Idaho State Police
Forensic Services

Approval for Quality System Controlled Documents

Discipline/Name of Document: Controlled Substances
#2 Gas Chromatograph Mass Spectrometer Analytical Method

Revision Number: 6

Issue Date: 7/3/2007

APPROVED BY: Corinna C Ousley
Quality Manager

7/3/07
Date Signed

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Gas Chromatograph Mass Spectrometer Analytical Method

1.0.0 Background

The gas chromatograph mass spectrometer (GC/MS) is an analytical instrument that separates and identifies a wide variety of organic compounds based on their mass spectra and retention time data.

2.0.0 Scope

The purpose of this Analytical Method is to layout the basic daily tune, scheduled periodic maintenance, sample preparation, and data interpretation necessary to perform quality analysis using a GC/MS.

3.0.0 Equipment and Reagents

3.1.0 Equipment

- 3.1.1 A GC/MS and corresponding analytical software.
- 3.1.2 Capillary column and data acquisition methods sufficient to separate the analytes of interest.
- 3.1.3 Short and long wave UV light source.

3.2.0 Reagents

- 3.2.1 ~~Reagent~~ ACS grade, or better, organic solvents.
- 3.2.2 Standards of the analytes of interest. Standard solutions may be prepared in-house or purchased from a commercial source. They can contain a single analyte or a mixture but all must be authenticated before use in casework.
- 3.2.3 Sodium carbonate and bicarbonate.

4.0.0 Mass Spectrometer Tune

4.1.0 Frequency

- 4.1.1 Using Hewlett-Packard/Agilent software and instrumentation an AUTOTUNE will be run after every major maintenance procedure, i.e. source cleaning or column change. They will also be run whenever a drift from expected values is encountered in the QUICKTUNE, see 4.2.
- 4.1.2 Using Hewlett-Packard/Agilent software and instrumentation, a successful

MS QUICKTUNE or AUTOTUNE, will be run each day that the instrument is used. A day is defined as a twenty-four (24) hour period starting at the time of the tune. If a sequence of samples will run longer than twenty-four hours then it must be interrupted and a successful QUICKTUNE, and daily standard run before the sequence can continue.

4.2.0 Definition of a Successful Tune (using PFTBA)
Using Chemstation software the following parameters should be met.

4.2.1 Mass assignments within +/- 0.2 AMU of 69, 219, and 502

4.2.2 Peak widths (PW) should be within 0.1 AMU of 0.55.

4.2.3 The relative abundances should show 69 as the base peak, although it might switch with the 219 peak. Under no circumstances should the base peak be anything other than 69 or 219. The relative abundances should be anything greater than 30% for 219, anything higher than 1% for 502.

4.2.4 The Isotope mass assignments should be approximately 1 AMU greater than the parent peak and the ratios should be 0.5-1.5% for mass 70, 2-8% for mass 220, and 5-15% for mass 503.

4.2.5 The presence of mass 18 (water) and/or 28 (nitrogen) indicate an air leak into the system. If either mass is above 10% relative abundance then maintenance to repair an air leak is required. The exception to this rule is, one to four hours following the pump down of the system or the refilling of the calibration vial; there may be residual air in the system.

4.3.0 The QUICKTUNE, STANDARD SPECTRA TUNE, and AUTOTUNE printouts shall be initialed by a drug analyst and kept in a logbook.

5.0.0 GC/MS Quality Assurance

5.1.0 For each GC/MS, a standard containing at least one controlled substance will be analyzed on each day that samples are to be run. This standard will be run before any casework is analyzed. If for any reason this standard fails, change of retention time, MS scan etc., then the samples analyzed after the previous standard and before the failed standard are to be considered suspect (for the failed analyte). It will be left to the analyst's discretion whether or not the failure of the standard is germane to each sample and whether the affected samples need to be reanalyzed. The failure of the standard due to instrument failure should be noted in the logbook, along with whatever maintenance that was performed to remedy the situation.

5.2.0 To confirm any substance, there must be a standard of that substance analyzed within twenty-four hours of the sample run.

5.3.0 Sample extracts are not to be concentrated to less than approximately 250ul, the volume of a vial insert.

6.0.0 General Scheduled Maintenance

All non-consumable items that are repaired or replaced must be entered into the

maintenance logbook. Entrees into the logbook should include any symptoms of problems along with the status of the system after the repair has been completed.

6.1.0 Daily (consumables). These items are needed to operate the GC/MS system but their replacement, or repair, do not need to entered into the maintenance logbook.
- 6.1.1 Perform Autotune
- 6.1.2 Check and fill solvent rinse vial on autosampler, empty waste solvent vials.

6.2.0 Monthly
- 6.2.1 Run a column efficiency standard (GROB, NP ISO, etc.) and compare to previous month's runs, making sure the same type sample mix is analyzed using the same data acquisition method. Retention times should be within +/- 0.04 minutes. A printout is kept in the maintenance logbook.

6.3.0 Quarterly, if possible.
- 6.3.1 Check the oil level of the rough pump. Fill if needed and note in logbook. This can only be done if the pump is not running.

6.4.0 Annual.
- 6.4.1 Replace solvent trap, if the part is available, and replace pump oil. Should be done when other maintenance is performed, approximately once a year.

7.0.0 Non-scheduled Maintenance

All non-scheduled maintenance is to be performed on an "as needed" basis as indicated from failure of the autotune, poor chromotagraphy, and or other indications of a system failure. All of these types of repairs will be noted in the maintenance log.

7.1.0 Replace or trim column. After a column has been replaced or trimmed the column efficiency standard will be run.

7.2.0 Clean MSD, replace filaments, gold seal, and injection liner, when needed. Consult with manufacturer's manual or software for cleaning procedure.

7.3.0 Replace electron multiplier if, after repeated cleaning of the source, the mv readings remain at or above 3000.

7.4.0 Replace any part, or system of parts, as necessary.

8.0.0 Data Interpretation

8.1.0 Retention time.
- 8.1.1 A sample's retention time will be considered acceptable if a mass spectral scan of the analyte is within +/- 0.04 min of a matching scan from a known standard. Retention time window was determined using the method described in "EPA SW846, method 8000B, section 7.6, Revision 2, December 1996 ".
- 8.1.2 The instrumentation and data acquisition parameters must be sufficient to

maintain a 0.1 minute retention time difference between analytes of interest that produce similar mass spectra.

8.2.0 Mass spectral interpretation. For the purpose of drug identification, analysis of mass spectra is one of pattern recognition. A great deal of the interpretation is dependent on each analyst's opinion as to what constitutes a match. All comparisons for the purpose of confirmation are made between analytical standards, not library searches, and the sample spectra. The determination of what constitutes a minor peak, and its relative significance, shall be left up to the individual analyst. The following are the minimum requirements to determine a match.

8.2.1 Identification of the molecular (parent) ion, if normally present. * Note* Some compounds do not have molecular ions in their mass spectra.

8.2.2 Presence of the correct base ion.

8.2.3 The ratios of the relative abundances of the major ions, from the sample, should be similar to those of the standard.

9.0.0 Blanks

The purpose of instrument blanks is to check for carry-over between samples, while an extraction blank (negative control) checks the level of contamination of all solvents etc. used in preparing the sample. It is acceptable to use an extraction blank as the instrument blank. For the purposes of this section an internal standard is not considered an analyte of interest.

9.1.0 Frequency. An instrument blank will be run after the daily standard(s) and immediately before each sample(s). An extraction blank is to be prepared and run daily.

9.2.0 Interpretation. A blank run is considered blank if the analyte(s) of interest would not be identified using the above criteria from 8.0.

9.3.0 If a blank has an identifiable analyte of interest then the blank will be rerun or replaced until the analyte of interest cannot be identified. The sample(s) immediately following the suspect blank(s) will be re-extracted and reanalyzed after an acceptable blank has been generated.

10.0.0 Sample Preparation Methods

The following are examples of sample preparation methods for specific substances and or classes of substances.

10.1.0 Cocaine

10.1.1 Samples and standards can be extracted directly using an organic solvent.

10.1.2 Samples and standards can be dissolved in water, or weak acid, and then made basic with Na_2CO_3 or other strong base. Finally the solution is extracted using an immiscible solvent.

10.2.0 Opiates

10.2.1 Heroin

10.2.1.1 Samples and standards are extracted directly into solvent.

10.2.1.2 Samples and standards are dissolved in water, or weak acid, and then made basic with $NaHCO_3$. The solution is extracted using chloroform.

10.2.2 Other Opiates

By far the most prevalent, non-heroin, opiates are found in pills. To analyze these samples see the General unknown AM.

10.3.0 Phenethylamines

Either of two extraction methods can be used depending on the analyst's discretion.

10.3.1 Basic Extraction. Place sample into a test tube. Dissolve with distilled water. Make basic with Na_2CO_3 or other strong base. Extract with petroleum ether, hexane, or other non-water soluble solvent. **NOTE** Amphetamine and methamphetamine basic extracts are volatile. If the extract in the sample vial is allowed to completely evaporate then the analyte may be lost. It is important to recap the sample vial with a new septa if the extract needs to be saved for reanalysis or returned to evidence in a trace case where all of the original sample was used.

10.3.2 Direct extraction. A small amount of the sample is dissolved in methanol or other appropriate solvent. A small amount of Na_2CO_3 may be added to improve chromotagraphy.

11.0.0 Documentation. Only the documentation used to reach the conclusion need be kept in the case-file. These include chromatograms of sample(s), standard(s), library search results, and blank(s).

12.0.0 History

Revision #	Issue or review date	History	Author or Reviewer
0	4/1/01	Original Issue	D.C. Sincerbeaux
1	8/27/02	Add #	D.C. Sincerbeaux
2	1/10/03	Add sec 9	D.C. Sincerbeaux
3	9/13/05	Changed 9.0.0, 9.1.0, 9.2.0 and 9.4.0 became 10.0.0	D.C. Sincerbeaux
4	6/30/06	Changed 6.0.0, 6.4.1, dropped 6.2.0, 6.3.2, 6.5.0. Changed 7.0.0	

		and 7.2.0	D.C. Sincerbeaux
5	1/12/07	Added new sec #10, 12, 5.3 Added pg #s, changed name, sec 3, dropped 6.1.3 &4, and minor word changes throughout	D.C. Sincerbeaux
6	7/3/2007	Add 8.1.2	D.C. Sincerbeaux

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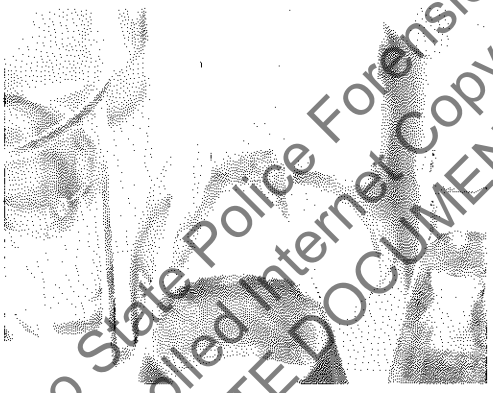

Discipline/Name of Document: Controlled Substances
#1 General Drug Analytical Method

Revision Number: 11

Issue Date: 7/29/2008

APPROVED BY: Corinna C Owsley — 7/29/08
Quality Manager — Date Signed

#1
General Drug
Analytical Method

1.0.0 Background / Scope

The following guidelines describe how controlled substance laboratory reports are to be worded, what to do about analytical methods that are no longer, or rarely used, sample and standards destruction, and sampling rules. These guidelines are a natural evolution of rules and procedures that have been used by ISP for years.

2.0.0 Reporting

The choice of words for the "Description and Conclusion" section of the laboratory report should be as brief as possible while containing all of the following elements.

2.1.1 The container, if any, i.e. plastic bag, glass vial, paper bindle etc.

2.1.2 Physical description of substance. Powder, liquid, plant material etc.

2.1.3 Original weight, volume, number of pills etc. of sample. See 2.1.6

2.1.4 Conclusion. See 2.2.1 through 2.2.4

2.1.5 Amount used for analysis, or reserved weights need to be in the notes but do not need to be reported. See 2.1.6

2.1.6 Exceptions. Trace amounts of residue used do not need to be noted. If the charge on a marijuana case is based on the number of plants, then the weight of the sample and the reserve does not need to be recorded. Weights of liquids are not to be reported. Volumes of all liquids, and weights of non-methamphetamine bearing solids from clanlab samples and the amounts used, do not need to be noted. If all of a sample is consumed in analysis and/ or extracts are returned with the evidence, this will be listed on the report.

2.2.0 All controlled substances analyzed, will be confirmed if possible. Exceptions are inadequate sample size or inability to obtain a standard.

2.2.1 If a substance is confirmed the report will read "contains XXXXX".

2.2.2 If a substance is present but not confirmed, the report will read "Results of testing indicates the presence of a controlled substance, unable to confirm". The reason why the substance in not confirmed must be in the case record.

2.2.3 Non-analytical identifications of pills will read "*source* (PDR, Logo Index, etc.) lists as XXXX". All therapeutic ingredients will be reported but their relative amounts do not have to be. If the relative amounts effect scheduling then that must

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be in the notes.

2.2.4 All controlled substances should be scheduled.

2.2.5 Reporting of non-controlled substances shall be left up to the discretion of the analyst.

2.3.0 In order to alleviate confusion on the part of our customers, conversion between metric and English units of measure should be reported on marijuana cases, when appropriate. Example 90.7g (3.2oz).

2.3.1 The following conversion factors apply 28.35 g/oz, 453.6 g/lb.

2.3.2 "Trace" or "residue" will be defined as anything less than 0.10 grams.

2.4.0 The uncertainty of measurement (UM) is; for less than 100g (+/-) 0.01g, for greater than 100g it is 0.03%. See section 12.0 for an explanation of UM

2.5.0 All digits observed from a balance will be reported.

3.0.0 Sample and Standard Destruction

3.1.0 Sample Destruction. For the purpose of this section a sample will be defined as any case work related extract, solution, or solid that is not returned to evidence. Standards of non-controlled substances will also be treated using these procedures.

3.1.1 Aqueous liquids will be stored in a waste bottle until disposal. Organic solvents will also be stored until disposal.

3.1.2 Disposal of aqueous liquids shall consist of neutralization of pH followed by solidification of remaining liquid with absorbent material (kitty litter etc.). The bottle and solid will then be discarded with normal trash.

3.1.3 Extracted plant material, test tubes, used empty vials, and TLC plates are placed in the disposable glass containers. Once these containers are full, they are stored until the next scheduled drug evidence burn, where they will be destroyed.

3.1.4 Solid (powder) samples can be either washed down the drain or placed in the liquid (aqueous) waste bottle.

3.2.0 Controlled Substance Standard Destruction. For the purpose of this section, a standard (primary, secondary, bench) is defined as any controlled substance used as a reference for confirmatory analysis.

3.2.1 When a standard needs to be destroyed, i.e. past the expiration date, contamination, or degradation etc., then the standard will be stored until the next scheduled drug burn and destroyed there. Two criminalists will witness the removal of the standards from the laboratory and fill out any necessary paperwork required by the agency conducting the drug burn. The laboratory standard log will indicate when the standard was destroyed. Any DEA forms will also be filled out and turned over to the proper authorities.

3.2.2 If a standard is removed from the laboratory by being totally consumed, accidentally destroyed or spilled, the removal should be witnessed by a second criminalist and both individuals should sign and date the standard log.

4.0.0 Old Analytical Methods

There are numerous analytical or extraction methods that at one time were used in the Forensic Service laboratory system. These methods do not have approved Analytical Methods. If an analyst decides that these or other non-approved methods need to be used then the analyst must refer to section 15.4.1.2 of the quality manual for the proper procedures before analysis begins.

5.0.0 Sampling Rules

Sampling rules allow for the analysis of key evidence items within a case to maximize the resources of the lab. If during the pretrial process it becomes apparent that items not analyzed will require analysis for successful prosecution then upon resubmission that item will receive rush priority.

5.0.1 A felony charge has priority over a misdemeanor. Example: a gram of cocaine found in a suspect's pocket will be tested while a gram of marijuana found in the same pocket may not be.

5.0.2 A misdemeanor is treated equally to a felony if it is closer to the suspect or was the probable cause for a subsequent search. Example: A gram of marijuana found in a suspect's pocket would be analyzed in addition to a gram of cocaine found in the suspect's car.

5.0.3 Based on the analysts training and experience if it is suspected different types of felony drugs are submitted then one of each type will be analyzed. The analyst may use resources such as: statements of fact, description of items as well as visual inspection of items in making this determination.

5.0.4 The analyst will always strive to provide evidence supporting the highest charge, i.e. trafficking, manufacturing, delivery vs. felony possession vs. misdemeanor possession.

5.1.0 When only a trace level of sample is present, every effort will be made to use less than one half of the sample. If it is necessary to use the entire sample, then any extracts, left over liquids, or residues will be returned to the evidence envelope.

5.2.0 Multiple samples, non-statistical methods.

5.2.1 For less than trafficking amounts. (See appendix) The number of samples necessary to support the charge will be analyzed. Example: If you have five samples and the charge is possession then only one sample needs to be tested. If the charge is intent to deliver then more samples may need to be tested. Consultation with the prosecutor should determine the number

needed. The report will state the total number of samples, the sample weight of the number actually analyzed, and the findings.

5.2.2 For trafficking amounts. **ALL** samples will be analyzed until the appropriate trafficking weight is reached. Example: Forty balloons come in, each with about 0.1g of suspected heroin. The analyst will weigh out enough to get to the first trafficking level, 2.0 g, and analyze each.

5.2.3.1 Pills that have recognizable logos and/or identification numbers need analytical confirmation if a literature search indicates that they contain a controlled substance, Schedule I or II. Exception, if a controlled substance has been analytically confirmed from a non-pill sample in the case then a pill(s) listed to contain the same controlled substance only needs a literature search, (section 2.2.3). If a literature search reveals that pills with two, or more, different labels contain the same controlled substance then only one of the pills needs to be analyzed. A sample from each type of two part, unsealed, gelatin type capsules will be analyzed. For the purpose of satisfying the "two test, two sampling" rule, described in 9.2.0, a literature search will be considered a presumptive test.

5.2.3.2 Acceptable literature references are, published books (PDR, DIB, Logo index etc.) and manufacturers web sites. All literature searches shall be documented with a hard copy (photo copy, printed computer page etc.). Information from Poison control centers can be used as a preliminary test when further analytical testing is performed.

5.2.4 For the non-statistical methods then ONLY the results of the samples actually tested can be reported and testified to. No representation as to the content of the other samples is to be inferred.

5.3.0 Multiple samples, statistical method.

If the content of all the samples of a multi sample exhibit, even those samples not actually analyzed, is to be inferred then a hypergeometric sampling scheme will be employed. The ISP Forensic laboratories will use the software from ENFSI for making the calculations as to the number of samples required. This software has been supplied to each laboratory. It is up to each analyst using this method to understand its limitations and the implications.

5.3.1 Count the number of samples.

5.3.2 The ISP system will use 0.9 as the level of "proportion of positives" and 0.95 as the confidence level.

5.3.3 Enter the values from 5.3.1 and 5.3.2 into the excel program.

5.3.4 Analyze the number of random samples from the resulting calculation.

6.0.0 Reagents

Unless stated in a separate analytical method, or below, the recipes for reagents found in "*Clarke's Analysis of Drugs and Poisons, 3rd edition*" are to be used.

6.1.0 The following list of color test reagents are approved for use.
Marquis, Cobalt thiocyanate, Liebermann's, Mecke's, Froehde, Fast blue, Duquenois, Simon's (2nd amines), Dille-Koppanyi, and Sulfuric acid/UV.

6.2.0 The following reagents are approved as spray reagents Fast blue, Iodoplatinate, Van Urk (p-DMAB), Fluorescamine, and Dragendorff's.

6.3.0 For each reagent that is essential to the success of a test, a worksheet recording the following will be maintained; reagents name, recipe, QC method, date made, name of preparer, and results of QC check. All reagents will be checked against known standards and a blank when they are prepared. Reagents that are prepared for one time use, i.e. Weber test, the QC results are to be documented in the case notes. If the effectiveness of a reagent is verified with each use and the results are documented in the appropriate case files, then no other documentation is required.

6.4.0 Shelf life. With the exception of Marquis, Cobalt thiocyanate, and Simon's, which are to be tested monthly, all reagents are to be tested with a positive control and a blank, or negative control as appropriate, with each use. Shelf life is thus considered indefinite.

6.5.0 The following reagents or situations require special attention;

6.5.1 Marquis. This reagent will degrade over time especially when not refrigerated. Test with both a positive (methamphetamine) and negative (dimethyl sulfone) control. When testing with methamphetamine, the reaction should flash orange immediately. If the orange reaction is slowed the reagent must be replaced.
The recipe for Marquis: slowly add 100mls of sulfuric acid to 1ml of approximately 37% (w/w) formaldehyde.

6.5.2 Simon's (2nd amines). Sodium nitroprusside stock solution "1" should be kept in the dark and refrigerated.

6.5.3 A 2% (w/v) cobalt thiocyanate aqueous solution is used for cocaine. Mix cobalt thiocyanate with distilled/deionized water and filter if necessary. Solution should be clear and pink. A positive reaction produces a turquoise blue precipitate. HCl is added to the test well containing the sample and cobalt thiocyanate if the sample is suspected of containing cocaine base. Test with both a positive (cocaine) and negative (dimethyl sulfone) control.

6.5.4 Fast Blue BB salt solution for marijuana and mushrooms. Add enough of the Fast Blue BB salt to distilled/deionized water to change the water to a yellow color. The exact concentration is not relevant as the solution is tested with each use and thus depends on the analyst's personal preference.

6.5.5 Duquenois. Add 2.5 mls acetaldehyde and 2 g vanillin to 100mls of 95% or greater ethanol.

7.0.0 Authentication of Standards

Before a standard can be used as a reference for casework, it must be authenticated. This only has to be done once.

7.1.0 Authentication is performed on the appropriate instrument, either a GC/MS or FTIR.

7.2.0 A standard will be considered authenticated when the match (Q) is greater than 85 %, as compared to a library search. If the match is less than 85% then two analysts must concur on the validity of the match. Initials of each analyst will be kept on the printout in the standards logbook or file. Reference libraries can come from any reliable source, i.e. instrument library or scientific journals or publications.

7.3.0 Authentication documentation will be kept for each standard.

7.4.0 Standards will be obtained from commercial or governmental sources i.e. Sigma, Supelco, and DEA, ect. Standards may also be obtained from previously analyzed casework.

8.0.0 Blanks

A reagent (negative control), or solvent (instrument) blank will be run at least once with each batch of analyses. The results will be noted in the case-file. The exception to this is the FTIR background scan, which does not need to be kept. Additional blanks may be run at the analyst's discretion. The results of a reagent blank are considered negative when there is no evidence of contamination from an analyte of interest. Refer to the GC/MS Analytical Method for specific information regarding blanks.

9.0.0 Identification Criteria

9.1.0 General Guidelines. The following identification criteria will be applied to both controlled and noncontrolled substances unless different criteria are listed in separate Analytical Method's.

9.2.0 Testing Rules

9.2.1 For each controlled substance, whenever possible, two positive tests from two different sampling events will be employed for confirmation. One of the tests must provide structural information, i.e. either MS or FTIR. A positive test is defined as one that gives a reaction or result that indicates the presence of the analyte in question. A negative reaction to a color test cannot be used for a positive test even if a negative reaction was expected. Example: a negative reaction of methamphetamine and cobalt thiocyanate even though no color change is expected.

9.2.2 If only one sampling event can be performed on a sample then n-tridecane internal standard is to be added to the extract before analysis on the GC/MS. A blank with

internal standard will also be run. Use either a 1000 or 10,000 ug/ml tridecane/ methanol or chloroform stock standard.

9.2.3 For non-controlled substances i.e. inorganics, cutting agents and non-scheduled prescription drugs, the second sampling event does not have to be used.

9.3.0 If a sample's MS spectra matches the spectra of a standard, has a retention time within the acceptable time window, and the second test is positive, if ran, then the compound is confirmed.

9.3.1 Mass spectral interpretation. For the purpose of drug identification, analysis of mass spectra is one of pattern recognition. A great deal of the interpretation is dependent on each analyst's opinion as to what constitutes a match. All comparisons for the purpose of confirmation are made between analytical standards, not library searches, and the sample spectra. The determination of what constitutes a minor peak, and its relative significance, shall be left up to the individual analyst. The following are the minimum requirements to determine a match.

9.3.2 Identification of the molecular (parent) ion, if normally present. * Note Some compounds do not have molecular ions in their mass spectra.

9.3.3 Presence of the correct base ion. Exception, for cocaine the base ion of the sample does not have to match that of the standard but does have to be present in significant abundance.

9.3.4 The ratios of the relative abundances of the major ions, from the sample, should be similar to those of the standard.

9.4.0 If a sample's FTIR spectra matches a spectra of a standard that was prepared the same as the sample, and a second test is positive, then the compound is confirmed.

9.4.1 Standard spectra are prepared from authenticated standards and then stored internally for each FTIR instrument, at each laboratory.

9.4.2 FTIR spectra are considered matched if the peaks of the standard are present in the sample, in location, shape, and relative intensities. Any extra major peaks in the sample must be explainable.

10.0.0 Records Retention

The documentation needed to support the conclusion(s) in the report will be kept in the case file. Current batch documentation will be stored in an area of the laboratory known to and accessible to the controlled substances chemists. Examples of batch documentation are GC/MS autotunes.

11.0.0 Abbreviations

Each laboratory will prepare and maintain a list of abbreviations that are used in the case notes.

12.0.0 Uncertainty of Measurement

Of the many possible variables that contribute to the uncertainty of measurement, using our AM's, only one is accurately measurable, the use of a balance. If requested by our clients, the contribution of that variable is what we will report. All analysts must be aware of other possible variables and to be able to explain their potential impact on the reported weight. Examples of other variables include but are not limited to, moisture/solvent content, static, and the ability to remove all of a sample from packaging.

13.0.0 History

Revision #	Issue or review date	History	Author or Reviewer
0	4/1/01	Original Issue	D.C. Sincerbeaux
1.0	4/26/02	Update section 6	D.C. Sincerbeaux
2.0	7/22/02	Add Sec 7 and 8	D.C. Sincerbeaux
3.0	8/27/02	Add section 9, 10, & #	D.C. Sincerbeaux
4.0	1/10/03	Changed sec 8 and 10	D.C. Sincerbeaux
5.0	4/16/03	Added sec 11.0	D.C. Sincerbeaux
6.0	11/26/03	Changed section 7	D.C. Sincerbeaux
7.0	9/30/05	Major rewrite. Changed sections1.0.0, 2.1.(2,6), 2.2.0, 3.2.(0,2), 5.2.(1,2,3,), 6.(0,1,2), 8.0.0, 9.2.(0,1,2)	D.C. Sincerbeaux
8.0	12/22/06	Minor word changes throughout, Changed 2.1.6, 2.2.3, 9.2.1, 9.2.2, and 9.2.3	
9.0	7/3/2007	Added 6.3, 6.4,7.4 changed 3.2, 4.0,6.0, 6.1	D.C. Sincerbeaux
10.0	7/19/07	changed 2.1.6, 6.5.1 added 6.5.5	D.C. Sincerbeaux
11.0	7/29/08	added 12, 2.4-6, 5.2.3.1 &2. Edited several sections dropped 3.1.5	D.C. Sincerbeaux