

Microgram

Bulletin

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FEBRUARY 2005

- INTELLIGENCE ALERT -

HEROIN CONCEALED WITHIN THE HOLLOWED OUT WOODEN SLATS OF A FRAME BOX IN DOVER, NEW JERSEY

The DEA Northeast Laboratory (New York, New York) recently received a small wooden crate (15 x 12 x 10.5 inches) made of hollowed out boards containing a brown powder, suspected heroin (see Photo 1, right, and Photo 2, next page (displayed oversize to show detail)). The box originated in Brazil, was seized at a mail screening center in Dover, New Jersey by Immigration and Customs Enforcement Agents, and had originally contained porcelain pottery. The cavities in the individual slats were masked by strips of wood veneer, and were detected by X-ray analysis. Analysis of the powder (total net mass



Photo 1



Photo 2

485.9 grams) by GC/FID, GC/MS, and FTIR confirmed 75 percent heroin hydrochloride, adulterated with lidocaine. The Northeast Laboratory routinely encounters heroin concealed in a wide variety of items, including hollowed out boards (though never before as a crate).

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- INTELLIGENCE ALERT -

**“MELTED” COCAINE BRICKS WITH LETTER/BRAILLE LOGOS
IN LOS ANGELES, CALIFORNIA**

The DEA Southwest Laboratory (Vista, California) recently received 15 kilo bricks of suspected cocaine hydrochloride with non-standard consistency and also imprinted with unusual “M” and “W” letter logos containing tiny Braille characters for those letters (see Photo 3, right, and Photo 4, next page). The bricks were seized in the Los Angeles area by Agents from the DEA Los Angeles Division, and were wrapped in plastic and then a reddish-brown colored tape. Oddly, the bricks had a melted appearance as if they had been poured as a liquid slurry into the molds, as opposed to the usual damp pressings; however, they were not crumbly, and each one (still) weighed one kilogram and had about the same dimensions as standard pressed bricks. Analysis by GC, GC/MS, and FTIR



Photo 3



Photo 4

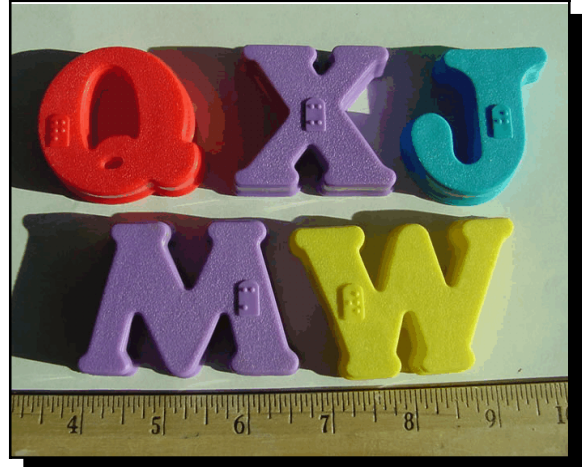


Photo 5

confirmed 71 percent cocaine hydrochloride adulterated with procaine hydrochloride and cut with lactose. The logos were made using small educational refrigerator magnets that can be purchased (as a complete alphabet set) at many toy stores (for examples, see Photo 5). This was the first submission of cocaine bricks either with a melted appearance or having letter/Braille logos to the Southwest Laboratory.

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- INTELLIGENCE ALERT -

COCAINE IN INCA PLAQUES FROM GUATEMALA IN MIAMI

The DEA Southeast Laboratory (Miami, Florida) recently received six “relief” plaques with Inca-style designs, each containing a hollowed out cavity containing packages of white powder, which field-tested positive for cocaine (see Photo 6). The plaques originated in Guatemala, and were seized from cargo at the Miami International Airport by Immigration and Customs Enforcement (ICE) Agents. Each plaque felt like hard plastic (not further identified), weighed about five pounds, and was backed with a narrow wooden board which was held in place with staples and/or a hard glue. The packages behind the boards were wrapped in clear plastic and aluminum foil. Analysis of the powder (total net mass 10,029 grams) by GC/MS and FTIR confirmed cocaine hydrochloride, ranging from approximately 75 to 80 percent purity. There have been several similar submissions to the Southeast Laboratory over the past few years.



Photo 6

- INTELLIGENCE ALERT -

MARIJUANA CONCEALED IN CASKETS IN OKLAHOMA

[From the NDIC *Narcotics Digest Weekly* 2005;4(3):3
Unclassified, Reprinted with Permission.]

On December 10, 2004, an Oklahoma Highway Patrol (OHP) trooper stopped the driver of a box van for speeding and subsequently seized 610 pounds of marijuana. The two men in the van were traveling eastbound on Interstate 40. The driver, who appeared to be extremely nervous, produced registration and proof of insurance. When questioned, he stated that his trip had begun in Tucson, Arizona, and that he and his passenger were traveling to Atlanta, Georgia. The driver was issued a warning for speeding. The OHP trooper then asked for and was given consent to search the vehicle. A drug-detection canine alerted to the rear of the van. When officers opened the van doors they found numerous caskets, four of which contained 40 plastic-wrapped bundles of marijuana weighing a total of 610 pounds. Both the driver and passenger were taken into custody, and the vehicle was impounded.

NDIC Comment: Interstate 40 is one of the most common routes used by drug traffickers to transport illicit drugs in the United States. Law enforcement officers in Oklahoma commonly seize marijuana shipments from vehicles traveling on I-40. Because drug traffickers realize that they risk having their shipments seized when they travel on I-40, they are constantly developing new methods of concealment. This incident is the first in which law enforcement in Oklahoma reports seizing drugs from caskets.

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- INTELLIGENCE ALERT -

TRAFFICKERS USE TRUCKS RESEMBLING NEW MEXICO DEPARTMENT OF TRANSPORTATION VEHICLES TO TRANSPORT MARIJUANA

[From the NDIC *Narcotics Digest Weekly* 2005;4(3):2
Unclassified, Reprinted with Permission;
Some Details Withheld in Accordance with *Microgram* Policy.]

For the second time in 4 months, U.S. Customs and Border Protection (CBP) agents seized a truck resembling a New Mexico Department of Transportation (NMDOT) vehicle transporting marijuana. On November 30, 2004, CBP agents assigned to the Deming Station discovered over 2,312 pounds of marijuana in a truck resembling an NMDOT vehicle during a highway interdiction. Agents observed an orange utility truck traveling west on State Route 9 and later north on SR 11 from Columbus. An NMDOT emblem was present on both doors of the truck, and an amber-colored emergency light was mounted on the roof. The truck was also bearing a New Mexico government license plate. However, [certain aspects of the truck] were not consistent with official NMDOT vehicles. Agents stopped the utility truck to verify the immigration status of the driver. They subsequently searched the vehicle and discovered 245

bundles and 36 cardboard boxes of marijuana concealed in the bed and toolbox of the truck. Prior to this incident an NMDOT employee was arrested in September at a CBP checkpoint north of Las Cruces after agents discovered 293 pounds of marijuana in the truck he was driving. The subject had changed the appearance of his privately owned vehicle to resemble an NMDOT vehicle. He switched his personal license plate with a New Mexico government plate, affixed NMDOT emblems on the doors, and mounted emergency equipment to the roof. In both cases the subjects were turned over to Drug Enforcement Administration (DEA) agents on charges of possession with the intent to distribute drugs.

NDIC Comment: Drug traffickers in New Mexico and in other states along the Southwest Border occasionally steal delivery trucks or buy them at auctions and alter the appearance of the vehicles in an attempt to lessen the risk of being stopped by law enforcement officers during the transport of illicit drugs. They often paint companies' or government agencies' decals on the vehicles to make them appear to be legitimate. CBP agents in Arizona have encountered vehicles manipulated to resemble those in the CBP fleet. Those vehicles were equipped with the identical emergency equipment, decals and emblems, vehicle numbers, and government license plates used on official CBP vehicles.

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- INTELLIGENCE ALERT -

**4-METHYLAMINOREX/MDMA/METHAMPHETAMINE LABORATORY
IN FORT LAUDERDALE**

[From the NDIC *Narcotics Digest Weekly* 2005;4(4):1
Unclassified, Reprinted with Permission.]

On December 2, 2004, Fort Lauderdale Police officers and Drug Enforcement Administration (DEA) agents responding to an anonymous tip seized an operational laboratory used to make three illegal drugs - 4-methylaminorex (also known as U4Euh, euphoria, and intellex), MDMA (3,4-methylenedioxymethamphetamine, also known as ecstasy), and crystal methamphetamine (also known as ice). Officers seized 5 pounds of 4-methylaminorex that had been stored in a freezer and hundreds of bottles of chemicals that had been stored in the man's home and a nearby storage unit. Law enforcement officers arrested the laboratory operator, a 46-year-old Caucasian male with a degree in chemical engineering who had no prior criminal history and was a Broward County Environmental Protection Department employee. The man had established a fraudulent chemical company that enabled him to order many chemicals from wholesale suppliers and have them shipped directly to his home. He also reportedly stole chemicals from his workplace. Law enforcement officials believe that the laboratory operator had been producing the drugs in his home since June 2004. The man was charged in federal court with numerous crimes including conspiracy to manufacture 4-methylaminorex, MDMA, and methamphetamine. Law enforcement officials report that the defendant, who is gay, marketed the 4-methylaminorex to gay men in South Florida who abused other drugs including crystal methamphetamine. In addition to distributing the drug locally, the man is believed to have sold wholesale quantities to associates in California and Australia.

NDIC Comment: According to drug abuse researchers, gay men who abuse methamphetamine typically do so to achieve sexual enhancement, an effect they may try to replicate with other stimulant drugs such as 4-methylaminorex. The drug 4-methylaminorex has been a Schedule I controlled substance under the Controlled Substances Act since 1987 but has rarely been seized by law enforcement in the United States, and its abuse has never been widespread in the country. As a result of the publicity surrounding this event, other illicit drug producers with some chemical background may try to produce and distribute 4-methylaminorex. A synthetic stimulant, 4-methylaminorex is similar to methamphetamine in that it is available in either powdered or crystal form and can be ingested, injected, snorted, or smoked. Many abusers of 4-methylaminorex report that its stimulant effects are longer lasting than those of methamphetamine.

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- INTELLIGENCE BRIEF -

**LARGE SEIZURE OF APPARENT “ICE” METHAMPHETAMINE
IN BECKHAM COUNTY, OKLAHOMA**

The Oklahoma State Bureau of Investigation’s Central Drug Lab (Oklahoma City, Oklahoma) recently received nine plastic containers containing a crystal-like substance, suspected “Ice” methamphetamine (see Photos 7 and 8). The exhibits were seized by a state Drug Task Force from an eastbound SUV-type vehicle during a highway interdiction stop on Interstate 40 in Beckham County (western Oklahoma). The containers were all the same size, were individually wrapped in plastic, and were hidden in a false compartment in the rear of the vehicle. The lids of the containers were marked with “O.K.” in red marker. Analysis of the material (total net mass approximately 15.3 pounds) by GC and GC/MS confirmed methamphetamine. HPLC quantitation on two exhibits indicated 76 and 75 percent methamphetamine, calculated as the hydrochloride salt (the remaining samples were not quantitated). Although not a record, this was a large submission to the laboratory [Editorial Notes, next page].



Photo 7



Photo 8

[Editor's Notes: Per the Federal Sentencing Guidelines, "Ice" is 80 percent or greater *d*-methamphetamine hydrochloride. The definition does not include any language concerning physical appearance. The above exhibits meet the generally accepted *descriptive* understanding of "Ice" (that is, large crystals of methamphetamine hydrochloride), but not the legal definition.]

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- INTELLIGENCE BRIEF -

DIMETHYLAMPHETAMINE IN "ICE"-LIKE FORM IN FLORENCE, ALABAMA

The South Central Laboratory (Dallas, Texas) recently received a large, multiple exhibit submission of powdered and crystalline substances, suspected crystal and "Ice" methamphetamine (see Photos 9 and 10 for some of the "Ice" appearing samples). The exhibits were seized at three residences in Florence, Alabama by Task Force Agents from the DEA Huntsville, Alabama Post of Duty (Florence is located in the far northwest corner of the state). Analysis by GC/MS, FTIR, and HPLC, however, indicated eight exhibits containing methamphetamine, seven exhibits containing dimethylamphetamine, one exhibit containing a mixture of methamphetamine and dimethylamphetamine, seven exhibits containing cocaine, and three exhibits containing only dimethylsulfone (DMS). Most of the exhibits containing methamphetamine or dimethylamphetamine also contained DMS as a cutting agent. The dimethylamphetamine samples ranged in concentration from 18 to 99 percent, and five were cut with DMS. Three of the dimethylamphetamine samples looked like "Ice", while the other four were powders. The methamphetamine/dimethylamphetamine sample was grey crystals, and was cut with DMS. The South Central Laboratory has previously encountered dimethylamphetamine as a minor component in methamphetamine exhibits, but not as the principal or sole component.



Photo 9



Photo 10

- INTELLIGENCE BRIEF -

PSEUDOEPHEDRINE CONTROLS IMPLEMENTED IN ILLINOIS

[From the NDIC *Narcotics Digest Weekly* 2005;4(4):3
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On January 1, 2005, the Methamphetamine Manufacturing Chemical Retail Sale Control Act (720 ILCS 647) went into effect [in Illinois]. The act regulates the packaging, display, and sale of pseudoephedrine, a precursor commonly used in the production of methamphetamine. Manufacturers of products that contain pseudoephedrine must limit the amount of the drug contained in each blister pack box to no more than 3 grams. Store owners in Illinois must place adult-strength cold tablets that contain pseudoephedrine as their sole active ingredient behind store counters or in locked cases. Additionally, retailers may not sell more than two packages at a time of a product containing pseudoephedrine.

NDIC Comment: A growing number of lawmakers in midwestern and western states are battling the increasing methamphetamine production threat by passing laws that control the packaging, retail display, and sale of pseudoephedrine. For example, Indiana is considering a new law similar to that passed in Illinois, while Iowa and Missouri are considering strengthening existing laws. Some legislators are considering a law that would list pseudoephedrine products as Schedule V narcotics under the Controlled Substances Act. However, until lawmakers in all U.S. states adopt legislation controlling the sale of pseudoephedrine, it is likely that methamphetamine producers will obtain pseudoephedrine in states where restrictions are not yet in place. For instance, when Oklahoma lawmakers enacted a stringent pseudoephedrine law in April 2004, law enforcement officials in neighboring states reported an increase in pseudoephedrine sales.

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Selected Intelligence Brief

METHAMPHETAMINE MYTHS

[From the NDIC *Narcotics Digest Weekly* 2005;4(2):1
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FACT OR FICTION?

- * Methamphetamine can be produced in a fish tank using gun bluing and charcoal.
- * Pseudoephedrine can be obtained from chicken feed and mineral blocks.
- * Red phosphorus can be obtained from old television tubes.
- * A chemical in a tire repair product can be used in place of anhydrous ammonia.

These are among the many stories that law enforcement officers and first responders hear every year. How many of these commonly circulated beliefs are based on fact? How many are pure fiction?

Background

Methamphetamine myths have circulated in the intriguing subculture of methamphetamine producers and abusers since the early 1990s. Chronic methamphetamine abusers--commonly known as tweakers--are the driving force behind the most common methamphetamine myths. Many methamphetamine abusers, including tweakers, also produce methamphetamine for personal use; they sometimes produce enough to sell to finance their next production cycle.

Tweaking

Chronic methamphetamine abuse produces a psychosis similar to schizophrenia and is characterized by paranoia, mutilation of the skin, self-absorption, and auditory and visual hallucinations. Additionally, chronic methamphetamine abusers frequently behave in a violent and erratic manner, particularly when they ingest high doses of the drug. These abusers often binge on methamphetamine, during which time they do not eat and, therefore, lose a significant amount of weight. Quite often they completely ignore personal hygiene.

The most dangerous stage of the binge cycle is known as tweaking. During the tweaking stage, the tweaker has not slept in days, becomes paranoid, and has an intense craving for more methamphetamine. No amount of methamphetamine will recreate the euphoric high initially achieved, which causes frustration for the tweaker and leads to unpredictable and potentially violent behavior. Tweakers also become captivated by the most insignificant objects or details. For example, they will disassemble small kitchen appliances or electronic equipment and scatter parts all over the room. The bizarre methamphetamine myths that law enforcement officers and first responders often hear during methamphetamine-related investigations are most likely concocted and tested by tweakers during the tweaking stage.

Methamphetamine abusers typically produce methamphetamine using the red phosphorus or lithium/ammonia (also known as Nazi or Birch) production method. The precursor chemicals used in the red phosphorus method are pseudoephedrine, iodine, and red phosphorus. The precursors used in the lithium/ammonia method are pseudoephedrine, lithium metal, and anhydrous ammonia. Methamphetamine myths often involve methods of obtaining precursors, such as extracting chemicals from common retail items, as well as methods of producing methamphetamine using ordinary products as precursors. Some methamphetamine abusers may be trying to contend with practical issues--such as faster and cheaper ways to manufacture the drug--when they stumble upon what they believe to be a new method of production or an easier way to obtain a precursor. Consequently, abusers attempting to manufacture methamphetamine often are the source of unfounded information concerning methamphetamine production.

Fact or Fiction?

Law enforcement officers and first responders have reported dozens of methamphetamine myths over the past 15 years. Most have proven to be pure fiction, although some that they have encountered while interacting with small-scale methamphetamine producers have factual basis. Most of the myths involve extracting precursor chemicals--primarily ephedrine, pseudoephedrine, or red phosphorus--from common retail products or using household products as precursors in the production process. The following two tables exhibit many of the most popular myths reported over the past 5 years as well as simple reasons for the myths being fact or fiction.

Table 1: Methamphetamine Myths Involving Precursor Chemicals

Myth	Fact
Methamphetamine can be produced using ALMOND OR VANILLA EXTRACT .	Extracts cannot be used as precursors.
ARGON GAS can be used in place of anhydrous ammonia.	Argon gas was rumored to be useful in place of anhydrous ammonia; however, this myth was based on the fact that a company called "Airgas" manufactures a high-purity form of anhydrous ammonia called "ammonia blue."
CARPENTER'S CHALK contains red phosphorus that can be used in the red phosphorus production method.	Commercial red carpenter's chalk closely resembles red phosphorus but cannot be used in place of red phosphorus.
Manufacturers of CHICKEN FEED add ephedrine or pseudoephedrine to the feed, and the chemicals can be extracted and used in methamphetamine production.	Ephedrine or pseudoephedrine has never been added to chicken feed.
CREATINE can be used to produce methamphetamine.	Creatine is a dietary supplement and is not useful in methamphetamine production. Creatine has been used as

	a diluent for methamphetamine, cocaine, and ketamine.
Methamphetamine can be produced in a FISH TANK using CHARCOAL and GUN BLUING , among other items.	None of these items contain precursors necessary for methamphetamine production.
Methamphetamine can be produced by passing an ELECTRIC CURRENT through an ALUMINUM SCREEN sprayed with FOAM INSECTICIDE .	The resulting compound does not contain methamphetamine, but some methamphetamine abusers reportedly have used the substance as a cutting agent (diluent) for methamphetamine. Insecticide is toxic when ingested, injected, or inhaled by humans.
One of the chemicals in FIX-A-FLAT tire repair can be used in place of anhydrous ammonia to produce methamphetamine.	Some tire repair products contain a minute amount of ammonia, but it cannot be separated from the solvents.
HALON from halon fire extinguishers can be used in place of anhydrous ammonia in methamphetamine production.	Halon fire extinguishers contain no chemicals that can be used in place of anhydrous ammonia. Lab operators often use empty fire extinguisher canisters to contain anhydrous ammonia stolen from storage tanks.
HOUSEHOLD AMMONIA can be used in place of anhydrous ammonia.	Household ammonia contains too much water to be used in methamphetamine production.
Anhydrous ammonia can be obtained by freezing HOUSEHOLD AMMONIA .	Water cannot be frozen out of ammonia in a household freezer.
HYDROCHLOROTHIAZIDE can be used in methamphetamine production.	Hydrochlorothiazide is a commonly prescribed blood pressure medication that cannot be used to produce methamphetamine.
JEWELER'S ROUGE can be used in	Jeweler's rouge does not contain red

place of red phosphorus.	phosphorus, although it is similar in appearance.
Ephedrine or pseudoephedrine can be extracted from MINERAL BLOCKS such as SALT LICKS .	Mineral blocks including salt licks do not contain ephedrine or pseudoephedrine; however, salt can be extracted from salt licks and used in methamphetamine production.
Crystal methamphetamine can be made using PEPTO-BISMOL® .	There are no chemicals in Pepto-Bismol® that are useful in methamphetamine production.
Red phosphorus can be extracted from incendiary SHOTGUN SHELLS , particularly Dragon's Breath shells.	Dragon's Breath shells are constructed with a propellant charge and particles of zirconium metal. Shotgun shells typically contain no red phosphorus.
Ammonia can be extracted from SMELLING SALTS .	The quantity of ammonia in smelling salts is minute, and the product would be no more useful in methamphetamine production than trying to use household ammonia.
Red phosphorus can be obtained from the heads of " STRIKE ANYWHERE " MATCHES.	"Strike Anywhere" match heads contain phosphorus sulphide, oxidizing agents, powdered glass, and glue. Red phosphorus cannot be extracted from the matchheads.
Red phosphorus can be obtained from old TELEVISIONS , particularly from TV tubes.	Television manufacturers report that no red phosphorus is used in televisions; only rare earth phosphor is used in the tubes.

Table 2: Miscellaneous Myths

Myth	Fact
<p>COLORED methamphetamine, such as black or purple, has some significance.</p>	<p>Some producers add coloring to their methamphetamine to give it a "signature" that tells abusers who produced the drug. Colors also remain in methamphetamine from the pseudoephedrine tablets (red) and sodium hydroxide (blue drain cleaner) used in the production process.</p>
<p>DIABETES TEST STRIPS are used in methamphetamine production.</p>	<p>Test strips used with blood glucose monitors often are stolen from pharmacies or are obtained via health insurance fraud and are resold on Internet auction sites, at flea markets, and at convenience stores. There is no use for such items in the production of methamphetamine.</p>
<p>GEL METHAMPHETAMINE, which resembles petroleum jelly, can be rubbed directly on the skin and absorbed through the pores.</p>	<p>This myth began when an arrestee thought he/she heard officers report that they had encountered methamphetamine resembling petroleum jelly.</p>
<p>INFANT FORMULA is used as a cutting agent (diluent) for drugs such as methamphetamine.</p>	<p>Infant formula often is stolen from retail stores and resold on Internet auction sites, at flea markets, and at convenience stores. Some criminal groups steal large quantities of infant formula and smuggle the formula to other locations--particularly Mexico and Central America--where the formula is sold on the black market. Infant formula is not a common diluent for methamphetamine.</p>

Summary

Methamphetamine myths will continue to circulate as long as methamphetamine abusers seek faster and cheaper ways to manufacture the drug. The nationwide tweaker subculture allows myths to spread rapidly. It is quite common for law enforcement officers and first responders throughout the United States to report hearing an unusual story about a new methamphetamine production method, a shortcut used in the production process, or an alternative to a common precursor. However, as officers and first responders become more aware of the effects of methamphetamine abuse and particularly the intricacies of tweekers, they will recognize methamphetamine myths for what they are--the drug culture's version of the urban legend.

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SELECTED REFERENCES

[Notes: Selected references are a compilation of recent publications of presumed interest to forensic chemists. Unless otherwise stated, all listed citations are published in English. Listed mailing address information (which is sometimes cryptic or incomplete) exactly duplicates that provided by the abstracting services. Patents are reported only by their *Chemical Abstracts* citation number.]

1. Aalberg L, Clark CR, DeRuiter J. **Chromatographic and mass spectral studies on isobaric and isomeric substances related to 3,4-methylenedioxyamphetamine.** *Journal of Chromatographic Science* 2004;42(9):464. [Editor's Notes: Reports on the preparation of a number of compounds that are isobaric or isomeric with MDMA, and comments on the similarities and differences in their mass spectra (actual compounds not reported in the abstract). Contact: National Bureau of Investigation Crime Laboratory, Vantaa 01370, Finland.]
2. Adamowicz P, Chudzikiewicz E, Lechowicz W. **Illicit "Ecstasy" tablets in southern Poland: A two-year review.** *Z Zagadnien Nauk Sadowych* 2004;56:100. [Editor's Notes: Presents analytical results for 199 tablet seizures submitted over a two year period (time frame not specified in the abstract). Contact: Institute of Forensic Research, Cracow, Poland.]
3. Bogusz MJ, Carracedo A. **Forensic analysis.** *Journal of Chromatography Library* 2004;69B:1073. [Editor's Notes: A review on the forensic analysis of drugs. Contact: Department of Pathology & Laboratory Medicine, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia 11211.]
4. Brandt SD, Freeman S, McGagh P, Abdul-Halim N, Alder JF. **An analytical perspective on favoured synthetic routes to the psychoactive tryptamines.** *Journal of Pharmaceutical and Biomedical Analysis* 2004;36(4):675. [Editor's Notes: Appears to be a review of the topic, focusing on the probable impurities and marker compounds resulting from common illicit syntheses. Contact: Department of Instrumentation and Analytical Science, UMIST, Institute of Science and Technology, P.O. Box 88, Manchester M60 1QD, U.K.]
5. Day JS, Edwards HGM, Dobrowski SA, Voice AM. **The detection of drugs of abuse in fingerprints using Raman spectroscopy II: Cyanoacrylate-fumed fingerprints.** *Spectrochimica Acta* 2004;60:1725. [Editor's Notes: Includes analyses of codeine, cocaine, amphetamine, barbital, nitrazepam, and five common adulterants. Contact: Chemical and Forensic Sciences, University of Bradford, Bradford, West Yorkshire, BD7 1DP, UK.]

6. Fitsev IM, Blokhin VK, Budnikov GK. **Chromatographic techniques in forensic chemical examinations.** Journal of Analytical Chemistry (Translation of *Zhurnal Analiticheskoi Khimii*) 2004;59(12):1171. [Editor's Notes: A minor review. (Unspecified) psychoactive drugs are discussed. Contact: Forensic Examination Center, Ministry of Internal Affairs of Tatarstan, ul. Dzerzhinskogo 19, Kazan, Tatarstan 420503, Russia.]
7. Wilson JM, McGeorge F, Smolinske S, Meatherall R. **A "Foxy" intoxication.** Forensic Science International 2005;148(1):31. [Editor's Notes: Focus is toxicological, but includes mass spectra for the title compound (N,N-diisopropyl-5-methoxytryptamine, also known as "Foxy-Methoxy") and N,N-diisopropyl-5-hydroxytryptamine. Note that there are some nomenclature problems in this article, and the structure and term 5-ethoxy-diisopropyltryptamine are incorrectly used in several instances. Contact: Laboratory Medicine, St. Boniface General Hospital, 409 Tache Avenue, Winnipeg Manitoba, Canada R2H 2A6.]
8. Zhang ZY, Yang JH, Ouyang H, Li ZJ, Chai ZF, Zhu J, Zhao JZ, Yu ZS, Wang J. **Study of trace impurities in heroin by neutron activation analysis.** Journal of Radioanalytical and Nuclear Chemistry 2004;262(1):295. [Editor's Notes: 62 heroin samples were analyzed for 15 trace elements by NAA. The authors indicate that the results provide origin information. Contact: Institute of High Energy Physics, Key Laboratory of Nuclear Analytical Techniques, The Chinese Academy of Sciences, Beijing, Peop. Rep. China 100039.]

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NEW EMAIL ADDRESSES NEEDED

The email addresses for the following organizations have returned rejection notices to the *Microgram* Editor for the past three email notifications of *Microgram Bulletin*, and will therefore be dropped from the subscription list unless a corrected email address is provided by March 31, 2005. Note that the errors include anti-spamming, mailbox full, user not found, or user unknown messages. The Editor requests your assistance in contacting these organizations, determining if they wish to remain on the *Microgram* subscription e-net, and if so asking them to provide a valid email address to the Editor at: [microgram_editor -at- mailsnare.net](mailto:microgram_editor-at-mailsnare.net)

Aiken County Sheriff's Office, Aiken, SC

Alabama Department of Forensic Sciences - Birmingham, Dothan, and Huntsville Laboratories

Caroline County Sheriff's Department, Denton, MD

Connecticut Department of Public Safety, Division of Scientific Services, Meriden, CT

Georgia Bureau of Investigation, Central Region Medical Examiner's Office, Dry Branch, GA

G.J. Kupferschmidt Consulting, Ontario, Canada

Glendale Police Department, Special Investigations Unit, Glendale, AZ

Kaiser-Permanente Regional Laboratory, Portland, OR

Kentucky State Police - All Laboratories (ISP appears to have changed)

Laboratory for Clinical and Forensic Toxicology, Antwerp, Belgium

Morris County Sheriff's Crime Laboratory, Morristown, NJ

National Bureau of Investigation, Vantaa, Finland
New South Wales Police, Forensic Services, New South Wales, Australia
Newark Police Department, Forensic Laboratory, Newark, NJ
Office of the Deputy Assistant Secretary of Defense for Counternarcotics, Washington, DC
Oklahoma City Police Department, Forensic Drug Laboratory, Oklahoma City, OK
Sheridan Police Department, Sheridan, CO
University of New Haven, Forensic Sciences Program, West Haven, CT
U.S. SOUTHCOM (Herndon, VA Office (Counternarcotics))
USACIL, Hickam AFB, HI
Washington State Patrol - All Laboratories (ISP appears to have changed)

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THE DEA FY - 2005 STATE AND LOCAL FORENSIC CHEMISTS SEMINAR SCHEDULE

The remaining FY - 2005 schedule for the DEA's State and Local Forensic Chemists Seminar is as follows:

May 9 - 13, 2005
July 11 - 15, 2005
September 19 - 23, 2005

Note that the school is open only to forensic chemists working for law enforcement agencies, and is intended for chemists who have completed their agency's internal training program and have also been working on the bench for at least one year. There is no tuition charge for this course. The course is held at the AmeriSuites Hotel in Sterling, Virginia (near the Washington/Dulles International Airport). A copy of the application form is reproduced on the last page of the August 2004 issue of *Microgram Bulletin*. Completed applications should be mailed to the Special Testing and Research Laboratory (Attention: Pam Smith or Jennifer Kerlavage) at: 22624 Dulles Summit Court, Dulles, VA 20166. For additional information, call 703/668-3337.

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Computer Corner

Digital Evidence Inventory Theory

#191

by Michael J. Phelan
DEA Digital Evidence
Laboratory

Evidence inventory is a critical component of every forensic laboratory operation. Digital laboratories' evidence inventories are inherently complex tasks because of the unusual types of evidence that must be secured and tracked. For example, a computer hard drive evidence submission could contain copies of multiple exhibits made on-site, while another hard drive evidence submission might contain only part of a much larger exhibit. A Redundant Array of Inexpensive Drive (RAID) configuration could have up to 10 hard drives that make up only one logical drive. Careful labeling and tracking of these varied evidence submissions is important to avoid confusion during inventories.

Yet another digital evidence inventory consideration is the need for a laboratory to simultaneously account for original, archival, and work copy evidence, in order to meet chain of custody requirements. Development of clear definitions of each evidence category, and the corresponding policies regarding evidence labeling, inventorying, handling, and destruction, are essential.

Basic Concepts

There are five basic concepts when considering digital evidence inventories. The first

concept is the definition of digital evidence - not a simple matter! The Scientific Working Group on Digital Evidence (SWGDE) has defined digital evidence as information of potential probative value that is either stored or transmitted in binary form. This definition is widely interpreted as meaning the binary data, as represented by either a magnetic flux or optical reflectivity pattern (and its associated *meta* data such as format, access rights, and date/time stamp information) stored on the physical object (typically a hard drive, diskette, CD/DVD, magnetic tape, or memory chip). A common point of misinterpretation arises when the object itself (the container) is confused with the actual binary data. For example, when on-site copies of evidence are placed onto a law enforcement hard drive (or drives) for temporary transport or storage, the data is the evidence - not the hard drive(s).

The second concept is more familiar - the requirement to continuously account for all digital evidence exhibits and subexhibits. Again, however, the definitions are important. For example, a computer containing two hard drives may require (if the seizing official determines) two separate exhibit number assignments, one for each hard drive, as opposed to a

single number for the computer itself. Subexhibits may need to be recognized at the same time. For example, a seized computer might have a CD/DVD drive that contains a CD - that CD merits recognition as a sub-exhibit, since it is physically associated with the hosting computer. Similar considerations apply to any other form of portable storage that is associated with a seized computer.

The third concept is evidence containers. As noted above, the container may or may not be the actual evidence. Nonetheless, containers must be uniquely identified, secured, and tracked to maintain their accountability. Documentation of contents is also critical - a container may be documented to contain: 1) only one exhibit; 2) more than one exhibit; or 3) part of one exhibit (for example a RAID drive).

The fourth concept is the definition and differentiation of "original" versus "best evidence" submissions. This is important because the former may be required to be returned to the submitting agent or even the original owner at some future date.

Finally, the fifth concept is the definition and differentiation of "work" versus "archive" copies. Work copies must be carefully controlled, since all derivative

findings are based on its examination. However, archive copies are equally important, because they may be needed at a later date to answer requests for defense discovery, or to serve as the basis of a supplemental examination if such is ever requested by the investigator or Court.

Working Definitions

Original Evidence is the actual seized or surrendered object.

Work Copy Evidence is a forensically produced replica that may be either a complete, exact copy (often referred to as a duplicate, sector-by-sector copy, physical copy, or a "bit stream image"), or a simple copy (often referred to as a file, directory, partition, logical copy, or remapped copy). Both work copy products are accurate representations of the original (usually validated by comparing the original and work copy hash values). Work copy evidence is usually considered temporary, and is typically destroyed/wiped at the conclusion of the examination.

Archive Evidence is a more permanent storage that should reliably store a copy of the evidence for as long as the investigative agency requires. Different organizations can have very different retention policies. Some digital laboratories return the archive copy to the submitting investigator upon completion of the examination. Other organizations maintain a central archive. However, the importance of maintaining an archive copy under seal, and recorded in a system of records,

is essential to its potential acceptance in the future by the courts as "best evidence".

Digital Inventory Strategies

Most forensic laboratories have some form of redundancy in their laboratory evidence management systems. This redundancy is often the result of older systems being replicated (but not replaced) by newer, more capable systems - for example, a paper system by an electronic system. Although the electronic system was often originally instituted as a "replacement" for the paper system, laboratory management usually prefers to have a duplication of the records because of the critical importance of evidence accountability. All systems are prone to some level of failure because of human operator error. Retaining redundancy is therefore prudent, especially given the negative consequences of losing track of evidence. There is a (rational) assumption that the chance of the same error occurring in two unrelated systems is significantly lower versus in a single, non-redundant system.

A complementary quality control system is essential to evidence inventory management. The essence of quality control for an evidence inventory system is a robust audit program, typically involving monthly checks along with formally scheduled internal and external full evidence audits. On the latter point, while automated inventory technologies such as bar codes are an efficient means to track a large number of objects, reliance

upon bar code-based systems is no substitute for human checking of the information on the evidence label and seals.

Summary

The ideal digital evidence inventory control system should be able to simultaneously track both exhibits and submitted objects. Digital containers and original evidence need to be differentiated in an inventory system. Archive evidence should have a simple one-to-one relationship between the archive container (usually a sealed evidence bag, envelope, or box) and the archive media contained within. There are two advantages to the one-to-one relationship: First, the archive inventories are straightforward; and second, discovery motions can be answered by copying the requested exhibit in the archive - and not by having to extract one exhibit from possibly many exhibits stored on a hard drive.

All transactions involving evidence custodians and examiners need to be documented. Establishing time limits for evidence checked out to examiners and the courts is a good means to maintaining control. Having too many exhibits assigned out to one examiner is an invitation for future problems.

Comments or Questions?

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