

# VERMONT FORENSIC LABORATORY

## Generating Affidavits for DUI Cases

Doc. No.  
TOX\_P400\_Version 10

Approved by:  
Lab Director

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### 1.0 Purpose and Scope

- 1.1 This procedure describes the review of case information and the subsequent generation of case specific infrared and/or relation back affidavits for breath/blood ethanol results.
- 1.2 The scope of this procedure includes case review, instrument file review, relation back estimates (AKA retrograde extrapolation) and associated QC requirements.

### 2.0 Responsibility

- 2.1 All analysts having the responsibility for generating alcohol affidavits are responsible for following this manual as written.
- 2.2 This manual is reviewed periodically by the Toxicology Section staff. Revisions are made at that time or when there is an identified need to change this written manual to be compatible with changing needs in the process. In the event that there are changes to be made to this manual, the analyst must report those changes in detail to the Toxicology Section Supervisor in a timely manner.
- 2.3 All analysts performing this procedure for the purpose of generating affidavits for legal purposes must be fully trained prior to the generation of any affidavits in accordance with the Alcohol Training Manual (TOX\_P300).
- 2.4 All analysts understand that the estimates and opinions documented in the affidavits are those of the analyst and are made in consideration of the totality of the case. Analysts have the discretion to decline to provide an affidavit and to perform the calculations and state their opinions in accordance with their training and experience. Analysts have an obligation to express all assumptions made in this process. Opinions may be subject to change based upon new information that becomes available.

### 3.0 Emergency or High Priority Situations

- 3.1 The Commissioner of Public Safety, Laboratory Director or Toxicology Section Supervisor can designate affidavit requests as high priority.
- 3.2 High priority affidavits are generated as soon as possible.
- 3.3 Priority affidavits are reviewed and released as soon as they are available, once they pass the quality assurance criteria.

### 4.0 Procedure

#### 4.1 Generic Infrared Affidavit

- 4.1.1 A generic IR affidavit is prepared at least annually detailing the DMT's analytical capabilities and its demonstrated ability to meet performance standards and is applicable to all DMTs deployed in the field. This affidavit is provided to all State's Attorneys annually.

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### 4.2 Case Specific Infrared Affidavits

- 4.2.1 These requests seek information regarding whether or not the DMT evidential breath alcohol testing instrument was working properly on the date and time of the test, whether or not the officer operated the DMT in accordance with current training procedures, and whether or not the instrument was properly maintained and provided an accurate and reliable result during the test in question.
- 4.2.2 Required documents (most received from requestor)
  - 4.2.2.1 The officer's DUI processing form and affidavit
  - 4.2.2.2 The officer's 1A supplemental affidavit (if available)
  - 4.2.2.3 The DMT DUI Subject Test Report
  - 4.2.2.4 Any error reports which may be associated with the Subject Test
  - 4.2.2.5 The DMT Instrument Maintenance file
- 4.2.3 The analyst will document on a Case Specific Infrared Affidavit Document Review Checklist (TOX\_F400\_1) that documents listed in 4.2.2 have been reviewed.
  - 4.2.3.1 The analyst will make notes regarding any unusual circumstances (e.g. any instrument errors, deviation in testing protocol, etc.) identified during the review.
- 4.2.4 Any unusual situations may be discussed with the Toxicology Section Supervisor and, if necessary, the State's Attorney prior to generating an affidavit.
- 4.2.5 Once all of the documents have been reviewed, the analyst will generate a case specific infrared affidavit based on the specific incident. See Appendix A for an example.

### 4.3 Relation Back Affidavits

- 4.3.1 Vermont law states that to be convicted of DUI, a person must be impaired to the slightest degree, or have a blood or breath alcohol concentration greater than 0.08 at the time they were operating the motor vehicle. Alcohol concentrations may be measured in blood or breath and presented in units of grams per 100 milliliters (g/100 ml) of blood or grams per 210 liters (g/210 L) of breath, respectively. In this document, alcohol concentrations are presented without specified measurement units, as either may apply. There is a presumptive inference (Title 23 V.S.A. § 1204) such that if the test is taken within 2 hours of the time of operation and the result is 0.10 or more, it is assumed that the person was under the influence at the time of operation.

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Therefore, when a test is taken outside of two hours from the time of operation, when there is evidence of alcohol ingestion within 30 minutes prior to, or any time after operation, or when the test result is under a 0.10, a relation back estimate by a qualified individual to the time of operation is required.

- 4.3.2 Elimination rates for ethanol concentrations less than 0.02 BAC are not linear; therefore relation back estimates will not be performed on test results below this level.
- 4.3.3 The documents listed in **section 4.2.2** (breath results) and/or the case record (blood results) and the arrest custody report (or another document listing the subject's weight) are reviewed. The following information is considered when performing a relation back estimate:
  - 4.3.3.1 The time of the test
  - 4.3.3.2 Test result
  - 4.3.3.3 Time of interest (operation)
  - 4.3.3.4 Whether or not the subject had consumed any alcohol within 30 minutes prior to, or any time after, the time of interest.
    - 4.3.3.4.1 If alcohol had been consumed in this time period, it is also necessary to know the weight and sex of the subject and as much information regarding the drinking pattern as possible.
- 4.3.4 Preparing a relation back affidavit
  - 4.3.4.1 After reviewing the information listed in **section 4.3.3** and considering the totality of the case, the analyst may calculate an estimated BAC/BrAC for the time of interest and will document their opinion in an affidavit. See Appendices B and C for examples.
  - 4.3.4.2 Calculations will be documented. Notes will be dated and initialed and included in the case file for review.
- 4.3.5 Relation back calculation formula
  - 4.3.5.1 The elimination rate of ethanol from the body may vary based on biological and physiological variations among individuals. A standard rate of elimination will be used to estimate the amount of alcohol eliminated between the time of operation and the time of the test. A range of elimination rates will also be considered when providing estimates. The calculated estimates of alcohol eliminated will be added to the test result to provide estimates of the BrAC/BAC at the time of operation. The elimination rates used are based on population averages published in peer-reviewed, scientific literature.

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4.3.6 Widmark formula for determining BAC based on the individual and their drinking pattern

4.3.6.1 The Widmark formula calculates the theoretical maximum BAC that would be achieved in an individual based on the drinking pattern. This calculation can also be used in relation forward estimations.

$$4.3.6.2 \text{ BAC} = \frac{(\text{fl.oz.})(\% \text{ ABV})}{(\text{Weight in lbs})(\rho \text{ factor})(0.184)}$$

4.3.6.3 The rho ( $\rho$ ) factor is a measure of total body water in the human body. Rho values vary between individuals based on body composition.

4.3.7 A standard drink is considered a 12 oz. beer at 5% ABV, a 1.5 oz. shot of liquor at 40% ABV or a 5 oz. glass of wine at 12% ABV. Specific alcohol information is preferred, but when not available, a standard drink is used.

### 5.0 Affidavit Documentation in FA

5.1 Affidavit requests are tracked in FA.

5.2 The affidavit request and supporting documentation is entered as virtual evidence into FA to initiate and track the request, even though it is not considered evidence by the VFL. This virtual evidence may be destroyed in FA by the Toxicology Section Supervisor, or their designee, upon completion of the affidavit(s) for that case. All affidavit requests and completed affidavits are stored electronically in the Object Repository within FA as well as in the physical case file; documents in these locations are not destroyed during this process.

### 6.0 Affidavit Review

6.1 Analysts will ensure that all affidavits are completed in a timely manner. All documents generated and calculations performed will be documented in the supporting packet.

6.2 Prior to release of a completed affidavit, a combined technical and administrative review will be completed by an authorized individual using QA\_F100\_7.7\_1\_Affidavit Review Checklist.

6.3 A complete data packet includes:

6.3.1 An Affidavit Review Checklist (QA\_F100\_7.7\_1).

6.3.2 The completed affidavit.

6.3.3 A cover page or request email from the investigating officer or attorney.

6.3.4 The investigating officer's DUI Affidavit – Infrared or Blood.

6.3.5 The accompanying 1A narrative affidavit.

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6.3.6 If required, an arrest custody report or other documentation of subject's sex and weight.

6.3.7 The DMT DUI Subject Test Report or Blood Result Report.

6.3.8 Any error reports associated with the DMT Subject Test.

6.3.9 For case specific affidavits, the Document Review Checklist (TOX\_F400\_1).

6.3.10 For relation back affidavits, all calculation worksheets generated by the analyst.

### 6.4 Technical/Administrative Review

6.4.1 Once the analyst has prepared an affidavit, the assigned reviewer must perform a review of the complete package as described in section 6.3.

6.4.2 Ensure that all forms are present and accurate.

6.4.3 The agency case number and lab number must be verified.

6.4.4 All calculations and worksheets generated by the analyst must have the date and initials of the analyst and the calculations must be confirmed.

6.4.5 All transcribed data must be verified.

6.4.6 All pages are numbered and include the analyst's initials and case/lab number.

6.4.7 When review is complete and no quality issues have been identified, the reviewer notes on the Affidavit Review Checklist (QA\_F100\_7.7\_1) their initials and the date reviewed.

6.4.8 If issues have been identified during review, the reviewer must attempt resolution through discussion with the analyst and/or Toxicology Section Supervisor. If issues cannot be resolved, it may be necessary to contact the submitting party for further information about the case or terminate the request.

6.5 Upon completion of the technical/administrative review, a director review will be completed by the Laboratory Director, or their designee, using QA\_F100\_7.7\_1\_Affidavit Review Checklist.

### 7.0 References

7.1 TOX\_P300\_Alcohol Training Manual

7.2 TOX\_F400\_1\_Case Specific Infrared Affidavit Document Review Checklist

7.3 QA\_F100\_7.7\_1\_Affidavit Review Checklist

7.4 VFL Alcohol Reference Library

7.5 Appendix A – Example of Case Specific Infrared Affidavit

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**7.6** Appendix B – Example of Relation Back Affidavit - Breath

**7.7** Appendix C – Example of Relation Back Affidavit - Blood

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### APPENDIX A: Example of Case Specific Infrared Affidavit

State v. Defendant

Case Number 18VFL00000

NOW COMES Chemist, affiant, being duly sworn and on oath, deposes and says:

- 1) The information contained in this affidavit is true and accurate to the best of my knowledge.
- 2) I am a chemist employed by the Vermont Forensic Laboratory.
- 3) I have been trained by the manufacturer of the DMT to operate, calibrate, certify, maintain, repair and install these instruments.
- 4) I have testified in Vermont as an expert witness in the field of analytical chemistry, blood alcohol physiology and pharmacology and on the workings of the DMT evidential breath testing instrument. I have been qualified as an expert witness in every court in which I have testified.
- 5) On January 8, 2018, I reviewed the affidavit, processing form, and DMT evidence ticket of OFFICER with regard to an arrest of DEFENDANT for Driving Under the Influence of Alcohol. The date of arrest was January 1, 2018.
- 6) In the affidavit, the officer indicates that the motorist submitted to an evidentiary breath test using DMT 123456, an infrared device. I reviewed the maintenance records for this instrument.
- 7) The evidential breath alcohol testing device in use in Vermont is the DMT, an instrument which employs infrared absorption as its method of analysis. Through rulemaking, the principle of absorption of infrared energy has been adopted as an approved method of breath alcohol testing.
- 8) Through rulemaking, performance standards have been established for all breath tests. The DMT meets the performance standards because:
  - A) The DMT is capable of accepting and analyzing a subject's exhaled alveolar, or deep lung, air (breath).
  - B) The DMT is capable of analyzing replicate samples containing a known concentration of alcohol with a precision of plus or minus 5% from their mean when alcohol concentrations are reported to three significant figures. The DMT reports results as the number of grams of alcohol per 210 liters of breath (g/210L).
  - C) The DMT meets and exceeds the minimum test accuracy required by rule for alcohol testing of plus or minus 10% or 0.005 g/210L, whichever is greater, when analyzing a simulated breath sample of a known concentration, when alcohol concentrations are reported to three significant figures. This demonstrated capability directly extends to accurately evaluating a breath sample.
  - D) The DMT is capable of detecting the presence of compounds in breath which could potentially interfere with the accurate determination of a breath alcohol concentration.
  - E) The DMT and the methods used for determination of breath alcohol concentration for evidential purposes have been approved by the Commissioner of Public Safety.
- 9) The DMT has been tested and has been found to be an accurate and reliable instrument for measuring alcohol content of a breath sample. The DMT has also been tested and approved by the federal government as an evidentiary device. The DMT appears on the Department of Transportation, National Highway Traffic Safety Administration's list of Conforming Products published in the Federal Register (**Federal Register** Vol. 82, No. 211 Thursday, November 2, 2017).
- 10) A DMT result obtained by an officer certified to operate the instrument and acquired in accordance with the procedures incorporated in the Vermont Criminal Justice Training Council Student Manuals in effect at the time of testing and approved by the Commissioner of Public Safety, is accurate and reliable and is in compliance with the provisions of the Department of Public Safety's rules.
- 11) After reviewing the affidavit, processing form, DMT evidence ticket in this case, and the maintenance records for this instrument, and based upon my knowledge of the workings of the DMT, I believe that the instrument used in this case meets the performance standards and that the test result of 0.XXX at XXXX hours on 1/1/2018 is an accurate and valid indication of the alcohol content in the motorist's system at the time of the test. This opinion may be subject to change based upon new information that becomes available.

Dated at Waterbury in the county of Washington, Vermont this \_\_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
**Chemist, Affiant**

Subscribed to and sworn before me on this \_\_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
**Notary Public**

My commission expires \_\_\_\_\_



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### APPENDIX B: Example of Relation Back Affidavit - Breath

State v. Defendant  
Case Number 18VFL00000

NOW COMES Chemist, affiant, being duly sworn and on oath, deposes and says:

- 1) The information contained in this affidavit is true and accurate to the best of my knowledge.
- 2) I am a chemist employed by the Vermont Forensic Laboratory.
- 3) I have testified in Vermont as an expert witness in the fields of analytical chemistry, blood alcohol physiology and pharmacology and on the workings of the DMT evidential breath testing instrument. I have been qualified as an expert witness in every court in which I have testified.
- 4) Given particular factual information, I am able to estimate breath alcohol concentration [BrAC] values for breath samples obtained at a particular time for an earlier specific time. This estimate is founded upon known principles of absorption and elimination of alcohol by the human body.
- 5) Given the following facts in the case
  - a. Time of breath sample collection: XXXX hours
  - b. Result of analysis for alcohol: 0.XXX g/210 L
  - c. Subject is a SEX weighing XXX pounds
  - d. Time of operation: XXXX hours
- 6) And the assumptions that:
  - a. The subject's alcohol elimination rate was 0.015 g/210 L/hr.
  - b. Elimination rates of alcohol in humans can range from 0.010-0.030 g/210 L/hr.
  - c. The last alcoholic beverage, 1 XX (XX oz., X% ABV), was consumed after operation.
- 7) I have calculated that the BrAC at the time of operation would have been approximately **0.XXX g/210L**, with a range of 0.XXX g/210 L to 0.XXX g/210 L.
- 8) These values take into account a test result of 0.XXX g/210 L plus the estimated amount of alcohol eliminated between the time of operation and the time of the test at each elimination rate. Any alcohol consumed in the 30 minutes prior to, or after, operation may not have been fully absorbed at the time of operation and must be subtracted from the extrapolated estimate.
- 9) Using the Widmark formula, I calculated that consuming XX would contribute approximately 0.XXX g/210 L to the subject's BrAC. This value was subtracted from the extrapolated values, resulting in the estimated BrACs listed above.. In this scenario it is conservatively assumed that all of the alcohol from the drink consumed after operation would have been in effect at the time of testing but none of it would have been in the subject's system at the time of operation.
- 10) The stated estimates of BrAC at XXXX hours are based on information provided to me by OFFICER and apply specifically and only to that information noted above. The assumptions made about the subject's state of absorption and elimination rate are based on population averages published in peer reviewed scientific literature. References available upon request. The values calculated are estimates due to the recognized variables in the analytical process and in biological and physiological variations among individuals. This opinion may be subject to change based upon new information that becomes available.

Dated at Waterbury in the county of Washington, Vermont this \_\_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
**Chemist, Affiant**

Subscribed to and sworn before me on this \_\_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
**Notary Public**

My commission expires \_\_\_\_\_

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### APPENDIX C: Example of Relation Back Affidavit - Blood

State v. Defendant

Case Number 18VFL00000

NOW COMES Chemist, affiant, being duly sworn and on oath, deposes and says:

- 1) The information contained in this affidavit is true and accurate to the best of my knowledge.
- 2) I am a chemist employed by the Vermont Forensic Laboratory.
- 3) I have testified in Vermont as an expert witness in the field of analytical chemistry, blood alcohol physiology and pharmacology and have been trained in the methods of blood ethanol analysis by headspace gas chromatography with flame ionization detection (GC-FID). I have been qualified as an expert witness in every court in which I have testified.
- 4) Given particular factual information I am able to estimate blood alcohol concentration [BAC] values for blood samples obtained at a particular time for an earlier specific time. This estimate is founded upon known principles of absorption and elimination of alcohol by the human body.
- 5) Given the following facts in the case
  - a. Time of blood sample collection: XXXX hours
  - b. Result of analysis for alcohol: 0.XXX ± YYY g/100 mL, 99.7% level of confidence
  - c. Time of operation: XXXX hours
- 6) And the assumptions that:
  - a. The subject's alcohol elimination rate was 0.015 g/100 mL/hr.
  - b. Based on biological and physiological variations in individuals, elimination rates can range from 0.010-0.030 g/100 mL/hr.
  - c. The last alcoholic beverage was consumed at least 30 minutes prior to operation and the subject was in the post-absorptive state.
- 7) I have calculated that the BAC at the time of operation would have been approximately 0.XXX g/100 mL, with a range of 0.XXX g/100 mL to 0.XXX g/100 mL.
- 8) These values take into account a test result of 0.XXX g/100 mL plus the estimated amount of alcohol eliminated between the time of operation and the time of the test at each elimination rate.
- 9) The stated estimates of BAC at XXXX hours are based on information provided to me by OFFICER and apply specifically and only to that information noted above. The assumptions made about the subject's state of absorption and elimination rate are based on population averages published in peer reviewed scientific literature. References available upon request. The values calculated are estimates due to the recognized variables in the analytical process and in biological and physiological variations among individuals. This opinion may be subject to change based upon new information that becomes available.

Dated at Waterbury in the county of Washington, Vermont this \_\_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
**Chemist, Affiant**

Subscribed to and sworn before me on this \_\_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
**Notary Public**

My commission expires \_\_\_\_\_

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DOCUMENT HISTORY			
DATE	VERSION	APPROVED BY	ACTIVITY OR REVISION
11/25/2013	4	MS	Updated to new format; minor changes made throughout document
12/20/2013	5	MS	Section 6.3.2 regarding director review added
12/31/2014	6	TT	Minor changes made throughout document; ToC added; some references added; section 4.2.2 added; Affidavit Review Checklist (previously ALC_F400_1) is now ALC_F400_2; Case Specific Infrared Affidavit Document Review Checklist is now ALC_F400_1
6/8/2015	7	Lab Director	Sections 6.3, 6.4, 7.2: updated reference to Affidavit Review Checklist from "ALC_F400_2" to "QA_F100_5.9_1" (ALC_F400_2 to be retired)
11/30/2016	8	Lab Director	Section 2.4 added; section 4.2.1 clarified; minor changes made throughout document
01/08/2018	9	Lab Director	Section 4.1 added; threshold for performing relation back affidavits changed; updated affidavit format to include range on all relation back affidavits; minor changes made throughout document
01/02/2019	10	Lab Director	Updated document references; added information regarding case file contents and review requirements (section 6.0); minor changes made throughout document; TOX_F400_1 updated (previously ALC_F400)