



In this Issue:

- Trace Miscellaneous: Analysis off the Beaten Track
- IBIS
- Suspicious Death Investigations: Teamwork required between Drug Chemistry, Toxicology, Trace and Latent Prints

SUMMER 2018

OREGON STATE POLICE

Forensic Services Division Newsletter

TRACE EVIDENCE CORNER

TRACE MISCELLANEOUS: WHERE CASES GO WHEN THEY CAN'T GO ANYWHERE ELSE

In most areas of the laboratory, OSP's forensic scientists follow procedures that are designed for a specific type of evidence. However, at times an agency would like to submit an unusual type of evidence that we haven't worked with before or don't see very often. These are the cases we consider for a Trace Miscellaneous request. In evaluating whether the lab will accept evidence for a Trace Miscellaneous request, we must first understand what we are looking for in the evidence and what questions we are trying to answer through the analysis. For this reason, police reports/narratives are always required with Trace evidence submission. Sometimes a case will be declined because we do not have the expertise and/or the proper instrumentation needed to draw a valid conclusion. Once a case is accepted, the assigned analyst may need to do research and conduct experiments so they can design appropriate procedures for the submitted evidence.

Many of the Trace Miscellaneous cases that we accept fall into three categories:

1. **Chemical Identification and Poisoning/Tampering:** Evidence samples in these cases are often foods, beverages, or personal hygiene products that are suspected of containing a toxic agent. Sometimes the apparent victim is a human, but the lab works cases of animal abuse as well. Recent cases of this type include:

- Screening samples for antifreeze, bleach and acetone
- Confirming the presence of arsenic, strychnine, laxatives, and pesticides in foods, beverages, canine and feline stomach contents and shampoo
- Confirming the presence of capsaicin residue (indicative of pepper spray) on suspect clothing
- Testing inhalants including "poppers" and cylinders of compressed gases

With cases of this type, knowing what compounds we are looking for is the key to designing an experimental procedure. If an item is received with the request "test for poison", we will do a basic screen for drugs, poisons, and heavy metals. If we find nothing, it doesn't mean that there are no poisons present—it simply means we didn't find anything with the screening tests we performed. The more contextual information provided with a case, the better we can tailor the analysis to the scenario.



The Oregon State Police Forensic Laboratory **does not** accept cases involving soil or geological comparisons, bite marks, determination of meals or time of consumption from human stomach contents, or the examination of evidence for entomological (insect) data. If your investigation would be aided by these types of analysis, there are private, fee-based experts that may be able to assist you. Lab staff may be able to provide you with a list of private lab options.

Continued
on page 2



OREGON STATE POLICE

Forensic Services Division Newsletter

TRACE MISCELLANEOUS, CONTINUED

2. **Feature and Characteristic Comparison:** Cases of this type typically involve comparison of two or more samples to see if they are similar or different. Could they share a common source? Analysis may involve instrumentation or may be conducted solely with microscopic exams. Past cases include:

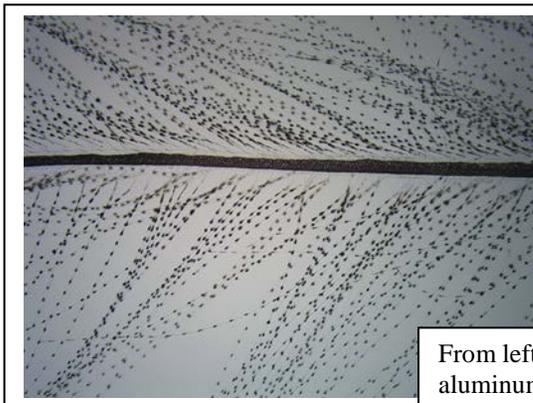
- Comparison of feathers from a “down” vest to feathers snagged on a gun
- Comparison of the metallic composition of homemade silencers to the metal shavings on a drill bit
- Disposable gloves from a scene compared to those found near a suspect vehicle
- Comparison of linoleum at an illegal dump site to scraps of linoleum found at a residential demolition site

Analysis involving class comparisons may provide limited information. If the gloves or feathers in the abovementioned cases are of a very common type or if the product is mass-produced, there is less significance to finding that two items are similar. But if something is more unusual or has rare features, the association between the compared items is more meaningful. Again, the scientist needs to understand the context of the case to assess the value of the analytical findings.

3. **Classification and Investigation of Unknowns:** In these circumstances, the agency asks the questions: What is this? Where did it come from? What can it do? These cases can be the most challenging of all and often involve extensive research and testing. Several recent examples include:

- Testing the contents of a beverage next to a decedent (high-levels of nicotine detected)
- Identifying the residue on a homicide victim’s clothing as a type of fish-based plant fertilizer
- Sourcing manufacturer codes on vehicle parts to narrow down make/model/years of source vehicles
- Testing the heating capacity of appliances such as microwaves and flat-iron hair straighteners.

Trace Miscellaneous is performed in the **Portland Laboratory only**. Many of our Trace analysts are dually qualified in the analysis of controlled substances so that poison screening can encompass controlled substance testing at the same time. If you encounter a case you think might fit into the Trace Miscellaneous category, please call before submitting the evidence. In addition, please submit a police narrative or report. Upon contact with the Lab, we may also request that you provide positive and negative control samples, if appropriate. Contact Liz Flannery, Trace Unit Supervisor: 971-673-8325.



From left to right: Microscopic views of a feather, an aluminum/zinc alloy turning recovered from a drill bit, and strychnine-laced grains of rat poison mix with frozen meat in a dog-fatality investigation.



OREGON STATE POLICE

Forensic Services Division Newsletter

IBIS BASICS

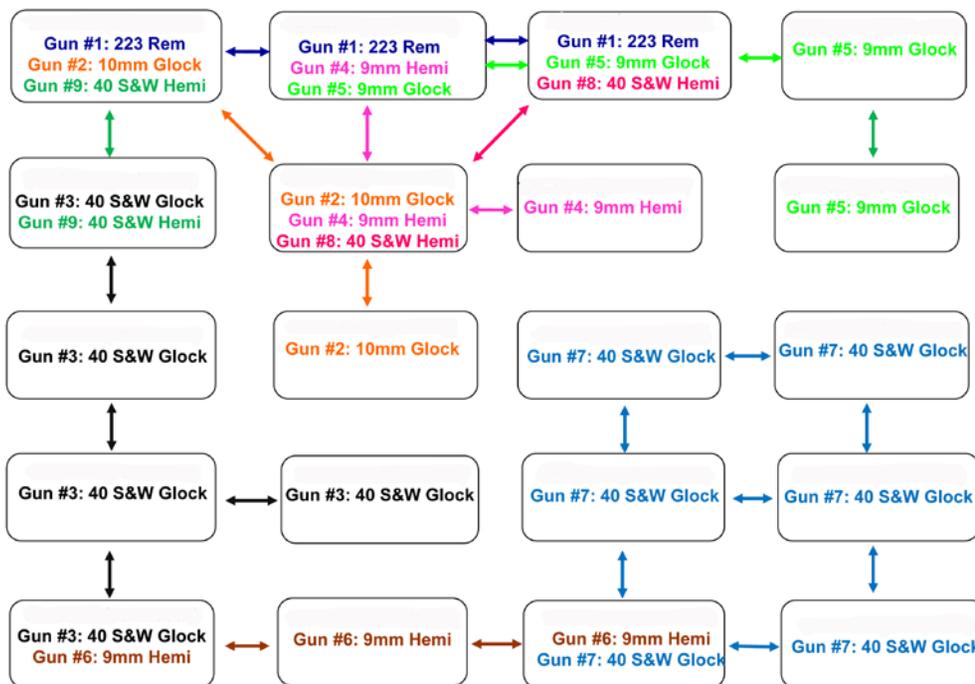
WHAT IS "IBIS"?

IBIS, or **Integrated Ballistics Identification System**, is a database containing digital images of bullets and fired cartridge cases. Owned and managed by the Bureau of Alcohol, Tobacco and Firearms (ATF), IBIS software allows lab staff to compare firearms evidence submitted by Oregon law enforcements agencies with vast numbers of entries from previous crimes. IBIS work is performed in the Portland Metro Laboratory only.

Traditional methods for attempting to link bullets and ejected cartridge cases from one shooting scene to another was time-consuming and involved comparing the physical items of evidence collected from multiple crime scenes by examining their class characteristic and microscopic details.

The IBIS database streamlines these searches by automating a large part of the process. Digital images of fired cartridge cases are acquired using IBIS Brasstrax equipment, collecting both two-dimensional and three-dimensional scans of the surface topography to capture the unique striations and marks produced by the firearm. These images are then searched against the database of images acquired using the same Brasstrax equipment (in our lab and elsewhere) to maximize image uniformity. This allows simultaneous comparisons of evidence from a specific crime scene with evidence from many other scenes. In addition, IBIS searches encompass entries from a multi-jurisdictional interstate region, allowing us to find links between crimes in multiple states. The Portland Metro Forensic Laboratory IBIS Program participates in NIBIN (National Integrated Ballistics Information Network) database server region that includes: Oregon, Washington, Idaho, Nevada, Montana, Alaska, Hawaii, and the portion of California north of Los Angeles.

Once images from a crime are taken and entered, the IBIS software searches through volumes of existing digital images of evidence from crime scenes and suggests a list of entries as potential matches.



Using side-by-side image comparison, this list of potential hits is first narrowed by an IBIS Technician and then further examined by a Firearms Examiner to determine whether any potential match exists. In this way, IBIS is similar to an internet search engine, in that it is a tool used to dig through immense amounts of information and the user (in this case the Technician and Firearms Examiner) makes the ultimate decision whether the search engine has produced useful results.

Example of IBIS findings:

Links established among nine firearms at twenty crime scenes.



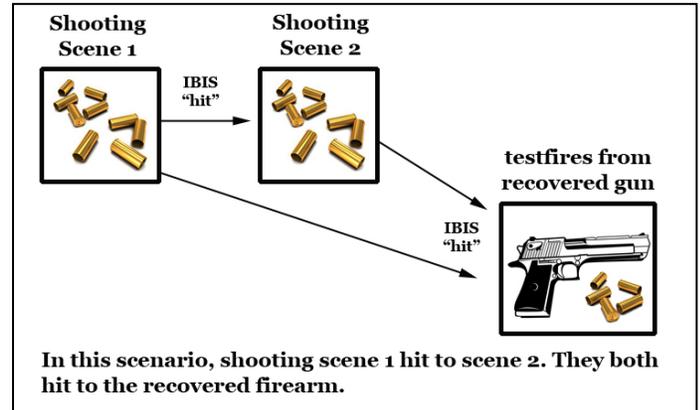
OREGON STATE POLICE

Forensic Services Division Newsletter

IBIS BASICS, continued

IBIS HITS

If a potential link is found between crimes, the submitting officer will receive an e-mail (if provided) with a report that will show the agency case number, which items of evidence are being linked, and the agency/officer information for the linked case(s). These reports are called “Unconfirmed Hit Notification Reports” and they are used for investigative leads. If a confirmation of the link is needed, the physical items of evidence must be resubmitted to the Firearms section for further examination and microscopic confirmation.



For the IBIS program to function to its full potential, *all* fired cartridge cases recovered from crime scenes should be submitted to the laboratory. Once the database is populated with cartridge cases collected by Oregon law enforcement agencies, test-fired cartridge cases produced by a recovered firearm can be compared to the database entries. Images of the test fires from the known firearm are searched through IBIS to see if they share microscopic details with any database entries. The net result is a mass correlation to all entered evidence from shooting scenes to learn of potentially linked cases that might have been unknown before. The goal of the IBIS program is to provide investigative leads that allow crimes to be solved—whether that is linking separate scenes to a shared firearm, or physical evidence from a scene to a firearm taken from an individual. As of early 2018, the Portland Metro Forensic Laboratory has provided approximately 1000 confirmed and unconfirmed hits to our agency users.

Only cartridge cases from semi-automatic pistols and rifles chambered for the following calibers are entered into IBIS:

- 22 caliber
- 25 caliber (25 auto, 6.35mm)
- 32 caliber (32 auto, 7.65mm)
- 380 auto caliber (9mm-kurz, -corto, -browning short)
- 9mm caliber (9mm {9X19} luger or parabellum, 9mm largo, 9x18 makarov)
- 357 Magnum caliber
- 357 Sig caliber
- 38 Super caliber
- 40 caliber (40 S&W, 10mm auto)
- 44 Magnum caliber
- 45 caliber (45 auto)
- 7.62 x 25mm tokarev
- 7.62 x 39mm (i.e. SKS and AK rifles)
- 223 Rem (5.56 rifle)



Side-by-side comparison of two cartridge cases using IBIS software. The vertical yellow line near the right side shows where one object ends and the other begins.

SNEAK PEEK:

Wondering if the DNA-searching technique used to identify the Golden State Killer can be used to help identify a suspect in your unsolved case? Have an open missing persons case that you think could benefit from a genealogical search for a relative? **Stay tuned for further information in our next newsletter.** Can't wait for the next newsletter? Please direct questions to Stephenie Winter Sermeno, DNA Supervisor, at 971-673-8261.



OREGON STATE POLICE

Forensic Services Division Newsletter

SUSPICIOUS DEATH INVESTIGATIONS

SUSPICIOUS DEATH INVESTIGATIONS CALL FOR MULTI-DISCIPLINARY ANALYSIS

Investigations into suspicious deaths may involve drug-overdoses, apparent suicides or suspected poisonings. As the designer drug and opioid epidemic continues to claim lives in our state, OSP's Forensic Services Division is ready to assist in situations where the cause of death may not be obvious at the scene. Death Investigations often require a multi-disciplinary approach involving multiple units of the laboratory: the most common units are the Toxicology section specializing in postmortem cases, the Drug Chemistry Section, Trace Evidence (Miscellaneous Trace) and Latent Prints.

Due to the complex nature of these cases and the potential hazards of the evidence, it is essential that there be clear communication between the agency representatives and the laboratory during the evidence submission process. Following the procedures described below will enable lab personnel to ensure that the evidence is triaged and analyzed by the appropriate examiners.

In a case involving a death due to possible drug overdose or poisoning, analysis by the Chemistry and/or Trace Units can be performed on suspected drugs/drug residues or possible poisons found near the body. Identification of drugs and poisons is greatly simplified by testing samples in these pre-ingestion forms; the findings from this testing can then help the Toxicology Unit to target their testing of the more complicated matrices of blood, urine and tissue of the deceased.

Obvious types of evidence at the scene include: syringes, spoons, straws and drug packaging. However, the deceased person may have been eating or drinking something prior to death that led to their demise. Be aware of beverages and foods near the body, in the trash, or in another part of the scene, especially in the absence of more typical evidence. In addition, the decedent's computer may provide valuable information about drugs purchased online or internet searches for specific types of poisons. If you have additional information that might assist us in understanding the scenario, a phone call to lab staff is highly encouraged.



Relevant evidence collected in these investigations should be submitted to your local OSP Forensic Laboratory as soon as practical. Investigating officers should provide a police report or a narrative that describes the "where and what" of the items of evidence that are being submitted to the lab, in addition to a description of the location and condition of the decedent when found. This information is extremely helpful in directing the analytical process.

By taking a multi-disciplinary approach, the laboratory can more effectively provide support toward the successful closure of these types of investigation. Communication between investigation officers and lab personnel is the key. If you have any questions about submission of evidence in suspicious death cases, reach out to Jon Dyer (Chemistry Unit Supervisor 971-673-8302) or Robert Jones (Toxicology Unit Supervisor 971-673-8266). Online info about the collection and submission of forensic evidence of all types is available in the OSP [Physical Evidence Manual](#).



OREGON STATE POLICE

Forensic Services Division Newsletter

SUSPICIOUS DEATH INVESTIGATIONS

EVIDENCE SUBMISSION PROCEDURES

To facilitate multi-disciplinary lab work on the Forensic Services Request Form (Form 49):

- List the decedent's name and date of birth and mark the box to indicate "Deceased". If available, include their state identification (SID) number or FBI number. If a suspect is known and may be prosecuted under Len Bias-type or other types of charges, indicate that on the Form 49. List all known suspects if possible.
- Offense Type: Death Investigation. Investigations of this nature are not limited to the normal two-items per suspect policy for drug evidence. Submit items that are considered relevant to the event, whether of weighable quantities or residues. However, safety rules for submission of suspected fentanyl compounds may still apply. Contact your local laboratory if you have questions about fentanyl submission policies.
- If multiple law enforcement agencies are involved, list all agencies and their case numbers.
- If known, list the related county or state medical examiner's case number. If the number is not known, please indicate which medical examiner is involved.

Postmortem Toxicology:

Blood, urine and tissue samples from the Medical Examiner's office are submitted directly to the Toxicology Unit in the Portland Metro Forensic Lab. The Toxicology results are released only back to the Medical Examiner. Lab staff members are not permitted to share these findings directly with investigating agencies.

Drug Chemistry:

In recent years, abuse of new, synthetic "designer drugs" has sky-rocketed. The list of deadly drugs causing fatal overdoses keeps growing. Many of these designer drugs do not react with traditional field drug tests; in addition, they are increasingly found in counterfeit tablets that look like normal prescription drugs such as Xanax or Oxycontin. Precautions are merited with any substance that may be implicated in an overdose death; limit your exposure and submit to the laboratory without field testing.

Identification of the Deceased via Deceased Printing

All requests for Deceased Printing must be made through the Medical Examiner's Office. Latent Print experts will search local, regional and FBI databases. These databases do include non-criminal records; however, not all records are retained in the database. The search results, including any confirmed identification of an individual, will be reported back to the Medical Examiner and only they may release the information.

Miscellaneous Trace:

The Trace section can test beverages, foods, and other samples for poisonous heavy metals such as lead, mercury and arsenic, as well as other poisons such as strychnine and cyanide. We also have limited testing abilities for other toxins, but do not have the resources to test for every possible poison.

(See Page 1 article)