



SAN DIEGO POLICE DEPARTMENT
CRIME LABORATORY



FORENSIC CHEMISTRY UNIT

SEIZED DRUG TRAINING MANUAL

Approved By: Chelsea Carter, Supervising Criminalist
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INTRODUCTION

A new analyst will complete all of the following training blocks, which can be completed in any order depending upon the training needs of the unit. The training program takes approximately 8 months to 1 year to complete and the Supervisor or Technical Lead may assign trainers throughout the training period. A formerly trained, or experienced, Seized Drug Analyst may complete the training blocks in a more abbreviated form with approval of the Supervisor and the Quality Assurance Manager. Completion of each training sign off is at the discretion of the Supervisor and the Technical Lead. Additional training materials or programs can be assigned if necessary. At the end of training, a new analyst will be certified to perform all areas of seized drug analysis and testimony.

Additional reading beyond the suggested reading list is at the discretion of the trainee and their trainer(s). It is recommended that during the training period, the trainee meet with qualified analysts on a regular basis to discuss the articles they are reading.

GENERAL COURSEWORK

Date: Trainer: Trainee:

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Read Seized Drugs Manual

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Drug Laws

California Health and Safety Code

Federal Drug Schedules

San Diego Municipal Code

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General Forensic Science Considerations

Evidence Handling

Preservation of Evidence

Interdisciplinary Issues

Human Factors

Confidentiality

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Safety

Safety Data Sheers (SDS)

Eyewash/Shower Locations

First Aid Certification

Narcal and Rescue breathing supplies

Spill Kits

Confidentiality

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General Procedures

Case assignment process

Chain of Custody

Number of samples out at any one time

Opening/sealing/resealing of sealed evidence

Inventory/Discrepancies

Cleanliness of work area

General Case Approach

Minimum amount for testing

Sampling plan

Types of samples not tested

Number of items per case

Sample handling techniques

Labeling of evidence

Proper weighing procedures

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General analytical scheme

Color Tests

Documenting color tests

Use of standards/blanks

Crystal Tests

Documenting crystal tests

Use of standards/blanks

Instrumentation/other

GCMS

IR

Raman

Other

UV

Physical ID's

Bright Field Microscopy

Stereoscope

Reference Materials

Log sheets for reagents and controls

Evidence Storage

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Uncertainty of Measurement

Individual determination

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Court Testimony and Presentation of Evidence

Lab Policies and general court procedures

Service of Subpoena

Observation of other analysts

Prop 115's

Criminal and Civil law procedures

Communication log

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Quality Assurance

Quarterly Checks

Maintenance

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Databases

FileOnQ

Narcotics

CRMS

SDLaw

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Ethical practices in Forensic Science/Seized Drug Analysis

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Required Reading:

SDPD Quality Assurance Manual

California Uniformed Controlled Substances Act

San Diego Municipal Code 52.33

NOT FOR LABORATORY USE

Trainee: _____	Date: _____
Trainer: _____	Date: _____
QA Manager: _____	Date: _____

PHENETHYLAMINES

Date: Trainer: Trainee:

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Drug Class

Stimulants

Effects

Common Drugs

Forms

Background

Entactogens/Hallucinogens

Effects

Common Drugs

Forms

Background

Dissociative Anesthetics

Effects

Common Drugs

Forms

Background

Synthetic Cathinones

Effects

Common Drugs

Forms

Background

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Synthesis and structure

Stereochemistry/isomers

Precursors

Analogs

Cutting Agents

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Common Packaging

Plastic bags/cellophane

Bindles

Vials

Pipes

Syringes

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Ingestion

Injection

Oral

Inhaled

Mixtures/Multi-drugs

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Analytical Procedures

Preliminary analysis

Color test, components, and results

Wagners

Marquis

NItroprusside

Documenting color tests

Use of standards/blanks

Crystal test, components and results

Types of microcrystal tests

-Gold Chloride – Direct

-Gold Chloride/Phosphoric Acid- Hanging Drop

Methods of encouraging crystal growth

Documenting crystal shapes

Use of standards/blanks

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Final analysis

GCMS

Background

-Types of GC instruments

-Mass selective detectors

-Theory of operation

-Capabilities and limitations

-Analysis parameters

-Column type

-Heat of injection and oven

-Flow rates and pressure

-Other program temperature parameters

-MS Setting

Application

-Sample Preparation

-Use of negative controls

-Running a sample

-Sample results, software analysis, and interpretation

-Documenting of GCMS analysis

-Use of standards

-Computer library

Matching criteria

Subtractions

Deciphering isomers & mixtures

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Fourier Transform Infrared Spectroscopy (FTIR)

Background

- Types of IR instruments
- Theory of operation
- Capabilities and limitations
- Analysis parameters

Application

- Sample preparation
- Use of negative controls
- Running a sample
- Sample results, software analysis, and interpretation
- Documenting of FTIR analysis
- Use of standards
- Computer Library
 - Matching criteria
 - Deciphering isomers & mixtures

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Raman

Background

- Types of IR instruments
- Theory of operation
- Capabilities and limitations
- Analysis parameters

Application

- Sample preparation
- Running a sample
- Sample results, software analysis, and interpretation
- Documenting of Raman analysis
- Use of standards
- Computer library
 - Matching criteria
 - Subtractions
 - Warnings – fluorescence, mixtures

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No controlled substance detected (NCSD)

- Color and crystal tests
- Instrumental tests

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Technical Review Procedures

- QA manual requirements
- Seized Drug manual requirements
- Discussion of technical issues

Recording of review

Paper

Database

Testimony

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Related compounds/precursors

Methamphetamine

Phenetermine

Amphetamine

Methylmethamphetamine

Ephedrine

Pseudoephedrine

MDA

MDMA

Phenylpropanolamine

MDPV

Benzylpiperazine

Ethylone

Methylone

3-Trifluoromethylphenylpiperazine

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Practical Demonstration

Demonstration of basics by trainer

-Perform color and crystal examinations of standards and training samples

Review results with trainer

-Perform instrumental or other analysis with standards and training samples

Review results with trainer

-Analyze a minimum of 15 adjudicated cases

Treat these as real case work

Take to final analysis

Technically reviewed by trainer

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Competency Test

Minimum of 10 samples will be analyzed

Work independently

(Passing score is 100%)

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Written Examination (min. passing score of 80%)

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Moot court
(can be done with any and all drug classes and
Supervisor approval)

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Commencement of casework
Completion of training outline
Submission/Approval memo to QA manager

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Required Reading:

E.G.C. Clarke, Ed.
Isolation and Identification of Drugs, Elsevier, 1969.

C. Fulton
Modern Microcrystal Tests for Drugs, Wiley-Interscience, 1969.

Feigl
Spot Tests in Organic Analysis, Elsevier, 1966.

Smith and Dent
Modern Raman Spectroscopy A Practical Approach, Wiley, 2005.

Larkin
Infrared and Raman Spectroscopy, Elsevier, 2011.

Smith
Understanding Mass Spectra A Basic Approach, Wiley, 2004.

Trainee: _____	Date: _____
Trainer: _____	Date: _____
QA Manager: _____	Date: _____

COMMON DRUGS

Date: Trainer: Trainee:

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Caines

General

- Drug class effects
- Background
- Synthesis and structure
 - Chemical structure
 - Stereochemistry/isomers
 - Cutting agents

Forms

- Rock cocaine vs cocaine HCl

Common packaging

- Plastic bags/cellophane
- Bindles
- Vials
- Pipes

Ingestion

- Inhaled

- Oral

- Injection

- Mixtures/Multi-Drugs

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Analytical procedures

Preliminary testing

- Color tests: components and results
- Wagner's test for cocaine base vs cocaine HCl
- Marquis

Final analysis

- GCMS
- IR
- Raman

Special consideration/analysis

- Cocaine base vs. cocaine HCl
 - Methanol vs. hexane extractions

Trainee practice

- Perform color and crystal examinations with standards
- Perform instrumental analysis with standards

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Opiates
General
 Drug class effects
Background
Synthesis and structure
 Chemical structure
 Stereochemistry/isomers
 Precursors and breakdown products
Forms
Common packaging
 Plastic bags/cellophane
 Bindles
 Silicone containers
 Syringes
Ingestion
 Inhaled
 Oral
 Injection
 Mixtures/Multi-Drugs

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Analytical procedures
 Preliminary testing
 - Color tests: components and results
 Wagner's
 Marquis
 Mecke
 - Crystal test: components and results
 Mercuric iodide
 Final analysis
 - GCMS
 Special considerations
 Fentanyl - Effects

Trainee practice
 Perform color and crystal examinations with standards
 Perform instrumental analysis with standards
(See required reading list and end of the section)

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GHB/GBL/1,4-Butanediol

General

Drug class effects

Schedules

Background

Synthesis and structure

Chemical structure

Prodrug/analogs

Forms

Common packaging

Bottles

Ingestion

Oral

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Analytical procedures

Preliminary testing

-Color tests: components and results

Wagner's

Cobalt thiocyanate

Ferric

Lieberman's

Duquenois/Chen 2

-Crystal tests: components and results

CMAS/NC3

Final analysis

-GC/MS

-IR

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Trainee practice

Perform color and crystal examinations with standards

Perform instrumental analysis with standards

(See required reading list and end of the section)

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Phencyclidine

General

Drug class effects

Background

Synthesis and structure

Chemical structure

Analogs

Prodrug/analogs

Forms

Common packaging

Bottles

Ingestion

Oral

Inhalation

Special considerations

Handling precautions

Odor

Taking to final

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Analytical procedures

Preliminary testing

-Color tests: components and results

Wagner's

Cobalt thiocyanate

-Crystal tests: components and results

KMNO₄

Final analysis

-GCMS analysis

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Trainee practice

Perform color and crystal examinations with standards

Perform instrumental analysis with standards

(See required reading list and end of the section)

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Physical Identification

General

Drug class effects

Schedules

Forms

Tablets and capsules

Liquids

Films

Common Packaging

Rx bottles

Blister or foil packs

Vials and Bottles

Ingestion

Oral

Injection

Inhalation

Special considerations

Narcotic preparations

Steroids

Counterfeit Pills

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Analytical procedures

Preliminary testing

Identification by markings

-Drug ID Bible

-Rx II/CD

-Internet References (RxList.com, Drugs.com, etc)

-Information on container

Crystal tests

GCMS analysis

Final analysis

GCMS analysis

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Trainee practice

Perform preliminary and final examinations of standards and/or training samples

(See required reading list and end of the section)

Required Reading:
SDPD Seized Drug manual

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Caines

CRACK – The Drug Chromatographer, Applied Science
“Crack: What is it and what it does”, Microgram, Aug. 1986
SDPD Training Bulletin
“Rock” or “Crack” Cocaine, April 1987
Poison Lab Publication
“Cocaine”
DEA Laboratory notes
“Specific Field Test for Cocaine”, Nov. 1973
J.C. Robertson
“Legal and Analytical Aspects of Cocaine”
Lee
“The Alkaloids”, Cocaine Handbook

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Opiates

Goodman & Gilman's
The Pharmacological Basis of Therapeutics,
“Opioid Analgesic And Antagonists”
CND Analytical, Inc.
Analytical Profiles of the Narcotic Analgesics, 1991
P. Bone
“Black Tar Heroin”, July 1986
Barber, Ventura Sheriff's Crime Lab
“Heroin and Opiates Refresher Course”
J. Thornton, CAC Newsletter
“Specificity of Microcrystalline Test for Heroin”, 1985

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GHB/GBL/1,4-Butanediol

K. Andera
“Microchemical Identification of Gamma-Hydroxybutyrate”
Journal of Forensic Science, 2000, 45 (3), 665-668
L. Ciolino
“The Chemical Interconversion of GHB and GBL: Forensic Issues And Implications”
Journal of Forensic Science, 2001, 46(6), 1315-1323
DEA Laboratory Notes
Gamma Hydroxybutyric Acid, Oct. 2018

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Phencyclidine

F. Tennant

“Medico-Legal Identification of the Phencyclidine (PCP) User”

K. Bailey

“Identification of Some Analogs of the Hallucinogenic Phencyclidine”

Drug ID Bible or similar text

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Physical Identification

R. Collins (www.steroidlaw.com)

“Anabolic Steroids and the Law – Steroids 101”

“Anabolic Steroids and the Law – Anabolic Steroids as Controlled Substances – History and Law”

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Competency Test

Minimum of 10 samples will be analyzed

Work independently

(Passing score is 100%)

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Written Examination (min. passing score of 80%)

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Most court

(can be done with any and all drug classes and Supervisor approval)

Trainee: _____	Date: _____
Trainer: _____	Date: _____
QA Manager: _____	Date: _____

PLANTS & EXOTICS

Date: Trainer: Trainee:

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Cannabis, THC, Cannabidiol, Synthetic Cannabinoids

General

Drug class effects

Legalization/Scheduling

11018.5c Cannabis definition 11018

SDMC 52.33

Forms

Whole plants

Plant material

Concentrated cannabis

How its made

Potency

Liquids

Other

Common Packaging

Plastic bags

Wax paper

Silicone containers

Bottles

Ingestion

Oral

Inhalation

Special Considerations

Reporting and weights

Isomers

Analogs

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Analytical Procedures

Preliminary Testing

Color Test

-Modified Duqunois-Levine

-Specificity

GCMS analysis

Final analysis

GCMS analysis

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Trainee practice

Perform preliminary and final examinations of standards and/or training samples

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Required Reading

R.C. Clarke

“Marijuana Botany- An Advanced Study:

The Propagation And Breeding of Distinctive Cannabis”

J.I. Thornton and G.R. Nakamura

“The Identification of Marijuana”

Proposition 64

H.S. 11015 and 11015.5

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Hallucinogenic Mushrooms (Psilocybin, Psilocin)

General

Drug class effects

Background

Structure

Chemical structures

Morphological features

-Shape, size, color

Forms

Common packaging

Ingestion

Oral

Special considerations

Psilocybin vs psilocin vs bufotenine

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Analytical procedures

Preliminary testing

Microscopy of spores

Color tests: components and results

-Weber

Final analysis

Sample preparation

GCMS analysis

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Trainee practice

Perform preliminary and final examinations of standards and/or training samples

Required reading

R. Norland

What's in a Mushroom.

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LSD and LAMPA

General

Drug class effects

Background

Structures

Forms

-Paper

-Liquid

-Candy

-Gel

Common packaging

Ingestion

Special considerations

Handling precautions

Light sensitivity

Taking to final

Other potent hallucinogens

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Analytical procedures

Preliminary tests

Ultraviolet light

Final analysis

GC/MS

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Trainee practice

Perform preliminary and final examinations of standards and/or training samples

Required reading

“Lysergic Acid Diethylamide”

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Khat

General

Drug class effects

Background

Structures

-Cathinone

-Cathine

-Phenylpropanolamine

Forms

Common packaging

Ingestion

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Analytical procedures
Extraction
GCMS analysis

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Trainee practice
Perform preliminary and final examinations of standards
and/or training samples
Required reading
"Khat" DEA Drug Identification Bible

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Competency Test
Minimum of 10 samples will be analyzed
Work independently
(Passing score is 100%)

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Written Examination (min. passing score of 80%)

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Moot court
(can be done with any and all drug classes
and Supervisor approval)

Trainee: _____	Date: _____
Trainer: _____	Date: _____
QA Manager: _____	Date: _____