

NCSBI QUALITY ASSURANCE PROGRAM
for the TRACE EVIDENCE SECTION

Prepared & Approved By: SAC Troy Hamlin

Date:_____

Reviewed By: QA Manager Bill Weiss

Date:_____

Approved By: Assistant Director Jerry Richardson

Date:_____

Originating Unit: NCSBI Trace Evidence Section

Effective Date: July 25, 2003

Supersedes: February 1, 2002

**NCSBI QUALITY ASSURANCE PROGRAM
for the TRACE EVIDENCE SECTION**

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**NCSBI Quality Assurance Program
for the Trace Evidence Section**

Provisions for Modification and Updating of this Manual

Any updates, modifications, additions, or deletions to this manual prepared after the issue date on the cover sheet will have the following information located at the bottom of each page:

Issue Date:_____

Supersedes:_____

Prepared By:_____

Date:_____

Approved By:_____

Date: _____

Originating

Unit: _____

Planning and Organization

Section 1

1.1 GOALS

The goals of this agency are the following:

- (a) Provide state and local law enforcement agencies laboratory services for the analysis of trace materials and crime scene responses associated with official criminal investigations.
- (b) Ensure the quality, integrity and scientific accuracy of the analysis of trace materials through the implementation of a detailed Quality Assurance/Quality Control (QA/QC) program.

1.2 SCOPE

The QA/QC program described in this manual is intended to support trace materials analysis, to ensure that the trace analyst is operating within established performance criteria, and to ensure that the quality and integrity of the analysis are maintained.

1.3 PROGRAM OBJECTIVES

The objectives of this quality assurance program are to:

- 1) Ensure uniformity and accountability in records and analytical techniques.
- 2) Measure quality performance with administrative and technical case reviews.
- 3) Document corrective actions taken.
- 4) Discontinue analyses and procedures that do not conform to specifications outlined in this manual.
- 5) Monitor personnel and equipment performance.
- 6) Ensure the use of documented and validated procedures and equipment.
- 7) Ensure that the trace materials analyses are technically sound and/or legally defensible.
- 8) Provide performance guidelines to employees.

- 9) Ensure that the personnel performing the analysis have the appropriate training and education.
- 10) Ensure that the analysts are competent in performing analyses and interpreting results through a series of proficiency tests.
- 11) Provide a safe workplace.
- 12) Provide competent external audits to ensure that the operating policies and procedures are adequate and that they are being followed.

1.4 AUTHORITY AND ACCOUNTABILITY

Individual analysts in the Trace Evidence Section with delegated responsibilities are empowered by the Special Agent in Charge to carry out these responsibilities and to act in his/her place.

Specific delegated responsibilities include:

1. The Special Agent in Charge is ultimately responsible for the Quality Assurance program pertaining to audits and all other delegated responsibilities.
2. Senior Analysts have the responsibility of ensuring that the QC functions are being carried out in the Trace Evidence Section on a day to day basis.
3. All analysts are responsible for testing and validating new reagents and equipment; developing and maintaining new and existing procedures; and maintaining and updating manufacturer information.
4. The Supply Officer is responsible for maintaining adequate supplies and replenishing these supplies as well as coordinating the requisition of new supplies as needed for the section.
5. The Safety Officer is responsible for approving all new reagents and ensuring the proper usage of chemicals and equipment within the section as well as all safety related matters.
6. The Training Officer assigned to a particular Trace Evidence discipline as outlined in the administrative orders is responsible for developing and updating the training program within that discipline and administering the training program appropriately to new analysts.

7. The Key Operator of each piece of laboratory equipment is responsible for the maintenance of the assigned equipment, and for communicating necessary changes and updates to the section.

Personnel

SECTION 2

2.1 JOB DESCRIPTION

A current copy of all job descriptions within the Trace Evidence Section will be maintained by the Special Agent in Charge. The job descriptions for all personnel will include responsibilities, duties, and skills.

2.2 QUALIFICATIONS/EDUCATION

2.2.1 General Requirements

Analysts must exhibit knowledge of the theories, procedures and analytical techniques necessary to produce reliable results and conclusions. In addition, analysts must have education, experience, and training commensurate with the examinations and testimony provided. A minimum of a baccalaureate degree in a natural or applied science is required of any individual entering the Trace Evidence Section.

2.2.2 Requirements for Individuals Performing Trace Evidence Examinations

Prior to performing independent analysis of trace materials, all Trace Analysts will meet the general requirements for analyzing evidence in general, and meet the requirements for a specific Trace Evidence discipline. These disciplines may include the following: glass, hair, fiber, paint, arson, gunshot residue, light bulb filaments, physical match examinations, explosives and materials analysis.

1. Successful completion of the SBI in-house training program for the Trace Evidence discipline to which the analyst is assigned.
2. Successful completion of accepted courses in Forensic Science and/or the SBI in-house training to include the following:
 1. Evidence handling procedures
 2. Evaluation of evidence
 3. Laboratory safety procedures
 4. Documentation and reporting procedures
 5. Operation of instruments related to the analysts= specific Trace discipline

6. Preparation of court exhibits
 7. Court procedures and related law
3. Successful completion of written and practical tests and exercises related to the analyst=s training program.
 4. Successful completion of a moot court or question and answer session.
 5. Successful completion of a Final Examination and a Proficiency Test.
 6. Successful completion of supervised casework in which all casework is reviewed and approved by a Senior Analyst. This period of time will be determined by the Senior Agent for the specific Trace Evidence Discipline.

2.2.3 Continuing Education

The Trace Evidence Analyst must stay abreast of developments within the field by reading current scientific literature and by attending seminars, professional meeting, and other training sessions. Management must give analysts an opportunity to comply with the above.

2.2.4 Training Records

Documentation of all training will be maintained by the Special Agent in Charge (or his/her designee).

Documentation

SECTION 3

3.1 Current Procedures Manual

A copy of the current technical procedures used for the processing and examination of all evidence received by the Trace Evidence Section will be available to each Trace Analyst.

3.2 Operational Guidelines

3.2.1 Receipt, identification, storage, and handling of evidence submitted to the SBI Crime Lab.

Bureau guidelines for evidence submitted to the Crime Lab are documented in the SBI Evidence Accountability policy. A copy of this policy is found in the SBI Crime Laboratory Procedures Manual.

3.2.2 Guidelines for the Proper Recording of All Analysts Data

The following information will be recorded in the permanent file of every case submitted to the Trace Evidence Section for analysis. The preprinted forms used can be found in Appendix A immediately following this section.

- 1) An SBI Physical Evidence Examination Request Form (SBI-5).
- 2) Any pre-formatted pages of notes used to document what analyses were performed and their results.
- 3) The printouts resulting from instrumental analyses.
- 4) Any photographs taken to illustrate physical matches and/or the condition of the evidence.
- 5) The report generated by the Trace Evidence Analyst upon the completion of his/her examination.
- 6) A cover sheet for all of the notes associated with the case report. The cover sheet will contain documentation of a technical and administrative review by a qualified peer.
- 7) Any notes or data generated from the LIMS System.

3.3 Material Safety Data Sheets (MSDS)

Material Safety Data Sheets will be maintained on all chemicals and reagents used in the Trace Evidence Section. The section Safety Officer will maintain a file of those sheets in the Chemical Storage Room.

3.4 Schedules and Procedures for Maintenance, Inspections, Calibration and Testing of Pertinent Equipment.

An inventory will be kept of all equipment used in the Trace Evidence Section as described in Section 4.1.2 of this document. Service and maintenance on equipment will be documented and filed as described in Section 4.1.5 and 4.1.6 of this document.

3.5 Records of Methods Validation

All records of in-house methods validation testing will be maintained in the Trace Evidence Section.

3.6 Personnel Records

The Trace Evidence Special Agent in Charge will maintain a personnel file on each analyst. The file will be subdivided as follows:

- 1) Personnel history, assignments, promotions, etc.
- 2) Commendations
- 3) Complaints and disciplinary action
- 4) Training
- 5) Evaluations

3.7 The Special Agent in Charge will also maintain a separate file of proficiency tests results from each trainee and proficiency test results from each trained analyst.

3.8 Quality Assurance and Audit Reports

To document the Quality Assurance/Quality Control program of the Trace Evidence Section, the SAC will prepare and maintain a Quality Assurance Manual. This manual will be made available to all employees of the Trace Evidence Section.

Copies of audit reports will be maintained by the SAC. Those reports generated by the SBI Inspection Program will be stored according to Bureau procedure.

3.9 Safety Manuals

Copies of the Safety Manuals described in Section 16 of this document will be made available to every employee of the Trace Evidence Section.

3.10 Security Plan

Section security issues will be addressed by an administrative order prepared by the Special Agent in Charge of the Trace Evidence Section. This administrative order will be distributed to every employee and be maintained in the section files.

Control of Equipment, Instruments, Materials Reagents, Chemicals and Supplies

SECTION 4

4.1 Equipment and Instruments

4.1.1 Procurement

All equipment and instruments will be ordered by the Special Agent in Charge.

4.1.2 Equipment Inventory Log

An inventory log will be maintained on each piece of equipment in the Trace Evidence Section by the Special Agent in Charge or his designee. This log will include the following information:

Equipment Item
Asset Number
Serial Number
Year Purchased
Model Type
Model Number
Room Location

See **Appendix B** for a copy of this form.

4.1.3 Operating Manuals

Operating manuals and warranty information provided by the manufacturer will be maintained in the Trace Evidence Section.

4.1.4 Training

Operators of scientific instruments will be knowledgeable in their use. Operator training will occur during the in-house Trace Evidence training program and will cover the manufacturer=s instructions, theory of application, procedures, and any calibration requirements.

4.1.5 Equipment Maintenance

Anytime a piece of equipment requires service or maintenance - **outside of** routine in-house maintenance - that fact will be documented and kept on file within the Trace Evidence Section along with the appropriate work orders, receipts, etc.

4.1.6 Inspection and Certification

Each piece of equipment that require inspection and/or certification will be checked on an appropriate schedule. Inspection/Certification will be done according to the Trace Evidence Calibration Procedures and will be documented on the log kept for each respective piece of equipment.

Some instruments will be inspected and certified routinely by certified external agencies (e.g., balances and microscopes). Certificates of calibration issued by external technical service personnel will be maintained in the Trace Evidence files or the laboratory QA manager.

4.2 Materials, Reagents, Chemical, and Supplies

4.2.1 Sources of Reagents, Chemicals and Supplies.

An assigned Trace Evidence analyst will maintain a listing of commercial sources for all reagents, chemicals and supplies used in the Trace Evidence Section. This listing will show the catalog number, supplier, and required grade, if appropriate.

4.2.2 Procurement

All orders for materials, reagents, chemicals and supplies will be placed by an assigned Trace Evidence analyst and approved by the Special Agent in Charge. Copies of all orders will be maintained for a period of three years.

4.2.3 Receipt of Chemicals, Supplies, Reagents, and Materials by the Trace Evidence Section

All chemicals, reagents, supplies and materials will be received into the Trace Evidence Section by an assigned analyst, so that they can be checked against the orders placed.

All inventory will be stored under the conditions specified by the manufacturer. Any materials that require special handling will be handled appropriately and under conditions specified in the Section=s Safety Manuals.

4.2.4 Material Safety Data Sheets

Material Safety Data Sheets will be maintained in the chemical/solvent room or on O Drive for all chemicals and reagents used in the Trace Evidence Section.

4.2.5 Laboratory Prepared Reagents and Solutions

All lab prepared reagents and solutions will be made with great care and using good lab practices.

Reagents will be prepared using deionized water from the section Millipore System.

All prepared reagents and solutions will be clearly labeled as to the contents of the container, date of preparation, and initials of the preparer. All reagents will be stored under appropriate conditions.

The Trace Evidence Section Technical Procedures contain the necessary instructions for any solution that has to be prepared in house for a specific discipline. Safety and storage considerations will be reserved in the MSDS files.

4.2.6 Preparation of Glassware and Plasticware

All glassware and plasticware will be cleaned before use.

Disposable plasticware will be disposed of immediately after use.

4.2.7 Disposal of Materials, Reagents, Chemicals and Supplies

Small quantities of reagents and chemicals may be properly disposed of by flushing down laboratory sinks with adequate water.

Disposal of hazardous wastes will be handled as described in the Laboratory Chemical Hygiene Plan and in the Crime Laboratory Safety Manual.

Validation of Analytical Procedures
Section 5

- 5.1 The Trace Evidence Section procedures selected for use in forensic analysis by the SBI Laboratory will be readily available to analysts of the Trace Evidence Section.
- 5.2 Any Trace Evidence analyst may conduct research on a specific techniques, analysis method, or instrument with the approval of the Special Agent in Charge. Research and development must be conducted while obeying all safety and operating guidelines that are available at the time. Research in a specific discipline should be coordinated with the senior analyst in that discipline.
- 5.3 New methodology within the Trace Evidence Section will be researched and validated prior to implementation with specific criteria and documentation.
 - 5.3.1 Standards - Each new trace analysis procedure will be tested on various types of applicable standards to determine its feasibility and practical application in the field of Trace Evidence. New instrumental procedures will be subjected to various known standard validation procedures and results will be documented.
 - 5.3.2 Consistency - Any significant modification made to the analytical procedures provided will be compared with the original procedure using identical samples when possible. Techniques tested will be compared to previously approved or existing applicable procedures and the results compared. Results should be reproducible to ensure consistency.
 - 5.3.3 Time - If time is a factor in a trace evidence discipline (ie. GSR) research will be conducted on a standard samples in order to predict the effects of time on the type of trace evidence in question. Samples will be analyzed and/or tested at various periods of time to compare and document the results. If feasible, various environmental conditions should be included in this process.
 - 5.3.4 Documented Reports - Methodology research reports will include all chemicals necessary for procedure(s), instrumental techniques, sample preparation methods, any variances of prior methods, safety considerations and final comparisons, conclusions and results.

- 5.3.5 All procedures will be supported by all available literature and pertinent documentation, research and test records, control samples and/or spectral reproductions, and safety information. This reference material should be compiled and maintained by the research analyst for review by members of the forensic science community.
- 5.3.6 Upon approval and review of procedures by the Special Agent in Charge, Safety Officer, and Laboratory Quality Assurance Manager, the analyst conducting the research will develop written procedures on all techniques and instrumentation.

5.4 Historical and Archive Records

Documentation related to any technical procedure removed from the approved list of procedures will be maintained in the technical library.

Evidence Handling Procedures

SECTION 6

6.1 Evidence Labeling and Documentation

The analyst will ensure that all evidence received is in a sealed condition (unless the nature of the evidence makes this impossible). The analyst will enter their name in the evidence custody dialog box in the LIMS System. The analyst will identify the evidence container with the appropriate laboratory file number, affix the date received and their initials to the evidence container. The analyst will then place the evidence in their assigned locked evidence storage area unless the nature of the evidence makes it a biological hazard. In this case the analyst will utilize the putrid evidence room and protect themselves and others from contamination.

- 6.2. Upon opening the evidence container the analyst will compare the contents with the SBI-5 and identify the evidence with the assigned laboratory file number, the item number, date and initials. If there is a discrepancy, the analyst will report this to the Special Agent in Charge or his designee for verification. The requesting officer will then be notified.
- 6.3 When the laboratory analysis is complete, the analyst will return the evidence to the evidence container, seal and identify the container. The analyst will return the evidence to their assigned evidence storage area until it is returned to the appropriate evidence technician, officer, or transferred to another laboratory section for further analysis.

Internal Quality Control for the Trace Evidence Section

SECTION 7

The following control measure will be applied to each case in accordance with established procedures in the Crime Laboratory and Trace Evidence Procedures Manuals.

7.1 Bulk Evidence Storage Rooms

Policy for use of bulk evidence storage rooms will comply with Trace Evidence Policy Procedure 96-TES-2.

7.2 Labeling Evidence and Evidence Containers

Each analyst will be responsible for properly marking all evidence containers upon receipt. After completing the case, the analyst will be responsible for labeling the evidence with identifying marks to ensure proper identification at a later date.

7.3 Putrid Evidence Rooms

Putrid Evidence will be placed in a putrid evidence room for a time not to exceed the time it takes for the evidence to air dry. Once the putrid evidence has dried, the evidence will be removed from the room and prioritized in order to limit exposure of Trace Evidence Personnel to possible contamination.

Data Analysis and Reporting

SECTION 8

8.1 Verification of Hair and/or Fiber Conclusions

All Trace Evidence Hair and/or fiber positive associations must be verified by another qualified Hair and/or Fiber analyst. The verifying analyst will place his initials and the date verified on the cover sheet or verify by the appropriate dialog box in the LIMS.

8.2 Report Writing and Review

8.2.1 Lab reports will be issued on all Trace Evidence cases.

8.2.2 Review of Reports.

All lab reports will be reviewed by appropriately designated personnel.

8.3 Case Statistical Reports

8.3.1 A Trace Evidence Weekly Case Count Report will be submitted to the section secretary at the end of each week or the last working day for the individual analyst. This information will be compiled each week by the secretary and distributed to the Special Agent in Charge and the SBI Laboratory Assistant Director=s Office.

8.3.2 A Trace Evidence Monthly Case Count Report will be submitted to the section secretary on the last working day of the month. The information should include number of cases worked, turnaround time, number of items, and number of exams. Court time and crime scene time will also be submitted.

Proficiency Testing

SECTION 9

9.1 Known Proficiency Testing

Each Trace Evidence Section analyst will be tested at least once each year with a known proficiency test in their area(s) of expertise. The following areas of expertise are subject to these tests: Arson, Explosives, Fiber, Glass, Gunshot Residue, Hair, Metals, and Paint.

An analyst must complete a proficiency test in each of the above listed disciplines in which they are qualified. These tests may be prepared internally or may be part of an external proficiency testing program.

9.2 Re-examination

The trace disciplines of headlight filament.

9.3 Blind Proficiency Testing (Optional)

Blind proficiency test may be submitted to the Trace Evidence Section. They will be prepared in such a way as to appear to be a routine case. These tests may be prepared internally or may be part of an external proficiency testing program.

9.4 Proficiency Test Files

The Special Agent in Charge will maintain records of all proficiency tests taken, any deficiencies noted, and - if applicable - corrective action taken. When deficiencies are noted, the file will identify the likely cause of the deficiency. All deficiencies will be corrected according to the [State Bureau of Investigation Policy and Procedure Manual, Procedure 39, page 7.](#)

Corrective Action for Analytical Discrepancies

SECTION 10

The corrective actions taken whenever analytical discrepancies are detected will be in accordance with the Trace Evidence Policy/Procedure [98-TES-17](#) and the [State Bureau of Investigation Policy & Procedures Manual, Procedure 39, pages 5-7](#).

Monitoring of Court Testimony

SECTION 11

Court testimony of Analysts will be monitored in accordance with the [Trace Evidence Policy/Procedure 96-TES-8](#) and the [State Bureau of Investigation Policy & Procedures Manual, Procedure 34, pages 1-2.](#)

Departures from Documented Policies and Procedures
SECTION 12

Departures from the documented policies and procedures will be done in accordance with the State Bureau of Investigation=s Crime Laboratory Directive #03-02.

Complaints
SECTION 13

Complaints will be dealt with in accordance to the State Bureau of Investigation Policy & Procedures Manual, Procedure 24.

Disclosure of Information
SECTION 14

Information will be disclosed in accordance with the State Bureau of Investigation Policy & Procedures Manual, Policy 5, page 12.

Audits

SECTION 15

Audits are an important aspect of the quality assurance program. They are an independent review conducted to compare the Trace Evidence Section=s performance with a standard for that performance. These audits are designed to provide management with an evaluation of the Trace Evidence Section=s performance in meeting it=s quality policies and objectives. These audits will occur at least once annually.

15.1 SBI Inspection

The Trace Evidence Section is routinely inspected by an SBI Inspection Team. This team is composed of supervisory employees of SBI agents from various field districts or laboratory sections and the Inspector of the SBI. A typical inspection will last three days. During this time, all phases of the operation of the section are scrutinized including: evidence handling and accountability, case turn around time, report writing, note taking, management practices, leave and time management policies, security, records security, inventory of equipment, supplies, and personnel records.

15.2 Annual ASCLD/LAB Internal Audit

Each year the Trace Evidence Section will be audited by a special team composed of the following individuals but not limited to:

1. The laboratory Quality Manager and his designees.
2. Two Special Agents from the Crime Laboratory (non Trace Evidence Section Personnel).

These individuals will prepare a report for the Assistant Director of the Laboratory and the Trace Evidence Agent in Charge covering their findings on the following topic areas:

1. Is the Trace Evidence Procedure Manual being followed?
2. Is the Trace Evidence Quality Assurance manual being followed?

Safety

SECTION 16

16.1 Policy

The Trace Evidence Section will operate in strict accordance with the regulations of the pertinent federal, state, and local health and safety authorities.

16.2 Written Manuals

Written general laboratory safety manuals will be prepared and issued to all employees of the Trace Evidence Section.

16.2.1 General Laboratory Safety guidelines are covered in the North Carolina Department of Justice Employee Safety and Health Manual and the North Carolina State Bureau of Investigation Safety Manual.

16.3 Disposal of Biological Waste

Disposal procedures for biological wastes are covered in the North Carolina State Bureau of Investigation Safety Manual, the Blood Borne Pathogens Manual, and the Chemical Hygiene Plan.