National Fish and Wildlife Forensic Laboratory
QUALITY ASSURANCE MANUAL

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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 Forensics Laboratory (NFWFL); 2) assist members of the laboratory in performing their duties; and 3) ensure that information generated by the laboratory is reliable and correct.

1.2 Scope of the National Fish and Wildlife Forensics Laboratory (NFWFL) - The National Fish and Wildlife Forensics Laboratory is part of the Office of Law Enforcement of the Fish and Wildlife Service. The National Fish and Wildlife Forensics Laboratory (NFWFL) offers analytical capabilities for the prosecution of wildlife crimes to 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 excellent service in responding to the needs of the client.

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

1.3.3 The NFWFL staff will utilize protocols and procedures considered to be state-of-the-art in the forensic science community.

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

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

1.3.6 The NFWFL will maintain a properly functioning facility in which to perform analyses.

1.3.7 The NFWFL structure will group the work and personnel of the lab, allowing for the interrelation of disciplines.

1.4 ASCLD/LAB Accreditation - The NFWFL has been accredited in Trace Evidence, Toxicology, Firearms/Toolmarks, Serology and DNA by the American Society of Crime Laboratory Directors, Laboratory Accreditation Board (ASCLD/LAB). The NFWFL will seek accreditation in additional areas of analysis as available.

1.5 Quality Assurance Defined - Quality assurance is defined as the sum of all activities in which a laboratory is engaged. A quality assurance program is an essential part of a sound analytical protocol used by the laboratory to detect and correct problems in analytical and interpretational processes.

Quality assurance activities include preventative activities - the quality control (QC) program, assessment activities - the quality assessment (QA) program, and corrective activities.

Preventative activities include tasks undertaken prior to the examination of samples which are intended to establish systems conducive to accuracy in analytical testing. These include the

development and consistent use of standard operating procedures, instrument preventative maintenance, calibration of instruments, testing of materials, training of personnel, and strict adherence to the principles of good laboratory practice.

Assessment activities are those functions undertaken during testing to determine if the control systems are performing correctly. Assessment activities include the use of standards, controls, blanks, maintenance of control charts and proficiency testing.

Corrective activities are performed when loss of control (error) or possible error is detected somewhere in the analytical system. Examples include instrument troubleshooting, instrument re-calibration, personnel re-training, and reanalysis of unused sampling materials.

1.6 Quality Assurance Philosophy - It is imperative that all work conducted by the NFWFL is technically correct. This applies not only to actual laboratory work, but also to written reports, verbal reports, and court testimony.

Technical competency may be achieved only by the amalgamation and synthesis of a number of factors, including initial training, experience, supervision of casework, continuing education, proficiency testing, and an appreciation of the scientific method, all of which must be projected against a background of proper professional ethics.

This landscape is vast, but each component is important and is inextricably tied to the others. No component can be ignored, and no component may be properly considered in isolation. Quality assurance does not, and cannot rest on a single component. One cannot embrace one component of quality assurance and disregard the others. The successful completion of proficiency testing samples, for example, is not a guarantee of technical competency, nor is an unacceptable result on a proficiency testing an indication of technical incapability. Quality assurance is, and must be, a dynamic endeavor; it is both all-encompassing and never-ending.

Forensic work does not permit the rationalization of substandard work. While in most other human endeavors, it is universally accepted that no one is infallible, in forensic work it is widely expected that all work will be exemplary. Anything less than exemplary work may be subject to criticism. Whether or not that criticism is fair is not an issue; the adversary nature of our system of justice is such that the criticism will in fact ensue.

Quality assurance, as countenanced by the NFWFL, will address the major areas enunciated in this document. The initial step in the implementation of quality assurance procedures will be the compilation of quality assurance procedures in the form of a quality assurance document, of which this is a part.

This quality assurance document is, for all intent and purpose, a public document. It is open to inspection by any interested party, just as the basis for any opinion must be open to inspection. The quality assurance document will be reviewed as often as is appropriate. Previous versions of documents will be retired, but not destroyed. Any analyst may propose amendments of the quality assurance document at any time, and in fact a duty to do so is incumbent upon them when there is a perceived need. Upon receipt of a proposed amendment to the quality assurance document, an

attempt will be made by management to develop a consensus among all analysts in the NFWFL. If a consensus cannot be reached, the Laboratory Director will resolve the issue, with all analysts being notified as to the decision.

It is expected that this document will, with periodic amendments, serve as a durable quality assurance document for the NFWFL. Amended versions will exist years in the future, at a time when the laboratory staff will be greatly expanded. For the benefit of trainees and relatively inexperienced analysts, this document will of necessity be complex and detailed in order to communicate not only the essence of certain issues, but also the logical and historical underpinnings of these issues.

1.7 Objectives of the Quality Assurance Program - It should be recognized that absolute infallibility in forensic practice is not humanly possible; an effective quality assurance program can, however, provide a mechanism whereby technical correctness may be achieved and maintained. The objective of the quality assurance program is to reduce measurement errors in analytical determinations to a level below established limits. It is the goal of this program to preserve the integrity of evidence, to ensure the precision and accuracy of results obtained in the examination of the evidence, and to provide clear documentation of results, supporting data and conclusions.

To achieve this goal, the quality assurance program strives:

- To reinforce effective policies and procedures
- To monitor the development of staff and technical procedures
- To identify and correct problems or deficiencies in the work product

The quality assurance program encompasses all facets of the analytical process from evidence receipt to final report and court testimony. The program also includes issues such as the clarity of client reports, the handling and issuance of final results and reporting guidelines. The quality assurance procedures for chain of custody issues and the security of evidence storage are documented herein.

The approaches employed to ensure and maintain a quality product are as follows:

- Hire qualified staff
- Promote qualified staff
- Dismiss unacceptable staff
- Implement, in a timely fashion, actions to correct any deficiencies that may arise
- Develop employees through personnel evaluations
- Formulate policies and procedures
- Use training protocols
- Emphasize the necessity of staying informed through access to literature, meetings,

seminars and continuing education
- Maintain secure facilities
- Maintain proper evidence handling procedures
- Sufficiently document all case related activities
- Use reliable technical procedures
- Use properly maintained and calibrated equipment
- Adhere to a professional code of ethics

1.8 Quality Assurance Manual Review - The review and amendment of this manual is the responsibility of the NFWFL Deputy Director and must be accomplished on an annual basis. It is also the Deputy Director's responsibility to ensure that each current and new employee reads and understands the requirements set forth in this document.

1.9 Employee Responsibility - It is the intent of this laboratory to provide only the highest quality and most reputable analytical results. Therefore the plans, requirements, and instructions set forth in this document require mandatory and strict adherence by all employees. This manual must be read and followed by each employee. Employee participation in this program is encouraged through review of deficiencies and impracticalities. Suggestions for improvements should be made to the Management Team. Proposed deviations from this manual must be justified and brought to the attention of the NFWFL Forensic Science Branch Chief, Deputy Laboratory Director and/or relevant Supervisors. Deviations may at times be required, and in fact may be in accordance with good professional practice. Expediency, in the absence of compelling professional reasons, will not represent sufficient justification.

2. NFWFL ORGANIZATION AND PERSONNEL REQUIREMENTS

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

2.2 Technical Qualifications Files - A technical qualifications file folder is maintained for each laboratory staff member in the office of the NFWFL Quality Assurance Coordinator. File maintenance and update are the responsibility of the NFWFL Quality Assurance Coordinator. Technical qualifications files include the following items:

- A resume of qualifications.
- References to all training classes, seminars, short courses, and conferences attended.
- Copies of diplomas, course outlines, and other pertinent information.
- A list of laboratory protocols which the individual is qualified to perform.

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

2.4 Curriculum Vitae - A curriculum vitae (CV) is often utilized by both clients and opposing counsel as a means of assessing the technical competency of an expert. This assessment may take place at some point, remote in time and place, where the analyst is not present to communicate directly with the interested party. Education, experience, membership in professional organizations (and thereby indirectly the ethical codes of those organizations that the expert must subscribe to),

publications, etc., all have a bearing on the total professionalism of the analyst. A CV of each analyst must be updated every year. Each analyst will ensure that his or her CV is accurate in all respects. The CV should be conservative in tone; marginal qualifications should be excluded.

3. LABORATORY FUNCTION ISSUES

3.1 Laboratory Space and Design - The NFWFL consists of five analytical laboratory sections: Criminalistics, Morphology, Pathology, Serology and Technical Support. The NFWFL facility also has administrative space and an evidence storage space. The laboratory space in each section is sufficient for the proper analysis of evidence. The storage space consists of a warehouse in which chemical storage cabinets and storage areas for laboratory and administrative supplies are kept. The evidence space is a unique and separate room consisting of a secured storage facility, with a secured refrigerator/freezer.

Each laboratory room is equipped with adequate space to perform assigned tasks. Each laboratory room includes cabinetry for the storage of supplies, instrumentation accessories, equipment, tools, and evidence. Each laboratory has sufficient counter space for the operation of instrumentation and the documentation of findings. In addition, each forensic scientist has a separate desk space for performing administrative duties. File cabinets and book shelves are provided to store records, reference texts, and other documents.

The physical design of the laboratory provides for the efficient flow of evidence from the time of its acceptance until its return to the client. The facility is equipped with adequate lighting for personnel to carry out assigned tasks. The laboratory is equipped with the adequate plumbing and wiring needed to carry out assigned tasks. The laboratory is also equipped with proper ventilation for the handling and examination of volatile and biohazardous evidence or the performance of hazardous procedures. The laboratory is equipped with proper heating, cooling, and humidity controls to provide the conditions necessary for laboratory analyses. The laboratory has sufficient safeguards to prevent unauthorized entry.

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

> **3.2.1 NFWFL Client Definition -** A client is defined in this document as a member of any recognized law enforcement entity that is authorized to submit evidence for analysis. The term client does not imply fee for service. The cost of analysis conducted at the NFWFL is incorporated within the budget of the United States Fish and Wildlife Service, Office of Law Enforcement.

3.3 Client Contact Issues

> **3.3.1 Client Contact with the "Opposite Side" -** If a forensic scientist is asked to analyze evidence relating to a case previously submitted to NFWFL, the forensic scientist must determine whether the new request is from the original client or from the opposite side. If the request is from the original client, the additional work must be incorporated into the current

Master Case File. If the request is from the opposing side, there may be a conflict of interest, and a Court Order must be obtained to perform the work. If permission is granted by the courts, work for the opposing side must go in a separate Master Case File. The original Case File will contain information that will cross reference the work performed under Court Order.

3.3.2 Opposing Experts within the Lab - Opposing experts who visit the Lab will be accompanied at all times. Under no circumstance will the opposing expert be allowed to conduct examination of the evidence without an accompanying NFWFL staff member.

3.4 Laboratory Security System

3.4.1 Introduction - Strict policies for security have been implemented and will be maintained. The fundamental doctrine is that no individual will 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.

3.4.2 Standards and Criteria - 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. The laboratory maintains proper fire detection and protection equipment.

3.4.3 Volunteers - The laboratory uses qualified 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 never be left alone in an area when evidence is accessible. Volunteers will never be issued keys.

3.4.4 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.

3.4.5 Visitors/Volunteers Roster - All visitors and volunteers must sign a roster when entering and leaving the Lab. 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.

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3.5 Communication within the Laboratory - Channels of communication within the laboratory should exist for coordination of casework, and to ensure wide dissemination of technical information. All communications, both internal and external, should be clear, concise, and simply stated. Tact and diplomacy are a must in NFWFL communications. The Director should ensure that communication exists between all levels (vertical, horizontal and diagonal) of the laboratory. This will be partly accomplished through regular staff meetings and dissemination of information via e-mail and Lab bulletin boards.

3.6 Case Coordinator - Case evidence submissions may require analysis by more than one discipline (i.e., Criminalistics, Morphology, Serology). 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.

3.7 Turn Around Time - Turn around time begins when the case or the case evidence has been received in the Lab and logged into the laboratory computer database. The NFWFL forensic scientists are obligated to meet the needs of the client by meeting, insofar as possible, negotiated turn around times. In no instance, however, will the quality of the work performed be compromised to meet a specified turn around time.

3.8 Management Information System - As necessary, the Laboratory Director will utilize statistical reports to provide a sound basis for accurately making decisions about laboratory workload, lab productivity, management, and planning.

3.9 The NFWFL Library - The NFWFL maintains an informal library containing current books, journals, and other literature dealing with each functional area.

4. LEGAL COMPLIANCE

4.1 Discovery Procedures - Under the doctrine of discovery, the opposing side in both civil and criminal matters may be entitled to laboratory notes and records; however, not all records or notes may be subject to discovery. A request for discovery made directly to this laboratory will require consultation with the client attorney (even if a signed court order is produced) since some material (*e.g.*, correspondence with the attorney which is covered by the attorney work-product privilege) may not be subject to discovery. If the laboratory is directed by the client attorney not to comply with a discovery order, our laboratory will honor that directive, but will document the particulars of the situation.

Only copies of materials will be provided upon a request for discovery. Original documents, photographic negatives, computer files, video and audio tapes will not be provided; those original records will not leave the laboratory.

A subpoena or discovery order may ask for the production of records or reports which are not present in the laboratory. The laboratory will not assume responsibility for collecting the information required, but rather will inform the attorney that such records do not exist at the NFWFL. Discovery requests that appear unreasonable (*e.g.*, computer libraries of standard spectra, etc.) must be immediately directed to the laboratory Deputy Director.

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 his office (Chief, Office of Law Enforcement, U.S. Fish and Wildlife Service, P.O. Box 3247, Arlington, Virginia 22203-3247).

A copy of all materials 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. The NFWFL Forensic Scientist can attempt to resolve trivial conflicts in scheduling over the telephone, but it is not the responsibility of the NFWFL to resolve serious scheduling conflicts; the parties to the conflict are responsible for doing so. The NFWFL staff person will honor the first subpoena received. If the Forensic Scientist believes that they have been asked to provide testimony on a subject with which they are not familiar, the Forensic Scientist must notify the Laboratory Director or Deputy Director. Only the subpoenaing attorney or a judge with jurisdiction in the matter may excuse a subpoena. Forensic Scientists must consult with the client when receiving a subpoena from the "opposite side."

A subpoena *duces tecum* is a subpoena for all relevant documentation, and would include all reports, laboratory notes, memoranda to the file, spectra, photographs, video records, retained standards, records of communication with the client, etc. A subpoena *duces tecum* is therefore a subpoena

covering all written records as well as compelling the presence of the witness. Before complying with this directive, however, the client's attorney should be consulted to determine if there are materials which would fall under the attorney work-product privilege.

4.4 Depositions - In civil cases, and in rare instances in criminal matters, 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. As far as any analyst is concerned, there is no real difference between testimony given at a deposition and testimony given in a court of law; the testimony is given under oath, the witness is cross-examined, and the same measure of scientific rigor applies. The deposition is ordinarily taken in a law office, but it could be in our laboratory, or elsewhere. When depositions occur, the client's attorney (usually Assistant United States Attorney) will be notified. The one difference that affects the witness is that, even though a question may, for the record, be objected to by an attorney, the witness is required to answer the question. The reason for this is that no judge is present to rule on the objection.

In some jurisdictions, the witness is not entitled to a transcript of the deposition for purposes of correction. (For example, a deposition held in Medford, but in connection with a civil matter in New Mexico, would be conducted in accordance with New Mexico law, not Oregon law; the witness would not be entitled to review the transcript for errors). In most jurisdictions, however, the witness is offered the opportunity to read the deposition and correct any errors before the court reporter files the official copy. Whenever this opportunity is available to an analyst, it should be invoked. If the attorneys do not volunteer the mechanism by means of which this will be done, 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.

Depositions sent to an analyst for review must be corrected and returned within the time frame agreed upon by the attorneys at the time of the deposition.

4.5 Opinions and Conclusions - Forensic Scientists must ensure that all scientific opinions or conclusions are adequately supported and placed in proper context. Conclusions and opinions must be reasonable and within the constraints of the scientific knowledge of the analyst. This will be

accomplished through case review, the taking of proper laboratory notes, and by providing accurate courtroom testimony. The following principles apply:

4.5.1 Formal opinions and conclusions must be based on analytical results and observations obtained through scientific methodologies which have been adequately tested and validated.

4.5.2 Forensic Scientists will not engage in speculation, and conclusions based on partial information will be clearly identified as being tentative in nature.

4.5.3 Forensic Scientists must refuse to give opinions or conclusions about matters beyond their expertise.

4.5.4 The limitations to all opinions and conclusions must be explained; statements which need qualification to be fair and sensible must be accompanied by the necessary qualification.

4.5.5 When applicable, appropriate standards, blanks and controls must be tested prior to forming an opinion or conclusion.

4.6 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 monitoring will, on occasion, be accomplished by the Laboratory Director, Laboratory Deputy Director, Forensic Science Branch Chief or an experienced Senior Forensic Scientist. Monitoring may be accomplished through direct observation or by obtaining input from trial participants. The testimony of any expert witness has the potential to critically affect the outcome of the judicial proceedings. NFWFL Forensic Scientists are responsible for the following situations:

4.6.1 Complying with a subpoena or attorney directive regarding the place and time of the appearance: The analyst is responsible for preparing for his or her testimony, for consulting as necessary with the client attorney and for the preparation of all necessary notes and courtroom displays.

4.6.2 Dealing with scheduling conflicts: If a conflict exists which will prevent the Forensic Scientist from appearing in court as requested, it is the responsibility of the Forensic Scientist to notify the client or the subpoenaing party as soon as possible.

4.6.3 Dealing with testimony conflicts: If the Forensic Scientist believes that he or she has been asked to provide testimony on a subject with which he or she is not familiar, the Forensic Scientist must notify the Laboratory Deputy Director and client attorney.

4.6.4 Maintaining technical competency in an area of expertise: If the Forensic Scientist feels that he or she is deficient in the knowledge needed to provide accurate testimony, it is the responsibility of that person to inform the Laboratory Deputy Director and client attorney.

4.6.5 Maintaining a professional demeanor at all times: Business attire is required.

4.6.6 Being technically prepared for testimony: The Forensic Scientist must be familiar with his /her laboratory notes, the final report provided to the client, and related articles or technical information prior to the testimony. The Forensic Scientist should be able to answer questions which are reasonably anticipated without fumbling through papers. The testimony should be previously discussed with the attorney to prepare the expert for the line of questioning anticipated. Analyst should provide a current copy of their CV.

4.6.7 Providing appropriate court displays: Displays should be used to enhance or clarify an expert's testimony. Displays must present evidence or circumstances in a fair and impartial manner.

4.6.8 Being organized: All paperwork or displays should be organized and properly labeled. Displays must be large enough for the jury to see.

4.6.9 Providing fair and impartial testimony: Testimony must be presented in a manner which is accurately interpreted and properly weighted. Testimony should be understandable to a lay person. When necessary, technical terms should be defined. If asked to provide a yes or no answer where either answer would be inappropriate or misleading, the witness should indicate to the attorney that the question cannot be answered with a simple yes or no answer and ask the court's permission to explain.

4.6.10 Rendering a complete opinion: When rendering an opinion, it is the responsibility of the Forensic Scientist to include testimony regarding limitations associated with the opinion.

4.6.11 Discussing only topics presented: The witness is not allowed to volunteer information about evidence which has not been presented or about topics not discussed.

4.6.12 Following Ethical Conduct: When testifying, the analysts should use those sections of the Code of Ethics of the California Association of Criminalists dealing with courtroom testimony. (See Appendix A.)

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 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 Formal Training - Formal training can be provided through public or private educational institutions, public or private-sector training groups, and professional forensic science organizations.

5.4 NFWFL Training - Training can be provided by the NFWFL Forensic Science Branch Chief, a Team Leader, or another assigned, experienced Forensic Scientist.

5.5 Maintenance of Technical Competence - Employees are encouraged to maintain their technical competency by attending training courses and conferences and participating in professional organizations. The expected frequency of attendance at professional meetings will not be dictated by the NFWFL, but consistent abstinence from meetings of professional organizations is antipathetic to good professional practice. Presentation of research findings at meetings or professional organizations is encouraged, as is committee work, and serving as an officer.

5.6 Analyst Training and Proficiency Testing - All analysts who have completed training on new protocols must successfully complete a proficiency test prior to performing independent casework.

5.7 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 - Instruments include those that generate data for analytical interpretation (analytical instruments; i.e., GCMS, etc.) as well as those which are used in qualitative and quantitative measurement of reagents (measurement equipment; i.e. balances, micropipettes, etc.). Accurate calibration and careful attention to the maintenance of instrumentation is an essential part of the laboratory quality assurance program. All instruments must be accurately calibrated and properly 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. (see section 9; Analytical Data Validation)

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 do not need to be submitted to blind proficiency tests. Procedural Protocols (i.e. how to collect blood samples, how to decontaminate workbenches, etc.) are accepted after a review and comment by the Protocol Validation Review board. The board is composed of the Team Leaders of each analytical unit (Genetics, Morphology, Criminalistics, Chemistry and Pathology). 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. Acceptance of Analytical protocols is described in "7.2 Method Validation: Acceptance of Analytical Protocols".

7.2 Method Validation: Acceptance of Analytical Protocols

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

Scope

Method validation is the process of proving that an analytical method is acceptable for its intended purpose. In general, methods should include studies on specificity, linearity, accuracy, precision, range, detection limit, quantitation limit, 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.

7.2.1. Method Validation Requirements. Before a new protocol is used for evidentiary

casework, the protocol in question will be validated. Minimum Criteria for Method Validation will include the following criteria:

- Literature review on the relevant issue
- Accuracy of the analysis
- Specificity of the analysis
- Precision and Reproducibility of the analysis

As needed, quantitative protocols should include the additional criteria:

- 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. Any case information not able to be satisfactorily stored in the Protocol Validation File must have reference in the Protocol Validation File as to the storage location. The Quality Assurance Office will assign a unique Protocol Number.

The Protocol Validation file will contain documentation, or verification that each of the necessary elements of the validation of the protocol. These include:

- Literature review on the relevant issue
- Specificity of the analysis
- Accuracy of the analysis
- Precision and Reproducibility of the analysis

If applicable:

- Limit of Detection
- Linearity
- Range of detection
- Robustness

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 and Pathology)

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

Each analyst that will use the protocol will complete a blind proficiency examination before the protocol is used in routine analysis.

Validation of Existent Protocols

Protocols established before the establishment of the Method Validation Protocol can become 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 Retro-validation - If proficiency results can not test an existing protocol, then a

compilation and analysis of historical data will determine of the protocol needs to be corrected.

7.2.4.3 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 Protocols. Substantive revisions to existing protocols need to be re-validated as indicated in "7.2.4.3 Validation of Existent Protocols; Re-validation." A blind proficiency test, consisting of known reference standards, will be used to evaluate the revised protocols. Once re-validated, protocol changes will be documented and explained within a commentary section of the protocol. The revised protocol will be identified by a new version number and dated. Protocol revisions need to approved and signed by the Forensic Science Branch Chief and the appropriate Team Leader.

7.2.6 Method Validation of Imported Protocols. Protocols acquired from other sources, must be validated 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), potentially contaminated, 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 Forensic Science Branch Chief, the Team Leader and/or technical reviewer prior to issuing a final report. All changes 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 outside the Laboratory will be by formal written request only. A log of who protocols have been distributed to will be maintained by the Quality Assurance Office.

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 Materials and Supplies - Materials and supplies must be stored away from evidence examination areas to prevent contamination. Materials and supplies must be kept clean at all times. Verification of all solutions must be performed according to the procedures defined in the protocols

manual for the appropriate evidence types.

8.3 Contamination Checks - When data on known QC controls and reference standards fall outside established, acceptable limits in analytical results, materials and supplies used in sample testing must be scrutinized for contamination.

8.4 Reliability of Chemicals, Reagents and Solutions - Commercial chemical and reagent containers must be initialed and dated when opening. NFWFL prepared reagents or solutions must be labeled with the date prepared, the preparer's initials, the contents and relevant hazard warnings. Commercially prepared chemicals, reagents and solutions will be verified using control data and reference standards. Known controls and standards will normally be tested and compared along with the questioned evidence material. The quality of all reagents will be assured to be adequate for the procedures in which they are employed. Reagents will not be used for casework after their expiration date or expected shelf-life. All laboratory-prepared solutions used in casework will be discarded after 1 year.

8.5 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.

8.6 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.

8.7 Evidence Re-examination Policy - Occasionally a client will request re-examination of an evidence item that has already been examined at another Forensic Lab. At times, these request may be considered as "shopping for an answer" that is in accordance with the client's expectations. The NFWFL will only accept these types of requests if the original Forensic examiner submits a written request for re-examination of the evidence. All other re-examination requests will be denied.

8.8 Documentation of Analytical Results - Analysts must fully document evidence examination in accordance with requirements set forth in Section 13.

8.9 Accuracy and Consistency of Analysis - The accuracy and consistency of examinations must be ensured by the use of analytical controls and traceable standards. Libraries of reference materials must be maintained and be available to Forensic Scientists and technicians. Guidelines for the use of standards will be found in the protocols manual for each evidence type.

8.10 Technical and Administrative Reviews of Case Reports- Every case assignment with supporting analytical documentation will be technically and administratively reviewed by a second person (analyst or Branch Chief) 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 14.2 and 14.3 for further information)

8.11 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. Each analyst must separately analyze, record, and report test results in a format consistent with case documentation and reporting requirements.

8.12 Laboratory Services Evaluation - The services of the laboratory will be evaluated through the use of a *Forensic Laboratory Evaluation Form.* This form is mailed to clients with each return of evidence at the close of a case. Completed evaluations are reviewed and placed on file for reference.

8.13 Courtroom Testimony Evaluation - The testimony of laboratory staff is monitored through the use of a *Courtroom Testimony Evaluation Form.* This form is mailed to selected court representatives for each laboratory staff member who has testified. Completed evaluations are reviewed and placed on file for reference.

8.14 Annual Quality Audits - Audits are used to assess compliance with the operational requirements of the quality assurance manual. Along with day-to-day review of scientific reports, periodic audits provide effective means for ensuring that quality control activities are being observed and that each forensic examiner performs in a manner consistent with the quality system.
The audit process will include the following aspects:

- Staff adherence to the Quality Assurance Manual
- Analytical procedure selection, control, and validation
- Control of reagents and standards
- Equipment calibration and maintenance records
- Adequacy of case reports and laboratory notes and their disposition
- Evidence handling procedures
- Proficiency testing
- Personnel training records
- Handling of deficiencies and remedial action
- Laboratory orderliness and health and safety measures
- Periodic reviews of the Quality Assurance Manual

Audits will include a review of the quality program. An annual quality review of the system is important for ensuring that laboratory management can continue to be confident that all measures are being taken to provide the highest quality service using state-of-the-art forensic technologies. Audit reports form the basis for changes in the quality system.

A written report of the findings will be presented to the Laboratory Director. This report must identify problem areas and suggest actions. The report should also contain any suggestions that the auditor would have to improve the quality system. The Laboratory Deputy Director must ensure that corrective action is taken in a timely manner.

9. ANALYTICAL DATA VALIDATION

9.1 Introduction - In addition to the requirements set forth in this manual, the validation of analytical data is accomplished by a review procedure, and the use of reference standards and quality controls.

9.2 Data Review Procedure - It is the responsibility of each analyst to review each laboratory note data sheet, check calculations, understand the work that is documented, and initial and date each sheet.

9.3 Laboratory Blanks - Laboratory blanks must be included in the examination when the protocol requires it. Problems associated with blanks and the resolution of any problems exceeding acceptable values must be documented.

9.4 Laboratory Controls - Laboratory controls must be included in the examination when the protocol requires it. Controls provide information which validates successful adherence to predetermined parameters. Deviations from expected control results must be documented.

9.5 Laboratory Reference Standards - Laboratory reference standards must be included in the examination when the protocol requires it. Reference standards must be validated prior to use in casework. Reference standards logs will be maintained in each respective area of the Laboratory.

9.6 Obtaining Exemplars from Suspects - If a standard from the suspect is not submitted for comparison, and the NFWFL Forensic Scientist feels that the standard is necessary to accomplish the needs of the client, it is the analyst's responsibility to request the standard from the client.

10. EVIDENCE CONTROL

10.1 Introduction - The NFWFL strives to maintain a system that ensures the integrity of all physical evidence under its control. 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.

10.2 Criteria for Receiving Evidence - The NFWFL strives to inform clients regarding proper packaging, documentation and shipping procedures for submitting evidence to the laboratory. Evidence is usually received in sealed packages by traceable delivery; usually certified or registered mail, or via commercial shipping company. Evidence is then checked for proper packaging, preservation and documentation. The Evidence Custodian must resolve all discrepancies in paperwork with the client prior to logging the case into the LIMS.

10.3 Chain of Custody Issues - 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 Lab 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 NFWFL staff members only. Each individual named in a chain is subject to testimony regarding their involvement with the evidence.

10.4 Evidence Storage & Handling

10.4.1 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. The lockers are accessible only to the person using the locker.

Evidence in the process of examination by an analyst is considered to be secure. As such, it is not necessary to lock up the evidence being examined if the analyst needs to leave for a short time, such as for lunch, if it is in the examination area.

10.4.2 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.

An analyst who needs to store evidence temporarily in a storage locker need not seal the evidence each time it is stored.

10.4.3 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.

10.4.4 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. All evidence, because of the relative unknown nature of where it has been or what it has contacted could be considered hazardous. There are evidence types, though, which require special handling precautions based on their physical nature. These include wet tissues, liquids (leaking packages), stains, carcasses, sharp objects such as syringes, razor blades, broken glass and bones, claws, talons and beaks, All firearms are to be considered loaded until deemed safe by a qualified firearms handler. 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 Lab Safety Officer. Details on the handling of such materials are to be found in the NFWFL Safety Manual.

10.5 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 lab staff. The database is backed up nightly to preserve the data.

10.5.1 Case Submission Log-In - All cases must be logged into the computerized Laboratory Information Management System (LIMS). Each case will be assigned a unique identifying NFWFL case number and each item within the case will be assigned and tagged with unique NFWFL laboratory numbers. A physical evidence list will be generated from the LIMS and sent to the client. Once the case is logged in, a Master Case File is generated and labeled with the sequential NFWFL case number. All documentation related to the case, including chain of custody, laboratory notes, etc., will be maintained or referenced in the Master Case File.

10.5.2 LIMS Evidence Tracking - All items of evidence will be tracked through the LIMS which records date, time and who and where the evidence was transferred from and to. Secured personal identification numbers will be used for all transfers. A completed chain of custody will be printed at the close of the case.

10.5.3 Request for Analysis - Each submission of evidence will have an associated request for analysis which identifies the analyst and the evidence items assigned to the request. Assignment requests are generally prepared by the Team Leader.

10.6 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.

10.7 Case Segments - Occasionally, evidence from a single case may involve items that require analysis from different disciplines in the Lab. 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.

10.8 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.

10.9 Conservation of Evidence - In general, 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. It must be clear to the client that although the evidence is being "consumed" in the analysis, the evidence still exists in the form of spectra (*e.g.*, emission spectrography or absorption spectrophotometry) or recorded test results (*e.g.*, fiber solubility).

10.10 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 properly 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 transactions must be indicated in the Master Case File.

10.11 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 from 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.

11. MASTER CASE FILE DOCUMENTATION

11.1 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.

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

11.2 Evidence Submittal Form - each new submission of evidence requires a completed Evidence Submittal Form to include the following information:

- Agency Case Number
- Client's name
- Agency name
- Case Name (if applicable)
- Evidence relinquish date
- A complete description of each evidence item received to include all relevant numbers or identifiers.
- A description of the analysis requested

11.3 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 maintain proper chain of custody records on this form prior to submission. An external chain of custody will be created if one was not submitted.

The following information is required on the external chain of custody

- Agency Case Number
- Client's name
- Agency name
- Case Name (if applicable)
- A complete description of each evidence item received to include all relevant numbers or identifiers.
- Transfer information between individuals or agencies to include name and date of the transfer

11.4 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.

11.5 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. Disposition of evidence from the case requires that an Evidence Release Form be prepared and sent to the client for signature. Evidence released for disposal can either be destroyed or curated into the NFWFL standards collection. Elements of the Evidence Release form include:

- NFWFL Case Number
- Analyst's name
- Agency Case Number
- Client's name
- Agency name
- A complete description of each evidence item which will be disposed to include all relevant numbers or identifiers
- Signature and date block for authorization to dispose

11.6 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 develop a conclusion. Analysts must fully document evidence examination in accordance with requirements set forth in Section 13.

11.7 Written Correspondence - A record of all written correspondence (letters, faxes, and electronic mail) must be maintained in the Master Case File. Documentation must include the contact name, contact agency, contact fax number/e-mail address, date/time of correspondence and/or a list of the information transmitted.

11.8 Dictation Tapes - Dictated laboratory notes may be generated by NFWFL staff members during evidence examination. Upon completion, all laboratory dictation tapes must be referenced in the Master

Case File and stored in the NFWFL evidence storage unit. These tapes must be maintained to help the analyst recall details regarding the examination and to allow adequate review of the work. Laboratory tapes must be sufficiently detailed so the reviewer will know the basis for any conclusions and the protocols employed.

11.9 Film Negatives and Radiographs - Film negatives and radiographs may be generated by NFWFL staff members during evidence examination. Upon processing, all laboratory film negatives and radiographs must be filed in the Master Case File or in the NFWFL evidence storage facility. Laboratory photos are prepared in order to document evidence examination. These photos, and therefore the negatives, must be maintained to help the analyst recall details regarding the examination and to allow adequate review of the work.

11.10 Digital Images - Digital images may be generated by NFWFL staff members during evidence examination. All digital images taken of the evidence will be annotated in the laboratory notes. Upon processing, all laboratory digital images must be recorded onto a compact diskette (CD or DVD). '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.

12. MASTER CASE FILE MAINTENANCE AND ORGANIZATION

12.1 Master Case File Maintenance - All records relating to a case are kept in a single Master Case File. Completed cases are maintained in numerical order in file cabinets which are locked after working hours.

12.2 Deposition 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 original laboratory notes must be kept in the Master Case File. All forwarding and releasing requests must be approved by the client and the case coordinator.

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.

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

12.3.1 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

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

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

12.3.3 Information Sent to the Client (in the form of yellow xerographic records)

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

13. ANALYTICAL DOCUMENTATION GUIDELINES

13.1 Introduction - Forensic science cannot be viewed solely in terms of its products, it is also judged by the legitimacy of the processes by which evidence is examined and interpreted. Any opinion rendered by a Forensic Scientist in a written report or in court testimony must have a basis in fact and in theory. The Forensic Scientist must always bear the responsibility for justifying his or her opinion, and the work that has lead to that opinion. If this work is not properly documented, it deserves to be rejected. It is not the prerogative of the Forensic Scientist to waive this requirement, and no one has the right to release the Forensic Scientist from this burden.

In general, documentation to support conclusions must be such that in the absence of the examiner, another competent examiner could evaluate what was done, interpret the data and arrive at the same conclusions.

13.2 General Criteria for Documentation

13.2.1 Documentation must occur in ink. Laboratory notes are intended to be permanent and not subject to alteration by erasure.

13.2.2 Notes may be made on blank, standard, blue-lined graph paper, but examiners are encouraged to generate examination forms related to the type of evidence where appropriate.

13.2.3 Documents must include a title which identifies the activity recorded.

13.2.4 Documentation of the date must include the day, month and year.

13.2.5 All specific activities should include a date.

13.2.6 No entry may be pre- or post-dated.

13.2.7 Unused portions of documents must be rendered void.

13.2.8 Corrections to data must be made by drawing a single line through the error and entering the correct information nearby.

13.2.9 Liquid paper (whiteout) must never be used to correct data or observations. Corrections and additions to documents must be dated and initialed.

13.2.10 No information shall be obliterated or rendered unreadable. Notes must be legible to facilitate review.

13.2.11 Notes that are type written must be initialed by the author.

13.2.12 Post-it notes do not constitute a permanent record and should be used for limited purposes unless taped to the permanent record.

13.2.13 Under no circumstance should entries be made which are knowingly false or intentionally cryptic to frustrate decipherment by another person.

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

13.3 Specific Criteria for Documentation

13.3.1 Each page of all analytical documentation, including notes, diagrams, spectrographs, photographs, etc., must include:

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

13.3.2 Data without appropriate captions, explanation, or with unspecified units of measure should be avoided.

13.3.3 Common sense allows for the abbreviation of the note-taking process in routine cases where a standardized battery of tests are invoked by a standardized operating procedure.

13.3.4 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. Phone call documentation for specific cases must be maintained in the Master Case File. Particular care should be taken to document all contacts to and from the opposing side. Detailed notes on technically related conversations with the client must be documented. This includes the following items:

13.3.4.1 Technical requests by the client
13.3.4.2 Conversations about technical issues with the client
13.3.4.3 Requests for additional examinations by the client
13.3.4.4 Concurrence from the client that no additional work is needed to be performed or that the additional work may be postponed
13.3.4.5 Requests by a NFWFL Forensic Scientist for additional information or additional sample material
13.3.4.6 Any other inquiry which causes the NFWFL Forensic Scientist to alter his technical plans

13.3.5 Sample integrity information not already documented on the chain of custody must be noted in the lab notes (*e.g.*, the package is sealed or unsealed).

13.3.6 Photographs must be taken to document evidence before it is altered (*e.g.*, a fiber adhering to a bullet prior to its removal, or a splash of blood on the muzzle of a firearm). Documentation of this sort is indicated whenever a recorded visual image would be significantly more meaningful than a written description, and where the analyst observes something that no one else will be able to see in the same condition at a later time.

13.3.7 Photographs must be taken of special techniques employed to visualize the evidence (*e.g.*, an infrared photograph of gunshot residues obscured by a bloodstain, or the fluorescence characteristics of some type of evidence). This form of documentation is applicable to those instances where no one, the analyst included, could appreciate the evidence unless the special visualizing technique were to be invoked.

13.3.8 Photographs or xerographic records must be generated to document data derived from analytical tests (*e.g.*, spectra, electrophoretic plates, etc.).

13.3.9 Protocols employed must be identified in the lab notes.

13.3.10 Instrument conditions and parameters must be recorded unless they are contained in a referenced procedure.

13.3.11 A conclusion or opinion as to the interpretation of the findings must be included in the laboratory notes.

13.3.12 When a conclusion is reached based on unambiguous results, the rationale behind that conclusion should be reflected in the lab notes unless the basis would be obvious to anyone

familiar with the type of testing conducted.

13.3.13 Analytical results on evidence items, as well as related standards, blanks or controls must be documented.

13.3.14 The rationale behind conclusions must be recorded.

13.3.15 Significant interactions with other technical experts (i.e. NFWFL Forensic Science Branch Chief, etc.) which affect the protocols employed or the conclusions drawn must be documented.

13.3.16 All transformations and partial destruction of evidence resulting from the analytical protocols employed must be documented. The lab notes must indicate when evidence has been significantly altered and cannot be restored to its original condition (see section 10.9; Conservation of Evidence). It is common to speak of a portion of the evidence being "consumed" in the analysis. But in reality the evidence still exists in the form of spectra (*e.g.*, emission spectrography or absorption spectrophotometry) or recorded test results (*e.g.*, fiber solubility).

13.3.17 Notes should not be re-executed at a later time to improve their neatness or appearance, or to add detail which was improvidently omitted when the notes were first taken.

13.3.18 Alterations, loss, or damage to evidence items must be documented in the lab notes.

13.3.19 A record of all written correspondence (letters, faxes, and electronic mail) must be maintained in the Master Case File. Documentation must include the contact name, contact agency, contact fax number/e-mail address, date/time of correspondence and/or a list of the information transmitted.

13.4 Documentation Philosophy - Entries in the lab notes must be intelligible to another Forensic Scientist without additional explanation. Note taking is as important to the Forensic Scientist as is proper training in chemistry, biology, or other disciplines. To summarize the requirement of note taking, it is helpful for the Forensic Scientist to ask the following questions:

- What approach was used?
- What tests were conducted?
- What were the test results?
- What constituted the basis for any conclusions reached?
- Am I leaving clear documentation as to what I have done?
- If this case were to be reversed on appeal years from now, when I am gone, will someone else be able to follow what I did and understand the basis for my conclusions?
- Are there any substantive steps in my work where a person would have to guess what I did, or guess as to the meaning of my entries?

14 REPORT CONTENT, REVIEW AND HANDLING PROCEDURES

14.1 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. An internal case summary may not include all of the following information, but should include that which is necessary to facilitate an easy review:

- 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 of receipt and transfer to analyst
- Examination Conducted (if applicable): Description and/or identification of the analysis performed with a description of the sampling procedure and a description of deviations from the NFWFL standard analytical procedure
- Summary Results & Conclusions: Analytical results with a conclusive statement
- 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

14.2 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 objectively evaluate the laboratory notes, data, and other documents which form the basis for the scientific conclusion. Technical reviews are recorded in the Master Case File. The technical review verifies that:

14.2.1 All documentation is properly labeled

14.2.2 Proper methodologies were applied to the evidence

14.2.3 Standards were referenced where appropriate

14.2.4 The basis for conclusions were indicated in the laboratory notes

14.2.5 The final report is consistent with the original laboratory notes

14.2.6 The final report complies with laboratory policy regarding format and content

14.2.7 The report is sufficiently detailed, clear, and concise

14.2.8 The reviewer concurs with the conclusions

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

14.3.1 The case assignment documentation is complete

14.3.2 Report pages are properly labeled

14.3.3 The report is grammatically correct and that case and evidence numbers are accurate throughout and between all reports, laboratory notes and submittal documentation

14.4 Report Edits & Amendments - Whenever 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 Deputy Director and/or Forensic Science Branch Chief. The following steps are required to correct a discrepancy on a report:

14.4.1 Electronically retrieve the original report from the archive.

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

14.4.3 Amend the report by making the appropriate changes.

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

14.4.5 Add the appropriate statement to the bottom of the page - "AMENDED REPORT. AMENDMENT DOES NOT AFFECT EXAMINATION RESULT" or "AMENDED REPORT. AMENDMENT DOES AFFECT EXAMINATION RESULT."

14.4.6 Print a new copy of the report.

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

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

14.4.9 Maintain copies of the amended report, the letter of explanation, and fully document the situation in the Master Case File following the corrective action documentation guidelines of Section 15.4.

14.5 Final Report Processing - The final report on NFWFL letterhead is generated and signed by the Analyst. A Xerox copy is maintained in the Master Case File and the original copy is sent to the

client. The date of the mailing is documented. The copy retained in the Master Case File will remain in the file for 10 years.

14.6 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. 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 or Laboratory Deputy Director.

14.7 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.

14.8 Report Duplication Issues - Reports are only to be duplicated per client request. The duplicated report must be stamped "Duplicate Report." It must be sent with a letter of release. A copy of the letter of release must be maintained in the Master Case File.

14.9 Successive Reports for a Single Case - Occasionally, evidence for a single case may be submitted at different times. All paperwork for one case must be maintained in one Master Case File. All evidence for one case must be referenced by the same NFWFL Case Number. A final report may be generated for each separate submission.

15. CORRECTIVE ACTION PLAN

15.1 Introduction - This section outlines the corrective action procedures to be followed in the event that analytical 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 uncontrolled event(s) that led to the discrepancy, and implement appropriate corrective measures to bring the matter back to quality compliance.

Analysis of evidence reported as 'no results' or 'inconclusive' and then subsequently identified as conclusive through further testing at a later date may not be considered as a discrepancy under the corrective action plan. Factors such as sampling size and/or quality or analytical method employed may have affected the initial results. An amended report will be required following Section 14.4 Report Edits and Amendments.

15.2 Preventive Measures - The primary way to thwart a discrepancy is to implement and maintain quality assurance measures. These measures are outlined throughout this manual and include hiring and training competent staff; proper maintenance and calibration of equipment; the use of validated protocols and control reference standards as well as technical and administrative reviews and quality audits.

15.3 Corrective Action Process - When a discrepancy is observed, either through the proficiency testing process or in casework, the following corrective action process should be followed:

15.3.1 The appropriate Team Leader and Deputy Director is notified of the discrepancy

15.3.2 All casework for the analyst should be halted

15.3.3 The analytical documentation is thoroughly reviewed to determine, if possible, what caused the discrepancy

15.3.4 Implement a corrective measure

15.3.5 Confirm that a return to compliance has been achieved by analyzing reference samples

15.3.6 Document the entire process

15.3.7 Amend the report and maintain copies of the amended report in the Master Case File. (see 13.2 - Report Edits & Amendments)

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

15.4 Documenting Corrective Actions - An analytical discrepancy and the corrective action that returns a system to compliance must be documented. The following elements must be recorded in the Master Case File:

15.4.1 Who discovered the discrepancy.

15.4.2 Who was the analyst involved.

15.4.3 When did the discrepancy occur.

15.4.4 What was the nature of the discrepancy.

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

15.4.6 What was the name of the test method.

15.4.7 What was the nature of the corrective action.

15.4.8 How was a return to compliance confirmed.

16. 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 in Appendix A.

APPENDIX A

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 refuse 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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