



Maine Health and Environmental Testing  
Laboratory – Forensic Chemistry

**TRAINING MANUAL**

**SOLID DOSE DRUG CHEMISTRY**

**MAINE HEALTH AND ENVIRONMENTAL  
TESTING LABORATORY**

**FORENSIC CHEMISTRY**

*Training Manual Solid Dose Drug Chemistry: Doc # = 009*  
*Approved by: Forensic Lab Director – W. Mark Fondren, D-ABFT-FA*

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*Originally issued 4-4-2017*  
*Date Revised: 11-03-2017*

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## Section 1: Introduction

### **Purpose:**

- ❖ To train chemists / analysts to examine evidence for the presence of controlled substances.
- ❖ To ensure chemists / analysts meet minimum standards before working independently.
- ❖ To train chemists / analysts to defend their casework / findings in judicial proceedings (Courtroom Testimony).
- ❖ This training course is designed to provide each trainee with the needed skills to safely examine evidence submitted to the lab.

### **Requirements:**

The minimum qualifications for an analyst are detailed in Chapter 266 of 10-144 DHS Rules and 17-A MRSA 1112 (1) and 22 MRSA 42 (1) regulations. This information is also contained within the Quality Manual, available on SharePoint.

### **Coordinator:**

An experienced and fully qualified / authorized Chemist in the field of drug identification shall coordinate this program. Although the coordinator may delegate some training activities to other qualified Chemists working within the lab system, the coordinator has the responsibility to ensure the trainee achieves the desired objectives before working independently. It is encouraged that the trainee work with each experienced analyst currently working in the section to witness how each analyst completes the same task.

### **Training Period:**

This program is designed to ensure that all appropriate areas of study are included. The estimated time required to complete each unit of instruction will vary depending on the abilities and previous experience of the individual trainee. Training may take as little as a few weeks, or as long as 9 months, depending on the previous training and work history of the trainee. No matter the timeline, each analyst will successfully complete an initial

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competency test, including a mock trial before being authorized by the Forensic Lab Director to work independently.

The training is divided into specific sections or topics consisting of:

- Section 1: Introduction
- Section 2: Laboratory Orientation and Reading
- Section 3: Evidence Intake-Storage-LIMS
- Section 4: TLC – Thin Layer Chromatography
- Section 5: Balances
- Section 6: Microscopic Identification of Marijuana
- Section 7: Extractions
- Section 8: Instrumentation (GCMS - FTIR)
- Section 9: Tablets and Capsules
- Section 10: Mushrooms
- Section 11: Steroids
- Section 12: LSD
- Section 13: Report Writing
- Section 14: Legal and Forensic Ethics
- Section 15: Sampling
- Section 16: Courtroom Testimony
- Section 17: Mock Casework

The trainee may work on multiple topics concurrently, but each topic must be completed by the trainee and so documented by the assigned coordinator before the trainee can be authorized to begin independent casework.

Completion of each section need not involve actual cases submitted to the lab. It is acknowledged that a case in each 'section' may not be submitted to the laboratory during the time a trainee is training. This is addressed within each section.

## **Responsibilities:**

During the training period the following shall be followed:

1. The trainee shall **NOT** maintain the physical custody of the evidence as a case is being worked. (The Trainee may receive evidence from a customer, IF the trainee has been authorized to do so by the Forensic Lab Director). The Trainee MAY work with another chemist who has physical custody of the evidence and may assist (train) by examining samples in the presence of the chemist who has physical custody of the evidence, and when so directed by the analyst working the case.

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2. Initially, the trainee shall observe each test being conducted by the trainer. As the trainee gains confidence, understanding, and experience, the trainer may assign specific tasks within the case he/she is working to the trainee and allow the trainee to complete those tasks/examinations under the watch of the trainer. The trainee shall initial all work completed, but the trainer shall take ownership of the all work within the case. Under no circumstance may the trainee work independently until authorized to do so by the Forensic Lab Director.
3. The trainee may **NOT** sign reports during the training period.

## **Documentation:**

The Trainee and the Coordinator will review the training program to ensure the trainee understands the overall program, expectations, and has the opportunity to ask questions before detailed, section specific training commences.

This review, and the completion of all subsequent sections/items referenced in this manual shall be recorded on the checklist, which comprise the last pages of the training manual.

The trainee will prepare a ‘training binder’ that will hold a copy of this training manual, and all associated pages discussed in the next paragraphs.

Throughout this manual references are made that the trainee shall retain specific items in the training binder (GC/MS data for example). The trainee should clearly label what these pages are, initial, and then place them within the appropriate section of the binder.

The checklist, and the completed training binder with all associated pages, will be presented to the Forensic Lab Manager / Quality Manager when all items are completed and before the trainee is fully authorized to work independently.

The Training Coordinator will work with the Forensic Lab Director / Quality Manager when the trainee nears the end of the training program and is ready to complete the mock trial and gain State of Maine Certification as a Drug Chemist.

## **Retraining:**

If a trainee’s performance is unacceptable in any specific section, the Training Coordinator shall:

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- ✓ Notify the trainee and Forensic Lab Director / Quality Manager that performance is/was unacceptable. (Notification of the unacceptable performance may be made by either email or personal communication, but a record will be retained in the training binder along with all documentation indicating the trainee ‘successfully repeated the section and any additional work as determined by the Forensic Lab Director – see below).
- ✓ The Forensic Lab Director may require the trainee to simply repeat the failed section or may augment the training material in the specific section, and/or take other appropriate action as management deems necessary (i.e., disciplinary). Appropriate documentation will be retained in the training binder.
- ✓ Subsequent failures, of either the original or additional sections during the training period, will be brought to the attention of higher management by the Forensic Lab Director / Quality Manager.

Specific Criteria for acceptable performance are detailed within each specific section of the training.

## Section 2: Laboratory Orientation and Reading

**Goals:** The Trainee will gain an understanding of the laboratories physical layout, including which rooms are used for what purpose, who has access to the various rooms, where files are retained, who within the laboratory has responsibility for various tasks, where various pieces of safety equipment are stored, what to do and where to meet in case of fire (or fire drill), etc.

The trainee will also begin to familiarize themselves with the various manuals that detail policy and procedures within the laboratory. During this time the trainee will read, study, and understand each of the following manuals, all of which are available from the Forensic Lab Director / Quality Manager, and are on SharePoint, the laboratory's home for documents, manuals, and forms.

- ❖ Safety Manual (including biohazard, blood borne pathogens, chemical hygiene)
- ❖ Laboratory Standing Operating Procedures Manual (SOP)
- ❖ Evidence Handling Manual
- ❖ Solid Dose Drug Procedures Manual
- ❖ Accreditation Documents (including ISO 17025, and any 'Supplemental' issued by the laboratories accrediting body)
- ❖ Quality Manual

### **Reference Materials:**

Aside from formal manuals, the laboratory offers various sources of outside reference material that can be useful in daily casework. The following list is available. If the Trainee is unfamiliar with these items, the training coordinator shall spend time with the trainee showing him/her where these are stored in lab, and what types of references are available online.

- Basic Training program for Forensic Drug Chemists – Drug Enforcement Administration
- Clarke's Isolation and Identification of Drugs, 2<sup>nd</sup> Edition or later
- The Physician's Desk Reference (PDR)
- Drug Identification Bible
- Analytical Data for Drug Analysis – Vol. I and II (Mills)
- The Journal of Forensic Sciences
- Internet: SWG DRUG / Microgram

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Once the trainee has become familiar with the physical layout of the lab, and has completed reading all manuals, this section may be marked as ‘COMPLETE’ on the Checklist. It is encouraged that the trainee revisit each of these manuals as training progresses and questions regarding lab policy arise. The training coordinator (and other lab staff) shall also take every opportunity to show the trainee how to use the Quality Manual (or other appropriate manual) when ‘teaching moments’ are presented.

## Section 3: Evidence Intake-Storage-LIMS

### Goals:

- ❖ The trainee will gain an understanding of how evidence for analysis arrives at the lab, how a ‘contract’ for analysis is completed between the laboratory and the customer. Trainee will also learn what a chain of custody document is, how it is filled out, and the importance of completing this document correctly. Trainee will learn what is meant by ‘sealed’ when referring to the condition of evidence
- ❖ Trainee will gain an understanding of how evidence is stored both in the ‘drug safe’ and in the basement (B-16).
- ❖ Trainee will gain an understanding and master creating cases in the LIMS system (StarLims), adding samples to the newly created case, printing evidence labels, and applying labels to evidence.

### Tasks to Complete:

- ❖ Trainee will watch various staff take in evidence from the customer.
- ❖ Trainee will watch the contract for analysis be completed, and the chain of custody signed/dated.
- ❖ Trainee will be shown by Coordinator and/or Evidence Custodian the system by which evidence is stored within the ‘drug safe’ and in the evidence storage room (B-16).
- ❖ Trainee will watch staff input information into LIMS system, resulting in the creation of a case, and samples assigned to the newly created case, and the printing of labels related to the evidence for that newly created case.
- ❖ When the Trainee feels they understand how the contract and chain are completed, the Coordinator will pretend to be a customer submitting evidence, and the trainee shall receive said evidence, completing the contract and chain of custody documents. There will be no labels printed, and this pretend case will NOT be entered into the LIMS system. The completed contract and Chain of Custody shall be retained within the

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trainees training binder, and the checklist completed indicating completion of section 3.

After the completion of Sections I, II, and III, the trainee **MAY** be authorized to accept evidence from customers, if so recommended to the Forensic Lab Director by the Training Coordinator. IF so authorized, the Forensic Lab Director will complete the appropriate Authorization and retain such documentation.

## **Section 4: TLC - Thin Layer Chromatography**

### **Goals:**

- ❖ Trainee will gain an understanding of how and why TLC works.
- ❖ Trainee will learn of various solvent systems and how to prepare each.
- ❖ Trainee will gain understanding regarding how compounds are detected.
- ❖ Trainee will gain understanding regarding movement of compounds on plate
- ❖ Trainee will gain understanding regarding TLC and its comparison with other chromatographic techniques.
- ❖ Trainee will gain understanding regarding the importance of using traceable standards and properly recording data on both the TLC form and plate.
- ❖ Trainee will gain understanding regarding the preservation of TLC data for the case file.

### **Tasks to Complete:**

- ❖ Trainee will participate in discussions/lecture with coordinator as needed
- ❖ Trainee will watch coordinator prepare TLC plate and associated paperwork (TLC Form, Reagent log for Spray)
- ❖ Trainee will prepare and conduct TLC analysis of at least 10 standards, documenting the work on the appropriate TLC form, and preserving the findings to mimic the documentation retained for casework.

### **References:**

- ❖ Solid Dose Drug Procedures Manual
- ❖ Criminalistics – An Introduction to Forensic Science – Saferstein pp. 121-131
- ❖ Handbook of Forensic Science Vol. 2 – pp 78-83
- ❖ Clarks Identification of Drugs, 2<sup>nd</sup> Edition (Page 160), or later edition.



## Section 5: Balances

### Goals:

- ❖ Trainee will learn the ‘name’ of each balance within the lab
- ❖ Trainee will gain an understanding of the daily and weekly balance checks that are conducted by the Technical Lead of the section
- ❖ Trainee will gain an understanding of when balances and weights are ‘calibrated’ by approved vendor
- ❖ Trainee will gain an understanding of what Uncertainty of Measurement is, to the level that they can explain in trail
- ❖ Trainee will learn and understand what class S weights are, including how and when to use
- ❖ Trainee will gain an understanding of the daily/weekly balance checks that are conducted with in the lab, and where such records are maintained.

### Tasks to Complete:

- ❖ Trainee will assist other chemists as directed with weighing exhibits from cases. As noted in section 2, trainee will only complete specific tasks when in the presence of other staff. Trainee will not take possession of evidence. It is the responsibility of the training coordinator to accomplish the tasks in this section, but still preserve the integrity of the case(s) the coordinator is working.

## Section 6: Microscopic Identification of Marijuana

### Goals:

- ❖ Trainee will gain understanding of the botanical classification (taxonomy) of marijuana.
- ❖ Trainee will gain understanding of the chemical constituents of marijuana.
- ❖ Trainee will gain understanding of the unique botanical characteristics of marijuana
- ❖ Trainee will be able to conclusively identify of marijuana from other botanicals
- ❖ Trainee will understand the differences between felony and misdemeanor criminal charges in relation to marijuana

## **Tasks to Complete:**

- ❖ Trainee will participate in lecture/discussion with training coordinator as needed.
- ❖ Trainee will microscopically view known samples of marijuana and compare to various other botanicals that are not marijuana.
- ❖ Trainee will conduct TLC on standard(s) of major drugs found in marijuana (Delta 9-THC and/or other cannabinoids).

## **References:**

- ❖ Solid Dose Drug Procedures Manual
- ❖ Clark's Identification of Drugs
- ❖ Handbook of Forensic Science – Vol. 2 – Saferstein – pp 87-92

## **Section 7: Extractions**

### **Goals:**

- ❖ Trainee will gain understanding of acidic, basic and neutral drug groups
- ❖ Trainee will gain understanding regarding principles of extraction for different drug groups
- ❖ Trainee will gain understanding regarding Quechers Extraction Procedures for detection of cannabinoids in Edibles
- ❖ Trainee will gain understanding of why different solvents-pH's are utilized in the analysis of items suspected to contain controlled substances.
- ❖ Trainee will gain understanding of procedural blanks

### **Tasks to Complete:**

- ❖ Trainee will extract at least 2 drugs and examine via GCMS or FTIR
- ❖ Trainee will extract at least 2 mock samples and 1 negative using the Quechers Edibles extraction procedure
- ❖ Training Coordinator shall choose at least 1 drug that requires a basic extraction, or chlorinated solvent.
- ❖ GCMS / spectral data will be saved and included within the Training binder

## **References:**

- ❖ Training Manual – DEA
- ❖ Forensic Science Handbook – Chapter 3, Volume II – Saferstein pp 69-78
- ❖ Solid Dose Drug Procedures Manual
- ❖ Handbook of Forensic Science – Vol. 2 – Saferstein – pp 92-129

## **Section 8: Instrumentation (GCMS / FTIR)**

### **a-Gas Chromatograph Mass Spectrometry**

#### **Goals:**

- ❖ Trainee will gain understanding of GC/MS theory
- ❖ Trainee will gain understanding major instrument components (injector, column, transfer line, MS, filament, data handling, etc).
- ❖ Trainee will gain understanding as to capabilities and limitations of GC/MS
- ❖ Trainee will gain an understanding of how to conduct and evaluate a tune
- ❖ Trainee will gain an understanding of how to evaluate samples for suitability prior to comparing unknowns to a known standard
- ❖ Trainee will gain understanding regarding how to compare sample spectra to known spectra within various approved libraries
- ❖ Trainee will gain understanding regarding the interpretation of chromatograms and mass spectrums, including decision points for accepting and rejecting spectral matches

#### **Tasks to Complete:**

- ❖ Trainee will participate in discussion/lecture with training coordinator
- ❖ Trainee will complete 2 tunes on different days. The Training Coordinator will review and approve (initial) printouts. Retain in training binder.
- ❖ Trainee will analyze 5 different samples (unknowns or standards), comparing the spectra of these unknowns to libraries to determine the identity of the unknown. Printouts indicating the spectra and library match will be retained in the training binder.

## References:

- ❖ Criminalistics – An Introduction to Forensic Science – Saferstein – pp 132-142
- ❖ Handbook of Forensic Science- Vol. 2 – Saferstein – Chapter 2
- ❖ Clarks Identification of drugs 2<sup>nd</sup> Edition, or later
- ❖ Handbook of Forensic Science – Vol. 1 – Saferstein - Chapter 3

## **b-Fourier transformed Infrared Spectroscopy (FTIR)**

### Goals:

- ❖ Trainee will gain understanding as to the basic operation of the instrument
- ❖ Trainee will master adding liquid nitrogen to the detector
- ❖ Trainee will gain understanding of how to utilize microscope
- ❖ Trainee will gain understanding and use of polystyrene film
- ❖ Trainee will gain understanding of background collection prior to examining sample
- ❖ Trainee will gain understanding of how to compare unknown spectra to spectral librarys
- ❖ Trainee will gain understanding how to print and preserve spectra and library match information for case folders

### Tasks to Complete:

- ❖ Trainee will successfully add liquid nitrogen to instrument
- ❖ Trainee will successfully create spectra using polystyrene film, print and retain for training binder
- ❖ Trainee will scan, compare to library, and print 3 samples of cocaine (salt or base). Spectra and library match information will be saved in training binder

### References:

- ❖ Handbook of Forensic Science – Vol. 2 – Saferstein – Chapter 3 - FTIR

## Section 9: Tablets and Capsules

### Goals

- ❖ Trainee will gain understanding of the resources available for physical identification of tablets and capsules
- ❖ Trainee will gain understanding of terminology used to describe tablets/capsules
- ❖ Trainee will gain understanding of criteria for identification of tablets/capsules
- ❖ Trainee will gain understanding of physical/chemical identification methods when physical identification is inadequate

### Tasks to Complete:

- ❖ Trainee will either assist training coordinator or independently identify a minimum of 3 tablets based on visual identity. Visual identity will be confirmed by either GCMS or FTIR. Instrument printouts and corresponding notes regarding the visual identity shall be retained in the training binder by the trainee.

### References:

- ❖ Solid Dose Drug Procedures Manual
- ❖ Physician's Desk Reference (PDR)
- ❖ Logo Index – DEA
- ❖ Drug Identification Bible

## Section 10: Mushrooms

### Goals:

- ❖ Trainee will gain an understanding of the chemical structures associated with drugs typically found in 'mushrooms'
- ❖ Trainee will gain understanding of extraction technique and confirmation with cases involving suspected mushrooms

### Tasks to Complete:

- ❖ Trainee and Coordinator will discuss the challenges of examining suspected mushroom cases.
- ❖ Extract one sample of 'mushrooms' and confirm using GC/MS. Retain instrumental printouts of chromatogram, mass spectra, and suggested library matches in training binder.

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- ❖ **NOTE:** It is recognized that a mushroom suspected case may not be submitted during the training period of an analyst. In this instance, the coordinator will first determine if there are any mushroom cases in storage that, with the permission of the submitter, may be used for training. If there are none, then coordinator shall obtain any mushroom (wild or purchased) and present to trainee for extraction.

## References:

- ❖ Training Manual – DEA
- ❖ Solid Dose Drug Procedures Manual

## Section 11: Steroids

### Goals:

- ❖ Trainee will gain understanding of the chemical structures associated with steroids
- ❖ Trainee will gain and understanding related to the appearance of how steroids are typically sold/found in drug related cases
- ❖ Trainee will gain an understanding of the methods of analysis and challenges typically associated with exhibits of suspected steroids (i.e., matrix and extended chromatographic run times).
- ❖ **NOTE:** It is recognized that a Steroids suspected case may not be submitted during the training period of an analyst. In this instance, the coordinator will first determine if there are any steroid cases in storage that, with the permission of the submitter, may be used for training. If there are none, then coordinator may substitute the analysis of steroid standards to meet this portion of training manual.

### Tasks to Complete:

- ❖ Trainee and Coordinator have met and discussed the challenges associated with examining submissions of suspected steroids.
- ❖ Extract one sample reported containing a steroid and confirm using GC/MS

### References:

- ❖ Training Manual – DEA
- ❖ Forensic Science Handbook – Chapter 3, Volume II – Saferstein
- ❖ Solid Dose Drug Procedures Manual

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## Section 12: LSD

### Goals:

- ❖ Trainee will gain understanding of the chemical structures associated with LSD
- ❖ Trainee will gain and understanding related to the appearance of how LSD is typically sold/found in drug related cases (i.e., blotter papers).
- ❖ Trainee will gain an understanding of the methods of analysis and challenges typically associated with exhibits of suspected LSD (i.e., low concentration).
- ❖ **NOTE:** It is recognized that an LSD suspected case may not be submitted during the training period of an analyst. In this instance, the coordinator will first determine if there are any LSD cases in storage that, with the permission of the submitter, may be used for training. If there are none, then coordinator may substitute the analysis of LSD standards to meet this portion of training manual.

### Tasks to Complete:

- ❖ Trainee and Coordinator have met to discuss the challenges, including safety, associated with examining submissions of suspected LSD.
- ❖ Extract one LSD sample and confirm using GC/MS

### References:

- ❖ Training Manual – DEA
- ❖ Forensic Science Handbook – Chapter 3, Volume II – Saferstein
- ❖ Solid Dose Drug Procedures Manual

## Section 13: Report Writing

### Goals:

- ❖ Trainee will master how to create reports using the labs LIMS system (STARLIMS).

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- ❖ Trainee will learn how to phrase report such that it is clear and understandable to the customer
- ❖ Trainee will learn how to express weights on reports using appropriate UofM values.
- ❖ Trainee will learn how to phrase report when all items in case submission are not examined, and a sampling plan is used.

## **Tasks to Complete:**

- ❖ Trainee will work with Training Coordinator and other lab staff during the training program watching how reports are created, and how they are worded.
- ❖ Trainee will read lab reports from cases that have been used in the training process.
- ❖ No formal documentation of the above items is required, but trainee will successfully complete a report as part of the mock case which is used in the mock trial exercise. See Section 16.

## **Section 14: Legal and Forensic Ethics**

### **Goals:**

- ❖ Trainee will gain an understanding of the Controlled Substances Act
- ❖ Trainee will gain an understanding of Temporary Scheduling
- ❖ Trainee will gain an understanding of Maine State Drug Laws
- ❖ Trainee will gain an understanding of the differences between scheduled and non-scheduled substances
- ❖ Trainee will gain an understanding for the potential of abuse, likelihood of dependency, and currently accepted medical use for the following drugs:
  - Amphetamines
  - Benzodiazepines
  - Cocaine
  - LSD
  - Marijuana
  - Mushrooms
  - Opioids
  - Steroids
- ❖ Trainee will gain an understanding of the ethics as it pertains to forensic examinations: Why it's needed-how it is accomplished daily



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## **Tasks to Complete:**

- ❖ Trainee will read the Controlled Substances Act including the provisions dealing with temporary scheduling
- ❖ Trainee will read Maine State Drug Laws
- ❖ Trainee will review basic pharmacology, accepted medical uses, for the above referenced drugs / drugs family's (Internet research is acceptable).
- ❖ Trainee will discuss the controlled substances act, Maine State Drug Laws, and basic pharmacology topics with training coordinator. (No formal documentation is required).
- ❖ Trainee will discuss legal ethics with Forensic Lab Director and how ethics is part of Laboratory Accreditation, and how it must be incorporated into daily casework

## **References:**

- ❖ Controlled Substances Act
- ❖ Basic Training Program for Forensic Drug Chemists – DEA
- ❖ Maine State Statue Title 17A - Handout
- ❖ Forensic Science Handbook – Saferstein – pp. 70-76
- ❖ Criminalistics – An Introduction to Forensic Science – Saferstein – pp. 228-248
- ❖ Guiding Principles by ANAB  
(<https://anab.qualtraxcloud.com/ShowDocument.aspx?ID=6732>)

## **Section 15: Sampling**

### **Goals:**

- ❖ Trainee will gain understanding into the importance of sampling
- ❖ Trainee will gain understanding as to what comprises a homogenous population
- ❖ Trainee will gain understanding and master use of the sampling program(s) as detailed in the procedure manual
- ❖ Trainee will gain understanding of how sampling plan is recorded in case notes, and final report to the customer

### **Tasks to Complete:**

- ❖ Trainee, Training Coordinator, and Quality Manager will meet to discuss the sampling plan(s). Including evidence reduction-administrative sampling and how statistically valid samplings are used in normal

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casework. Also covered will be how to correctly word reports such that it is clear what was sampled, and how findings of analysis relate to the items submitted

- ❖ Trainee will be presented with various grouping of similar items. Trainee will divide groups into ‘homogenous populations’

## References:

- ❖ Solid Dose Drug Procedures Manual

## **Section 16: Courtroom Testimony**

### Goals:

- ❖ Trainee will gain an understanding of general Courtroom procedures
- ❖ Trainee will gain an understanding of the rules of evidence
- ❖ Trainee will gain an understanding as to the role of both fact witnesses and expert witnesses
- ❖ Trainee will gain an understanding of a Giglio Request vs Discovery Request vs FOIA Request and how to handle each
- ❖ Trainee will gain an understanding of how to testify such that he/she can be easily heard and understood
- ❖ Trainee will gain understanding how to testify in such a manner that their testimony can successfully be captured by the court reporter.

### Tasks to Complete:

- ❖ Trainee will prepare a CV or Resume in preparation for Court.
- ❖ Observing the testimony of at least one experienced Forensic Scientist in court, and after watching, discuss the event with either the training coordinator and/or Forensic Lab Director
- ❖ Read the Courts decision in: **Frye v. United States**, 293 F. 1013 (D.C. Cir. 1923)
- ❖ Read relevant caselaw regarding Forensic Drug Chemistry cases
- ❖ Trainee will prepare written responses to the following list of questions and submit them to the training coordinator for review and discussion:

- Could you please introduce yourself to the jury?

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- How are you currently employed?
- How long have you been employed by the State of Maine as a drug chemist?
- What are your duties / responsibilities as a drug chemist for the State of Maine ?
- Are you Certified by the State of Maine, Department of Health and Human Services (DHHS) as a drug chemist?
- What exactly does that mean and how do you gain such certification?
- Can anyone gain this Certification?
- How were you employed before this position?
- Can you tell us a little about your educational background?
- Are you a member of any professional societies?
- You already described your basic duties / responsibilities as a drug chemist, but can you elaborate on the type of testing that is conducted within the laboratory...meaning, if someone submits a sample that is suspected of being a controlled substance, how do you work that type case? How are you 'sure' it is what you say it is?
- And you, on behalf of the Laboratory, issue a report that details your findings?
- Does anyone in the lab review your reports before they are released? WHO and how is that accomplished?
- Do all submissions to the laboratory contain controlled substances?
- What happens if you examine samples that are suspected of containing a controlled substance and you don't find a controlled substance present? Let's say you find....Tylenol....what do you do then?

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- What is a ‘proficiency test’?
- Are you required to work ‘proficiency tests’?
- How often?
- Are results from proficiency tests reviewed? By whom?
- What happens if you ‘fail’ a proficiency test?
- Can you explain the difference between presumptive testing and confirmatory testing?
- Can you explain (in lay-terms) what is an FTIR? How is it used in the identification of a sample that is suspected to contain a controlled substance?
- Can you explain (in lay-terms) what is a GC/MS? How is that used in the identification of a sample that is suspected to contain a controlled substance?
- If both these types of instruments (FTIR and GC/MS) are used to ‘confirm’ the presence of a controlled substance, what the difference? Meaning, when would you use an FTIR as opposed to a GC/MS?

**Note to Trainee:** To facilitate the completion of this task, see the Forensic Lab Director for a separate MS Word document (uncontrolled) containing these questions. In the alternative, the trainee may simply re-type these questions in a separate document as they prepare their answers.

## Section 17: Mock Casework

### **Goals:**

- ❖ Trainee will demonstrate the mastery of material covered in this training manual

### **Tasks to Complete:**

- ❖ Trainee will analyze and report their findings using mock cases prepared by and submitted by training coordinator. Mock cases (at least 4) will



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start with the submission of evidence, completion of a contract for analysis and Chain of Custody and will be deemed complete when a report is prepared, technically and administratively reviewed.

One of the mock cases completed by the trainee will be selected for use in the Mock trail. Case will be selected by the training coordinator in conjunction with the Forensic Lab Director / Quality Manager.



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## DRUG CHEMISTRY TRAINING PROGRAM CHECKLIST

**Trainee:** \_\_\_\_\_

**Training Coordinator:** \_\_\_\_\_

### Section 1: Introduction

Trainee and Coordinator have met to discuss training program, expectations, and answer all questions from trainee.

Trainee has prepared a training binder that includes a copy of this training manual

**Date Complete:** \_\_\_\_\_ **Trainee:** \_\_\_\_\_ **Coordinator:** \_\_\_\_\_

### Section 2: Laboratory Orientation and Reading

Trainee has read the following Manuals: (Initial and date each when complete):

- Safety Manual
- Standard Operating Procedures Manual
- Evidence Manual
- Solid Dose Drug Procedures Manual
- ISO 17025 / Supplemental
- Quality Manual

Trainee understands the general layout of the laboratory

**Date Complete:** \_\_\_\_\_ **Trainee:** \_\_\_\_\_ **Coordinator:** \_\_\_\_\_



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## **Section 3: Evidence Intake-Storage-LIMS**

Trainee has viewed the process by which is submitted to the lab

Trainee has viewed the completion of the Contract for Analysis and Chain of Custody document

Trainee has been shown the evidence storage system in both the drug safe and basement (B-16)

Trainee has viewed staff enter evidence into LIMS system

Trainee and Coordinator have completed a mock Contract for Analysis and Chain of Custody document

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 4: TLC – Thin Layer Chromatography**

Trainee has viewed coordinator prepare TLC forms

Trainee has successfully tested 10 standards by TLC and completed TLC form.

Documentation placed in training binder

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 5: Balances**

Trainee has assisted coordinator with weighing items as directed by the coordinator

**Date Complete:**

**Trainee:**

**Coordinator:**

**Section 6: Microscopic Identification of Marijuana**

Trainee and coordinator have discussed the analysis of plant material, specifically marijuana

Trainee has microscopically viewed marijuana and other botanicals to differentiate the differences

Trainee has conducted TLC of Delta-9 THC and/or other cannabinoids using appropriate standards (potentially completed in conjunction with section 4)

**Date Complete:**

**Trainee:**

**Coordinator:**

**Section 7: Extractions**

Trainee has completed 2 extractions (1 of which is a basic extraction or uses a chlorinated solvent) and included GC/MS data in binder

**Date Complete:**

**Trainee:**

**Coordinator:**

**Section 8a – Instrumentation GC/MS**

Trainee has met with training coordinator to discuss GC/MS instruments major components, and general use

Trainee has completed 5 tunes on different days under the guidance of the Coordinator

Trainee has completed analysis of 5 samples (known or unknown) to confirm identity by library searches. Printouts included in binder

**Date Complete:**

**Trainee:**

**Coordinator:**





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## **Section 8b – Instrumentation FTIR**

Trainee has successfully added liquid Nitrogen to detector of FTIR

Trainee has successfully scanned polystyrene film

Trainee has successfully scanned 3 samples of cocaine (base or salt) to distinguish between forms. Scans are placed in in training binder

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 9: Tablets and Capsules**

Trainee has identified 3 tablets based on visual markings, and then confirmed identification via instrumental analysis (GC/MS or FTIR). Documentation placed in training binder

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 10: Mushrooms**

Trainee and coordinator have discussed the analysis of mushroom submissions

Trainee has extracted and analyzed 1 mushroom and analyzed via GC/MS. Data placed in training binder

**Date Complete:**

**Trainee:**

**Coordinator:**



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## **Section 11: Steroids**

Trainee and coordinator have discussed the analysis of steroids related cases

Trainee has prepared and examined by GC/MS one sample of suspected steroids

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 12: LSD**

Trainee and coordinator have discussed the analysis of suspected LSD cases.

Trainee has prepared and analyzed 1 LSD sample via GC/MS

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 13: Report Writing**

No formal documentation is required for this section. Coordinator will sign off when they feel trainee has gained an understanding of report writing. Trainee will demonstrate mastery as part of Section 16

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 14: Legal and Forensic Ethics**

Trainee has successfully reviewed the Controlled Substances Act, including the portions dealing with Temporary Scheduling

Trainee has reviewed the Maine State Drug Laws

Trainee has reviewed information relating to the potential for abuse, likelihood of dependence, and medically accepted uses of the following drugs / drug classes:

- Amphetamines
- Benzodiazepines



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- Cocaine
- LSD
- Marijuana
- Mushrooms
- Opioids
- Steroids

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 15: Sampling**

Trainee-Training Coordinator-Quality Manager have met to discuss sampling plan(s) and their relationship to report writing

Trainee has successfully divided all groupings into homogenous populations

**Date Complete:**

**Trainee:**

**Coordinator:**

## **Section 16: Courtroom Testimony**

Trainee has prepared a CV

Trainee has observed at least 1 other Forensic Scientist testify in Criminal court

Trainee has read: Frye vs. United States court opinions

Trainee has prepared written answers to questions.

**Date Complete:**

**Trainee:**

**Coordinator:**



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## **Section 17: Mock Casework**

Trainee has successfully worked 5 mock cases and received feedback regarding each case from the Training Coordinator and the Forensic Lab Director / Quality Manager. Feedback need not be written...it may simply be discussing how the trainee worked each case, or each exhibit within the case.

**Date Complete:**

**Trainee:**

**Coordinator:**