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2024 Gunshot Residue Proficiency Test
FTS-24-GSR Summary Report

The Submission Deadline for this test was September 27, 2024

The test was manufactured by FTS at the FTS Laboratory Facility (127 W. Grand River Avenue, Williamston, MI 48895) and all activities were coordinated by Rebecca Smith (rsmith@forsci.com), Proficiency Test Program Manager. Ms. Smith is also authorizing the release of this report. SEM-EDS QA/QC analysis of a sample of GSR negative stubs distributed in the test were subcontracted to an ISO 17025 accredited laboratory. This is the summary report issued on 10/23/24. FTS considers all reports confidential and does not release information regarding participant's results without authorization from that participant.

Summary

Tests results were received in 110 of 136 tests distributed (81% response rate). Of the 111 respondents:

Item 1 (GSR Negative)
108 of 110 (98%) reported a negative result for the presence of gunshot residue on the Item 1 stub.
1 of 110 (1%) reported a positive result for the presence of gunshot residue on the Item 1 stub.
1 of 110 (1%) reported an inconclusive result for the presence of gunshot residue on the Item 1 stub.

Item 2 (GSR Negative)
99 of 110 (90%) reported a negative result for the presence of gunshot residue on the Item 2 stub.
6 of 110 (5%) reported a positive result for the presence of gunshot residue on the Item 2 stub.
5 of 110 (5%) reported an inconclusive result for the presence of gunshot residue on the Item 2 stub.

Assigned Value

Proficiency tests under ISO 17043:2023 are assessed via comparison of the participant result to the assigned value of a proficiency test item or items. For quantitative tests, FTS determines the assigned value based on statistical methods described in ISO 13528:2022. For qualitative tests, the FTS study coordinator determines the assigned value based on a number of factors, including product source information, internal and/or external pre-distribution laboratory analysis, and consensus of responses (consensus value).

Quality systems and laboratory reporting guidelines vary greatly from laboratory to laboratory, therefore participating laboratories and their accrediting bodies are responsible for the assessment of whether a reported result is an outlying result. For the convenience of subscribers FTS has highlighted, in yellow, any result that in the opinion of the FTS study coordinator may be inconsistent with the assigned value in the summary report.

For this proficiency test, the following assigned values are based on source information which was then confirmed by laboratory analysis:

Item 1: No characteristic three-component (Pb/Ba/Sb) GSR particles present.
Item 2: No characteristic three-component (Pb/Ba/Sb) GSR particles present.

Manufacturer's Information

All items were prepared at different times. Each item consisted of a carbon taped aluminum SEM stub (Ted Pella, Inc., #16084-1/#16111) stored within a plastic pin storage mailer (Ted Pella, Inc., #16630).

Item 1 was produced by stamping a carbon taped aluminum SEM stub onto clean, dry skin. The stub was packaged it into a plastic pin storage mount mailer, sealed and labeled per FTS guidelines.

Item 2 was produced by stamping a carbon taped aluminum SEM stub onto clean, dry skin. The interior of a Ziploc® gallon-sized bag containing one used brake pad (collected from Hank Graff Dealership, Okemos, MI), was sampled with the carbon taped SEM stub, taking measures to limit the exposed surface area of the stub. The sub was then packaged into a plastic pin storage mount mailer, sealed and labeled per FTS guidelines.

Item 3 (negative control sample) was produced by packaging a carbon taped aluminum SEM stub into a plastic pin storage mount mailer, sealed and labeled per FTS guidelines.

All three items with matching UTICs were packaged together in a labeled 6" x 9" manila envelope, sealed and labeled per FTS guidelines.

A representative number (determined by hyper-geometric sampling) of Item 1 and Item 2 stubs were examined via SEM-EDS and did not show the presence of any characteristic three component Pb/Ba/Sb particles.

Please examine the following SEM stubs to determine if gunshot residue is present.

Items Submitted

Item 1: Carbon taped SEM stub sampled from the hands of Suspect A.
Item 2: Carbon taped SEM stub sampled from the hands of Suspect B.
Item 3: GSR Negative Control carbon taped SEM stub.

3) Make and Model of Analytical Instrumentation Used:

UTIC	Webcode	Make and Model of Analytical Instrumentation Used
p20242001	W031	Hitachi SU3800; Oxford Ultim Max INCA software

UTIC	Webcode	Make and Model of Analytical Instrumentation Used
p20242002	W024	JEOL 6610LV Oxford X-max 50N
p20242003	W119	Tescan Vega 3 Scanning Electron Microscope/ Oxford X-Max Energy Dispersive Spectrometer
p20242004	W119	Tescan VEGA-3 Scanning Electron Microscope and Oxford X-Max 20 Energy Dispersive Spectrometer
p20242005	W061	JEOL JSM-6480LA Scanning Electron Microscope
p20242006	W061	Leica M205C stereo light microscope. Tescan MIRA-4 FE-scanning electron microscope fitted with an Oxford AZtec energy dispersive microanalysis system.
p20242007	W061	JEOL-7001F Field Emission Scanning Electron Microscope with Oxford Instruments X-Max 80mm2 SDD (EDX Detector).
p20242008	W061	Tescan Mira/Oxford EDS with Aztec GSR search software
p20242010	W133	JEOL 6610 Oxford INCA
p20242011	W133	JEOL 6610 SEM Oxford Inca EDX
p20242013	W023	JEOL IT300LV SEM Oxford 50mm XMax EDS
p20242015	W138	Hitachi S-3700N SEM / Oxford INCAx-act EDS
p20242016	W179	Thermo Scientific Quattro S
p20242018	W230	Tescan Vega SEM with Oxford EDS
p20242019	W009	Hitachi SU 3800
p20242020	W028	Tescan Vega4 SEM with Oxford Ultim Max 100 EDS
p20242021	W028	SEM/EDS SEM - Tescan Vega 4 EDS - Oxford Ultim Max 100
p20242022	W028	Tescan Vega 4 SEM with Oxford Ultim Max 100 EDS
p20242023	W263	SEM: Zeiss EVO MA 10, EDS: Bruker X Flash EDS
p20242024	W265	SEM/EDS: Carl Zeiss EVO MA10/Oxford X-Max 50
p20242025	W040	Hitachi S-3400N SEM Oxford X-Max 50 Energy Dispersive X-ray
p20242027	W144	SEM JEOL JSM-6610-LV Microanalysis Integrated System EDS Oxford, Model 51-XMX100. PJ 605936
p20242028	W144	SEM JEOL, modelo JSM-6610LV / EDX Oxford, modelo 51-XMX0002, software INCA, Version 5.03.
p20242029	W144	SEM JEOL, modelo JSM-6610LV / EDX Oxford, modelo 51-XMX0002, software INCA, Version 5.03.
p20242030	W144	JEOL JSM-6610-LV/EDX Oxford 51-XMX1002 (20 mm2), INCA software 5.03
p20242031	W193	Thermo Scientific Quattro S Field Emission Scanning Electron Microscope/Oxford Ultim Max 40 Energy Dispersive X-Ray Spectrometer
p20242032	W143	Hitachi S-3700N (SEM), EDAX Octane Plus A (EDS)
p20242033	W143	Hitachi S-3700N

UTIC	Webcode	Make and Model of Analytical Instrumentation Used
p20242034	W181	Tescan Mira 4, Oxford UltimMax 40 Tescan Vega 4, Oxford UltimMax 65
p20242035	W246	The Scanning Electron Microscope (Hitachi; FlexSEM1000) is performed for investigating PT sample. The investigation of GSR particle was operate via Backscattered electron (BSE) mode with Type: 4-quadrant-backscattered electron detector; Model (Hitachi). The characteristic X-ray was collected by Energy-Dispersive X-ray spectroscopy (EDS) with analyser DDP-4 (EDAX Elecment). The size of EDS detector is 30 mm2 in diameter. The EDS's signal was analyzed via Genesis GSR Particle Analysis version 6.332.
p20242036	W170	Scanning Electron Microscope ZEISS EVO 50 EP, Energy Dispersive X-Ray Spectroscopy Oxford Instruments X-Max 20 mm2. Software INCA GSR Suite Versión 4.15.
p20242037	W170	Scanning Electron Microscope Zeiss Sigma 500, Energy Dispersive X-Ray Spectroscopy Oxford Instruments ULTIM MAX 100, Software AZTEC version 6.0 SP2
p20242038	W170	Scanning Electron Microscope Zeiss Sigma 500, Energy Dispersive X-Ray Spectroscopy Oxford Instruments ULTIM MAX 100, Software AZTEC version 6.0 SP2
p20242039	W170	Scanning electron micoscope Zeiss Sigma 500 coupled with an Oxford Ultimmax 100 sqmm EDS and Aztec 6.0 SP2 software with GSR module.
p20242040	W170	Scanning Electron Microscope Zeiss Sigma 500, Energy Dispersive X-Ray Spectroscopy Oxford Instruments ULTIM MAX 100, Software AZTEC version 6.0 SP2.
p20242041	W132	Phenom-GSR Benchtop SEM
p20242042	W160	JEOL IT300 Oxford XMax 80 Detector
p20242043	W153	ZEISS SIGMA SEM with OXFORD XMAX50N EDX and INCA GSR software
p20242044	W088	Aspex Explorer
p20242045	W088	FEI Explorer SEM/EDS with Perception V.3.4.198 Software
p20242046	W088	FEI (Aspex) Explorer SEM/EDS w/ Perception v.3.4.198 software
p20242047	W034	Hitachi SU 3500 Oxford X-MaxN 50
p20242053	W079	FEI Quanta 600 SEM and Oxford X-MAX EDS
p20242054	W079	FEI Quanta 600 (SEM) with Oxford X-Max (EDS)
p20242055	W114	Make: Phenom SEM Model: Phenom XL Desktop SEM w/ Perception Gunshot Residue
p20242056	W114	Phenom XL
p20242057	W114	Make: Phenom SEM Model: Phenom XL Desktop SEM w/ perception Gunshot Residue
p20242058	W114	Thermo Scientific Phenom XL
p20242059	W114	Phenom XL
p20242060	W250	TESCAN Vega 3 LMU SEM with Oxford Instruments Ultim Max 100 EDS Detector

UTIC	Webcode	Make and Model of Analytical Instrumentation Used
p20242061	W158	JEOL JSM-IT300LV Scanning Electron Microscope Oxford X-Max Energy Dispersive Spectrometer
p20242062	W158	JEOL JSM-IT300LV Scanning Elctron Microscope Oxford X-Max Energy Dispersive Spectrometer
p20242063	W158	SEM: JEOL IT300LV EDS: Oxford Xmax50n
p20242065	W110	JEOL model IT-500 Scanning Electron Microscope with an Oxford Ultim Max 65 Silicon Drift Detector
p20242066	W110	SEM/EDS: JEOL brand, model JSM-6490 scanning electron microscope and Oxford brand, model PentaFET-x3, energy dispersive X-ray spectrometer
p20242068	W082	JEOL JSM-IT500LA scanning electron microscope with an Oxford Instruments Ultim Max 65 energy dispersive X-ray detector
p20242069	W251	Microscopio electrónico de barrido (SEM), marca FEI, modelo ASPEX EXPLORER
p20242070	W012	JEOL IT500 SEM with Oxford EDS Denton Vacuum Desk IV carbon coater
p20242072	W059	Zeiss MA10 SEM with Oxford X-ray detector
p20242073	W001	TESCAN Vega SEM /Oxford XMAX 80 EDS
p20242075	W005	SEM: Tescan Vega3 XMU: SN VG8551179US SEM Software: Version 4.2.26.0 (32 bit) EDS: Oxford Instruments Xmax 80mm2 Model 51-XMX-0010 127eV SN/System # 35359 EDS Software: INCA for Windows 7-Issue 21b SP3, INCA Suite Version 5.05
p20242076	W066	Quorum Simple Preparation System: carbon evaporation FEI QUANTA 650 SEM EDAX Octane Elect energy dispersive x-ray spectrometry Automated data collection with Genesis software (after that manual control of particles for verification)
p20242077	W209	Analytical instrumentation used is a Scanning Electron Microscopy coupled to Energie Dispersive X-Ray Spectroscopy (**SEM/EDS**), Mark: **ZEISS** - Model **EVO 25** for **SEM** and Mark: **Bruker XFlash 6/30** for **EDS**.
p20242078	W033	Zeiss EVO 15MA / Oxford SDD Xmax20
p20242079	W033	Tescan Vega 4 SEM with an Oxford Detector
p20242080	W033	Tescan Vega4 / Oxford SDD Xmax20
p20242081	W053	JEOL JSM-7100F
p20242082	W130	JEOL SEM Operation (version 1.220 or higher) Oxford Aztec (version 4.2 or higher)
p20242085	W069	Tescan Vega 3 LMH / Oxford X-Max 80
p20242086	W069	Tescan Vega 3 LMH/Oxford INCA
p20242087	W116	Tescan Vega3 SEM and Oxford X-MaxN (EDS)
p20242088	W025	Phenom Perception GSR Desktop SEM
p20242089	W025	ASPEX PSEM eXplorer
p20242093	W083	Tescan Vega 3 SEM Oxford Xmax 50 EDS

UTIC	Webcode	Make and Model of Analytical Instrumentation Used
p20242094	W017	Aspex Explorer
p20242095	W017	SEM: Zeiss EVO (10-8001014037) EDS: Oxford EDS ULTIM Max 40
p20242097	W035	PSEM75-ASPEX Manufacturer: ASPEX Corporation Model: PSEM75
p20242101	W147	Hitachi FlexSem 1000
p20242102	W147	Hitachi FlexSEM 1000
p20242103	W117	SEM: JEOL JSM-IT500 EDS: Oxford Ultim Max 65
p20242104	W084	Nanoscience Phenom XL G2 SEM with Perception software
p20242105	W051	JEOL JSM 7600F FE-SEM with Oxford X-MaxN 50 detector
p20242106	W016	Tescan Vega 3 with Oxford Instruments X-Max 50 EDX
p20242108	W076	Hitachi SU 3500 Scanning Electron Microscope-EDAX Octane Super Energy Dispersive X-ray detector with Super Ultra-Thin Window
p20242109	W076	Hitachi SU 3500 Scanning Electron Microscope - EDAX Octane Super Energy Dispersive X-ray detector with Super Ultra-Thin Window
p20242110	W076	Hitachi SU3500 SEM / EDAX Octane Super Detector. EDAX GSR Software.
p20242111	W126	Zeiss Evo MA with Oxford Instrument (Aztec software)
p20242112	W141	The examination and analysis was performed by Scanning Electron Microscopy (SEM) and analyzed by Energy-dispersive Spectroscopy (EDS). The instrument used was a Phenom Perception GSR Desktop SEM which contains a silicon drift detector and a CeB6 source.
p20242113	W185	Thermo Scientific QuattroS with Qxford Instruments Ultim Max EDS detector
p20242114	W042	Tescan Vega 3 with Oxford X-Act EDS
p20242115	W070	Zeiss EVO 15 SEM with Oxford UltiMax 100 EDS detector
p20242116	W070	ZEISS EVO 50 with Oxford X-Max 80
p20242117	W070	Zeiss EVO15 SEM with Oxford Ultimax 100 EDS
p20242118	W098	Tescan Vega 3 SEM Oxford X-Max 80 EDS with Inca-GSR
p20242119	W098	Tescan Vega SEM/Oxford Aztec EDS
p20242120	W098	Tescan Vega IV SEM and Oxford Ultim Max 100 EDS
p20242122	W098	Tescan Vega SEM/Oxford Aztec EDS
p20242123	W225	Jeol JSM-IT300LV
p20242124	W055	ThermoFisher eXplorer Aspex SEM/EDS
p20242125	W055	ThermoFisher (Aspex) eXplorer SEM/EDS
p20242126	W055	JEOL IT300LV SEM Oxford X-Act EDS
p20242127	W055	ThermoFisher (Aspex) eXplorer
p20242129	W037	Tescan Vega Essence (Vega 4) Scanning Electron Microscope with Oxford/X-ray Detector, backscatter detector, and secondary detector
p20242130	W037	Tescan Vega 2 Scanning Electron Microscope with Oxford X-ray Detector
p20242131	W037	Tescan VEGA II SEM with Oxford AZTec EDS
p20242132	W056	ASPEX (Thermo/FEI) PSEM Explorer II

UTIC	Webcode	Make and Model of Analytical Instrumentation Used
p20242133	W056	ASPEX PSEM Explorer 2
p20242134	W056	ThermoScientific/Nanoscience Instruments Phenom XL ParticleX Desktop SEM (Perception Suite version 6.7.1.4991)
p20242135	W084	Nanoscience Phenom SEM with Perception software
p20242137	W248	JSM-6610LV, Jeol, Japan and INCA Energy, SDD X-Max80, Oxford Instruments Ltd., UK

4) Quality Assurance Criteria for an identification of a positive GSR sample:

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242001	W031	Interpretation of Data Particles identified as characteristic of or consistent with pGSR are often spheroid particles, typically between 0.5µm and 5.0µm in diameter; the remaining are irregular in shape or vary from 5.0µm to 100+µm in size, or both. In general, it is not consistent with the mechanisms of pGSR formation to find particles by SEM displaying crystalline morphology. However, such particles have occasionally been observed in known primer GSR residues. Since morphology can vary greatly, it should never be considered as the only criterion for identification of pGSR. Particles classified as characteristic of pGSR will have the following elemental composition: Lead, antimony, barium Particles classified as consistent with pGSR will have one of the following elemental compositions: Lead, barium, calcium, silicon Barium, calcium, silicon Antimony, barium Lead, antimony Barium, aluminum Lead, barium The following compositions have been observed from different kinds of ammunition with “lead-free/non-toxic” primers. 1. Particles classified as characteristic of pGSR will have one of the following elemental compositions: Gadolinium, titanium, zinc Gallium, copper, tin Particles with compositions consistent with pGSR from different kinds of “lead-free/non-toxic” ammunitions will have one of the following elemental compositions: Titanium, zinc Strontium It is common for additional elements to become incorporated into particles of these classes. Such particles can contain but not be limited to one or more of these elements:

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242001 (Cont.)	W031	Aluminum Silicon Phosphorus Sulfur* Chlorine Potassium Calcium Iron** Nickel Copper Zinc Zirconium*** Tin Bismuth (Federal Syntech catalyst primers)* The presence of sulfur in classified particles that contain barium without lead should be viewed with caution as barium sulfate is used in many applications unrelated to the discharge of a firearm. ** Although rare, the presence of iron should be viewed with caution as these particles can be associated with brake dust. *** The presence of zirconium should be viewed with caution as these particles can be associated with vehicle air bags. Additional classifications can be developed for specific types of primer compositions no included above. Any new classification should aid in differentiating environmentally or occupationally produced particles that could be found in a sample from pGSR. An assessment of the significance of these classifications shall be made in consideration of appropriate research and documentation. Consistent particles are reported if the morphology of the particles are molten/spheroid and a particle population reveals no particles of concern (see step 6 a-d). During automated analysis, a particle population of the surface of the stub(s) is searched. If an analyst deems it necessary, the surface of the stub may also be searched manually both in SE and BSE. This is done to obtain a consensus of the particles on the surface of the stub(s). The classification of particles being searched during an automated run may contain but are not limited to one or more of the following elements: Iron- brake pad sample Potassium/chloride- fireworks sample Magnesium/aluminum- fireworks sample Copper/cobalt- air bag sample Note: This is not an all-encompassing category list. If consistent particles are found along with an abundance of particles containing elements above (6 a-d) or with elemental peak levels consistent with non-firearm sources, those particles are then not reported as consistent with pGSR.
p20242002	W024	A positive GSR particle contains lead, barium and antimony.
p20242003	W119	One (1) or more primer gunshot residue particles (PbSbBa) confirmed.
p20242004	W119	One or more characteristic particles (PbSbBa) confirmed.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242005	W061	1) Procedures and policies IAW SWGGSR and ASTM E1588-20. Adminstrative and operational control meaures to maintain integrity of exhibits and limit probability of contamination. 2) Analysis performed with positive GSR control - ENFSI SPS GSR A-04-05 3) Analysis performed with negative/process control 4) Reported results verified by analyst through manual review process 4) Reported results technically reviewed by addtional analyst.
p20242006	W061	Periodic calibration of the EDS response as part of routine maintenance. Each batch of samples automatically searched requires the successful detection of a periodically analysed positive control sample and the verification of negative control samples. These are processed in conjunction with the samples under the same operating conditions. Relocation, review and re-acquisition of x-ray spectra of relevant particles are also undertaken. Particles characteristic and consistent with gunshot primer residue according to the ASTM are reported following consideration of total particle population and verification of all negative and positive controls.
p20242007	W061	GSR reference stub with known GSR characteristic and consistent particles present is run using the same method/instrument parameters as the test samples. Particles characteristic and consistent with GSR are classified according to ASTM E1588-20 Section 9.1. The instrument used for this test is currently undergoing a rigorous optimisation and verification procedure for GSR analysis. The conditions used for the results for this test may not be the most optimal nor the final settings used for case work moving forward.
p20242008	W061	ASTM 1588-20 Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry. Internal Standard
p20242010	W133	Particles conatining at least 2 of the elements Pb, Sb, Ba with peaks at least 2x above background as well as appropriate morphological characteristics.
p20242011	W133	Spectral confirmation of elements associated with P-GSR [lead (Pb), barium (Ba), and antimony (Sb); or any combination of two of these elements] should be the primary spectral elements and approximately 2-3 times that of normal background noise. In addition, morphological characteristics are taken into consideration during confirmation.
p20242013	W023	Three chracteristic pGSR particles (Pb, Ba and Sb) detected on evidence samples to consider evidence sample to contain pGSR. 30 characteristic pGSR particles on Positive Control, manual reacquire 3 particles Negative Control to contain no characteristic pGSR particles

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242015	W138	Characteristic GSR particles have a molten, non-crystalline morphology and contain lead, barium, and antimony. Particles consistent with GSR have a molten, non-crystalline morphology and contain either lead and antimony, lead and barium, antimony and barium, or barium and aluminum. We do not use the terminology "positive" or "negative" for GSR. If GSR particles are identified we report the number confirmed in each category (characteristic or consistent). If GSR particles are not detected, we state that they were not detected.
p20242016	W179	Analysis is carried out to inhouse accredited procedure (ISO17025). GSR particles identified and confirmed according to guidelines set out in the ASTM Standard Practice guide 2020. A representative number of the 2 and 3 component particles detected are re-visited and confirmed; both the elemental composition and morphology of particles are taken into account. Presence of any contraindicative particles are also taken into account. Analytical data is peer reviewed. Positive case – to find at least one characteristic GSR particle with Lead, Antimony and Barium and an appearance typical of having been formed from a molten process. Instrument undergoes regular servicing and monthly checks including analysis of a synthetic ENFSI proficiency test sample with requirement to achieve detection of at least 90% of the 1 micron GSR particles Regular environmental monitoring of GSR examination and analytical areas is carried out.
p20242018	W230	A positive result is reported when at least one characteristic particle containing lead, antimony and barium (3component particles) is confirmed with appropriate morphology (All particles associated with GSR should have a molten, noncrystalline morphology, usually spherical or with rounded edges. The surface may be smooth, fuzzy, scaly or covered with small spheres.) and/or appropriate indicative particles on the sample, and no contradictions to a non firearms source. - GSR positive control and negative control stub ran at the beginning with each batch. - Quant calibration established by examination of cobalt standard - Threshold established by examination of cobalt and rhodium standard
p20242019	W009	The presence of all three of the elements Pb, Ba, and Sb in a single particle.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242020	W028	1. A particle containing lead, barium, and antimony is defined as a particle characteristic of gunshot residue (GSR) in accordance with ASTM E1588. This may be referred to as a threecomponent particle. 2. The confirmation of one GSR particle on any stub from a person or object is sufficient to report the kit or item positive for GSR. The relocation of additional potential GSR particles is not required. 3. The confirmation of at least one GSR particle on any stub collected from an item constitutes a positive result; analysis of other stubs collected from that person or object is not required. 4. A particle containing a combination of any two of the elements lead, barium, or antimony are consistent with gunshot residue but may have a source not related to the discharge of a firearm. These particles are not routinely reported.
p20242021	W028	1. A particle containing lead, barium, and antimony is defined as a particle characteristic of gunshot residue (GSR) in accordance with ASTM E1588. This may be referred to as a three-component particle. 2. The confirmation of one GSR particle on any stub from a person or object is sufficient to report the kit or item as positive for GSR. The relocation of additional potential GSR particles is not required.
p20242022	W028	A positive GSR sample contains one or more particles characteristic of gunshot residue (GSR). Particles characteristic of GSR (per our laboratory reports) are those which contain all three elements: lead, barium and antimony. This is per ASTM 1588-20 Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry.
p20242023	W263	A BSE calibration and Quant Optimization need to be performed before running each batch of samples. GSR particles need to have a sperical morphology and contain lead, barium, and antimonry in its elemental composition to be identified as a positive GSR particle.
p20242024	W265	A threshold count of three manually confirmed GSR particles to interpret the sample as positive for GSR in addition to both the negative control and the laboratory's environmental control samples are both negative for GSR. Characteristic GSR particles contain all three elements: lead, barium and antimony that are rarely found in particles from any source other than GSR. Typically, consistent GSR particles contain two of these three elements that are found in GSR and also arise from other non-firearm sources.
p20242025	W040	More than one characteristic and/or indicative particle with positive and negative controls providing appropriate results.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242027	W144	Quality Control (based on ASTM 1588-20) EDS X-ray energy calibration and SEM beam current stability are monitored regularly during the automated analysis. At least one time during the week, the laboratory have to check a synthetic GSR standard (ENFSI); the results of the standard analysis must be agree with the detection capacity stated for the method (approximately 1 micrometer or less, depending of the instrumental parameters). Periodically the laboratory must to check negative controls for discarding contamination with GSR during the sample preparation and analysis. The analysis of the samples must be accompanied by the analysis of a negative control obtained during the sampling process. It corresponds an open air blank stub, clean, unused, will be checked with each automated search. If positive findings of GSR on this disk are detected, data will be invalid for the respective samples. The blank control insures that there is no contamination throughout the entire process of sampling, prepping and analysis. Data Analysis We have established termination criteria in the analysis of each sample stubs, when reach 25 ternary particles with PbBaSb (unique or characteristic) in the sample (all stubs collected from one person's hands are considered one sample), followed by the reanalysis of the 3-component particles and/or consistent particles, with spectral confirmation of elements associated with GSR (quantitatively) and other elements permitted and prohibited according to ASTM Guide E 1588-20, SWGGSR Guide for Primer Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (2011) and other criteria about the levels of sulfur, iron and magnesium from internal validation process. Morphological characteristics are additionally considered before a final confirmation of GSR, consistent with a high temperature vapor condensing into solid droplets. In our reports we include the amount of characteristic and consistent particles found and confirmed in each sample. At least one (1) characteristic particle and other consistent particles (PbBa, PbSb, BaSb, BaAl) to complete a total seven particles, is necessary to conclude about the presence of GSR (as population) in the sample. When we find a few of ternary particles (PbBaSb) and binary particles with correct elemental profile and morphology, but insufficient to complete 7 particles in total, we conclude about the particles source from the firearm but the verbal scale no refers to population. Other verbal scales are used when we detect and confirm only binary particles (PbBa, PbSb, BaSb, BaAl), or ternary particles with non typical morphologies or non typical elemental profiles, without other casespecific sources for comparisons, such as by the analysis of GSR from cartridges. In our laboratory we do not use the terms "positive" or "negative" in the reports from the analysis of GSR by SEM-EDX.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242028	W144	Quality Control (based on ASTM 1588-20) EDS X-ray energy calibration and SEM beam current stability are monitored regularly during the automated analysis. At least one time during the week, the laboratory have to check a synthetic GSR standard (ENFSI); the results of the standard analysis must be agree with the detection capacity stated for the method (approximately 1 micrometer or less, depending of the instrumental parameters). Periodically the laboratory must to check negative controls for discarding contamination with GSR during the sample preparation and analysis. The analysis of the samples must be accompanied by the analysis of a negative control obtained during the sampling process. It corresponds an open air blank stub, clean, unused, will be checked with each automated search. If positive findings of GSR on this disk are detected, data will be invalid for the respective samples. The blank control insures that there is no contamination throughout the entire process of sampling, prepping and analysis. Data Analysis We have established termination criteria in the analysis of each sample stubs, when reach 25 ternary particles with PbBaSb (unique or characteristic) in the sample (all stubs collected from one person's hands are considered one sample), followed by the reanalysis of the 3-component particles and/or consistent particles, with spectral confirmation of elements associated with GSR (quantitatively) and other elements permitted and prohibited according to ASTM Guide E1588-17, SWGGSR Guide for Primer Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (2011) and other criteria about the levels of sulfur, iron and sulfur, iron and magnesium from internal validation process. Morphological characteristics are additionally considered before a final confirmation of GSR, consistent with a high temperature vapor condensing into solid droplets. In our reports we include the amount of unique (characteristic) and indicative (consistent) particles found and confirmed in each sample. At least one (1) characteristic particle and other consistent particles (PbBa, PbSb, BaSb) to complete a total seven particles, is necessary to conclude about the presence of GSR (as population) in the sample. When we find a few of ternary particles (PbBaSb) and binary particles with correct elemental profile and morphology, but insufficient to complete 7 particles in total, we conclude about the particles source from the firearm but the verbal scale no refers to population. Other verbal scales are used when we detect and confirm only binary particles (PbBa, PbSb, BaSb), or ternary particles with non typical morphologies or non typical elemental profiles, without other casespecific sources for comparisons, such as by the analysis of GSR from cartridges. In our laboratory we do not use the terms "positive" or "negative" in the reports from the analysis of GSR by SEM-EDX.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242029	W144	Quality Control (based on ASTM 1588-20) · EDS X-ray energy calibration and SEM beam current stability are monitored regularly during the automated analysis. · At least one time during the week, the laboratory have to check a synthetic GSR standard (ENFSI); the results of the standard analysis must be agree with the detection capacity stated for the method (approximately 1 micrometer or less, depending of the instrumental parameters) · Periodically the laboratory must to check negative controls for discarding contamination with GSR during the sample preparation and analysis. · The analysis of the samples must be accompanied by the analysis of a negative control obtained during the sampling process. It corresponds an open air blank stub, clean, unused, will be checked with each automated search. If positive findings of GSR on this disk are detected, data will be invalid for the respective samples. The blank control insures that there is no contamination throughout the entire process of sampling, prepping and analysis. Data Analysis · We have established termination criteria in the analysis of each sample stubs, when reach 25 ternary particles with PbBaSb (unique or characteristic) in the sample (all stubs collected from one person's hands are considered one sample), followed by the reanalysis of the 3-component particles and/or consistent particles, with spectral confirmation of elements associated with GSR (quantitatively) and other elements permitted and prohibited according to ASTM Guide E 1588-17, SWGGSR Guide for Primer Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (2011) and other criteria about the levels of sulfur, iron and magnesium from internal validation process. · Morphological characteristics are additionally considered before a final confirmation of GSR, consistent with a high temperature vapor condensing into solid droplets. · In our reports we include the amount of unique (characteristic) and indicative (consistent) particles found and confirmed in each sample. · At least one (1) characteristic particle and other consistent particles (PbBa, PbSb, BaSb) to complete a total seven particles, is necessary to conclude about the presence of GSR (as population) in the sample. · When we find a few of ternary particles (PbBaSb) and binary particles with correct elemental profile and morphology, but insufficient to complete 7 particles in total, we conclude about the particles source from the firearm but the verbal scale no refers to population. · Other verbal scales are used when we detect and confirm only binary particles (PbBa, PbSb, BaSb), or ternary particles with non typical morphologies or non typical elemental profiles, without other casespecific sources for comparisons, such as by the analysis of GSR from cartridges. · In our laboratory we do not use the terms "positive" or "negative" in the reports from the analysis of GSR by SEM-EDX.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242030	W144	Quality Control (based on ASTM E1588-20) • EDS X-ray energy calibration and SEM beam current stability are monitored regularly during the automated analysis. • At least one time during the week, the laboratory have to check a synthetic GSR standard (ENFSI); the results of the standard analysis must be agree with the detection capacity stated for the method (approximately 1 micrometer or less, depending of the instrumental parameters) • Periodically the laboratory must to check negative controls for discarding contamination with GSR during the sample preparation and analysis. • The analysis of the samples must be accompanied by the analysis of a negative control obtained during the sampling process. It corresponds an open air blank stub, clean, unused, will be checked with each automated search. If positive findings of GSR on this disk are detected, data will be invalid for the respective samples. The blank control insures that there is no contamination throughout the entire process of sampling, prepping and analysis. Data Analysis • We have established termination criteria in the analysis of each sample stubs, when reach 25 ternary particles with PbBaSb (characteristic) in the sample (all stubs collected from one person's hands are considered one sample), followed by the reanalysis of the 3-component particles and/or consistent particles, with spectral confirmation of elements associated with GSR (quantitatively) and other elements permitted and prohibited according to ASTM Guide E 1588-20, SWGGSR Guide for Primer Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (2011) and other criterio about the levels of sulfur, iron and magnesium from internal validation process. • Morphological characteristics are additionally considered before a final confirmation of GSR, consistent with a high temperature vapor condensing into solid droplets.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242030 (Cont.)	W144	• In our reports we include the amount of characteristic and consistent particles found and confirmed in each sample. At least one (1) characteristic particle and other consistent particles (PbBa, PbSb, BaSb) to complete a total seven particles, is necessary to conclude about the presence of GSR (as population) in the sample. When we find a few of ternary particles (PbBaSb) and binary particles with correct elemental profile and morphology, but insufficient to complete 7 particles in total, we conclude about the particles source from the firearm but the verbal scale no refers to population. Other verbal scales are used when we detect and confirm only binary particles (PbBa, PbSb, BaSb), or ternary particles with non typical morphologies or non typical elemental profiles, without other case specific sources for comparisons, such as by the analysis of GSR from cartridges. • In our laboratory we do not use the terms “positive” or “negative” in the reports from theanalysis of GSR by SEM-EDX.
p20242031	W193	1. All three elements (Pb, Sb, Ba) were detected on a sample. 2. The use of GSR standard at the start of the run to ensure the instrument is in a good working condition and manual reconfirmation of GSR particle(s) detected on a sample.
p20242032	W143	Manual confirmation of a particle previously classified during the automated analysis as containing Pb and Sb, Pb and Ba, Sb and Ba, or Pb, Sb, and Ba. Manual collection of a backscatter electron image of said particle to assess morphology, along with manual collection of the EDS spectrum for 100 live seconds to assess the presence of Pb, Sb, and Ba. Analysis of a negative control stub that does not contain any particles with compositions similar to those being reported. Analysis of a positive control stub and the manual confirmation of (3) particles characteristic of GSR (containing Pb, Sb, and Ba). An associated PLANO standard analyzed with a manually confirmed particle characteristic of GSR.
p20242033	W143	One particle containing the elements Lead, Antimony and Barium (Pb, Sb, and Ba) is classified as charateristic of pGSR.
p20242034	W181	Presence, at least, of one characteristic GSR particle (PbSbBa) and three consistent GSR particles, as well as two or more characteristic GSR particles (PbSbBa).

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242035	W246	The positive GSR samples are confirmed according to ASTM 1588-20 (Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy Energy Dispersive X-Ray Spectrometry) conditions. The SEM condition requires accelerating potential at 20 kV. The resolution of EDS presents less than 150 eV (127eV in our laboratory with copper/ aluminum calibration; PELCO XCS-5 EDS Calibration standard). The validation of GSR sample carried out with Test -Matrix A of synthesis particle specimen (SPS, Plano GmbH) to confirm 0.5 µm in diameter of GSR. The characteristic GSR particle consists of Barium (Ba), Antimony (Sb) and Lead (Pb). The finding of GSR particles with low and moderate amounts to be accepted is at least 1 particle and 4 particles respectively based on ENFSI workshop on the "Application of the Bayesian Approach in Gunshot Residue Investigation". Therefore, these conditions of GSR analysis relate to international standard for identification of GSR particles defined as quality assurance criteria.
p20242036	W170	1. At least one (1) characteristic particles (SbBaPb, GdTiZn, GaCuSn), typical morphology and size are required. 2. One (1) characteristic particle and two (2) or more consistent with GSR particles (PbBaCaSi, BaCaSi, SbBa, PbSb, BaAl, PbBa) characteristic morphology and size are required. 3. Four or more consistent with GSR particles, characteristic morphology and size are required. In all cases, the presence of commonly associated GSR particles (elements such as Pb, Sb, Ba, with characteristic morphology), is of significance in the interpretation that the population is GSR.
p20242037	W170	1. At least one (1) characteristic particles (SbBaPb, GdTiZn, GaCuSn), typical morphology and size are required. 2. One (1) characteristic particle and two (2) or more consistent with GSR particles (PbBaCaSi, BaCaSi, SbBa, PbSb, BaAl, PbBa) characteristic morphology and size are required. 3. Four or more consistent with GSR particles, characteristic morphology and size are required. In all cases, the presence of commonly associated GSR particles (elements such as Pb, Sb, Ba, with characteristic morphology), is of significance in the interpretation that the population is GSR.
p20242038	W170	1. At least one (1) characteristic particles (SbBaPb, GdTiZn, GaCuSn), typical morphology and size are required. 2. One (1) characteristic particle and two (2) or more consistent with GSR particles (PbBaCaSi, BaCaSi, SbBa, PbSb, BaAl, PbBa) characteristic morphology and size are required. 3. Four or more consistent with GSR particles, characteristic morphology and size are required. In all cases, the presence of commonly associated GSR particles (elements such as Pb, Sb, Ba, with characteristic morphology), is of significance in the interpretation that the population is GSR.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242039	W170	1. At least one (1) characteristic particles (SbBaPb, GdTiZn, GaCuSn), meeting morphology and size criteria. 2. One (1) characteristic particle and two (2) or more consistent with GSR particles (PbBaCaSi, BaCaSi, SbBa, PbSb, BaAl, PbBa) meeting morphology and size criteria. 3. Four or more consistent with GSR particles, meeting morphology and size criteria. In all cases, the presence of commonly associated GSR particles (elements such as Pb, Sb, Ba, with characteristic morphology), is of significance in the interpretation that the population is GSR.
p20242040	W170	1. At least one (1) characteristic particles (SbBaPb, GdTiZn, GaCuSn), typical morphology and size are required. 2. One (1) characteristic particle and two (2) or more consistent with GSR particles (PbBaCaSi, BaCaSi, SbBa, PbSb, BaAl, PbBa) characteristic morphology and size are required. 3. Four or more consistent with GSR particles, characteristic morphology and size are required. In all cases, the presence of commonly associated GSR particles (elements such as Pb, Sb, Ba, with characteristic morphology), is of significance in the interpretation that the population is GSR.
p20242041	W132	**Characteristic particles** Characteristic particles are those that have compositions rarely found in particles from any source other than firearm residue (FAR). Particles that have a composition characteristic of firearm residue are defined in the ATSM E1588 will have the following elemental profile: Lead, Antimony, Barium particles with this composition may contain one or several of only the following other elements: silicon, calcium, aluminium, copper, trace amounts of iron, trace amounts of sulphur, phosphorus, zinc, nickel (in conjunction with copper and zinc), potassium, chlorine and tin. Particles with the elemental compositions Pb-Ba-Sb-Al and Pb-Ba-Sb-Sn are commonly encountered in casework are deemed characteristic under the definition above. Firearm residue particles with non-routine elemental compositions including the presence of additional elements may be encountered in case work (e.g. Pb-Ba-Ca-Si, Pb-Ba, Pb-Sb). Such particles can be considered characteristic of or consistent with FAR provided that the elemental compositions can be accounted for by case-specific sources, such as the analysis of a reference sample (e.g. cartridge casing). The relative quantity of these elements and their distribution in the particle population should be similar between the recovered sample and reference sample.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242041 (Cont.)	W132	Consistent particles Consistent particles are those that are found in FAR and can also arise from non-firearm sources. Particles that have a composition consistent with firearm residue will have one of the following elemental profiles: Barium, Calcium, Silicon Barium, Antimony Lead, Antimony Lead, Barium Barium, Aluminium Lead, Antimony, Tin Lead Barium Antimony While the overall population of both characteristic and consistent particles should be considered, care should be taken when reviewing consistent particles as many of these particles may originate from other sources not related to firearms (a comparison should be made to a reference sample if available). The number of characteristic particles confirmed should be noted in the file and may be described as per the scale below: Single Particle, 2-5 Low, 6-12 Medium, 13-50 High, >50 Very High The number of characteristic particles are generally not stated in the report, however the number/level of particles may be included at the discretion of the scientist. The number of characteristic particles within the overall population is taken into account when evaluating the findings either investigatively or at activity level . The finding of a single characteristic particle (in the absence of a supporting population of particles) is not deemed significant.
p20242042	W160	Manual reacquisition of the first 12 positive particles and then remainder checked on-screen.
p20242043	W153	According to ASTME 1588-20 : STANDARD PRACTICE FOR GUNSHOT RESIDUE ANALYSIS BY SCANNING ELECTRON MICROSCOPY / ENERGY DISPERSIVE X-RAY SPECTROMETRY
p20242044	W088	EDS calibrated with copper each day of analysis. Positive and negative GSR control at beginning and end of sequence. EDS count rate monitored between each sample on copper. Positive GSR sample requires at least one particle characteristic of gunshot residue. Such particles contain Pb, Sb, Ba, are molten in appearance, and do not contain any elements not expected to be found in ammunition.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242045	W088	Particles characteristic of GSR contain Pb, Sb, and Ba all within a single particle that is molten in morhpology and does not contain any elements that are unacceptable or not expected to be present in GSR. Positive and negative controls are run before and after the sample runs to ensure that the instrument is identifying GSR when it is present (pos control) and that the instrument doesn't find any when there isn't any GSR present (neg control).
p20242046	W088	Particles that are characteristic of GSR are single, discrete, microscopic particles, molten in morphology, that contain the elements Pb, Ba, and Sb. Particles that are characteristic of GSR may also have one or more of the following additional elements: In major, minor, or trace amounts C, O, Na, Al, Si, P, S, Cl, K, Ca, Cu, Zn, Sn, Zr, Ni (in the presence of Cu or Zn). In minor or trace amounts Fe, Ni (in the absence of Cu or Zn), Mg. Positive and negative control stubs are analyzed before and after the sample stubs. The positive control ensures that the instrument is finding GSR particles when it should be. The negative control then ensures the instrument is not finding GSR when it is not present.
p20242047	W034	Detection of >50 Pb-Ba-Sb particles on the positive control stub. Failure to detect >50Pb-Ba-Sb particles on the positive control shall result in a restart/rerun of the sequence or the fraction for which the control failed. Negative control has 0 Pb-Ba-Sb particles detected.
p20242053	W079	Single particle containing lead-barium-antimony with a heat-formed shape.
p20242054	W079	A single particle containing the elements lead, barium, and antimony with a heat formed shape.
p20242055	W114	Contains a minimum of three (3) tri-component and additional consistent PGSR particles.
p20242056	W114	A positive GSR sample must contain a minimum of three (3) tri-component and additional consistent PGSR particles. Tri-component particles are composed primarily of Antimony, Barium and Lead. Consistent particles are similarly comosed of one or two of those elements.
p20242057	W114	Contains a minimum of three (3) tri-component and additional consistent PGSR particles. Tri-component PGSR particles are composed primarily of antimony, barium, and lead. Consistent particles are similarly composed of one or two of these elements.
p20242058	W114	A minimum of three (3) tri-component particles and additional consistent particles. Tri-component PGSR particles are composed primarily of Antimony, Barium, and Lead. Consistent particles are similarly composed of one or two of these elements.
p20242059	W114	Contains a minimum of three (3) tri-component and additional consistent PGSR particles. Tri-component PGSR particles are composed primarily of Antimony, Barium and Lead. Consistent particles are similiarly composed of one or two of those elements.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242060	W250	ASTM E1588-20 Standard Practice for GSR Analysis by SEM/EDS Quality Control blank stub must be negative Quality Control positive must have number of particles within stipulated range
p20242061	W158	Morphology: The majority of PGSR consists of spherical or molten particles between 0.5 micron and 5.0 microns in diameter; the remaining particles are irregular in shape and vary dramatically from 1 to 100+ microns in size. In general, it is not consistent with the mechanisms of PGSR formation to commonly find particles with crystalline morphology. Since morphology can vary greatly, it should never be considered the only criterion for identification of PGSR. Elemental Composition: Three-component PGSR particles are composed of lead, barium, and antimony. Two-component particles are composed of any combination of two of the above mentioned elements. Particles with elevated levels of additional elements, such as iron, that indicate a source such as fireworks or primerbased construction tools would not be considered primer gunshot residue. Ammunition produced and marketed to be non-toxic or environmentally safe can produce particles consisting of elements not listed previously such as strontium or titanium and zinc.
p20242062	W158	The majority of P-GSR consists of spherical or molten particles between 0.5 micron and 5.0 microns in diameter; the remaining particles are irregular in shape and vary dramatically from 1 to 100+ microns in size. In general, it is not consistent with the mechanisms of P-GSR formation to commonly find particles with crystalline morphology. Since morphology can vary greatly, it should never be considered the only criterion for identification of P-GSR. Three-component P-GSR particles are composed of lead, barium and antimony. Two-component particles are composed of any combination of two of the above mentioned elements. Particles with elevated levels of additional elements that indicate a source such as fireworks or primer-based construction tools would not be considered primer gunshot residue. Ammunition produced and marketed to be non-toxic or environmentally safe can produce particles consisting of elements not listed previously such as strontium or titanium and zinc.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242063	W158	-Morphology: The majority of PGSR consists of spherical or molten particles between 0.5 micron and 5.0 microns in diameter; the remaining particles are irregular in shape and vary dramatically from 1 to 100+ microns in size. In general, it is not consistent with the mechanisms of PGSR formation to commonly find particles with crystalline morphology. Since morphology can vary greatly, it should never be considered the only criterion for identification of PGSR. -Elemental Composition: Three-component PGSR particles are composed of lead, barium, and antimony. Two-component particles are composed of any combination of two of the above mentioned elements. Particles with elevated levels of additional elements, such as iron, that indicate a source such as fireworks or primer-based construction tools would not be considered primer gunshot residue. Ammunition produced and marketed to be non-toxic or environmentally safe can produce particles consisting of elements not listed previously such as strontium or titanium and zinc.
p20242065	W110	Particles classified as characteristic of gunshot primer residue contain the elements lead, barium, and antimony and typically exhibit a spheroidal or non-crystalline morphology. Particles classified as consistent with gunshot primer residue generally contain the elements lead/barium, lead/antimony, barium/antimony, or barium/aluminum and typically exhibit a spherical or other morphology indicative of having a molten origin (i.e globular or cratered).
p20242066	W110	Particles found to contain the combination of lead, barium, and antimony are considered characteristic of gunshot primer residue and typically exhibit a spheroidal or non-crystalline morphology. Particles that contain lead and antimony, lead and barium, barium and aluminum, or barium and antimony and that exhibit a spherical or other morphology indicative of having a molten origin (i.e., globular or cratered) are considered to be consistent with GSR.
p20242068	W082	Only GSR kits containing characteristic GSR particles will be reported as positive for gunshot residue. A positive result means that at least one particle characteristic of GSR was detected on the sample. Characteristic particles have a non-crystalline morphology and an elemental composition consisting of antimony, barium, and lead.
p20242069	W251	a) Observación de partículas compuestas de plomo (Pb), bario (Ba) y antimonio (Sb). b) Observación de tamaño(s) de partículas entre 0,5 a 10 micras. c) Observación de partículas esferoidales.
p20242070	W012	Samples will be considered positive if at least three particles containing barium, antimony and lead (3-component particles) are present on the stub set and they have the proper morphology.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242072	W059	Must be spherical particles containing Lead, Barium and Antimony.
p20242073	W001	7.6.6 Element Confirmation 7.6.6.1 Elements are confirmed as present by observing that the major element lines are centered in the X-ray peaks and in the appropriate ratios. 7.6.6.2 Lead is confirmed when all major lead lines are present including the PbL-beta1 with a signal to noise of three or greater. 7.6.6.3 Barium is confirmed when all major barium lines are present including the BaL-beta2 with a S/N of three or greater. 7.6.6.4 Antimony is confirmed when all major antimony lines are present including SbL-beta2. Signal to noise ratios are not determined due to frequent overlapping peak energies with Ba, Ca and Sn. Smaller amounts of Sb may not exhibit an SbL-beta2 peak, but the SbL-alpha and SbL-beta1 shall be present and in the appropriate ratio. 7.6.6.5 Signal to noise ratios are performed when the relevant peaks are questionable; the calculated ratio will be documented in the casefile. Signal to noise calculations are performed using the Excel spreadsheet on the Oxford computer desktop. (see Section 7.10 for the calculation formula). The spectral data (in the form of a .txt file) used to make the S/N calculation shall be included in the case file. All such calculations will be checked during technical review. 7.6.6.6 When small amounts of Pb, Ba or Sb appear to be present, or overlap with other elements altering their peak ratios, longer analysis times and/or using a process time of six in Point & Id may be needed, along with overlaying the spectra with elemental standards or using the spectral reconstruction/synthesis software. Supporting data shall be included in the casefile demonstrating the confirmation of the element in these instances. 7.6.6.7 Label peaks with software generated peak labels to indicate elements present. The examiner will notate on the printed spectra as to which elements were confirmed as present. 7.6.6.8 If a particle is not on the carbon tape but on another substance, collect spectra for that substance to ascertain what elements may be arising from the substance.
p20242075	W005	Quality control consists of analysis of 2023 ENFSI standard, threshold check for particle ID on GSR reference stub, in-house blank (negative control), and GSR reference stub (positive control). When the SEM/EDS automated program detects characteristic and/or consistent with primer GSR (pGSR) particles, the analyst will confirm the morphology and elemental composition and report the number of manually confirmed pGSR particles (characteristic and/or consistent with). A particle characteristic of pGSR contains a mixture of lead, antimony, and barium. A particle consistent with pGSR contains a mixture of lead and antimony, lead and barium, and/or antimony and barium. All particles confirmed have the above mentioned elemental composition and have a melted or spherical morphology unless otherwise noted.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242076	W066	The particle is classified as characteristic of GSR if it contains lead, antimony and barium elements (Sinoxid) or gadolinium, titanium and zinc elements or gallium, copper, and zinc elements (Sintox) . The morphology of the particles also important aspect; has often spheroid shape, inhomogenous surface and the diameter between 0,5-100 micrometer.
p20242077	W209	The result of the analysis is considered **positive** if: • The total numbers of **characteristic** and/or **consistent GSR** particles detected (the sum of the two) on the exhibit is greater than or equal to three (03); • The total numbers of **characteristic** and/or **consistent GSR** particles detected (the sum of the two) on the exhibit is equal to two (02), associated with four (04) Commonly GSR; • One particle characteristic or consistent GSR particles detected on the exhibit is, associated -at least- with Five (05) Commonly GSR. **This result has to be confirmed by another analyst, skilled in GSR analysis.** Two parameters are considered to classify particles as GSR particles, namely: the morphology and the elemental composition. - **Morlophogy of GSR particles** : Particles having a spherical or an ellipsoidal shape and / or a melted appearance, typically between 0.5 µm and 5.0 µm in diameter, although they can go up to 100 µm in diameter ; - **Elemental compositions of GSR : GSR** particles can be organized in three classes according to their elemental composition : • **Characteristic GSR :** Particles having the morphology of **GSR** particles and one of the following elemental compositions : • Lead, antimony, barium (**PbSbBa**). • **Consistent GSR** : Particles having the morphology of **GSR** particles and one of the following elemental compositions : • Lead, barium, calcium, silicon (**PbBaCaSi**) ; • Barium, calcium, silicon (**BaCaSi**) ; • Antimony, barium(**SbBa**) ; • Lead, antimony (**PbSb**) ; • Barium, aluminum (**BaAl**) ; • Lead, barium (**PbBa**). • **Commonly associated particles** : Particles having the morphology of **GSR** particles and one of the following elemental compositions • Lead (**Pb**) ; • Antimony (**Sb**) ; • Barium (**Ba**). **Reference : ASTM E 1588-20.**
p20242078	W033	A positive GSR sample has characteristic pGSR particle(s). A characteristic pGSR particle is spheroidal in shape and contains barium, antimony, and lead.
p20242079	W033	A spheroidal particle containing the elements barium, antimony, and lead.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242080	W033	A positive GSR sample contains characteristic primer Gunshot Residue particle(s). A characteristic primer gunshot residue particle is spheroidal in shape and contains Antimony, Barium and Lead.
p20242081	W053	• the application of a validated and calibrated SEM/EDS system; • the aplication of Standard Operating Procedures; • the application of ASTM-E1588 Standard Practice for GSR analysis by SEM/EDS as a guideline for the classification of particles; • annual instrument check (maintenance) by the manufacturer; • weekly analysis of a control stub (profiency test sample with known particle layout, count, size and elemental composition); • monthly sampling and analysis of instrument and workstation to check background levels of particles and monitor potential contamination; • a blank stub is included during each measurement; • the analysis results of the automated measurements are manually confirmed by a qualified investigator; their results are then checked by a second qualified investigator; • a GSR sample will be marked as 'positive' (in the report a different expression will be used) if at least one characteristic (PbBaSb, GdZnTi or GaCuSn) particle is present.
p20242082	W130	In order for a particle to be considered characteristic of pGSR: a. The reacquired particle must exhibit a morphology and elemental composition as listed in ASTM E1588 (most current version at time of analysis). NOTE: In general, the particle should appear that it was at one point molten and contain Pb, Sb, and Ba. One of those three elements (Pb, Sb, or Ba) is required to be a major contributor to the elemental composition. b. Characteristic elements must meet identification criteria as described in the X-ray Fluorescence Spectrometer chapter in the Quality Control Manual NOTE: The labeling of other elements on instrumental data does not denote that the element has been identified or indicated, unless otherwise noted.
p20242085	W069	A positive finding for the presence of particles characteristic of gunshot primer residue shall occur with the automatic identification and subsequent user confirmation of at least one Pb-Ba-Sb particle exhibiting characteristic GSR morphology and supported by a sufficient number of automatically identified one or two component GSR supporting particles (Pb, Ba, Sb, Pb-Ba, Pb-Sb and/or Ba-Sb) in the remaining particle population.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242086	W069	Positive (3-component particles) - characteristic of GSR A positive finding for the presence of particles characteristic of gunshot primer residue shall occur with the automatic identification and subsequent user confirmation of at least one Pb-Ba-Sb particle exhibiting characteristic GSR morphology and supported by a sufficient number of automatically identified one or two-component GSR supporting particles (Pb, Ba, Sb, Pb-Ba, Pb-Sb and/or Ba-Sb) in the remaining particle population. The particle population should NOT contain: •major levels of iron (indicates particles consistent with brake lining) •major levels of aluminum and magnesium in a single particle (indicates particles consistent with fireworks) •major levels of copper and cobalt (indicates particles consistent with airbags)
p20242087	W116	Microscopic particles containing all three elements lead, barium and antimony with a molten appearance.
p20242088	W025	One (1) particle containing the elements Pb, Ba and Sb with a spherical or irregular, non-crystalline morphology.
p20242089	W025	One (1) particle containing the elements Pb, Ba and Sb with a spherical or irregular, non-crystalline morphology.
p20242093	W083	A positive conclusion for the presence of GSR will be reported when the population of particles on the sample contains particles characteristic of GSR.
p20242094	W017	In-house positive GSR sampling stub
p20242095	W017	In-house GSR Standard tagged with Yb Cupper Standard GSR Negative Control Background control
p20242097	W035	Particles must contain the elements of Lead (Pb), Barium (Ba) and Antimony (Sb) and have the correct morphology (rounded, molten and/or looking heat treated) in order to be positively identified as characteristic of Primer Gunshot Residue. The population of particles must also NOT contain elements that would indicate that it originated from a source other than the discharge of a firearm.
p20242101	W147	Particles considered characteristic of gunshot residue are particles that contain the elements lead, barium, and antimony.
p20242102	W147	Particles considered characteristic of gunshot residue are particles that contain the elements lead, barium, and antimony.
p20242103	W117	All gunshot residue particles must have a non-crystalline morphology. Characteristic particles contain: Lead, Antimony, and Barium or Lead, Antimony, Barium, and Tin. Other additional components may be present in the particles from the primer composition, other ammunition components, or from the firearm itself.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242104	W084	A positive result is reported when at least one characteristic GSR particle containing lead-barium-antimony is confirmed meeting the criteria for elemental compostion, morphology and there are no indication of a source other than a firearm. For cases involving lead free/clean, non-toxic, foregin, or other unusual ammunitions, a careful assessment of particle population as well as an examination of the primer from the case ammunition (or similar) will be necessary in order to conclude GSR is present.
p20242105	W051	1. A positive control, which is a sample known to contain gunshot residue particles (GSR), is examined for each batch run after the performance check and threshold setting of the system are performed. This is to verify that the automated run is properly set up for the detection of GSR particles, thus eliminating a false negative. 2. A negative control, which is a sample known to not contain GSR particles, is examined for every batch run. This is to verify that the examination procedure does not introduce GSR particles (i.e. contamination) onto the samples to be examined for GSR particles, thus eliminating a false positive. For this test, the stub marked “Item 3” was used as the negative control. 3. Manual review is performed for the positive control and the samples in each batch run to verify the results of the automated analysis.
p20242106	W016	A particle characteristic of gunshot primer residue is a microscopic, molten particle that contains the elements lead, barium and antimony.
p20242108	W076	At least one particle characteristic of primer gunshot residue confirmed. A particle characteristic of primer gunshot residue must contain the chemical elements antimony (Sb), barium (Ba) and lead (Pb).
p20242109	W076	At least one characteristic primer gunshot residue particle confirmed. A characteristic primer gunshot residue particle must contain the elements of antimony (Sb), barium (Ba), and lead (Pb).
p20242110	W076	A positive finding includes confirming at least one particle characteristic of GSR containing antimony, barium and lead.
p20242111	W126	For sinoxid type, particles must have appropriate elemental composition and morphology. For any other types we would require a reference sample of the primer.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242112	W141	A portion of the Plano standard is used as the positive control that is run at the beginning and end of the sample set. One characteristic particle will be revisited, verified, and documented for the case file. On cases where no particles require manual scanning, it is not necessary to manually confirm a characteristic particle. The positive control at the end of the run should be consistent in detection with the positive control at the beginning of the run to show beam stability throughout the run. Consistency is based on analyst discretion. If the positive control becomes inconsistent, the analyst should contact the technical leader, perform a maintenance check and/or contact the manufacturer depending on the maintenance check result. The run shall have a negative control which is the collection stub exposed to the same environmental conditions within the lab as the sample stubs being analyzed. The negative control must be free of characteristic primer gunshot residue particles. If characteristic pGSR is present, the analyst should contact the technical leader. Each sampling stub shall be labeled in such a manner that it is distinguishable from other stubs within that sample set to ensure correct return to its appropriate holder. Once the run is completed, both the positive and negative controls are checked by the analyst. The morphology of GSR related particles should indicate formation at highly elevated temperatures (globular). Particles that are angular or crystalline in nature shall be rejected. Particles classified as characteristic of GSR have elemental compositions of lead, antimony, and barium. Particles classified as consistent with GSR have elemental compositions containing a combination of two of the three elements: lead, antimony, and barium. If tri-component particles are found on a stub, manual re-examination may be discontinued after four particles have been confirmed. Consistent particles are reported at the discretion of the analyst upon consideration of the presence of less than four characteristic particles and upon consideration of the quantity of consistent particles.
p20242113	W185	ASTM E 1588-17
p20242114	W042	ASTM E-1588

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242115	W070	Particles that are confirmed to be characteristic of gunshot primer residue must contain the three elements antimony, barium, and lead. In the total population of suspected particles, multiple (two or more) particles with all three elements must be present in order to determine that the individual or item is associated with a firearm discharge. Alternatively, the presence of one three-component particle and one (or more) two-component particle(s) constitutes the same interpretation. Particles confirmed to be consistent with gunshot primer residue must contain two of the three elements referenced above. Multiple (two or more) of these particles must be present in order to determine that the individual or item may be associated with a firearm discharge. If only one particle, whether it be two-component or three-component, is confirmed on a sample, no interpretation can be rendered. All particles shall have morphology consistent with a high temperature vapor condensing into solid droplets. The size of these particles is irrelevant but tends to range from approximately 0.3 to 100+ micrometers. In addition to the guidelines set above, the presence of certain elements may preclude a particle from being considered as GSR. Particles that don't meet these criteria will not be considered gunshot primer residue. In addition to the guidelines set above, the presence of certain elements may preclude a particle from being considered GSR. Particles that don't meet these criteria will not be considered gunshot primer residue.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242116	W070	Particles that are confirmed to be characteristic of gunshot primer residue must contain the three elements antimony, barium, and lead. In the total population of suspected particles, multiple (two or more) particles with all three elements must be present in order to determine that the individual or item is associated with a firearm discharge. Alternatively, the presence of one three-component particle and one (or more) two component particle(s) constitutes the same interpretation. Particles confirmed to be consistent with gunshot primer residue must contain two of the three elements referenced above. Multiple (two or more) of these particles must be present in order to determine that the individual or item may be associated with a firearm discharge. If only one particle, whether it be two-component or three-component, is confirmed on a sample, no interpretation can be rendered. If, for example, clothing from one individual or samples from one vehicle are separated into multiple exhibits, findings must be individually reported but may be cumulatively interpreted. All particles shall have morphology consistent with a high temperature vapor condensing into solid droplets. The size of these particles is irrelelvant but tends to range from approximately 0.3 to 100+ microns. In addition to the guidelines set above, the presence of certain elements may preclude a particle from being considered as GSR Particles that don't meet these criteria will not be considered gunshot primer residue.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242117	W070	Particles that are confirmed to be characteristic of gunshot primer residue must contain the three elements antimony, barium, and lead. In the total population of suspected particles, multiple (two or more) particles with all three elements must be present in order to determine that the individual or item is associated with a firearm discharge. Alternatively, the presence of one three-component particle and one (or more) two-component particle(s) constitutes the same interpretation. Particles confirmed to be consistent with gunshot primer residue must contain two of the three elements referenced above. Multiple (two or more) of these particles must be present in order to determine that the individual or item may be associated with a firearm discharge. If only one particle, whether it be two-component or three-component, is confirmed on a sample, no interpretation can be rendered. All particles shall have morphology consistent with a high temperature vapor condensing into solid droplets. The size of these particles is irrelevant but tends to range from approximately 0.3 to 100+ micrometers. In addition to the guidelines set above, the presence of certain elements may preclude a particle from being considered as GSR. Particles that don't meet these criteria will not be considered gunshot primer residue.
p20242118	W098	At least one particle comprised of lead, barium, and antimony with molten morphology.
p20242119	W098	One characteristic gunshot primer residue particle that consists of Pb, Sb, Ba and has a molten morphology.
p20242120	W098	Confirmation of at least one characteristic pGSR particle (Ba, Pb, and Sb + Morphology) = positive GSR sample
p20242122	W098	A positive GSR sample will have at least one characteristic pGSR particle which contains Pb, Sb, Ba and has a molten morphology.
p20242123	W225	1. Positive control: Identification of 10 GSR particules in the ENFSI standard before the analysis of the case 2.Negative controls: 0 GSR particules in the sample chamber and enviromental controls after the analysis of the case. ASTM 1588-20 Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry
p20242124	W055	For hand samples, a postive GSR result requires the confirmation of 4 particles containing Antimony, Barium, and Lead. For samples from clothing, a positive GSR result requires the confirmation of 1 particle containing Antimony, Barium, and Lead.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242125	W055	Cu calibration check before run, resolution must be less than 150 eV. Positive control ran before and after sample. Lab blank ran with each run, must be free of particles characteristic of primer gunshot residue. "Positive" for GSR must have 4 or more characteristic particles present on a sample from the hands. If 1, 2, or 3 are confirmed, the sample is considered "insignificant". If none are confirmed, the sample is considered "negative".
p20242126	W055	Mn calibration check before run, resolution must be less than 150 eV. Positive control ran before and after sample. Lab blank ran with each run, must be free of particles characteristic of primer gunshot residue. "Positive" for GSR must have 4 or more characteristic particles present on a sample from the hands. If 1, 2, or 3 are confirmed, the sample is considered "insignificant". If none are confirmed, the sample is considered "negative".
p20242127	W055	EDS detector calibrated with Cu standard. PLANO synthetic GSR standard used as positive control - must find at least 25 3comp particles, 1 of which is submicron. Pre and Post Run. Negative Control - unused stub, no 3comp particles detected. Classifications as characteristic of pGSR - morphology and elemental composition consistent with current version of ASTM E1588. Each particle must contain Pb, Ba, and Sb. Additional elements allowable consistent with ASTM E1588. For a sample set collected from hands of single individual to be considered positive for pGSR, it must possess at least 4 individual particles that are characteristic of pGSR. Confirmation of 1-3 particles characteristic of pGSR results in an inconconclusive result/report wording.
p20242129	W037	a single particle containing lead, barium, and antimony with the appropriate morphology
p20242130	W037	A single particle must contain Lead/Barium/Antimony with the appropriate morphology.
p20242131	W037	A single particle containing Lead, Barium, and Antimony with appropriate morphology.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242132	W056	The criteria for confirmation are Elemental Composition by EDS (Primary) and Morphology by either the SED or the BSD (Secondary). **Primary - Elemental Composition** Particles with composition “Characteristics” of GSPR - Are to be concluded as a positive GSPR sample: Lead, antimony, barium (Pb-Sb-Ba) Gadolinium, titanium, zinc (Gd-Ti-Zn German Police Characteristic)* Gallium, copper, tin (Ga-Cu-Sn German Police Characteristic)* * These particles are not actively searched in the automated run on the PSEM Particles with composition “Consistent” with GSPR Lead, barium, calcium, silicon, tin (Pb-Ba-Ca-Si-Sn Lead, barium, calcium, silicon (Pb-Ba-Ca-Si) Barium, calcium, silicon (Ba-Ca-Si) with trace of sulfur Antimony, barium (Ba-Sb) may have trace iron or sulfur Lead, antimony (Pb-Sb) Barium, aluminum (Ba-Al) in the absence of sulfur Lead, barium (Pb-Ba) “Consistent” particles from “Lead Free” ammunition (non-toxic, sintox, leadless, clean) Titanium, zinc (Ti-Zn) may include copper, tin, silicon, calcium and aluminum Strontium (Sr) Allowable element list. The “characteristic” and “consistent” particles above may contain one or more of the following elements: - Silicon - Calcium - Aluminum - Copper - Iron (minor) - Phosphorus - Sulfur (minor) - Potassium - Chlorine - Tin - Zinc - Zirconium (trace) - Sodium (in the presence of chlorine) - Nickel (in conjunction with Cu and Zn) **Secondary - Morphology** The majority of GSPR particles are spherical. These spheroidal particles can be solid or hollow, and vary in size from 0.3um to 5.0um in diameter. GSPR particles can also be irregular in shape and can range in size up to 100+um. Certain ammunition produces particles favoring or dis-favoring a particular morphology. However, crystalline morphology is inconsistent with the mechanism of GSPR formation.

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242133	W056	The criteria for confirmation are Elemental Composition by EDS (Primary) and Morphology by either the SED or the BSD (Secondary). Primary-Elemental Composition. -Particles with composition "Characteristics" of GSPR: Lead, antimony,barium (Pb-Sb-Ba) Secondary- Morphology -The majority of GSPR particles are spherical. These spherodial particles can be solid, hollow, and vary in size from 0.3um to 5.0um in diameter. -GSPR particles can also be irregular in shape and can range in size up to 100=um.
p20242134	W056	CRITERIA FOR CONFIRMATION: Primary - Elemental Composition by EDS Secondary – Morphology by either the SED or the BSD PRIMARY – ELEMENTAL COMPOSITION: Particles with composition “Characteristics” of GSPR - Are to be concluded as a positive GSPR sample: Lead, antimony, barium (Pb-Sb-Ba) Gadolinium, titanium, zinc (Gd-Ti-Zn German Police Characteristic)* Gallium, copper, tin (Ga-Cu-Sn German Police Characteristic) Particles with composition “Consistent” with GSPR Lead, barium, calcium, silicon, tin (Pb-Ba-Ca-Si-Sn) Lead, barium, calcium, silicon (Pb-Ba-Ca-Si) Barium, calcium, silicon (Ba-Ca-Si) with trace of sulfur Antimony, barium (Ba-Sb) may have trace iron or sulfur Lead, antimony (Pb-Sb) Barium, aluminum (Ba-Al) in the absence of sulfur Lead, barium (Pb-Ba) “Consistent” particles from “Lead Free” ammunition (non-toxic, sintox, leadless, clean) Titanium, zinc (Ti-Zn) may include copper, tin, silicon, calcium and aluminum Strontium (Sr) Allowable element list. The “characteristic” and “consistent” particles above may contain one or more of the following elements:

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242134 (Cont.)	W056	Silicon Calcium Aluminum Copper Iron (minor) Phosphorus Sulfur (minor) Potassium Chlorine Tin Zinc Zirconium (trace) Sodium (in the presence of chlorine) Nickel (in conjunction with Cu and Zn) SECONDARY – MORPHOLOGY: The majority of GSPR particles are spherical. These spheroidal particles can be solid or hollow, and vary in size from 0.3um to 5.0um in diameter. GSPR particles can also be irregular in shape and can range in size up to 100+um. Certain ammunition produces particles favoring or dis-favoring a particular morphology. However, crystalline morphology is inconsistent with the mechanism of GSPR formation. ELEMENTAL IDENTIFICATION: Lead (Pb) Atomic number 82 The Mα1 and Lα1 peaks must be present Mα1 = 2.342Kev (±0.03Kev) Lα1 = 10.548Kev (±0.03Kev) Lβ1 = 12.610Kev (±0.03Kev) k-Ratio rough quant for Pb must be equal or greater than 5% Antimony (Sb) Atomic number 51 The Lα1, Lβ1 and Lβ2 peaks must be present Lα1 = 3.603Kev (±0.03Kev) Lβ1 = 3.842Kev (±0.03Kev) Lβ2 = 4.099Kev (±0.03Kev) Lγ1 = 4.347Kev (±0.03Kev) k-Ratio rough quant for Sb must be equal or greater than 5%

UTIC	Webcode	Quality Assurance Criteria for an identification of a positive GSR sample
p20242134 (Cont.)	W056	Barium (Ba) Atomic number 56 The Lα1, Lβ1 and Lβ2 peaks must be present Lα1 = 4.464Kev (±0.03Kev) Lβ1 = 4.826Kev (±0.03Kev) Lβ2 = 5.155Kev (±0.03Kev) Lγ1 = 5.531Kev (±0.03Kev) k-Ratio rough quant for Ba must be equal or greater than 5%
p20242135	W084	A positive result is reported when at least one characteristic GSR particle containing lead-barium-antimony is confirmed that meets the lab's criteria for elemental composition, morphology and particle population and there are no indications of a source other than a firearm. Particles in this category are reported as particles “characteristic of GSR” or “characteristic GSR particles”. While GSR examinations are not quantitative, and the number of particles confirmed cannot be used to determine the source of any GSR particles detected, the number of characteristic GSR particles confirmed during testing is included in the lab report per current ASTM reporting recommendations. For cases involving lead free/clean, non-toxic, foreign, or other unusual ammunitions, a careful assessment of particle population as well as an examination of the primer from the case ammunition (or similar) will be necessary in order to conclude GSR is present.
p20242137	W248	The presence of particles that fulfill the criteria of the chemical content and morphology of GSR. Moreover, in the period of analysis of Items 1 - 3 SEM-EDX system was checked with the use of Quodata synthetic sample GSR2024 as well as known real GSR sample and was found to work correctly.

5) Were gunshot residue particles detected on Item 1 according to your quality assurance criteria from Question 4 (e.g. ASTM 1588-20 Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry)?

A) ☐ Yes

B) ☐ No

C) ☐ Inconclusive

6) Were gunshot residue particles detected on Item 2 according to your quality assurance criteria from Question 4 (e.g. ASTM 1588-20 Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry)?

A) ☐ Yes

B) ☐ No

C) ☐ Inconclusive

UTIC	Webcode	Were gunshot residue particles detected on Item 1?	Were gunshot residue particles detected on Item 2?
p20242001	W031	No	No
p20242002	W024	No	No
p20242003	W119	No	No
p20242004	W119	No	No
p20242005	W061	No	No
p20242006	W061	No	No
p20242007	W061	No	No
p20242008	W061	No	No
p20242010	W133	No	No
p20242011	W133	No	No
p20242013	W023	No	No
p20242015	W138	No	No
p20242016	W179	No	No
p20242018	W230	No	No
p20242019	W009	No	No
p20242020	W028	No	No
p20242021	W028	No	No
p20242022	W028	No	No
p20242023	W263	No	No
p20242024	W265	No	Inconclusive
p20242025	W040	No	No
p20242027	W144	No	No
p20242028	W144	No	No
p20242029	W144	No	No
p20242030	W144	No	No
p20242031	W193	No	No
p20242032	W143	No	No
p20242033	W143	No	No
p20242034	W181	No	No
p20242035	W246	Yes	Yes
p20242036	W170	No	Yes
p20242037	W170	No	Yes
p20242038	W170	No	Yes
p20242039	W170	No	Yes
p20242040	W170	No	Yes
p20242041	W132	No	No
p20242042	W160	No	No

UTIC	Webcode	Were gunshot residue particles detected on Item 1?	Were gunshot residue particles detected on Item 2?
p20242043	W153	No	No
p20242044	W088	No	No
p20242045	W088	No	No
p20242046	W088	No	No
p20242047	W034	No	No
p20242053	W079	No	No
p20242054	W079	No	No
p20242055	W114	No	No
p20242056	W114	No	No
p20242057	W114	No	No
p20242058	W114	No	No
p20242059	W114	No	No
p20242060	W250	No	No
p20242061	W158	No	No
p20242062	W158	No	No
p20242063	W158	No	No
p20242065	W110	No	No
p20242066	W110	No	No
p20242068	W082	No	No
p20242069	W251	No	No
p20242070	W012	No	No
p20242072	W059	No	No
p20242073	W001	No	No
p20242075	W005	No	No
p20242076	W066	No	No
p20242077	W209	No	No
p20242078	W033	No	No
p20242079	W033	No	No
p20242080	W033	No	No
p20242081	W053	No	Inconclusive
p20242082	W130	No	No
p20242085	W069	No	No
p20242086	W069	No	No
p20242087	W116	No	No
p20242088	W025	No	No
p20242089	W025	No	No
p20242093	W083	No	No
p20242094	W017	No	No
p20242095	W017	No	No
p20242097	W035	No	No
p20242101	W147	No	No
p20242102	W147	No	No

UTIC	Webcode	Were gunshot residue particles detected on Item 1?	Were gunshot residue particles detected on Item 2?
p20242103	W117	No	No
p20242104	W084	No	No
p20242105	W051	No	No
p20242106	W016	No	No
p20242108	W076	No	No
p20242109	W076	No	No
p20242110	W076	No	No
p20242111	W126	No	No
p20242112	W141	No	No
p20242113	W185	No	No
p20242114	W042	No	No
p20242115	W070	No	No
p20242116	W070	No	No
p20242117	W070	No	No
p20242118	W098	No	No
p20242119	W098	No	No
p20242120	W098	No	No
p20242122	W098	No	No
p20242123	W225	Inconclusive	No
p20242124	W055	No	No
p20242125	W055	No	No
p20242126	W055	No	No
p20242127	W055	No	No
p20242129	W037	No	No
p20242130	W037	No	No
p20242131	W037	No	No
p20242132	W056	No	Inconclusive
p20242133	W056	No	Inconclusive
p20242134	W056	No	Inconclusive
p20242135	W084	No	No
p20242137	W248	No	No

7) How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court). In order to maintain confidentiality, please refrain from including identifying information specific to your laboratory.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242001	W031	ITEMS: 1 a sealed manila envelope identified as "FTS FORENSIC TESTING SERVICES FTS-24-GSR UTIC p20242001" containing: 1-1 an adhesive lift sealed in a manila envelope identified as "FTS FORENSIC TESTING SERVICES FTS-24-GSR Item 1 p20242001" 1-2 an adhesive lift sealed in a manila envelope identified as "FTS FORENSIC TESTING SERVICES FTS-24-GSR Item 2 p20242001" 1-3 an adhesive lift sealed in a manila envelope identified as "FTS FORENSIC TESTING SERVICES FTS-24-GSR Item 3 p20242001" RESULTS: The manila envelopes, items #1-1, #1-2, and #1-3, each contained an adhesive lift labeled, "Suspect A," "Suspect B," and "Control" respectively. The particles on the adhesive lifts were analyzed by scanning electron microscopy energy dispersive x-ray spectrometry (SEM-EDS) and assessed by their elemental constituents and morphology for particles characteristic of or consistent with primer gunshot residue (pGSR). Characteristic pGSR particles contain all three elements: lead, barium, and antimony. Typically, consistent pGSR particles contain two of these three elements. No particles confirmed as either characteristic of or consistent with pGSR were detected on the lift from Suspect A, item #1-1. There is no indication that Suspect A had any association with the discharge of a firearm. However, the absence of pGSR particles does not prove that a person did not discharge a firearm. It is possible that Suspect A did discharge a firearm, but that pGSR particles were not deposited, were removed by activity, or were not detected. No particles confirmed as either characteristic of or consistent with pGSR were detected on the lift from Suspect B, item #1-2. There is no indication that Suspect B had any association with the discharge of a firearm. However, the absence of pGSR particles does not prove that a person did not discharge a firearm. It is possible that Suspect B did discharge a firearm, but that pGSR particles were not deposited, were removed by activity, or were not detected. No particles confirmed as either characteristic of or consistent with pGSR were detected on the lift from the Control, item #1-3.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242002	W024	Analysis of Item 1 did not detect the presence of gunshot primer residue, therefore, it could not be determined if Suspect A had been exposed to an environment of gunshot primer residue. Analysis of Item 2 did not detect the presence of gunshot primer residue, therefore, it could not be determined if Suspect B had been exposed to an environment of gunshot primer residue. Analysis of Item 3 did not detect the presence of gunshot primer residue. The absence of gunshot primer residue may result from any of the following: • The test subject did not discharge a firearm nor was the test subject in the immediate vicinity of a discharged firearm. • The test subject was exposed to an environment of GSR, but the GSR was removed prior to sampling. • The test subject was exposed to an environmnet of GSR, GSR was deposited on the test subject but not where sampling occurred. • The test subject was exposed to an environment of GSR, but no GSR deposited on the test subject.
p20242003	W119	Conclusions: Items 1-3 were analyzed using Scanning Electron Microsocpy/Energy Dispersive Spectrometry. Item 1 No P-GSR-related particles were detected. Item 2 No P-GSR-related particles were confirmed. Item 3 No P-GSR-related particles were detected. Note: P-GSR can be deposited from the discharge of a firearm, having been in the vicinity of a firearm when it was discharged, or from having contacted a surface bearing primer gunshot residue. Particles consistent with P-GSR and single-component particles are found in P-GSR but may also originate from other sources. The absence of P-GSR does not eliminate the possibility that the subject may have handled or discharged a firearm.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242004	W119	**Item Description** 1 One sealed manila envelope, labeled to contain “Item 1 – Carbon taped SEM stub sample from the hands of Suspect A,” holding one collection stub 2 One sealed manila envelope, labeled to contain “Item 2 – Carbon taped SEM stub sample from the hands of Suspect B,” holding one collection stub 3 One sealed manila envelope, labeled to contain “Item 3 – GSR negative control carbon taped SEM stub,” holding one collection stub **Analysis:** The samples were placed into the chamber of a scanning electron microscope, equipped with an automated stage, backscattered electron (BSE) detector, and an energy dispersive spectrometer (EDS) with an automated Gunshot Residue (GSR) analysis software package. Lead (Pb), antimony (Sb), and barium (Ba) are elements commonly found in the primer mixtures of ammunition cartridges. When these three elements combine into a single particle, the particle is defined as being characteristic of Primer GSR (P-GSR), barring elemental tags from other sources. Particles containing two of these three elements with high-temperature or “molten-type” morphology are classified as consistent with P-GSR. Particles containing only one of these elements are classified as single component particles. The software program is set to scan the samples for particles containing lead (Pb), antimony (Sb), or barium (Ba). When a particle containing these elements is detected, an image of the particle, the elemental composition and particle coordinate data are automatically stored. These particles are then manually relocated and confirmed by the analyst. **Results:** Item 1 – Suspect A: No P-GSR-related particles were detected. Item 2 – Suspect B: No P-GSR-related particles were confirmed. Item 3 – Negative Control: No P-GSR-related particles were detected. **Notes:** P-GSR can be deposited from the discharge of a firearm, having been in the vicinity of a firearm when it was discharged, or from having made contact with a surface bearing P-GSR. Particles consistent with P-GSR and single-component particles are found in P-GSR but may also originate from other sources. The absence of P-GSR does not eliminate the possibility that the subject may have handled or discharged a firearm.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242005	W061	Based on the examinations performed, the associated case context as I understand it, and my knowledge and experience as a GSR examiner, in my opinion: The GSR evidence **does not support** the proposition that the samples collected from the hands of Suspect A has had a firearm association. The GSR evidence **does not support** the proposition that the samples collected from the hands of Suspect B has had a firearm association. The absence of particles characteristic and indicative of GSR does not necessarily preclude the items from having had a firearm association, as this finding may be the result of: a - No GSR being deposited during a firearm association. b - GSR being deposited, but outside the areas that were sampled. c - GSR being deposited, but subsequently being removed or redistributed prior to sampling. d - The random sampling process not collecting any GSR that had been deposited in on the item. e - GSR being present on the sample at levels below the limit of detection of the instrumentation used in this examination. In isolation, a GSR examination cannot differentiate between which one or combination of the above scenarios is responsible for the analytical findings.
p20242006	W061	No gunshot residue was detected on the sample submitted as a negative control (Item #3). No gunshot residue was detected on the sample collected from the hands of Suspect A (Item #1). It was noted that Item #1 appeared very clean, with a very low total number of particles detected during the automatic detection sequence. No gunshot residue was detected on the sample collected from the hands of Suspect B (Item #2).
p20242007	W061	I formed the opinion based on the technique used, that no GSR particles were detected on any of the GSR stubs (items 1, 2 and 3).

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242008	W061	Item 1: No particles that could be attributed to GSR were detected on the sample taken from the hands of Suspect A. Item 2: No particles that could be attributed to GSR were detected on the sample taken from the hands of Suspect B. Item 3: No particles that could be attributed to GSR were detected on the negative control sample. The absence of GSR on a person, their clothing or other object may be due to: -The person not having discharged a firearm. -The person or object not having been exposed to a firearm when it was discharged. -The person or object not having made physical contact with a surface that had GSR on it. However, the absence of GSR does not eliminate an individual as having discharged a firearm or being near a firearm when it was discharged, as non-detection of GSR could be the result of: -GSR that had been on the person or their clothing had been lost prior to sampling because of washing or other physical activity. -GSR that had been on a surface that was sampled had been lost prior to sampling because of environmental conditions such as rain or wind. -The firearm involved had been of a type that does not eject significant amounts of GSR. -The ammunition involved produces GSR of a type that is not readily detected using SEM-EDS. -A physical barrier between the firearm and the surface that was sampled at the time of discharge had prevented GSR depositing onto the surface (for example, the shooter's hands had been gloved). -A material, such as blood or debris, that may have hindered either or both the sampling and analysis process. -GSR that had been on the surface was not collected during the sampling procedure.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242010	W133	No microscopic particles containing any combination of lead, barium or antimony were detected on the Hands of Suspect A. It is indeterminate if Suspect A discharged a firearm, handled a discharged firearm or was in close proximity to a discharging firearm. No microscopic particles containing any combination of lead, barium or antimony were detected on the Hands of Suspect B. It is indeterminate if Suspect B discharged a firearm, handled a discharged firearm or was in close proximity to a discharging firearm. No microscopic particles containing any combination of lead, barium or antimony were detected on the Negative Control in Item 1-3.
p20242011	W133	**RESULTS AND CONCLUSIONS:** Item 1-1: No microscopic particles containing any combination of lead, barium or antimony were detected on the GSR sampling device labeled "Item 1" in Item 1-1. It is indeterminate if Suspect A discharged a firearm, handled a discharged firearm or was in close proximity to a discharging firearm. Item 1-2: No microscopic particles containing any combination of lead, barium or antimony were detected on the GSR sampling device labeled "Item 2" in Item 1-2. It is indeterminate if Suspect B discharged a firearm, handled a discharged firearm or was in close proximity to a discharging firearm. Item 1-3: No microscopic particles containing any combination of lead, barium or antimony were detected on the GSR sampling device labeled "Item 3" in Item 1-3. It is indeterminate if the Negative Control came in contact with a discharged firearm or was in close proximity to a discharging firearm.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242013	W023	No primer gunshot residues were detected on Items 1 and 2. The absence of primer gunshot residue may occur because the subject may not have discharged a firearm, or may have discharged a firearm, but no primer gunshot residues were deposited on the sampled area, or may have discharged a firearm; however, the primer gunshot residues were removed by washing, wiping, or other activity before the samples were collected. No primer gunshot residues were detected on Item 3. The absence of primer gunshot residue may occur because the sampled surface may not have been in the vicinity of a firearm when it was discharged, or may have been in the vicinity of a firearm when it was discharged, but no primer gunshot residues were deposited on the sampled area, or the primer gunshot residues were removed by washing, wiping, or other activity before the samples were collected.
p20242015	W138	**Summary** No gunshot residue (GSR) particles were detected on the sample stub associated with Suspect A (Item 1). No GSR particles were detected on the sample stub associated with Suspect B (Item 2). The presence of GSR may occur for the following reasons: • The subject may have discharged a firearm or been in the vicinity of a firearm discharge • The subject may have handled a firearm or ammunition • The subject may have been in contact with a surface bearing GSR The absence of GSR may occur for the following reasons: • The subject did not discharge a firearm • The subject may have discharged a firearm, but no GSR particles were on the sampled area • GSR particles were removed by washing, wiping, or other activity before samples were collected GSR analysis does not determine whether or not an individual discharged a firearm. The sample stubs were analyzed via Scanning Electron Microscopy (SEM) / Energy Dispersive Spectroscopy (EDS).
p20242016	W179	No characteristic GSR particles were detected on the submitted items (item1, item 2 and item 3)
p20242018	W230	From the analysis using Scanning Electron Microscope (SEM) and Energy Dispersive X-Ray Spectroscopy (EDS) techniques on evidence items 1 to 3, the following findings were made: No particles characteristic of gunshot residue were found on items 1, 2, and 3.

<table>
<tr><th>UTIC</th><th>Webcode</th><th>How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).</th></tr>
<tr><td>p20242019</td><td>W009</td><td>Purpose
The items were examined to determine whether gunshot residue (GSR) particles could be identified.

<table><tr><th>Item</th><th>Description</th><th>Results</th></tr><tr><td>1</td><td>Samples from the hands of Suspect A.</td><td>No GSR particles were identified.</td></tr><tr><td>2</td><td>Samples from the hands of Suspect B.</td><td>No GSR particles were identified.</td></tr><tr><td>3</td><td>Negative control.</td><td>No GSR particles were identified.</td></tr></table>
Notes
The absence of GSR particles is not proof that the person did not discharge a firearm.</td></tr>
<tr><td>p20242020</td><td>W028</td><td>Analysis by Scanning Electron Microscope with Energy Dispersive Spectrometer (SEM/EDS) of Item 1, taken from Suspect A, did not detect the presence of particles characteristic of gunshot residue. No conclusions can be made as to whether or not this individual discharged a firearm, was in the vicinity of a firearm discharge, or came in contact with an item with gunshot residue on it.

Analysis by Scanning Electron Microscope with Energy Dispersive Spectrometer (SEM/EDS) of Item 2, taken from Suspect B, did not detect the presence of particles characteristic of gunshot residue. No conclusions can be made as to whether or not this individual discharged a firearm, was in the vicinity of a firearm discharge, or came in contact with an item with gunshot residue on it.

Analysis by Scanning Electron Microscope with Energy Dispersive Spectrometer (SEM/EDS) of Item 3, negative control SEM stub, did not detect the presence of particles characteristic of gunshot residue.</td></tr>
<tr><td>p20242021</td><td>W028</td><td>Analysis by Scanning Electron Microscopy with Energy Dispersive Spectrometer (SEM/EDS) of Item 1, a carbon taped SEM stub sampled from the hands of Suspect A, did not detect the presence of particles characteristic of primer gunshot residue (pGSR). There is no indication that this individual came into contact with pGSR or was in the vicinity of a firearm during discharge. However, it is possible that the individual was exposed to pGSR, but that pGSR particles were not deposited, were removed by activity, were not collected, or were not detected.

Analysis by SEM/EDS of Item 2, a carbon taped SEM stub sampled from the hands of Suspect B, did not detect the presence of particles characteristic of pGSR. There is no indication that this individual came into contact with pGSR or was in the vicinity of a firearm during discharge. However, it is possible that the individual was exposed to pGSR, but that pGSR particles were not deposited, were removed by activity, were not collected, or were not detected.

Analysis by SEM/EDS of Item 3, a GSR Negative Control carbon taped SEM stub, did not detect the presence of particles characteristic of pGSR.</td></tr>
</table>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242022	W028	Analysis by Scanning Electron Microscope with Energy Dispersive Spectrometer (SEM/EDS) of Item 1, a carbon taped SEM stub sampled from the hands of Suspect A, did not detect the presence of particles characteristic of gunshot residue (GSR). There is no indication that this individual came into contact with GSR or was in the vicinity of a firearm during discharge. However, it is possible that the individual was exposed to GSR, but that GSR particles were not deposited, were removed by activity, were not collected, or were not detected. Analysis by SEM/EDS of Item 2, a carbon taped SEM stub sampled from the hands of Suspect B, did not detect the presence of particles characteristic of GSR. There is no indication that this individual came into contact with GSR or was in the vicinity of a firearm during discharge. However, it is possible that the individual was exposed to GSR, but that GSR particles were not deposited, were removed by activity, were not collected, or were not detected. Analysis by SEM/EDS of Item 3, a negative control (NC) carbon taped SEM stub, did not detect the presence of particles characteristic of GSR.
p20242023	W263	Item 1 – No characteristic GSR particles (Pb-Ba-Sb) found. Item 2 – No characteristic GSR particles (Pb-Ba-Sb) found. Item 3 – No characteristic GSR particles (Pb-Ba-Sb) found. Samples analyzed on three different instruments with similar results
p20242024	W265	No particles confirmed as either characteristic or consistent with GSR were detected on Item 1. Item 1 does not provide any indication that Suspect A had any association with the discharged of a firearm. However, the absence of GSR particles does not prove that a person did not discharge a firearm. If Suspect A did discharge a firearm, then the particles were removed by activity, were not deposited, or were not detected by the procedure. At least three consistent particles containing Ba Ca Si were confirmed on Item 2. Item 2 cannot be unambiguously interpreted as GSR due to the presence of unusual elements, S and Fe, in the particles. Certain lead-free ammunitions and applications unrelated to the discharge of firearm have similar compositions. Without something for comparison, e.g. recovered firearm or cartridge cases, a conclusion cannot be reached.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242025	W040	Item 1: Examined with scanning electron microscopy / energy dispersive X-ray detection. No particles characteristic of gunshot primer residue or indicative of gunshot primer residue were located on the sample labeled *from the hands of suspect A*. The absence of gunshot primer residue on the hands is suggestive of an individual not having discharged a firearm, not being near the discharge of a firearm, or not coming in contact with an object that has gunshot primer residue on it. However, due to the ease at which gunshot primer residue can be removed or lost from a surface, a negative result could also occur from circumstances such as: washing or other contact with hands, environmental factors such as wind and rain, the length of time between the gunshot primer residue deposition and the sample collection, and/or the firearm not producing traditional three element gunshot primer residue when discharged. Item 2: Examined with scanning electron microscopy / energy dispersive X-ray detection. No particles characteristic of gunshot primer residue or indicative of gunshot primer residue were located on the sample labeled *from the hands of suspect B*. The absence of gunshot primer residue on the hands is suggestive of an individual not having discharged a firearm, not being near the discharge of a firearm, or not coming in contact with an object that has gunshot primer residue on it. However, due to the ease at which gunshot primer residue can be removed or lost from a surface, a negative result could also occur from circumstances such as: washing or other contact with hands, environmental factors such as wind and rain, the length of time between the gunshot primer residue deposition and the sample collection, and/or the firearm not producing traditional three element gunshot primer residue when discharged.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242027	W144	RESULTS AND CONCLUSIONS: Under the methodology used for the determination of gunshot residues by SEM-EDS(*), the following was found: 1-In the sample identified as Item 1 NO particles of lead, barium and antimony were identified that can be categorized as gunshot residue particles. In the Negative Control (Item 3) binary or ternary particles with lead, barium and/or antimony were not detected.. 2-In the sample identified as Item 2 NO particles of lead, barium and antimony were identified that can be categorized as gunshot residue particles. In the Negative Control (Item 3) binary or ternary particles with lead, barium and/or antimony were not detected. Interpretation (*): 1. The absence of detectable gunshot residue on Item 1 sampled from the hands of suspect A is verified. The non-detection of residue could occur due to circumstances such as the person did not fired a firearm; the level of activity performed by the person (loss of residue); environmental factors such as rain and wind that cause the loss of gunshot residue; or the firearm not producing sufficient residue on the hands and clothing at the time of firing, among other factors. 2. The absence of detectable gunshot residue on Item 2 sampled from the hands of suspect B is verified. The non-detection of residue could occur due to circumstances such as the person did not fired a firearm; the level of activity performed by the person (loss of residue); environmental factors such as rain and wind that cause the loss of gunshot residue; or the firearm not producing sufficient residue on the hands and clothing at the time of firing, among other factors. (*) Forensic Test accredited by ANAB, under ISO/IEC 17025:2017 (the scope can be consulted at http://search.anab.org/)

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242028	W144	1.1 Under the methodology used to determine gunshot residues on hands, the following was found: 1.1.1 In the sample called **Item 1**, they were **NOT** detected binary or ternary particles with lead, barium and/or antimony that can be categorized as gunshot residue particles (See note 1). 1.1.2. In the sample designated as **Item 2**, they were **NOT** detected binary or ternary particles with lead, barium and/or antimony that can be categorized as gunshot residue particles. However, It was found three agglomerations of iron particles that form quasi-semicircles on the carbon ribbon (See Note 2). 1.1.3 In the negative control (Item 3) NO binary or ternary particles with lead, barium and antimony were detected, that can be categorized as gunshot residue particles. It was analyzed by duplicate since Item 1 and Item 2 were analyzed individually. **1.2 Interpretation:** 1.2.1 The absence of detectable gunshot residue is checked in the sample called as **Item 1, from the hands of Suspect A**. Non-detection of residues could occur due to circumstances such as the person not firing a firearm; hand washing/cleaning; use of gloves; profuse sweating; environmental factors such as rain and wind that cause waste loss shooting; abundant dirt on the hands (blood, dirt, etc.); normal physical activity within a period of 4 hours or more between the incident and the sampling; or that the weapon does not produce enough residue on the hands at the time of operation, among other factors. 1.2.2 The absence of detectable gunshot residue is checked in the sample called as **Item 2, from the hands of Suspect B**. Non-detection of residues could occur due to circumstances such as the person not firing a firearm; hand washing/cleaning; use of gloves; profuse sweating; environmental factors such as rain and wind that cause waste loss shooting; abundant dirt on the hands (blood, dirt, etc.); normal physical activity within a period of 4 hours or more between the incident and the sampling; or that the weapon does not produce enough residue on the hands at the time of operation, among other factors. Note 1: The provisions of the current protocol for the collection of gunshot residues in hands it not accomplish, since the sample collection form was not received, so the admissibility and exclusion criteria were not verified for the collection of samples. Note 2: The distribution of these particles indicates that sampling may did not been performed through palpations on the surfaces of interest (hands in this case).

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242029	W144	Results: 1. Samples were received for analysis of firearm residue on hands, the item 3 corresponds to the negative control, the item 1 correponds to samples from the hands of Suspect A and the item 2 correponds to samples from the hands of Suspect B, according to information provided in the FTS test form p20242029. The gunshot residue collection form in hands is not counted as it is an interlaboratory test. 2. Under the methodology used for the determination of gunshot residue in hands, the following was found: 2.1 In the sample called Item 1, they were NOT detected binary or ternary particles with lead, barium and/or antimony that can be categorized as gunshot residue particles. 2.2. In the sample designated as Item 2, they were NOT detected binary or ternary particles with lead, barium and/or antimony that can be categorized as gunshot residue particles. 2.3 In the negative control called Item 3, they were NOT detected binary or ternary particles with lead, barium and antimony were detected, that can be categorized as gunshot residue particles. 3. Interpretation: 3.1. The absence of detectable firearm firing residues is checked in the sample collected from the hands of **Suspect A (Item 1)**. Non-detection of residues could occur due to circumstances such as the person not operating a firearm; hand washing / cleaning; use of gloves; profuse sweating; environmental factors such as rain and wind that cause the loss of shot residues; abundant dirt on the hands (blood, dirt, etc.); normal physical activity within a period of 4 hours or more between the incident and the collection of samples; or that the weapon does not produce enough residue on the hands at the moment of the actuation, among other factors. 3.2. The absence of detectable firearm firing residues is checked in the sample collected from the hands of **Suspect B (Item 2)**. Non-detection of residues could occur due to circumstances such as the person not operating a firearm; hand washing / cleaning; use of gloves; profuse sweating; environmental factors such as rain and wind that cause the loss of shot residues; abundant dirt on the hands (blood, dirt, etc.); normal physical activity within a period of 4 hours or more between the incident and the collection of samples; or that the weapon does not produce enough residue on the hands at the moment of the actuation, among other factors.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242030	W144	Results and Conclusions Under the methodology used for the determination of gunshot residues, the following was found: 1. In the sample identified as ITEM 1 (see Note 1), NO binary or ternary particles with lead, barium and/or antimony (that can be categorized as gunshot residues particles) were detected. Neither were particles detected with barium and aluminum. 2. In the sample identified as ITEM 2 (see Note 1), NO binary or ternary particles with lead, barium and/or antimony (that can be categorized as gunshot residues particles) were detected. Neither were particles detected with barium and aluminum. 3. In the sample received as a control identified as ITEM 3 (see Note 1), NO binary or ternary particles were detected with lead, barium and antimony that can be categorized as gunshot residues particles. Neither were particles detected with barium and aluminum. 4. Interpretation: The absence of detectable gunshot residue in the samples ITEM 1 (from the hands of Suspect A) and ITEM 2 (from the hands of Suspect B) is consistent with individuals not having fired a weapon. This result does not eliminate the possibility that the suspects discharged firearms. A negative result could also occur from circumstances such as washing hands, wiping the hands, wearing gloves, sweating profusely, environmental factors including wind and rain, bloody hands, normal physical activity within four or more hours passing between firing and sampling, or the weapon not producing primer residue on the hands when discharged. Notes: The items received in this case does not correspond to the usual presentation of a kit for collecting samples for analysis of gunshot residues in hands by scanning electron microscopy and X ray microanalysis, according to the current protocol for the collection of gunshot residues on hands. The corresponding sample collection form not was received, so the criteria established for the admissibility and exclusion of samples were not verified. The samples were analyzed separately, each accompanied by the control received, because they correspond to samples from the hands of two different suspects.
p20242031	W193	On analysis, no gunshot residue was detected on the metal stubs Item 1 and Item 2.
p20242032	W143	Item 001-001: No particles containing Pb, Sb, or Ba were detected. Item 001-002: No particles classified as characteristic of or consistent with pGSR were confirmed. Item 001-003: No particles were detected.
p20242033	W143	Item 001-001 No particles containing Pb, Sb, or Ba were detected. Item 001-002 No particles classified as characteristic of or consistent with pGSR were confirmed.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242034	W181	In the SEM stub applied on the areas of Suspected 1 (Item #1), characteristic particles of gunshot residues were NOT found. In the SEM stub applied on the areas of Suspected 2 (Item #2), characteristic particles of gunshot residues were NOT found.
p20242035	W246	The gunshot residue (GSR) particles from PT sample were examined by Scanning Electron Microscope (Hitachi; FlexSEM1000) with Energy-Dispersive X-ray spectroscopy (EDAX; Element 30). The results showed that GSR particles which consisted of Ba, Sb, and Pb were found in Item#01 and Item#02 , while Item#03 served as a control sample without GSR particles. Regarding statement in GSR finding report, we state that “the amount of GSR particle of Item#01 was found 1 particle, which contained Pb, Sb, Ba, indicated that the Item#01 detected a low amount of GSR particles” and “the amount of GSR particles of Item#02 was found more than 4 particles, which contained Pb, Sb, Ba, indicated that the Item#02 detected a moderate amount of GSR particles”.
p20242036	W170	No gunshot residues metallic particles were found on Item # 1. A negative result may be due to one of the following factors: 1. The sampled person: • Did not shoot a firearm. • Did not handle a firearm. • Were not in close proximity to a gunshot. • Did not have contact with an object that has gunshot residue, among others. 2. The sample person could have shot, handled a firearm, or was in the vicinity of the shot, but the residues disappeared, as a result of one or more of the following factors: • Washed or rubbed hands. • Physical activity or sweating. • Use of a physical barrier to prevent gunshot residue from being deposited on the sampled surface, for example, the use of gloves. • The excessive presence of blood or dirt that can mask any gunshot residue in the sample. • Environmental factors such as wind or rain. • When a long time has passed between the shot and the sample taking, among others. Gunshot residues metallic particles were found on Item # 2. A positive result may be due to one or more of the following factors, that the sampled person: • Fired a firearm. • Manipulated a firearm. • Was in the vicinity of one or more shots. • Came into contact with an object that has gunshot residue. • It was hi by a firearm projectile and the sample was taken near the impact site. The scope of this technique is to determine the presence or absence of gunshot residue particles; it is not possible to establish the circumstances by which they reached the sample surface. The result of this report, when appreciated together with the other elements of evidence and/or knowledge, constitutes a contribution to the investigation.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242037	W170	No gunshot residues metallic particles were found on Item # 1. A negative result may be due to one of the following factors: 1. The sampled person: • Did not shoot a firearm. • Did not handle a firearm. • Were not in close proximity to a gunshot. • Did not have contact with an object that has gunshot residue, among others. 2. The sample person could have shot, handled a firearm, or was in the vicinity of the shot, but the residues disappeared, as a result of one or more of the following factors. • Washed or rubbed hands. • Physical activity or sweating. • Use of a physical barrier that prevents gunshot residue from for example, the use depositing on the sampled surface, for example, the use of gloves. • The excessive presence of blood or dirt that can mask any gunshot residue in the sample. • Environmental factors such as wind or rain. • When a long time has passed between the shot and the sample taking, among others. Gunshot residues metallic particles were found on Item # 2. A positive result may be due to one or more of the following factors, that the sampled person: • Fired a firearm. • Manipulated a firearm. • Was in the vicinity of one or more shots. • Came into contact with an object that has gunshot residue. • It was hi by a firearm projectile and the sample was taken near the impact site. The scope of this technique is to determine the presence or absence of gunshot residue particles; it is not possible to establish the circumstances by which they reached the sample surface. The result of this report, when appreciated together with the other elements of evidence and/or knowledge, constitutes a contribution to the investigation.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242038	W170	No gunshot residues metallic particles were found on Item # 1. A negative result may be due to one of the following factors: 1. The sampled person: • Did not shoot a firearm. • Did not handle a firearm. • Were not in close proximity to a gunshot. • Did not have contact with an object that has gunshot residue, among others. 2. The sample person could have shot, handled a firearm, or was in the vicinity of the shot, but the residues disappeared, as a result of one or more of the following factors: • Washed or rubbed hands. • Physical activity or sweating. • Use of a physical barrier that prevents gunshot residue from for example, the use depositing on the sampled surface, for example, the use of gloves. • The excessive presence of blood or dirt that can mask any gunshot residue in the sample. • Environmental factors such as wind or rain. • When a long time has passed between the shot and the sample taking, among others. Gunshot residues metallic particles were found on Item # 2. A positive result may be due to one or more of the following factors, that the sampled person: • Fired a firearm. • Manipulated a firearm. • Was in the vicinity of one or more shots. • Came into contact with an object that has gunshot residue. • It was hi by a firearm projectile and the sample was taken near the impact site. The scope of this technique is to determine the presence or absence of gunshot residue particles; it is not possible to establish the circumstances by which they reached the sample surface. The result of this report, when appreciated together with the other elements of evidence and/or knowledge, constitutes a contribution to the investigation.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242039	W170	I) No gunshot residues metallic particles were found on Item # 1. A negative result may be due to one of the following factors: 1. The sampled person: - Did not shoot a firearm. - Did not handle a firearm. - Were not in close proximity to a gunshot. - Did not have contact with an object that has gunshot residue, among others. 2. The sampled person could have shot, handled a firearm, or was in the vicinity of the shot, but the residues disappeared, as a result of one or more of the following factors: - Washed or rubbed hands. - Physical activity or sweating. - Used a physical barrier that prevents gunshot residue getting into the sampled surface, for example, the use of gloves. - The excessive presence of blood or dirt may mask any gunshot residue in the sample. - Environmental factors such as wind or rain. - When a long time has passed between the gunshot and the sample taking, among others. II) Gunshot residues metallic particles were found on Item # 2. A positive result may be due to one or more of the following factors, that the sampled person: - Fired a firearm. - Manipulated a firearm. - Was in the vicinity of one or more shots. - Came into contact with an object that has gunshot residue. - was hitted by a firearm projectile and the sample was taken near the impact site. The scope of this technique is to determine the presence or absence of gunshot residue particles; it is not possible to establish the circumstances by which they reached the sample surface. It is not possible to establish the circumstances by which they reached the sample surface. The result of this report, when appreciated together with the other elements of evidence and/or knowledge, constitutes a contribution to the investigation.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242040	W170	No gunshot residues metallic particles were found on Item # 1. A negative result may be due to one of the following factors: 1. The sampled person: · Did not shoot a firearm. · Did not handle a firearm. · Were not in close proximity to a gunshot. · Did not have contact with an object that has gunshot residue, among others. 2. The sampled person could have shot, handled a firearm, or was in the vicinity of the shot, but the residues disappeared, as a result of one or more of the following factors. · Washed or rubbed hands. · Physical activity or sweating. · Use of a physical barrier that prevents gunshot residue from depositing on the sampled surface, for example, the use of gloves. · The excessive presence of blood or dirt that can mask any gunshot residue in the sample. · Environmental factors such as wind or rain. · When a long time has passed between the shot and the sample taking, among others. Gunshot residues metallic particles were found on Item # 2. A positive result may be due to one or more of the following factors, that the sampled person: · Fired a firearm. · Manipulated a firearm. · Was in the vicinity of one or more shots. · Came into contact with an object that has gunshot residue. · It was hit by a firearm projectile and the sample was taken near the impact site. The scope of this technique is to determine the presence or absence of gunshot residue particles; it is not possible to establish the circumstances by which they reached the sample surface. The result of this report, when appreciated together with the other elements of evidence and/or knowledge, constitutes a contribution to the investigation.
p20242041	W132	Firearm residue was not deteced on the sample stub taken from the hand of suspect A. Firearm residue was not deteced on the sample stub taken from the hand of suspect B. Note: no case scenario or information was provided => unable to interpret or evaluate the findings.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242042	W160	Items 1 - 3 were examined for the presence of gunshot residue. Nothing of significance was detected. **Comment** When a cartridge is fired, a primer in the base initiates the main propellant (sometimes containing nitroglycerine). Residues may be produced from the bullet, propellant and the primer. The discharge is a mixture of gases and particulate matter which may be deposited on the hands, face, hair and clothing of the firer and on persons or exposed surfaces nearby. Those originating from the primer comprise small particles that are identified by their elemental composition and their morphology. These primers are also used in some cartridges such as firing pistols and nail guns etc. Particles are either classed as characteristic, if the composition is encountered only from discharge residue sources, or indicative, where combinations of elements can be produced from other sources. The deposition and distribution of cartridge discharge residue (CDR) is a random process and depends on variable factors including environmental conditions, the type of firearm, ammunition and number of shots fired. These particles may be a combination of those produced by the combustion of the primer compounds and those caused by bullet/projectile friction or fragmentation. The persistence of CDR depends on variable factors including environmental conditions, type of surface and activity after firing. Due to their nature, transfer can occur from surface to surface quite readily. CDR would not be expected to remain after hair washing, showering or washing of clothing. Handguns will invariably deposit CDR on the firer more than long arms (rifles) because of the proximity of their open parts (e.g. muzzle, cylinder and ejection parts) to the firer. CDRs are expected to be lost within hours off the hands, face and hair and can remain longer on clothing, the persistence depending on the fabric and the activity after firing. Due to the above considerations, the absence of CDRs cannot exclude someone from the involvement with a firearms related incident; likewise the presence of CDRs must be interpreted in conjunction with all other available information. **Conclusion** The absence of GSR particles on items 1to 3 provides no support for contact with a source of these particles/residues. The scale I have used in assessing the strength of evidence is as follows: No support – very weak support – weak support – support – strong support – very strong support – conclusive.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242043	W153	For the interpretation in our forensic field, only particles characteristic of a firearm shot are listed as "gunshot residue". They com almost exclusively from a shot, without being able to date their creation. Regarding items #1 and #2, no characteristic particles of the discharge of a firearm was detected through the morphological examination and the analyses of the stubs collected from suspects 1 and 2. Note 1 : When the absence of characteristic particles is noted, no interpretation is written from now on. Note 2 : Item 1 has all the characteristics of a GSR negative control carbon taped SEM stub.
p20242044	W088	CONCLUSIONS: Examination of item 1 failed to reveal particles characteristic of gunshot primer residue (GSR). Examination of item 2 failed to reveal particles characteristic of gunshot primer residue (GSR). The absence of GSR on the hands is consistent with the following: -the individual did not discharge a firearm -the individual was not in close proximity to a firearm during discharge -the individual did not contact a surface bearing GSR -the discharged ammunition did not produce particles characteristic of GSR -any GSR deposited on the hands was lost prior to sampling due to an excessive time interval between firearm discharge and collection, washing of hands, and/or other routine activities RESULTS: Items 1-3 were examined for the presence of particles characteristic of GSR. Particles that are characteristic of GSR are single, discrete, microscopic particles, molten in morphology, that contain the elements lead, barium, and antimony. Such particles are residue from a detonated primer of a discharged firearm. Examination of item 1 failed to reveal particles characteristic of GSR. Examination of item 2 failed to reveal particles characteristic of GSR. Examination of item 3 failed to reveal particles characteristic of GSR. METHODS OF ANALYSIS: Items 1-3 were examined by scanning electron microscopy/energy dispersive x-ray spectroscopy (SEM/EDS) and analyzed for elemental composition and particle morphology.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242045	W088	CONCLUSIONS: Examination of items 1 and 2 failed to reveal particles characteristic of gunshot primer residue (GSR). The absence of GSR on the hands is consistent with the following: -the individuals did not discharge a firearm -the individuals were not in close proximity to a firearm during discharge -the individuals did not contact a surface bearing GSR -the discharged ammunition did not produce particles characteristic of GSR -any GSR deposited on the hands was lost prior to sampling due to an excessive time interval between firearm discharge and collection, washing of hands, and/or other routine activities RESULTS: Items 1 and 2 were examined for the presence of particles characteristic of GSR. Particles that are characteristic of GSR are single, discrete, microscopic particles, molten in morphology, that contain the elements lead, barium, and antimony. Such particles are residue from a detonated primer of a discharged firearm. Examination of item 1 failed to reveal particles characteristic of GSR. Examination of item 2 failed to reveal particles characteristic of GSR. Examination of item 3 failed to reveal particles characteristic of GSR. METHODS OF ANALYSIS: Items 1, 2, and 3 were examined by scanning electron microscopy/energy dispersive x-ray spectroscopy (SEM/EDS) and analyzed for elemental composition and particle morphology.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242046	W088	CONCLUSIONS: Examination of items 1 and 2 failed to reveal particles characteristic of gunshot primer residue (GSR). The absence of GSR on the hands is consistent with the following: -the individual did not discharge a firearm -the individual was not in close proximity to a firearm during discharge -the individual did not contact a surface bearing GSR -the discharged ammunition did not produce particles characteristic of GSR -any GSR deposited on the hands was lost prior to sampling due to an excessive time interval between firearm discharge and collection, washing of hands, and/or other routine activities RESULTS: Items 1-3 were examined for the presence of particles characteristic of GSR. Particles that are characteristic of GSR are single, discrete, microscopic particles, molten in morphology, that contain the elements lead, barium, and antimony. Such particles are residue from a detonated primer of a discharged firearm. Examination of item 1 failed to reveal particles characteristic of GSR. Examination of item 2 failed to reveal particles characteristic of GSR. Examination of item 3 (GSR Negative Control) failed to reveal particles characteristic of GSR. METHODS OF ANALYSIS: Items 1-3 were examined by scanning electron microscopy/energy dispersive x-ray spectroscopy (SEM/EDS) and analyzed for elemental composition and particle morphology.
p20242047	W034	No particles confirmed as having a composition characteristic with GSR were detected on Item #1 samples labeled #1, #2, and #3.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242053	W079	**Item 1, Suspect A** No particles characteristic of GSR were detected on the sampling stub reportedly recovered from the hands of Suspect A. The absence of GSR particles can mean the subject did not discharge a firearm. However, a person can discharge a firearm and GSR may not be detected for one or more of the following reasons: • The firearm did not deposit detectable quantities of GSR. • GSR was deposited but fell off or was washed off the person. • The person wore gloves • GSR was deposited but missed by the sampling stubs. • GSR was deposited but missed in the search and analysis process. **Item 2, Suspect B** No particles characteristic of GSR were detected on the sampling stub reportedly recovered from the hands of Suspect B. The absence of GSR particles can mean the subject did not discharge a firearm. However, a person can discharge a firearm and GSR may not be detected for one or more of the following reasons: • The firearm did not deposit detectable quantities of GSR. • GSR was deposited but fell off or was washed off the person. • The person wore gloves • GSR was deposited but missed by the sampling stubs. • GSR was deposited but missed in the search and analysis process.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242054	W079	**Item 1, Suspect A** No GSR particles were detected on the sampling stub reportedly recovered from the hands of Suspect A. The absence of GSR particles can mean the subject did not discharge a firearm. However, a person can discharge a firearm and GSR may not be detected for one or more of the following reasons: • The firearm did not deposit detectable quantities of GSR. • GSR was deposited but fell off or was washed off the person. • The person wore gloves. • GSR was deposited but missed by the sampling stubs. • GSR was deposited but missed in the search and analysis process. **Item 2, Suspect B** No GSR particles were detected on the sampling stub reportedly recovered from the hands of Suspect B. The absence of GSR particles can mean the subject did not discharge a firearm. However, a person can discharge a firearm and GSR may not be detected for one or more of the following reasons: • The firearm did not deposit detectable quantities of GSR. • GSR was deposited but fell off or was washed off the person. • The person wore gloves. • GSR was deposited but missed by the sampling stubs. • GSR was deposited but missed in the search and analysis process.
p20242055	W114	Indicates that Subject A may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure. Indicates that Subject B may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242056	W114	Sample: 1-1 Total Load: 0 Finding: Similar to an adhesive blank Sample: 1-2 Total Load: 0 Finding: Contains particles characteristic of background samples. Sample: 1-3 Total Load: 0 Finding: Similar to an adhesive blank Indicates that the Suspect A may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure. Indicates that the Suspect B may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure.
p20242057	W114	Indicates that suspect A may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure. Indicates that suspect B may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure.
p20242058	W114	Item 1 (Suspect A): Similar to an adhesive blank Item 2 (Suspect B): Contains particles characteristic of background samples
p20242059	W114	Item 1-1 Similar to an adhesive blank Item 1-2 Contains particles characteristic of background samples Item 1-3 Similar to an adhesive blank Indicates that the subject, Suspect A, may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure. Indicates that the subject, Suspect B, may not have discharged a firearm with either hand. If the subject did discharge a firearm, then the particles were not deposited, were removed by activity, or were not detected by the procedure.
p20242060	W250	Examination and analysis performed on Item 1 of FTS GSR PT 2024 did not reveal the presence of particles characteristic of gunshot residue. Examination and analysis performed on Item 2 of FTS GSR PT 2024 did not reveal the presence of particles characteristic of gunshot residue.
p20242061	W158	Item 1: No primer gunshot residue particles were detected. Item 2: No primer gunshot residue particles were detected.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242062	W158	Lab Item # 1 No primer gunshot residue particles were detected. 2 No primer gunshot residue particles were detected. 3 No primer gunshot residue particles were detected. The methodologies used for this analysis, along with the Lab Items they were used with, include: Scanning Electron Microscopy/Energy Dispersive Spectrometry - Lab Items 1, 2 and 3 EXPLANATORY AND QUALIFYING STATEMENTS All reported particles are molten in appearance. · Microscopic particles containing all three elements (lead, barium, and antimony) with a molten appearance are characteristic of primer gunshot residue. · Microscopic particles containing two of the elements (lead, barium, and antimony) with a molten appearance are consistent with primer gunshot residue but may also originate from other sources. · The presence of primer gunshot residue on a person is consistent with that person having discharged a firearm, having been in the vicinity of a firearm when it was discharged, or having handled an item with primer gunshot residue on it. · The absence of primer gunshot residue on a person does not eliminate that person from having discharged a firearm, having been in the vicinity of a firearm when it was discharged, or having handled an item with primer gunshot residue on it. · The presence of primer gunshot residue on an object is consistent with that object having been in the vicinity of a firearm when it was discharged or having otherwise come in contact with a person or object bearing primer gunshot residue. · The absence of primer gunshot residue on an object does not eliminate that object from having been in the vicinity of a firearm when it was discharged or having otherwise come in contact with a person or object bearing primer gunshot residue.
p20242063	W158	Lab Item # Results of Analysis 1 No primer gunshot residue particles were detected. 2 No primer gunshot residue particles were detected. 3 No primer gunshot residue particles were detected. The methodologies used for this analysis, along with the Lab Items they were used with, include: Scanning Electron Microscopy/Energy Dispersive Spectrometry - Lab Items 1, 2 and 3

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242065	W110	Item 1 No particles consistent with gunshot primer residue were detected on the submitted hand sample from Suspect A. No statement can be made regarding the subject's involvement based on the results of this examination. Item 2 No particles consistent with gunshot primer residue were detected on the submitted hand sample from Suspect B. No statement can be made regarding the subject's involvement based on the results of this examination. Item 3 No particles consistent with gunshot primer residue were detected on the negative GSR control stub.
p20242066	W110	Item 1 No particles consistent with gunshot primer residue were detected on the submitted hands samples. No statement can be made regarding the subject handling or discharging a firearm based on the results of this examination. Item 2 No particles consistent with gunshot primer residue were detected on the submitted hands samples. No statement can be made regarding the subject handling or discharging a firearm based on the results of this examination. Item 3 No particles consistent with gunshot primer residue were detected on the negative control sample.
p20242068	W082	Gunshot residue was not detected on item 1. A negative result means that no particles characteristic of GSR were detected on the sample. Characteristic particles have non-crystalline morphology and an elemental composition consisting of antimony, barium, and lead. Based on the results on item 1, it is inconclusive if the subject was in the environment of a discharged firearm. Gunshot residue was not detected on item 2. A negative result means that no particles characteristic of GSR were detected on the sample. Characteristic particles have non-crystalline morphology and an elemental composition consisting of antimony, barium, and lead. Based on the results on item 2, it is inconclusive if the subject was in the environment of a discharged firearm. Gunshot residue was not detected on item 3. A negative result means that no particles characteristic of GSR were detected on the sample. Characteristic particles have non-crystalline morphology and an elemental composition consisting of antimony, barium, and lead.
p20242069	W251	ÚNICO: No se detectaron residuos de disparos de plomo, bario y antimonio en los portamuestras registrados como FTS-24-GSR.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242070	W012	SEM-EDS examinations on Item 1-1 and Item 1-2 were negative for Gunshot Primer Residue. No three component Gunshot Primer Residue particles containing lead, barium, and antimony were confirmed in Item 1-1 or Item 1-2, and this meets the criteria for a negative Gunshot Primer Residue result. Therefore, no conclusions can be made as to whether these individuals may have discharged a firearm, may have been in the vicinity of a firearm when it was discharged, or may have come into contact with an item with Gunshot Primer Residue on it. SEM-EDS examination on Item 1-3 was negative for Gunshot Primer Residue. No three component Gunshot Primer Residue particles containing lead, barium, and antimony were confirmed in Item 1-3, and this meets the criteria for a negative Gunshot Primer Residue result. Therefore, no conclusions can be made as to whether this item may have been in the vicinity of a firearm when it was discharged or may have come into contact with an item with Gunshot Primer Residue on it.
p20242072	W059	No particles of gunshot residue were identified on the samples in Items 1, 2, or 3.
p20242073	W001	Gunshot residue was not detected on the hand stub of Item 001.001. The absence of gunshot residue on a subject's hands indicates that the subject did not discharge a firearm, discharged a firearm but gunshot residue was not deposited in detectable amounts, or discharged a firearm but the gunshot residue was removed by wiping or washing prior to the collection of the gunshot residue kit. Gunshot residue was not detected on the hand stub of Item 001.002. The absence of gunshot residue on a subject's hands indicates that the subject did not discharge a firearm, discharged a firearm but gunshot residue was not deposited in detectable amounts, or discharged a firearm but the gunshot residue was removed by wiping or washing prior to the collection of the gunshot residue kit. Gunshot residue was not detected on the negative control stub of Item 001.003. Analysis performed by scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM-EDS).

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242075	W005	001.01 One stub with carbon tape from hands of suspect A. No primer gunshot residue particles were confirmed. 001.02 One stub with carbon tape from hands of suspect B. No primer gunshot residue particles were confirmed. 001.03 One stub with carbon tape listed as GSR Negative Control. No primer gunshot residue particles were confirmed. Further Information and/or Analysis Item 001.02 did not have PbSbBa which is considered characteristic of primer GSR per our procedures. In this instance, I would request more information from the submitting agency to possibly assist in determining the unique elemental composition seen in this item. The information needed would be hobbies/occupation of suspect B, case scenario, other items of evidence collected (e.g., firearm, cartridge cases, live rounds). Depending on the responses received for these questions, I may request the firearm and/or a cartridge case for elemental composition comparison to the hand stub from suspect B as there are other primer compositions that could be considered primer GSR (e.g., lead free).
p20242076	W066	Item 2. : on the surface of the sample holder many particles with the following elemental composition can be detected : barium, calcium, silicon and iron, zirconium, without any lead. These particles were classified as consistent with GSR (it could be GSR but these particles can be associated with other sources). The micromorpyology of the particles and the iron and zirconium content are not typical for characteristic GSR. Item 1.: on the surface of the sample holder no particles with composition and micromorpyology characteristic of GSR was detected.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242077	W209	**Report** **Identification of the laboratory/company** **Report's Number** **Company Case Number** **Requesting unit : Number and date of the requisition** **Analyst : Last name, first name, specialty, signature** **Date of the report** **1-Mission** I undersigned, (Rank: Last name, first name and quality of the examiner (specialized in ……)) at the department of (Insert the name of the department) completing the request of ((Requisition) number……) issued by Forensic Testing Services on 07/2024, guarantee my performance of the examination requested on the exhibits received in order to test the presence of gunshot residue (GSR). **2- Exhibits description** **2.1-Exhibit coded (Item1)**: carbon taped SEM stub sampled from the hands of Suspect A. (Insert the exhibit's (Item 1) photo) **2.2-Exhibit coded (Item 2)**: carbon taped SEM stub sampled from the hands of Suspect B. (Insert the exhibit's (Item 2) photo) **2.3-Exhibit coded (Item 3)**: GSR Negative control carbon taped SEM stub. (Insert the exhibit's (Item 3) photo) **Note** :Following their unpacking and examinations, the exhibits (Item 1), (Item 2) and (Item 3) were repackaged at the department. Data provided by customer: // The laboratory doesn't take responsibility of the data provided by customer and can affect the validity of results. All the information provided by the customer is documented in the request and telephonic form. **3-Methodology** **GSR** examination using Scanning Electron Microscopy/Energy Dispersive X-Ray Spectroscopy (**SEM/EDS**) entitled "Analysis of gunshot residues by the scanning electron microscopy associated with an X-ray energy dispersive spectroscopy (SEM – **EDS**)". The search of **GSR** on the victim's and suspect's hands and clothes, is performed by the scanning electron microscopy associated with an X-ray energy dispersive spectroscopy (**SEM– EDS**), this technique permitthe detection and the identification of **GSR** particles, which have a specific morphology, dimensions and chemical composition. These particles are classified as follow: - **Characteristic GSR**: Particles that have compositions rarely found in particles from any source other than GSR; - **Consistent GSR**: Particles that have compositions also found arise from other non-firearm source; - **Commonly associated particles**: Particles that have compositions that are also commonly found in environmental particles numerous sources. **4- Date (s) of testing or inspection:** Gunshot residues analyses are performed on 21/08/2024.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242077 (Cont.)	W209	**5. Results** The result of the **GSR** examination of the carbon taped SEM stub sampled from the hands of Suspect A (**Item1**) found in the exhibit (p20242077) was **Negative**. Indeed, no particle, having the form and the chemical composition of **GSR**, was detected on this sample (**Item1**). The result of the **GSR** examination of the carbon taped SEM stubsampled from the hands of Suspect B (**Item2**) found in the exhibit (p20242077) was **negative**. Indeed, no particle, having the form and the chemical composition of GSR, was detected on this sample (**Item2**). The result of the **GSR** examination of the control carbon taped SEM stub (**Item3**) found in the exhibit (p20242077) was **negative**. Indeed, no particle, having the form and the chemical composition of **GSR**, was detected on this sample (**Item3**). Warning// **6. Opinion and interpretation //** **7. Answer(s) to the question(s) of the request:** Search of **GSR** particles by **SEM/EDS**: • The result of the **GSR** examination of the sample (**Item1**) found in the exhibit (p20242077) was **negative**. Indeed, no particle, having the form and the chemical composition of **GSR**, was detected on this sample (**Item 1**). • The result of the **GSR** examination of the sample (**Item 2**) found in the exhibit (p20242077) was **negative**. Indeed, no particle, having the form and the chemical composition of **GSR**, was detected on this sample (**Item 2**). **8. Annex:** General information about the search of gunshot residues particles under Scanning Electron Microscopy/Energy Dispersive X-Ray Spectroscopy (**SEM/EDS**): The dischargeof a firearm leads to the deposition of gunshot residue particles on hands and clothes of the suspect as well as objects present in the environment of shooting. The **GSR** examination by **SEM/EDS** allowing the detection of the presence or absence of gunshot residue on the examined objects without allowing the indictment or the exoneration of the suspects. The **positive** results may be due to: • the discharge of a firearm; • Being in the vicinity of discharging firearm at the time of the accident / crime; • The handling of a ammunition or one of its components ... Also, the **negative** results may be due to: • Being away from the vicinity of dischargingfirearm or not being present with it at the time of the accident /crime; • The Use of a physical barrier to prevent gunshot residue on hands (gloves) or clothing (apron); • The Loss of **GSR** particles due to: • The activities that the suspect may perform after the accident / crime; • Good hand washing after the accident / crime; • Natural factors such as rain and wind; • The process of collecting samples that may not result in collecting throwing residue particles. - The nature of the weapon and ammunition used during the accident / crime that may not allow the formation of GSR particles to be detected in this technique. **Signature of the analyst**

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242078	W033	The following methodologies were used in the examination of this case: SEM-EDX. Item #1: Examination of the adhesive lift did not identify particles characteristic of primer gunshot residue. There is no indication the subject came into contact with particles characteristic of primer gunshot residue or was in the vicinity of a firearm during discharge. It is possible that characteristic particles of primer gunshot residue were not deposited, were removed by activity, or were not detected. Item #2: Examination of the adhesive lift did not identify particles characteristic of primer gunshot residue. There is no indication the subject came into contact with particles characteristic of primer gunshot residue or was in the vicinity of a firearm during discharge. It is possible that characteristic particles of primer gunshot residue were not deposited, were removed by activity, or were not detected. Item #3: Examination of the adhesive lift did not identify particles characteristic of primer gunshot residue.
p20242079	W033	The following methodologies were used in the examination of this case: visual examination and SEM-EDX. Item #1: Examination of the carbon taped SEM stub sampled from the hands of Suspect A did not identify particles characteristic of primer gunshot residue. There is no indication the subject came into contact with particles characteristic of primer gunshot residue or was in the vicinity of a firearm during discharge. The absence of characteristic particles of primer gunshot residue on hands does not conclude that a subject did not fire a gun. It is possible the subject fired a gun, but the characteristic particles of primer gunshot residue were not deposited, were removed by activity, or were not detected. Item #2: Examination of the carbon taped SEM stub sampled from the hands of Suspect B did not identify particles characteristic of primer gunshot residue. There is no indication the subject came into contact with particles characteristic of primer gunshot residue or was in the vicinity of a firearm during discharge. The absence of characteristic particles of primer gunshot residue on hands does not conclude that a subject did not fire a gun. It is possible the subject fired a gun, but the characteristic particles of primer gunshot residue were not deposited, were removed by activity, or were not detected. Item #3: Examination of the GSR negative control carbon taped SEM stub did not identify particles characteristic of primer gunshot residue.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242080	W033	The following methodologies were used in the examination of this case: visual examination and SEM-EDX. Item 1: Examination of the adhesive lift did not identify particles characteristic of primer gunshot residue. There is no indication the subject came into contact with particles characteristic of primer gunshot residue or was in the vicinity of a firearm during discharge. It is possible that characteristic particles of primer gunshot residue were not deposited, were removed by activity, or were not detected. Item 2: Examination of the adhesive lift did not identify particles characteristic of primer gunshot residue. There is no indication the subject came into contact with particles characteristic of primer gunshot residue or was in the vicinity of a firearm during discharge. It is possible that characteristic particles of primer gunshot residue were not deposited, were removed by activity, or were not detected. Item 3: Examination of the adhesive lift did not identify particles characteristic of primer gunshot residue.
p20242081	W053	In a forensic report, the results will be evaluated under the following set of hypotheses: Hypothesis 1: Gunshot residue is present on the sample of the piece of evidence. Hypothesis 2: Gunshot residue is not present on the sample of the piece of evidence. Based on the collection of particles, a likelihood ratio will be reported using a standardized verbal scale. For item #1 this will be: Based on the detected particles there is no indication for the presence of gunshot residue. Therefore the hypotheses will not be evaluated. For item #2 this will be: The findings of the GSR investigation on the presence of gunshot residue on item #2 are approximately equally probable (LR = 1-2) if hypothesis 1 is true, as if hypothesis 2 is true. Furthermore the report and the appendix will include an explanation on the interpretation of gunshot residue findings, as presented below. The most common reasons for finding GSR on the sample of a piece of evidence are: • The person has discharged a firearm; • The person or object has been in the vicinity of a firearm during or right after it was discharged; • The person or object has been in contact with an item or person with GSR on it or them, where some gunshot residue is transferred. The most common reasons for not finding GSR on the suspect of a suspect are: • The person is not involved with a shooting incident; • No gunshot residue is transferred to the hands or clothing of the person, which could be due to the lack of particles formed during the shot, but also due to other conditions, such as weather influences or wearing gloves. • The particles that were formed during the shot cannot be detected with the applied research method or are not recovered with sampling. • The gunshot residue have disappeared before sampling due to certain activities.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242082	W130	1. Laboratory item #1 ("from Suspect A"): No particles characteristic of primer gunshot residue (pGSR) were detected. 2. Laboratory item #2 ("from Suspect B"): No particles characteristic of primer gunshot residue (pGSR) were detected The absence of pGSR on the hands and/or clothing indicates that the individual either: • did not discharge a firearm, or • discharged a firearm; however, o characteristic pGSR particles were not generated/deposited on the hand/clothing o the pGSR was removed by some action o the pGSR was not transferred onto the collection medium The examination itself cannot determine the relative likelihood of these listed circumstances. Characteristic pGSR particles appear non-crystalline and contain lead, barium, and antimony, a composition rarely found in particles from any source other than GSR
p20242085	W069	GSR kit from suspect A. Particles characteristc of gunshot primer residue were not indentified on the sample. Negative. GSR kit from suspect B. Particles characteristc of gunshot primer residue were not indentified on the sample. Negative.

<table>
<tr><th>UTIC</th><th>Webcode</th><th>How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).</th></tr>
<tr><td>p20242086</td><td>W069</td><td>
<table>
<tr><th>Item</th><th>Description</th><th>Finding</th><th>Conclusion</th></tr>
<tr><td>1</td><td>GSR kit from Suspect A</td><td>Particles characteristic of gunshot primer residue were not identified on the samples.</td><td>Negative</td></tr>
<tr><td>2</td><td>GSR kit from Suspect B</td><td>Particles characteristic of gunshot primer residue were not identified on the samples.</td><td>Negative</td></tr>
<tr><td>3</td><td>GSR kit – Negative Control</td><td>Particles characteristic of gunshot primer residue were not identified on the samples.</td><td>Negative</td></tr>
</table>

Remarks
Particles classified as characteristic of gunshot primer residue have compositions rarely found in particles from any other source.

A finding of "positive" for particles characteristic of gunshot primer residue on a person's hands means that individual either discharged a firearm, was in the vicinity of a firearm when it was discharged, or handled an item with gunshot primer residue on it.

A finding of "negative" for particles characteristic of gunshot primer residue, does not preclude the possibility of any of the above stated events.

The GSR instrumental analysis of the above evidence was performed in the XXXXXXX laboratory; the interpretation of the data was performed in the XXXXX XXXXXX laboratory.

The evidence will be retained at XXX.

Analytical Details
These findings were determined using scanning electron microscopy/energy dispersive x-ray spectroscopy analyses.</td></tr>
<tr><td>p20242087</td><td>W116</td><td>1A No primer gunshot residue particles were detected.
1B No primer gunshot residue particles were detected.</td></tr>
</table>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
		The sample stubs described in items 1, 2 and 3 were analyzed for the presence of gunshot residue. Gunshot residue may include particles that are characteristic in composition and/or indicative in composition. Characteristic particles are composed of the elements lead, barium and antimony in a single particle. Particles classified as characteristic are typical of gunshot residue. At least one characteristic particle must be identified to obtain a positive result. Indicative particles are composed of only one or two of the elements lead, barium and antimony in a single particle. Particles classified as indicative may have originated from environmental/occupational sources and/or gunshot residue. The presence of indicative particles alone is not sufficient for a positive result. No characteristic or indicative particles were identified on item 1. The lack of characteristic particles in item 1 does not eliminate the possibility that Suspect A could be associated with the discharge of a firearm; it simply indicates that no characteristic particles were identified on the stubs used to sample the hands of Suspect A. Some conditions which could lead to this result are: A. Not handling or firing a firearm. B. Not being near a firearm when it was discharged. C. Wiping or washing gunshot residue from hands. D. Firearm may not be a good depositor of gunshot residue. E. If subject is alive and greater than six hours had elapsed between the time when the firearm was discharged and when the hands were sampled. F. Not using the hands to discharge the firearm. One (1) indicative particle was identified on item 2. No characteristic particles were identified on item 2. Due to the lack of characteristic particles on item 2, no determination can be made regarding the identified indicative particles and their association with gunshot residue. However, the lack of characteristic particles does not eliminate the possibility that Suspect B could be associated with the discharge of a firearm; it simply indicates that no characteristic particles were identified on the stubs used to sample the hands of Suspect B. Some conditions which could lead to this result are: A. Not handling or firing a firearm. B. Not being near a firearm when it was discharged. C. Wiping or washing gunshot residue from hands. D. Firearm may not be a good depositor of gunshot residue. E. If subject is alive and greater than six hours had elapsed between the time when the firearm was discharged and when the hands were sampled. F. Not using the hands to discharge the firearm.
p20242088	W025	No contamination was detected on the control stub in item 3.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
		The sample stubs described in items 1, 2 and 3 were analyzed for the presence of gunshot residue. Gunshot residue may include particles that are characteristic in composition and/or indicative in composition. Characteristic particles are composed of the elements lead, barium and antimony in a single particle. Particles classified as characteristic are typical of gunshot residue. At least one characteristic particle must be identified to obtain a positive result. Indicative particles are composed of only one or two of the elements lead, barium and antimony in a single particle. Particles classified as indicative may have originated from environmental/occupational sources and/or gunshot residue. The presence of indicative particles alone is not sufficient for a positive result. No characteristic or indicative particles were identified on item 1. The lack of characteristic particles on item 1 does not eliminate the possibility that Suspect A could be associated with the discharge of a firearm; it simply indicates that no characteristic particles were identified on the stub used to sample the hands of Suspect A. Some conditions which could lead to this result are: A. Not handling or firing a firearm. B. Not being near a firearm when it was discharged. C. Wiping or washing gunshot residue from hands. D. Firearm may not be a good depositor of gunshot residue. E. If subject is alive and greater than six hours had elapsed between the time when the firearm was discharged and when the hands were sampled. F. Not using the hands to discharge the firearm. No characteristic particles were identified on item 2. Indicative particles were identified on item 2. Due to the lack of characteristic particles on item 2, no determination can be made regarding the identified indicative particles and their association with gunshot residue. However, the lack of characteristic particles does not eliminate the possibility that Suspect B could be associated with the discharge of a firearm; it simply indicates that no characteristic particles were identified on the stub used to sample the hands of Suspect B. Some conditions which could lead to this result are: A. Not handling or firing a firearm. B. Not being near a firearm when it was discharged. C. Wiping or washing gunshot residue from hands. D. Firearm may not be a good depositor of gunshot residue. E. If subject is alive and greater than six hours had elapsed between the time when the firearm was discharged and when the hands were sampled. F. Not using the hands to discharge the firearm.
p20242089	W025	No contamination was detected on the control stub (item 3).

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242093	W083	No particles characteristic of or known to be associated with Gunshot Residue (GSR) were detected on the sample from Suspect A (Item #1). Note, however due to the nature of GSR the absence of GSR may not preclude the test subject from having either discharged a firearm, having been in the vicinity of a firearm when it was discharged, or from having contacted an item with GSR on it. No particles characteristic of or known to be associated with Gunshot Residue (GSR) were detected on the sample from Suspect B (Item #2). Note, however due to the nature of GSR the absence of GSR may not preclude the test subject from having either discharged a firearm, having been in the vicinity of a firearm when it was discharged, or from having contacted an item with GSR on it. No particles characteristic of or known to be associated with Gunshot Residue (GSR) were detected on the negative control GSR stub (Item #3).
p20242094	W017	1. No particle characteristic of gunshot residue (GSR) was found on the sampling stub, Exhibit Item 1, reportedly used to sample the hands of Suspect A. Therefore, there is no indication that the person (Suspect A) fired a firearm or was in proximity to a firearm being discharged. 2. No particle characteristic of gunshot residue (GSR) was found on the sampling stub, Exhibit Item 2, reportedly used to sample the hands of Suspect B. Therefore, there is no indication that the person (Suspect B) fired a firearm or was in proximity to a firearm being discharged. 3. No particle characteristic of gunshot residue (GSR) was foun don the sampling stub, Exhibit Item 3, reportedly used as a negative control.
p20242095	W017	1. No particle characteristic of gunshot residue (GSR) was found on the sampling stub, Exhibit ITEM 1, reportedly used to sample the hands of A, Suspect. Therefore, there is no indication that the person (A, Suspect) fired a firearm or was in proximity to a firearm being discharged. 2. No particle characteristic of gunshot residue (GSR) was found on the sampling stub, Exhibit ITEM 2, reportedly used to sample the hands of B, Suspect. Therefore, there is no indication that the person (B, Suspect) fired a firearm or was in proximity to a firearm being discharged.
p20242097	W035	Item 1 contained no GSR related particles. Item 2 contained no GSR related particles. Item 3 contained no GSR related particles.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242101	W147	Item 1 - SEM GSR disc from “Suspect A” No characteristic gunshot residue particles were identified on the adhesive disc. The absence of characteristic gunshot residue particles on the hands is consistent with an individual not: having fired a firearm, being in the proximity of a discharging firearm, or contacting a surface that has GSR on it, including handling a firearm or ammunition. However, the absence of characteristic gunshot residue particles does not eliminate an individual from having fired or handled a firearm or being in the proximity of a discharging firearm. A negative result could occur from circumstances such as washing or wiping of the hands, wearing gloves, sweating, environmental factors including wind and rain, blood or excessive debris on the hands, or normal physical activity passing between a firearm event and sampling. Item 2 - SEM GSR disc from “Suspect B” No characteristic gunshot residue particles were identified on the adhesive disc. The absence of characteristic gunshot residue particles on the hands is consistent with an individual not: having fired a firearm, being in the proximity of a discharging firearm, or contacting a surface that has GSR on it, including handling a firearm or ammunition. However, the absence of characteristic gunshot residue particles does not eliminate an individual from having fired or handled a firearm or being in the proximity of a discharging firearm. A negative result could occur from circumstances such as washing or wiping of the hands, wearing gloves, sweating, environmental factors including wind and rain, blood or excessive debris on the hands, or normal physical activity passing between a firearm event and sampling. Item 3 - SEM GSR disc labeled “Negative Control” No characteristic gunshot residue particles were identified on the adhesive disc.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242102	W147	Item A – SEM GSR kit from Unknown No characteristic gunshot residue particles were identified on the adhesive discs labeled as Items 1-3. The absence of characteristic gunshot residue particles on the hands is consistent with an individual not: having fired a firearm, being in the proximity of a discharging firearm, or contacting a surface that has GSR on it, including handling a firearm or ammunition. However, the absence of characteristic gunshot residue particles does not eliminate an individual from having fired or handled a firearm or being in the proximity of a discharging firearm. A negative result could occur from circumstances such as washing or wiping of the hands, wearing gloves, sweating, environmental factors including wind and rain, blood or excessive debris on the hands, or normal physical activity passing between a firearm event and sampling.
p20242103	W117	Gunshot residue will remain on the hands for approximately 6 hours or less with normal activity. Gunshot residue may be deposited on hands from handling, firing, or being in close proximity to the discharge of a firearm or by contacting a surface contaminated with gunshot residue. The absence of gunshot residue, alone, does not indicate the lack of involvement with a firearm. No particles characteristic to gunshot residue were found on Item 1. No conclusion can be drawn from the result of this sample. No particles characteristic to gunshot residue were found on Item 2. No conclusion can be drawn from the result of this sample.

<table>
<tr><th>UTIC</th><th>Webcode</th><th>How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).</th></tr>
<tr><td>p20242104</td><td>W084</td><td>
<table>
<tr><td>Item Number</td><td>Subject</td><td>Characteristic GSR particles Confirmed on Right Hand*</td><td>Characteristic GSR particles Confirmed on Left Hand*</td></tr>
<tr><td>1</td><td>Suspect A</td><td>0</td><td>0</td></tr>
<tr><td>2</td><td>Suspect B</td><td>0</td><td>0</td></tr>
<tr><td>3</td><td>Negative Control</td><td>0</td><td>0</td></tr>
</table>
A negative result is indicated when no characteristic GSR particles are detected.

*Additional information about GSR examinations:
-Characteristic GSR particles for most types of ammunition contain the elements lead, barium and antimony.
-Confirmed particles are individual particles that were relocated, analyzed, and classified by the analyst as GSR based on appropriate elemental composition and morphology.
The absence of GSR means there is no indication that the subject or item came into contact with GSR or was in the vicinity of a firearm during discharge. If the subject or item was exposed to GSR, then GSR was not deposited, was removed by activity, or was not detected.
When a firearm is discharged, particles that can be classified as consistent with GSR are also generated. These are individual particles that contain only two of these elements (lead, barium, antimony) or barium along with specific elements, and meet other criteria. Such particles can be found in GSR but may also originate from other non-GSR sources. Particles consistent with GSR are evaluated during testing as part of the assessment of the population of particles on a sample.</td></tr>
<tr><td>p20242105</td><td>W051</td><td>The stubs marked "Item 1" and "Item 2" were examined for the presence of particles characteristic of GSR and none was detected. Particles consistent with GSR, i.e., particles containing either titanium and zinc; or containing strontium; or containing barium, calcium and silicon, were detected on the stub marked "Item 2". These particles could come from discharging a firearm, handling a firearm, being in proximity to a discharging firearm, having physical contact with a surface having particles consistent with GSR adhering to it, or from other sources unrelated to a firearm discharge.</td></tr>
</table>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242106	W016	Item: 1 Item submitted as "Carbon taped SEM stub sampled from the hands of Suspect A" Item 1 was analyzed using Scanning Electron Microscopy with Energy Dispersive X-Ray Spectrometry (SEM-EDX) for morphology and elemental composition. RESULTS: No particles characteristic of gunshot primer residue detected. The absence of primer residue on the hands is consistent with, but not limited to, the following scenarios: • The individual not having discharged a firearm • Four (4) to six (6) hours passing between firing and sampling • Normal physical activity between firing and sampling • The individual washing the hands, wiping the hands, or sweating profusely • The individual wearing gloves during the discharge of a firearm • Excessive blood or debris on the hands • Environmental factors including wind and rain • The ammunition discharged (lead-free, non-toxic, or some .22 caliber rimfire ammunition) not producing particles characteristic of the conventional gunshot primer residue • The firearm not producing primer residue on the hands when discharged Item: 2 Item submitted as "Carbon taped SEM stub sampled from the hands of Suspect B" Item 2 was analyzed using Scanning Electron Microscopy with Energy Dispersive X-Ray Spectrometry (SEM-EDX) for morphology and elemental composition. RESULTS: No particles characteristic of gunshot primer residue detected. The absence of primer residue on the hands is consistent with, but not limited to, the following scenarios: • The individual not having discharged a firearm • Four (4) to six (6) hours passing between firing and sampling • Normal physical activity between firing and sampling • The individual washing the hands, wiping the hands, or sweating profusely • The individual wearing gloves during the discharge of a firearm • Excessive blood or debris on the hands • Environmental factors including wind and rain • The ammunition discharged (lead-free, non-toxic, or some .22 caliber rimfire ammunition) not producing particles characteristic of the conventional gunshot primer residue • The firearm not producing primer residue on the hands when discharged Item: 3 Item submitted as "GSR Negative Control carbon taped SEM stub" Item 3 was analyzed using Scanning Electron Microscopy with Energy Dispersive X-Ray Spectrometry (SEM-EDX) for morphology and elemental composition. RESULTS: No particles characteristic of gunshot primer residue detected.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242108	W076	Primer gunshot residue particles were not detected on the sampling device (item 1-1-1) used to collect residues from the hands of suspect A. The absence of primer gunshot residue particles on an individual's hands could be due to the individual: 1. Not discharging a firearm or being in the close vicinity of a discharging firearm 2. Discharging a firearm or being in the close vicinity of a firearm that does not deposit or produce significant "characteristic" or "consistent with" primer gunshot residue particles on the firing hand 3. Washing or wiping the hands after discharging or handling a firearm, a firearm component, or an object with primer gunshot residue Primer gunshot residue particles were not detected on the sampling device (item 1-2-1) used to collect residues from the hands of suspect B. The absence of primer gunshot residue particles on an individual's hands could be due to the individual: 1. Not discharging a firearm or being in the close vicinity of a discharging firearm 2. Discharging a firearm or being in the close vicinity of a firearm that does not deposit or produce significant "characteristic" or "consistent with" primer gunshot residue particles on the firing hand 3. Washing or wiping the hands after discharging or handling a firearm, a firearm component, or an object with primer gunshot residue Primer gunshot residue particles were not detected on the sampling device "Control" (item 1-3-1).
p20242109	W076	Primer gunshot residue particles were not detected on the sampling device (item 2-1-1) used to collect residues from the hands of suspect A. The absence of primer gunshot residue particles on an individual's hands could be due to the individual: 1. Not discharging a firearm or being in the close vicinity of a discharging firearm 2. Discharging a firearm or being in the close vicinity of a firearm that does not deposit or produce significant "characteristic" or "consistent with" primer gunshot residue particles on the firing hand 3. Washing or wiping the hands after discharging or handling a firearm, a firearm component, or an object with primer gunshot residue Primer gunshot residue particles were not detected on the sampling device (item 2-2-1) used to collect residues from the hands of suspect B. The absence of primer gunshot residue particles on an individual's hands could be due to the individual: 1. Not discharging a firearm or being in the close vicinity of a discharging firearm 2. Discharging a firearm or being in the close vicinity of a firearm that does not deposit or produce significant "characteristic" or "consistent with" primer gunshot residue particles on the firing hand 3. Washing or wiping the hands after discharging or handling a firearm, a firearm component, or an object with primer gunshot residue Primer gunshot residue particles were not detected on the sampling device "GSR Negative Control" (item 2-3-1).

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242110	W076	Primer gunshot residue particles were not detected on the sampling device (item 3-1-1) used to collect residues from the hands of suspect “A”. The absence of primer gunshot residue particles on an individual’s hands could be due to the individual: 1. Not discharging a firearm or being in the close vicinity of a discharging firearm 2. Discharging a firearm or being in the close vicinity of a firearm that does not deposit or produce significant “characteristic” or “consistent with” primer gunshot residue particles on the firing hand 3. Washing or wiping the hands after discharging or handling a firearm, a firearm component, or an object with primer gunshot residue Primer gunshot residue particles were not detected on the sampling device (item 3-2-1) used to collect residues from the hands of suspect “B”. The absence of primer gunshot residue particles on an individual’s hands could be due to the individual: 1. Not discharging a firearm or being in the close vicinity of a discharging firearm 2. Discharging a firearm or being in the close vicinity of a firearm that does not deposit or produce significant “characteristic” or “consistent with” primer gunshot residue particles on the firing hand 3. Washing or wiping the hands after discharging or handling a firearm, a firearm component, or an object with primer gunshot residue Primer gunshot residue particles were not detected on the GSR negative control sampling device (item 3-3-1).
p20242111	W126	The samples were examined for the presence of GSR with a negative result for all.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242112	W141	Results of Analysis Exhibit Number Description of Evidence GSR-1 One (1) sealed envelope labeled FTS-24-GSR collected from [redacted]. GSR-1-C One (1) sealed brown evidence envelope containing SEM stub (blue) labeled "Item 3." There were 0 microscopic particle(s) containing any combination of lead (Pb), barium (Ba), and antimony (Sb) confirmed on exhibit GSR-1-C. GSR-1-B One (1) sealed brown evidence envelope containing SEM stub (red) labeled "Item 2." There were 0 microscopic particle(s) containing any combination of lead (Pb), barium (Ba), and antimony (Sb) confirmed on exhibit GSR-1-B. GSR-1-A One (1) sealed brown evidence envelope containing SEM stub (green) labeled "Item 1." There were 0 microscopic particle(s) containing any combination of lead (Pb), barium (Ba), and antimony (Sb) confirmed on exhibit GSR-1-A. Conclusions In reference to exhibit GSR-1-C collected from Negative Control: The absence of gunshot residue does not eliminate the individual from having discharged a firearm, being in close proximity to a discharged firearm, or coming into contact with a surface containing primer GSR particles. In reference to exhibit GSR-1-B collected from Suspect B: The absence of gunshot residue does not eliminate the individual from having discharged a firearm, being in close proximity to a discharged firearm, or coming into contact with a surface containing primer GSR particles. In reference to exhibit GSR-1-A collected from Suspect A: The absence of gunshot residue does not eliminate the individual from having discharged a firearm, being in close proximity to a discharged firearm, or coming into contact with a surface containing primer GSR particles. Microscopic particles containing all three elements (Pb, Ba, Sb) with globular appearance are characteristic of primer GSR. The submitted exhibits were examined by scanning electron microscopy/energy dispersive spectrometry and analyzed for morphology and elemental composition of primer GSR particles.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242113	W185	No gunshot residue particles larger than 1,25 microns are found on GSR stub, taken from suspect A hands (Item1). No gunshot residue particles larger than 1,25 microns are found on GSR stub, taken from suspect B hands (Item2).
p20242114	W042	Items #01.01 and #01.02 were analyzed for the presence of primer gunshot residue by scanning electron microscopy-energy dispersive spectroscopy. Primer gunshot residue was NOT detected on the samples from the hands of Suspect A and Suspect B. Item#01.03 was not examined at this time. Additional Remarks The presence of primer gunshot residue indicates a subject discharged a firearm, was in the proximity to a firearm discharge, or handled an object contaminated with PGSR. The absence of PGSR does not exclude a subject from discharging a firearm
p20242115	W070	Electron microscopic examination and analysis of Item 1 and Item 2 did not reveal the presence of gunshot primer residue. The absence of gunshot primer residue is consistent with an individual who has not discharged a firearm or otherwise been exposed to a source of gunshot primer residue. A negative result could also occur when gunshot primer residue particles are lost due to washing, excessive time interval between firearm discharge and collection, or other routine activities.
p20242116	W070	Electron microscopic examination and analysis of Item 1 did not reveal the presence of gunshot primer residue. The absence of gunshot primer residue is consistent with an individual who has not discharged a firearm or otherwise been exposed to a source of gunshot primer residue. A negative result could also occur when gunshot primer residue particles are lost due to washing, excessive time interval between firearm discharge and collection, or other routine activities. Electron microscopic examination and analysis of Item 2 did not reveal the presence of gunshot primer residue. The absence of gunshot primer residue is consistent with an individual who has not discharged a firearm or otherwise been exposed to a source of gunshot primer residue. A negative result could also occur when gunshot primer residue particles are lost due to washing, excessive time interval between firearm discharge and collection, or other routine activities.
p20242117	W070	Electron microscopic examination and analysis of Item 1 and Item 2 did not reveal the presence of gunshot primer residue. The absence of gunshot primer residue is consistent with an individual who has not discharged a firearm or otherwise been exposed to a source of gunshot primer residue. A negative result could also occur when gunshot primer residue particles are lost due to washing, excessive time interval between firearm discharge and collection, or other routine activities.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242118	W098	No gunshot primer residue particles were detected on the GSR kit from Suspect A (Item 1) or the GSR kit from Suspect B (Item 2). The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently discharged or been in immediate proximity of a firearm as it is being discharged. B. Gunshot primer residue particles may have been deposited, but were removed. C. The firearm/ammunition does not consistently produce characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the firearm. No gunshot primer residue particles were detected on the GSR negative control (Item 3). Definitions: A characteristic gunshot primer residue particle has a composition rarely found in particles from any source other than pGSR. A characteristic gunshot primer residue particle is composed of lead, barium, and antimony and has a molten appearance. Other elements may also be present in the particle. An indicative (also called consistent) gunshot primer residue particle has a composition that is found in pGSR, but also can arise from other non-firearm sources. An indicative gunshot primer residue particle is composed of either lead and barium, lead and antimony, or barium and antimony, and has a molten appearance. Other elements may also be present in the particle. Additional Information: A list of possible non-pGSR (environmental) sources can be found in the [redacted] Laboratory Customer Handbook. Please note that any gunshot primer residue deposited on a living person's hands will typically be removed by normal activity within four hours. Therefore, the interpretations listed above for the GSR kits collected from hands should only be applied to the four hours immediately prior to the kits collection.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242119	W098	This item (Item 3) was used as a control standard. No gunshot primer residue particles were detected on the GSR stub (Item 1). The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently discharged or been in immediate proximity of a firearm as it is being discharged. B. Gunshot primer residue particles may have been deposited, but were removed. C. The firearm/ammunition does not consistently produce characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the firearm. No gunshot primer residue particles were detected on the GSR stub (Item 2). The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently discharged or been in immediate proximity of a firearm as it is being discharged. B. Gunshot primer residue particles may have been deposited, but were removed. C. The firearm/ammunition does not consistently produce characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the firearm.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242120	W098	3x5.5 yellow envelope containing a GSR stub from Suspect A (Item 1) No gunshot primer residue particles were detected on the GSR stub. The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently fired a weapon or been in immediate proximity of a weapon as it is being fired . B. Gunshot primer residue particles may have been deposited, but were removed. C. The weapon/ammunition does not consistently deposit characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the weapon. 3x5.5 yellow envelope containing a GSR stub from Suspect B (Item 2) No gunshot primer residue particles were detected on the GSR stub. The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently fired a weapon or been in immediate proximity of a weapon as it is being fired . B. Gunshot primer residue particles may have been deposited, but were removed. C. The weapon/ammunition does not consistently deposit characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the weapon. 3x5.5 yellow envelope containing a GSR Negative Control stub (Item 3) This item was used as a control standard.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242122	W098	GSR Kit from Suspect A (Item 1) No gunshot primer residue particles were detected on the GSR kit. The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently fired a weapon or been in immediate proximity of a weapon as it is being fired . B. Gunshot primer residue particles may have been deposited, but were removed. C. The weapon/ammunition does not consistently deposit characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the weapon. GSR Kit from Suspect B (Item 2) No gunshot primer residue particles were detected on the GSR kit. The absence of gunshot primer residue particles is consistent with any of the following conditions: A. A person has not recently fired a weapon or been in immediate proximity of a weapon as it is being fired . B. Gunshot primer residue particles may have been deposited, but were removed. C. The weapon/ammunition does not consistently deposit characteristic or indicative gunshot primer residue particles. D. There was an intervening object between the hands and the weapon. GSR Negative Control (Item 3) This item was used as a control standard.
p20242123	W225	1. The analysis carried out on the stub identified as “item 1”, is inconclusive. 2. In the analysis carried out on the stub identified as “item 2”, no characteristic particles of GSR were identified. 3. In the analysis carried out on the stub identified as “item 3”, which belongs to the GSR negative control, no characteristic particles of GSR were identified.
p20242124	W055	1. No particles characteristic of primer gunshot residue and no smokeless powder particles were confirmed on Exhibits 1 (sample stub from suspect A), 2 (sample stub from suspect B), or 3 (negative control stub). Based on these results, the following possibilities exist: 1.1. The individuals did not handle/discharge a firearm, was not otherwise in an environment of gunshot residue, or did not come into contact with an object containing particles characteristic of primer gunshot residue. 1.2. The individuals was exposed to a source of primer gunshot residue, but particles characteristic of primer gunshot residue were not deposited on the hands. 1.3. Particles characteristic of primer gunshot residue were deposited on the hands, however, due to washing, wiping, or other activity, the particles were removed.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242125	W055	1. No particles characteristic of primer gunshot residue (and no smokeless powder particles) were confirmed on Exhibits 1 (item 1), 2 (item 2), or 3 (item 3). Based on these results, the following possibilities exist: 1.1. The individuals did not handle/discharge a firearm, were not otherwise in an environment of gunshot residue, or did not come into contact with an object containing particles characteristic of primer gunshot residue. 1.2. The individuals were exposed to a source of primer gunshot residue, but particles characteristic of primer gunshot residue were not deposited on the hands. 1.3. Particles characteristic of primer gunshot residue were deposited on the hands, however, due to washing, wiping, or other activity, the particles were removed.
p20242126	W055	1. Exhibits 1 (questioned carbon taped SEM stub from the hands of suspect A), 2 (questioned carbon taped SEM stub from the hands of suspect B), and 3 (negative control carbon taped SEM stub) were analyzed for the presence of primer gunshot residue. 2. No particles characteristic of primer gunshot residue (and no smokeless powder particles) were confirmed on Exhibits 1 or 2. Based on these results, the following possibilities exist: a. The individuals did not handle/discharge a firearm, were not otherwise in an environment of gunshot residue, or did not come into contact with an object containing particles characteristic of primer gunshot residue. b. The individuals were exposed to a source of primer gunshot residue, but particles characteristic of primer gunshot residue were not deposited on the hands. c. Particles characteristic of primer gunshot residue were deposited on the hands, however, due to washing, wiping, or other activity, the particles were removed. 3. Exhibit 3 was submitted as a negative control. No particles characteristic of primer gunshot residue were observed on this negative control.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242127	W055	1. Exhibits 1 (carbon taped SEM stub from hands of Suspect A), 2 (carbon taped SEM stub from hands of Suspect B), and 3 (GSR negative control carbon taped SEM stub) were examined microscopically and by scanning electron microscopy/energy dispersive x-ray spectrometry for the presence or absence of gunshot residue. 2. No particles characteristic of primer gunshot residue (and no smokeless powder particles) were confirmed on Exhibits 1 or 2. Based on these results, the following possibilities exist: a. The individuals did not handle/discharge a firearm, were not otherwise in an environment of gunshot residue, or did not come into contact with an object containing particles characteristic of primer gunshot residue. b. The individuals were exposed to a source of primer gunshot residue, but particles characteristic of primer gunshot residue were not deposited on the hands. c. Particles characteristic of primer gunshot residue were deposited on the hands, however, due to washing, wiping, or other activity, the particles were removed. 3. No particles characteristic of primer gunshot residue (and no smokeless powder particles) were confirmed on Exhibit 3.
p20242129	W037	There were not any particles of primer gunshot residue identified on the items submitted. There is no indication that the items came into contact with primer gunshot residue or were in the vicinity of a firearm during discharge, or that primer gunshot residue was not deposited, not collected, not detected, or was removed.
p20242130	W037	There were not any particles of primer gunshot residue identified on the items submitted. There is no indication that the items came into contact with primer gunshot residue or were in the vicinity of a firearm during discharge, or primer gunshot residue was not deposited, not collected, or was removed.
p20242131	W037	There were not any particles of primer gunshot residue identified on the samples submitted. There is no indication that the items came into contact with primer gunshot residue or were in the vicinity of a firearm during discharge, or primer gunshot residue was not deposited, not collected, not detected, or was removed.
p20242132	W056	1.1.1) No particles characteristic of gunshot primer residue were detected on the sample. 1.2.1) Without a comparison to a cartridge case, no conclusion about the particle examined on this sample can be reached at this time. If such a cartridge case was recovered, it can be submitted to the laboratory for analysis. 1.3.1) No particles characteristic of gunshot primer residue were detected on the sample.

<table>
<tr><th>UTIC</th><th>Webcode</th><th>How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).</th></tr>
<tr><td>p20242133</td><td>W056</td><td>1.1, 1.3) No particles characteristic of gunshot primer residue were detected on the sample.
1.2) Without a comparison to a cartridge case, no conclusion about the five (5) particles examined on this sample can be reached at this time. If such a cartridge case was recovered, it can be submitted to the laboratory for analysis.</td></tr>
<tr><td>p20242134</td><td>W056</td><td>1.1) No particles characteristic of gunshot primer residue were detected on the sample.

1.2) Without a comparison to a cartridge case, no conclusion about the one (1) particle examined on this sample can be reached at this time. If such a cartridge case was recovered, it can be submitted to the laboratory for analysis.

1.3) No particles characteristic of gunshot primer residue were detected on the sample.</td></tr>
<tr><td>p20242135</td><td>W084</td><td>The gunshot residue (GSR) collection stubs contained in Items 1 through 3 were examined for the presence of GSR particles using Scanning Electron Microscopy with Energy Dispersive Spectrometry (SEM/EDS) and the Laboratory’s current Standard Operating Procedures for GSR analysis.

<table>
<tr><td>Subject</td><td>Characteristic GSR particles confirmed*</td></tr>
<tr><td>Item 1</td><td>0</td></tr>
<tr><td>Item 2</td><td>0</td></tr>
<tr><td>Item 3</td><td>0</td></tr>
</table>
A negative result is indicated when no characteristic GSR particles are detected.

*Additional information about GSR examinations:
− Characteristic GSR particles for most types of ammunition contain the elements lead, barium and antimony.
− Confirmed particles are individual particles that were relocated, analyzed, and classified by the analyst as GSR based on appropriate elemental composition and morphology.
− The absence of GSR means there is no indication that the subject or item came into contact with GSR or was in the vicinity of a firearm during discharge. If the subject or item was exposed to GSR, then GSR was not deposited, was removed by activity, or was not detected.
− When a firearm is discharged, particles that can be classified as consistent with GSR are also generated. These are individual particles that contain only two of these elements (lead, barium, antimony) or barium along with specific elements, and meet other criteria. Such particles can be found in GSR but may also originate from other non-GSR sources. Particles consistent with GSR are evaluated during testing as part of the assessment of the population of particles on a sample.</td></tr>
</table>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20242137	W248	No GSR particles were detected in Items 1 and 2. The negative control carbon taped SEM stub Item 3, did not reveal GSR and so the analysis by means of SEM-EDX was performed correctly.

8) How long did it take to complete this test (in hours)? Please report actual analytical hours only.

9) Did you find this test to be a fair test of the process of the examination and interpretation of gunshot residue?

A) ○ Yes

B) ○ No

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination and interpretation of gunshot residue?
p20242001	W031	2	Yes
p20242002	W024	15	Yes
p20242003	W119	5	Yes
p20242004	W119	4 hours	Yes
p20242005	W061	40	No
p20242006	W061	5	Yes
p20242007	W061	20 hours	Yes
p20242008	W061	2:15 hr instrumental analysis only	Yes
p20242010	W133	3	No
p20242011	W133	6 Hours	No
p20242013	W023	12 hours	Yes
p20242015	W138	4	Yes
p20242016	W179	4.5 hours	Yes
p20242018	W230	2 hours	Yes
p20242019	W009	4	Yes
p20242020	W028	1	No
p20242021	W028	6	Yes
p20242022	W028	4 hours	Yes
p20242023	W263	20 hours	Yes
p20242024	W265	10 hours	Yes
p20242025	W040	22 hours	Yes
p20242027	W144	6 hours	Yes

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination and interpretation of gunshot residue?
p20242028	W144	8,43	Yes
p20242029	W144	9 hours	Yes
p20242030	W144	7	Yes
p20242031	W193	30 hours	Yes
p20242032	W143	12	Yes
p20242033	W143	6	Yes
p20242034	W181	12	Yes
p20242035	W246	The test is complete for 11 hours approx	Yes
p20242036	W170	5.06 hours	Yes
p20242037	W170	5.0 hours	Yes
p20242038	W170	5	Yes
p20242039	W170	8	Yes
p20242040	W170	4,7	Yes
p20242041	W132	42	No
p20242042	W160	60	Yes
p20242043	W153	3 hours and 16 minutes	Yes
p20242044	W088	8	Yes
p20242045	W088	8	Yes
p20242046	W088	~ 8 hours	Yes
p20242047	W034	10	Yes
p20242053	W079	8	Yes
p20242054	W079	8	Yes
p20242055	W114	2hrs	Yes
p20242056	W114	1.5 hours	Yes
p20242057	W114	3 hours	Yes
p20242058	W114	2	Yes
p20242059	W114	1.5 hours	Yes
p20242060	W250	3.50 hours	Yes
p20242061	W158	14 hours	Yes
p20242062	W158	12	Yes
p20242063	W158	15	Yes
p20242065	W110	5	Yes
p20242066	W110	4	Yes
p20242068	W082	13.5	Yes
p20242069	W251	6 hours	Yes
p20242070	W012	30	Yes
p20242072	W059	5 hours	Yes
p20242073	W001	8.5 hours	No
p20242075	W005	10	Yes

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination and interpretation of gunshot residue?
p20242076	W066	7	Yes
p20242077	W209	03 Hours	Yes
p20242078	W033	6	Yes
p20242079	W033	7	Yes
p20242080	W033	4	Yes
p20242081	W053	6.5	Yes
p20242082	W130	72	(blank)
p20242085	W069	4	Yes
p20242086	W069	7	Yes
p20242087	W116	6	No
p20242088	W025	3	Yes
p20242089	W025	2	Yes
p20242093	W083	9	Yes
p20242094	W017	4 hours	No
p20242095	W017	less than 6 hours analytical	Yes
p20242097	W035	~1hr for sample setup and analysis.	Yes
p20242101	W147	10.69	Yes
p20242102	W147	24	Yes
p20242103	W117	20	Yes
p20242104	W084	3	Yes
p20242105	W051	13	Yes
p20242106	W016	5	No
p20242108	W076	10	Yes
p20242109	W076	8	Yes
p20242110	W076	10	Yes
p20242111	W126	6 hours	No
p20242112	W141	4	Yes
p20242113	W185	4	Yes
p20242114	W042	12	(blank)
p20242115	W070	4	Yes
p20242116	W070	11 hours	Yes
p20242117	W070	14	Yes
p20242118	W098	4	Yes
p20242119	W098	8	Yes
p20242120	W098	5.5	Yes
p20242122	W098	6 hours	Yes
p20242123	W225	12.09 hours	Yes
p20242124	W055	4	Yes
p20242125	W055	8	Yes
p20242126	W055	8	No

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination and interpretation of gunshot residue?
p20242127	W055	6	Yes
p20242129	W037	~ 5hrs	Yes
p20242130	W037	~ 4 hours	Yes
p20242131	W037	3.5	Yes
p20242132	W056	10.867 hours	Yes
p20242133	W056	14:43:12	Yes
p20242134	W056	2.63	Yes
p20242135	W084	3	Yes
p20242137	W248	2.5 h	Yes

10) How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.

Additionally, this question is a means to provide you with an opportunity to explain or include information about your findings or interpretation, as needed. In order to maintain confidentiality, please refrain from including identifying information specific to your laboratory.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242003	W119	No changes are recommended at this time. It should be noted that the scope of this analysis and conclusions is limited to inorganic primer residues characterized by the confirmation of lead, barium and antimony.	Thank you for clarifying your responses.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242004	W119	I would prefer submission of these items include a case scenario with shooting and firearm-related information as the majority of our submissions provide.	We understand the desire for more case scenario details. However, as all PT scenarios are contrived, and the interpretation of evidence and its significance are not being assessed by FTS, we are eliminating case scenario details that may bias, mislead, or influence analysts' results.
p20242005	W061	Unsure if there was meant to be a sample containing GSR in this test? Item 1 seemed to have the same instrument detections as the negative control, so we may have received 2 x negative controls?. Wholistically, I think it is good to include particles which are chemically or morphologically similar to GSR, or even particles that have a GSR-like source. In the vast majority of real casework samples, these are the particle types we encounter the most frequently, and it is appropriate to ensure analysts are correctly reporting on these particle types. However, also having characteristic GSR particles in the proficiency test ensures that analysts can meet the minimum requirements of GSR examinations (i.e. the distinction between very clear GSR particles and not-GSR particles).	Please see Manufacturer's Information above. Although skin was sampled for both Items 1 and 2, the skin must be recently cleaned to prevent possible GSR contamination on negative items distributed within this PT. FTS tries to offer different PT items year to year with the objective to represent a real case scenario as closely as possible while also adhering to accreditation standards. It was the intention of FTS to offer two negative GSR items in order to reflect what is seen in actual case work. Additionally, the PT demonstrated an analyst's ability to discern between characteristic GSR particles and GSR-like environmental particles (e.g. brake dust). Additionally, it should not be expected that every GSR PT distributed by FTS will contain a positive GSR item as that is not the expectation in normal casework.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242006	W061	A total of 12 particles (including an approximately 1µm Bi particle) was detected on Item #1 during an autorun with increased sensitivity. This is a very low particle loading and a question arises whether the carbon taped SEM stub was used to collect a particle sample.	Please see FTS Response for p20242005.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242007	W061	Item 3 (control) contained more detected particles (>2000 particles) than both item 1 (~350 particles) and item 2 (~1500 particles) combined. As the only person who handled this test it suggests that the control stub could have been mixed with one of the test samples prior to shipping. Our laboratory procedure is to handle any GSR exhibit with care due to the potential for contamination and/or mixing up of samples. Stubs are removed one at a time and labelled on the bottom to differentiate them from each other. It is suggested for FTS that even though the envelope and vial is labelled and matches, that the stub is also labelled to further confirm that the right sample is being examined. If any of the stubs within this test were positive I would have been hesitant to submit a result in-case other samples had been inadvertendly mixed around. For reference, our analysis concluded: Item 1 - Contained a small quantity of Pb particles. Item 2 - Contained a large quantity of BaSO4 particles. Item 3 - Small quantity of Pb particles and a large quantity of CuZn particles.	Thank you for clarifying your results. Please see Manufacturer's Information above for details regarding the production and handling of GSR negative samples by FTS prior to distribution. If, at any time, there is concern regarding your PT items, please contact FTS for a replacement, if necessary.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242010	W133	A larger sampling of the particles would allow for a more thorough examination of particles of interest as well as the population of particles. Also, 2 samples are generally provided in real-world samples which also allows for a greater population of particles.	Thank you for the suggestion. Due to limitations in preparing valid PT items, we must limit the number of stubs distributed with each test.
p20242011	W133	Sampling devices per suspect/item should be at least 2 to ensure proficiency test is consistent with evidence encountered during routine casework.	Please see FTS Response for p20242010.
p20242013	W023	We typically get 2 stubs from each subject being tested for pGSR.	Please see FTS Response for p20242010.
p20242016	W179	The test was appropriate for establishing if any GSR particles were on the submitted items, but in this case no Lead based characteristic GSR particles were detected. *Note: this laboratory does not routinely test for GSR from lead free ammunition unless it is known that lead free ammunition was used in the incident and a control sample is available from which the type of GSR can be determined for analysis and comparison purposes.*	Thank you for clarifying your responses.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242020	W028	A sample shouldn't be so negative that it looks like a blank. If it was pressed to a suspect's hands, even if they just showered or washed their hands, you are still going to pick up some envirnomental particles. Having only 1 particle total on a questioned sample is not realistic at all. I am still not even convinced you didn't give me two blank control lifters.	Please see FTS Response for p20242005.
p20242027	W144	Please label each stub with your name and/or identification code on the bottom of the stub.	Thank you for the suggestions. Serialization of the stubs has been suggested in the past but it would create significant tracking issues within our quality system, so we have not moved in this direction. As with all evidence, analysts must take measures to ensure the samples are tracked.
p20242028	W144	Each stub needs to be labeled with a number sequence or any identification individually to avoid possible confusion.	Please see FTS Response for p20242027.
p20242029	W144	I suggest that next year the stubs be sent with a serial number that identifies them.	Please see FTS Response for p20242027.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242030	W144	As an opportunity for improvement associated with the application of ASTM E1588-20 standard practice (section 6.2), the stubs could come prenumbered or serialized (e.g., TED PELLA 16111N or manually with permanent marker), to minimize manipulation of the stubs with samples (for marking) before mounting them on the equipment. It is quite difficult to write on the metal disc of the received items and there is a risk of touching the carbon tape or of it falling off during this handling. In this case the cost/benefit would seem a priori not to be very high due to the inclusion of the pre-serialization of the stubs.	Please see FTS Response for p20242027.
p20242034	W181	In the SEM stub applied on the areas of Suspected 1 (Item #1), particles distributed over lines have been observed. In the SEM stub applied on the areas of Suspected 2 (Item #2), particles distributed over circles (3) have been observed.	Thank you for clarifying your results.
p20242035	W246	The report format on web submission should have an upload session file (i.e. .jpeg or .docx) for results of GSR examination. However, the overview of the PT-24-GSR test is satisfactory.	Thank you for the suggestion. We would not assess the raw data associated with this PT, therefore we do not require for it to be uploaded to our website.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242037	W170	It will be great to have more information related to the case and related to the activities the people have during the criminal activity and the time they were sampled, it is import to know how many time passed during the facts and the sampling. It is also important to know the profession or the working activities of the sampled person as the consistent GSR particles, could be generate in certain technical activities.	Please see FTS Response for p20242004.
p20242038	W170	It will be great to have more information related to the case and related to the activities the people have during the criminal activity and the time they were sampled, it is import to know how many time passed during the facts and the sampling. It is also important to know the profession or the working activities of the sampled person as the consistent GSR particles, could be generate in certain technical activities.	Please see FTS Response for p20242004.
p20242039	W170	Is desirable having information related with the sampled person activities and profession in order to have a better understanding about how the found particles have reach the stub. Is also desirable knowing how many time has passed between the possible gunshot event and the sampling.	Please see FTS Response for p20242004.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242040	W170	It will be great to have more information related to the case and related to the activities the people have during the criminal activity and the time they were sampled, it is import to know how many time passed during the facts and the sampling. It is also important to know the profession or the working activities of the sampled person as the consistent GSR particles, could be generate in certain technical activities.	Please see FTS Response for p20242004.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242041	W132	We issue Police with GSR sampling kits which include a sample for the right hand, left hand and face of the suspect. We typically do not report results for individual stubs. We report the combined results of the kit as a whole (suspects samples). Only in very specific and clearly defined circumstances to aid an investigation would we consider reporting results of an individual GSR stub. We do not generally report the results of the control stub. Generally in case work we look for background information regarding the case circumstances. If more detailed background information had been given it may have been possible to evaluate the findings taking into account different propositions. Additional information may include the number of shots fired, type of weapon used, location (inside/outside), time since discharge of weapon and sampling of suspect. This information would allow us to interpret the findings adding more value to the investigation. Note: The stub for item 2 appeared to be damaged and took a long time to run. The analysis had to be restarted with a higher threshold however the analysis was still taking too long. The stubs were carbon coated and run at the higher threshold. The analysis ran to completion however the whole run took ~42 hours. Some particles were detected that may be considered as consistent particles or could potentially have origianted from lead free ammuntion. A reference sample (e.g. from a spent cartridge casing) was not available for comparison and therefore it was not possible to comment on the potential origin of such particles.	Please see FTS Response for p20242004. Thank you for clarifying your responses and for your feedback.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242042	W160	For future tests, it would be useful to provide a conparison source (if the samples were positive) to allow for further interpretation to be carried out.	Thank you for the suggestion.
p20242047	W034	Given scenario with submitted number of samples (one stub from suspect A, one stub from suspect B, one single negative Control) is non-respresentative of actual casework submitted to our laboratory. Having only one control submitted for two collected samples is not observed in our experience, more that a control is submitted with each sample taken from an individual (or in many cases, no negative control submitted at all.) But impossible to capture replication of all labs submission policies, so ultimately no concerns.	Thank you for clarifying your responses.
p20242060	W250	The scenario was straightforward. The test could be asjusted to quantify GSR particles by specifying the number of characteristic particles found, if present.	Thank you for the suggestion.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242069	W251	Desafortunadamente, el embalaje secundario llegó roto al igual que el embalaje del artículo 2, esto se debe a las normas aduaneras de nuestro país, ya que están abriendo el embalaje al azar, según informa el servicio de entrega de paquetería. Consideramos que es necesario sellar los portamuestras con una etiqueta de embalaje, cubriendo el cuerpo y la tapa, para garantizar la conservación de los residuos de armas de fuego y evitar un sesgo de los resultados en el procesamiento de los artículos, incluso si el paquete aún está abierto.	Thank you for bringing this to our attention. We will consider adding that to the packaging for future PT distributions.
p20242073	W001	With all of my samples being negative (no gunshot residue detected), it is not a fair test of interpretation of GSR as I only reacquired one particle and even that ended up not even being a consistent GSR particle as indicated from initial acquisition.	Please see FTS Response for p20242005.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242082	W130	Kits submitted to our laboratory must include a negative control that was collected from the clean, gloved hands of the officer collecting the sample stubs to demonstrate the condition of the officer's gloves. If we were to treat this proficiency test as a real case, then this kit is either incomplete, or the negative control submitted was not properly generated. There should be separate negative controls (i.e. a separate set of clean gloves used by the officer) for each suspect from which a pGSR sample stub was collected. Only one was submitted with this kit, so either it was generated for one suspect and not the other, or it was used during the collection of each suspect, which is not appropriate.	Thank you for clarifying your results. Please see FTS Response for p20242010.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242087	W116	All stubs were analyzed 3 different times. During each analysis the positive and negative controls functioned as expected. Casework samples were analyzed before and after the analysis of this proficiency test with no issues. The first analysis of this proficiency test was on 7/29/24, the second analysis was on 7/30/24 and the third analysis was on 8/7/24. Each time, no 3-component particles were detected. After the first analysis, the SEM was used to scan and view the surface of each stub. On Item 1B (FTS Item 2) 3 circular areas could be seen where it appeared a shell casing had been placed on the stub. Particles were reacquired and analyzed from those areas and no 2-component or 3-component particles were detected. There were particles that contained barium, however the majority of the particles contained iron. Images of the stub in question were captured. The stubs were analyzed a second time and then rotated 180 degrees and analyzed a third time all with the same result. It appears that when making the test no 2-component or 3-component particles were placed on the stubs.	Thank you for clarifying your results. Please see FTS Response for p20242005.
p20242094	W017	It would be better if there were negative and positive samples instead of two negatives.	Please see FTS Response for p20242005.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242097	W035	I understand the challenge of having all samples be truly negative, as this is something that can be encountered in casework. However, to adequately test an examiner's knowledge of interpreting whether or not something is GSR, you need to have particulate to look at.	Please see FTS Response for p20242005.
p20242103	W117	For future tests, SEM stubs designated for suspect test samples should have more identifiable features. I ran Item 1 a total of 3 times to ensure that this sample truly did not have any characteristic particles since only 1 feature (lighter flint) was identified. Item 1 is more representative of a negative control than a test sample.	Please see FTS Response for p20242005.
p20242106	W016	The test could better mimic GSR casework by utilizing an actual GSR kit from an established provider such as Sirchie or Tritech. This would allow the test provider to complete a GSR Information form, as is required in actual GSR casework. The analyst would then be able to evaluate the time between the incident and the collection as this is an important part of GSR analysis. They would also be able to evaluate the status of the suspect and if they had sustained a gunshot wound, also another important part of GSR analysis.	Please see FTS Response for p20242004.
p20242111	W126	While the test was a fair test of our examination process, we would require a scenario in order to be able to interpret out results.	Please see FTS Response for p20242004.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242112	W141	This particular sample on this instrument had an excess run time of several days due to the high amounts of iron found on Item 2. This also extended the hours in which analysis was performed.	Thank you for your feedback.
p20242115	W070	My particular stubs did not appear to be used at all. From a proficiency test standpoint, having stubs with some particles to review is more beneficial than having totally blank stubs.	Please see FTS Response for p20242005.
p20242116	W070	Add some sort of scenario	Please see FTS Response for p20242004.
p20242117	W070	It might be more beneficial to see how scientists use their criteria for analyzing particles if there are more particles containing combinations of lead, barium, and antimony on the stubs.	Thank you for the suggestion.
p20242118	W098	Use real-world samples, even for negative-pGSR stubs. i.e., stub a person's hands so that the stub has real-world environmental particles on it.	Please see FTS Response for p20242005.
p20242120	W098	Item 1 was atypically clean, with very few particles being detected. This is not normally seen in casework, as even negative samples will have a decent amount of environmental particles (100+) just from debris of normal activity desposited on an individual's hands; even on relatively clean hands. A suggestion would be for negative stubs to include more environmental debris.	Please see FTS Response for p20242005.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242123	W225	The result of item 1 is “inconclusive” because during the environmental control analysis GSR particles were detected, so according to our procedure we cannot report it as “positive” and corrective actions are taken.	Thank you for clarifying your responses.
p20242126	W055	Including positive samples in a proficiency test is essential to ensure the overall reliability and accuracy of the test. This is because a key aspect of a proficiency test is to confirm that a test can accurately identify both positive and negative results. If a proficiency test only includes negative samples, the test's ability to detect positive samples can't be confirmed. This means that while the test may be excellent at identifying negatives, there could be issues with its sensitivity or specificity when it comes to positive results. Including positive samples in a proficiency test allows for a more comprehensive evaluation of the testing process. It provides an opportunity to confirm that the test can accurately detect the presence of a specific substance or characteristic, and that the results are reported correctly. Furthermore, including positive samples in a proficiency test can help identify potential issues with the testing process, such as contamination or false positives. This information can be used to improve the testing process and ensure that accurate and reliable results are being obtained. Overall, the inclusion of positive samples in a proficiency test is crucial to ensure the overall reliability and accuracy of the test, and to identify any potential issues with the testing process.	Please see FTS Response for p20242005.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242132	W056	Note: When only two-element particles are confirmed, this laboratory does not consider the presence of these particles to be positive, negative nor inconclusive since these particles may be generated from primer ignition and/or environmental sources. Our stance is that the examination is incomplete. Whether GSR is present cannot be determined until a cartridge case related to the incident is comparatively examined. Thus, our SOP is to request and compare to a recovered discharged cartridge when only binary particles are present.	Thank you for clarifying your responses.
p20242133	W056	When only two-element particles are confirmed, this laboratory does not consider the presence of these particles to be positive, negative nor inconclusive since these particles may be generated from primer ignition and/or environmental sources. Our stance is that the examination is incomplete. Whether GSR is present cannot be determined until a cartridge case related to the incident is comparatively examined. Thus, our SOP is to request and compare to a recovered discharged cartridge when only binary particles are present.	Thank you for clarifying your responses.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20242134	W056	Note: When only two-element particles are confirmed, this laboratory does not consider the presence of these particles to be positive, negative nor inconclusive since these particles may be generated from primer ignition and/or environmental sources. Our stance is that the examination is incomplete. Whether GSR is present cannot be determined until a cartridge case related to the incident is comparatively examined. Thus, our SOP is to request and compare to a recovered discharged cartridge when only binary particles are present.	Thank you for clarifying your responses.
p20242135	W084	Scenario/Item description provided on test submission form did not match same info hard copy paperwork provided with test samples.	Thank you for your feedback. Please contact FTS should any concerns arise regarding your PT items or testing forms.
p20242137	W248	This test resembles the real negative case scenario, does not need an excessive time to perform and still demands fully professional attempt to analyze the samples and interpret them.	Thank you!