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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 alcohol results.
- 1.2** The scope of this procedure includes case review, instrument file review, relation-back calculations and associated QC requirements.

## **2.0 Responsibility**

- 2.1** All analysts having the responsibility for generating alcohol affidavits are responsible for following this procedure.
- 2.2** This procedure is reviewed periodically by the Alcohol Program staff. Necessary revisions are made at that time or when there is an identified need to change this written procedure to be compatible with changing needs in the analytical process.
- 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. Refer to section **5.0 Quality Criteria and Corrective Action** regarding competency.

## **3.0 Procedure**

### **3.1 Case Specific Infrared Affidavits**

- 3.1.1 These requests seek information regarding whether or not the DMT instrument was working properly on the date and time of the test, whether or not the officer operated the DataMaster DMT in accordance with his or her training, and whether or not the instrument was properly maintained and was accurate and reliable during the test in question.
  - 3.1.2 Required documents
    - 3.1.2.1 The officers DUI processing form and affidavit
    - 3.1.2.2 The officers 1A supplemental affidavit (if available)
    - 3.1.2.3 The DataMaster DMT DUI Subject Test
    - 3.1.2.4 Any error reports which may be associated with the subject test
    - 3.1.2.5 The VFL DataMaster DMT Instrument Maintenance file
  - 3.1.3 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 example.
  - 3.1.4 Any unusual situations should be discussed with the Alcohol Program Supervisor and, if necessary, the State's Attorney prior to generating an affidavit.
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## 3.2 Relation Back Affidavits

3.2.1 Vermont law states that to be convicted of DUI, a person must be impaired to the slightest degree, or over 0.08 at the time they were operating the motor vehicle. There is a presumptive inference (Title 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. Therefore, when a test is taken outside of two hours from the time of operation, or when the test result is under a 0.10, a relation back determination by a qualified individual to the time of operation is required.

3.2.2 Required information to perform a relation-back calculation (aka retrograde extrapolation). This information can be gathered from the documents listed in **section 3.1.2** (breath results) or from the case record (blood results).

3.2.2.1 The time of the test

3.2.2.2 Test result

3.2.2.3 Time of operation

3.2.2.4 Whether or not the subject had consumed any alcohol within 30 minutes of, or after, the time of operation

3.2.2.4.1 If alcohol had been consumed in this time period, it is also necessary to know the weight and gender of the subject and as much information regarding the drinking pattern as possible.

3.2.2.4.2 Use the Widmark formula (below) to determine the BAC (blood alcohol concentration) contribution of any alcohol consumed within 30 minutes of, or after operation.

3.2.3 Preparing a relation back affidavit

3.2.3.1 After reviewing all of the information listed in **section 3.2.2**, the analyst will calculate an estimated BAC for the time of operation and will document their opinion in an affidavit. See Appendices B and C for examples.

3.2.4 Relation-back calculation formula

3.2.4.1 Elimination rates can vary between individuals. The average elimination is 0.019 BAC/hour with a range of 0.010-0.030 BAC/hour. The rate used in calculations by the VFL is 0.015 BAC/hour. This rate was chosen because it will underestimate the true BAC for 95% of the population thus giving the benefit to the defendant.

3.2.4.2 Add back 0.015 BAC per hour of time elapsed between the time of operation and the time of the test.

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3.2.5 Widmark formula for determining BAC based on the individual and their drinking pattern. This calculation can also be used in relation-forward estimations.

3.2.5.1 The Widmark formula will calculate the theoretical maximum BAC that would be achieved in an individual based on the drinking pattern.

3.2.5.2  $BAC = (\# \text{ oz} * ABV) / (WT \text{ lbs} * \text{Rho factor} * 0.184)$

3.2.5.3 Rho factor for males is 0.68

3.2.5.4 Rho factor for females is 0.61

3.2.6 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.

#### **4.0 Emergency or High Priority Situations**

**4.1** The Commissioner of Public Safety, Laboratory Director or Alcohol Program Supervisor can designate affidavit requests as high priority.

**4.2** High priority affidavits are generated as soon as possible.

#### **5.0 Quality Criteria and Corrective Action**

**5.1** Analysts will assure that all affidavits are completed in a timely manner and that all documents generated and calculations performed are accurate to the best of their knowledge. Analysts will include all required documents and review of the required documents as they are pertinent to the affidavit. All calculations will be documented in the supporting packet.

**5.2** All analysts performing this procedure must be thoroughly trained in blood alcohol physiology and pharmacology with emphasis on absorption, distribution and elimination of alcohol prior to the generation of any affidavits. All analysts must also be certified in the appropriate use and maintenance of the DataMaster DMT prior to the generation of any case specific IR affidavits.

**5.3** Upon completion of affidavit generation, an administrative review will be completed by the Alcohol Program Supervisor, or their designee, prior to release.

#### **6.0 References**

**6.1** Holzbecher, M. and Wells, A. (1984) Elimination of ethanol in humans. *Can. Soc. Forens. Sci. J.* 17(4):182-196.

**6.2** Medical-Legal Aspects of Alcohol. 4<sup>th</sup> Ed. Edited by James C. Garriott. Lawyers & Judges Publishing Company, Inc., 2003.

**6.3** Appendix A – Example of Case Specific Infrared Affidavit

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

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

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## APPENDIX A Case Specific Infrared Affidavit

### State v. Defendant

### Case Number 12VFL00012

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 on the workings of the DataMaster instrument. I have been qualified as an expert witness in every court in which I have testified.
  - 4) On DATE, I reviewed the affidavit, processing form, and DataMaster DMT evidence ticket of ARRESTING OFFICER with regard to an arrest of SUSPECT for Driving under the Influence of alcohol. The date of arrest was DATE.
  - 5) In the affidavit, the officer indicates that the motorist submitted to an evidentiary breath test using DataMaster DMT SERIAL NUMBER, an infrared device. I also reviewed the maintenance records for this instrument.
  - 6) The infrared device in use in Vermont is the DataMaster DMT, a type of infrared spectrophotometer. Through rulemaking, infrared spectrophotometry has been adopted as an approved method of breath testing.
  - 7) Through rulemaking performance standards have been established for all breath tests. The DataMaster DMT meets the performance standards because:
    - A) The DataMaster DMT analyzes a subject's expired alveolar, or deep lung, air.
    - B) The DataMaster DMT is capable of analyzing replicate samples containing a known amount of alcohol with a precision of plus or minus 5% from their mean when alcohol concentrations are reported to three significant figures.
    - C) The DataMaster DMT meets and exceeds the minimum test accuracy required by the Vermont Department of Health rules for alcohol testing of plus or minus 10% when determining the breath alcohol concentration of a person when the concentration is expressed as weight (g) of alcohol per 210 liters of expired air.
    - D) The DataMaster DMT is capable of detecting the presence of compounds in the breath which could potentially interfere with an accurate determination of a breath alcohol concentration.
    - E) The DataMaster DMT and the procedures for its use have been approved by the Commissioner of Health and the Commissioner of Public Safety for the purpose of evidentiary breath alcohol testing.
  - 8) The DataMaster DMT has been tested and has been found to be an accurate and reliable instrument for measuring alcohol content. The DataMaster DMT has also been tested by the federal government and has been approved by the federal government as an evidentiary device. The DataMaster DMT appears on the federal government's Conforming Products List.
  - 9) A DataMaster DMT result obtained by an officer certified to operate the instrument and when taken in accordance with their training, is accurate and reliable and is in compliance with the provisions of the rules and regulations governing breath testing.
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- 10) After reviewing the affidavit, processing form, DataMaster DMT evidence ticket in this case, and the maintenance records for this instrument, and based upon my knowledge of the working of the DataMaster 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 is an accurate and valid indication of the alcohol content in the motorist's system at the time of the test.

Dated at Waterbury in the county of Washington, Vermont this DATE.

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

Subscribed to and sworn before me on this \_\_\_\_\_ day of \_\_\_\_\_, 2012.

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

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## APPENDIX B: Relation Back Affidavit - Breath

State v. Defendant  
Case Number 12VFL00012

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

- 1) I am a chemist employed by the Vermont Forensic Laboratory.
- 2) 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 DataMaster DMT instrument. I have been qualified as an expert witness in every court in which I have testified.
- 3) 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.
- 4) Given the following facts in the case
  - a. Time of breath sample collection: XXXX hours
  - b. Result of analysis for alcohol: 0.XXX g/210L
  - c. Subject is a male weighing XXX pounds
  - d. Time of operation: XXXX hours
- 5) And the assumptions that:
  - a. The subject's alcohol elimination rate was 0.015/hr
  - b. The last alcoholic beverage, 1 XX (XXoz, X% ABV) was consumed after the crash
- 6) I have calculated that the BrAC at the time of operation would have been approximately 0.XXX. This takes into account a test value of 0.XXX plus 0.XXX resulting in an interim value of 0.XXX. The value added is the estimated amount of alcohol eliminated between the time of operation and the time of the test.
- 7) Using the Widmark formula, I calculated the approximate BAC that would have been produced for this subject based on the beer consumed to be 0.XXX. I then subtracted this amount from the interim value resulting in 0.XXX. In this scenario it is conservatively assumed that all of the alcohol from the beer consumed after the crash 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.
- 8) The stated estimate of BrAC at 0000 hours is based on information provided to me by Officer and applies specifically and only to that information noted above. The value calculated is an estimate due to the recognized variables in the analytical process and in biological and physiological variations among individuals.

Dated at Waterbury in the county of Washington, Vermont this DATE.

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

Subscribed to and sworn before me on this \_\_\_\_ day of \_\_\_\_\_, 2012

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

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### APPENDIX C: Relation Back Affidavit - Blood

State v. Defendant

Case Number 12VFL00012

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

- 1) I am a chemist employed by the Vermont Forensic Laboratory.
- 2) I have testified in Vermont as an expert witness in the field of analytical chemistry, blood alcohol physiology and pharmacology. I have been qualified as an expert witness in every court in which I have testified.
- 3) 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.
- 4) Given the following facts in the case
  - a. Time of blood sample collection: XXXX hours
  - b. Result of analysis for alcohol: 0.XXX %
  - c. Time of operation: XXXX hours
- 5) And the assumptions that:
  - a. The subject's alcohol elimination rate was 0.015/hr
  - b. The last alcoholic beverage was consumed at least XX minutes prior to operation
- 6) I have calculated that the BAC at the time of operation would have been approximately 0.XXX. This takes into account a test value of 0.XXX plus 0.XXX. The value added is the estimated amount of alcohol eliminated between the time of operation and the time of the test.
- 7) The stated estimate of BAC at XXXX hours is based on information provided to me by OFFICER and applies specifically and only to that information noted above. The value calculated is an estimate due to the recognized variables in the analytical process and in biological and physiological variations among individuals.

Dated at Waterbury in the county of Washington, Vermont this DATE.

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

Subscribed to and sworn before me on this \_\_\_\_ day of \_\_\_\_\_, 2012

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