

Alaska Scientific Crime Detection Laboratory

Controlled Substances Analysis Manual

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Section 1 Sample Selection

Item Selection Policy

In order to provide relevant and timely service the Scientific Crime Detection Laboratory (SCDL) has adopted policies in the Controlled Substances Discipline involving the prioritization and selection of evidence analyzed. If, during pretrial processes, it is determined items that were not analyzed are necessary for prosecution then, upon resubmission, those items will receive top priority by the laboratory. Selection of items for analysis is based on the following criteria:

- Items suspected to contain higher scheduled drugs will receive higher priority.
- If weighable quantities of a drug are present, residues will not be analyzed. Exceptions can occur when the residue present is suspected to be a higher scheduled substance than the weighable quantities.
- If multiple items are submitted that are suspected to be the same substance, only one item will be analyzed. For example, if three items of white, crystalline substance are submitted, only one would be selected for analysis. Exceptions may occur when weight thresholds exist in the Alaska Statutes and distribution cases.
- Probable cause items will be analyzed if notated on the Request for Laboratory Services (RLS) form or otherwise communicated by the submitting agency.
- The above item selection policy will be adopted for each suspect on the RLS form if items can be associated to specific suspects. This information can come from latent print testing of drug evidence or information from the submitting agency. Information from the submitting agency must be documented on the RLS form or otherwise communicated to the lab or the additional items will not be worked.
- Additional circumstances can affect item selection at the discretion of the Chemistry Discipline Supervisor.

When items are not selected by the analyst for analysis, based on information the analyst observes on the evidence packaging or within the evidence, the reason must be documented in the case notes.

Sample Conservation

An unused portion of the original sample will exist in order to allow for subsequent retesting. In cases where only residue amounts are submitted, the residue must be a visible amount and with a quantity sufficient for analysis and reanalysis. While an attempt is made to conserve sample for reanalysis, additional testing performed in the laboratory (such as latent print testing) might destroy any remaining sample.

If the requesting agency and prosecutor determine that testing that would require consumption of the entire sample should be performed, a written acknowledgement of consumption from the District Attorney's Office must be documented in the LIMS.

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Determining Populations

Controlled substance analysts rely on their training and experience along with information provided by the submitting agency in determining which items consist of multiple populations and require sub-itemization prior to analysis.

While the analyst is making determinations about population compositions there is no assumption that can be made about the homogeneity of the population unless full testing is performed on each unit within that population or the sampling plan is followed (see Appendix II Sampling Plan).

- Samples submitted by the submitting agency as separate items must never be combined as a single item by the analyst prior to analysis.
- When analyzing items containing multiple bindles or packages that cannot be visualized through the packaging, the appearance of the contents must be verified by the analyst prior to grouping into populations.
- Factory sealed and labeled packages with the same markings can be considered as one population without visualizing the contents.
- Tablets, capsules (licit or illicit), marked blotter paper or sublingual films with the same logo, color, and shape submitted as one item can be considered as one population.

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Section 2 Quantity Determination

All balances utilized in controlled substances casework will be calibrated by an external calibration service that is accredited to ISO/IEC 17025:2005 with a scope of accreditation covering applicable calibration requirements prior to use and on an annual basis. Calibration records are stored in the laboratory's Quality Assurance Records. The calibrated weights used in performance checks are calibrated by an external calibration service that is accredited to ISO/IEC 17025:2005 with a scope of accreditation covering applicable calibration requirements on an annual basis. The weight calibration records are stored in the laboratory's Quality Assurance Records.

All balances are checked on a monthly basis with calibrated weights and a check standard. Any member of the Forensic Chemistry discipline may perform the monthly balance performance checks. This is documented on the Balance Performance Check Form which is stored in the controlled substances laboratory space. The information from the performance checks is also documented in the spreadsheet utilized for the ongoing estimate of the measurement of uncertainty. The Mettler Toledo XS2002S model balances have an acceptable tolerance of +/- 0.02 gram, set by the laboratory. The Mettler Toledo MS16001L model balances have an acceptable tolerance of +/- 0.2 gram, set by the laboratory. The Mettler Toledo XSE204 model balance has an acceptable tolerance of +/- 0.0100 gram, set by the laboratory. If a balance does not pass a performance check it will be taken out of service until repaired and calibrated. The check standard is defined in Appendix III for each balance model.

Each week a balance is utilized in casework analysts will perform a performance check with calibrated weights and a check standard. This is documented on the Balance Performance Check Form which is stored in the controlled substances laboratory space. The information from the performance checks is also documented in the spreadsheet utilized for the ongoing estimate of the measurement of uncertainty. If a balance does not pass a performance check it will be taken out of service until repaired and calibrated.

The Mettler Toledo XS2002S model balances are used for weights up to 2050.00 grams. The Mettler Toledo MS16001L model balances are used for weights of 10.0 grams to 8000.0 grams. The Mettler Toledo XSE204 model balance is not currently utilized for casework.

The balance used will be recorded in the case notes. Actual balance readings are recorded in the case notes and on the report with the exception of less than or equal to 0.09 gram. A balance reading of less than or equal to 0.09 will be recorded in the case notes. The method of measurement, either net or gross, will be indicated in the notes.

A gross weight is obtained and recorded in the notes of all items when only a representative sample will be tested. A net weight will be obtained and recorded in the notes on all items analyzed when practical. If the substance is in such a form as to make weight determination impractical, such as a thin film of residue in a pipe, then net weights are not required, but 'residue' will be recorded.

Liquids will be weighed and the analyst may document an approximate volume in the notes.

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Bags with substance will be weighed and counted. Tablets or capsules will be weighed and counted. Blotter paper and sublingual films will be weighed and dosage units counted. The counts of these items will be listed in the item description on the report. When weighing capsules, the content is not to be removed from the capsule for weighing as the capsule is considered part of the sample. The capsule and content are considered a net weight.

Actual balance readings are reported for weights equal to or greater than 0.10 gram. If the weight is equal to or less than 0.09 gram then "weight is below reporting limit" is reported. "Residue" is reported when evidence cannot be weighed.

Proper weighing techniques:

- Place material into a tared container and obtain a net weight. This will accommodate most drug samples.
- Weigh material directly.
- Weigh the original container with its contents, empty the contents, weigh the empty container, and subtract the difference in the two weights (weight by difference). Analyst must show the subtraction in their notes.
- Obtain the net weights of individual items in an item and sum the individual weights (weight by summation). Analyst must show the individual weights and summation in their notes. The reported weight is a combined net weight.

Weight considerations

The following are weights/counts listed in the Alaska Statutes.

Misconduct Involving Controlled Substances						Critical Units
	6th	5th	4th	3rd	2nd	
Precursors					6 g	6 g
IA			Any		Any (dist)	
IIA			Any	Any (dist)		
IIIA		< 25 tabs or < 3 g	25 tabs or 3 g	Any (dist)		3 g or 25 tabs
IVA		< 25 tabs or < 3 g	25 tabs or 3 g, Any (dist)			3 g or 25 tabs
VA		< 50 tabs or < 6 g	50 tabs or 6 g, Any (dist)			6 g or 50 tabs
VIA	< 1 oz	1 oz, <1 oz (dist)	4 oz or 25 plants, 1 oz (dist)			1 oz, 4 oz or 25 plants
Spice (IIIA)	< 6 g	6 g	12 g			6 g, 12 g

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Bath Salts (IIA)		< 500 mg	500 mg			500 mg
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Section 3 Analytical Scheme

The intent of the controlled substances analysis scheme is to detect and confirm all controlled substances listed in Alaska Statutes Chapter 71 with the level of specificity required by those statutes. When referring to the presence of a controlled substance, "any quantity" as worded in the Alaska Statutes is interpreted by the laboratory as "a quantity that allows for complete testing using the discipline's analysis scheme with all positive results meeting their defined acceptability criteria."

Only those substances controlled under Alaska Statutes Chapter 71 will be routinely reported.

Presumptive tests include color tests, crystal tests, physical identification, microscopic analysis (plant material only) and GC-FID.

All analyses conducted will include GC/MS.

The FTIR must be used, if the base or salt form of a controlled substance will be reported.

All controlled substances present, not possible from breakdown or decomposition, will be identified when sufficient quantities of the item of evidence exists.

Minimum criteria

The minimum criteria necessary to report a controlled or non-controlled substance are two consistent results that include at least one presumptive test (or FTIR) and a GC/MS. Each test is conducted from a separate sampling of the item.

When a non-controlled substance is reported the item will also be analyzed to confirm that no controlled substances are present and the report will state: "**No controlled substances per Alaska Statutes detected. _____, a non-controlled substance was identified.**"

When a pharmaceutical product contains both controlled and non-controlled substances the non-controlled substance does not have to be identified or reported when it does not affect the scheduling of the controlled substance.

The minimum criteria necessary to report "**No controlled substances per Alaska Statutes detected.**" are two GC/MS tests, from separate samplings of the item. Each sampling will be extracted with a different solvent (see extraction protocols in Section 7).

Additional considerations

For reported substances known to share similar mass spectral characteristics with other compounds, a secondary test capable of further distinguishing the compounds from one another will be used. This will be done regardless of whether the similar compounds are controlled.

Drugs known to undergo conversion when heated to GC inlet temperatures (psilocybin, GHB, clorazepate,) will be differentiated using a separate, non-converting technique if required for statute interpretation.

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Samples indicating either Diazepam or Ketazolam must be differentiated by FTIR, if the sample cannot be identified by physical markings or is in powdered form.

Reports shall only be as specific as the techniques used allow. They will not indicate enantiomer (levo/dextro) or diastereomer (pseudo/allo) forms unless the statute interpretation requires it and the testing used is capable of the differentiation.

Section 4 Instrumentation- Maintenance, Parameters and Quality Assurance

GAS CHROMATOGRAPHY

This section applies to the gas chromatography portion of both the GC-FID and the GC/MS instruments in the controlled substances discipline.

Electronic copies of manufacturer's instrument manuals are located on the laboratory's network drive under the Chemistry folder in the discipline shares.

GC column stationary phases are approved prior to use in the controlled substances discipline by the Controlled Substances Discipline Supervisor.

The specifications for the column used on a particular instrument will be recorded in the printed method located in the instrument's maintenance binder.

With the exception of derivatizing agents, GC injection solvents used for case samples and their respective negative controls will contain an internal standard (tetradecane at 0.5 mg/mL). Solvents used to prepare working standards will not contain an internal standard.

Hydrogen generators provide the hydrogen gas for flame ionization detectors.

Maintenance

Assessing the chromatographic performance of the QC Mixture is the primary way in which the controlled substances discipline determines whether GC maintenance is necessary. However, the following preventative maintenance tasks will be performed at the minimum frequencies outlined below.

For the GC-FID:

<u>Service</u>	<u>Minimum Frequency</u>
Liner Replacement	Every 6 Months
Septum Replacement	Every 6 Months*
Gold Seal Replacement	Every 3 Years
Syringe Replacement	Every 3 Years
Column Trim/Replacement	Trim as needed, Replace Every 2 Years

**Not applicable if a Merlin microseal septum is installed*

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For the GC/MS:

<u>Service</u>	<u>Minimum Frequency</u>
Liner Replacement	Every 2 Months
Septum Replacement	Every 2 Months*
Gold Seal Replacement	Every 2 Years
Syringe Replacement	Every 2 Years
Column Trim/Replacement	Trim as needed, Replace Every 2 Years

**Not applicable if a Merlin microseal septum is installed*

Procedures for performing these services can be found in the instrument manufacturer manuals.

Quality Assurance

On the first working day of the week, the QC Mixture must be analyzed on the gas chromatograph before it can be used for case work. Also, whenever maintenance has been performed on the gas chromatograph, the QC Mixture must be analyzed to ensure the instrument is working properly. Passing criteria for the QC Mixture are:

- All components of the mixture are adequately separated and integrated
- No excessive fronting or tailing of peaks is observed
- No extraneous peaks are integrated
- The abundance and retention time of each peak is consistent with previous analyses of the same QC Mixture lot on that instrument.

The person running the QC Mixture will place their initials and the lot number in the "Sample Info for" box above the sequence table of the GC-FID. The person running the QC Mixture will place their initials and the lot number in the "Comment" field of the GC/MS. The person approving the passing criteria have been met will place their initials and date on all pages of the printed QC Mixture stored in the maintenance binder.

If the passing criteria are not met, troubleshooting will occur until the problem is resolved. Any maintenance that occurs will be recorded in the instrument's maintenance log.

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Hardcopies of passing QC Mixture results will be kept in the corresponding instrument maintenance binder. At least twice a year, the previous year's QC data will be scanned and entered into the LIMS case file CHEM INST under the appropriate instrument and the hardcopies will be destroyed.

Instrument Parameters

The SCREENFID.M method is used when analyzing samples for routine casework on the GC-FID. The SCREEN.M method is used when analyzing samples for routine casework on the GC/MS. Other available methods for casework are printed in the Instrument binder associated with each instrument.

Copies of the method parameters used by each gas chromatograph are stored in their respective instrument maintenance binders. No permanent changes will be made to currently used GC methods without approval from the discipline supervisor. When a change is made, a copy of the archived method parameters is marked with end date and retained in the instrument's notebook. Periodically, these archived methods will be transferred into the LIMS case file CHEM INST under the appropriate instrument and the hardcopies will be destroyed. Temporary changes to split ratios and oven program parameters are allowed when appropriate. These changes will be documented in the case file(s) in which the temporarily modified method was used.

Below is a table listing the GC parameters for the SCREENFID.M method used in routine casework:

Injector Parameters	
Solvent A	Methanol
Solvent B	Hexane
Preinjection Washes	2 Solvent A, 2 Solvent B
Sample Pumps	3
Postinjection Washes	2 Solvent A, 2 Solvent B
Injection Volume (uL)	1

Inlet Parameters	
Mode	Split
Split Ratio	40:1
Inlet Temperature (C)	250
Septum Purge Flow (mL/min)	0.5
Column Flow (mL/min)	1

Oven Parameters	
Initial Oven Temperature (C)	50
Initial Oven Time (min)	0

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Oven Temperature Ramp (C/min)	10
Final Oven Temperature (C)	320
Final Oven Time (min)	3
Run Time (min)	30

FID Parameters	
Heater (C)	300
H2 Flow (mL/min)	40
Air Flow (mL/min)	450
Makeup Flow (mL/min)	44
Const Col + Makeup (mL/min)	45

The instrument's software is programmed to automatically integrate detected peaks and, if a mass selective detector is being used, perform library searches of their mass spectra. The table below lists the integration parameters used by the SCREEN.M method.

Integration Parameters	
Integrator	RTE
Parameters File	screen.p
Data Point Sampling	1
Smoothing	Checked
Start Threshold	0.200
Stop Threshold	0.000
Baseline Reset (# points)>	5
If leading or trailing edge <	100.0%, Baseline drop else tangent
Minimum Peak Area	50000
Peak Location	Top
Maximum Number of Peaks	100

Below is a table listing the GC parameters for the SCREEN.M method used in routine casework:

Injector Parameters	
Solvent A	Methanol
Solvent B	Hexane
Preinjection Washes	2 Solvent A, 2 Solvent B
Sample Pumps	3
Postinjection Washes	2 Solvent A, 2 Solvent B
Injection Volume (uL)	1
Inlet Parameters	
Mode	Split

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Split Ratio	40:1
Inlet Temperature (C)	250
Septum Purge Flow (mL/min)	3
Column Flow (mL/min)	1
Oven Parameters	
Initial Oven Temperature (C)	100
Initial Oven Time (min)	1
Oven Temperature Ramp (C/min)	25
Final Oven Temperature (C)	325
Final Oven Time (min)	5
Run Time (min)	15

MASS SPECTROMETRY

The section on gas chromatography covers the GC component of GC-MS whereas this section specifically covers the MS component.

Electronic copies of manufacturer produced instrument manuals are located on the laboratory's network drive under the Chemistry folder in the discipline shares.

Maintenance

Assessing the results of the standard tune is the primary way in which the controlled substances discipline determines whether MS maintenance is necessary. However, the following preventative maintenance tasks will be performed at the minimum frequencies outlined below:

<u>Service</u>	<u>Minimum Frequency</u>
Rough Pump Oil	Change Every 6 Months
Ion Source Cleaning	Annually
Check PFTBA Level	Annually

Procedures for performing these services can be found in the instrument manufacturer manuals.

Quality Assurance

Each week, mass spectrometers must be tuned with the stune.u program before they can be used in case work. The mass spectrometer must also be tuned whenever it has been cleaned or serviced prior to resuming case work. Passing criteria for a standard tune are:

- The ion abundances of 18 (water), 28 (nitrogen), and 32 (oxygen) relative to ion 69 are less than 10%
- The three principle peaks (69, 219, and 502) have acceptable shapes

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- The ion abundance of 502 relative to 69 is 2% or greater
- The electron multiplier voltage is less than or equal to 2600 volts

If the passing criteria are not met, troubleshooting will occur until the problem is resolved. Any maintenance that occurs will be recorded in the instrument's maintenance binder. The mass spectra of the QC Mix components will also be reviewed. To be considered acceptable, accurate library matches must be made for each component of the QC Mixture.

Hardcopies of passing tune results will be kept in the corresponding instrument maintenance binder. They will be filed chronologically with the QC Mixture results and archived using the same procedure outlined in the GC section. Automated library search results for the QC Mixture will be included with the chromatogram hardcopy.

Instrument Parameters

To ensure consistent total ion abundance and relative ion abundance between instruments, the standard tune (stune.u) program will be used when tuning a mass spectrometer used for controlled substances casework.

Copies of the MS method parameters used by each GC/MS are stored in their respective instrument maintenance binders. With the exception of changing the solvent delay due to column maintenance, no permanent changes will be made to currently used MS methods without approval from the discipline supervisor. When a change is made, a copy of the archived method parameters is marked with end date and retained in the instrument's notebook. Periodically, these archived methods will be transferred into the LIMS case file CHEM INST under the appropriate instrument and the hardcopies will be destroyed.

Temporary changes to MS scan ranges are allowed when appropriate. These changes will be documented in the case file(s) in which the temporarily modified method was used.

The GC/MS software is programmed to automatically integrate detected peaks and perform library searches of their mass spectra. The integration parameters used are listed on page 11 of this manual.

Spectra obtained from analyzing working standards may also be used when making comparisons. When a working standard that has not been previously added to the in-house library is used, its mass spectrum will be added as described in the Mass Spectral Libraries section.

Mass Spectral Libraries

The discipline's in-house library (SCDL.L) and/or outside libraries from reputable sources may be used during mass spectral searches. The library search report will list which libraries were

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used for each sample analyzed. Libraries will be located on each instrument computer in the following directory: C:\DATABASE\

Mass spectra obtained from working standards will only be added to the discipline's in-house library if they were analyzed using the SCREEN.M method. Background subtraction will be used before adding a spectrum to the library if column bleed or other interfering ions are present. When entering the compound name into the library entry, the standard control number will also be included.

Whenever a new entry is added to the discipline's in-house library, the updated version will be copied to each instrument computer and replace the previous version. The contents of outside libraries will not be edited in any way, however if a newer version of an outside library is obtained, it will replace the previous version on every instrument computer.

Below is a table listing the MS parameters for the SCREEN.M method used in routine casework:

Mass Spectrometer Parameters	
Tune File	stune.u
EMV Mode	Gain (25)
Acquisition Mode	Scan
Low Mass	40
High Mass	550
Threshold	750
Sample #	2
Transfer Line Temperature (C)	270
Source Temperature (C)	230
Quad Temperature (C)	150
Standard Tune Parameters	
Tune File	stune.u
Tune Mass 1	69
Tune Mass 2	219
Tune Mass 3	502
Mass 50 Target (0.3 - 5%)	1
Mass 131 Target (20 - 120%)	55
Mass 219 Target (20 - 120%)	45

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Mass 414 Target (0.3 - 10%)	3.5
Mass 502 Target (0.3 - 10%)	2.5
69 Abund. Target, counts (1E5 - 2E6)	500000
Peak Width Target, amu (0.4 - 0.8)	0.55
Maximum Repeller (10 - 42.84)	30
Emission Current (10 - 300)	34.6
Maximum Ion Focus (40 - 127.5)	90
Ion for Ion Focus Maximum (1, 2, 3)	3
Ion for Repeller Maximum (1, 2, 3)	2

FOURIER TRANSFORM INFRARED SPECTROPHOTOMETRY (FTIR)

A FTIR Spectrometer with an ATR (attenuated total reflectance) accessory for analysis of drug substances is used.

Electronic copies of manufacturer produced instrument manuals are located on the laboratory's network drive under the Chemistry folder in the discipline shares.

FTIR Maintenance

- Record all maintenance in the instrument logbook kept by the FTIR in the instrument room.
- Routine maintenance performed as needed:
 - Desiccant replacement
 - Cleaning of mirrors (service personal only)

Records

The following documents must be maintained in the laboratory for the Infrared Spectrometer. Some data may be duplicated between hard copy in the log book and electronic storage in the LIMS:

- Description of the instrument system
- Documentation of polystyrene performance data
- Documentation of validation checks
- Documentation of all maintenance and repairs

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Quality Assurance

In the first week of the month the monthly quality assurance will be performed and documented. Any day the FTIR is used in casework a polystyrene standard check is performed and documented in the same way as the monthly check.

- Instrument validations are run after any major service or hardware replacement. The manufacturer's software program will be used to determine performance of wavenumber accuracy, resolution, and signal-to-noise. The field on these reports for annotating the scientist performing the test, date, and verification by another scientist need not be filled out since this information is satisfied by the name and date appearing on the document.
- Initiate the system suitability and performance verification reports. Run a polystyrene standard. Hard copies are compiled in the FTIR log book and then annually placed in the LIMS case file CHEM INST under the appropriate instrument and the hardcopies will be destroyed.

System Suitability, Performance Verification, and Polystyrene Analysis

If the **iS10** displays a **RED** System Status shield, either the operating parameters are out of specification or the monthly check needs to be performed. The following steps are necessary to obtain a **GREEN** System Status shield. If the System Status shield is **GREEN**, skip to **Polystyrene Analysis**.

Install the *Smart Omni Transmission* accessory. Select **OK** and wait for internal check to occur. When the screen states "All Tests Passed", select **OK**.

1. Click the System Status shield, then **System Suitability**.
2. Select **Run** to initiate the system suitability test.
 - After the system suitability test is completed, a report is produced automatically.
 - If the test "fails", the System Status shield will display **RED**. Contact Nicolet Technical Support if this occurs.
 - If the test "passes", the System Status shield will display **GREEN**. Select **Report**, then **Print**. Check the report to ensure all test values are within specifications. Place a hard copy of the report, with initials and date, in the FTIR Instrument Log.
3. Next, select **Performance Verification** and then **Run**.
 - After the performance verification test is completed, a report is produced automatically.
 - If the test "fails", the System Status shield will display **RED**. Contact Nicolet Technical Support if this occurs.

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- If the test “passes”, the System Status shield will display **GREEN**. Select **Report**, then **Print**. Check the report to ensure all test values are within specifications. Place a hard copy of the report, with initials and date, in the FTIR Instrument Log.
- 4. Collect a new reference background for the Transmission accessory. Select **View**, then **Configure System Status**, then **System Suitability**, **Configure**, and **Collect**. Once the background has been collected, click **OK**.
- 5. Remove the *Smart Omni Transmission* accessory.

Install the *Smart Golden Gate ATR* accessory. Select **OK** and wait for internal check to occur. When the screen states “All Tests Passed” select **OK**. (The System Status shield will be **RED** again.)

1. Click the System Status shield, then **System Suitability**.
2. Make sure that the ATR anvil is up and select **Run** to initiate the system suitability test.
3. After a few minutes, a prompt for the “reference sample” will appear. Insert, face up, the Polystyrene Standard with the metal frame labeled “**ATR STD**”. Put down the anvil and continue.
 - After the system suitability test is completed, a report is produced automatically.
 - If the test “fails”, the System Status shield will display **RED**. Examine the report to see which test parameters did not meet the criteria. If possible, correct the problem, and then rerun the ATR System Suitability. If the test continues to fail, contact Nicolet Technical Support.
 - If the system “passes”, the System Status shield will display **GREEN**. Select **Report**, then **Print**. Check the report to ensure all test values are within specifications. Place a hard copy of the report, with initials and date, in the FTIR Instrument Log.
4. Collect a new reference background for the ATR accessory. First, remove the Polystyrene Standard from the ATR. Then close the **System Status Overview**. Select **View**, then **Configure System Status**, then **System Suitability**, **Configure**, and **Collect**. Once the background has been collected, click **OK**.
5. Continue to **Polystyrene Analysis**.

Polystyrene Analysis

1. Collect Background (with the anvil up) picking the **COL BKG** icon on the **Main Menu** bar, Select **OK**
2. Collect Sample by picking the **COL SMP** icon on the **Main Menu** bar. Collect the sample (in Absorbance) using the Polystyrene Standard with the metal frame labeled “**ATR STD**” facing up. The title of the polystyrene standard will include Polystyrene Standard, initials of the analyst running the sample, and the date run.
3. Once the spectra is collected, Select **Find PKS** on the **Main Menu** bar to change screens
4. Find the peak at 1601 cm^{-1} . Click on this peak to label the peak (note: all peaks larger than this one will also be labeled) The wavenumber must be $1601\text{ cm}^{-1} \pm 2\text{ cm}^{-1}$ to pass
5. Select **Replace** in the upper right corner to update the display window
6. Select **Search** on the **Main Menu** bar
7. Select **Modify Display** and change the **List of Matches** to “1”, Select **OK**

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8. Select **Add NB** on the **Main Menu** bar. When prompted for "Item #" enter initials and date, when prompted for "Lab #" enter "Polystyrene Standard". There is a third prompt, this can be left empty or the sample information with initials and date re-entered.
9. Select **Change Notebook**. Choose the notebook for the corresponding calendar year
10. Select **Add to Notebook**. The prompt "Add Report to Notebook" will appear. Enter the following information: Polystyrene Standard, Initials. Select **OK**
11. Print a hard copy of the report and place it in the FTIR Instrument Log with handwritten initials and date.

Instrument Parameters

All samples will be analyzed using the ATR.exp. Copies of the ATR.exp are stored in the instrument binder. With the exception of temporarily changing the number of scans, no changes will be made to currently used method without approval from the discipline supervisor. When a change is approved, a copy of the previous method parameters will be imported into the LIMS and marked with its start and end dates.

FTIR Libraries

In-house and/or outside libraries from reputable sources may be used during spectra searches.

Hydrogen Generator Maintenance

The hydrogen generator manufacturer also recommends preventative maintenance. Below is a copy of the suggested preventative maintenance schedule from the manufacturer's hydrogen generator service guide.

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Description of Service Requirement	Recommended Service Interval			
	Daily	Weekly	6 Monthly	24 Monthly
Operation				
Check POWER ON indicator is illuminated	C	-	-	-
Check STATUS/FAULT indicators located on control panel	C	-	-	-
Check Water Level	C	-	-	-
Check Water Quality (Conductivity)	C	-	-	-
Check Desiccant Cartridge	-	C	-	-
6 Month Service Kit	-	-	R	-
24 Month Service Kit	-	-	-	R

Key:- C = Check R = Replace

A breakdown of the 6 and 24 month services from the manufacturer's service guide is below.

Item	Refer to Section	6 Month	24 Month
Change Water Filter	2.3.4	X	X
Change Environmental Filter	2.3.5	X	X
Change De-ioniser Cartridge	2.3.6	X	X
Change Water Pump	2.3.8		X
Change Float	2.3.9		X
Check rear fans		X	X
Check power supply fan		X	X
Check float operation		X	X
Check Cell Voltage			X
Check Desiccant Cartridge <i>(Change as required)</i>	2.3.2	X	X

Procedures for performing these services can be found in the manufacturer's service manual. All 6 and 24 month services performed on the hydrogen generators will be recorded in their respective maintenance logs.

Carrier Gas Information

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All of the gas chromatographs use UHP Grade (99.999%) helium as their carrier gas. Compressed gas cylinders are on site at all times. Two cylinders are connected to the gas manifold in Gas closet # 2124 that delivers gas to the instruments and extra cylinders are located in the compressed Gas Cylinder Room # 1175 located on the first floor of the laboratory.

The gas manifold system will sound an alarm when a cylinder in use drops to about 500 psi. Only the cylinder in use should have the valves open on the cylinder and that side of the manifold. Manually turn off the cylinder being taken out of service and close that side of the manifold. Update the magnetic indicator signs on the cylinders as appropriate (in use, empty, full). Ensure a full cylinder is available in the Gas closet for the next use.

Instrumentation – Data and Analysis

GC-FID Sequence Table

Acquired data will initially be saved to the following folder:

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C:\Chem32\1\DATA\RUNDATA

After the analyst has completed their review of the acquired data it will be moved from the RUNDATA folder to the following folder:

C:\Chem32\1\DATA\YYYYMMM

GC/MS Sequence Table

Acquired data will initially be saved to the following folder on each instrument:

D:\Instrument Name\DATA\RUNDATA

After the analyst has completed their review of the acquired data it will be moved from the RUNDATA folder to the following folder:

D:\Instrument Name\DATA\YYYYMM

At the beginning of each month, a new folder will be created for that month's data to be saved. Data folders that are over 1 year old will be deleted from the instrument computers.

Data file names will be the case number (including the year) followed by a differentiating character or characters if multiple samples from the same case are being analyzed. Data files for negative controls will be written in the same format with the prefix "B". When drug standards are analyzed, the file name will indicate what drug is tested.

The sample field will include the lab and item number of what is being tested and will indicate "blank" if the sample is a negative control. When analyzing a drug standard, the sample field will contain the drug name and its standard number.

GC-FID

Analysis

Each analyst is responsible for ensuring that the instrument has passed all quality assurance requirements before analyzing case samples. All samples will be analyzed using the SCREENFID.M or SCREENFID20.M method. A negative control prepared in the same manner (including any concentration) and on the same day as the case sample will be analyzed directly prior to the case sample. A blank without the internal standard is analyzed directly prior to all known standards. In situations where multiple case samples are prepared in the same manner and analyzed on the same day, the same prepared negative control can be used in each

analysis. For retention time comparison, a standard must be analyzed using the same method conditions (except for split ratios) as the sample within 24 hours of when the sample was analyzed.

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The instrument software is programmed to analyze a series of samples through a sequence table.

Results from each sample acquisition are electronically printed to the "JT" folder located on the desktop of the instrument computer. These images are transferred to their appropriate case files in the LIMS.

Acceptability Criteria

An acceptable blank is one that results in no integrated peaks other than the internal standard. The discipline supervisor will be consulted if additional peaks are present.

When performing a retention time comparison, the GC-FID will be used unless approved otherwise by the supervisor. The integrated retention times of the case sample analyte and the known standard must be within 0.050 minutes for the test to be considered positive.

If GC-FID data is rejected, the reason for the rejection will be recorded in the notes and the spectra saved, in addition to the non-rejected data.

GC/MS

Analysis

Each analyst is responsible for ensuring that the instrument has passed all quality assurance requirements before analyzing case samples. All samples will be analyzed using the SCREEN.M or SCREEN20.M method. A negative control prepared in the same manner (including any concentration) and on the same day as the case sample will be analyzed directly prior to the case sample. A blank without internal standard is also analyzed directly prior to all known standards. In situations where multiple case samples are prepared in the same manner and analyzed on the same day, the same prepared negative control can be used in each analysis.

The instrument software is programmed to analyze a series of samples through a sequence table.

Results from each sample acquisition are electronically printed to the "JT" folder located on the desktop of the instrument computer. These images are transferred to their appropriate case files in the LIMS.

Acceptability Criteria

An acceptable blank is one that results in no integrated peaks other than the internal standard. The discipline supervisor will be consulted if additional peaks are present.

The mass spectrum of each sample is visually compared with that of a known standard or reputable library. The significance of peaks (both absent and present) is noted and no prominent ions should be missing from the evidence spectrum. For a match to be considered acceptable the main ions should agree between unknown and standard and the presence or absence of a 'molecular ion' must agree between unknown and standard. Due caution will be made when a

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library search result gives matches of different compounds with very similar mass spectra (see Analysis Scheme section).

If GC/MS data is rejected, the reason for the rejection will be recorded in the notes and the spectra saved, in addition to the non-rejected data.

FTIR

Procedures for FTIR analysis:

- Collect a background spectrum (blank) of air
- Acquire a blank spectrum of the ATR crystal
- Place small amount of sample on ATR crystal
- Acquire sample absorbance spectrum and search libraries to assist with identification

If significant amounts of interfering substances are present, extract the sample using any extraction which successfully isolates the substance of interest. Use caution to prevent conversion between base and salt forms when this is an issue.

The case file will include the blank and sample spectra along with any library or standard spectra used for identification. If FTIR sample data is rejected, the reason for the rejection will be recorded in the notes and the spectra saved, in addition to the non-rejected data.

Acceptability Criteria

- For identifying a reportable drug, the sample spectrum must be visually compared with the spectrum of a standard, either run on the same instrument using the same sampling mode (ATR), or the sample spectrum must be visually compared to a library-generated spectrum.
- Unknown materials may contain extra absorbance bands due to sample impurities. The significance of absorbance band peaks (both absence and presence) and relative intensities of absorbance bands should be assessed. However, no prominent bands should be missing from the unknown spectrum.

Polystyrene Analysis

1. Collect Background (with the anvil up) picking the **COL BKG** icon on the **Main Menu** bar, Select **OK**
2. Collect Sample by picking the **COL SMP** icon on the **Main Menu** bar. Collect the sample (in Absorbance) using the Polystyrene Standard with the metal frame labeled "**ATR STD**" facing up. The title of the polystyrene standard will include Polystyrene Standard, initials of the analyst running the sample, and the date run.
3. Once the spectra is collected, Select **Find PKS** on the **Main Menu** bar to change screens
4. Find the peak at 1601 cm^{-1} . Click on this peak to label the peak (note: all peaks larger than this one will also be labeled) The wavenumber must be $1601\text{ cm}^{-1} \pm 2\text{ cm}^{-1}$ to pass

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5. Select **Replace** in the upper right corner to update the display window
6. Select **Search** on the **Main Menu** bar
7. Select **Modify Display** and change the **List of Matches** to "1", Select **OK**
8. Select **Add NB** on the **Main Menu** bar. When prompted for "Item #" enter initials and date, when prompted for "Lab #" enter "Polystyrene Standard". There is a third prompt, this can be left empty or the sample information with initials and date re-entered.
9. Select **Change Notebook**. Choose the notebook for the corresponding calendar year
10. Select **Add to Notebook**. The prompt "Add Report to Notebook" will appear. Enter the following information: Polystyrene Standard, Initials. Select **OK**
11. Print a hard copy of the report and place it in the FTIR Instrument Log with handwritten initials and date.

Blank Analysis

1. Collect Sample by picking the **COL SMP** icon on the **Main Menu** bar. Collect the sample (in Absorbance) by tightening the anvil down onto the empty and clean diamond. The title of the sample should be Blank for Laboratory Case #, Item #, Initials, Date
2. Once the spectra is collected, Select **Search** on the **Main Menu** bar.
3. If the blank is satisfactory, Select **Modify Display** and change the **List of Matches** to at least "3", Select **OK**
4. Select **Add NB** on the **Main Menu** bar. When prompted for "Item #" enter the item number blank, when prompted for "Lab #" enter the laboratory case number, when prompted a third time enter at a minimum initials and date.
5. Select **Change Notebook**. Choose the notebook for the corresponding calendar year
6. Select **Add to Notebook**. The prompt "Add Report to Notebook" will appear. Enter the following information: Blank for Laboratory Case #, Item #, Initials. Select **OK**
7. Print a copy of the report and place it in the LIMS case file.

Sample Analysis

1. Collect Sample by picking the **COL SMP** icon on the **Main Menu** bar. Collect the sample (in Absorbance) by tightening the anvil down onto the sample placed on the diamond. The title of the sample should be Laboratory Case #, Item #, Initials, Date
2. Once the spectra is collected, Select **Search** on the **Main Menu** bar.
3. Depending on the quality of the spectra, Select **Modify Display** and change the **List of Matches** to at least 3 to list on the report, Select **OK**
4. Select **Add NB** on the **Main Menu** bar. When prompted for "Item #" enter the item number, when prompted for "Lab #" enter the laboratory case number, when prompted a third time enter at a minimum initials and date.
5. Select **Change Notebook**. Choose the notebook for the corresponding calendar year
6. Select **Add to Notebook**. The prompt "Add Report to Notebook" will appear. Enter the following information: Laboratory Case #, Item #, Initials. Select **OK**
7. Print a copy of the report and place it in the LIMS case file.

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Standard Verification

1. Collect Sample by picking the **COL SMP** icon on the **Main Menu** bar. Collect the sample (in Absorbance) by tightening the anvil down onto the empty and clean diamond. The title of the sample should be Blank for Standard Name, Unique Laboratory Identifier, Initials, Date
2. Once the spectra is collected, Select **Search** on the **Main Menu** bar.
3. If the blank is satisfactory, Select **Modify Display** and change the **List of Matches** to "1", Select **OK**
4. Select **Add NB** on the **Main Menu** bar. When prompted for "Item #" enter Unique Laboratory Identifier blank, when prompted for "Lab #" enter the Blank for Standard Name, when prompted a third time enter at a minimum initials and date.
5. Select **Change Notebook**. Choose the notebook titled "Reference Standard beginning 02-2014"
6. Select **Add to Notebook**. The prompt "Add Report to Notebook" will appear. Enter the following information: Blank for Standard Name, Unique Laboratory Identifier, Initials. Select **OK**
7. Collect Sample by picking the **COL SMP** icon on the **Main Menu** bar. Collect the sample (in Absorbance) by tightening the anvil down onto the standard placed on the diamond. The title of the sample should be Standard Name, Unique Laboratory Identifier, Initials, Date
8. Once the spectra is collected, Select **Search** on the **Main Menu** bar.
9. Select **Modify Display** and change the **List of Matches** to at least "3". Select **OK**
10. Select **Add NB** on the **Main Menu** bar. When prompted for "Item #" enter the Unique Laboratory Identifier, when prompted for "Lab #" enter the Standard Name, when prompted a third time enter at a minimum initials and date.
11. Select **Change Notebook**. Choose the notebook titled "Reference Standard beginning 02-2014"
12. Select **Add to Notebook**. The prompt "Add Report to Notebook" will appear. Enter the following information: Standard Name, Unique Laboratory Identifier, Initials. Select **OK**
13. Print a copy of the report and give it to the Standards Maintenance Officer

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Section 5 Reagents and Chemicals

Purchased chemicals will be labeled when received with date received and initials of receiver. When opened, chemicals will be labeled with the date opened and initials of opener.

Containers of prepared reagents will be labeled with the chemical's identity, preparer's initials, date of preparation, hazard labels and the expiration date.

Prepared Reagents

Preparation: Formulations for preparing routinely used reagents are located in this section. Each reagent made will be documented on the Reagent Preparation Form. Each reagent is named for tracking purposes by name of reagent, date prepared and initials of preparer. For example: QC Mix MMDDYY Initials.

Verification: Verification procedures for routinely prepared reagents are located in this section and documented on the Reagent Preparation Form. Each new batch of reagent that is prepared must be verified prior to use in casework. Verification may be done by the preparer or by another Controlled Substance analyst. The verifier will initial the Reagent Preparation Form for that batch of reagent to certify that the reagent performed as expected.

Reagents are tested at the time of preparation (where applicable) to ensure that they are functioning properly, and the results are recorded in the Reagent Preparation Form. The forms will be stored in the Reagent Log Book.

A Reagent Preparation Form is used to document reagent preparation. It will include:

- Reagent name and amount made
- Date prepared and initials of preparer
- Formulation and lot numbers or laboratory designated unique identifiers where applicable
- Response to verification check
- Storage conditions and expiration date (if any).
- Initials of person verifying reagent (may be same as preparer).

A Reagent Check Form is used to document the monthly verifications. It will include:

- Reagent name
- Date
- Lot Number

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- Analyst/Verifier
- Verification (result)

All of the following reagents with the exception of the Marquis reagent, Weber reagent, Borate Buffer, QC Mix, and Internal Standard Injection Solvents will be verified every month using the Reagent Check Form. The forms will be stored in the Reagent Log Book.

Commercially prepared test kits may be used in place of laboratory prepared reagents. Manufacturer's supplied instructions will be followed. The lot number of the test kit will be recorded in the case notes. A positive and negative control will be used each day a commercially prepared kit is used and the results of these tests will be documented in the case notes. All three test kits used will come from the same lot.

The following are commonly used reagents however other reagents can be used if they have been shown to be acceptable by the scientific forensic community such as those that are listed in the reference book, Clarke, E.G.C. Analysis of Drugs and Poisons or other reputable forensic publications and perform as expected with positive and negative controls.

Quality Control Mixture (QC Mix)

This is the only reagent where the laboratory designated unique identifiers are required to be listed on the Reagent Preparation Form and does not require a hazard label.

Ingredients: MSM 10 mg, Cocaine HCl 11 mg, Tetracaine HCl 11 mg, Buprenorphine HCl 11 mg in 10 mL methanol

Verification Procedure: Only the four components integrated, resolved, and accurately identified as specified in Section 6 GC and GC/MS Quality Assurance requirements.

Storage Conditions: Refrigerated

Expiration: 1 year

Internal Standard Injection Solvent

Ingredients: Prepare a 0.5 mg/mL tetradecane solution in the appropriate GC injection solvent.

Verification Procedure: GC/MS has only one integrated peak with the mass spectrum of tetradecane.

Storage Conditions: Room Temperature

Expiration: none

Borate Buffer

Ingredients : 5.4 g NaOH and 20 g Boric acid in 500 mL distilled water

Verification Procedure: pH checked with pH paper (between 9-10)

Storage Conditions: Room Temperature

Expiration: none

Gold Chloride Crystal Test for Cocaine

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Ingredients: Solution A: 20% Acetic Acid
Solution B: 5% $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$ in distilled water

Verification Procedure: positive (cocaine - long rods with one or many arms at nearly right angles to the main axis), negative (blank slide)

Storage Conditions: Room Temperature

Expiration: none

Silver Nitrate / Cupric Nitrate Crystal Test for GHB

Ingredients: 100 mg of AgNO_3 and 100 mg of $\text{Cu}(\text{NO}_3)_2$ dissolved in 10 mL of water

Verification Procedure: positive (GHB - rectangular crystals), negative (blank slide)

Storage Conditions: Room Temperature

Expiration: none

Marquis Reagent

Ingredients: 20 mL concentrated sulfuric acid, 20 drops formaldehyde (37%)

Verification Procedure: positive (guaifenesin – purple/methamphetamine - orange), negative (blank spot plate)

Storage Conditions: Room Temperature

Expiration: 1 month

para-Dimethylaminobenzaldehyde (p-DAB or Van Urk's)

Ingredients: 1 gram of para-dimethylaminobenzaldehyde in 100 mL ethyl alcohol and 10 mL concentrated HCl.

Verification Procedure: positive (psilocyn/mushroom – violet), negative (blank spot plate)

Storage Conditions: Room Temperature

Expiration: none

Cobalt Thiocyanate / Acidified Cobalt Thiocyanate

Ingredients: Solution A: 2 g cobaltous thiocyanate in 100 ml of distilled water

Solution B: ~10% HCl

Verification Procedure: positive with acid (cocaine salt – blue with addition of Solution A, color remains with addition of Solution B), negative (blank test tube)

Storage Conditions: Solution A and B - Room Temperature

Expiration: none

Sodium Nitroprusside

Ingredients: Solution A: 0.25 g sodium nitroprusside, 1 ml acetaldehyde in 25 ml distilled water

Solution B: 2% sodium carbonate in 50 ml of distilled water

Verification Procedure: positive (methamphetamine - blue), negative (blank spot plate)

Storage Conditions: Solution A and B – Refrigerated

Expiration: none

Weber Reagent

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Ingredients: Solution A: Add approximately 10 mg of Fast Blue B Salt [o-Dianisidine bis (diazotized) zinc double salt] to approximately 2 mL water. The solution will have a faint straw color.

Solution B: Concentrated HCl

Verification Procedure: positive (psilocyn mushrooms – red with Solution A, blue with solution B), negative (blank spot plate)

Storage Conditions: None due to single day use

Expiration: 1 day

Duquenois-Levine

Ingredients: Solution A: Add 2.5 mL of acetaldehyde and 2 g of vanillin to 100 mL of ethanol

Solution B: Concentrated HCl

Solution C: Dichloromethane

Verification Procedure: positive (marijuana – blue-violet / blue-violet), negative (blank spot plate)

Storage Conditions: Solution A – Refrigerated; Solutions B and C - Room Temperature

Expiration: none

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Section 6 Standards

Types of Standards

Primary Standards

Definition: These are compounds whose manner of origin and composition is known and documented. This is typically expressed as: compound name, name of manufacturing organization, lot or batch number and date received. These are compounds purchased from an approved provider. Primary standards may be a pure (neat) compound or a solution of a pure compound. All primary standards are verified by instrumental analysis (GC/MS or FTIR) prior to use in casework.

Maintenance: Primary standards are retained within the security of the chemistry laboratory. Primary standards are stored in a locked cabinet, refrigerator, or freezer (as appropriate) in the Standards/Chemical Prep Room #2116. Receipt of these standards is logged in the Primary Drug Standards Log Book along with the Certificate of Analysis (if available) and the lab generated confirmation data. See Standard Control for the procedure.

Use: Primary standards can be utilized as reference standards in research and development of methods, training, quality control of critical reagents, retention time comparison, and for qualitative analysis of casework. Primary standards can be used in instrumental analysis to generate spectra, which may be used for comparison with case sample generated spectra or to build user defined libraries. Primary standards can be used to prepare working standards.

Secondary Standards

Definition: These are compounds whose manner of origin and composition is not documented but exist in the chemistry section as a result of removal from analyzed cases by present or previously employed analysts, from pharmacies or other source of similar nature. All secondary standards are verified by GC/MS prior to use in casework.

Maintenance: Secondary standards are retained within the security of the chemistry laboratory. Secondary standards are stored in a locked cabinet, refrigerator, or freezer (as appropriate) in the Standards/Chemical Prep Room #2116. These standards are logged in the Secondary Drug Standards Log Book along with the lab generated confirmation data. See Standard Control for the procedure.

Use: Secondary Standards can be utilized for quality control of reagents, research where purity is not crucial, and training. These compounds can be used for direct comparisons with case samples for qualitative analysis once their identity is verified by GC/MS analysis and compared to a literature source, primary standard, or approved library database.

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Working Standards

Definition: These are dilute solutions of primary standards prepared for analytical use.

Maintenance: Working standards are retained within the security of the chemistry laboratory. The stock solution of each working standard is stored in the refrigerator in the Chemistry Instrument Room #2117. Subsequent vials may be filled from the stock solution and can be stored in the chemistry laboratory. See Standard Control for the procedure.

Use: See primary and secondary standard uses.

Training Materials

Definition: These are compounds that are kept in locked storage in the Chemistry Evidence Room #2115 by the Controlled Substances Discipline Supervisor.

Maintenance: An initial inventory of training materials is available and new materials will be added to the inventory as they are introduced to the system but the inventory will not be routinely audited.

Use: Training Materials are used for training, competency/proficiency tests and displays only.

Standard Control

Traceability

Standards will be traced using a laboratory designated unique identifier. This identifier will include a Control Number and a two letter designation. Examples: 1-AE, 45-AA, 102-BR.

Any container that contains any amount of substance removed from a primary or secondary standard will be labeled with the laboratory designated unique identifier at all times.

Compounds considered standards will be assigned a Control Number. The list of Control Numbers is maintained by the Standards Maintenance Officer and kept with the Primary and Secondary Drug Standards Log Books.

When new compounds are obtained by the laboratory, the list of Control Numbers will be updated by the Standards Maintenance Officer.

Compounds will not change Control Numbers once assigned by the laboratory.

Each new vial of a compound will be assigned a two letter designation that will follow, in alphabetical order, that of the previous, most recent, vial on hand.

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Example: A standard vial of heroin designated AA is consumed. A new vial of heroin is received and designated AB.

The first time a compound is received at the laboratory, the first vial will be designated AA.

If more than one vial of a compound is received at one time, each vial will be given a different two letter designation in alphabetical order. Example: A standard vial of heroin designated AA is consumed. Three new vials of heroin are received and designated AB, AC, and AD.

Primary Standards

Receipt of a new primary standard

Initial and date the original standard vial(s) upon receipt. If multiple original vials of the same compound are received, designate each vial with the appropriate two letter designation.

Complete the Drug Standard Control Form.

Place the original standard vial in the appropriate box, alphabetically according to the common compound name, in the locked cabinet, refrigerator, or freezer (as appropriate). Example: diacetylmorphine common name is heroin; the drug standard will be located in the "H" box.

Add the completed Drug Standard Control Form to the Primary Drug Standard Log Book in alphabetical order according to the common compound name. Example: diacetylmorphine common name is heroin so the Drug Standard Control Form will say Heroin (diacetylmorphine HCl) and be located in the "H" section.

Quality Assurance

If available, attach the Certificate of Analysis, or equivalent, to the Drug Standard Control Form.

The standard must be confirmed by GC/MS or FTIR and the hard copy will be labeled with the respective laboratory-designated unique identifier and the initials of the verifying analyst.

Attach the TIC/Mass spectrum or IR spectrum to the respective Drug Standard Control Form. Confirmation is not required immediately upon receipt of the standard; however it must be performed prior to the first use of the standard. Only one vial per lot number need be confirmed. Only one vial per lot number should be open at one time.

Standards received in solution will be disposed of in the proper manner.

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Portion Control

Primary Standards will be kept under the original manufacturer's seal until opened to portion a sample for testing purposes. The standard will be checked in with an initial weight that includes seals.

All primary standards, except DEA Exempt standards, will be weighed on a calibrated analytical balance both before and after they are portioned for testing purposes. The weight will be recorded on the Drug Standard Control Form. This process will be witnessed by a second person within the Forensic Chemistry Discipline. A top loader balance may only be used for standards too large to weigh on the analytical balance.

Gross weights will be recorded. The gross weight will include the container with labels, lid, and contents. The initial weight taken when a vial is being verified will be done after the manufacturer's seals are removed, to provide uniformity for subsequent sampling weights.

Depletion of Standard Vials

When an original standard vial has been depleted, the corresponding Drug Standard Control Form will be retrieved, initialed, and dated to record when the vial was depleted. The vial itself can be discarded after the form reflects that the standard has been depleted.

The Drug Standard Control Form, with all attachments, will be removed and placed in the Archived Drug Standard Log Book.

If there are multiple original vials of the same standard, the Drug Standard Control Form will not be archived until all vials listed on the form are depleted.

Secondary Standards

Portion Control

All secondary standards will be weighed on a calibrated analytical balance both before and after they are portioned for testing purposes. The weight will be recorded on the Drug Standard Control Form. This process will be witnessed by a second person within the Forensic Chemistry Discipline. A top loader balance may only be used for standards too large to weigh on the analytical balance.

Gross weights will be recorded. The gross weight will include the container with labels, cap, and contents. The initial weight will be taken when a vial is acquired/created.

Depletion of Standard Vials

When an original standard vial has been depleted, the corresponding Drug Standard Control Form will be retrieved, initialed, and dated to record when the vial was

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depleted. The vial itself can be discarded after the form reflects that the standard has been depleted.

The Drug Standard Control Form, with all attachments, will be removed and placed in the Archived Drug Standard Log Book.

Working Standards

Creation of a new working standard.

Working standards are prepared as needed.

Prepare an appropriate size vial with the following information: compound name, control number, two letter designation of the original standard vial, and the date prepared (MMDDYY) and initials of preparer.

Prepare an approximate concentration of 1 mg/mL in an appropriate solvent of the drug standard. Since these standards are not used for quantitative analysis, approximate concentration is sufficient.

Quality Assurance

Working standards must be able to be traced back to the original standard vial they were prepared from at all times and are used until there are signs of breakdown or extra integrated peaks.

Portion Control

Approved personnel may portion from a working standard as needed. No weight or witness is necessary.

Depletion of Working Standard

When a working standard has been depleted, the vial will be discarded.

Log Books and Contents

The Drug Standard Log Books are to be stored in Standards/Chemical Prep Room #2116. Each respective log book will contain the following:

A Drug Standard Control Form for each Primary and Secondary Standard in the inventory.

The quality assurance data for each Primary and Secondary Standard in the inventory attached to its respective Drug Standard Control Form and a Certificate of Analysis, if available.

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The Archived Drug Standard Log Book is to be stored in Standards/Chemical Prep Room #2116. It will contain the following:

A Drug Standard Control Form, with its attachments, for each standard (primary or secondary) that has been depleted, expired, or removed from the inventory but is not yet scanned into the electronic archive.

Electronic Archive

A folder containing data for archived standards can be located in [I:/Discipline Shares/Controlled Substances/ Drug Standards](#) under Archive.

Items in the Archived Drug Standard Log Book will be transferred on a routine basis to the electronic archive.

A cover page will accompany each transfer listing the compounds that can be found in the entry.

Data collected prior to the effective date of CSAM 2013 R0 being implemented can be found in this folder as well.

Security

The Alaska Scientific Crime Detection Laboratory will maintain a current DEA license for the purchase of controlled substances. A copy of the current DEA license will be kept by the Controlled Substances Discipline Supervisor. The Controlled Substances Discipline Supervisor will also maintain the laboratory records for purchases of federal Schedule I and II substances (in compliance with DEA Form-222). The laboratory is responsible for assuring that drug standards maintained on the premises are secure.

Access to primary and secondary standards is restricted to the Forensic Chemistry Discipline members, the Quality Assurance Manager, and the Forensic Laboratory Manager. An official memo is submitted, at least annually but updated as appropriate, to the Quality Assurance Manager and the Forensic Laboratory Manager listing by name the individuals with access to the inventory. This document can be located in [I:/Discipline Shares/Controlled Substances/Drug Inventories](#) by year.

If storage of any or all of the primary and/or secondary standards, either temporarily or permanently, is to deviate from the previous mentioned locations, it must be approved by the Controlled Substances Discipline Supervisor.

There are two sets of keys to the locked standards locations and are available for use by the approved personnel. One set of keys is held by the Controlled Substances Discipline Supervisor and the second set of keys is held by the Forensic Laboratory Manager.

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Locked standard locations will be accessed by approved personnel only in the presence of a witness.

An audit of all primary and secondary standards will be made annually, no later than September 1, updates performed, and an official memo written to the Quality Assurance Manager and the Forensic Laboratory Manager indicating that this audit was completed. The audit will account for all primary and secondary standards within the laboratory and will include a yearly gross weight for each controlled substance. This document can be located in [I:/Discipline Shares/Controlled Substances/Drug Standards](#) by year.

Section 7 Analysis Techniques

COLOR TESTS

Color tests (also known as spot tests) are non-specific and presumptive in nature. The following color tests are commonly used:

MARQUIS TEST

Place 1-3 drops of Marquis Reagent in a clean white spot plate or test tube along with the sample; observe and record response.

Common Responses:

Violet/Purple	Heroin
Gray to Violet-black	MDA & MDMA
Orange to Brown	Amphetamine/Methamphetamine & Phentermine
Slow Pink to Rose	Aspirin
Yellow	3,4-methylenedioxymethcathinone & Diphenhydramine
Purple	2,3-methylenedioxymethcathinone

COBALT THIOCYANATE TEST

Place 1-3 drops of Cobalt Thiocyanate Reagent Solution A in a clean white spot plate or test tube along with the sample; observe the formation of blue color and/or precipitate. Cocaine salts have a blue precipitate (positive) while cocaine base has little to no color change at this point

Add approximately 1-2 drops of Solution B and cocaine base will have a blue color change. Solution stays pink throughout test.

WEBER TEST

Add a mushroom sample (or alcohol extract) to a clean spot plate. Analyze a psilocyn standard or a known psilocyn-containing mushroom fragment in a separate well. Add Weber

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Solution A and look for a red color. Then add one drop of Weber Solution B. A blue color indicates psilocyn. The solution has no change in color with psilocybin or bufotenine.

DUQUENOIS-LEVINE TEST

Add 1 volume of Duquenois-Levine Solution A to the sample and shake. Then add 1 volume of Duquenois-Levine Solution B. Agitate and observe color produced. A blue-violet color will develop with cannabinoids.

If no blue-violet color is observed, there is no need to continue with the final step.

Add Duquenois-Levine Solution C and note whether the color is extracted into the bottom layer. If positive for THC, a blue-violet color will be extracted into the lower layer.

SODIUM NITROPRUSSIDE TEST

Place 1-3 drops of Sodium Nitroprusside solutions A and B in a clean white spot plate or test tube along with the sample; observe and record response.

A blue color is positive for secondary amines. This is used primarily for methamphetamine and MDMA.

para-DIMETHYLAMINO BENZALDEHYDE (p-DAB) TEST

Place 1-3 drops of (p-DAB) Reagent in a clean white spot plate or test tube along with the sample; observe and record response.

A violet color is positive for ergot alkaloids to include LSD and psilocyn, psilocybin.

CRYSTAL TESTS

Crystal tests are presumptive in nature. The following crystal tests are commonly used:

GOLD CHLORIDE (Cocaine)

Procedure: Place sample on a glass slide and add 1-2 drops Gold Chloride Solution A. Add one small drop of Gold Chloride Solution B and observe on the polarizing microscope. A result of positive for cocaine in the notes indicates the appearance of long rods with one or many arms at nearly right angles to the main axis.

SILVER NITRATE/CUPRIC NITRATE (GHB)

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Procedure: Place sample on glass slide and add 1 or 2 drops of reagent. View crystals with a polarizing light microscope. Rectangular crystals grow at the edges in under 5 minutes are positive for GHB.

PHYSICAL IDENTIFICATION OF PHARMACEUTICALS

Pharmaceutical preparations can be presumptively identified with a literature reference based on dosage unit, form, shape, color, and/or manufacturer's markings/imprints. Literature reference of pharmaceuticals is appropriate when:

1. Physical identification is done as a secondary test to chemical analysis when an absolute identification is required, or
2. Triaging of multiple items in a case has identified the pharmaceuticals as not apparently vital to the total prosecution.

The following are accepted as references for use in establishing physical identification of pharmaceuticals:

- Physician's Desk Reference (PDR)TM, Medical Economics
- Drug Identification BibleTM, Amara-Chem, Inc.
- Manufacturer sealed and marked products (blister packs, sublingual foil, etc.)
- Government and manufacturer's websites (Printed documentation of the pharmaceutical reference must be included in the case notes when using a website as a reference. For example a screenshot of the webpage with the date accessed in the notes.)
- Pharmer.org, Drugs.com, RxList.com, or other information websites

VISUAL ANALYSIS OF PLANT MATERIAL

1. Plant material
 - a. Observe sample under stereomicroscope.
The minimum criteria for a positive microscopic examination of marijuana is cystolithic hairs and clothing hairs on opposite sides of the same leaf.
2. Resin extract of Marijuana
 - a. Observe sample under stereomicroscope and/or compound microscope.
Microscopic examination may reveal cystolithic hairs or clothing hairs.

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Germination of seeds to demonstrate viability is not performed.

EXTRACTION PROTOCOLS

Many drug samples are mixtures or contain excipient material requiring the compound of interest to be separated from a matrix before subjecting the sample to further instrumental analysis. Information as to solubility and specific physical properties can usually be found in *Clarke's Isolation and Identification of Drugs and Poisons*. The choice of an organic solvent is dependent upon the drug to be extracted and the preference of the analyst.

For all extractions the final injection solvent must contain the internal standard.

Residue Collection

- Paraphernalia with visible residue may be:
 - Swabbed with a cotton-tipped applicator and treated with an extraction listed below
 - Scraped and extracted appropriately
- If the swab method is chosen, a negative control must be prepared using a clean swab at the same time.

General Extractions

- Dry Extraction
 - Place a portion of the sample in a disposable test tube
 - Add a solvent that dissolves the drug of interest
 - If necessary, decant or filter to separate the solvent and discard any insoluble material
- Liquid/liquid extraction
 - Basic extraction
 - Place a portion of the sample in a disposable test tube
 - Dissolve the sample in borate buffer (or other suitable basic solution)
 - Add appropriate solvent
 - Vortex or shake

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- Acid extraction
 - Place a portion of the sample in a disposable test tube
 - Dissolve the sample in suitable acid
 - Add appropriate solvent
 - Vortex or shake
- Acid/base extractions (Back Extractions)
 - Place a portion of the sample in a disposable test tube
 - Dissolve sample as described in the acid extraction above
 - Add an appropriate organic solvent without internal standard
 - Vortex or shake to separate layers and discard organic layer
 - Adjust pH of acidic aqueous layer to make basic
 - Add appropriate solvent
 - Vortex or shake

Other extractions available

- Food Products with suspected THC
 - Place a portion of sample in a disposable test tube
 - Add hexanes
 - Vortex or centrifuge
 - Transfer hexanes to a new disposable test tube
 - Extract with 0.5N NaOH (methanolic solution)
 - Resulting Layers:
 - Top hexanes Layer – Discard
 - Basic methanolic Layer – THC if present
 - Wash basic methanolic layer with three aliquots of hexanes
 - Acidify using 1N HCl to pH 1-2
 - Extract with hexanes
 - Vortex or shake
 - Resulting Layers:
 - Top hexanes Layer – THC if present
 - Acidic methanolic layer – Discard
 - Final Layer: dry hexanes layer and then reconstitute in an appropriate solvent
- Gammabutyrolactone (GBL) or 1,4-Butanediol (BD) Extraction
 - Combine approximately equal volumes of the sample liquid and dichloromethane with internal standard in a test tube (2-3 mL of each when sample size permits). If the sample is powder, take up in water and then extract with dichloromethane
 - Vortex or shake.
 - Let settle
 - Resulting Layers:
 - GBL/BD will be in the dichloromethane layer.

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- If gammahydroxybutyric acid (GHB) is present, it will be in the aqueous layer.
- Gammahydroxybutyric Acid (GHB) Extraction: Perform a microcrystalline test and then if positive proceed with the following protocol:
 - Remove a portion of sample (or take the aqueous layer from "GBL or BD Extraction" and evaporate to dryness. Keep dried sample at ~105° C
 - GHB derivatization procedure using a derivatizing agent
 - Place the derivatizing agent in three auto-sampler vials or auto-sampler vials with glass inserts.
 - Add a couple of mg on unknown sample to the first vial. To the second vial add a couple of mg of the standard GHB. Leave a third vial blank with only derivatizing agent.
 - Derivatize capped vials at 90° C for 10 minutes (hotplate or warm water bath).
- Alkaloid Extraction
 - Grind sample to a fine powder
 - Soak 1 to 2 grams in ethanol or methanol for 30 minutes, vortex
 - Add 10 drops of 20% acetic acid
 - Soak an additional 30 minutes and vortex
 - Centrifuge sediment to bottom and transfer acidic ethanol to a test tube
 - Evaporate to dryness
 - Reconstitute with dichloromethane, vortex, and analyze by GC/MS
- Clorazepate Extractions
 - Extraction Method 1
 - Place powder from a capsule or crushed tablet in a container
 - Add approximately 3 mL of 15N ammonium hydroxide
 - Stir the mixture
 - Centrifuge or allow to settle
 - Remove the aqueous layer and evaporate the resulting residue is the clorazepate salt, suitable for FTIR analysis
 - Extraction Method 2
 - Place powder from a capsule or crushed tablet in a container
 - Add approximately 12-15 mL of dichloromethane and methanol mixed in a 3:1 ratio
 - Mix vigorously
 - Centrifuge and allow to settle
 - Remove the liquid and filter it through a filter presoaked with the dichloromethane:methanol mixture

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- Add 1.5 to 2 mL of water to the filtrate and mix thoroughly
- Centrifuge or allow to settle
- Remove the aqueous top layer and wash it twice with dichloromethane, centrifuging after each wash. (If the dichloromethane layer contains a white opaque foam-like substance after the second wash, repeat the wash until the dichloromethane layer is clear.)
- Evaporate the aqueous layer. The resulting residue is the clorazepate salt, suitable for FTIR analysis.

Section 8 Reporting

All controlled substances identified will be reported by the language listed in the Alaska Statutes. The analyst will identify all controlled substances within a sample. With discipline supervisor approval this can be waived if sufficient quantity of the evidence item does not exist or there are decomposition concerns, etc. This approval must be documented in the case activities.

In order to clearly state on reports what analysis was performed, items tested will be sub-itemized on the report from items of the same population that were not tested.

Approved report language is listed below. Any alternative wording on reports is not permitted without prior approval from the discipline supervisor. This approval must be documented in the case activities.

When a controlled substance is not detected the report will state: **“No controlled substances per Alaska Statutes detected.”**

Analyst may report a non-controlled substance identified. This will be listed after **“No controlled substances per Alaska Statutes detected.”** And state: “_____, a non-controlled substance was identified.”

When a small sample is present and there is not enough sample for complete testing while maintaining a portion untested the report will state: **“Quantity insufficient for analysis unless a letter of consumption is provided by the District Attorney’s Office.”**

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When a small sample is present and there is not enough sample for two tests the report will state: **"Quantity insufficient for analysis."**

When testing has begun on a sample but not enough sample exists for complete identification the report will state: **"Insufficient sample for identification."**

When only a physical identification of a pharmaceutical product by literature reference is performed the report will state: **"Not Analyzed. Markings indicate _____, a controlled (non-controlled) substance per Alaska Statutes."**

When a pharmaceutical product contains only non-controlled substances, the report will state the non-controlled substances as **"Not Analyzed. Markings indicate _____ and _____, non-controlled substances per Alaska Statutes."**

When the non-controlled substance in a controlled pharmaceutical product does affect the scheduling of a controlled substance, the report will state the non-controlled substance: **"Not Analyzed. Markings indicate _____ and _____, a controlled mixture per Alaska Statutes."**

When a non-controlled substance in a controlled pharmaceutical product does not affect the scheduling of the controlled substance, the report will only list the controlled substance.

With supervisor approval, the statement **"Sample consistency precludes identification."** can be used.

Section 9 Administrative

Evidence

All evidence transfers are documented in the LIMS. The analyst will ensure all evidence has transferred properly in the LIMS.

Personal evidence lockers are provided for each analyst in the controlled substance laboratory and additional larger storage areas area available in the controlled substance evidence room # 2115. Each analyst will ensure all evidence is properly stored prior to leaving the laboratory.

The reagent prep room #2116 has access limited to the Forensic Chemistry personnel.

Notes

The worksheet will include at a minimum:

The start and end dates of analysis. This is recorded by editing the request and entering the two dates in the ASSIGNOR BLOCK.

A detailed description of the item's packaging and physical description of the items received. This must be in enough detail to properly convey the information to the technical and administrative reviewer.

The weight of each item analyzed. See Section 2 Quantity Determination for details.

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The sampling plan applied when appropriate.

The sample preparations or extractions used.

Descriptions of each analysis performed with results.

The conclusions reached for each item analyzed.

In the analyst's opinion, any significant discrepancies between the request for laboratory services form and the evidence received will be noted. Discrepancies on the number of items received must also include a witness by another laboratory member. The analyst will describe the discrepancy and record the witness in the case notes. The person witnessing the discrepancy will email the discipline supervisor and then log into the LIMS and place this email in the case activities. The technical reviewer is responsible for ensuring the case activity email is present. The discipline supervisor will address the discrepancy as necessary.

When items are not selected by the analyst for analysis, based on information the analyst observes on the evidence packaging or within the evidence, the reason must be documented in the case notes.

Draft Complete

Cases are marked draft complete and ready for technical and administrative review at the end date of analysis. If a case requires additional analytical work, then the analyst will add a new end date of analysis once the case is again marked draft complete and ready for technical and administrative review. The original end date is placed in the notes by the analyst. If a case requires only administrative changes to the notes or the report, then a new end date is not required.

Evidence Marking and Seals

All items analyzed will be marked by the analyst with the case number, the item number and the analyst's initials. If the item is too small for marking, it can be repackaged in a marked laboratory bag. All items of weighable quantities analyzed with a pending latent print request will be repackaged and labeled appropriately.

All packaging layers received in a sealed condition will be resealed by the analyst. The outer packaging must be sealed with evidence tape, initialed and dated by the analyst crossing the barrier of the seal and the package. Heat sealing is not utilized in the controlled substances discipline as the only form of a seal.

If evidence is reopened at a later date (other than for an Advanced Technical Review) this information will be documented in the notes and a second seal applied.

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Reports

A report will be issued for each case analyzed. Each report will clearly communicate the items received and analyzed. At a minimum the report will include:

- a brief description of the item(s) analyzed
- weight of controlled substances identified
- count of controlled substances
- sampling plan if used
- result, conclusion or opinion of the item(s) analyzed.

Amended reports

An amended report will be issued when an error is discovered after the report has been distributed. The case analyst will notify the supervisor and issue an amended report following Quality Assurance Manual 5.10.9 will be issued.

Reviews

The evidence must be returned to the evidence vault or another laboratory member prior to administrative review. Each case will be technically and administratively reviewed prior to distribution. The minimum requirements listed in the Quality Assurance Manual will be completed.

In addition the technical reviewer will ensure:

- the imaging file names match the spectra
- standards are properly documented.

The discipline supervisor will be consulted on any issues between the case analyst and the technical reviewer and will make the final decision.

Preliminary results may be provided by the case analyst when necessary. This communication will be documented in the case activities and will include a disclaimer that this is preliminary information. The Quality Assurance Manual outlines further details on the release of preliminary results under 5.10.3.3.

Discovery

Discovery for the controlled substances discipline is managed by the discipline supervisor other than routine bench note requests. Discovery requests are stored in I:/Discipline Shares/Controlled Substances/ Discovery Provided by lab case number and noted in the case activities area of the LIMS case.

Validation requirements

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When new instrumentation is acquired, the manufacturer's representative will install and perform the initial set up of the instrument. The documentation will be stored with the discipline records in the LIMS.

Prior to use in case work a validation of the performance of the instrument will be performed. This documentation will be stored with the discipline records.

The minimum requirements for the performance validation are analysis of ten known reference standards appropriate to the new instrument. The discipline supervisor will approve the standards selected for the performance validation. Each reference standard will be run utilizing the approved current casework method. The performance validation data will be stored in the discipline records for the life of the instrument. The performance data will also be forwarded to the Quality Assurance Manager.

Proficiency Tests

Proficiency test samples are transferred to the discipline supervisor rather than returning to the laboratory's central evidence area. The discipline supervisor will destroy the samples only after the results have been received from the proficiency test provider.

External proficiency tests are reported based on the Federal Regulations under the United States Controlled Substances Act to comply with the proficiency test provider's guidelines.

Appendix I Abbreviations

APAP: Acetaminophen (for *N*-acetyl-*para*-aminophenol)

ATR: Attenuated Total Reflectance

BB DCM: Borate Buffer / Dichloromethane or buffer

DCM: Dichloromethane (Methylene Chloride)

DIB: Drug Identification Bible

ICFI: Insufficient Concentration for Identification

ISFI: Insufficient Sample for Identification

ID: Identification

MSM: Methylsulfonylmethane (Dimethyl Sulfone)

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N/A: Not Applicable

NA: Not Analyzed

NCSD: No Controlled Substances Detected

PDR: Physicians' Desk Reference

QIFA: Quantity Insufficient for Analysis

QIFAC: Quantity Insufficient for Analysis unless a consumption letter is provided

QNS: Quantity Not Sufficient

REF: Refrigerated

RT: Room Temperature

TABS: Tablets

Appendix II Sampling Plan

Hypergeometric Sampling Plan*

Based on statistical probability, there is 95% confidence that at least 90% of the units contain the drug.

The use of the sampling plan requires that all units appear to be homogenous.

If any results are different than the rest, the analyst must re-evaluate the population.

The report will reference the sampling plan utilized and the confidence levels and corresponding inferences of the population. The report will state what was received and clearly state the results/conclusions. The weight of the units tested will be reported.

Description

Item 1 163 bags containing plant material ____grams, gross weight

Result

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Item 1 A hypergeometric sampling plan was used. Item 1 contains _____ with a 95% confidence that at least 90% of the population contains _____. Weight of tested items

Population Size	Sample Size
1-12	All
13-20	12
21-30	15
31-40	18
41-50	19
51-60	20
61-70	21
71-80	22
81-100	23
101-130	24
131-180	25
181-270	26
271-470	27
471-1000	28

**Information is taken from enfsi-dwg sampling calculator 2012 referenced in the ASCLD/LAB Policy on Sampling, Sampling Plans and Sample Selection.*

Appendix III Uncertainty of Measurement

The estimation of the uncertainty of measurement of the controlled substances weights has been performed. The initial study performed in 2013 has been documented in two reports titled "Controlled Substances Estimate of the Uncertainty of Measurement December 18, 2013 Mettler XS2002S balances and Mettler Toledo MS16001L balances". These reports are stored in the internal network drive of the controlled substances discipline share folder and a copy is kept in the Quality Assurance Records.

The report addresses the following elements:

- Statement of the measurand
- Statement of the measurement traceability
- Equipment used
- All uncertainty components considered
- All significant uncertainty components and their evaluation
- Data used to estimate repeatability and/or reproducibility
- All calculations

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- The combined standard uncertainty, the coverage factor, the coverage probability, and the resulting expanded uncertainty
- The schedule to review and/or recalculate the measurement of uncertainty.

Based on this initial study the expanded combined standard uncertainty at 95% coverage for the Mettler Toledo XS2002S balances is +/- 0.03 gram and +/- 0.3 gram for the Mettler Toledo MS16001L balances rounded to one significant figure when used at the Alaska Scientific Crime Detection Laboratory.

These reports also address uncertainty of combined weights utilizing a root sum of squares formula. The expanded combined standard uncertainty at 95% coverage is equal to +/- 0.03 gram x the square root of the number measurement made (\sqrt{N}) for the Mettler Toledo XS2002S balances and +/- 0.3 gram x the square root of the number measurement made (\sqrt{N}) for the Mettler Toledo MS16001L balances. This will be applied when weight by difference or weight by summation is performed. If the value obtained from the \sqrt{N} is greater than the readability of the balance utilized, the value will be rounded to the readability of the balance. The value will be rounded up at a 5 or higher and rounded down at a 4 or lower.

An ongoing estimation of the uncertainty of measurement is performed on a weekly and monthly basis. Monthly each balance used in casework will be performance checked with calibrated weights listed on the Balance Performance Check Form and a check standard. Each week a balance is utilized in casework analysts will perform a performance check with calibrated weights listed on the Balance Performance Check Form and a check standard. This information is documented on the Balance Performance Check Form which is stored in the controlled substances laboratory space. The information from the performance checks and check standards is also documented in the spreadsheet utilized for the ongoing estimate of the measurement of uncertainty stored in the internal network drive of the controlled substances discipline share folder.

The check standard chosen for the Mettler Toledo XS2002S balances is tablets packaged for stability. The check standard chosen for the Mettler Toledo MS16001L balances is a powder packaged for stability.

The data from this ongoing estimation of the uncertainty of measurement will be reviewed and an updated estimation of the uncertainty of measurement reports will be written at least every 3 years or if any significant change in the expanded uncertainty is detected.

The laboratory's estimation of the uncertainty of measurement for drug weights utilized the ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – ANNEX B document (AL-PD-3063 Version 1.0). This document is available on the ASCLD/LAB website.

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Appendix IV Controlled Substances Key Control Policy

Each analyst is assigned the evidence locker in their work area. Any unassigned work areas' evidence locker can be used as needed. When not in use the key is stored in the lock indicating it is available for use.

Most of the evidence lockers in the evidence room #2115 are unassigned and available for use as needed. When not in use the key is stored in the lock indicating it is available for use.

The duplicate key from each locker within the controlled substances laboratory is sealed in a labeled envelope. These sealed envelopes are locked in the primary controlled substances cabinet in the reagent prep room # 2116. These keys can only be opened by the discipline supervisor or designee.

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If a locker key is lost, the discipline supervisor must be notified immediately.

The following are the unique key numbers for the evidence lockers in room #2115.

- 3743
- 3748
- 3754
- 3761
- 3779
- 3795

The following are the unique key numbers for the evidence lockers in the work areas.

- 3027
- 3035
- 3059
- 3060
- 3062
- 3063
- 3064
- 3158

Appendix V Justice Trax Print Instructions

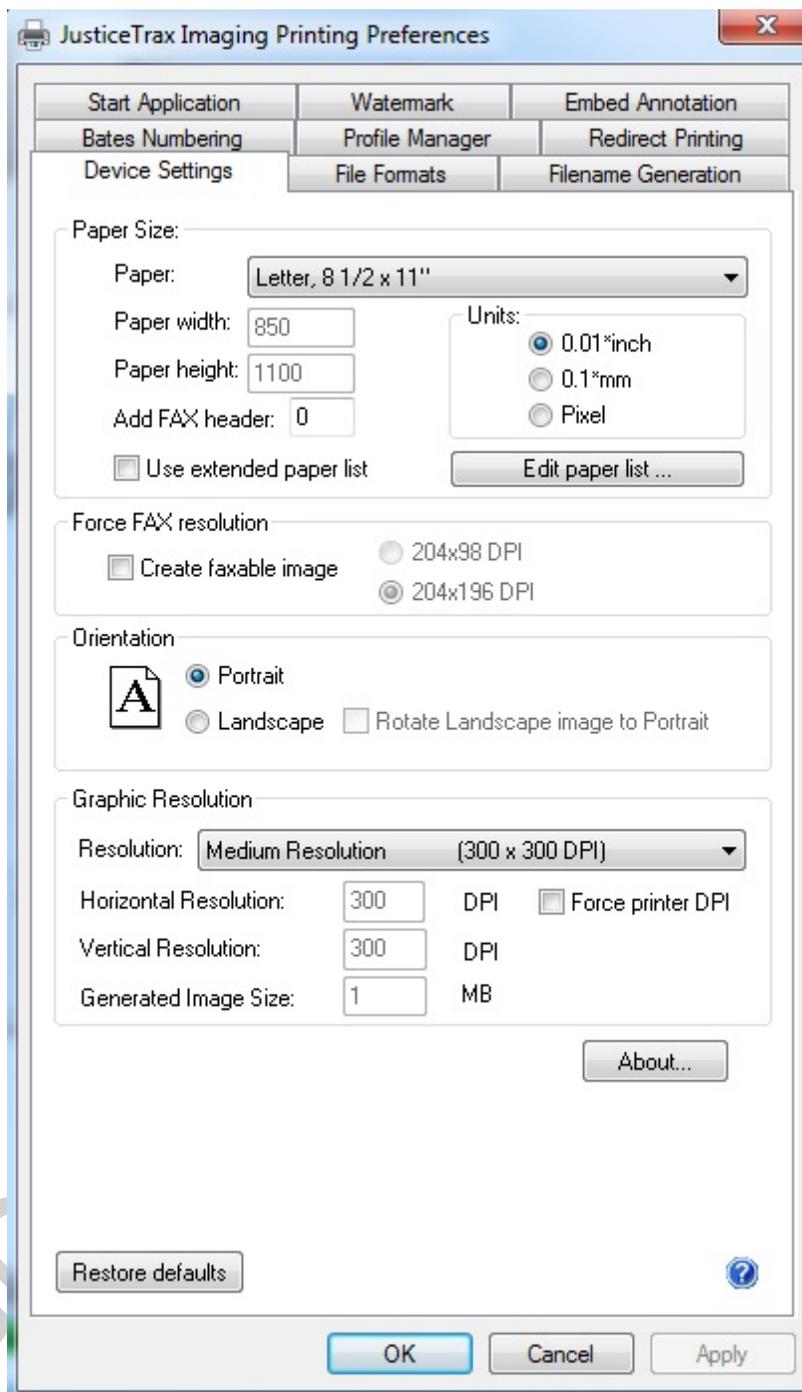
The following three screen shots show the proper set up for printing to the imager on the instrument computers.

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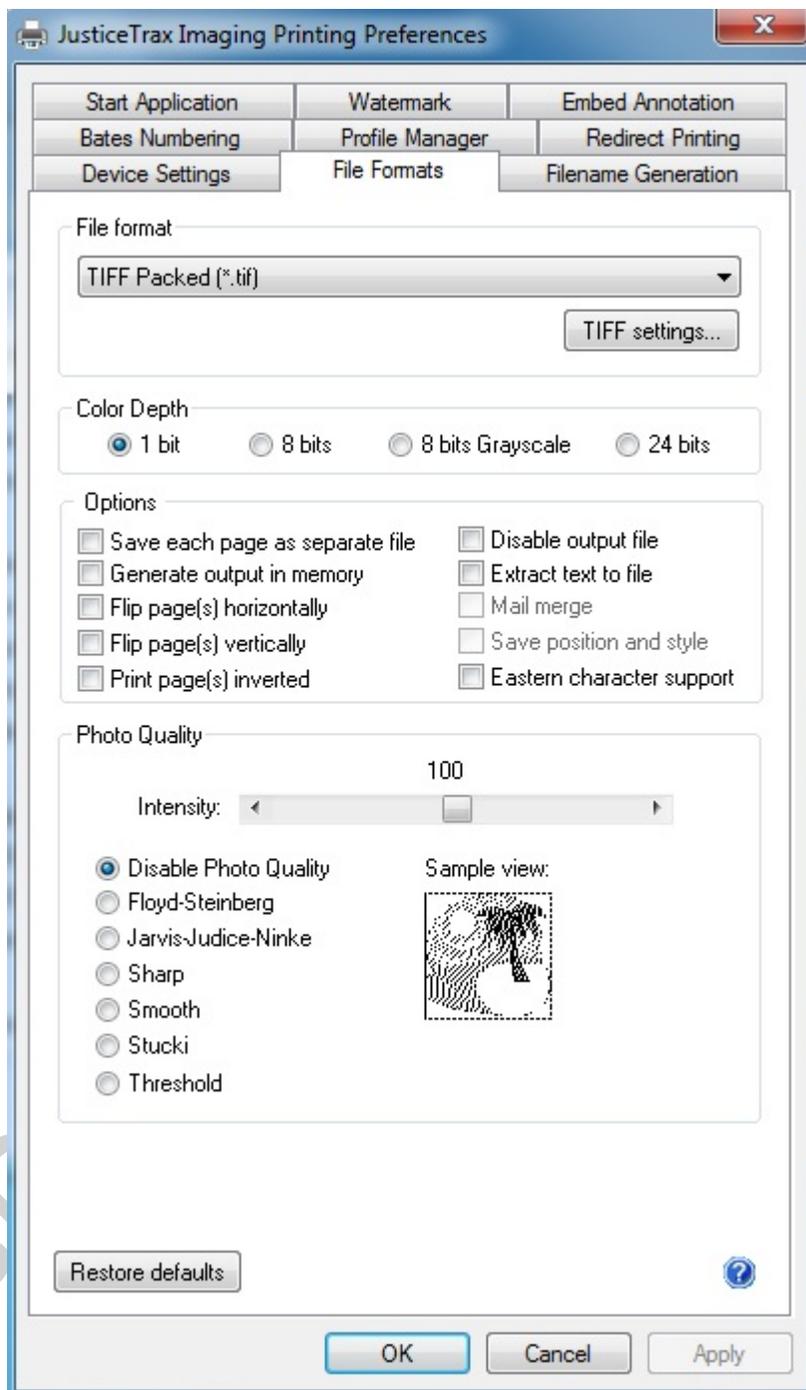


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Appendix VI Revision History

2016 R0	2015 R0	Location	Revision made
all	all	all	spacing, grammar updated as needed
2	2	Last Paragraph on page	Changed prosecutor to District Attorney's Office
5	5	First paragraph on page	Added "Bags with substance will be weighed and counted."
9	9	First paragraph on page	Added "Other available methods for casework are printed in the Instrument binder associated with each instrument."
15-16	15	System Suitability and Performance Verification	Entire section rewritten.
22	22	Number 11 under Polystyrene Analysis	Changed to "place it in the FTIR Instrument Log with handwritten initials and date." to reflect current practice.
22	22	Number 3 under Blank analysis	Changed to "at least "3""
22	22	Number 3 under Sample Analysis	Changed to "at least "3""
23	23	Number 9 under Standard Verification	Changed to "at least "3""
30	30	Third paragraph under Quality Assurance	In the last sentence, changed "will" to "should"
41	41	Big paragraph under Notes	Added to the end of the first sentence, "will be noted"
43	43	Proficiency Tests	Added new section.
47	47	Appendix III	Changed "at least annually" to "at least every 3 years" in the second paragraph on page 47. Added new last paragraph.

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