



"Enriching Lives"

COUNTY OF LOS ANGELES

DEPARTMENT OF MEDICAL EXAMINER-CORONER

1104 N. MISSION RD, LOS ANGELES, CALIFORNIA 90033



Jonathan R. Lucas, M.D.
Chief Medical Examiner-Coroner

Gunshot Residue (GSR) Analysis Report

Report Date: 06/05/19
Agency: Riverside Police Department
Agency #: P18135608

LACDOC #: 2019-40805.1

Karla Beler
Riverside Police Department
10540 Magnolia Ave. Ste. B
Riverside, CA 92505

Analysis: Determine by Scanning Electron Microscopy / Energy Dispersive Spectroscopy (SEM/EDS) analysis if any gunshot residue particles are present.

GSR Origin: When a firearm is discharged, hot vapors originating from the primer material at the base of the cartridge escape the firearm through any area that is not air tight. These vapors quickly cool and condense into microscopic, metal-containing particles that fall on anything in the vicinity of the discharge of the firearm. We refer to these particles as gunshot residue (GSR). The Sinoxid formulation of primer material has a specific chemical composition that typically includes lead styphnate, antimony sulfide, and barium nitrate. Other elements originating from ammunition components (e.g., bullet, cartridge case, and jacket) and the firearm itself can also contribute to the composition of GSR particles.

Particles that are **characteristic** of GSR contain the elements lead, antimony, and barium. It is possible, though very rare, to form lead, antimony, and barium particles through other sources (e.g., brake linings in foreign countries or certain pyrotechnics). The presence of additional elements not typically found in primer residues may eliminate these particles as originating from the discharge of a firearm.

Particles that are **consistent** with GSR generally contain the elements lead and antimony, lead and barium, antimony and barium, and barium and aluminum. Particles of these compositions have been identified in primer residues and can also originate from non-firearm or occupational sources.

Particles that are **commonly associated** with GSR generally contain single elements such as lead or antimony. Though they can be generated from non-firearm sources, these particles may be of significance in the interpretation of a population of particles in addition to particles characteristic of or consistent with GSR.

The formation, distribution, deposition, and loss of GSR vary and are influenced by many factors including but not limited to environment, type of ammunition and firearm, and physical activity of the subject. Therefore, the number of particles identified is not significant. The finding of GSR on inanimate objects (e.g., clothing and vehicles) may have arrived there historically and may not be associated with the incident in question. Additionally, the deposition of GSR on surfaces sampled does not reveal how they arrived there. When GSR is identified, the conclusion is that the object or person was in an environment of GSR, nearby when a firearm was discharged, or came in contact with a surface that had GSR on it.

The above results have been technically and administratively reviewed and are the opinions and conclusions of the Analyst.

Accreditations:

National Association of Medical Examiners (Provisional)
California Medical Association-Continuing Medical Education
Accreditation Council for Graduate Medical Education

ANAB ISO/IEC 17025:2005 Forensic Science Testing Laboratories
Peace Officer Standards and Training Certified



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Subject: Arthur Levario

Evidence: One properly sealed GSR kit containing two adhesive lift samples.

Results: SEM/EDS analysis revealed:

- * **Right Hand**
 - **One particle characteristic of GSR.**
 - Lead, Barium, Antimony
 - **Five or more particles consistent with GSR.**
 - Lead and Antimony
- * **Left Hand**
 - **Two particles characteristic of GSR.**
 - Lead, Barium, Antimony
 - **Five or more particles consistent with GSR.**
 - Lead and Antimony

Conclusion: Therefore, the finding of characteristic particles indicates that the subject may have discharged a firearm, been in the vicinity of the discharge of a firearm, or touched a surface with gunshot residue on it.

Analyst: Melvina Gin
Senior Criminalist

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