

	TRACE-PM 10.20 Powder Analysis (Example - White Powder)	
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	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

10.20 Powder Analysis (Example - White Powder)

10.20.1 Introduction

White powders may include but are not limited to foot/deodorant powders, starches, cleaning agents, coffee creamers, artificial sweeteners, diatoms, baking powder and/or soda, glass/silicates, talc, antacids, over the counter pain medicines, salts and any other small particle powders. Known samples can be collected from the suspect or suspect's clothing/vehicle/belongings.

Note: for White Powder Analysis submitted to the laboratory that was previously suspected of containing Biological Warfare agents, please also see *Safety Manual SM7 - Reception of Evidence Suspected of Containing Biological Warfare Agent* and be knowledgeable of the following:

- The Michigan State Police (MSP), Forensic Science Division (FSD) *shall not receive for analysis any evidence suspected of containing a biological warfare agent (e.g., anthrax, ricin, etc.)*. All law enforcement personnel should familiarize themselves with the Assessment Guide for the First Responder: For Incidents Involving Suspected Biological/Chemical Packages/Powders (3rd edition)(from hereafter referred to as the "Assessment Guide"). This document is available to all law enforcement agencies and provides guidance for responding to calls involving an unknown substance that may be a biological warfare agent. If you need assistance with accessing a copy of the Assessment Guide, please contact the Homeland Security Section of the MSP, Emergency Management and Homeland Security Division.
- Evidence suspected of containing a biological warfare agent includes any item or package containing an unknown substance along with some indication that the item was meant to cause or has already caused harm to someone. Such indication includes written or verbal references to the killing of or causing harm to someone and/or to a biological agent. Unknown substances without association to a crime or some form of threat that may be prosecuted will not be analyzed at any MSP crime laboratory.

Any law enforcement agency in receipt of an item that may potentially contain a biological agent must:

- Respond to all such calls per guidance established in the Assessment Guide. The Federal Bureau of Investigation (FBI) Weapons of Mass Destruction (WMD) Coordinator must be contacted by the responding agency prior to packaging or handling the item. Please contact the FBI Detroit Field Office at 313-965-2323. Do not bring such items into any MSP crime laboratory.
- Per section 2 of the Assessment Guide, if the FBI deems the item to present a "credible threat" with respect to bioterrorism, a HAZMAT team must be contacted by personnel at the scene for packaging of the item.
- Once properly packaged, the item must be screened by the FBI WMD Coordinator for chemical and radiological hazards as well as explosives. Upon completion of this screening, the item shall be transported to the Michigan Department of Community Health (MDCH) for appropriate

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laboratory testing. The FBI will have contacted the MDCH and they will be awaiting receipt of any such item. Again, do not bring such items into any MSP crime laboratory.

- *Upon determination by the MDCH that item the does not contain the biological warfare agent(s) of concern, it may then be delivered only to the MSP's Lansing Crime Laboratory. No other MSP crime laboratory is authorized to receive or analyze evidence that has been suspected of containing a biological warfare agent.*
- *Additionally, the item must be accompanied with proper MDCH diagnostic documentation. Without such documentation, the item will not be received for analysis at the Lansing Crime Laboratory.*
- Upon receipt of evidence that has been cleared by MDCH of containing a biological warfare agent, the item is to be prioritized and analyzed as soon as possible. Upon completion of the desired analysis, the submitting agency is responsible from promptly retrieving such evidence. The Lansing Crime Laboratory will not be responsible for long term storage or disposal of such items. Items to be analyzed at the Lansing crime laboratory shall follow the following protocol:

All WMD cases must have clearance documentation from the MDCH prior to entry into the crime laboratory.

- *If the evidence contains visible powder, the evidence will be submitted directly to the Trace Evidence Unit for collection of the powder for analysis. Once the Trace Evidence Unit has collected the powder for their analysis, the paper evidence will be forwarded to the Questioned Document Unit for examinations. Upon completing their examinations, the Questioned Document Unit then turns it over to the Latent Print Unit for evaluation. Any envelope flaps, stamps, or other items that may contain DNA are then transferred to the DNA Unit for processing.*
- Evidence containing no visible powder will be submitted directly to the Questioned Document Unit. Upon completing their examinations, the Questioned Document Unit then turns it over to the Trace Evidence Unit for evaluation. Once the Trace Evidence Unit has completed their analysis, the evidence will be forwarded to the Latent Print Unit for evaluation. Any envelope flaps, stamps, or other items that may contain DNA are then transferred to the DNA Unit for processing.

10.20.2 Safety Considerations

Standard Laboratory Precautions - See FSD Health & Safety Manual

10.20.3 Preparations

Obtain the necessary known samples if a comparison is going to be made. Use of in-house reference white powders, if available or applicable, is acceptable.

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10.20.4 Minimum Standards & Controls

In general, initial examination of a powder or white powder can indicate or narrow down the possible identity of the powder and whether it is homogenous or heterogenous. Reference samples can then be gathered to identify the powder or known samples of powders can be gathered from suspects.

10.20.5 Instrumentation

Standard Laboratory Instrumentation.

10.20.6 Procedure or Analysis

Upon receiving evidence for powder/white powder examinations, the following steps should be taken:

10.20.6.1

Follow general evidence handling procedures.

10.20.6.2

Visual examination of the known(s) and questioned exhibit(s). Debris should be collected from clothing or other items submitted from potential suspects.

10.20.6.3

Stereoscopic examination of the questioned powder and any known samples. Debris from clothing or other items should also be examined under the stereoscope.

10.20.6.4

If other trace evidence types are observed during examination, they should be collected (when appropriate) and turned over to a trace evidence examiner for analysis along with any the appropriate knowns from the scene.

10.20.6.5

The question and known samples, must be compared using their physical, optical, and chemical properties.

10.20.6.5.1

Physical properties are compared using visual and stereoscopic methods.

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10.20.6.5.2

Optical properties are compared using high-power microscopes, i.e., polarized light, and fluorescence microscopes.

10.20.6.5.3

Chemical properties can be compared by (1) microchemical tests with confirmation by instrumental methods, or (2) instrumental methods alone. Some available instrumental methods are u-XRF, SEM/EDS, or FTIR.

Care should be taken in identifying by chemical name without an identification being made by the appropriate instrumental method.

10.20.6.5.4

The examiner should keep in mind that the questioned samples (debris) may be from activities or crimes previously committed.

10.20.6.6

A reference collection should be kept at each laboratory performing this type of examination.

10.20.7 Report Wording

Due to bulk manufacturing it is not possible to state that a certain white powder came from a specific known sample to the exclusion of all others.

If the examiner is to state that the questioned sample could have originated from the source as the standard sample, then both samples must have the same physical, optical, and chemical properties without any unexplained differences.

If the questioned sample is of insufficient size for instrumental methods but is consistent with the known in physical and optical properties, then a weaker conclusion has to be reached. For example, "The questioned and known samples displayed the same physical and optical properties; however, no further testing was performed due to insufficient questioned sample size."

10.20.8 References

Hooke College of Applied Sciences, Microscopical Identification of White-Powder Unknowns Workbook - available at Northville Laboratory