EQUIPMENT MAINTENANCE

23.1 PURPOSE

To insure that equipment in the Forensic Biology Unit is working properly.

23.2 RESPONSIBILITY

Forensic Science Examiners (however titled) in the Forensic Biology Unit. Ordering information is maintained both electronically and in a log book by the Forensic Biology Unit. For additional information, refer to the Equipment Inventory in Appendix 3.

23.3 DEFINITIONS

A. NIST: National Institute of Standards and Technology
B. LIMS: Laboratory Information Management System

23.4 PROCEDURE

23.4.1: General Information/Performance Checks

A. New equipment will be performance checked and deemed acceptable for use before being placed into service. The performance check will be recorded on the appropriate equipment log sheet (newly generated if needed). A memo will be generated by a Lead of the Forensic Biology Unit or designee, stating that it is acceptable for use and its effective date.

B. New equipment acceptable for use will be added to the Equipment Inventory located in Appendix 3.

C. If the equipment does not produce results per defined parameters of the performance check then notify a Forensic Biology Lead and attach a sign to the equipment that it is not to be used for case work. The Technical Lead of the unit will investigate and determine a solution. An Incident Report may be opened.

D. New equipment for a new method will be validated along with the new method. (see FB SOP-25 Validation of New Serological Tests).

E. Laboratory Equipment will be cleaned as needed with the appropriate disinfecting solution described in FB SOP-21 (General Chemical and Reagent QC) and according to FB SOP-01 (Physical Evidence Examination).

F. For additional information, please see GL-21 (General Laboratory Equipment) and GL-22 (Policy on Validation and Performance Checks).

23.4.2: Ovens

A. Check the temperatures of the ovens weekly using the thermometer placed within each.

B. The temperature range should be 35°C - 39°C.

C. The temperature, date and initials are recorded on the appropriate Oven Equipment Log Sheet (form GL 21.4).

D. If the temperature deviates from this range, adjust the temperature according to the manufacturer's instructions as needed and record on the appropriate Oven Equipment Log Sheet (form GL 21.4).

E. If the temperature continues to deviate from this range, notify Lead, remove from service until the problem is corrected and record on the appropriate Oven Equipment Log Sheet (form GL 21.4).

F. If the temperature is adjusted for a different use, check with a NIST traceable thermometer before and after use.

23.4.3: Refrigerators and Freezers

A. Check the temperatures of the refrigerators and freezers weekly. Units used infrequently and for storage other than evidence or critical reagents will be checked before each use but not less than once per month.

B. The refrigerator temperature must be maintained above 0°C and no higher than 7°C.

C. The freezer temperature must be maintained no higher than -10°C.

D. The temperature, date and initials are recorded on the appropriate Refrigerator or Freezer Equipment Log Sheet (form GL 21.4).

E. If the temperature deviates from either of these ranges, adjust the temperature according to the manufacturer's instructions as needed and record on the appropriate Refrigerator or Freezer Equipment Log Sheet (form GL 21.4).

F. If the temperature continues to deviate from these ranges, notify Lead, remove from service until the problem is corrected. Record actions taken on the appropriate Refrigerator or Freezer Equipment Log Sheet (form GL 21.4).

G. The LIMS location designated as "Freezer Storage" will consist of secure freezer storage units.
   1. These units may contain:
      a. Samples, items and/or evidence requiring long term freezer storage.
      b. Sexual assault related evidence retained according to Public Act No. 15-207 and requiring freezer storage.
      c. Evidence requiring temporary freezer storage as needed.

   2. In general, the contents will be organized by case number beginning with the oldest cases in the walk-in-freezer up to the most current cases in individual freezer units as they are obtained by the unit. The specific case ranges within each unit will be clearly marked on each unit.

   3. See Equipment Inventory (Appendix 3) for a list of freezer storage units and their location.

23.4.4: Thermometers

A. Check the thermometers from each unit yearly against a NIST traceable thermometer. The temperatures must read within ± 2°C of the NIST thermometer.

B. For removable thermometers, place each with the appropriate NIST traceable thermometer as follows:
   1. The freezer thermometers into the walk-in freezer (room 1-186).
   2. The refrigerator thermometers into the walk-in refrigerator (room 1-185).
   3. The oven thermometers into one (1) oven.

C. For Units with fixed thermometers, place the appropriate NIST Traceable thermometer directly into the Unit.

D. Leave the thermometers overnight.

E. The date, initials and results are recorded on the appropriate Thermometer Equipment Log Sheet (form GL 21.3).

F. If the temperature deviates from the range, notify Lead, remove the thermometer from service and replace. Record on the appropriate Thermometer Equipment Log Sheet (form GL 21.3).

G. For additional information on NIST traceable thermometers see GL-21 (General Laboratory Equipment).

23.4.5: Micropipettes

A. Micropipettes are used in Forensic Biology for non-critical measurements.

B. The micropipettes are serviced yearly by an outside vendor and this service is recorded on the equipment and on the appropriate Micropipette Equipment Log Sheet.

C. If necessary, a performance check may be conducted before use as follows:
   1. Weigh the maximum and minimum volumes of dH_2O dispensed with that particular model.

   2. Repeat the measurement 10 times for each volume recording the empirical (observed) weight for each replicate, along with additional information, according to the Micropipette Performance Check Equipment Log Sheet.

   3. Attach this log sheet to the appropriate Micropipette Equipment Log Sheet and/or record the date, initials and final result on the appropriate Micropipette Equipment Log Sheet.

D. Micropipettes used for aliquoting (i.e. a repeat micropipette) will be checked annually to verify it is working properly, according to section 23.4.5.C above and the specifications listed below.

E. If the unit does not meet the following specifications, notify Lead, remove from service and record on the appropriate Micropipette Equipment Log Sheet.

F. Acceptable ranges at minimum and maximum volumes:
   1. 10µl micropipette $\pm$ 10% @ 1µl and 10µl
   2. 20µl micropipette $\pm$ 10% @ 2µl and 20µl
   3. 100µl micropipette $\pm$ 10% @10µl and $\pm$ 5% @ 100µl
   4. 200µl micropipette $\pm$ 10% @ 20µl and $\pm$ 5% @ 200µl
   5. 1000µl micropipette $\pm$ 5% @ 100µl and 1000µl
   6. Repeat micropipette $\pm$ 5% @ 200µl and 10ml

23.4.6: Alternate Light Sources

A. Crime-lites
   1. Check known stains (semen, saliva, urine and blood) weekly for fluorescence or stain detection under appropriate Crime-lite/wavelength. Note: Crime-lite(s) used less often than weekly may be checked before each use but it is not necessary to check more often than once per week.

   2. The date, sample, Crime-lite number and/or wavelength used, initials and result are recorded on the appropriate Crime-Lite Equipment Log Sheet.

3. If the known stains are not fluorescent or visible under these Crime-lites/wavelength(s), remove from service until problem is corrected and record on the appropriate Crime-Lite Equipment Log Sheet.

B. CrimeScopes (Mini and Hand-held)

1. Check the known stains (semen, saliva and urine) before each use for fluorescence under selected wavelength(s).

2. The date of check, sample, wavelength, initials and result are recorded on the appropriate CrimeScope Lights Equipment Log Sheet.

3. If the known stains are not fluorescent or visible under these wavelength(s), remove from service until problem is corrected and record on the appropriate CrimeScope Lights Equipment Log Sheet.

23.4.7: Ultrasonic Bath

A. Drain, clean bath and replace water quarterly or as often as needed. Fill the tank with dH_2O to approximately one (1) inch from the top.

B. The date and initials are recorded on the Ultrasonic Bath Equipment Log Sheet.

C. If necessary, dH_2O may be added to the bath before use ensuring the level is approximately one (1) inch from the top of the tank.

D. If the bath fails to work according to the manufacturer's instructions, remove from service until problem is corrected and record on the Ultrasonic Bath Equipment Log Sheet.

23.4.8: Balance

A. Check the balance quarterly as follows:

1. Weigh the appropriate NIST traceable weight (80g, 20g and 1g).

2. Record the date, initials and results on the Balance Performance Check Equipment Log Sheet.

3. If the empirical (observed) weight deviates $\pm$ 2% from the NIST weight, remove from service until the problem is corrected and record on the Balance Performance Check Equipment Log Sheet.

B. The balance must be performance checked according to GL-21 (General Laboratory Equipment) and GL-21.1 (Balance Performance Check) if an incident occurs that requires the balance to be performance checked outside of its normal schedule (such as a significant move or a failure to perform as expected).

C. The balance is serviced yearly by an outside vendor and recorded on the equipment and on the Balance Performance Check Equipment Log Sheet.

23.4.9: Microscopes

The microscopes are serviced yearly by an outside vendor and recorded on the equipment and on the Microscope Equipment Log Sheet.

23.4.10: Hoods

A. Generally, venting hoods are serviced yearly by an outside vendor and recorded on the equipment.

B. Replace filters in non-venting hoods as necessary and record on the Hood Filter Replacement Equipment Log Sheet.

23.5 REFERENCES

A. Boekel Scientific. Boekel Incubator Operating Instructions.
B. Mettler Toledo. Operating Instructions Line of Balances.
C. Sears Kenmore. Refrigerator Owner's Guide.
D. Rainin Instrument CO. INC. Pipetmen Operating Instructions.
E. Rainin. Pipet-Lite Operating Instructions.
F. Foster + Freemen. Crime-lite Information Sheets.
G. Spex Forensics. Mini-CrimeScope Operation Manual v. 2.0.
H. Fisher Scientific. Operator's Manual Tabletop Ultrasonic Cleaners.
I. Traulsen. "N-Width" Reach in Refrigerator/Freezer Models/Self-Contained Owner's Manual.
J. Firgidaire. "All About the Use & Care of your Refrigerator".
K. Norlake. "General Laboratory Refrigerators and Freezers Manual Defrost Instillation, Operation and Maintenance Instructions".
L. GL-21 (General Laboratory Equipment)
M. GL-22 (Policy on Validation and Performance Checks)