

# VERMONT FORENSIC LABORATORY

## Alcohol Training Manual

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## 1.0 Training Overview

### 1.1. Training Purpose and Description

#### 1.1.1. Purpose and Goals

The purpose of this training program is to provide a uniform training process for forensic chemists (analysts) and DMT technicians in the Toxicology Section at the Vermont Forensic Laboratory (VFL). This program is designed to ensure and document that those individuals who will be working as alcohol analysts or DMT technicians are knowledgeable and competent to perform their technical and analytical duties.

#### 1.1.2. Scope

This program will allow the trainee to familiarize themselves with quality assurance policies and procedures, laboratory set-up, security and safety, evidence handling and chain of custody, the laboratory information management system, testing procedures, report writing, courtroom testimony, DMT operation, calibration, maintenance, repair, user instruction, and management of DM Host. Training will concentrate on test methods currently utilized at the VFL and will culminate in a competency test(s). This program is designed for new employees or current employees without prior alcohol analysis and/or DMT maintenance experience. A trainee with previous experience in forensic or other alcohol analysis and/or DMT maintenance may not require all modules or steps; it is the responsibility of the Toxicology Section Supervisor to determine the duration and scope of the training program for a trainee with previous experience. Similarly, the module content may be tailored as applicable to anticipated job responsibilities.

#### 1.1.3. Documentation

The trainee will compile all documentation associated with training work completed. These files may include, but are not limited to, worksheets, reports, and review sheets. The trainer will review these materials and document completion of required training components. Documentation of training will be maintained at the laboratory.

## 1.2. Trainee Responsibilities

### 1.2.1. Instructions for Trainee

The length of time needed to complete the training program will vary and is left to the discretion of the trainer and supervisor. The trainee will be provided access to any required or suggested readings and will be exposed to samples and situations expected to be encountered during routine

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work in the Toxicology Section. The trainee will keep records, where appropriate, of how training tasks were accomplished (e.g. what ethics training was received, who did the trainee observe testify in court, what additional papers not listed in Appendix I did the trainee reference, etc.). At the conclusion of training, the trainee will evaluate the effectiveness of the training program and suggest any improvements to the section supervisor.

### 1.2.2. Required Training Modules

The trainee, trainer, and section supervisor shall discuss which portions of the training manual are to be completed by the trainee based on the trainee’s anticipated job responsibilities and the trainee’s prior experience. This section may also be used to outline re-training requirements for current employees if needed. The requirements for the trainee are outlined below:

	Required?		Completed?	
	Yes	No	Date	Trainer
1. Training Overview	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
2. Laboratory Introduction				
2.1 General Laboratory Requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
2.2 Safety	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
2.3 Section-Specific Requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
3. Sample and Evidence Control				
3.1 Evidence Handling for Casework	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
3.2 Laboratory Information Management System	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
4. Fundamental Scientific Knowledge				
4.1 Documentation of Education and Experience	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
4.2 General Knowledge of Forensic Science	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
4.3 Working Knowledge of Alcohol Fundamentals				
4.3.1 Alcohol Physiology and Pharmacology	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
4.3.2 DMT Fundamentals	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
4.3.3 Blood Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
5. Applied Scientific Knowledge				
5.1 General Forensic Alcohol Analysis				
5.1.1 Retrograde extrapolation theory	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
5.2 Breath Alcohol Analysis				
5.2.1 DMT Theory	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
5.2.2 DMT Training	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
5.3 Blood Alcohol Analysis				
5.3.1 Gas Chromatography Theory	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
Blood Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
CRM Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>
Beverage Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input style="width: 60px;" type="text"/>	<input style="width: 40px;" type="text"/>

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### 6. Laboratory Analysis

#### 6.1 General Laboratory Training

6.1.1 Instrument and Equipment QC  
and Maintenance

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 6.2 Breath Alcohol Analysis

6.2.1 Reagent Preparation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.2.2 DMT Maintenance

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.2.3 DMT Repair

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.2.4 DM Host Use

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.2.5 DMT User Training

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 6.3 Blood Alcohol Analysis

6.3.1 Reagent Preparation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.3.2 Instrument and Equipment QC  
and Maintenance

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.3.3 Training Sample Processing

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.3.4 Beverage Alcohol Analysis

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 6.4 Certified Reference Materials

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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### 7. Reports and Notifications

#### 7.1 Report Writing

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 7.2 Breath Alcohol Reports

7.2.1 Case Specific IR Affidavits

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.2.2 Retrograde Extrapolation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.2.3 Review of DMT Reports

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.2.4 Technical Review

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.2.5 Administrative and Director Review

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.2.6 Mock Cases – Breath

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 7.3 Blood Alcohol Reports

7.3.1 Blood Alcohol by GC

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.3.2 Retrograde Extrapolation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.3.3 Technical Review

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.3.4 Administrative and Director Review

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7.3.5 Mock Cases – Blood

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 7.4 Certified Reference Materials

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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### 8. Legal Issues

8.1 Legal System Fundamental Knowledge

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8.2 Expert Testimony Training and Practice

8.2.1 General Alcohol Testimony

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8.2.2 Breath Alcohol Testimony

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8.2.3 Blood Alcohol Testimony

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8.3 Document Preparation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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### 9. Final Evaluation

#### 9.1 Competency Tests

DMT Technician

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Blood Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Certified Reference Material

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Retrograde Extrapolation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Beverage Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 9.2 Written or Oral Exam

Impairment

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Retrograde Extrapolation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Breath Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Blood Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Certified Reference Materials

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Beverage Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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#### 9.3 Mock Court

General Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Breath Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Blood Alcohol

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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### 1.3. Trainer Responsibilities

#### 1.3.1. Instructions for Trainer

The trainer is responsible for instructing the trainee in the operations of the laboratory and the processes and procedures that will ultimately comprise the trainee's job duties. The trainer will ensure that the trainee is exposed to all relevant topics within the training program. The trainer will provide sample sets for the trainee to analyze and/or practice scenarios regarding the maintenance and repair of DMTs and will meet with the trainee periodically to monitor progress, review work, and provide feedback. The trainer will assist the trainee in preparing for any assessments, which will include a competency test(s) and may include a mock trial. At the conclusion of training, the trainer will evaluate the effectiveness of the training program and suggest any improvements to the section supervisor.

#### 1.4. Acknowledgement of Training Plan

The signatures of the trainee, trainer, and section supervisor below indicate that the expected responsibilities and required training modules have been discussed and agreed upon.

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

Date: \_\_\_\_\_

Trainer: \_\_\_\_\_

Date: \_\_\_\_\_

Section Supervisor: \_\_\_\_\_

Date: \_\_\_\_\_

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## 2.0 Laboratory Introduction

### 2.1. General Laboratory Requirements

The trainee will become familiar with and follow the administrative and quality assurance policies and procedures described in the VFL Quality Assurance Manual.

Task	Trainee	Trainer	Date Completed
I have received a tour and have become oriented to the laboratory.			
I have received ethics training and understand that my position carries ethical responsibilities.			
I have read and understand the required readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

### 2.2. Safety

The trainee will become familiar with and follow the safety policies and procedures described in the VFL Safety Manual.

Task	Trainee	Trainer	Date Completed
I have received a safety tour lead by the safety officer.			
I have read and understand the required readings and training outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

### 2.3. Section-Specific Requirements

The trainee will become familiar with and follow requirements and guidelines specific to the Alcohol section.

Task	Trainee	Trainer	Date Completed
I have read and understand the required readings outlined for this section in Appendix I.			

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### 3.0 Sample and Evidence Control

This training module will include, but is not limited to, the collection, packaging, storage, and handling of evidence, chain of custody, the laboratory information management system (LIMS), and requirements for consuming samples and evidence.

#### 3.1. Evidence Handling for Casework

The trainee will become familiar with and follow the policies and procedures described in the VFL Evidence Handling Manual.

Task	Trainee	Trainer	Date Completed
I have read and understand the required readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed the receipt, handling, storage, and return of evidence in the Evidence section.			
I have observed the receipt, bench handling, storage, and return of evidence in the Toxicology section.			

#### 3.2. Laboratory Information Management System

The trainee will become familiar with the laboratory information management system (LIMS) in use at the VFL.

Task	Trainee	Trainer	Date Completed
I have read and understand the required readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed the use of LIMS by a qualified Alcohol analyst.			
I have been introduced to training on the use of the LIMS database.			

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### 4.0 Fundamental Scientific Knowledge

This training module will ensure that the trainee has appropriate formal education and can demonstrate a working knowledge of the fundamental scientific basis of forensic alcohol analysis and/or maintenance and repair of DMTs.

#### 4.1. Documentation of Education and Experience

##### 4.1.1. Education Requirements

Analysts shall meet the educational requirements outlined by the ASCLD-LAB International accreditation supplemental requirements. DMT technicians shall meet the education requirements specified in the job description, as required by the ASCLD-LAB International accreditation supplemental requirements.

The trainee shall produce pertinent materials, such as transcripts, syllabi, or correspondence with instructors, to show that educational requirements are met. These documents will be reviewed and approved by the section supervisor.

##### 4.1.2. Experience Requirements

Prior experience in alcohol analysis and/or maintenance and repair of DMTs may be accepted in lieu of completing portions of this training program. The section supervisor is responsible for determining whether a trainee's prior experience is accepted by the laboratory.

##### 4.1.3. Acknowledgement of Education and Experience

The signatures of the trainee and section supervisor below indicate that the trainee's documentation of education and experience, if applicable, has been reviewed and that the trainee meets the educational requirements to work as an analyst or DMT technician.

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

Date: \_\_\_\_\_

Section Supervisor: \_\_\_\_\_

Date: \_\_\_\_\_



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### 4.2. General Knowledge of Forensic Science

The trainee will become familiar with the various services provided by the VFL. The trainee will develop and demonstrate a general understanding of the scope and breadth of the capabilities of each lab section at the VFL.

Task	Trainee	Trainer	Date Completed
I have read and understand the required readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

### 4.3. Working Knowledge of Alcohol Fundamentals

#### 4.3.1. General Knowledge of Alcohol Physiology and Pharmacology

The trainee will develop and demonstrate a working knowledge of alcohol physiology, pharmacology, and impairment. This training may include reading peer reviewed journal articles and textbooks, as needed, or attending a course on alcohol and highway safety.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

#### 4.3.2. Working Knowledge of DMT Fundamentals

The trainee will develop and demonstrate a working knowledge of breath alcohol analysis and the DMT. This training may include reading peer reviewed journal articles and textbooks as needed.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

#### 4.3.3. Working Knowledge of Blood Alcohol Analysis

The trainee will develop and demonstrate a working knowledge of blood alcohol analysis including the use of gas chromatography and the principles of measurement uncertainty. This training may include reading peer reviewed journal articles and textbooks as needed.

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Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

### 5.0 Applied Scientific Knowledge

This training module will ensure that the trainee has received appropriate education and training to apply principles of gas chromatography and infrared spectroscopy to the analysis of forensic alcohol samples and the operation and maintenance of DMTs. Training will include, but is not limited to, reading peer reviewed journal articles, textbooks, laboratory protocols, validation studies, and manufacturer's literature on historic and current technologies in use at the VFL. Topics may include, but are not limited to, infrared spectroscopy analysis of breath samples, gas chromatography analysis of blood and beverage alcohol samples, operation and maintenance of the DMT, and retrograde extrapolation. Case files and/or instrument records will be reviewed to demonstrate how these technologies are used and documented at the VFL.

#### 5.1. General Forensic Alcohol Analysis

##### 5.1.1. Retrograde Extrapolation Theory

The trainee will develop and demonstrate a working knowledge of alcohol absorption, distribution, and elimination as well as methods for retrograde extrapolation (relation back calculations) in use at the VFL.

Task	Trainee	Trainer	Date Completed
I have reviewed case files showing the relation back of alcohol test results.			
I have read and understand the required readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

#### 5.2. Breath Alcohol Analysis

##### 5.2.1. DMT Theory

The trainee will develop and demonstrate a working knowledge of the DMTs and simulators maintained by the VFL. Training will include, but is not limited to, the theory underlying the

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DMT, calibration and certification of DMTs, and maintenance and repair of these instruments, including the simulators. The trainee should be exposed to historic breath alcohol testing methods; however, a detailed working knowledge of these techniques is not required.

<b>Task</b>	<b>Trainee</b>	<b>Trainer</b>	<b>Date Completed</b>
I have reviewed instrument files showing the maintenance of the DMT.			
I have read and understand the required readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

### 5.2.2. DMT Training

The trainee will complete the DMT operator and supervisor training courses and attend training provided by the manufacturer of the DMT. The technician trainee will receive training provided by the simulator manufacturer, or a qualified technician in the proper use, maintenance, and adjustment of the simulator used with the DMT.

<b>Task</b>	<b>Trainee</b>	<b>Trainer</b>	<b>Date Completed</b>
I have completed the VFL DMT operator training course.			
I have completed the VFL DMT supervisor training course.			
I have received training on the DMT from the instrument manufacturer.			
I have received training on the simulator from the simulator manufacturer or a qualified technician.			

## 5.3. Blood Alcohol Analysis

### 5.3.1. Gas Chromatography Theory

The trainee will develop and demonstrate a working knowledge of techniques in use at the VFL to analyze alcohol samples, including the use of gas chromatography. In addition to general knowledge of GC theory, the supervisor may designate one or more specific sections of alcohol analysis for a trainee to learn, depending on the scope of the training (i.e. blood alcohol by GC, certified reference materials by GC, or beverage analysis by GC).

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Task	Trainee	Trainer	Date Completed
I have read and understand the required readings outlined for this section in Appendix I.			
I have reviewed case files showing the use of gas chromatography for blood alcohol analysis.			
I have answered the gas chromatography questions outlined for this section in Appendix II and received feedback on my answers.			
I have answered the blood alcohol questions outlined for this section in Appendix II and received feedback on my answers.			
I have reviewed a certification packet for the certification of simulator solutions by gas chromatography.			
I have answered the certified reference material questions outlined for this section in Appendix II and received feedback on my answers.			
I have reviewed case files showing the use of gas chromatography for beverage alcohol analysis.			
I have answered the beverage alcohol questions outlined for this section in Appendix II and received feedback on my answers.			

## 6.0 Laboratory Analysis

The analyst trainee will demonstrate the ability to apply knowledge of the currently validated analysis technologies and methodologies to the analysis of training samples representing the range and type of samples routinely encountered in casework analysis. The DMT technician trainee will demonstrate the ability to apply knowledge of the DMT to the maintenance and repair of these instruments representing the range and type of issues routinely encountered. In addition to laboratory work, this training may include, but is not limited to, reading laboratory protocols, validation studies, peer reviewed journal articles, and reviewing casework.

### 6.1. General Laboratory Training

#### 6.1.1. Instrument and Equipment Quality Control and Maintenance

The trainee will develop and demonstrate knowledge of the instrumentation and equipment and associated quality control requirements in use at the VFL. In addition, the trainee will become

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familiar with maintenance requirements for the lab space that ensure a clean, effective, and safe working environment.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed and/or performed lab space maintenance, including, but not limited to, eyewash tests and cleaning of work areas.			
I am familiar with quality control procedures for pipettes and balances.			
I have observed an experienced analyst in the use of pipettes and balances.			
I have been authorized to use pipettes and balances.			
I am familiar with quality control procedures for thermometers.			
I have observed an experienced analyst in the use of thermometers.			
I have been authorized to use thermometers.			

## 6.2. Breath Alcohol Analysis

### 6.2.1. Reagent Preparation

The analyst trainee will develop and demonstrate a working knowledge of the procedures, skills, and techniques needed to prepare reference materials used with the DMT.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have reviewed the Alcohol Reagent Log and understand what information must be recorded for purchased and prepared reagents.			
I have observed an experienced analyst or technician in the use of a simulator solution with the DMT, including performing a solution change protocol.			

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I have demonstrated the ability to use simulator solution with the DMT and perform a solution change protocol under the general supervision of a trained analyst/technician.			
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### 6.2.2. DMT Maintenance

The trainee will develop and demonstrate a working knowledge of the various DMT procedures and perform a set of relevant tasks routinely performed on the DMT.

Each task will be completed under the direct supervision of a qualified analyst or technician. (The trainee should initial documents that he/she performed under supervision. The qualified analyst/technician also needs to initial all pages of the instrument documentation.) At minimum, the tasks completed during training will include the following:

Task/Procedure	Date Observed	Date Performed
Calibration (CAL)		
Certification (CERT)		
Accuracy and Precision Check (A&P)		
Installation (INSTALL)		
Verification Testing*		
Diagnostic Check		
Annual Preventative Maintenance (APM)		
Routine Performance Check (RPC)		
Site Evaluation		

\*Full verification testing need not be observed directly. A culmination of the procedures associated with a verification test is sufficient.

Task	Trainee	Trainer	Date Completed
I am familiar with the DMT operator use log and the information that is recorded.			
I am familiar with the DMT maintenance log and the information that is recorded.			
I am familiar with DMT simulator solution use log and the information that is recorded.			

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I have observed a qualified analyst or technician perform each of the protocols listed above.			
I have performed each of the protocols listed above under the direct supervision of a trained analyst or technician and included a copy of those reports.			
I have been authorized to perform in-house testing using the DMT.			
I have completed a competency test in the use of the DMT by successfully performing a CAL, CERT, A&P, INSTALL, APM, RPC, and Diagnostic Check without supervision.			

### 6.2.3. DMT Repair

The technician trainee will develop and demonstrate the ability to troubleshoot mechanical issues with the DMT, including the ability to reassemble a disassembled DMT. The technician trainee will also develop and demonstrate the ability to maintain the simulators used with the DMT.

Task	Trainee	Trainer	Date Completed
I have observed an experienced analyst, technician or the instrument manufacturer disassemble and reassemble a DMT.			
I have reassembled a disassembled DMT. Instrument reassembled:			
I have observed an experienced analyst or technician adjust the temperature calibration of a simulator.			
I have adjusted the temperature calibration of a simulator under the supervision of a trained analyst or technician.			
I have completed a competency test and been authorized to perform repairs on a DMT.			

### 6.2.4. DM Host Use

The trainee will be familiarized with the DM Host software. The trainee will upload data from at least one DMT and generate reports. At minimum, the reports generated will include those routinely used.

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Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst or technician use the DM Host software.			
I have successfully navigated DM Host and demonstrated the ability to view and print DMT tickets.			
I have generated summary reports using the DM Host software. A list of generated reports is attached.			

### 6.2.5. DMT User Training

The trainee will be familiarized with the DMT Operator and Supervisor courses and the associated training materials. The trainee will be familiarized with the Vermont Criminal Justice Training Counsel (VCJTC) training requirements for DUI certification and the role that VFL staff plays in providing that training.

Task	Trainee	Trainer	Date Completed
I have read and understand the required readings and presentations outlined for <b>Section 5.2.1</b> in Appendix I.			
I have discussed the training requirements with the Alcohol Section Supervisor.			
I have observed the teaching of the DMT operator training course.			
I have been observed teaching the DMT operator training course.			
I have observed the teaching of the DMT supervisor training course.			
I have been observed teaching the DMT supervisor training course.			
I have been authorized to provide DMT Operator training			
I have been authorized to provide DMT Supervisor training.			



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### 6.3. Blood Alcohol Analysis

#### 6.3.1. Reagent Preparation

The analyst trainee will develop and demonstrate a working knowledge of the procedures, skills, and techniques needed to prepare reagents used in blood alcohol analysis at the VFL.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have reviewed the Alcohol Reagent Log and understand what information must be recorded for purchased and prepared reagents.			
I have observed an experienced analyst in the preparation of reagents for blood alcohol analysis.			
I have prepared reagents for blood alcohol analysis under the general supervision of a trained analyst.			
I have been authorized to prepare reagents for blood alcohol analysis.			

#### 6.3.2. Instrument and Equipment Quality Control and Maintenance

The analyst trainee will develop and demonstrate knowledge of the instrumentation and equipment and associated quality control requirements used in the blood alcohol analysis section at the VFL.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed quality control procedures on the currently validated gas chromatograph.			
I have performed quality control procedures on the currently validated gas chromatograph.			
I have reviewed the instrument maintenance log and understand what information must be recorded.			
I have been authorized to use the headspace GC.			

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### 6.3.3. Training Sample Processing

The trainee will apply theoretical knowledge of the reagents and procedures in use at the VFL to the analysis of training samples. The trainer will provide a set of relevant previously analyzed mock evidence and/or proficiency test samples for the trainee to process. Each analysis performed by the trainee shall be documented. For each technique or methodology, the limitations and sensitivity of the procedure and the controls incorporated to monitor the quality of the run will be understood by the trainee.

The number and type of samples processed by the trainee will be sufficient to demonstrate the trainee's ability to competently conduct alcohol analysis and produce reliable results. If the section supervisor determines that the sample number or type requirements for the trainee differ from those listed below, documentation of this shall be kept with the training materials.

At minimum, the samples processed for training will include the following:

1. Analyzed under the general supervision of an experienced analyst, 10 samples, in two batches of five, from the pool of past proficiency or previously analyzed samples.
2. Analyzed independently, 5 samples from the pool of past proficiency or previously analyzed samples. The trainee will demonstrate competency by preparing a data package for a previous proficiency test, which will undergo technical review and be approved by the Toxicology Section Supervisor.  
Successful completion will be documented with a written authorization specifying that the trainee can now act as a technician for a qualified analyst.
3. Analyzed 50 casework samples under the supervision of a qualified analyst signing the case. (The trainee should initial case documents that he/she performed under supervision. The reporting analyst also needs to initial all pages of the examination documentation.)

Where appropriate, measurement uncertainty will be applied to the results of these analyses.

Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst using the blood alcohol analysis protocol.			
Per the above requirements, I have analyzed 10 samples under the general supervision of an experienced analyst.			

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Per the above requirements, I have independently analyzed 5 samples and prepared data packages for each sample, which have been reviewed.			
I have completed a competency test and have been authorized as a technician to assist a qualified analyst.			
Per the above requirements, I have completed at least 50 casework samples acting as a technician for a qualified analyst.			

### 6.3.4. Beverage Alcohol Analysis

At minimum, the samples processed for training will include the following:

1. Analyzed under the general supervision of an experienced analyst, 2 beverage samples prepared for training.
2. Analyzed independently, 2 beverage samples prepared for training. The trainee will demonstrate competency by preparing data packages for each sample, which will undergo technical review and be approved by the Toxicology Section Supervisor. Successful completion will be documented with a written authorization specifying that the trainee can now act as a technician for a qualified analyst.
3. Analyzed under the direct supervision of the experienced analyst signing the case, 2 casework samples. (The trainee should initial case documents that he/she performed under supervision. The reporting analyst also needs to initial all pages of the examination documentation.)

Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst using the beverage alcohol analysis protocol.			
I have analyzed and documented training samples meeting the criteria above. I have attached a list of samples.			
I have completed a competency test and have been authorized as a technician to assist an experienced analyst.			
I have completed at least 2 casework samples acting as a technician for an experienced analyst.			

### 6.4. Certified Reference Materials

The analyst trainee will develop and demonstrate the ability to prepare and certify simulator solutions by GC.

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Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed an experienced analyst in the preparation of a simulator solution.			
I have prepared a simulator solution under the general supervision of a trained analyst.			
I have completed a competency assessment by preparing a simulator solution that meets the certification requirements.			
I have been authorized to prepare simulator solutions for certification.			
I am familiar with the certification process of a simulator solution using GC.			
I have been authorized to use headspace GC per the requirements in section 6.3.2. of this manual (ALC_P300)			
I have completed the certified reference material requirements outlined in section 5.3.1 of this manual (ALC_P300).			
I have observed an experienced analyst certify a prepared simulator solution by GC.			
I have certified a simulator solution by GC under the general supervision of a trained analyst.			
I have completed a competency assessment by certifying a solution by GC that was previously certified by a trained analyst.			
I have been authorized to certify simulator solutions by GC.			

### 7.0 Reports and Notifications

The trainee will develop and demonstrate knowledge of procedures and documentation for reporting analytical results in accordance with laboratory policy.

In addition to laboratory work and report writing, training may include, but is not limited to, reading laboratory protocols, peer reviewed journal articles, and reviewing casework and/or instrument records.

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### 7.1. Report Writing

The trainee will observe the creation of casework reports and generate practice reports. Training will include, but is not limited to, report format, language used, and the use of the LIMS system to generate reports.

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have reviewed previously generated case reports.			
I have observed the creation of case reports on the LIMS database.			
I have created practice case reports and received feedback on them.			

### 7.2. Breath Alcohol Reports

The trainee will develop and demonstrate the ability to generate and perform technical reviews of reports used in the breath alcohol section.

#### 7.2.1. Case Specific Infrared Affidavits

The analyst trainee will become familiar with the policies, procedures, and documentation for generating case specific infrared affidavits. At minimum, the case specific infrared affidavits prepared for training will include the following:

1. Performed under the general supervision of an experienced analyst, 5 case specific infrared affidavits from previously completed affidavit requests.
2. Performed independently, 10 case specific infrared affidavits from previously completed affidavit requests.

The affidavits prepared for training will include a range of scenarios encompassing those which may be expected to be encountered in casework.

Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst prepare case specific infrared affidavits.			

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Per the above requirements, I have completed 5 case specific affidavits requests under general supervision of an experienced analyst. A list is attached.			
Per the above requirements, I have independently completed 10 case specific infrared affidavit requests. A list is attached.			

### 7.2.2. Retrograde Extrapolation

The analyst trainee will become familiar with the policies, procedures, and documentation for generating relation back breath affidavits. At minimum, the calculations performed for training will include the following:

1. Performed under the general supervision of an experienced analyst, 5 breath relation back affidavits from previously completed relation back affidavit requests.
2. Performed independently, 10 breath relation back affidavits from previously completed relation back affidavit requests.

The calculations performed for training will include a range of scenarios encompassing those which may be expected to be encountered in casework.

Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst perform relation back calculations and prepare appropriate affidavits for breath alcohol.			
Per the above requirements, I have completed 5 relation back affidavit requests for breath alcohol under general supervision of an experienced analyst. A list is attached.			
Per the above requirements, I have independently completed 10 relation back affidavit requests for breath alcohol. A list is attached.			

### 7.2.3. Review of DMT Reports

The trainee will become familiar with the policies, procedures, and documentation for review of reports generated by DMTs. The trainee will develop the ability to review DMT reports by pre-reviewing reports before they are officially reviewed by a qualified analyst/technician.

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Task	Trainee	Trainer	Date Completed
I have reviewed the documentation for review of DMT reports.			
I have observed the technical review of DMT reports by an experienced analyst/technician.			
I have performed and documented “pre-review” technical reviews of DMT reports.			
I have observed an admin/director review of DMT reports.			

### 7.2.4. Technical Review

The analyst trainee will become familiar with the policies, procedures, and forms for technical review of case files. The trainee will develop the ability to technically review analysts’ files and reports by pre-reviewing case files of qualified analysts before they are officially technical reviewed by a qualified analyst.

Task	Trainee	Trainer	Date Completed
I have reviewed the documentation for technical review of casework files.			
I have observed the technical review of case specific infrared affidavits by an experienced analyst.			
I have performed “pre-review” technical reviews of case specific infrared affidavits.			
I have observed the technical review of relation back breath affidavits by an experienced analyst.			
I have performed “pre-review” technical reviews of relation back breath affidavits.			

### 7.2.5. Administrative and Director Review

The trainee will become familiar with the policies, procedures, and forms for administrative and director review of casework files. The trainee’s knowledge of the administrative and director review processes should be such that the trainee can prepare files for administrative and director review.

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Task	Trainee	Trainer	Date Completed
I have observed the administrative and director review of breath alcohol casework files.			

### 7.2.6. Mock Cases - Breath

The trainer or designee will prepare mock cases for the trainee using previously completed cases. The trainee will process these cases, prepare affidavits, create case files, perform appropriate calculations, and write reports. The trainer will perform mock reviews of these cases and the trainee will revise the case files as needed to pass review.

Task	Trainee	Trainer	Date Completed
I have prepared case specific infrared affidavits, generated case files, and had these files reviewed for at least two case-specific infrared affidavit requests. Case Numbers:			
I have prepared breath relation back affidavits, generated case files, and had these files reviewed for at least two breath relation back affidavit requests. Case Numbers:			

### 7.3. Blood Alcohol Reports

The trainee will develop and demonstrate the ability to generate and perform technical reviews of reports used in the blood alcohol section.

#### 7.3.1. Blood Alcohol by Gas Chromatography

The analyst trainee will develop and demonstrate the ability to generate data packages and reports for blood alcohol analysis casework.

Task	Trainee	Trainer	Date Completed
I have observed an experienced analyst generate a data package for blood alcohol analysis by GC.			
I have generated a data package for blood alcohol analysis by GC under the general supervision of an experienced analyst.			
I have independently generated a data package for blood alcohol analysis by GC.			



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I have observed an experienced analyst generate a case report and perform an analyst review for blood alcohol analysis by GC.			
I have generated a case report and performed an analyst review for blood alcohol analysis by GC under the general supervision of an experienced analyst.			
I have independently generated a case report and performed an analyst review for blood alcohol analysis by GC.			

### 7.3.2. Retrograde Extrapolation

The analyst trainee will become familiar with the policies, procedures, and documentation for generating relation back blood affidavits. At minimum, the calculations performed for training will include the following:

1. Performed under the general supervision of an experienced analyst, 5 blood alcohol relation back affidavits from previously completed relation back affidavit requests.
2. Performed independently, 10 blood relation back affidavits from previously completed relation back affidavit requests.

The calculations performed for training will include a range of scenarios encompassing those which may be expected to be encountered in casework.

Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst perform relation back calculations and prepare affidavits for blood alcohol.			
Per the above requirements, I have completed 5 relation back affidavit requests for blood alcohol under general supervision of an experienced analyst. A list is attached.			
Per the above requirements, I have independently completed 10 relation back affidavit requests for blood alcohol. A list is attached.			

### 7.3.3. Technical Review

The analyst trainee will become familiar with the policies, procedures, and forms for technical review of case files. The trainee will develop the ability to technically review analysts' files and reports by pre-reviewing case files of qualified analysts before they are officially technical reviewed by a qualified analyst.

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Task	Trainee	Trainer	Date Completed
I have reviewed the documentation for technical review of casework files.			
I have observed the technical review of blood alcohol analysis casework by an experienced analyst.			
I have performed "pre-review" technical reviews of blood alcohol analysis casework.			
I have observed the technical review of relation back blood affidavits by an experienced analyst.			
I have performed "pre-review" technical reviews of relation back blood affidavits.			

### 7.3.4. Administrative and Director Review

The trainee will become familiar with the policies, procedures, and forms for administrative and director review of casework files. The trainee's knowledge of the administrative and director review processes should be such that the trainee can prepare files for administrative and director review.

Task	Trainee	Trainer	Date Completed
I have observed the administrative and director review of blood alcohol casework files.			

### 7.3.5. Mock Cases - Blood

The trainer or designee will prepare mock cases using previously analyzed samples for the trainee. The trainee will analyze these samples, document their lab work using the record keeping system approved for casework, create case files, perform appropriate calculations, and write reports. The trainer will perform mock reviews of these cases and the trainee will revise the case files as needed to pass review.

Task	Trainee	Trainer	Date Completed
I have analyzed samples, prepared case files, and had these files reviewed for at least two mock cases. Case Numbers:			
I have prepared affidavits, generated case files, and had these files reviewed for at least two relation-back blood mock cases.			

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Case Numbers:			
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### 7.4. Certified Reference Materials

The trainee will develop and demonstrate the ability to generate and perform technical reviews of data packages created during the certification of simulator solutions.

Task	Trainee	Trainer	Date Completed
I have observed an experienced analyst generate a data package for the certification of a simulator solution.			
I have generated a data package for the certification of a simulator solution under the general supervision of an experienced analyst.			
I have independently generated a data package for the certification of a simulator solution.			
I have observed an experienced analyst perform a technical review of a data package for the certification of a simulator solution.			
I have independently performed a technical review a data package for the certification of a simulator solution.			
I have observed the administrative and director review of a data package for the certification of a simulator solution.			

### 8.0 Legal Issues

The trainee will develop and demonstrate knowledge of the structure and function of the legal system in the state of Vermont as well as the roles and responsibilities of forensic scientists and DMT technicians in this system. The training should be sufficient to prepare the trainee to testify as an expert witness once qualified as an analyst. Training for DMT technicians should be sufficient so the technician has an understanding of his/her role in the judicial process, but technicians are not expected to testify routinely.

#### 8.1. Legal System Fundamental Knowledge

The trainee will develop and demonstrate fundamental knowledge of the legal system. This training will include, but is not limited to, court structure, trial format, discovery and admissibility, courtroom presentation skills, exhibit presentation, and ethical responsibilities of expert witnesses.

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Task	Trainee	Trainer	Date Completed
I have read and understand the readings outlined for this section in Appendix I.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

### 8.2. Expert Testimony Training and Practice

The trainee will develop and demonstrate knowledge of the responsibilities of expert witnesses and strategies for effective expert testimony. Training will include, but is not limited to, preparation of mock questions and answers for direct and cross examination and observation of courtroom testimony given by a qualified analyst. The trainee should practice direct and cross examination with more than one qualified analyst (analysts may or may not be from the Toxicology section) to receive greater experience and a variety of feedback. Training may also include prearranged or impromptu question and answer sessions.

#### 8.2.1. General Alcohol Testimony

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed an analyst be qualified in court as an expert witness.			
I have observed an experienced analyst testify in court as an expert witness on the subject of impairment.			
I have observed an experienced analyst testify in court as an expert witness on the subject of retrograde extrapolation.			

#### 8.2.2. Breath Alcohol Testimony

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed an experienced analyst testify in court as an expert witness regarding the workings of the DMT,			

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including the principle of infrared spectroscopy.			
I have observed an experienced analyst testify in court as an expert witness regarding the operation and/or application of the DMT.			
I have practiced direct and cross examination with more than one qualified analyst and received feedback.			
I have practiced presenting a DMT ticket as an exhibit.			

### 8.2.3. Blood Alcohol Testimony

Task	Trainee	Trainer	Date Completed
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed an experienced analyst testify in court as an expert witness regarding the analysis of blood alcohol samples, including the principle of gas chromatography.			
I have practiced direct and cross examination with more than one qualified analyst and received feedback.			
I have practiced presenting a blood alcohol report as an exhibit.			

### 8.3. Document Preparation

The trainee will practice preparing documents that would be requested from an analyst preparing to appear in court.

Task	Trainee	Trainer	Date Completed
I have prepared my curriculum vitae and had it reviewed by at least one qualified analyst.			
I have reviewed at least one breath discovery packet prepared by a qualified analyst or designee.			
I have prepared a practice breath discovery packet and had it reviewed by at least one qualified analyst.			
I have reviewed at least one blood discovery packet prepared by a qualified analyst or designee.			

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I have prepared a practice blood discovery packet and had it reviewed by at least one qualified analyst.			
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### 9.0 Final Evaluation

At the completion of this training program, the trainee’s ability to accept the responsibilities of an analyst or DMT technician will be assessed. The nature of final assessment and evaluation may differ based on the trainee’s experience and anticipated job responsibilities. The section supervisor is responsible for determining what assessment and evaluation is necessary for the trainee and documenting this.

#### 9.1. Competency Tests

The trainee will pass all applicable competency tests prior to beginning work as an analyst or DMT technician. Competency testing includes written and/or oral exam(s). Satisfactory completion of a competency test is required for all analysts and DMT technicians regardless of previous experience. The number and type of samples required for the competency test should be sufficient to cover the anticipated spectrum of assigned duties and to evaluate the individual’s ability to perform proper testing methods. The section supervisor is responsible for determining the components of a competency test and documenting this. For analysts, the competency test will require the preparation of a written report, which will undergo technical, administrative, and director reviews. For DMT technicians, the competency test will require the preparation of an instrument for deployment, start to finish, and the compilation of all necessary documentation. The laboratory will maintain documentation of the successful completion of competency tests.

#### DMT Technician Final Competency:

Task	Trainee	Trainer	Date Completed
I have completed all competency tests which have passed appropriate reviews. Instrument Number(s):			
I have received feedback during review on any issues encountered.			

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### Blood Alcohol Final Competency:

Task	Trainee	Trainer	Date Completed
I have completed all competency tests which have passed appropriate reviews. Case Number(s):			
I have received feedback during review on any issues encountered.			

### Certified Reference Material Final Competency:

Task	Trainee	Trainer	Date Completed
I have completed all competency tests which have passed appropriate reviews. Case Number(s):			
I have received feedback during review on any issues encountered.			

### Retrograde Extrapolation Final Competency:

Task	Trainee	Trainer	Date Completed
I have completed all competency tests which have passed appropriate reviews. Case Number(s):			
I have received feedback during review on any issues encountered.			

### Beverage Alcohol Final Competency:

Task	Trainee	Trainer	Date Completed
I have completed all competency tests which have passed appropriate reviews. Case Number(s):			
I have received feedback during review on any issues encountered.			

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### 9.2. Written or Oral Examination

The trainee will demonstrate an understanding of the different aspects of forensic alcohol analysis covered in this training manual by completing a written or oral examination.

Task	Trainee	Trainer	Date Completed
I have successfully completed a written examination pertaining to impairment.			
I have successfully completed a written examination pertaining to retrograde extrapolation			
I have successfully completed a written examination pertaining to breath alcohol analysis.			
I have successfully completed a written examination pertaining to blood alcohol analysis.			
I have successfully completed a written examination pertaining to certified reference materials.			
I have successfully completed a written examination pertaining to beverage alcohol analysis.			

### 9.3. Mock Trial

The trainee will understand that each case or sample set examined has the potential to require him or her to offer testimony as an expert witness. As such, the trainee will demonstrate his or her knowledge of alcohol testing methods and ability to testify as an expert witness by participating in a mock trial, including both direct and cross examination. The trainee will be evaluated for aspects of performance to include testimony content, response to cross examination, demeanor, and attire. The mock trial will take place prior to the trainee completing any casework.

The case the trainee will testify on may be a competency test case, a fabricated case, or a case which has been completed by a qualified analyst. The case selected will be agreed upon by the trainee and trainer.

The mock trial will include, but is not limited to, questions on qualifications, chain of custody, evidence handling, alcohol analysis methodology, measurement uncertainty, and technical aspects of the case at hand. Questioning by both the prosecutor and defense attorneys should be relevant and realistic. The atmosphere of the trial will be formal. It will be conducted in the same manner as a real courtroom. This will include conduct and protocol, and the trainee should present him- or herself accordingly.



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The outcome of the mock trial evaluation will be satisfactory or unsatisfactory. If it is determined that the trainee's performance was not satisfactory the section supervisor will determine what corrective action must be taken. The trainee will need to complete a mock trial with satisfactory performance before beginning work as a qualified analyst. Participants in the mock trial shall provide feedback for the trainee regardless of whether performance was satisfactory or unsatisfactory.

If the trainee has previous testimony experience this requirement may be modified at the discretion of the section supervisor. This modification will be documented. If a mock trial is not required, an alternate form of oral examination must be selected by the section supervisor.

### General Alcohol Mock Court:

Task	Trainee	Trainer	Date Completed
I have offered testimony in mock court, including both direct and cross examination on the topic of impairment. Mock case number:			
I have offered testimony in mock court, including both direct and cross examination on the topic of retrograde extrapolation. Mock case number:			

### Breath Alcohol Mock Court:

Task	Trainee	Trainer	Date Completed
A case has been chosen for mock court. Case Number:			
I have offered testimony in mock court, including both direct and cross examination covering the principles of infrared spectroscopy and the operation and/or application of the DMT.			

### Blood Alcohol Mock Court:

Task	Trainee	Trainer	Date Completed
A case has been chosen for mock court. Case Number:			
I have offered testimony in mock court, including both direct and cross examination regarding the analysis of			

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blood alcohol samples, including the principle of gas chromatography.			
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### 10.0 Authorization

At the completion of appropriate training the section supervisor shall provide written documentation authorizing the trainee to begin casework analysis or work as a DMT technician. Completion of appropriate training modules to support this determination will be documented in section 1.2.2. Written authorization documents will specify whether the trainee is qualified as an analyst or DMT technician, and what processes, methods, or technologies the authorization encompasses. Multiple authorization documents may be issued for the trainee if training modules are completed at different times.

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### Appendix I: Readings

#### A: Required Readings

##### 1. Training Overview

###### 1.1 VFL Training Manual

##### 2. Laboratory Introduction

###### 2.1 General Laboratory Requirements

- VFL Quality Assurance Manual
- ASCLD/LAB Guiding Principles of Professional Responsibility for Crime Laboratories and Forensic Scientists (<http://www.asclcd-lab.org/guiding-principles/>)
- Boyd, J., "Defensibility and Ethics in the Laboratory" Qual Assur J 2003; 7, 79-83.
- Ethics and Data Integrity for Environmental Labs, 2004 Webinar Series.
- Gallo, A., "How To Speak Up About Ethical Issues at Work" Harvard Business Journal June 4, 2015
- Northrup, T. P., "Ethics and Forensic Science" presentation
- Rosner, R., "Foundations of Ethical Practices in Forensic Sciences" J. For Sci Vol. 42, Issue 6 (November 1997), pg. 1190-1194)
- Trevino, L. K., et al. "Managing to be Ethical: Debunking Five Business Ethics Myths" Academy of Management Execution, 2004 Vol. 18, No. 2 (May), pg 69-81.
- Supplemental documents are available through the laboratories shared drive under the training folder, but are not required unless designated as such by the section supervisor.

###### 2.2 Safety

- VFL Safety Manual
- Meyer, S., "Lead, Noise, Infection Control Training" presentation, 2014.
- Lab Safety video by BioNetwork:  
<https://www.youtube.com/playlist?list=PL4qaj9envIYnBaQSPpcOMUqWiQUAgPoMq>
- How to clean up a blood spill by Cornell University Environmental Health and Safety:  
<https://www.youtube.com/watch?v=Uh0U3giZJx8>

###### 2.3 Section Specific Requirements

- VFL Alcohol Analysis Manual
- VFL DMT Manual
- VFL Certified Reference Material Manual

##### 3. Sample and Evidence Control

###### 3.1 Evidence Handling for Casework

- VFL Evidence Handling Manual

###### 3.2 Laboratory Information Management System

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LIMS How-To Guide

#### 4. Fundamental Scientific Knowledge

##### 4.2 General Knowledge of Forensic Science

- A Simplified Guide to DNA Evidence; National Forensic Science Technology Center (NFSTC)
- A Simplified Guide to Fingerprint Analysis; NFSTC
- A Simplified Guide to Firearms Examination; NFSTC
- A Simplified Guide to Forensic Drug Chemistry; NFSTC
- A Simplified Guide to Forensic Toxicology; NFSTC
- A Simplified Guide to Trace Evidence; NFST

#### 5. Applied Scientific Knowledge

##### 5.1.1 Retrograde Extrapolation Theory

- DUI – Alcohol Physiology and Pharmacology PowerPoint Presentation
- Pharmacokinetics and dynamics portion of the VFL Alcohol Reference Library
- Wigmore, James G. *Wigmore on Alcohol: Courtroom Alcohol Toxicology for the Medicolegal Professional*. Toronto: Irwin Law, 2011. Print.

##### 5.2.1 DMT Theory

- DMT portion of the VFL Alcohol Reference Library
- 2011 VCJTC DMT Infrared Breath Testing Manual
- 2015 VCJTC DMT Infrared Breath Testing Manual
- Evidential Breath Testing Operator Training PowerPoint Presentation
- DMT Supervisor Manual
- DMT Supervisor Training PowerPoint Presentation
- Intoximeters DMT Training Binder, Sept 2015 version or newer.

##### 5.3.1 Gas Chromatography Theory

- VFL Blood Alcohol Method Validation
- VPA Blood Testing PowerPoint Presentation
- Tiscione, et al. “Ethanol Analysis by Headspace Gas Chromatography with Simultaneous Flame-Ionization and Mass Spectrometry Detection”, *Journal of Analytical Toxicology*, Vol 35, 2011, pp. 501-511.
- Measurement Uncertainty Portion of the VFL Alcohol Reference Library
- Tipler, A.; “An Introduction to Headspace Sampling in Gas Chromatography – Fundamentals and Theory” Perkin Elmer reference guide
- Analytical Methods portion of the VFL Alcohol Reference Library

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### 8. Legal Issues

#### 8.1. Legal System Fundamental Knowledge

- Law 101: Legal Guide for the Forensic Expert; National Clearinghouse for Science, Technology and the Law (NCSTL)
- Sapir, Gil I., "Legal Aspects of Forensic Science" in Forensic Science Handbook, Vol. 1, ed. Richard Saferstein, Prentice Hall, Inc., Englewood, N.J. 1982, pp1-32 (Chapter 1).
- Vermont DUI Laws: Title 23, Chapter 13, Section 1201
- VFL Interpretation of the Rules and Regulations Performance Standards for Evidential Breath Alcohol Analysis

### **B: VFL Alcohol Reference Library**

Analysts are expected to be familiar with the contents of the VFL Alcohol Reference Library and be alert for articles and/or references that can be added. Updated references should be added to the VFL Alcohol Reference Library during the review period, when they become available, or when new methodologies or technologies are incorporated into the laboratory protocols.

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### Appendix II: Training Questions

Questions listed below are intended to be answered by analyst trainees. Trainees intending to qualify as technicians may only need to complete a subset of these questions as determined by the trainer. Headings are numbered in accordance with the section numbering in the body of this manual.

#### 2.1. General Laboratory Requirements

- Where are the following found:
  - Mission statement
  - Documentation/record keeping
  - Scope of the VFL
  - Policy on proficiency testing
  - Audits and casework review
  - Laboratory objectives
  - Report writing guidelines
  - Requests for analysis
- How often are manuals reviewed? By whom?
- What are the acceptance criteria for casework?
- If a key is lost, what must an employee do?
- Who has access to section areas?
- Who activates the security alarm? What areas are monitored by the alarm system?
- What must the employee do if he/she accidentally causes the alarm to go off?
- Do the lock systems create an audit trail?
- What is the role of proficiency testing in the laboratory?
- What purpose do audits serve?
- Why should a portion of items tested be retained?
- Name two types of evidence contamination and how they might be avoided.
- Can email be used for official business?
- What are corrective action reports? What is their purpose?

#### 2.2. Safety

- Who is the Safety Officer for the laboratory?
- What is the purpose of the H-F-R rating?
- To what do "H", "F", and "R" refer?
- How often are safety inspections conducted?
- Where are safety records kept for individual laboratory employees?
- What are "universal precautions" and when should they be applied?
- What does "PPE" stand for? What PPE is appropriate for use in the alcohol section?
- What is the evacuation plan for the laboratory in case of fire or other emergency?
- What are SDS's and where are they kept?
- What should be done in the event of a chemical spill?

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11. How is chemical waste disposed of?

### 3.1. Evidence Handling for Casework

1. What elements are required for all proper evidence seals?
2. How should blood alcohol kits be sealed?
3. How is incoming toxicological evidence stored?
4. What steps are taken if the evidence submission document does not match the submitted items?
5. How might evidence come into the laboratory?
6. Who is permitted to submit evidence?
7. Under what circumstances can evidence be consumed?
8. What should be documented regarding the blood alcohol evidence received?
9. What are the requirements for the destruction of blood alcohol evidence?

### 3.2. Laboratory Information Management System

1. What two case numbers are assigned to each case? What is the standard format for each?
2. Which number should be used when communicating with investigators?
3. What is a case record number and how is it generated?
4. Why do many cases have multiple case record numbers?
5. Describe the evidence numbering schematic used by the VFL.
6. What evidence item number or numbers would you assign in the following situations?
  - a. Three tubes inside a blood evidence kit numbered A1.
  - b. A relation back request received after blood alcohol analysis. The only evidence submitted for this case was one blood evidence kit numbered A1.
7. What is the process for documenting an affidavit request in FA?

### 4.2. General Knowledge of Forensic Science

1. What is Forensic Science?
2. What are some disciplines of forensic science-both offered and not offered by the VFL?
3. Generally what types of examinations and/or analyses are performed by the disciplines offered by the VFL?
4. What is a Forensic Analyst?
5. Define cognitive bias and list some ways by which to reduce it.

### 4.3. Working Knowledge of Alcohol Fundamentals

#### 4.3.1. Working Knowledge of Alcohol Physiology and Pharmacology

1. What is absorption with regard to ethanol?
2. What is distribution with regard to ethanol?
3. What is metabolism with regard to ethanol?
4. What is elimination with regard to ethanol?

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5. What is impairment?
6. By what mechanism does ethanol impair CNS function?
7. At what BAC level does ethanol impairment begin?
8. What are the stages of ethanol impairment?
9. What is the significance of 0.08 BAC?

### 4.3.2. Working Knowledge of DMT Fundamentals

1. Explain the principle and operation of infrared spectroscopy.
2. What is Beer's law and how does it relate to breath alcohol analysis?
3. What is Henry's law?
4. What is a partition ratio and how does it apply to breath alcohol analysis?
5. What is a fuel cell as it pertains to breath alcohol analysis? How is this technology used currently?

### 4.3.3. Working Knowledge of Blood Alcohol Analysis

1. Explain the principle and operation of headspace gas chromatography.
2. What is NIST? Why is it important?
3. What is an internal standard? What are the properties of a good internal standard?
4. What is the purpose of running a mixed volatile control (timing mix) during a run?
5. What is measurement uncertainty (MU) and what does it mean? How would you explain MU in a courtroom?

## 5.0. Applied Scientific Knowledge

### 5.1.1. Retrograde Extrapolation

1. What is retrograde extrapolation?
2. What information is required to perform a retrograde extrapolation calculation?
3. What is the elimination rate used in relation back calculations at the VFL? Why?
  - a. Cite literary references.
4. What is the significance of a subject consuming alcohol within 30 minutes of, or after, operation of a vehicle?
5. What is the Widmark equation? What is it used for?
6. Why are relation back calculations required in some court cases?
7. What are the limitations of retrograde extrapolation and Widmark estimates, and what assumptions are made during their calculation?

### 5.2.1. DMT Theory

1. Explain the calibration process of the DMT.
2. Diagram the internal components of the DMT.
3. What is the role of the pump?
4. What is the VFL's role with regard to the DMT?



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5. What is the role of the five-way valve?
6. What is the role of the filter wheel?
7. What areas of the DMT are heated? What are the ranges to which these areas are heated?
8. What is DM Host? How does it work?
9. Explain the purpose of each of the following procedures:
  - a. Calibration
  - b. Certification
  - c. Installation
  - d. Routine Performance Check
  - e. Annual Preventative Maintenance
  - f. Site Evaluation

### 5.3.1 Gas Chromatography Theory

1. Explain the calibration process of the GC-FID.
2. What is a surrogate? What is its role? What are the relevant QC criteria?
3. What is a CCS? What is its role? What are the relevant QC criteria?
4. What is a timing mix? What is its role? What are the relevant QC criteria?
5. Manually calculate BAC based on response of ethanol, internal standard and calibrators.

### Blood Alcohol Analysis

1. How are samples prepared for blood alcohol analysis by GC at the VFL?
2. What is the internal standard used for blood alcohol analysis?
3. What is a whole blood control? What is its role? What are the relevant QC criteria?
4. Describe a typical run sequence for blood alcohol analysis.
5. How is the measurement uncertainty of the blood alcohol analysis method estimated?

### Certified Reference Materials

1. What is a certified reference material?
2. What is NIST? How does NIST tie into the certification of simulator solutions?
3. Who prepares simulator solutions?
4. Describe the process for certifying a simulator solution by GC?
5. What are the acceptance criteria for an accepting and certifying a simulator solution?
6. How long are simulator solutions certified for?
7. How is the measurement uncertainty for certifying simulator solutions estimated?

### Beverage Alcohol Analysis

1. Describe the ranges of alcohol content for the following alcoholic beverages:
  - a. Table wines
  - b. Fortified wines
  - c. Light beer
  - d. Premium beer

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- e. Distilled spirits
2. What is proof?
3. Describe any differences between the blood alcohol method and the beverage alcohol method.

### 6.0. Laboratory Analysis

#### 6.1.1. Instrument and Equipment Quality Control and Maintenance

1. What QC checks and maintenance does each of the following require?
  - a. Pipettes
  - b. Thermometers
  - c. Balance
  - d. Water System

### 6.2. Breath Alcohol Analysis

#### 6.2.1. Reagent Preparation

1. What QC checks do purchased reagents require?
2. Who is responsible for ordering supplies for reagents prepared in-house? How does this process work?
3. What information should appear on the label of a simulator solution prepared in the laboratory?
4. How are reagents prepared in the laboratory QC checked? How are these QC checks documented?
5. Who is responsible for ordering supplies for reagents prepared in-house? How does this process work?
6. What solutions are required for the DMT? What is the purpose of each?

### 6.3 Blood Alcohol Analysis

#### 6.3.1 Reagent Preparation

1. What information should appear on the label of a reagent prepared in the laboratory?
2. How are reagents prepared in the laboratory QC checked? How are these QC checks documented?
3. What QC checks do purchased reagents require?
4. Who is responsible for ordering supplies for reagents prepared in-house? How does this process work?

#### 6.3.2. Instrument and Equipment Quality Control and Maintenance

1. What QC checks and maintenance does each of the following require?
  - a. Perkin Elmer TurboMatrix 110 HS autosampler

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- b. Currently validated GC-FID
- c. Hood
- d. Refrigerators/temperature monitoring system

### 6.4 Certified Reference Materials

1. Describe the process for preparing a simulator solution.
2. What does gravimetric mean?
3. What is the conversion factor used when certifying a simulator solution? Why is a conversion factor used?
4. What is the range of calibrator concentrations used in certifying a simulator solution?

### 7.1 Report Writing

1. List the required documents for case files.
2. What information must be included on a blood alcohol report?

### 8.0. Legal Issues

#### 8.1 Legal System Fundamental Knowledge

1. What are my responsibilities as an expert witness?
2. Whose “side” am I on – the prosecution? The defense?
3. Describe the Daubert and Frye standards. How do they differ? What admissibility standard is used in Vermont?
4. Describe the appeals court structure in the state of Vermont.
5. The state police have submitted evidence in a case. The prosecutor intends to call you as a witness at trial to present your results. The defense attorney calls and asks you a question about your work. What do you do?
6. Describe the difference between a hearing and a trial.
7. What is a deposition? How is it similar to a trial or hearing? How is it different?

#### 8.2 Expert Testimony Training and Practice

##### 8.2.1 General Alcohol Testimony

1. May notes (case file, etc.) be referred to during testimony? If so, how must this be done?
2. Describe characteristics that make an expert witness more effective.
3. While asking you a question a prosecutor makes a statement that is incorrect. What do you do?
4. Define the following terms using language you would use when speaking to a jury.
  1. Chain of Custody
  2. Absorption
  3. Elimination Rates
  4. Retrograde Extrapolation

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### 5. Accreditation

#### 8.2.2 Breath Alcohol Testimony

1. Define the following terms using language you would use when speaking to a jury.
  1. Infrared spectroscopy
  2. Calibration, as it relates to the DMT
  3. Quality control, as it relates to the DMT
  4. Internal checks of the DMT
  5. Routine Performance Check

#### 8.2.3 Blood Alcohol Testimony

1. Define the following terms using language you would use when speaking to a jury.
  1. Gas chromatography
  2. Headspace
  3. Internal standard
  4. Calibration, as it applies to GC
  5. Quality control, as it applies to GC
  6. Timing mix

