements listed in Section 7.2.1.

7.2.3 Protocol Validation Acceptance - All protocols must be accepted before being applied to routine casework. Protocol validation acceptance will include a presentation of a new or revised protocol to the Protocol Validation Review board for review and comment. The board is composed of the Team Leaders of each analytical unit (Genetics, Morphology, Criminalistics, Chemistry, Pathology and Digital Forensics).

Once review and comment are completed by the Protocol Validation Review board, signatures are obtained from the principal analyst who developed the protocol, the Team Leader of the unit which will use the protocol, the Deputy Director and the Director.

Before using a protocol in casework, each analyst will complete a blind proficiency examination.

7.2.4 Validation of Existent Analytical Protocols - Protocols in place before the establishment of the analytical protocol validation guideline will be validated through either:

7.2.4.1 Historical Success - The history of the proficiency testing program will indicate if a protocol needs to be corrected.

7.2.4.2 Re-validation - Re-validation is necessary if critical changes are made to an existing protocol. For example, if there is a change in one or more procedural steps, or if new technological advances omits one or more procedural steps. A re-validation may require only a partial study.

7.2.5 Revisions to Existing Analytical Protocols - Substantive revisions to existing analytical protocols need to be re-validated as indicated in “7.2.4.2 Validation of Existent Analytical Protocols; Re-validation.” Once re-validated, protocol changes may be documented and explained within a commentary section of the protocol. Protocol revisions need to be reviewed by the Protocol Validation Review board. Once approved, the revised protocol will be identified by a new version number and dated, and signatures will be obtained from the principal analyst who revised the protocol, the Team Leader of the unit which will use the protocol, the Deputy Director and the Director.

7.2.6 Method Validation of Imported Protocols - Protocols acquired from other sources, must be verified in the laboratory, reviewed by the Protocol Review Board, and approved with the proper signatures prior to use on casework.

7.3 Departures from NFWFL Analytical Protocols - It must be kept in mind that the type of

material most often analyzed in the forensic laboratory is not “standard,” but rather, it is often unique (i.e., one of a kind), and of limited quality and quantity. Protocols must often be adjusted to allow for this fact. Any departure from adopted protocols must be approved by the Team Leader. All departures from an adopted protocol must be fully documented in the laboratory notes.

7.4 Protocol Filing/Distribution - All protocols, both procedural and analytical, will be filed with and maintained by the Quality Assurance Office. The protocols will be given a unique identifier, a version date and contain sequentially numbered pages. New protocols will be issued to respective analysts. Retired protocols will be placed in an archival file.

Distribution of protocols to non-clients will be by formal written request only. The Quality Assurance Office will maintain a log to identify requests and distribution of protocols.

8. ROUTINE QUALITY CONTROL MEASURES

8.1 Good Housekeeping - It is critical that all work spaces be kept as clean as practical. Good housekeeping and safe laboratory practices dictate that all examinations, and particularly those involving biological hazards or highly toxic chemicals, be carried out using the proper protective clothing and equipment. The NFWFL Safety Manual should be consulted for specific details.

8.2 Control Standards - Where appropriate, control standards will be used in the analysis of evidence to verify that the analytical protocols worked as expected. Control standards could include negative controls, reagent blanks and reference standards. Verification of all control standards must be performed according to the procedures defined in the analytical protocols.

- Reagents and analytical standards used in casework which could affect the quality of work performed, must be tested prior to use on casework
- For commercial reagents or analytical standards, a certificate of analysis received with the purchase will serve to establish the quality of the material
- Chemical reference standards will not be used past their expiration date
- Analyst-prepared reagents and solutions will be labeled with the identity of the reagent and the date of preparation

8.3 Evidence Label/Identification Verification - Prior to analysis examiners must verify that the evidence agrees with the attached evidence labels and accompanying case information. Any discrepancies must be brought to the immediate attention of Evidence Unit personnel.

8.4 Evidence Examinations in Progress - Care should be exercised when analyzing evidence to prevent cross contamination. Standard exemplars must be appropriately identified and kept separate from evidentiary materials.

8.5 Evidence Re-examination Policy - Occasionally a client will request re-examination of an evidence item that has already been examined at another forensic lab. The NFWFL does not accept these requests unless approved by the Laboratory Director.

8.6 Documentation of Analytical Results - Analysts must fully document evidence examination in accordance with requirements set forth in Section 12 of this manual.

8.7 Accuracy and Consistency of Analysis - The accuracy and consistency of examinations must be ensured by the use of analytical controls and traceable standards.

8.8 Technical and Administrative Reviews of Case Reports- Every case report with supporting analytical documentation will be technically and administratively reviewed by two different people prior to release of the final examination report. The technical review will objectively evaluate the laboratory notes, data, and other documents which form the basis for the scientific conclusion. The administrative review will verify completeness, accuracy and proper format of the report (refer to QA Manual Sections 12.2 and 12.3 for further information)

8.9 Proficiency Testing - Proficiency testing is one of the measures used to monitor analytical competency. All analysts will be tested annually in each discipline in which they perform casework. DNA analysts will be tested every 180 days by an external proficiency test provider approved by ASCLD/LAB.

8.10 Laboratory Services Evaluation - The services of the laboratory will be evaluated through the use of a *Forensic Laboratory Evaluation Form*. This form is included with examination reports mailed to the client. Completed evaluations are reviewed and placed on file for reference.

8.11 Courtroom Testimony Evaluation - The testimony of laboratory staff is monitored through the use of a *Courtroom Testimony Evaluation Form*. Completed evaluations are reviewed and placed on file for reference.

8.12 Annual Quality Audits - By April 1st of each year, an Annual Accreditation Audit Report is submitted to the Executive Director of ASCLD/LAB based on an audit of NFWFL operations for the previous year with respect to each standards criterion identified in the ASCLD-LAB manual. The standards include those that are:

Essential - Standards which directly affect and have fundamental impact on the work product of the laboratory or the integrity of the evidence.

Important - Standards which are considered to be key indicators of the overall quality of the laboratory but may not directly affect the work product nor the integrity of the evidence.

Desirable - Standards which have the least effect on the work product or the integrity of the evidence but which nevertheless enhance the professionalism of the laboratory.

The report requires that substantive occurrences of non-compliance to “Essential” standards be

documented. “Substantive occurrences” of non-compliance are situations potentially having a significant bearing on the quality of the work of the laboratory.

In addition to evaluating each ASCLD-LAB manual standards criterion, the laboratory is required to identify staffing or organizational changes, including the addition, re-institution or suspension of an analytical discipline or sub-discipline, as well as any inconsistencies or errors occurring in proficiency testing or casework.

The annual quality audit report will be reviewed by senior laboratory staff.

9. EVIDENCE CONTROL

9.1 Introduction - The control system includes maintaining proper chain of custody, proper case and evidence documentation, maintenance of individual item numbers, controlling evidence seals, and providing a secure and environmentally-controlled evidence storage facility. The control system also involves utilizing a Laboratory Information Management System (LIMS) which records evidence submissions, transfers, requests for analysis, technical and administrative reviews and reporting of results.

9.2 Chain of Custody - All evidence received must be traceable from the time the evidence is submitted and received by the NFWFL to the time the evidence is returned to the client. This is accomplished using chain of custody procedures to record the receipt, transfer, and return of evidence. Records must indicate the individuals involved in receiving, relocating, storing, analyzing, and releasing evidence. Records must include the dates and, in the case of internal laboratory transfers, the times of all evidence transactions. The NFWFL recognizes ‘external’ chain of custody records as those generated by the client which track evidence transfers to, from and outside the NFWFL, and ‘internal’ chain of custody records as those generated by the NFWFL and which track evidence transfers within the laboratory. Chain of custody records for transfers of evidence within the laboratory must be signed by staff members only.

9.3 Evidence Storage & Handling

9.3.1 Storage Facility - Secured evidence storage facilities are located in the Evidence room. These facilities include a locking evidence room and a locking freezer. Each transfer of evidence into and out of the evidence unit is recorded in the LIMS. The computer entry includes secured information about the items transferred, who released, and who received the evidence, and the date and time of the transaction.

Additionally, each area of the laboratory has temporary lockers for overnight storage of evidence transferred to analysts.

9.3.2 Properly Sealed Evidence - A container is “properly sealed” only if its contents cannot be switched, altered, contaminated, or damaged without detection. The seal includes taping all container openings with evidence seal tape and initialing and dating the taped area.

It is assumed that all evidence items received by the laboratory will be properly sealed by a client prior to submission to the laboratory. Once the analysis is complete, the analyst must re-seal the package using evidence seal tape, and mark the tape with their initials and the date.

9.3.3 Labeling Evidence - All evidence items will be tagged with a NFWFL Evidence Tag and uniquely numbered, LIMS-generated label. The back of the tag tracks transfers between staff within the laboratory.

9.3.4 Potentially Hazardous Evidence Handling Criteria - Potentially hazardous evidence is defined as evidence which may pose a biological, chemical or physical hazard if not properly handled to minimize exposure. To ensure that exposure is minimized, potentially hazardous evidence must be opened only in designated work areas by trained personnel. All exposures or injuries must be reported to the appropriate supervisor and Laboratory Safety Officer. All firearms will be checked by a qualified firearms handler to determine that they are safe for handling. Details on the handling of such materials are to be found in the NFWFL Safety Manual.

9.4 Laboratory Information Management System (LIMS) - The NFWFL uses a computerized tracking system to record information relevant to submission, evidence transfer, request for analysis, and reporting of each case processed by the laboratory. The LIMS database resides on a local area network accessible only to laboratory staff. The database is backed up nightly to preserve the data.

9.5 Successive Submissions for a Single Case - Evidence from a single case may be submitted over multiple dates. Each receipt of evidence on different dates is considered a separate submission. In general, all evidence submitted by the same client for the same case is logged in under the same NFWFL case number. This will ensure that all records for that case are stored in the same Master Case File.

9.6 Case Segments - Occasionally, evidence from a single case may involve items that require analysis from different disciplines in the laboratory. The Case Coordinator is responsible for creating a Case Segment and transferring the information and/or evidence to the segment analyst. The Case Segment file will include an assignment notification request and a copy of the submittal form.

9.7 Evidence Sent Out for Analysis - Evidence may be shipped to another laboratory or agency per the client's request, court order, attorney's or case coordinator's request. Evidence must be properly sealed and must include a completed chain of custody. Documentation must include a description of the items forwarded, method of transmittal, destination, requesting agency, requesting person, copy of any letter of request, return receipt for mailing agency, and the name of the responsible NFWFL analyst.

9.8 Conservation of Evidence - It is the policy of the NFWFL to never completely consume evidence in analysis. Whenever possible, evidence which would normally be completely consumed in analysis will be subsampled to preserve a portion for future reference. In the event

that the evidence is not able to be subsampled, prior to conducting the analysis, the analyst must inform the client.

9.9 Returning Evidence to the Client - It is the policy of the NFWFL to return all evidence to the client once examination is complete and the final report has been issued. All evidence will be sealed and must include a completed chain of custody. Arrangements for receipt of perishable evidence will be made with the client prior to shipment. Evidence may be shipped by U.S. certified or registered mail, or commercial shipping service. A return receipt must be requested. All shipping information must be indicated in the Master Case File.

9.10 Releasing Evidence for Disposition - At the discretion of the client, evidence may be released from the case for disposition; either for destruction or to be curated into the NFWFL research collection. Release of evidence requires signature authority of the Case Coordinator, the Laboratory Director, and the client. An Evidence Release Form is prepared and sent to the client for approval. Once a signed release form is received by the NFWFL, the evidence can be disposed. The chain of custody is completed to reflect the disposition of the evidence.

10. MASTER CASE FILE DOCUMENTATION GUIDELINES

10.1 Introduction - All records pertaining to a case are to be maintained in the Master Case File. This includes, but is not limited to, evidence submittal forms, chain of custody records, written correspondence, sample work sheets, laboratory notes, and other documents relating to processing casework. Any case information not able to be satisfactorily stored in the Master Case File must have reference in the Master Case File as to the storage location. A Master Case File is assigned a unique, sequential, NFWFL Laboratory Case Number and all documentation is stored in a red case file folder. Completed case files are maintained in numerical order in file cabinets which are locked after working hours.

The following document control procedures have been established to assure that all laboratory records are created and maintained for proper accountability.

10.2 Evidence Submittal Form - Each new submission of evidence requires a completed Evidence Submittal Form to include the following information: the client's agency case number, client's name, agency name, case name and suspect (if applicable), a description of each evidence item received including all relevant numbers or identifiers, and a description of the analysis requested.

10.3 External Chain of Custody - Evidence submitted to the laboratory is expected to include an original chain of custody form (referred to as an external chain) which documents initial receipt of the evidence by the NFWFL and return of the evidence to the client. It is the client's responsibility to submit a chain of custody along with evidence.

10.4 Internal Chain of Custody - All transfers of evidence between individuals, and/or secured storage locations in the NFWFL, are recorded in the computerized LIMS. This information is also recorded on NFWFL tags attached to the evidence items. Upon completion of

the case and prior to returning the evidence to the client, an internal chain of custody report is generated and placed in the Master Case File.

10.5 Evidence Release Form - It is the policy of the NFWFL to return all evidence to the client. From time to time though, the client requests that the NFWFL dispose of the evidence. Release of evidence requires signature authority of the Case Coordinator, the Laboratory Director, and the client. An Evidence Release Form is prepared and sent to the client for approval. Evidence released for disposal can either be destroyed or curated into the NFWFL standards collection.

10.6 Analytical Documentation - All information generated by the analyst in the examination of evidence will be maintained in the Master Case File. Analytical documentation includes laboratory notes, diagrams, photographs, spectrographs, micrographs, etc., used to arrive at a conclusion. Due to the large size format of x-ray radiographs, they will be stored in numerical order in a secure location. Archived radiographs are stored in the Evidence Unit.

10.7 Written Correspondence - A record of all written correspondence (letters, faxes, and electronic mail) must be maintained in the Master Case File. Multi-paged administrative documents which are bound together may be identified by the NFWFL Case Number on the front of the document.

10.8 Digital Images - Digital images may be generated by NFWFL staff members during evidence examination. Either a printed copy of the images or a CD or DVD of the images may be stored in the Master Case File. 'Original' compact diskette digital images of latent prints will be logged into the LIMS database as evidence items and be maintained by the latent print examiner. Generally, all other compact diskette digital images will be filed in the Master Case File. Laboratory digital images are prepared in order to document evidence examination. Generally, these images will be used to help the analyst recall details regarding the examination and to allow adequate review of the work. Latent print digital images can be used for subsequent comparative analysis.

10.9 Phone Calls - A record of all substantive phone calls relating to case work must be documented on a phone log. Documentation must include the contact name, contact agency and phone number where appropriate or unclear, date/time of call, and basic outline of the conversation.

10.10 Court Deposition Requests and Release of NFWFL Laboratory Notes - All deposition materials generated by the NFWFL must be maintained in the Master Case File. Only copies of Laboratory notes may be released to the client, or forwarded to a different agency per the client request. All laboratory notes must be kept in the Master Case File.

All Discovery and Freedom of Information Act requests must be approved by the Lab Director. All released or forwarded documents must be accompanied by a copy of the court order, the attorney's letter of request and/or a NFWFL letter of request indicating the items being sent. All releasing or forwarding transactions must be indicated in the Master Case File. Documentation must include a description of the items forwarded, method of transmittal, destination, requesting

agency/person, copy of any letter of request, return receipt for mailing agency and responsible NFWFL representative.

10.11 Master Case File Organization - Each file must contain the original or a copy of the following, and in the order listed:

10.11.1 Submittal Information from the Client

- Evidence Release Form (if evidence has been released by the client at the close of the case)
- NFWFL Evidence Submittal Form
- External Chain of Custody
- Internal Chain of Custody from LIMS
- All other paperwork submitted by the client

10.11.2 Assignment Request / Analytical Documentation - Generally, assignment requests will be individually stapled or clipped together.

- Assignment Notification Form
- All analytical documentation produced by the NFWFL analyst such as diagrams, printouts, autoradiographs, photographs, observations, results, reference to procedures followed, etc.
- Any Lab results or case related items not able to be stored in the Master Case File must have their locations referenced in the Master Case File
- All Fax/Mail/E-mail correspondence

10.11.3 Information Sent to the Client in the form of yellow photocopy records

- Case Report Cover Letter
- Case Report(s)
- Physical Evidence List

11. ANALYTICAL DOCUMENTATION GUIDELINES

11.1 Introduction - The Forensic Scientist must always bear the responsibility for justifying his or her conclusion, and the work that has lead to that conclusion. In general, documentation to support conclusions must be such that in the absence of the examiner, another equally competent examiner could evaluate what was done, interpret the data and arrive at the same conclusions.

11.2 General Criteria for Documentation

11.2.1 Documentation must be legible and occur in ink.

11.2.2 Hand or type-written notes must be made on blue-lined graph paper.

11.2.3 All analytical activities must include a date.

11.2.4 Handwritten or typewritten case note edits cannot obliterate or erase the original text. Any edit activity must be initialed by the author.

11.2.5 Obscure symbols or abbreviations should be avoided unless they are defined in the notes, or they are standardized and included in a written laboratory protocol.

11.3 Specific Criteria for Documentation

11.3.1 Each page of all analytical documentation must include:

- NFWFL Case Number
- Initials of the Forensic Scientist
- Sequential numbering of pages of the format 1 of xxx; 2 of xxx, etc.

11.3.2 Evidence description and packaging as it was received by the analyst must be noted in the lab notes.

11.3.3 When appropriate, photographs may be taken to document evidence.

11.3.4 Protocols employed must be identified in the lab notes.

11.3.5 Instrument conditions and parameters must be recorded unless they are maintained in a calibration log or described in a protocol.

11.3.6 Analytical results on evidence items, as well as related standards, blanks or controls must be documented in the laboratory notes.

11.3.7 Unless specified by protocol, the lab notes must indicate when evidence has been significantly altered. See also section 9.8, Conservation of Evidence.

11.3.8 Notes should accurately reflect the bench experience.

12. REPORT CONTENT, REVIEW AND HANDLING PROCEDURES

12.1 Report Contents - A written copy of the client report is generated after the completion of the examination. The final report contains the information listed below.

- NFWFL Case Number
- Agency Case Number
- Name and address of the client
- Case Name and Suspect Name (if any)
- Laboratory Identification Numbers and description of evidence material
- Date Lab received evidence in Case Coordinator report
- Date of transfer in all reports

- Examination conducted
- Summary of analytical results
- Disposition of Evidence

Additionally, each page of the report:

- Must have the NFWFL Case Number
- Must have a report date
- Must be sequentially numbered with the format 1 of xxx, 2 of xxx, etc.
- Must be initialed by the Forensic Scientist, except the last page which will have the signature of the Forensic Scientist

12.2 Technical Review of Case Reports- Every completed case assignment with supporting analytical documentation will be technically reviewed by a second analyst prior to release of the final examination report. The review will evaluate the laboratory notes, data, and other documents that form the basis for the scientific conclusion. Technical reviews are recorded in the Master Case File. The technical review verifies that:

12.2.1 All documentation is properly labeled

12.2.2 Appropriate protocols were applied to the evidence

12.2.3 Standards were referenced

12.2.4 The basis for conclusions were indicated in the laboratory notes or case file

12.2.5 The final report is grammatically correct and complies with laboratory policy regarding format and content

12.2.6 The reviewer concurs with the conclusions

12.3 Administrative Review of Case Reports- Every case assignment and associated examination report will be administratively reviewed by a Branch Chief or another analyst other than the technical reviewer, prior to release of the examination report. Administrative reviews are recorded in the Master Case File. The administrative review verifies that:

12.3.1 The case assignment documentation is complete

12.3.2 Report pages are properly labeled

12.3.3 The report is grammatically correct. Case and evidence numbers are accurate throughout and between all reports, laboratory notes, and submittal documentation.

12.4 Report Amendments - If a discrepancy is discovered in a report that has been issued, the report must be corrected and an amended copy provided to the client. Amended reports are reviewed by the Lab Director. The following steps are required to correct a

discrepancy on a report:

12.4.1 Electronically retrieve the original report from the archive.

12.4.2 Draw a single strikeout line through the discrepancy on the report.

12.4.3 Amend the report by making the appropriate changes.

12.4.4 The report header must contain "AMENDED [appropriate section] REPORT and the date the amendment was made.

12.4.5 For digital media (i.e. compact disks, etc.), both the label on the media and the digital files contained on the media will need to be amended as follows:

- The label will be corrected by adding "AMENDED [appropriate section] REPORT" along with the analyst's initials and the date the amendment was made. A single strike-through will be placed through any other discrepancy on the label
- Digital files contained on the media are to be corrected by changing the text to a unique, contrasting color and adding the correct information. A cover letter (and/or splash-screen in the computer file, if applicable) sent with the amended report will state "AMENDED [appropriate section] REPORT" and indicate the color of the text that has been corrected

12.4.6 Add the appropriate statement to the bottom of each page of the report- "AMENDED REPORT. AMENDMENT DOES NOT AFFECT THE CONCLUSION" or "AMENDED REPORT. AMENDMENT DOES AFFECT THE CONCLUSION."

12.4.7 Print a new copy of the report.

12.4.8 Generate a letter of explanation concerning what was changed and why it was changed.

12.4.9 Forward the report and letter of explanation to the client.

12.4.10 Maintain copies of the amended report, the letter of explanation, and a summary of amended report actions per Section 13.3 in the Master Case File.

12.5 Final Report Processing - The final report on NFWFL letterhead is generated and signed by the analyst. A photocopy is maintained in the Master Case File and the original copy is sent to the client. The date of the mailing is documented.

12.6 Client Confidentiality - Analytical results, either verbal or written, must be relayed to the

client ONLY. Requests from any other parties for information regarding any aspect of the evidence or case-related information will be referred to the client and then documented in the Master Case File. Upon approval of the client, analysts may communicate with designated parties. Consultations with the defense attorney will be done only upon the authorization of the client or the prosecuting attorney. Under no circumstances will any exceptions be made to this policy. Any questions regarding the eligibility of callers to receive this information should be directed to the Laboratory Director.

12.7 Report Storage and Handling - All Master Case Files must be maintained in locked file cabinets in numerical order by the NFWFL Case Number. Master Case Files must be "checked out" if removed from the file cabinet. A check-out card must go in place of the file being removed. The check-out card must include the date/time/initials of the individual removing the file. The card will be removed when the file is returned.

12.8 Report Duplication Issues - Reports are only to be duplicated per client request. The duplicated report must be stamped "Copy." Appropriate copies will be maintained in the Master Case File.

12.9 Successive Submissions of Evidence for a Single Case - Occasionally, evidence for a single case may be submitted at different times. All paperwork for one case should be maintained in one Master Case File. All evidence for one case must be referenced by the same NFWFL Case Number.

13. CORRECTIVE ACTION PLAN

13.1 Introduction - This section outlines the corrective action procedures to be followed in the event that discrepancies are reported either through the proficiency testing process or in casework.

The goal of the corrective action plan is to review the discrepancy, determine the event(s) that led to the discrepancy, and implement appropriate corrective measures.

Analysis of evidence reported as 'no results' or 'inconclusive' and then subsequently identified as conclusive through further testing at a later date will not be considered as a discrepancy under the corrective action plan. An amended report will be required following Section 12.4, Report Amendments.

13.2 Corrective Action Process - When a discrepancy changes the conclusion of a report or a proficiency test, the following corrective action will be taken and the results filed with the NFWFL Quality Assurance Office.

13.2.1 The appropriate Team Leader and Lab Director are notified of the discrepancy.

13.2.2 All casework for the analyst will be halted.

13.2.3 The analytical documentation is thoroughly reviewed to determine what

caused the discrepancy.

13.2.4 Implement a corrective measure.

13.2.5 Confirm that a return to compliance has been achieved by analyzing reference samples where appropriate.

13.2.6 Amend the report and maintain copies of the amended report in the Master Case File.

13.2.7 Review, where necessary, all casework relevant to the discrepancy to determine if the discrepancy is an isolated incident.

13.3 Master Case File Documentation - An analytical discrepancy and the corrective action that returns a system to compliance must be documented. The following elements must be summarized in the Master Case File:

13.3.1 Who discovered the discrepancy.

13.3.2 Who was the analyst involved.

13.3.3 When did the discrepancy occur.

13.3.4 What was the nature of the discrepancy.

13.3.5 Why did the incident happen (scientific explanation if available).

13.3.6 What was the name of the test method.

13.3.7 What was the nature of the corrective action.

13.3.8 How was a return to compliance confirmed.

14. CODE OF ETHICS

Every NFWFL Forensic Scientist is expected to maintain a high level of professional integrity. Whether a Forensic Scientist is a member of the organization or not, the Forensic Scientist is expected to adhere to the canons of ethics of the California Associations of Criminalistics (CAC), the American Academy of Forensic Sciences (AAFS) and the American Board of Criminalists (ABC). The management of the NFWFL will be expected to adhere to the Management Code of Ethics promulgated by the American Society of Crime Laboratory Directors (ASCLD). It should be noted that the American Board of Criminalistics has certain provisions that are not to be found in the CAC Code of Ethics, *e.g.*, the necessity of keeping notes, and the responsibility of communicating with the opposing side in all instances where such communication is not expressly forbidden by the client attorney. These codes are a formal part of this Quality Assurance Manual and they are included below:

CALIFORNIA ASSOCIATION OF CRIMINALISTS

CODE OF ETHICS

This Code is intended as a guide to the ethical conduct of individual workers in the field of criminalistics. It is not to be construed that these principles are immutable laws nor that they are all-inclusive. Instead, they represent general standards which each worker should strive to meet. It is to be realized that each individual case may vary, just as does the evidence with which the criminalist is concerned, and no set of guides or rules will precisely fit every occasion. At the same time, the fundamentals set forth in this Code are to be regarded as indicating, to a considerable extent, the conduct requirements expected of members of the profession and of this Association. A failure to meet or maintain certain of these standards will justifiably cast doubt upon an individual's fitness for this type of work. Serious or repeated infractions of these principles may be regarded as inconsistent with membership in the Association.

Criminalistics is that professional occupation concerned with the scientific analysis and examination of physical evidence, its interpretation, and its presentation in court. It involves the application of principles, techniques and methods of the physical sciences, and has as its primary objective a determination of physical facts which may be significant in legal cases.

It is the duty of any person practicing the profession of criminalistics to serve the interests of justice to the best of his ability at all times. In fulfilling this duty, he will use all of the scientific means at his command to ascertain all of the significant physical facts relative to matters under investigation. Having made factual determinations, the criminalist must then interpret and evaluate his finding. In this he will be guided by experience and knowledge which, coupled with a serious consideration of his analytical findings and the application of sound judgment, may enable him to arrive at opinions and conclusions pertaining to the matters under study. These findings of fact and his conclusions and opinions should then be reported, with all the accuracy and skill of which the criminalist is capable, to the end that all may fully understand and be able to place the findings in their proper relationship to the problem at issue.

In carrying out these functions, the criminalist will be guided by those practices and procedures which are generally recognized within the profession to be consistent with a high level of professional ethics. The motives, methods, and actions of the criminalist shall at all times be above reproach, in good taste, and consistent with proper moral conduct.

I. ETHICS RELATING TO SCIENTIFIC METHOD:

- A. The criminalist has a truly scientific spirit and should be inquiring, progressive, logical and unbiased.
- B. The true scientist will make adequate examination of his materials, applying those tests essential to proof. He will not, merely for the sake of bolstering his conclusions, utilize unwarranted and superfluous tests in an attempt to give apparent greater weight to his results.

- C. The modern scientific mind is an open one incompatible with secrecy of method. Scientific analyses will not be conducted by "secret processes," nor will conclusions in case work be based upon such tests and experiments as will not be revealed to the profession.
- D. A proper scientific method demands reliability of validity in the materials analyzed. Conclusions will not be drawn from materials which themselves appear unrepresentative, atypical, or unreliable.
- E. A truly scientific method requires that no generally discredited or unreliable procedure be utilized in the analysis.
- F. The progressive worker will keep abreast of new developments in scientific methods and in all cases view them with an open mind. This is not to say that he need not be critical of untried or unproved methods, but he will recognize superior methods if and when they are introduced.

II. ETHICS RELATING TO OPINIONS AND CONCLUSIONS:

- A. Valid conclusions call for the application of proven methods. Where it is practical to do so, the competent criminalist will apply such methods throughout. This does not demand the application of "standard testing procedures," but, where practical, use should be made of those methods developed and recognized by this or other professional societies.
- B. Tests are designed to disclose true facts and all interpretations shall be consistent with that purpose and will not be knowingly distorted.
- C. Where appropriate to the correct interpretation of a test, experimental controls shall be made for verification.
- D. Where possible, the conclusions reached as a result of analytical tests are properly verified by re-testing or the application of additional techniques.
- E. Where test results are inconclusive or indefinite, any conclusions drawn shall be fully explained.
- F. The scientific mind is unbiased and refuses to be swayed by evidence or matters outside the specific materials under consideration. It is immune to suggestion, pressures, and coercions inconsistent with the evidence at hand; being interested only in ascertaining facts.
- G. The criminalist will be alert to recognize the significance of a test result as it may relate to the investigative aspects of a case. In this respect he will, however, scrupulously avoid confusing scientific fact with investigative theory in his interpretations.
- H. Scientific method demands that the individual be aware of his own limitations and

refuse to extend himself beyond them. It is both proper and advisable that the scientific worker seek knowledge in new fields; he will not, however, be hasty to apply such knowledge before he has had adequate training and experience.

I. Where test results are capable of being interpreted to the advantage of either side of a case, the criminalist will not choose that interpretation favoring the side by which he is employed merely as a means of justifying his employment.

J. It is both wise and proper that the criminalist be aware of the various possible implications of his opinions and conclusions and be prepared to weigh them, if called upon to do so. In any such case, however, he will clearly distinguish between that which may be regarded as scientifically demonstrated fact and that which is speculative.

III. ETHICAL ASPECTS OF COURT PRESENTATION:

A. The expert witness is one who has substantially greater knowledge of a given subject or science than has the average person. An expert opinion is properly defined as "the formal opinion of an expert." Ordinary opinion consists of one's thoughts or beliefs on matters, generally unsupported by detailed analysis of the subject under consideration. Expert opinion is also defined as the considered opinion of an expert, or a formal judgement. It is to be understood that an "expert opinion" is an opinion derived only from a formal consideration of a subject within the expert's knowledge and experience.

B. The ethical expert does not take advantage of his privilege to express opinions by offering opinions on matters within his field of qualification to which he has not given formal consideration.

C. Regardless of legal definitions, the criminalist will realize that there are degrees of certainty represented under the single term of "expert opinion." He will not take advantage of the general privilege to assign greater significance to an interpretation than is justified by the available data.

D. Where circumstances indicate it to be proper, the expert will not hesitate to indicate that while he has an opinion, derived of study and judgment within his field, the opinion may lack the certainty of other opinions he might offer. By this or other means, he takes care to leave no false impressions in the minds of the jurors or the court.

E. In all respects, the criminalist will avoid the use of terms and opinions which will be assigned greater weight than are due them. Where an opinion requires qualification or explanation, it is not only proper but incumbent upon the witness to offer such qualification.

F. The expert witness should keep in mind that the lay juror is apt to assign greater or less significance to ordinary words of a scientist than to the same words when used by a lay witness. The criminalist, therefore, will avoid such terms as may be misconstrued or misunderstood.

G. It is not the object of the criminalist's appearance in court to present only that evidence

which supports the view of the side which employs him. He has a moral obligation to see to it that the court understands the evidence as it exists and to present it in an impartial manner.

H. The criminalist will not by implication, knowingly or intentionally, assist the contestants in a case through such tactics as will implant a false impression in the minds of the jury.

I. The criminalist, testifying as an expert witness, will make every effort to use understandable language in his explanations and demonstrations in order that the jury will obtain a true and valid concept of the testimony. The use of unclear, misleading, circuitous or ambiguous language with a view of confusing an issue in the minds of the court or jury is unethical.

J. The criminalist will answer all questions put to him in a clear, straightforward manner and refuse to extend himself beyond his field of competence.

K. Where the expert must prepare photographs or offer oral "background information" to the jury in respect to a specific type of analytic method, this information shall be reliable and valid, typifying the usual or normal basis for the method. The instructional material shall be of that level which will provide the jury with a proper basis for evaluating the subsequent evidence presentations, and not such as would provide them with a lower standard than the science demands.

L. Any and all photographic displays shall be made according to acceptable practice, and shall not be intentionally altered or distorted with a view to misleading court or jury.

M. By way of conveying information to the court, it is appropriate that any of a variety of demonstrative materials and methods be utilized by the expert witness. Such methods and materials shall not however, be unduly sensational.

IV. ETHICS RELATING TO THE GENERAL PRACTICE OF CRIMINALISTICS:

A. Where the criminalist engages in private practice, it is appropriate that he set a reasonable fee for his services.

B. No services shall ever be rendered on a contingency fee basis.

C. It shall be regarded as ethical for one criminalist to re-examine evidence materials previously submitted to or examined by another. Where a difference of opinion arises, however, as to the significance of the evidence or to test results, it is in the interest of the profession that every effort be made by both analysts to resolve their conflict before the case goes to trial.

D. Generally, the principle of "attorney-client" relationship is considered to apply to the work of a physical evidence consultant, except in a situation where a miscarriage of justice might occur. Justice should be the guiding principle.

E. It shall be ethical for one of this profession to serve an attorney in an advisory capacity regarding the interrogation of another expert who may be presenting testimony. This service must be performed in good faith and not maliciously. Its purpose is to prevent incompetent testimony but not to thwart justice.

F. It shall be ethical and proper for one criminalist to bring to the attention of the Association a violation of any of these ethical principles; indeed, it shall be mandatory where it appears that a serious infraction or repeated violations have been committed.

G. This Code may be used by any criminalist in justification of his conduct in a given case with the understanding that he will have the full support of this Association.

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