

Procedure for Ensuring the Quality of Test Results

1.0 Purpose - To describe monitoring activities in the State Crime Laboratory (Laboratory) Quality System.

2.0 Scope – This procedure is applicable to all Laboratory personnel involved in the testing of items and/or evidence handling.

3.0 Definitions

- **External Proficiency Test** – A test prepared by, provided by, and reported to a source outside the laboratory.
- **Internal Proficiency Test** – A test produced by the Laboratory in which the expected results are unknown to the Forensic Scientist.
- **Proficiency Test file** – All documentation related to a proficiency test, either in paper or electronic format.
- **Quality Assurance** – An integrated system of management activities involving planning, assessing, reporting, and implementing quality improvements to ensure that a process or service is 1) of the type and quality needed and expected by the client and 2) in conformity with accreditation standards and norms of the scientific community.
- **Re-examination of evidence** - A form of testing in which a second Forensic Scientist tests the evidence without knowledge of the original test results.

4.0 Procedure

4.1 Internal Case Quality Assurance

4.1.1 Quality control (QC) measures shall be used to evaluate accuracy, precision, and contamination in case analysis. QC may include, but is not limited to, the following:

- Certified reference materials and internally generated reference materials.
- Reference collections.
- Statistical tables.
- Positive and negative controls.
- Control charts.
- Alternative methods.
- Inter-laboratory comparison or proficiency-testing programs.
- Replicate testing using the same or different methods.
- Retesting of reference materials.
- Correlation of results from tests conducted for different characteristics of an item of evidence.
- Functional checks of measuring and testing equipment.
- Intermediate checks of measuring equipment

4.1.2 The use of QC samples shall be described in Section technical procedures.

4.2 Technical and Administrative Review

4.2.1 The technical and administrative review of forensic case files shall be conducted as provided in the Procedure for Reviewing Laboratory Reports.

4.2.2 The technical and administrative review of IBIS or DNA Database Sample Analysis shall be conducted as provided in Section technical procedures.

4.3 Testimony Monitoring – Technical Review of Testimony

- 4.3.1** Monitoring and evaluating testimony are necessary to ensure that the testimony is accurate, understandable, and scientifically sound. Testimony monitoring also gauges whether the employee has displayed an unbiased demeanor and professional appearance consistent with all applicable policies and procedures of the Laboratory.
- 4.3.2** The testimony of an employee shall be evaluated at least once annually on an Expert Testimony Evaluation Form as follows:
- 4.3.2.1** The testimony of all employees testifying for the first time in a forensic science discipline, including an experienced Forensic Scientist testifying in a new discipline for the first time (unless there is no authorized Laboratory employee available to accompany the analyst to court).
- 4.3.2.2** All other employees and Forensic Scientists shall be evaluated at least once annually.
- 4.3.2.3** Individuals authorized to monitor and evaluate testimony on an Expert Testimony Evaluation Form (Internal) include the following with training in the discipline: Crime Laboratory Director (Lab Director), Assistant Director, Deputy Assistant Director, Forensic Scientist Manager/Forensic Scientist Supervisor of any Laboratory Section, Authorized Technical Reviewers for the discipline, and Senior Technicians. For the purpose of this section, a senior Technician is defined as an individual who has been employed with the Laboratory for five or more years.
- 4.3.2.4** The monitoring and evaluating of testimony by an authorized reviewer may serve as the only annual courtroom testimony evaluation.
- 4.3.2.5** The Expert Testimony Evaluation Form shall be reviewed by the employee and employee's supervisor.
- 4.3.3** Each completed Expert Testimony Evaluation Form shall be converted to electronic format and entered into a database for the Quality Manager (QM) to review.
- 4.3.4** If negative feedback is present, The QM shall determine if it compromises the quality of service. If the feedback is deemed to be of concern, the Procedure for Corrective Action and Non-conformities shall be followed.
- 4.3.5** All Expert Testimony Evaluation Forms shall be maintained according to the Record Retention Schedule as set forth by the North Carolina Department of Cultural Resources.
- 4.3.6** If an employee does not testify in a given year, the Forensic Scientist Manager or Supervisor shall document this in a notice to the QM by January 31 of the following year. This notice shall be maintained in the same manner as the Expert Testimony Evaluation Forms.

4.4 Proficiency Testing

- 4.4.1** Each Forensic Scientist or Technician who conducts forensic casework shall successfully complete at least one proficiency test each year in each discipline in which casework is performed. The

expected proficiency test results shall not be known or readily available to the test taker. In addition, Forensic Scientists who perform forensic testing on casework in multiple sub-disciplines shall successfully complete at least one proficiency test during each four year accreditation cycle in which the Forensic Scientist or Technician performs testing. The Forensic Scientist Manager of each Section shall maintain a proficiency test schedule for sub-discipline proficiency tests. The Laboratory shall take a primary sub-discipline test each year that the test is offered. Each Forensic Scientist shall take a primary sub-discipline (denoted by *) proficiency test each year. The disciplines and sub-disciplines are defined as follows:

Drug Chemistry

- Drug Analysis*
- Plant Material Analysis

Firearms and Tool Marks

- Serial Number Restoration
- Firearms Comparison*
- Firearm Function
- Barrel and Overall Length Determination
- IBIS/NIBIN

Fire Debris

Forensic Biology

- Body Fluid Identification*
- STR DNA Testing*
- Y-STR DNA Testing*
- STR DNA Database Testing*
- Individual Characteristic Database

Gunshot Residue

Latent Evidence

- Latent Print Processing
- Latent Print Comparison*
- Individual Characteristic Database

Impression Comparison

Toxicology

- Blood Alcohol Analysis*
- Blood Drug Analysis*
- Urine Drug Analysis

Trace Evidence

- Fiber Comparisons*
- Glass Comparisons*
- Hair Comparisons*
- Paint Comparisons*
- Physical Match Determination
- Tape
- Filament

Digital Evidence

- Digital Evidence Analysis
- Audio Analysis
- Video Analysis

- 4.4.2** Successful completion of externally prepared proficiency tests require that the scientist achieve the intended result per the manufacturer, that the test and individual responses meet the distributor's consensus threshold, and that the results provided by the scientist are within the bounds of the Laboratory's policy and procedures.
- 4.4.3** The Laboratory shall participate in external, open proficiency test programs purchased from vendors approved by the accrediting body in each area of expertise where such tests are available. Proficiency test providers which are ISO/IEC 17043 accredited shall be used whenever available. If there is no approved test provider, the laboratory shall locate and use a source of an external proficiency test in the discipline. All external proficiency tests shall be purchased and distributed to the various laboratory sections by the QM.
- 4.4.3.1** If the external proficiency test provider is not ISO/IEC 17043 accredited, the Laboratory must document how the test provider meets these requirements.
- 4.4.4** Sections may also manufacture internal proficiency tests for trained Forensic Scientists and shall notify the QM of the administration of such tests. Internal proficiency test procedures may include, but are not limited to, simulated cases and known standard techniques. Both external agency samples and intra-laboratory test samples may be used. If old external proficiency tests are administered as internal tests, all test manufacturer identifiers must be removed prior to issuance. If the test is created by the Laboratory, the expected answers must be verified prior to distribution.
- 4.4.4.1** For all internally generated proficiency tests the method by which the test was manufactured, and the intended results shall be documented in a memorandum and imported into the FA case record once the test has been completed.
- 4.4.5** For forensic casework in which no external proficiency test exists and no suitable internal proficiency test can be created, the forensic casework of the Forensic Scientist or Technician shall be observed by the Forensic Scientist Manager, Forensic Scientist Supervisor, or Technical Leader. The results of the observation shall be documented in a memo to the Quality Manager.
- 4.4.6** Proficiency tests shall be treated like case work and shall be performed to the full extent in which the scientist is qualified to participate. Scientists shall follow approved technical procedures. All proficiency tests shall be reviewed technically prior to submitting the results to the proficiency test

provider. Once proficiency test results are returned from the proficiency test provider, a memorandum shall be issued by the appropriate Technical Leader signifying participation in the review process for those scientists authorized to perform only technical reviews.

4.4.7 The proficiency test file shall contain all the documentation that case files contain and notes shall be on approved forms. The files shall contain a copy of the test results returned to the vendor, or in the case of internal proficiency tests, the report submitted for grading.

4.4.7.1 Documentation for each proficiency test shall include at least the following:

- Test identifier.
- Laboratory location.
- Laboratory file number.
- Method by which samples were obtained or created.
- Discipline or sub-discipline tested.
- Identity of the person taking the test.
- Date of analysis and completion.
- Originals or copies of all data and notes supporting the conclusions.
- Records submitted to the proficiency test provider for external proficiency tests.
- Expected results.
- Discrepancies noted.
- Documentation of review and feedback to the Forensic Scientist.
- Details of corrective action, if necessary.

4.4.8 Proficiency tests shall undergo a technical review; however, all work and reviews shall be independent. The name of each person completing a test (or any portion of the test) and/or reviewing the results shall be documented and each person shall be responsible for the accuracy of the results. If several Forensic Scientists are taking identical tests simultaneously, the Forensic Scientist Manager shall collect all independent tests as they are completed and distribute them for peer review.

4.4.9 For all proficiency tests, the following steps shall be followed when the Forensic Scientist has completed the test and any reviews have been conducted:

4.4.9.1 The original proficiency test file shall be stored in Forensic Advantage (FA) or returned to the Forensic Scientist Manager or designee. The test results shall be sent to the vendor on, or prior to, the due date for it to be a valid external test.

4.4.9.2 When proficiency test results are received from the vendor, the QM or designee, shall forward this material to the Forensic Scientist Manager. The Forensic Scientist Manager or designee shall then review the performance of the Forensic Scientist, provide feedback to the Forensic Scientist taking the test and to the reviewer(s) and document this review on a Proficiency Test Review Form. The completed proficiency test file, including the review forms, the test answers, and expected proficiency test results, shall be forwarded to the QM or designee within thirty days.

4.4.9.3 Upon receipt of the documentation, the QM or designee shall review the file to ensure complete documentation is present and make entries in the proficiency database records. If the test is internal in nature, the Forensic Scientist Manager or designee

shall have graded the test prior to sending it to the QM or designee. Proficiency tests shall be returned to the Forensic Scientist Manager for storage. After QM or designee, review, the Proficiency Test Review Form shall be imported into the Case Record Object Repository in FA.

4.4.9.4 Test records shall be stored confidentially and indefinitely within the Section or FA.

4.4.10 Whenever a Forensic Scientist does not achieve the expected result on a proficiency test the laboratory shall notify the accrediting body within 30 days of receiving the result.

4.4.10.1 For externally generated proficiency tests from a vendor, the unexpected result shall be identified and communicated by the vendor.

4.4.10.2 When an identification or exclusion is the expected result, an outcome of inconclusive is considered an unexpected result and shall be reported.

4.5 Corrective Action

Any deficiencies, discrepancies, or errors shall be handled as provided in the Procedure for Corrective Action and Non-conformities.

4.6 Monitoring of the Proficiency Test Program

The QM, or designee, shall monitor the status of the proficiency testing program. An annual status report of the proficiency testing program shall be prepared by the QM in conjunction with the Annual Laboratory Quality System Review as provided in the Procedure for Conducting Audits and Management Reviews.

4.7 Re-examination of Casework

4.7.1 Forensic cases shall not normally be re-worked; however, upon approval by the Lab Director or pursuant to a court order, the case may be re-worked by another qualified Forensic Scientist. For cases originally worked by the Laboratory, the Forensic Scientist shall not review the final report or discuss the results with the original Forensic Scientist prior to the re-examination.

4.7.2 Once the re-examination is complete for cases originally worked by the Laboratory, the Forensic Scientist Manager or designee shall compare the reported results of the two examinations. The results of this re-examination shall be documented in Section proficiency files and a copy provided to the QM. Complete administrative and examination documentation for both the original and the re-examination shall be placed in the original FA case file and any additional file that may be created. The Forensic Scientist Manager shall report any discrepancy immediately to the QM, Assistant Director of Technical Operations, and Lab Legal Counsel for action.

5.0 Records

- Laboratory and Section Court Testimony Evaluation records
- Proficiency Test Review Form
- Laboratory and Section Proficiency Test records
- Case Re-examination records

6.0 Attachments – N/A

Revision History		
Effective Date	Version Number	Reason
03/25/2024	18	4.3 – Removed legal system review of testimony requirement (Incorporated the requirement into the Procedure for Evaluating Customer Satisfaction) 4.4.2 – Add new clause to define successful completion of a PT. 4.4.4.1 – Add new clause to include instructions for internally created PTs/Records. 4.4.9.2, 4.4.9.3 – Add “or designee” after QM. 4.4.10 – Add new clause for informing the accrediting body of unexpected results on PTs. 4.4.10.1 – Add new clause to define unexpected result. 4.4.10.2 – Add new clause to define inconclusive results in comparisons as an unexpected result on PTs.