



# TENNESSEE BUREAU OF INVESTIGATION

## Forensic Services Division

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### Forensic Chemistry Standard Operating Procedure Manual

### Quality Assurance

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#### 4.0 QUALITY ASSURANCE

##### 4.1 *Cross-Contamination Precautions*

- 4.1.1 A clean working area will be maintained by each analyst.
- 4.1.2 Disposable glassware and weigh boats are used in case work to eliminate the possibility of cross-contamination. However, non-disposable glassware and tools may be required for certain analyses. The analyst is responsible for the proper cleaning of all non-disposable glassware and essential tools before and after each use.
- 4.1.3 The analyst should avoid making highly concentrated samples in order to reduce analyte carry-over into subsequent analyses on a particular instrument.

##### 4.2 *Monitoring of Testimony*

Expert testimony will be monitored and documented as outlined in the TBI Quality Assurance Manual (QAM). The evaluation process will be documented on a *Courtroom Testimony Evaluation* form available in Appendix G of the TBI QAM.

##### 4.3 *Validation of Technical Procedures and Performance Verifications*

- 4.3.1 New technical procedures will be developed and validated to verify that they are suitable for use.
- 4.3.2 Performance verifications will be conducted on all new instrumentation that utilizes existing FCU analytical techniques. All methodology that will be used on an instrument for that technique will be also verified.
- 4.3.3 All validations and performance verifications will be conducted using method-specific working standards to ensure accuracy and repeatability for each method.
- 4.3.4 TBI FCU Personnel will be allowed to conduct performance verifications on balances and instruments after successful completion of training for each type of equipment.
- 4.3.5 Current procedures will be re-evaluated in accordance with the TBI QAM if they have demonstrated adverse issues affecting quality control or proficiency testing.
- 4.3.6 Validation and performance verification documentation will be maintained within the TBI FCU in accordance with the requirements outlined in the TBI QAM.

##### 4.4 *Proficiency Testing*

Proficiency tests are necessary to ensure the reliability of the methods used as well as the competency of the forensic scientist conducting these analyses. The TBI FCU participates in an annual external proficiency test in accordance with the requirements outlined in the TBI QAM.

##### 4.5 *Services and Supplies*

All supplies, reagents, and services will be verified against the purchase request and/or packing slips to ensure they are correct upon receipt in the laboratory. The verifier will initial and date the purchase documentation. If the shipping documents or labels do not match, the supplies or material will not be placed into service until the problem is resolved. Any discrepancies in the



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order or product returns should be recorded on the order documents. If any material does not have a vendor assigned lot number, the date the material is received will be substituted. The documentation should be placed in the appropriate file for future reference. A list identifying approved suppliers is maintained by the TBI Quality Assurance Manager.

Refer to the Lab Documentation folder in Ensur for the appropriate supply logs.

#### *4.5.1 Critical Supplies and Services*

4.5.1.1 The TBI FCU has designated the listed supplies and services as critical to analysis:

- Primary reference standards
- Pipette calibration services provided by outside vendor
- NIST certified weights for balance performance verification
- Balance calibration services provided by outside vendors

4.5.1.2 Primary reference standards, pipettes, and NIST certified weights shall be procured from reputable suppliers. These supplies will be stored in a climate-controlled location in the TBI FCU Laboratory.

4.5.1.3 Primary reference standards shall be stored in a secured location within the unit. In the event a primary reference standard must be transported to a TBI FCU regional lab, it will be transported in a secured container by designated laboratory personnel.

4.5.1.4 Weights shall be made available to TBI FCU staff for balance performance verification. Weights shall be recertified by a designated recertification vendor annually. The weights will be transported to this vendor using a trackable package delivery service.

4.5.1.5 Balance recertification will be done annually by a designated recertification service in the TBI FCU laboratory.

4.5.1.6 Pipette recertification will be done annually by a designated recertification service in the TBI FCU laboratory.

4.5.1.7 All quality assurance data and/or certificates provided by suppliers that relate to these items will be maintained in the TBI FCU Laboratory.

#### *4.5.2 Non-critical Supplies and Services*

Any and all supplies not listed in section 4.5.1 are designated as non-critical for TBI FCU purposes.

4.5.2.1 Commercially procured reagents and solvents will be Reagent Grade or higher. Certificates of analyses will be maintained in the appropriate logbooks.

4.5.2.2 All laboratory prepared reagents will have a one-year expiration date except for the Marquis reagent and individual analysts' working 4-aminophenol reagents. Marquis and 4-aminophenol storage requirements are found in the Color Test chapter.

4.5.2.3 Refer to the Color Tests chapter regarding preparation and verification instructions for color test reagents. Appendix A of the TBI FCU manual contains preparation and verification instructions for all other reagents.

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#### 4.6 Reagent Verifications

- 4.6.1 Procedural blanks will serve as verification of commercially procured reagents and solvents used in extractions.
- 4.6.2 All lab-prepared reagents will be verified before being put into service and re-verified on a quarterly basis. The verification criteria for these reagents are outlined in Appendix A. Reagent verifications will be performed by trained TBI FCU personnel.
- 4.6.3 Any reagent or solvent that fails to produce the expected results will be immediately re-verified. If the re-verification results indicate improper pH or possible contamination, the solvent or reagent in questions will be discarded. The lab supervisor or Technical Leader will be contacted if unexpected results continue with fresh reagents.

#### 4.7 Suitable Environmental Conditions

- 4.7.1 The following environmental conditions in the FCU will be monitored on a continuous basis.
  - Excessive humidity
  - Excessive heat
  - Power disruptions
- 4.7.2 Any significant issues that would impact testing will be forwarded to facility management for resolution or repair. All affected testing will be suspended until these issues are resolved if the FCU supervisor or technical leader determines a detriment to data quality. Documentation for any environmental issues will be maintained at the affected TBI facility.