

VERMONT FORENSIC LABORATORY

Alcohol Training Manual

Doc. No.
ALC_P300_Version 2

Approved by:
Lab Director

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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 Alcohol 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, DataMaster 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 Alcohol 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 the 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 work in the Alcohol 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.

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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 retraining 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 type="text"/>	<input type="text"/>
2. Laboratory Introduction				
2.1 General Laboratory Requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
2.2 Safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
2.3 Section-Specific Requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
3. Sample and Evidence Control				
3.1 Evidence Handling for Casework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
3.2 Laboratory Information Management System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
4. Fundamental Scientific Knowledge				
4.1 Documentation of Education and Experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
4.2 Working Knowledge of Alcohol Fundamentals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
4.3 Working Knowledge of DMT Fundamentals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
5. Applied Scientific Knowledge				
5.1 Gas Chromatography Theory				
5.1.1 Blood Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
5.1.2 Beverage Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
5.2 DataMaster DMT Theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
5.3 Retrograde Extrapolation Theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6. Laboratory Analysis				
6.1 Reagent Preparation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.2 Instrument and Equipment QC and Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3 Training Sample Processing & DMT Maintenance & Repair Scenarios				
6.3.1 Blood Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3.2 Beverage Alcohol Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3.3 Retrograde Extrapolation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3.4 DataMaster DMT Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3.5 DataMaster DMT Repair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3.6 DM Host Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
6.3.7 Case Specific Infrared Affidavits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
7. Reports and Notifications				
7.1 Report Writing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
7.2 Technical Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>

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7.3 Administrative and Director Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.4 Mock Cases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5 Review of DMT Reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Legal Issues				
8.1 Legal System Fundamental Knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2 Expert Testimony Training and Practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.3 Document Preparation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Final Evaluation				
9.1 Competency Test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.2 Mock Court	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.3 Trainer Responsibilities

1.3.1 Instructions for the 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 DataMaster 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: _____

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.

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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 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.			

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.

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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 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 Alcohol 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 answered the questions outlined for this section in Appendix II and received feedback on my answers.			
I have observed the use of the LIMS system by a qualified Alcohol analyst.			
I have been introduced to training on the use of the LIMS database.			

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 DataMaster 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.

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4.1.2 Experience Requirements

Prior experience in alcohol analysis and/or maintenance and repair of DataMaster 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: _____

4.2 Working Knowledge of Alcohol Fundamentals

The trainee will develop and demonstrate a working knowledge of alcohol physiology, pharmacology, and impairment as well as gas chromatography and measurement uncertainty. 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 Working Knowledge of DMT Fundamentals

The trainee will develop and demonstrate a working knowledge of breath alcohol analysis and the DataMaster 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.			

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 DataMaster 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

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samples, gas chromatography analysis of blood and beverage alcohol samples, operation and maintenance of the DataMaster 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 Gas Chromatography Theory

The trainee will develop and demonstrate a working knowledge of techniques in use at the VFL to analyze blood and beverage alcohol samples.

5.1.1 Blood alcohol analysis

The trainee will develop and demonstrate a working knowledge of blood alcohol analysis using gas chromatography.

Task	Trainee	Trainer	Date Completed
I have reviewed case files showing the use of gas chromatography for blood alcohol analysis.			
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.			

5.1.2 Beverage alcohol analysis

The trainee will develop and demonstrate a working knowledge of beverage alcohol analysis using gas chromatography.

Task	Trainee	Trainer	Date Completed
I have reviewed case files showing the use of gas chromatography for beverage alcohol analysis.			
I have answered the questions outlined for this section in Appendix II and received feedback on my answers.			

5.2 DataMaster DMT Theory

The trainee will develop and demonstrate a working knowledge of the DataMaster DMTs maintained by the VFL. Training will include, but is not limited to, the theory underlying the DataMaster DMT, calibration and certification of DMTs, and maintenance and repair of these instruments. The trainee should be exposed to historic breath alcohol testing methods; however, a detailed working knowledge of these techniques is not required.

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Task	Trainee	Trainer	Date Completed
I have reviewed instrument files showing the maintenance of the DataMaster 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.			

5.3 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.			

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 DataMaster 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 Reagent Preparation

The analyst trainee will develop and demonstrate a working knowledge of the skills and techniques needed to prepare reagents 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.			

Printed copies of this manual are uncontrolled.

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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.			
I have been authorized to prepare reagents.			

6.2 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 in use at the VFL. In addition, the trainee will become 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 quality control procedures on the currently validated gas chromatograph.			
I am familiar with quality control procedures for pipettes, balances, and thermometers.			
I have observed and/or performed lab space maintenance, including, but not limited to, eyewash tests and cleaning of work areas.			
I have reviewed the instrument maintenance log and understand what information must be recorded.			
I have been authorized to use the headspace GC.			
I have been authorized to use balances and thermometers.			

6.3 Training Sample Processing and DMT Maintenance and Repair Scenarios

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.

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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.

6.3.1 Blood alcohol analysis

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 data packages for each sample, which will undergo technical review and be approved by the Alcohol 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 a qualified analyst signing the case, 50 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.)

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.			
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 a qualified analyst.			
I have completed at least 50 casework samples acting as a technician for a qualified analyst.			

6.3.2 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

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undergo technical review and be approved by the Alcohol 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.			

6.3.3 Retrograde Extrapolation

At minimum, the calculations performed for training will include the following:

1. Performed under the general supervision of an experienced analyst, 10 breath relation back affidavits from previously completed relation back affidavit requests.
2. Performed independently, 5 breath relation back affidavits from previously completed relation back affidavit requests.
3. Performed under the general supervision of an experienced analyst, 10 blood relation back affidavits from previously completed relation back affidavit requests.
4. Performed independently, 5 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 performing relation back calculations and preparing appropriate affidavits.			
I have completed and documented training affidavits meeting the criteria above. A list is attached.			

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6.3.4 DataMaster DMT Maintenance

The trainee will complete the DataMaster DMT operator and supervisor training courses, attend training provided by the manufacturer of the DataMaster DMT, and perform a set of relevant tasks routinely performed on the DataMaster 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:

- Calibration
- Certification
- Verification testing
- Installation
- Annual preventative maintenance
- Site evaluation
- Routine performance check and review

Task	Trainee	Trainer	Date Completed
I have completed the DataMaster DMT operator training.			
I have completed the DataMaster DMT supervisor training.			
I have completed training on the DataMaster DMT from the instrument manufacturer.			
I have observed a qualified analyst or technician perform each of the protocols listed above.			
I have performed each of the tasks listed above under the direct supervision of a trained analyst or technician.			

6.3.5 DataMaster DMT Repair

The trainee will attend training provided by the manufacturer of the DataMaster DMT. The trainee will then reassemble a disassembled DataMaster DMT.

Task	Trainee	Trainer	Date Completed
I have completed training on the DataMaster DMT from the instrument manufacturer.			
I have reassembled a disassembled DataMaster DMT. Instrument reassembled:			

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6.3.6 DM Host Use

The trainee will be familiarized with the DM Host software. The trainee will upload data from at least one DataMaster DMT and generate reports.

At minimum, the reports generated will include those routinely used.

Task	Trainee	Trainer	Date Completed
I have observed a qualified analyst or technician use the DM Host software.			
I have generated reports using the DM Host software. A list of generated reports is attached.			

6.3.7 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 observed the DataMaster DMT Operator and Supervisor trainings.			
I have discussed the training requirements with the Alcohol Section Supervisor.			

6.3.8 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, 10 case specific infrared affidavits from previously completed affidavit requests.
2. Performed independently, 5 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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I have completed and documented training affidavits meeting the criteria above. A list is attached.			
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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.

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 reports.			
I have observed the creation of reports on the LIMS system database.			
I have created practice reports and received feedback on them.			

7.2 Technical Review

The 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 performed and documented mock (pre-review) technical reviews of casework files.			

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7.3 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 casework files.			

7.4 Mock Cases

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 files reviewed for at least two mock cases. Case Numbers:			

7.5 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.

Task	Trainee	Trainer	Date Completed
I have reviewed the documentation for review of DMT reports.			
I have performed and documented mock (pre-review) reviews of DMT reports.			

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.

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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.

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 Alcohol section) to receive greater experience and a variety of feedback. Training may also include prearranged or impromptu question and answer sessions.

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 a qualified analyst testify in court.			
I have prepared practice direct and cross examination questions and answers.			
I have practiced direct and cross examination with more than one qualified analyst and received feedback.			
I have practiced presenting 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.			

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I have reviewed at least one discovery packet prepared by a qualified analyst or designee.			
I have prepared a practice discovery packet and had it reviewed by at least one qualified analyst.			

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.

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.			

Beverage Alcohol Final Competency:

Task	Trainee	Trainer	Date Completed
I have completed all competency tests which have passed appropriate reviews.			

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Case Number(s):			
I have received feedback during review on any issues encountered.			

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.			

9.2 Mock Court

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.

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

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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.

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.			

9.3 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
VFL Training Manual
2. Laboratory Introduction
 - 2.1 General Laboratory Requirements
VFL Quality Assurance Manual
 - 2.2 Safety
VFL Safety Manual
 - 2.3 Section-Specific Requirements
VFL Alcohol Analysis Manual
VFL DMT Manual
3. Sample and Evidence Control
 - 3.1 VFL Evidence Handling Manual
 - 3.2 LIMS Guide
5. Applied Scientific Knowledge
 - 5.1 Gas Chromatography Theory
 - 5.1.1 Blood Alcohol Analysis
VFL Blood Alcohol Method Validation
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 VFL Alcohol Reference Library
 - 5.2 DataMaster DMT Theory
DataMaster portion of the VFL Alcohol Reference Library
 - 5.3 Retrograde Extrapolation Theory
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.

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6. Laboratory Analysis
 - 6.3 Training Sample Processing and DMT Maintenance and Repair Scenarios
 - 6.3.7 VCJTC DataMaster DMT Infrared Breath Testing Manual
 - DataMaster DMT Supervisor Manual
 - Evidential Breath Testing Operator Training PowerPoint Presentation
 - DMT Supervisor Training PowerPoint Presentation
 - VPA Blood Testing PowerPoint Presentation
 - DUI- Alcohol Physiology and Pharmacology PowerPoint Presentation
7. Legal Issues
 - Vermont DUI Laws: Title 23, Chapter 13, Section 1201

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

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

2.2 Safety

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

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10. What should be done in the event of a chemical spill?
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 Working Knowledge of Alcohol Fundamentals

1. Explain the principle and operation of headspace gas chromatography.
2. Explain the calibration process of the GC-FID.
3. What is NIST? Why is it important?
4. What is the purpose of running a mixed volatile control (timing mix) during a run?
5. Manually calculate BAC based on response of ethanol, internal standard and calibrators.
6. What are the properties of a good internal standard?
7. What is the measurement uncertainty (MU) for the alcohol assay and what does it mean? How would you explain MU in a courtroom?
8. What is absorption with regard to alcohol?
9. What is elimination with regard to alcohol?
10. What is impairment?

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11. At what BAC level does alcohol impairment begin?
12. What is the significance of 0.08 BAC?
13. What is the Widmark equation? What is it used for?

4.3 Working Knowledge of DMT Fundamentals

1. Explain the principle and operation of infrared spectroscopy.
2. Explain the calibration process of the DataMaster DMT.
3. Diagram the internal components of the DataMaster DMT.

5.1.1 Blood Alcohol Analysis

1. What is the internal standard used for blood alcohol analysis?
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. What is a whole blood control? What is its role? What are the relevant QC criteria?
6. Describe a typical run sequence for blood alcohol analysis.
7. How is the measurement uncertainty of the blood alcohol analysis method estimated?
8. How is the estimated measurement uncertainty applied to blood alcohol results?

5.1.2 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
 - e. Distilled spirits
2. What is proof?
3. Describe any differences between the blood alcohol method and the beverage alcohol method.

5.2 DataMaster DMT

1. What is the VFL's role with regard to the DataMaster DMT?
2. What is the role of the filter wheel?
3. What is the role of the pump?
4. What is the role of the five-way valve?
5. What areas of the DMT are heated? What are the ranges to which these areas are heated?
6. What is DM Host? How does it work?
7. Explain the purpose of each of the following procedures:
 - a. Calibration
 - b. Certification

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- c. Installation
- d. Routine Performance Check
- e. Annual Preventative Maintenance
- f. Site Evaluation

5.3. Retrograde Extrapolation

8. What is retrograde extrapolation?
9. What information is required to perform a retrograde extrapolation calculation?
10. What is the elimination rate used in relation back calculations at the VFL? Why?
 - a. Cite literary references.
11. What is the Widmark formula? How and why is it used?
12. Why are relation back calculations required in some court cases?

6.1 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?
5. What solutions are required for the DataMaster DMT? What is the purpose of each?
6. How are these solutions certified?

6.2 Quality Control and Maintenance

1. What QC checks and maintenance does each of the following require?
 - a. Pipettes
 - b. Thermometers
 - c. Balance
 - d. Teledyne Tekmar HT3 autosampler
 - e. GC-FID
 - f. Hood
 - g. Refrigerators/temperature monitoring system
 - h. Water System

7.1 Report Writing

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

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?

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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

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. Gas chromatography
 2. Headspace
 3. Retrograde extrapolation
 4. Elimination rates
 5. Absorption
 6. Measurement uncertainty
 7. Chain of custody
 8. Accreditation
 9. Internal standard
 10. Calibration (as it applies to GC and DMT)
 11. Timing mix
 12. Infrared spectroscopy
 13. Routine performance check
 14. Internal checks of DMT

