



The Lab Report

Volume 1, Issue 4

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The Lab Report Wrap Up - 2011

As we all wrap up the year 2011, the Nebraska State Patrol Crime Lab would like to focus on not only the upcoming year, but also on recapping the past year in numbers. In the final issue of The Lab Report for 2011, we will be providing year-end statistics for the lab. These statistics will include the total number of case assignments per unit/section received for the year, the total number of agencies who submitted cases to the lab in 2011, total number of presentations/training provided, and the total number of court appearances by laboratory staff. This issue will also provide information on two new types of controlled substances and the federal/state rules regarding these substances, gunshot residue analysis (GSR), forensic professional organization involvement, evidence handling tips, helpful hints, and a spotlight on one of our Chemistry Unit analysts.

If you have any questions/concerns regarding the topics related to this issue of The Lab Report, please do not hesitate to contact us (laboratory staff contact information - pg. 9).

Enjoy!

Amy Weber (Firearm/Tool Mark Section Analyst - editor, The Lab Report)

The Backlog Corner

Biology Unit: 192 assignments (approx. 6 month turnaround time)

Physical Sciences Unit:

Firearm/Toolmark cases: 40 assignments (approx. 6 month turnaround time)

NIBIN: 96 assignments (approx. 6 month turnaround time)

Latent Fingerprints Section: 24 assignments (approx. 1-2 week turnaround time)

Chemistry Unit:

Controlled Substances: 459 assignments (approx. 8 week turnaround time)

Toxicology: 19 assignments (approx. 8 week turnaround time)

Trace: 8 assignments (approx. 12 week turnaround time)



NSP Crime Lab 2011 Statistical Recap

As we close the year 2011, the NSP Crime Lab would like to provide year-end statistics for the agencies we serve across the state. The crime lab staff have been involved in not only case analysis, but also court appearances as expert witnesses and providing educational presentations/trainings throughout the state. Listed below are the NSP Crime Lab year to date totals (current as of December 29, 2011):

Total Number of Case Assignments in 2011: 8981

Chemistry Unit:

Controlled Substances — 2772

Toxicology — 465

Trace — 71

Biology Unit:

Biology — 518

CODIS — 4275 (as of December 22, 2011)

Physical Sciences Unit:

Firearms/Toolmarks — 113

NIBIN — 253

Latent Fingerprints — 502

Questioned Documents — 12

Total Number of Different Agencies Served in 2011: 167

Total Number of Presentations/Trainings Provided in 2011: 25

Total Number of Persons Trained/In Attendance: over 850

Total Number of Court Appearances by Lab Staff in 2011: 50



Professional Organization Involvement

The NSP Crime Lab staff are involved in a number of professional organizations relevant to their forensic fields of expertise. Professional organizations provide annual training in current scientific practices/developments in the field, valuable national and worldwide professional contacts, and scientific research journals/publications for reference. Professional organizations in which laboratory staff are members include the following:

Association of Firearm and Tool Mark Examiners (AFTE)

International Association for Identification (IAI)

Midwestern Association of Forensic Scientists (MAFS)

Nebraska Division of the International Association for Identification (NEIAI)

American Academy of Forensic Sciences (AAFS)

Society of Forensic Toxicologists (SOFT)

Clandestine Laboratory Investigating Chemists (CLIC)

California Association of Criminalists (CAC)

American Society of Crime Lab Directors (ASCLD)

American Chemical Society (ACS)

Association of Forensic Quality Assurance Managers (AFQAM)



Spotlight on Forensics — Abbegayle Dodds (Chemistry Unit)



Name: Abbegayle (Abbey) Dodds

Hometown: Anchorage, Alaska

Education: B.S. Chemistry (Univ. of Alaska Anchorage)

M.S. Chemistry (Univ. of California-Davis)

M.S. Forensic Science (Univ. of California-Davis)

Work Experience:

Sacramento County District Attorney's Lab of Forensic Services, Sacramento, CA (September 2003 -April 2008).

Arizona Department of Public Safety Southern Regional Crime Lab, Tucson, AZ (May 2008-July 2010).

Nebraska State Patrol Crime Lab, Lincoln, NE (August 2010-present)

Hobbies: I practice yoga, I (sometimes and rather poorly) play the flute, and I enjoy the performing arts, especially opera and symphony performances! I have recently taken up running and am currently training for the Lincoln Half Marathon - wish me luck!

Contact Information: Email: abbegayle.dodds@nebraska.gov

Phone: 402-471-8950 Voicemail: 402-471-8977 Fax: 402-471-8954

Note: Please include the laboratory case number(s) in all case-related communications, if possible.





Synthetic Cannabinoids (K2) and Synthetic Cathinones (“Bath Salts”)

The controlled substances section of the NSP Crime Lab continues to see many common forms of drugs submitted for analysis (e.g. methamphetamine, cocaine, and marijuana, as well as a wide variety of pharmaceutical drugs). Over the past two years (2010-2011) however, we have witnessed a marked increase of new controlled substances being submitted for analysis - more so than the past 20 years combined!

Two categories of new substances that represent the most frequently occurring submissions are **synthetic cannabinoids** (a.k.a. K2) and **synthetic cathinones** (a.k.a. “bath salts”).

Synthetic Cannabinoids

Synthetic cannabinoids are drugs often found in herbal incense products (common names include Spice and K2), that mimic the effects of delta-9-tetrahydrocannabinol (THC), an active central nervous system constituent compound of marijuana. These substances have been widely available in “head shops” and via the internet. There are dozens of chemicals that are considered synthetic cannabinoids. In 2010, the majority of the substances identified fell into the category of the JWH-related chemicals. The JWH acronym and others, including RCS, AM, and CP followed by a group of numbers, are simply “short hand” for long, complicated chemical names.

In March 2011, five synthetic cannabinoids were temporarily categorized as Schedule I substances under the Federal Controlled Substances Act: JWH-018, JWH-073, JWH-200, CP-47,497 and cannabicyclohexanol. Since they are controlled federally, these five substances have not been as frequently seen as submissions to the laboratory, however submissions of other synthetic cannabinoids that are not federally controlled have increased. **(Note: unless permanently controlled, the ban on the aforementioned five substances is set to expire in March 2012).** In February 2011, Nebraska enacted its own control of these substances. Instead of specifically listing individual substances, the Nebraska statute is written using the chemical names, breaking them into “classes” of substances with substitutions of chemical groups. This allows us much broader control of most of the compounds without having to attempt to “keep up” with the changing trends. **The synthetic cannabinoid substances listed in state statute can be found in [Chapter 28, Article 405, schedule 1 number \(35\) of the Nebraska Criminal and Traffic Law Manual](#).**



Chemistry Unit

Analysts

Celeste Laird (Mgr.)

Mike Auten (trace)

Brad Rutledge (tox)

Drugs

Vicky Cowan

Abbey Dodds

Meggan Macomber



Synthetic Cannabinoids (K2) and Synthetic Cathinones (“Bath Salts”)

Synthetic Cathinones

Synthetic cathinones are sold in products labeled as “bath salts” (e.g. a product called Ivory Wave), “research chemicals”, “plant food”, and “hookah cleaner”. They are stimulants related to cathinones, the psychoactive substance found in the shrub *Ca-tha edulis* (Khat). Synthetic cathinones produce pharmacological effects similar to methamphetamine. Like the synthetic cannabinoids, there are a number of substances that are considered synthetic cathinones and appear to be widely available to the public. Some of the most commonly seen chemicals that fall into this class of substances are Mephedrone (4-methylmethcathinone), MDPV (3,4-methenedioxypyrovalerone), Methylone (3,4-methylenedioxy-N-methylcathinone), Methcathinone (N-methylcathinone), and 4-MEC (4-methyl-N-ethylcathinone).

In October 2011, Three of the synthetic cathinones were temporarily identified as Schedule I substances under the Federal Controlled Substances Act - Mephedrone, MDPV, and Methylone. None of the substances are currently controlled at the state level. Several of them could potentially be prosecuted under the Nebraska state analog provisions. Analog prosecutions require contacting either the DEA or a pharmacologist to testify to the pharmacological effect of the drug. **The state analog provision can be found in Chapter 28, Article 401, number (30)(a) of the Nebraska Criminal and Traffic Law Manual.**

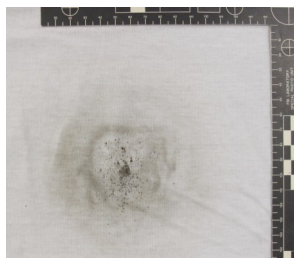
The NSP Crime Lab Chemistry Unit, Controlled Substances Section is continuing to research and monitor the control status and testing of synthetic cannabinoids and synthetic cathinones. We are happy to provide information and answer any questions regarding these substances.



“Plant Food” - synthetic cannabinoid



Ivory Wave bath salts



GSR powder patterning

Firearm/Toolmark**Section Analysts***Kent Weber (sup.)**Amy Weber**Sarah Zarnick***Gunshot Residue / Muzzle-to-Target Range Estimation**

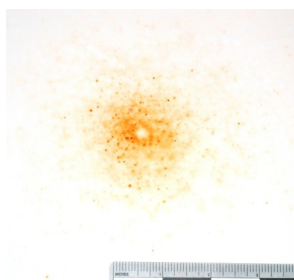
There are two different type of analysis that involve the examination of gunshot residues: firearm muzzle-to-target range/distance estimation and gunshot residue analysis of hand swabs. These are two vastly different types of examinations that oftentimes are confused.

The NSP Crime Lab Firearm/Toolmark Section performs muzzle-to-target range estimation examinations wherein the gunshot residues expelled from a firearm toward an intended target are analyzed for the purposes of reporting an approximate distance. Gunshot residues can be deposited on a nearby object (clothing, skin, etc.) with some predictability and in a reproducible pattern. When an item, such as clothing, is submitted for range estimation analysis, it is **important** that the suspect firearm and ammunition (fired and unfired) be submitted as well. Gunpowder loads differ across brands which can thereby change the pattern of residues on a target despite being used in the same firearm. Therefore, for the range analysis to be the most accurate, the same ammunition that was used during the commission of the crime should be used for testing purposes. If the same ammunition is not available, the resulting range reported will be more broad.

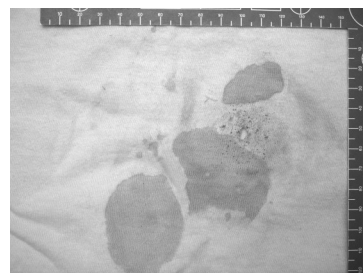
During muzzle-to-target range estimation examinations, section analysts perform visual and stereoscopic pattern/powder analysis on the clothing/other target, chemical enhancement of residue patterns on clothing/other target for the presence of burned/partially burned gunpowder particles (nitrites), chemical enhancement for the presence of lead (vaporous and bullet wipe) around the perforation on clothing/other target, and chemical enhancement for the presence of copper (bullet wipe) around the perforation on clothing/other target. If a submitted target exhibits background interference (e.g. dark colored clothing, patterned clothing, blood, etc.), techniques such as infrared photography are used to further enhance the area of interest. Shot pattern analysis on clothing/other targets are also performed.

Gunshot Residue / Muzzle-to-Target Estimation Evidence Submission Tips

- Submit **ALL** firearm-related evidence (fired and unfired ammunition from the scene and/or suspect, suspect firearm, victim clothing/other target).
- Clothing/Other Target: handle the article carefully as you do not want to disturb GSR patterns/residues present! Do not shake, crumple, or wad up the target prior to packaging.
- Packaging: If possible, attempt to protect the area of interest on the article prior to packaging - fold the article of clothing making sure to protect the defect area, place a piece of paper over the defect area prior to folding, etc.



Modified Griess test for the presence of nitrite patterning

**Before IR enhancement****After IR enhancement**

Gunshot Residue / Muzzle-to-Target Range Estimation

The NSP Crime Lab Firearm/Toolmark Section **DOES NOT** perform gunshot residue analysis of hand and/or clothing swabs/sticky tabs. This form of GSR testing involves analytical methods utilizing scanning electron microscopy (SEM analysis) and/or atomic absorption (AA). SEM and/or AA analysis for gunshot residues is a highly sensitive method that is looking for microscopic particles of lead, barium, and antimony. These microscopic particles are easily transferred from one place to another, including unknowing transfers by third parties that handle guns (i.e. police officers and police equipment) or by those who are around shooting events.

There are several things to take into consideration when submitting hand swabs/sticky tabs for SEM/AA analysis:

- There is generally a timeframe that is considered probative to take into consideration when collecting/submitting hand swabs/sticky tabs. In general, the more time that is allowed to pass between the commission of the shooting incident and the collection of the GSR swabs from the suspect hands, the greater the probability that the GSR has been removed (e.g. hand washing, wiping hands, general use of hands, etc.). Most GSR collection kits have instructions regarding timeframe.
- Once a suspect is in custody, officers should take every precaution to not allow the suspect hands to come into contact with items that may contain gunshot residues (e.g. handcuffs, patrol car interiors, etc.) until after the hand swabs/sticky tabs have been collected. This will help to minimize cross-contamination.
- There are several versions of GSR collection kits on the market through various vendors. The kits generally are designed for the type of analysis performed on the test materials (SEM, AA, combo of SEM/AA, or presumptive field tests). Prior to ordering these kits, the agency should contact a private testing lab to see which kit is preferable.

Although, the NSP Crime Lab Firearm/Toolmark Section does not perform gunshot residue analysis from hand swabs/sticky tabs, we can provide you a list of private laboratories that can perform this type of analysis.



**Gunshot Residue Kit
(GSR) - AA/SEM Combo**

Please do not hesitate to contact the Firearm/Toolmark Section if you have any questions/concerns with regard to the submission of evidence for Gunshot Residue / Muzzle-to-Target Range Estimation analysis.



GSR presumptive kit





Tips on Evidence!

Glass Item Packaging/Submission

There have been multiple instances as of late with glass items breaking in transit to the laboratory, **in particular glass pipes** (submission for controlled substance analysis). This makes it dangerous and difficult for analysts to test the items. Please make every attempt to properly and safely package glass items within the external evidence packaging to help alleviate breakage en route to the laboratory. Fragile items can be wrapped in bubble wrap and/or paper as well as having additional cushioning around the item (e.g. packing peanuts, crumpled paper, bubble wrap). Proper packaging of glass items will prevent future confusion/problems on the part of the submitting agency when items are not tested out of a safety precaution

Evidence Section

Vicki Hopkins (Mgr.)

Jan Johnson

Margaret Wiesen



Helpful Hints for Submitting Agencies and Attorneys

There are times when cases are settled prior to the submitted evidence being tested. If your agency has a case that has been settled prior to evidence analysis/reporting, please take the time to contact the laboratory and let the appropriate unit/section know. This could potentially assist with future laboratory backlog/turnaround times if analysts are not actively working cases that have been adjudicated through the court system.

More often than not, laboratory analysts receive subpoenas for court appearances that only list the suspect name and court case number. To alleviate confusion, it would be helpful if the agency issuing the subpoena would reference our laboratory case number that is listed on the report.





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Pam Zilly

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Evidence Receipt Hours:
**Monday-Friday
9am-4pm**

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