DEA Special Testing and Research Laboratory and DEA Intelligence Division Briefing

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Presenters
Jeffrey H. Comparin
Laboratory Director

James Kinnison
Unit Chief
Drug Enforcement Administration Laboratory System

DEA Laboratories

DEA Regional Laboratories

Provide Enforcement Support

- Evidence Analysis
  - Controlled Substances
  - Latent Prints
  - Digital Evidence
- Court Testimony
- Clandestine Drug Laboratory Seizures
- Trace Drug Evidence Collection
Special Testing and Research Laboratory

- Intelligence Oriented
- Overseas Support
  - Analysis
  - Field Work
- Training
  - Domestic
  - Foreign
- Research/Special Projects
- Publications and Reviews
- Unknowns/New Drugs
- Instrument Evaluations
- Reference Standards Program
- Methods Development

Special Programs

Strategic and Tactical Intelligence Support

- Cocaine Signature
- Heroin Signature
  - Heroin Domestic Monitor
- Methamphetamine Profiling
Cocaine Signature Program

Mission
• Origin Determination by Chemical Analyses

Laboratory’s Customers
• DEA’s Intelligence Division
• United States Drug Policymakers

History
• Initiated in 1997

Authentic Samples
• From cocaine producing regions
  • Leaf
  • Cocaine Processing Laboratory Samples
Cocaine Signature Program

Signatures – Origin of Base
- Colombia
- Peru
- Bolivia

Processing Methodology for Base to HCl
- Colombia
- Peru
- Bolivia

Sample Origins
- All International Offices
- Port of Entry Seizures
- DEA Field Laboratories
- Miscellaneous
Cocaine Signature Program

Determining the Origin of Cocaine Base

Four Methods Utilized

• CISPA – Multiple trace alkaloids including tropacocaine and trimethoxy alkaloids
  Oxidation / Hydrolysis / Diluents / Base Origin

• Cinnamoyls – Cinnamoylcocaine alkaloids
  Oxidation / Base Origin

• Trux – Truxilline alkaloids
  Base Origin / Leaf Variety

• IRMS – Isotopes of carbon and nitrogen
  13C to 12C and 15N to 14N – Leaf Variety

Cocaine Signature Program

Determining the HCl Processing Method

Static Headspace GC/MS

Quantifies Occluded Solvents Trapped in Crystalline Matrix of Powder

Determines

• Solvent used to dissolve cocaine base
• Solvent used for HCl conversion
  • Concentrated HCl or alcoholic HCl
Cocaine Signature Program

Reporting Results

Mission
• Origin Determination by Chemical Analyses

Laboratory’s Customers
• DEA’s Intelligence Division
• United States Drug Policymakers
• Other Nations
Heroin Signature Program

- History
  - Initiated in 1977

- Authentic Samples
  - From heroin producing regions world-wide
  - Backbone is the authentic database

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Heroin Signature Program

- Authentic Samples
  - All International Offices
  - Port of Entry Seizures
  - Regional DEA Laboratories
- Domestic Monitor Program
  - Retail Level Heroin Purchases
  - Intelligence Program: 28 Cities
Heroin Signature Program

Classifications

- Southeast Asian
  - SEA/2
  - SEA/4
- Southwest Asian
  - SWA/A
  - SWA/B
  - SWA/C
- South American - SA
- Mexican - MEX

Regional processes

1. Collection of the opium gum/latex
2. Extraction of morphine from opium
3. Production of heroin base
4. Production of heroin hydrochloride

Basis for classification of samples
Heroin Signature I: Capillary Electrophoresis

Clandestine extraction of morphine from opium - never complete or consistent

Opium alkaloids and by-products remain in the final heroin product

Heroin Signature II: Quantitation Results

44 – 48 acidic and neutral impurities
Heroin Occluded Solvent Analysis: GC/MS

Heroin Base to Heroin HCl Conversion

*Organic Solvents Become Trapped in the Crystalline Matrix*

Heroin Signature Program Reporting

*From Lab*  
*From Intelligence Division*
Methamphetamine Profiling Program

Mission
• Determine Synthetic Routes
• Monitor Precursor Chemicals
• Monitor Reagents and Solvents
• Track Manufacturing Trends

Synthetic vs. Natural Product

Methamphetamine Profiling Program

History
1997 – Started Developing Procedures
Late 1998 – Began Running Samples
• Data Collection
2000 – Inaugural Report
2003 – Formalized Program
Laboratory’s Customers
DEA’s Special Agents
DEA’s Intelligence Division
United States Drug Policymakers

Authentic Samples/Sample Origins
• DEA Field Laboratories
• International DEA Offices
• State and Local Police
• Clandestine Laboratories
Methamphetamine Profiling Program

Analytical Methods

• NMR – Qualitative and quantitative analyses
• Capillary Electrophoresis – Isomer determination
• GC/MS – Organic impurity determination
• LC/Fluorescence – Trace naphthalene compounds
• FTIR – Qualitative analysis
• ICPMS – Trace metals analysis

NH
O

Ephedrine

H

I

Iodomethamphetamine

NH
Methamphetamine

Methamphetamine Profiling Program

Reporting Results

• Average Purity
  • Regional
  • National
• Isomer Determination
• Synthetic Routes
• Adulterants/Diluents
• Trends
• Special Features
Strategic Intelligence Value of Signature/Profiling Programs

DEA Signature and Profiling Programs:
• Heroin Signature Program (HSP)
• Cocaine Signature Program (CSP)
• Methamphetamine Profiling Program (MPP)

These programs are of intelligence value since they identify:
• Changes in the source of origin of seized cocaine and heroin
• Trafficking routes and methods for various drug types
• The use of new processing methods and/or precursor chemicals
• Changes in drug purity
• The presence of adulterants and diluents

Thank You for Your Attention

Jeffrey H. Comparin
Laboratory Director

James A. Kinnison
Unit Chief