Maine State Police Crime Laboratory

Equipment, Reference Standards and Reference Materials

1. Scope

This document outlines the laboratory's policies regarding equipment tracking, maintenance, and calibration. The laboratory defines critical equipment as any device used to deliver, weigh, measure or detect a precise quantity in a procedure in which the quantity is required to be specific and reproducible and where a measurement will impact the laboratory analysis results. Essential equipment is any equipment that is significant to the tests performed.

2. Equipment

2.1 The laboratory will maintain the appropriate equipment for performing the analyses as defined in the scope of accreditation. If the equipment necessary to perform analyses is not available, the laboratory will remedy the situation as soon as practicable.

2.2 Each section is responsible for determining which pieces of equipment are essential and critical.

2.3 In rare circumstances, the laboratory must utilize equipment outside of this facility. In those instances the laboratory will ensure that the equipment used meets the requirements of ISO 17025.

2.4 The laboratory will ensure equipment used for casework or databasing analysis operates in accordance with analytical methods.

2.5 Before being placed into service, critical equipment will be calibrated or have a performance verification to ensure the equipment meets the standards as set forth by manufacturer specification and / or laboratory methods.

2.6 Equipment will be operated by authorized personnel only.

2.6.1 An individual authorized to perform a particular type of analysis is considered to be authorized to operate any equipment necessary to conduct that analysis.

2.6.2 An individual with limited casework duties may be authorized to utilize specific pieces of equipment only. A separate Documentation of Specialty Training should be completed for just the equipment that the individual is authorized to use.

2.6.3 Individuals in training may use equipment on training samples or under the direct supervision of an authorized user.

2.7 Each section is responsible for developing methods or policies on the use of equipment. These methods or policies need not be step-by-step instructions. Enough information

must be in the methods or policies so that a trained examiner can effectively perform the analysis.

2.7.1 If necessary, step-by-step instructions should be available in manufacturer provided instruction manuals and / or examiner training documentation.

2.8 In the event essential or critical equipment needs to be transported, the manufacturer or qualified service provider will be contacted for instructions on safe handling and transport of the equipment.

2.9 Equipment that is non-functional or no longer meets specifications shall be removed from service until corrective measures can be instituted. A Quality Assurance Report will be initiated and the equipment will be marked to denote that it is not in service.

2.9.1 Equipment that is permanently removed from service will be removed from the Equipment Inventory.

2.10 The laboratory will ensure that essential and critical equipment, including hardware and software, is protected against unintended adjustments by checking the performance of the instrument prior to or during use. Performance checks may consist of analyzing standards, reference materials or calibration checks.

2.11 Each section will implement policies to ensure the proper functioning of essential and critical equipment prior to use in casework or database samples.

3. Equipment Inventory

3.1 The laboratory will maintain an equipment inventory in Paradigm, which includes the following:

- Any piece of equipment estimated to be valued over $500
- Computer CPU's
- Equipment that is calibrated or otherwise an essential physical component used in testing procedures
- Equipment and any other non-consumable supply purchased under a grant
- Items over $5000, which are also tracked by the State of Maine as a fixed asset
- Equipment that is defined as critical

3.2 The inventory will be checked on a regular basis to ensure it remains accurate.

3.3 Each piece of equipment will be assigned unique number in Paradigm with the letter E denoting equipment, and two letters to denote the section where the equipment is located. For example:

E-FC-1, E-FC-2

3.4 The equipment inventory will be maintained in Paradigm and will include the following information:

- Identity of equipment and software
- Manufacturer name
- Model or type
- Serial number if available
- Current location
- Software and version number where applicable

3.5 Any checks to ensure compliance with specifications will be included as part of the validation documentation. If no validation is conducted on a particular piece of equipment, manufacturer specification documentation will be attached to the equipment inventory in Paradigm.

3.6 Sections may choose to store temperature, cleaning, calibration and other logs electronically as an Evidence Item in the Documents module of Paradigm; as separate paper folders; or a combination of both.

3.7 Maintenance and / or calibration logs will be kept on each piece of essential and critical equipment. Maintenance logs will document routine maintenance, damage, repair or modifications to the equipment. Maintenance logs may be electronic or paper.

3.8 Sections will maintain manufacturer's instructions for essential and critical equipment when instructions are available. The instructions may be electronic or paper, but should be readily accessible when utilizing the equipment.

4. Equipment Maintenance

4.1 Equipment will be located or stored within the limited access portion of the facility whenever practicable.

4.2 Each piece of essential and critical equipment will have a maintenance plan. Minimally, the maintenance plan should be the manufacturer's specifications as defined in the instrument instructions. Technical Managers may make modifications to the

manufacturer's recommended maintenance plan. In those instances, the maintenance plan will be defined in section policy or method.

4.3 The laboratory will follow manufacturer's specifications for providing appropriate operating conditions for electronic equipment.

4.3.1 Where possible, equipment will be protected with surge protection equipment and / or uninterruptable power supplies.

4.3.2 Where possible, equipment will be attached to the laboratory's generator to provide power back-up in the event of a power failure.

4.4 Laboratory equipment is located in a temperature controlled environment. In the rare circumstance that equipment should leave the laboratory, the equipment will not be subjected to extreme temperature or humidity.

4.4.1 State issued laptops may be routinely removed from the laboratory. However, care will be taken to ensure that the laptop computers are protected against extreme temperatures, extreme humidity, or other environmental factors that could damage the computer.

4.4.2 Neither case nor quality related data will reside solely on an individual's laptop hard drive; a copy also must exist on the laboratory network drive. Examiners may temporarily retain information on their hard drive; however it must be transferred or copied to the network drive by the end of the work day.

4.5 In the event critical equipment leaves the direct control of the laboratory, calibration or performance verification will be conducted prior to putting the equipment back into service. This also includes any service conducted on the equipment within the laboratory.

5. Measurement and Traceability

5.1 Each section is responsible for developing calibration and / or performance verification programs for equipment as necessary.

5.2 Calibration, calibration checks and performance verification procedures should minimally meet the manufacturer's recommendations.

5.3 Procedures must be established for the calibration, calibration checks and performance verification of critical equipment.

5.3.1 Critical equipment must be calibrated or have the calibration checked prior to being placed into service.

5.4 External calibration providers performing services on critical equipment must be 17025 accredited with a scope of accreditation that matches the services requested. Calibrations must be traceable to SI units whenever possible. Calibration certificates generated by the calibration providers must contain the measurement results including the measurement uncertainty and / or a statement of compliance with an identified metrological specification.

5.4.1 If traceability to SI units is not possible, traceability of critical equipment must be established to certified reference materials, agreed methods or other consensus standards.

5.4.2 Each section will define in policy or method how traceability is established where applicable.

5.5 Calibration or performance verification completion dates and expiration dates will be noted on critical equipment or in the equipment maintenance record whether paper or electronic.

5.6 If calibration of critical equipment gives rise to correction factors, the section will have procedures in place to ensure that the correction factors will be appropriately utilized.

5.7 Internal calibration checks or performance verifications of critical equipment must be conducted using NIST traceable standards when available.

5.7.1 The laboratory does not perform calibrations.

6. Uncertainty of Measurement

6.1 The laboratory will calculate and report out uncertainty of measurement in disciplines where analytical results will affect criminal charges or sentencing.

6.2 Each section responsible for developing uncertainty of measurement estimates will develop a policy outlining how uncertainty of measurement will be calculated, reviewed and reported.

6.3 Estimations of uncertainty will take into account all uncertainty components of importance for the method.

6.4 The uncertainty budget will typically involve:

- Measurement data from multiple examiners taken over time
- Uncertainty factors from equipment such as balances, rulers, etc.

6.5 Uncertainty of measurement will be evaluated annually to ensure the estimation of uncertainty is still relevant.

6.6 Uncertainty of measurement calculations will be repeated if staffing changes or equipment changes.

6.7 Uncertainty of measurement will be clearly documented in case record and the laboratory report.

7. Reference Standards and Reference Materials

7.1 Reference standards are items or materials used for calibration or calibration checks on critical equipment.

7.2 Reference standards shall be calibrated by an external calibration supplier that is 17025 accredited with a scope of accreditation that matches the services requested. If a 17025 accredited supplier is not available, the section will confirm and record the competence, measurement capability and measurement traceability for the supplier and reference standard that is being purchased.

7.3 Each section will determine a calibration schedule for these standards to include intermediate checks to maintain the confidence of the reference standards.

7.4 Reference standards will be maintained in a way to protect the standards from deleterious change; they will not be used for anything other than calibration checks.

7.5 Reference standards will be calibrated after any adjustment.

7.6 Each section will identify the use of reference standards in methods or policy, when applicable.

7.7 Reference materials are items used to aid in identification, comparison or interpretation of forensic samples.

7.8 Reference materials should be traceable to SI units or to certified reference materials when possible.

7.8.1 The primary sources of reference material utilized by this laboratory are items obtained from general commercial sources such as footwear, ignitable liquids, firearms, etc.

7.8.2 Reference material may also be generated by laboratory staff for comparison to case materials. Examples of this type of material are known DNA samples from laboratory staff or investigators, elimination fingerprints from laboratory staff or investigators, etc.

7.8.3 Occasionally reference material may be generated through the course of case work. Examples of this type of material are test fire cartridges retained for the purposes of future comparisons.

7.8.4 When necessary the reference materials will be verified prior to being used in forensic casework. For example, ignitable liquid samples will be analyzed and classified prior to being utilized for comparison purposes.

7.9 Reference materials will be fully documented and uniquely identified.

7.10 Each section will have procedures for safe handling, storage and use or reference standards and materials in order to protect against deleterious change or contamination.

7.10.1 The laboratory typically does not transport reference material or standards outside of the laboratory. In the event reference material or reference standards should leave the facility, the item will be protected against contamination or deleterious change. Manufacturer's guidelines for transport will be utilized where applicable. If manufacturing guidelines are not available, laboratory evidence handling and packaging guidelines will be employed.

7.11 Reference standards and materials will be properly controlled and protected against unintended use.

Individual Characteristic Databases

8.1 Individual characteristic database samples are considered reference materials.

8.2 Each section maintaining an individual characteristic database will maintain procedures for the operation of the database

8.3 Individual characteristic database samples will be uniquely identified, tracked, and stored in a way to prevent loss, cross transfer, and deleterious change.

8.4 Access to individual characteristic database samples under the control of the laboratory will be limited. Access will be determined by the Laboratory Director.