Title: In-house sample collection from evidence for gunshot residue (GSR) analysis

A. **Purpose**
To collect samples for the possible presence of gunshot residue (GSR ; pGSR) from primers.

B. Responsibility
Analysts authorized to conduct GSR examinations.

C. Equipment
1. Scanning Electron Microscope (SEM) (Hitachi 3700-N or equivalent)
2. Energy dispersive X-ray spectrometer (EDS) with GSR software (EDAX Genesis System or equivalent)
3. Adhesive-covered SEM stubs
4. Methanol (Reagent grade or equivalent)
5. Tweezers or other appropriate laboratory equipment

D. Procedure:

1. Preparation
   a. All evidence is handled in accordance with general laboratory (GL) policy.
   b. Document appropriate label information on worksheet(s) and check the integrity of the seal on the outside of packaging. Take appropriate case notes throughout the procedure and areas sampled will be appropriately documented.
2. Sample Collection
   a. All items found packaged separately will be analyzed separately.
   b. Appropriate cleaning of examination area will be conducted in between different items of evidence. This will include using methanol and paper towels (or similar product) to wipe down any part of the sampling area.
   c. Examination gloves will be changed in-between cleaning, handling, and sampling of evidentiary items.
   d. New brown paper will be placed as a barrier between items of evidence and surfaces.
   e. On the new brown paper take a new SEM stub and sample a generalized area as would be done with evidence. Label this stub as a negative control and indicate the item of evidence to be analyzed directly after this stub (e.g., NC prior to Item #1). A negative control will be taken in-between each sample of clothing, after surfaces have been cleaned and after a new piece of brown paper has been placed down.
   f. Additional sampling of evidence (e.g., for Forensic Biology/DNA section) may occur during the same time as collection for presence of GSR. Such sampling will be done by appropriately-trained analysts,

according to the needs of the Forensic Biology/DNA section, and according to relevant procedures within that section.

g. Evidence containing bullet-type hole(s) can be noted as to the presence of such holes.

h. A general sampling for GSR particles using adhesive-covered SEM stubs will be performed.

i. Clothing items
Use adhesive-covered SEM stubs to sample clothing items. The same stub can be used for multiple areas of the same item (as long as the adhesiveness of the stub is still effective).

A. Long pants: Take SEM samples from the outside/inside areas of all outside pockets.

B. Long sleeve shirt/jacket: take SEM samples from the areas of sleeve cuffs and all outside pockets.

C. Short sleeve shirt/T-shirt: Take SEM samples from the front area.

D. Shoes and hat: Take SEM samples from the areas of the outside surfaces of these items.

E. Inside shirts/underwear: No SEM samples are collected unless a special request is made by the submitting agency.

ii. Swabs
When swabs (e.g., from old SEM-type collection kits) are submitted for GSR analysis the Lead Examiner (or higher) will be notified. The contributor will be contacted to let them know that such evidence collection items are refrained from being submitted for GSR analysis. When approved by the Lead Examiner (or higher), stub-sampling of swabs can be done.

A. An adhesive-covered SEM stub will be used to sample each swab that needs analyzing.

B. Any strands of swab on the SEM stub should be removed. If tweezers (or other re-usable laboratory equipment) are used, they will be rinsed and cleaned thoroughly prior to re-use.

C. If a swab is placed on a pre-cleaned brown paper surface, a negative control stub will be taken in-between each item of evidence and labeled accordingly (e.g., NC prior to Item #1). The same negative control swab will be used to sample the tweezers prior to their use on the next item of evidence.

iii. Evidence not conducive to SEM disc sampling will be sampled according to best practices determined by the analyst. The same stub can be used for multiple areas of the same item (as long as the adhesiveness of the stub is still effective). Documentation as to how sampling occurred will be appropriately recorded within examination documents (e.g., worksheets or case notes). A Lead Examiner (or higher) will be consulted for unusual situations/evidence.

3. If items are packaged together and are in contact with one another, they should be considered the same item and will be sampled for GSR-type particles together, as one. Analysts can seek guidance from the Lead Examiner (or above) when reporting results or needing to update the itemization description within JusticeTrax.

E. References

General Laboratory (GL) procedures

Other procedures within section related to GSR

Revision #	Revision History
2	Updated the 'purpose' and 'responsibility' sections. Re-worded procedure and changed title for clarity. Removed unnecessary verbiage. Added stereoscope to equipment list. Added collection of Forensic Biology/DNA samples when examining evidence within procedure section. Added option for use of brown paper. Added steps to ensure proper clean sampling techniques were employed. Added collection of a negative control sample. Updated references. Added revision history to the procedure.
3	Title change to reflect this procedure is not just for clothing. Removed unnecessary reagents from C and added methanol. Updated section D.1.b ; changed 'should' to 'will.' Updated section D.2.b to describe cleaning procedures. Updated section D.2.c. Changed D.2.d. from 'should' to 'will.' Updated section D.2.e. to reflect multiple negative controls to be taken in-between sampling multiple items of evidence. Changed D.2.f. to no longer treat evidence with bullet-type holes any differently than regular evidence. Changed D.2.g from 'can' to 'will.'. Updated section D.2.h, changed 'should' to 'will,' changed that a Lead Examiner (or higher) will be notified, and combined clothing and swab evidence to the section. Added to section D.2.h.i. that the same stub can be used for multiple areas within the same clothing item. Added to section D.3. to account for situations where multiple items are found packaged together and how to sample. Removed section D.4.