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- APRIL 2006 -

- INTELLIGENCE ALERT -

HASHISH INSIDE MARIJUANA BRICKS AT JFK AIRPORT, NEW YORK

The DEA Northeast Laboratory (New York, New York) recently received 12 large brick-shaped packages of compressed plant material, apparent marijuana. The exhibits were seized at JFK Airport (New York) by U.S. Customs and Border Protection personnel (originating source and seizure details not available). Each package was wrapped with a combination of plastic and tape, and appeared to be typical marijuana bricks. However, upon disassembly, it was discovered that each brick contained a second, smaller package, also wrapped in plastic and tape, containing a gummy brown substance (see Photos 1, right, and Photo 2, next page). Analysis of the plant material (total net mass 6.97 kilograms) by microscopy, Duquenois-Levine color test, TLC, and GC/MS confirmed

Photo 1 - Bricks are Approximately 8 x 6 x 2 Inches

marijuana. Analysis of the brown substance (total net mass 17.93 kilograms) using the same techniques indicated hashish. Neither exhibit was quantitated. The Northeast Laboratory has encountered a wide variety of concealment techniques, but this is the first submission of hashish inside marijuana bricks.

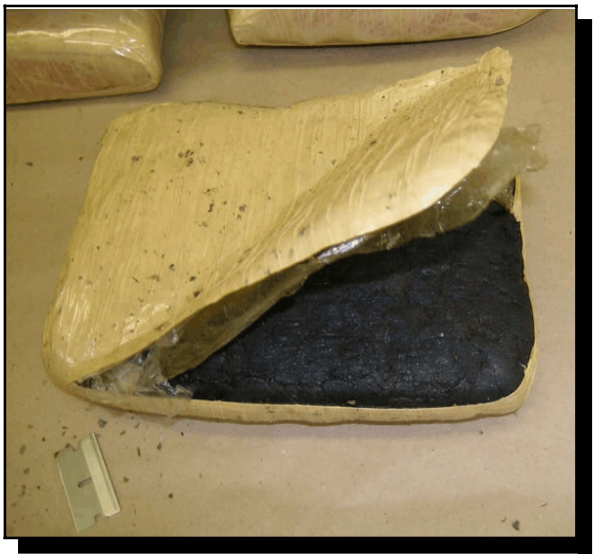

Photo 2 - Note Razor Blade in Lower Left Hand Corner for Scale

[Editor's Notes: Concealment of controlled substances within other controlled substances is sporadically encountered. In the cases that have been reported to *Microgram*, the inside (concealed) material was always the much more valuable substance (for example, heroin mini-bricks inside cocaine bricks). These unusual concealment efforts are generally considered to be an effort to dupe smuggling organizations - not law enforcement personnel. Such organizations typically charge for their services by both the total weight and the substance. More valuable substances are charged commensurately higher rates - to whit, in the present case, the charge for smuggling 18 kilograms of hashish would have been much more than for smuggling 25 kilograms of marijuana.]

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- INTELLIGENCE ALERT -

CARDBOARD "SQUARES" CONTAINING HEROIN IN MIAMI, FLORIDA

The DEA Southeast Laboratory (Miami, Florida) recently received 160 individual cardboard "squares" containing a dark gray, powdery substance, suspected heroin (see Photo 3). The exhibits were seized by DEA/Miami and the Coral Gables Police Department (originating source and seizure details not available). The "squares" were slightly irregularly cut (that is, not perfectly square), and also varied in size. Analysis of the powder (total net mass 5208 grams) by GC/MS and FTIR confirmed 70 percent heroin hydrochloride. It is not known whether this was the first such submission to the Southeast Laboratory.

Photo 3

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ECSTASY TABLETS CONTAINING MDMA AND METHAMPHETAMINE MIXTURES IN EASTERN KENTUCKY

The Kentucky State Police Eastern Forensic Laboratory (Ashland, Kentucky) recently received four dark green tablets with a poorly defined butterfly logo, and one light green tablet with a "JK" logo, both suspected MDMA (see Photos 4 and 5). The exhibits were acquired by the Big Sandy UNITE Drug Task Force (Prestonsburg, Kentucky) during the execution of separate search warrants in Allen and Saylersville (both in eastern Kentucky). Analysis of the butterfly tablets by GC/MS and GC/FID indicated a mixture of methamphetamine, MDMA, diphenhydramine, lidocaine, and caffeine (the ratio of methamphetamine to MDMA was 1.2 : 1). Analysis of the "JK" tablet (also by GC/MS and GC/FID) indicated a mixture of methamphetamine, MDMA, and caffeine (methamphetamine : MDMA was 2.6 : 1). Both tablets were approximately 9 millimeters in diameter, but were not weighed. These were the first submissions of these type tablets to the laboratory.

Photo 4

Photo 5

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- INTELLIGENCE ALERT -

LIQUID METHAMPHETAMINE IN TEQUILA BOTTLES AT THE SAN YSIDRO POINT OF ENTRY

The DEA Southwest Laboratory (Vista, California) recently received two bottles of tequila (different brands), each containing a cloudy, gold colored liquid that field-tested positive for methamphetamine (see Photo 6). The bottles were seized by Immigration and Customs Enforcement Agents from a vehicle entering the United States at the San Ysidro (California) Point of Entry. Preliminary screening of the liquid inside the bottles by IR-ATR indicated that liquid was water-based. Analysis of a dried sample by IR-ATR confirmed methamphetamine hydrochloride. Quantitative analysis by HPLC indicated 487 milligrams/milliliter in the small bottle (total volume 1008 milliliters) and 490 milligrams/milliliter in the larger bottle (total volume 3003 milliliters). This is the first submission of "liquid methamphetamine" in tequila bottles to the Southwest Laboratory.

Photo 6

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- INTELLIGENCE ALERT -

COCAINE AND HEROIN CO-SMUGGLED IN A LARGE METAL CYLINDER IN BOSTON, MASSACHUSETTS

The DEA Northeast Laboratory (New York, New York) recently received a large, heavy metal cylinder which contained two different quantities of powders, one off-white and the other beige, suspected cocaine and heroin, respectively (see Photo 7). The cylinder was seized in Boston by U.S. Customs and Border Protection personnel (originating source and seizure details not available). The metal cylinder (38 inches long by 7 inches in diameter) contained an interior metal cylinder and then a ridged plastic cylinder within, which contained the powders; the powders were separated by a plastic sheet toward the center of the plastic cylinder (see Photo 8). Analysis of the off-white powder (total net mass 7.75 kilograms) by GC/MS, FT-Raman, and GC/FID confirmed 86 percent cocaine hydrochloride. Analysis of the beige powder (total net mass 8.19 kilograms) by GC/MS, FT-IR, and GC/FID confirmed 61 percent heroin hydrochloride, 30 percent cocaine hydrochloride, and thiamine hydrochloride. The Northeast Laboratory has previously encountered a variety of metal containers containing either cocaine or heroin, but this is the first submission in which both cocaine and heroin were co-smuggled in the same container. The actual (original) identity/purpose of the metal cylinder could not be determined.

Photo 7

Photo 8

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- INTELLIGENCE ALERT -

N-BENZYLPIPERAZINE (BZP) AND 3-TRIFLUOROMETHYLPHENYL-PIPERAZINE (TFMPP) LABORATORY IN HOUSTON, TEXAS

The DEA South Central Laboratory (Dallas, Texas) recently received multiple exhibits from a clandestine laboratory, including a tableting machine, a tumbler, 8,100 clear, gelatin capsules containing tan powder, 14,637 round, tan tablets with a poorly defined flying saucer or crown logo, and multiple plastic bags of tan powders, all suspected benzylpiperazine (BZP) (see Photos 9 and 10). The laboratory was located in a mini-storage facility in Houston, and was seized by agents from the DEA Houston Division. The capsules (total net mass 3146 grams) were 6.5 x 19 millimeters and weighed 388 milligrams each; analysis by GC/MS, GC/IRD, FTIR, and CE indicated a mixture of N-benzylpiperazine (BZP, 104 milligrams/capsule) and 3-trifluoromethylphenylpiperazine (TFMPP, not quantitated). The tablets (total net mass 2782 grams) were 8 x 4.5 millimeters and weighed 212 milligrams each; analysis by GC/MS, GC/IRD, FTIR, and CE indicated a similar mixture of BZP (57 - 67 milligrams/tablet) and TFMPP (not quantitated). The various bags of powders could be divided into three sets based on their analyses; the first group contained a total of 2704 grams of 75 percent BZP; the second group contained a total of 1830 grams of TFMPP (not quantitated); and the third contained a total of 1609 grams of mixed BZP and TFMPP (27 - 35 percent BZP (TFMPP not quantitated)). BZP is a Schedule I controlled substance commonly abused as a substitute for MDMA. TFMPP is currently not controlled, but is also commonly abused as a substitute for MDMA. This is the first submission of BZP/TFMPP capsules or tablets to the South Central Laboratory; however, the respective powders have been previously submitted.

Photo 9

Photo 10

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- INTELLIGENCE ALERT -

LARGE FENTANYL / MDA / TMA LABORATORY IN AZUZA, CALIFORNIA

- POSSIBLY THE "OC-80" TABLET SOURCE -

The DEA Southwest Laboratory (Vista, California) recently received multiple exhibits from a very large-scale clandestine laboratory, including various tablets (including apparent OC-80 logo Oxycontin® tablets), a variety of chemicals, and drug manufacturing recipes. The laboratory

(which included a tablet press) was located in Azuza (a suburb of Los Angeles), and was seized by personnel from the Los Angeles Sheriff's Department and Crime Laboratory (see Photos 11 and 12). The initial appraisal of this site suggested that MDMA was being manufactured; however, subsequent laboratory analyses and a review of the recipes (acquired from the Internet) confirmed that it was actually producing fentanyl and 3,4-methylenedioxyamphetamine (MDA).

Photo 11

Photo 12

The fentanyl appeared to be synthesized using the Siegfried route, and was found in both tablet and powder forms. One tablet exhibit contained 201 round, green tablets bearing the “OC 80” logo (total net mass 27.5 grams). These appeared to be distinctly undersized mimics of legitimate Oxycontin® tablets (which contain 80 milligrams of oxycodone; see Photos 13 and 14); however, analysis by GC, GC/MS, and IR indicated that these tablets actually contained 1.5 mg of fentanyl hydrochloride. Tablets like these have been seized throughout the country, and it appears that this lab was a source or possibly the source (could not be confirmed, because the tablet press, punches, and dies were not submitted). There were many thousands of these tablets at the laboratory.

Photo 13

Photo 14

Other Ecstasy-type tablets and associated powders were found to contain a combination of MDA, fentanyl, and caffeine. The tablets came in four different logos: A) A Lacoste® Alligator (268 tablets, total net mass 66.0 grams (see Photo 15)); B) An unusual character that appeared to be an elongated letter "C" and its mirror-image interlocked back-to-back, somewhat similar to the Chanel® logo (101 tablets, total net mass 22.4 grams (see Photo 16)); C) An "XL" (1 tablet, 240 milligrams (No Photo)); and D) A "K" (996 square white tablets, total net mass 223.3 grams (No Photo)). Analysis of the tablets (same techniques) indicated an average of 14.2 milligrams of MDA and 1.0 milligrams of fentanyl (average tablet weight 224 milligrams). The synthetic route to MDA was not determined; however, large amounts of safrole were among the chemicals seized at the laboratory (but 3,4-methylenedioxyphenyl-2-propanone (MDP2P) was not identified in any of the submitted samples).

Photo 15

Photo 16

Photo 17

Finally, 1640 blue, diamond-shaped tablets (total net mass 620.4 grams) were found to contain 2,4,5-trimethoxyamphetamine hydrochloride (TMA, quantitation not done due to lack of a reference standard (see Photo 17)). No ingredients or recipes for TMA were identified at the laboratory, and it was therefore concluded that these tablets were not produced at this site.

The Southwest Laboratory has previously received "OC-80" Oxycontin® mimic tablets; however, these were the first ever submissions of Ecstasy-type tablets containing mixtures of fentanyl, MDA, and caffeine, and of blue, diamond-shaped tablets containing TMA, to the laboratory. This is also the second fentanyl-producing clandestine laboratory encountered in southern California in the past year and a half.

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SELECTED REFERENCES

[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 exactly duplicates that provided by the abstracting service. Patents are reported only by their *Chemical Abstracts* citation number.]

1. Al-Hebshi NN, Skaug N. **Khat (*Catha edulis*) - An updated review.** Addiction Biology 2005;10:299. [Editor's Notes: An extensive overview and review (focus is on usage aspects (not chemistry or analysis)). Contact: Laboratory of Oral Microbiology, Armauer Hansens Hus, N-5021, Bergen, Norway.]

2. Anderson C. **Presumptive and confirmatory drug tests.** Journal of Chemical Education 2005;82(12):1809. [Editor's Notes: Presents details of a teaching laboratory procedure that uses OTC medications as simulated illicit drugs. The analytical differences between simple color tests and GC/MS are emphasized. Contact: Department of Chemistry, Bard College, Annandale-on-Hudson, NY 12504.]

3. Benson S, Lennard C, Maynard P, Roux C. **Forensic applications of isotope ratio mass spectrometry - A review.** Forensic Science International 2006;157(1):1. [Editor's Notes: A review. Includes "illicit drugs" (not specified in the abstract). Contact: Australian Federal Police, Forensic Services, GPO Box 401, Canberra 2601, Australia.]

4. Bieri S, Brachet A, Veuthey J-L, Christen P. **Cocaine distribution in wild *Erythroxylum* species.** Journal of Ethnopharmacology 2006;103:439. [Editor's Notes: Cocaine distributions in the leaves of 51 species of *Erythroxylum* were determined, using GC/MS. Contact: Laboratory of Pharmaceutical Analytical Chemistry, School of Pharmaceutical Sciences, EPGL, University of Geneva, 20 Bd d'Yvoy, 1211 Geneva 4, Switzerland.]

5. Fang H, Zeng Z, Liu L, Pang D. **On-line back-extraction field-amplified sample injection method for directly analyzing cocaine and thebaine in the extractants by solvent microextraction.** Analytical Chemistry 2006;78(4):1257. [Editor's Notes: According to the authors, the presented technique is the first where water-immiscible solvent samples were directly analyzed by CZE. (However, the presented application was urinalysis.) Contact: Department of Chemistry, Wuhan University, Wuhan, Peop. Rep. China 430072.]

6. Gay ML, Niemann RA, Musser SM. **An isotopically labeled internal standard liquid chromatography - tandem mass spectrometry method for determination of ephedrine alkaloids and synephrine in dietary supplements.** Journal of Agricultural and Food Chemistry 2006;54:285. [Editor's Notes: Presents the title study. Contact: Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, College Park, MD 20740.]

7. Leuthold LA, Mandscheff J-F, Fathi M, Giroud C, Augsburger M, Varesio E, Hopfgartner G. **Desorption electrospray ionization mass spectrometry: Direct toxicological screening and analysis of illicit Ecstasy tablets.** Rapid Communications in Mass Spectrometry 2006;20(6):103. [Editor's Notes: Includes analysis of illicit tablets and powders. Results were compared with GC/MS and LC/MS. MS/MS techniques were especially powerful for identification purposes. Contact: Life Sciences Mass Spectrometry, School of Pharmaceutical Sciences, EPGL, University of Geneva, Switz.]

8. Lewis LD. **Method and means of disposing of hazardous wastes connected with criminal activity.** (Patent) Chem. Abstr. 2006:57039.

9. Liu JW, Lu Y. **Fast colorimetric sensing of adenosine and cocaine based on a general sensor design involving aptamers and nanoparticles.** Angewandte Chemie - International Edition 2006;45(1):90. [Editor's Notes: Abstract not provided. Contact: Univ Illinois, Beckman Inst Adv Sci & Technol, Dept Chem, Urbana, IL 61801.]

10. Mali BD, Rathod DS, Garad MV. **Thin-layer chromatographic determination of diazepam, phenobarbitone, and saccharin in toddy samples.** Journal of Planar Chromatography - Modern TLC 2005;18(104):330. [Editor's Notes: Presents the title study (Note: "Toddy" is a crude alcoholic preparation consumed in poor areas of southern India, commonly adulterated

with the referenced drugs). Contact: Regional Forensic Science Laboratory, Aurangabad, 431 002 India.]

11. Rodriguez-Cruz SE. **Rapid analysis of controlled substances using desorption electrospray ionization mass spectrometry.** Rapid Communications in Mass Spectrometry 2006;20:53. [Editor's Notes: Licit and illicit tablets (not specified in the abstract), and also marijuana, were analyzed by DESI-MS, MS/MS, and ESI-MS/MS. Contact: U.S. Drug Enforcement Administration, Southwest Laboratory, 2815 Scott St., Vista, CA 92081.]

12. Sanagi MM, See HH. **High temperature liquid chromatography on a poly(styrene-divinylbenzene) stationary phase.** Journal of Liquid Chromatography & Related Technologies 2005;28(19):3065. [Editor's Notes: The title technique was applied to the separation of various barbiturates (not specified in the abstract). Contact: Univ Teknol Malaysia, Dept Chem, Fac Sci, Skudai 81310, Johor, Malaysia.]

13. Sellers K, Morehead R. **Efficient profiling of cocaine adulterants, using GC-MS and HPLC-RI.** LCGC North America 2005(Suppl.):91. [Editor's Notes: GC/FID and GC/MS are used for all adulterants and diluents studied, while HPLC-RI is used for determination of sugars. Contact: Restek Corporation, Bellefonte, PA 16823.]

14. Sukhats'ka IY, Golovei OP, Tkach VI. **Ionometric determination of the total content of opium alkaloids in crime-investigation samples.** Visnik Kharkivs'kogo Natsional'nogo Universitetu im. V.N. Karazina 2005;648:339. [Editor's Notes: Presents the title study, focusing on the determination of alkaloids in solutions. This article is written in Ukrainian. Contact: Ukr. Derzh. Khim. - Tekhnol Univ., Dnepropetrovsk 49005, Ukraine.]

15. Teng S-f, Wu S-c, Tsay W-l, Liu C-r. **The composition of MDMA tablets seized in Taiwan.** Huaxue 2005;63(3):463. [Editor's Notes: 136 Tablets seized in 2002 - 2004 were analyzed by GC/MS. This article is written in Chinese. Contact: Department of Health, National Bureau of Controlled Drugs, Taiwan.

16. Walker TA, Schmitt GL. **Separation of fexofenadine, pseudoephedrine, potential impurities, and degradation products using ion interaction chromatography.** Journal of Liquid Chromatography & Related Technologies 2006;29(1):25. [Editor's Notes: The title technique was applied to the analysis of pharmaceutical tablets. Contact: Thomas A Walker PhD & Associates Inc, 852 Trail Ridge Rd, Louisville, CO 80027.]

17. Wang WP, Li CH, Li Y, Hu ZD, Chen XG. **Rapid and ultrasensitive determination of ephedrine and pseudoephedrine derivatized with 5-(4,6-dichloro-S-triazin-2-ylamino)fluorescein by micellar electrokinetic chromatography with laser-induced fluorescence detection.** Journal of Chromatography A 2006;1102(1-2):273. [Editor's Notes: The title technique was applied to the analysis of ephedra herbs. Contact: Lanzhou Univ, Dept Chem, Lanzhou 730000, Peoples R China.]

18. Wen T, Zhao X, Luo GA, Wang J, Wang YM, Li P, Zhu J, Yu ZS. **Simultaneous determination of heroin, amphetamine, and their basic impurities and adulterants using microemulsion electrokinetic chromatography.** Chinese Chemical Letters 2005;16(11):1499. [Editor's Notes: Presents the title study. Contact: Department of Chemistry, Tsinghua University, Beijing, Peop. Rep. China 100084.]

19. Wolf CE, Poklis A. **A rapid HPLC procedure for analysis of analgesic pharmaceutical mixtures for quality assurance and drug diversion testing.** Journal of Analytical Toxicology 2005;29:711. [Editor's Notes: Analyzed drugs include bupivacaine, clonidine, fentanyl, hydromorphone, midazolam, and morphine. Contact: Department of Pathology, Virginia Commonwealth University School of Medicine, P.O. Box 980165, Richmond, VA 23298.]

20. Wong R, Zoltek R. **Combination assay for alcohol and drugs of abuse.** (Patent) Chem. Abstr. 2006;144:102247v.

Additional References of Possible Interest:

1. Klous MG, Lee WC, Hillebrand MJX, van den Brink W, van Ree JM, Beijnen JH. **Analysis of diacetylmorphine, caffeine, and degradation products after volatilization of pharmaceutical heroin for inhalation.** Journal of Analytical Toxicology 2006;30(1):6. [Editor's Notes: Uses HPLC-DAD and MS to analyze the vapors from volatilizing a 75/25 mixture of pharmaceutical heroin and caffeine. [Note: This article appears to be quite similar to: Klous MG, Bronner GA, Nuijen B, vanRee JA, Beijnen JH. **Pharmaceutical heroin for inhalation: Thermal analysis and recovery experiments after volatilisation.** Journal of Pharmaceutical and Biomedical Analysis 2005;39(5):944.] Contact: Department of Pharmacy and Pharmacology, Slotervaart Hospital, Amsterdam, Netherlands.]

2. Lehner AF, Craig M, Fannin N, Bush L, Tobin T. **Electrospray [+] tandem quadrupole mass spectrometry in the elucidation of ergot alkaloids chromatographed by HPLC: Screening of grass or forage samples for novel toxic compounds.** Journal of Mass Spectrometry 2005;40(11):1484. [Editor's Notes: Presents the title study. Contact: Univ Kentucky, Livestock Dis Diagnost Ctr, Coll Agr, Lexington, KY 40512.]

3. Munro TA, Goetchius GW, Roth BL, Vortherms TA, Rizzacasa MA. **Autooxidation of salvinorin A under basic conditions.** Journal of Organic Chemistry 2005;70(24):10057. [Editor's Notes: Presents the title study. Contact: Univ Melbourne, Sch Chem, Mol Sci & Biotechnol Inst Bio21, Parkville, Vic 3010, Australia.]

4. Tanaka E, Honda K, Yasuhara H. **Ketamine: Its pharmacology and toxicology.** Japanese Journal of Forensic Toxicology 2005;23(3):187. [Editor's Notes: An overview and brief review. Includes analytical methods. Focus is toxicological. This article is written in Japanese. Contact: Department of Legal Medicine, Graduate School of Comprehensive Human Sciences, University of Tsukuba, Ibaraki-ken 305-8575, Japan.]

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THE JOURNAL/TEXTBOOK COLLECTION EXCHANGE

The Journal/Textbook Collection Exchange is a service intended to facilitate the transfer of unwanted journals and textbooks to forensic libraries or other subscribers. At present, this service is offered once a quarter (in January, April, July, and October). The most current items are listed on the next page. The offers are First Come/First Serve (except libraries have preference). There are no charges to the requestor. Provide full mailing address in request. **Important!:** Do not provide an address that irradiates mail!

* The *Journal of Forensic Sciences*:
2003 - January (#1).
2004 - March (#2), July (#4), and November (#6).
2005 - Entire year (#'s 1-6), plus January (#1), May (#3), July (#4), and November (#6).

* Physician's Desk Reference, 48th Edition (1994).

* Physician's Desk Reference, 51st Edition (1997).

* Physician's Desk Reference, 59th Edition (2005).

All subscribers are encouraged to donate surplus or unwanted items/collections. Reference texts and long runs of forensic/analytical journals are of particular interest; however, even single issues are worthwhile. If interested, please consult the *Microgram* website or contact the *Microgram* Editor for further instructions.

The next offering of journals and textbooks will be in the July 2006 issue of *Microgram Bulletin*.

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THE DEA FY - 2006 STATE AND LOCAL FORENSIC CHEMISTS SEMINAR SCHEDULE

The remaining FY - 2006 schedule for the DEA's State and Local Forensic Chemists Seminar is as follows:

May 8 - 12, 2006
July 10 - 14, 2006
September 11 - 15, 2006

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: P. Smith or J. Kerlavage) at: 22624 Dulles Summit Court, Dulles, VA 20166. For additional information, call 703/668-3337.

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Computer Corner #205

In-House Training - Part I

by Clay Schilling
Group Supervisor
DEA Digital Evidence Laboratory

The establishment of a comprehensive and effective in-house training program is crucial to the operation and success of any digital forensics program. With the ever-increasing advances in digital technology, it is important to have a program that will keep your organization current. While several commercial vendors provide all types and levels of digital forensics training, it is worthwhile to consider the benefits of an in-house training program. For example, increased flexibility in providing organization-specific training, such as evidence vault procedures, documentation and reporting requirements, distinctive processing methodologies, and so on. Other benefits include the use of the equipment and software that has already been installed and validated at your facility, focusing on legal issues that are critical to your agency's mission, providing moot court training that is specific for your type of casework (and that can be readily observed by management and/or critiqued by agency experts), and so on. Moreover, non-digital forensic training can also be added, such as organization history and structure, laboratory safety and security, equal employment opportunity, and other required agency-specific topics.

Training programs should be designed and administered at three distinct levels, those being basic, advanced, and skill maintenance. As implied above, the training can be conducted most conveniently by in-house personnel - which provides opportunities for other examiners to share their knowledge and expertise. Training can also be provided by external sources, or by a combination of in-house personnel and external sources. Additionally, the program should incorporate at least two levels of testing, those being initial qualification and proficiency. Initial qualification testing, which is normally completed at the conclusion of basic training, verifies and documents the examiner's understanding of the basic information and training. Proficiency testing, which is normally conducted annually, verifies and documents the continued understanding of digital forensics and compliance with established organizational policies and procedures.

Basic level training provides both novice and experienced practitioners with the fundamentals of how to properly conduct effective digital forensic examinations in accordance with your agency's specifications. This is the most important level of instruction, as it establishes the foundation on which an examiner's career depends. It can include a wide variety of topics, such as organizational history and structure, ethics, standard operating procedures, legal issues, documentation, evidence handling, and forensic processes. In contrast, advanced level training provides experienced practitioners with opportunities to expand and/or enhance their digital forensic examination skills. Advanced training is typically taught by external providers, and usually focuses on one specific topic, such as date/time stamp analysis, Internet history processing, and steganography. However, it can also be taught by qualified in-house personnel who have specialized expertise, for example SQL database or Exchange Server processing. Finally, the maintenance level should be designed to provide examiners with opportunities to maintain their digital forensic examination skills. It can include basic and advanced topics and/or "refresher" training, and can be taught by either qualified in-house personnel or external providers.

The three training levels will be discussed in more detail in "Part 2" of this series.

Questions or comments? E-mail: Clayton.D.Schilling -at- usdoj.gov