1.0 PRINCIPLE:
This procedure describes the analysis of aqueous samples for volatile compounds, (methanol, ethanol, acetone, isopropanol, and analogous compounds), utilizing a headspace gas-chromatographic method. Samples are diluted first with deionized water at a 1 to 100 ratio using class A volumetric pipettes and flasks and further diluted with an aqueous solution using N-propanol as an internal standard... Next, they are sealed in vials for headspace analysis. Volatile components in the heated aqueous phase diffuse into, and reach equilibrium with the vapor phase. An aliquot of the vapor phase is injected into the gas chromatograph (simultaneously onto two separate columns), which separates the analytes as a function of their chemical characteristics. Separated components from each column are identified by retention time, and quantitated by response on Flame-Ionization Detectors. Quantitation is based on a one-point calibration using the peak area ratio between the analyte and the internal standard.

2.0 SPECIMEN:
Samples requiring analysis for ethanol and other volatile compounds have their associated case jacket kept in the office in Toxicology sextion. Any aqueous sample may be suitable for this analysis, including (but not limited to) Beer, Wine, Spirits, and other containers with suspected ethanol. All other samples should be sealed and stored in appropriate airtight glass or polypropylene containers under refrigeration if possible. If not analyzed immediately, preserved liquid samples should be refrigerated and may be stored (sealed) for up to 12 months.

2.1 All evidence transfers, either between individuals or between an individual and a storage location must be documented on the Chain of Custody for the case, either in the LIMS, or on hard-copy COC document maintained in the Case Jacket.

2.2 When not in the sampling or aliquot process, samples in the toxicology section must be stored in a secure and locked area.

2.3 Samples must be maintained in such a manner so that they are protected from contamination or deleterious change. Depending on the nature of the sample, this may mean refrigeration or freezing when not in the analytical process.

2.4 When samples are finished being analyzed, samples in the toxicology section must be maintained "Under Proper Seal." This is interpreted to mean that the sample, or a container in which the sample is kept is sealed with tamper-evident tape with the initials and date of the person placing the seal on the seal as well.

3.0 MATERIALS AND EQUIPMENT:

3.1 Equipment:

3.1.1 Suitable Gas Chromatograph with autosampler for headspace; equipped with dual FID detectors, Rtx-BAC1 and Rtx-BAC2 30m capillary columns. (0.53 x 3 um; Restek 18000 & 18001) or equivalent.

3.1.2 Automatic Pipetter-Diluter (200 microliter & 2 ml syringes).

3.1.3 20 ml headspace autosampler vials with appropriate seals and aluminum caps, and crimper.

3.1.4 General Laboratory Glassware and Equipment.

3.2 Reagents:

3.2.1 Ethanol (EtOH; Baker; anhydrous 200 proof USP or equivalent)

3.2.2 Deionized water (DIW; Millipore or equivalent In-House supply)

3.2.3 Acetone (Baker HPLC grade or equivalent)

3.2.4 n-Propanol (NPA; Baker HPLC grade or equivalent)

3.2.5 Methanol (MeOH; Baker HPLC grade or equivalent)

3.2.6 Isopropanol (IPA; Baker HPLC grade or equivalent)

3.2.7 Aqueous EtOH Certified Reference Standard. (Cerilliant Corp. or better)

3.3 Preparation of Calibrators, Controls and Standard Stock Solutions:

(Balance used for the preparation of solutions must be checked by calibrated weights on the day of solution preparation)

3.3.1 1% EtOH Standard Stock Solution

3.3.1.1 Accurately weigh 5.000 g of anhydrous EtOH, and quantitatively transfer to a 500 ml Class A volumetric flask with DIW, Add 0.1 g of Sodium Azide. Q.S. with DIW and mix well.

3.3.1.2. Label the standard with the appropriate identification and safety labels (Analyte, concentration, preparer, date prepared validation date and analyst's initials).

3.3.1.3 Document preparation on a "Calibration/Control Standard Preparation Form," and file in the Standards Preparation Logbook.

3.3.1.4 This solution should be stored refrigerated, and is stable for at least 1 year.

3.3.2 1% Acetone Standard Stock Solution

3.3.2.1 Accurately weigh 5.000 g of Acetone, and quantitatively transfer to a 500 ml Class A volumetric flask with DIW. Add 0.1 g of Sodium Azide. Q.S. with DIW and mix well.

3.3.2.2 Label the standard and document preparation as above. This solution should be stored refrigerated, and is stable for at least 1 year.

3.3.3 1% MeOH Standard Stock Solution

3.3.3.1 Accurately weigh 5.000 g of Methanol, and quantitatively transfer to a 500 ml Class A volumetric flask with DIW. Add 0.1 g of Sodium Azide. Q.S. with DIW and mix well.

3.3.3.2 Label the standard and document preparation as above. This solution should be stored refrigerated, and is stable for at least 1 year.

3.3.4 Isopropanol Standard Stock Solution

3.3.4.1 Accurately weigh 5.00 g of IPA, and quantitatively transfer to a 500 ml Class A volumetric flask with DIW. Add 0.1g of Sodium Azide. Q.S. with DIW and mix well.

3.3.4.2 Label the standard and document preparation above. This solution should be stored refrigerated, and is stable for at least 1 year.

3.3.5 Cal. (0.10 g/100ml EtOH.)

3.3.5.1 Using a class A volumetric pipette, add 10 ml of the 1% EtOH standard stock solution to a 100 ml class A volumetric flask. Q.S. with DIW and mix well by inversion.

3.3.5.2 Label the standard and document preparation as above. This solution should be stored refrigerated, and is stable for at least 1 year.

3.3.6 0.10 g/100 ml EtOH In-House Control

3.3.6.1 Weigh 2.00 g of ethanol, quantitatively transfer to a two liter class A volumetric flask with DIW. Q.S. with DIW and mix well.

3.3.6.2 Decant the contents of the flask into a large amber glass bottle, label appropriately. This solution should be stored refrigerated, and is stable for at least 1 year.

3.3.7 Internal Standard Stock (nPA) Solution

3.3.7.1 Transfer ~ 7 ml of NPA to a 100 ml volumetric flask. Q.S. with DIW and mix well.

3.3.7.2 Label the standard and document preparation as above. This solution may be stored at room temperature, and is stable for at least one year.

3.3.8 Internal Standard Working Diluent Solution

3.3.8.1 Dilute 4.0 ml of NPA Stock Solution to a final volume of 2000 ml with DIW, mix thoroughly. Decant the contents of the 2000 ml flask into a large, amber bottle.

3.3.8.2 Label the standard and document preparation as above. This solution may be stored at room temperature, and is stable for at least one year.

3.3.9 Certified Reference Standard Solution

3.3.9.1 Store in air tight container after opening.

Note: (Cerilliant or equivalent) Certified Reference Material solutions expire 1 year from date of manufacture. These solutions may only be used for 6 months after date of first use. Expiration date of the Calibrator check solution in current use, along with the lot number, target value, and acceptable ranges are detailedon page 2 of the Volatile Batch Summary Review Form.

3.3.10 Volatile Calibrator Solution.

3.3.11 Using a class A volumetric pipette, add 10 ml each of the 1% MeOH, IPA and Acetone standard stock solutions to a 100 ml class A volumetric flask. Q.S. with DIW and mix well by inversion.

3.3.12 Label the standard and document preparation as above. This solution may be stored at room temperature, and is stable for at least one year.

3.3.13 Volatile Control Solution.

3.3.13.1.1.1 Using a class A volumetric pipette, add 10 ml each of the 1% MeOH, IPA and Acetone standard stock solutions to a 100 ml class A volumetric flask. Q.S. with DIW and mix well by inversion.

3.3.13.1.2 Label the standard and document preparation as above. This solution may be stored at room temperature, and is stable for at least one year.

3.4 Validation of Reagents:

Reagents and controls are validated by use in analytical batches. Acceptable performance is documented by CRM and In House Control performance Validated reagents are Marked with a green dot, detailing the specific procedure for which the reagent was validated, and the batch on which that process was documented. Newly prepared reagents may be evaluated for validity on an analytical batch, prior to any consideration of sample results. Acceptable performance of all batch control materials and overall batch acceptability (although individual samples may fail) is considered as validation of reagents. Reagents so validated are marked with a green sticker as noted above. Preparation of reagents, and their validation is documented in the Toxicology Section Reagent Preparation Validation Logbook, Maintained in the Toxicology laboratory.

4.0 PROCEDURE; Sample Analysis

4.1 Each sample is diluted 1 ml of sample to 100 mls with DI H2O using a class A volumetric flask and pipette.

Note 1: All biological specimens must be handled with care, and considered as Bio-Hazardous; "Universal Precautions" for handling biological specimens must be observed at all times, as outlined in the Laboratory Safety Manual.

Note 2: Prior to the withdrawal of aliquots, Guth Calibration Check Solution, Calibrator, Control and Internal Standard solutions should be removed from the refrigerator, and allowed to stand at room temperature for at least 30 min.

Note 3: Departure from procedures as specified in this SOP is not anticipated. Should an issue arise that may require such a departure, the issue must be raised with Quality Manager

and/or the Director. If the proposed change will not present a change of a magnitude that would require validation, the change may be approved, and the Director will modify and re-issue the SOP accordingly.

Any such procedural changes would be subject to the review process afforded by the quality control measures of the analytical scheme described herein. Hence, any modification or change that produces an unexpected deleterious effect on the analytical procedure would be expected to trigger analysis or batch failure in the QC review stages.

4.1 Pipetter/Diluter - Preparation/Priming:

4.1.1 Turn on the Pipetter/Diluter.

4.1.2 Place the inlet tubing in the NPA diluent solution bottle, making sure the end of the tubing is well below the level of the liquid.

4.1.2.1 Remove the dispenser probe from its holder and place the tubing from the probe in an empty waste container/flask.

4.1.3 Press the prime switch; Liquid will be dispensed from the probe at this time, as the system primes the lines. Cycle until bubbles have disappeared from lines.

4.2 Set-Up for Sample Preparation

4.2.1 Scroll to [Run an Existing Method], then press [Select].
4.2.2 Highlight [ETHANOL], and then press [Select].
4.2.3 The instrument will ask for confirmation of syringe sizes; Press [Confirm].
4.2.4 The instrument will ask for initialization; Press [Confirm].
4.2.5 Headspace Vial Labeling;

Note: All controls and samples are run in duplicate.

4.2.5.1 Label vials for calibrators and controls as follows:
System conditioner (any level calibrator or control),
Calibrator (0.10%) 12.7%: 1
Negative control: 1
CRM (certified reference material): 2
In House Control 0.1% Ethanol : 2
0.3% Calibrator/Control Ethanol: 2
0.02% Calibrator/Control Ethanol: 2
Volatile Control: 2
Samples: 2 (up to 15 cases)

In House Control 0.1% Ethanol: 2

Note: Each analyst contributing samples to a batch must prepare an additional set of controls

4.2.5.2 For each case, label 2 vials for each Submission.

Note: For every 15 cases, another set of ethanol controls (2) must be prepared.

4.3 Preparation of Calibrators, Guth and Controls

4.3.1 Automatic Pipetting of Samples, Calibrators and Controls

4.3.1.1 Place the probe in the solution to be sampled.
4.3.1.2 Press the Pipette Activation Button (PAB) once to aliquot 1 ml of diluent/internal standard solution.
4.3.1.3 Press the PAB to draw up 200 µl of the sample, calibrator or control.
4.3.1.4 Place the probe inside the appropriately labeled autosampler vial.
4.3.1.5 Press the PAB once to dispense the aliquots into the autosampler vial.
4.3.1.6 Press the PAB once more to dispense the rinse between sampling into a waste container.
4.3.1.7 Place a headspace cap on the vial and crimp - seal.
4.3.1.8 Proceed with the next sample, calibrator or control, starting with step number 1.
4.3.1.9 Repeat for all calibrators, controls and samples.
4.3.1.10 Place the vials sequentially into the sampling carriage Headspace Autosampler in the sequence detailed below:

Sample #	Contents
1	System Conditioner (any calibrator or control)
2	Calibrator 1 (0.10 g/%)
3	Blank DI Water 1 carry over check
4	CRM Rep 1
5	CRM Rep 2
6	0.1 g% EtOH In-house Control Set 1 Rep 1
7	0.1 g% EtOH In-house Control Set 1 Rep 2
8	0.3 g% EtOH In-house Control Set 1 Rep 1
9	0.3 g% EtOH In-house Control Set 1 Rep 2
10 - X	Samples; (each in duplicate)
X+1	0.02 g% EtOH In-house Control Set 1 Rep 1 as needed
X+2	0.02 g% EtOH In-house Control Set 1 Rep 2 as needed

4.4 Clean-Up of Automatic Pipetter/Diluter

4.4.1 Press [Escape] (ESC) from the current method.

4.4.2 Press [ESC] again to get to the main menu.

4.4.3 Press the prime switch; Liquid will be dispensed from the probe at this time.

4.4.4 Place the probe tubing into a waste reservoir and run thru 3 cycles.

4.4.5 Return prime switch to original postion.

4.4.6 Turn the instrument off and place the probe in the probe holder on the side of the pipetter/diluter.

5.0 INSTRUMENTAL ANALYSIS

5.1 Gas Chromatograph Setup:

5.1.1 Turn the air and hydrogen valves counterclockwise for the FID's

5.1.2 In the software program which controls the gas chromatograph, enter the sequence order for the method.

5.1.3 Save the sequence using the date in the file name,

5.2 Autosampler Configuration:

5.2.1 Place the vials in the proper order on the carousel for the autosampler and from the touch pad enter the proper to and from vial numbers and also the proper method . Select run.

5.3 Calibration/Quantitation

5.3.1 Data reduction of the headspace - GC run is performed by the chemstation

.Quantitative calculations are based on a comparison of the analyte to I.S. peak area response ratio for the controls and samples, to a linear calibration curve (y = mx+b) established from similar ratios from the known calibrator solutions. The software method is programmed to produce a linear one-point calibration curve, including the origin as a point. The value of the 0.1% calibrator is 12.7%. This value is based on the specific gravity of Ethanol which is 0.79. Using the equation:

$$0.1\% \div 0.79 \times 100 = 12.658\%$$

Each headspace run is independently calibrated. Corrective action, including instrument troubleshooting and/or preparation of new calibration solutions should be undertaken prior to repeat analysis of samples.

6.0 RUN EVALUATION

6.1 Run Acceptance Criteria

6.1.1. Run Completion: The batch must have been injected without unexplained interruption, and no significant instrumental errors can have occurred.

6.1.2 Blank and Carryover Check: No significant integrated peaks (other than the internal standard) should be noted in the blank sample. Target analytes present in the Carryover check must be at concentrations below the maximum allowable (0.005 g%). Both checks are documented on p. 2 of the Batch Summary Form.

6.1.3 Calibration Check (Accuracy & Precision): EtOH results for both replicates of the Certified calibration Check solution must be within 5% of the target value, as detailed on the Volatile Batch QC Review Form (page 2). Replicates must agree within 5%, and are similarly documented.

6.1.4 Calibration Linearity: The correlation coefficient of the calibration curve must be greater than or equal to 0.99, and is documented on page 2 of the Batch Summary Form.

6.1.5 0.1 g% EtOH Control (Accuracy & Precision): EtOH results for both replicates (per set, if applicable) of the In-House 0.1 g% control solution must be within 10% of the validation value, as detailed on the "Volatile Batch QC Review Form (page 2).

6.1.6 Precision: All Calibrator and Control duplicate analysis results must agree within 5%.

6.1.7 If the run is rejected. Corrective action, including instrument troubleshooting, proper documentation and/or preparation of new calibration solutions should be undertaken prior to repeat analysis of samples.

6.2 Sample Acceptance Criteria

6.2.1 Chromatography must be acceptable for all reported analytes in sample chromatograms, on the quantitation column (Baseline resolution on 1 side, at least 90% resolved from any adjacent peaks.)

6.2.2 Relative retention times for any identified analyte in control or samples must be within 0.1 min of the corresponding retention time for the analyte in the calibration solution. (This is automatic, as a function of the instrument qualitative ID window.)

6.2.3 Any reportable analyte must have been identified by the software by retention time on both columns, and the quantitative values must agree within 20%, as detailed on page 1 of the Batch Summary Form.

6.2.4 Duplicate quantitative results for any reportable analyte must be within 5% of each other, as detailed on page 1 of the Batch Summary Form (with the exception of low level autopsy cases, per analyst discretion).

6.2.5 DUI Samples with Ethanol concentrations > 0.4 g% must be re-analyzed with dilution. Post-mortem samples with such concentrations may be accepted at the discretion of the Director.

6.3 Analytical Review; A review of the batch is performed by an analyst other than the batch operator, checking the run and sample acceptance criteria as noted above. Reviews are documented on the batch summary forms.

6.4 Reporting of Results; Quantitative Results from analyses passing the sample acceptance criteria described above may be reported as follows: Only values > 0.01 g/% are reported, as the three-place average for the two cases replicate analyses, truncated to two decimal digits.

Procedural Uncertainty is reported with all quantitative results, and is calculated and tabulated annually for each analytical method, (See SOP TX-19 section 6.3).

7.0 Quality Assurance/Quality Control

7.1 Run and Sample Evaluation, Operator and Analytical Review; Each run is evaluated according to both the Sample and Run Acceptance Criteria specified above. Run acceptance is documented by both the operator, and a second, independent reviewer. Similarly, each sample is evaluated for acceptability according to the Sample acceptance Criteria specified above.

7.2 Report Administration and Final Review:

7.2.1 Prior to any result being issued, each case file is subjected to an technical and administrative review (in accordance with ASCLD guidelines) to ensure that appropriate documentation is present in the file, that results were generated from

appropriately reviewed and accepted analytical batches, and that results have been correctly transcribed from batch summary sheets and final reports

7.2.2 Prior to the final sign-off by the Director, each case is subjected to a final review. This review is designed to ensure that appropriate testing has been done, and that the results in the case file have been generated in a forensically defensible manner.

7.3 Sensitivity: Sensitivity of the method has been documented by performance on the external PT program (CAP, NHTSA, ODOH) between the ranges of 0.02 g/% - 0.30 g/%.

7.4 Specificity: Specificity of the method has been documented by performance on the external PT program and the volatile controls, containing potentially interfering substances. All samples are analyzed on two separate columns, of differing polarity. No substances interfering with any target analyte at the appropriate retention time on both columns have been observed to date.

7.5 Accuracy: Accuracy of the method is checked on each batch by the analysis of Certified Reference material, in addition to the control materials.

7.6 Precision: Precision of the method is evaluated for each result and documented on the Batch summary spreadsheet. Precision of reported values in ensured by the requirement that any reportable result agree with its replicate analysis to within 5%.

7.7 Linearity: Linearity of the Calibration Curve for the range of 0.0 - 0.3 g/100 ml is evaluated on each instrument run, and is required to be > 0.99 (r**2).

.

7.8 Performance Testing Samples: This laboratory participates in three regular, outside Proficiency Testing Programs;

College of American Pathologists- Alcohol Proficiency

7.9 Verification of Vial Sequence: The vial sequence is checked both prior to and after the injection of samples when the auto injector is used. The check after the injection of samples is documented on the run summary sheet.

Results from these proficiency-testing programs are reviewed upon receipt. Any significant problem with a PT result is addressed by the Chief Toxicologist/Laboratory Director. Any such problems and corrective/remedial action are documented in the PT notebook for the department.

7.10 A Batch summary sheet will be produced with each batch. Data on each batch should include fields such as: Sample name, Batch ID (Date of Batch), analysts who generated data, matrix, analyte found (and concentration if applicable), controls run with the batch and results obtained. If controls do not meet the criteria, the batch can be rejected as a whole or by a case by case basis. The supervisor is notified and proper action is taken to correct any problem. Batches and/or cases shall be repeated as needed.

8.0 References:

Reed, D. and Cravey, R.H. (1971) A Quantitative Gas Chromatographic Method for Alcohol Determination. J.Forensic Sci. Soc. 11:263

Karnitis, L. and Porter L.J. (1971) A Gas Chromatographic Method for Ethanol in Vapors of Biological Fluids. J. Forensic Sci. 16:318-322

Jones, A.W. and Schubereth, J. (1989) Computer-aided Headspace Gas Chromatography Applied to Blood Alcohol Analysis: Importance of Online Process Control. J. Forensic Sci. 34:1116-1127

A. Sources of error:

Uncertainty in alcohol determination is defined as 2X the standard deviation of the CRM, + 2x the standard deviation of the average of 20 laboratory determinations of that CRM reference value, + the procedural bias (defined as the difference of means between the CRM reference value, and the Laboratory determined value), expressed as a percentage.

Appendix I:

GC/Headspace temperature program specifications

Parameter			
Initial temp	50° C		
Hold Time	3.00min		
Ramps Rate/final temp/final time	rate	temp	time
	00.0	50	5.0
Post temp	50°c		
Post time	0.00		
Run Time	5.0 min		
Front inlet			
Mode	split		
Initial temp	180°c		
Pressure	10.0 psig		
Total flow			
Gas type	Helium		
Injection time	0.03 min		
Detector temp	300°c		
Plenum temp	100°c		

Example of controlled Liquid Volatile batch document TX Liquid-1. Batch documents can vary based on nature of batch.

Forensic Toxicology Laboratory

Liquid Ethanol Batch Summary

Batch ID:3-18-11

Analyst(s): mwa

Vial	Matrix	Ethanol Conc. % Col. A Rep 1	Col. A Rep 2	Col. B Rep 1	Col. A Avg.	Col. A % Diff.	B:A Delta %	Other Volatiles: (Note units)
0.10/12.7% Conditioner	Water	11.755		11.760				
0.10/12.7% Cal	Water	12.700		12.700				
Blank	Water	0.000		0.000				
0.30/38.1% Control	Water	40.108	39.964	40.204	40.0360	0.36	-0.42	
TX-11-368 diet coke	liquid	0.000	0.000	0.000	0.0000	#DIV/0!	#DIV/0!	
TX-11-315-1 unopened coke	liquid	0.000	0.000	0.000	0.0000	#DIV/0!	#DIV/0!	
TX-11-315-1 1/4 full coke	liquid	0.000	0.000	0.000	0.0000	#DIV/0!	#DIV/0!	
TX-11-315-1 diet Dr. Pepper	liquid	0.000	0.000	0.000	0.0000	#DIV/0!	#DIV/0!	
TX-11-315-2 yellow	liquid	9.767	9.801	9.707	9.7840	-0.35	0.79	
CRM 0.08/10.16 %	Water	10.020	10.072	10.057	10.0460	-0.52	-0.11	
0.10/12.7% CTL	Water	12.617	12.631	12.527	12.6240	-0.11	0.77	
0.02/2.54% CTL	Water	2.303	2.300	2.298	2.3015	0.13	0.15	
			Acceptable Limits:			+/- 5%	+/- 20%	

Vial position verified prior to sample removal: _____

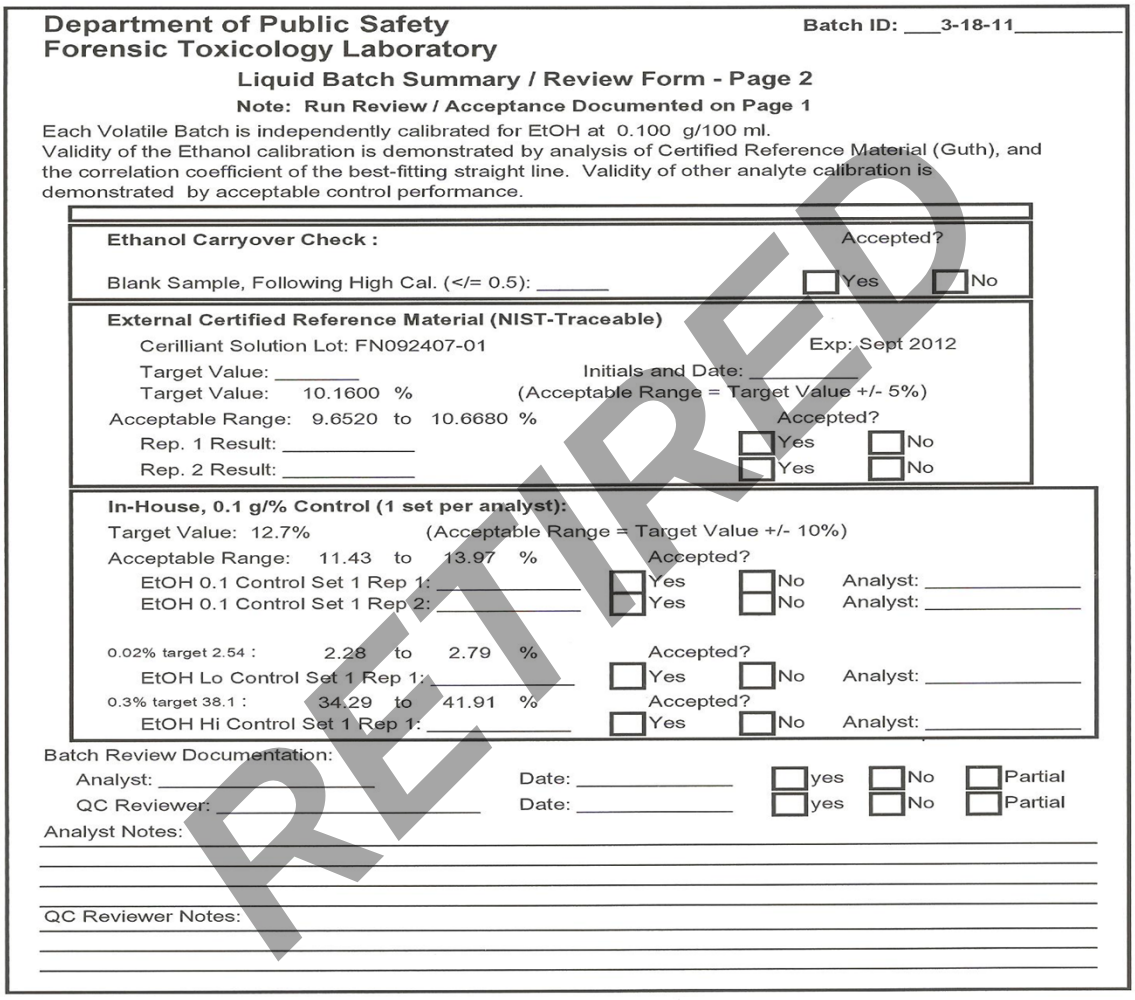
Analyst Run Review: _____ Date: _____

Comments: _____

Analytical Review: Run Acceptable?: _____

Date: _____

Example of controlled Liquid Volatile batch document TX Liquid-2. Batch documents can vary based on nature of batch.



Department of Public Safety
Forensic Toxicology Laboratory

Batch ID: ___3-18-11_____

Liquid Batch Summary / Review Form - Page 2

Note: Run Review / Acceptance Documented on Page 1

Each Volatile Batch is independently calibrated for EtOH at 0.100 g/100 ml.
Validity of the Ethanol calibration is demonstrated by analysis of Certified Reference Material (Guth), and the correlation coefficient of the best-fitting straight line. Validity of other analyte calibration is demonstrated by acceptable control performance.

Ethanol Carryover Check : Accepted?

Blank Sample, Following High Cal. (</= 0.5): _____ ☐ Yes ☐ No

External Certified Reference Material (NIST-Traceable)

Cerilliant Solution Lot: FN092407-01 Exp: Sept 2012

Target Value: _____ Initials and Date: _____

Target Value: 10.1600 % (Acceptable Range = Target Value +/- 5%)

Acceptable Range: 9.6520 to 10.6680 % Accepted?

Rep. 1 Result: _____ ☐ Yes ☐ No

Rep. 2 Result: _____ ☐ Yes ☐ No

In-House, 0.1 g/% Control (1 set per analyst):

Target Value: 12.7% (Acceptable Range = Target Value +/- 10%)

Acceptable Range: 11.43 to 13.97 % Accepted?

EtOH 0.1 Control Set 1 Rep 1: _____ ☐ Yes ☐ No Analyst: _____

EtOH 0.1 Control Set 1 Rep 2: _____ ☐ Yes ☐ No Analyst: _____

0.02% target 2.54 : 2.28 to 2.79 % Accepted?

EtOH Lo Control Set 1 Rep 1: _____ ☐ Yes ☐ No Analyst: _____

0.3% target 38.1 : 34.29 to 41.91 % Accepted?

EtOH Hi Control Set 1 Rep 1: _____ ☐ Yes ☐ No Analyst: _____

Batch Review Documentation:

Analyst: _____ Date: _____ ☐ yes ☐ No ☐ Partial

QC Reviewer: _____ Date: _____ ☐ yes ☐ No ☐ Partial

Analyst Notes:

QC Reviewer Notes:

RETIRED