



**SAN DIEGO POLICE DEPARTMENT
CRIME LABORATORY**



FORENSIC CHEMISTRY UNIT

SEIZED DRUG TRAINING MANUAL

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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
- Narcan 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

ARCHIVE

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 tests: 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

CuAgNO₃

Final analysis

-GCMS

-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 ID 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
J.P. Bono
“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 Identificaiton 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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Moot 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

GCMS

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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: _____