SAN DIEGO POLICE DEPARTMENT
CRIME LABORATORY

FORENSIC CHEMISTRY UNIT

SEIZED DRUG MANUAL

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1.0 INTRODUCTION

1.1 GENERAL GUIDELINES

1.1.1 This manual covers policies, methods, and procedures utilized in the analysis of the typical drugs of abuse that comprise the majority of this section's seized drug casework. It is not meant to cover rare and infrequent submissions. In the case of a non-routine submission, the analyst, using sound scientific principles, will select an examination scheme comprised of the types of analyses available to them and outlined in this manual. Standards, controls, and reference materials must be fully documented in the case packet, if applicable. In the event that new procedures, methodology, or instrumentation must be utilized in an analysis, the new method must be validated and approved in accordance with laboratory procedures prior to use.

1.1.2 The unit adheres to the requirements of the Laboratory Quality Assurance Manual. Additional requirements specific to the unit are listed in this manual.

1.2 UNIT DESCRIPTION

1.2.1 The Forensic Chemistry Unit is budgeted for eight positions: one Supervising Criminalist, six Criminalists, and two laboratory technicians.

1.2.2 The unit is located at Police Headquarters. Seized drug analysis is performed on the 6th floor in the Forensic Chemistry Unit, located in rooms 617 and 618.

1.2.2.1 These rooms are considered secure evidence storage rooms.

1.3 UNIT FUNCTIONS

1.3.1 This unit performs controlled substance analysis and alcohol analysis.

1.3.2 General duties performed include:

1.3.2.1 Performing analysis on suspected controlled substances in the form of solids, liquids, pills, plant material, and mushrooms.

1.3.2.2 Court testimony regarding all aspects of analysis and interpretation of results.

1.3.3 Combinations of methods are used to identify controlled substances. These methods include:

1.3.3.1 Color tests

1.3.3.2 Microcrystalline tests

1.3.3.3 Microscopic examinations

1.3.3.4 Raman spectroscopy

1.3.3.5 Infrared spectroscopy

1.3.3.6 Gas chromatography/mass spectroscopy

1.3.3.7 Literature, CD-Rom, and Internet references for pharmaceutical pill identification.

2.0 PERSONNEL AND JOB DESCRIPTIONS

2.1 SUPERVISING CRIMINALIST

2.1.1. The duties of the supervisor in the Forensic Chemistry Unit are covered by their specific Performance Plan.

2.2 CRIMINALIST I & CRIMINALIST II

2.2.1. The duties of the Criminalists in the Forensic Chemistry Unit are covered by their specific Performance Plan.

2.3 CRIMINALIST III (Technical Lead)

2.3.1. The duties of the Criminalist III in the Forensic Chemistry Unit are covered by their specific Performance Plan.

2.4 LABORATORY TECHNICIAN

2.4.1. The duties of the laboratory technician in the Forensic Chemistry Unit are covered by their specific Performance Plan

3.0 SUBMISSIONS AND HANDLING

3.1 IMPOUND SUBMISSIONS

3.1.1 Seized drug evidence is submitted under an incident number. The items contained within the impound will be identified with unique barcode numbers. A barcode number can be used to identify one item, or multiple items within an impound.

3.1.2 Forensic Chemistry personnel receive impounds from the Narcotics Vault or Property personnel.

3.2 ITEMS NOT EXAMINED

3.2.1 The following items are not routinely analyzed because either the District Attorney's and/or City Attorney's offices do not file on these cases or not enough material is present for analysis. Requests for analysis will be considered on a case-by-case basis by the unit supervisor.

3.2.1.1 Syringes

3.2.1.2 Drug paraphernalia

3.2.1.3 Residue quantities and quantities weighing less than 0.04 grams

3.2.1.4 Marijuana and Marijuana products, including concentrates and edibles

3.2.1.5 Impounds without subject's name or identifier (except "buy" cases)

3.2.1.6 Liquid other than suspected PCP or GHB-type compounds of less than approximately 0.5 mL. Suspected PCP of less than approximately 0.1 mL

3.2.1.7 Precursors and breakdown products of controlled substances unless they are the only chemicals present for that suspect

3.2.1.8 Food items

3.2.1.9 Suspected LSD of less than 1 square of paper or gel

3.2.1.10 Partial tablets or tablet fragments

3.2.1.11 Prescription medications in the subject's name

3.2.2 Items that pose a safety hazard to lab personnel such as: suspected terrorist powders, possible explosives, and materials that react with strong acids and bases used in chemical testing, will not be analyzed.

3.3 SAMPLE SELECTION

3.3.1 Sample selection: The number of items analyzed per defendant is dependent on the charges filed in the case, such as possession or sales related charges.

3.3.1.1 The casework approach for each analyst with respect to items tested will be to analyze enough items of evidence to meet the charges. For possession cases the Analyst will test one drug type. There is not a minimum number of items for examination.

3.3.1.2 In general for sales cases, 60% of each drug type will be analyzed per suspect. Each Analyst will keep in mind that enhancements exist for possession of certain weights of cocaine and methamphetamine of 1 ounce, 2 ounces, kilos, and so on, and ½ ounce increments for heroin that may require more analysis.

3.3.1.3 The number of items actually tested will be up to the Analyst and will be reflected in the seized drug report along with the analytical results and weights for those items. No assumptions will be made in the notes or final written product as to the contents of any untested submissions.

3.4 PRELIMINARY TESTING

3.4.1 Turn-around times are subject to change based on factors such as staffing, numbers of examinations required for each impound, and complexity of the analysis required, as well as on factors outside the laboratory's control, such as discrepancies.

3.4.1.1 Ideally, preliminary testing consisting of color and crystal, raman, or FTIR testing should be completed within one business day of the receipt of the request by the analyst.

3.4.1.2 Complex cases requiring GC/MS analysis are typically completed within three business days of receipt by the analyst.

3.4.2 The supervisor may reallocate resources and may notify the District Attorney's Office or City Attorney's Office of any delays.

3.5 FINAL TESTING

3.5.1 Receipt of a court subpoena for a seized drug case is the notice that the evidence must be confirmed for trial unless we are notified confirmation is no longer needed. The Criminalist who did the preliminary test will analyze these

cases, if possible. It is the Criminalist's responsibility to ensure that the final work is completed and the review process has been completed prior to the court date. Generally, a minimum of five-work days' notice is required for final analysis.

3.5.1.1 Cases that were preliminarily tested by technicians will be finalized by criminalists if final testing is needed.

3.5.2 Units such as Homicide and Sex Crimes, must submit laboratory requests for analyses of substances seized during an investigation. The unit supervisor will assign these cases to criminalists. These cases will be analyzed and confirmed, producing a final report.

3.6 BUY PROGRAMS

3.6.1 There are two types of buy programs: Buy-Walk and Buy-Bust. Buy-Walk operations involve the purchase of controlled substances with an arrest occurring at a later time. A Buy-Bust operation involves the purchase of controlled substances and an immediate arrest. Those arrestees will be in-custody pending arraignment.

3.6.2 The narcotics detective should notify the vault and the forensic chemistry supervisor in advance of a buy program. The detective will provide the vault staff or the forensic chemistry supervisor with the following information:

3.6.2.1 Name and phone number of primary contact.

3.6.2.2 Operation code name that will be annotated on every impound.

3.6.2.3 Approximate start date and length of program.

3.6.2.4 Approximate number of impounds anticipated.

3.6.3 One criminalist will be assigned to work all impounds under a program. Buy program impounds are worked in addition to routine casework.

3.6.4 It is the responsibility of the assigned criminalist to ensure that all impounds submitted have been finalized.

3.6.5 Buy program impounds are to be worked as time permits between the higher priority casework.

3.7 IMPOUND RECEIPT AND RETURN

3.7.1 Impounds are generally stored in the Narcotics Vault. Each analyst must sign for custody of the item from Property or Narcotics Vault personnel.

3.7.1.1 When possible, completed cases should be returned to the Vault at the end of each day.

3.7.1.2 Daily impound cases not returned to the Vault at the end of the day, will be stored, closed, in locked cabinets in the Forensic Chemistry Unit.

3.8 HANDLING AND REPACKING ITEMS

3.8.1 Suspected PCP and Fentanyl cases along with other possible hazardous samples must be handled with gloves and should be kept in the hood during analysis. Eye protection is recommended. For Fentanyl cases, a respirator is also recommended along with working the case in the special ductless fume hood located in the lab.

3.8.2 Analyzed syringes will not be recapped by analysts. After removing the cap and dispensing a portion of the contents for analysis, the uncapped syringe will be placed into the safety tube using a one-handed technique.

3.8.3 Forensic Chemistry will follow the official SDPD Procedures on handling currency in impounds. The policies are outlined below, see SDPD Procedures 3.02 – Investigations and 3.15 - Investigations for the most updated versions.

3.8.3.1 All money is to be entered in the designated fields for currency and coins, with the total amount impounded entered in the "Money Total Value" field. Do not enter a dollar sign ($), only the amount.

3.8.3.1.1 Cash amounts of **$20.00 and over** will be stored separate from other impounded property.

3.8.3.1.2 Cash amounts of **less than $20.00** should be placed in an envelope but can remain with the other impounded items.

3.8.3.2 Currency that contains possible drug residue will not be separated from the other drug items.

3.8.3.2.1 If narcotics are rolled into a dollar bill (any denomination) and used as a tooter, snorter, etc., or the money has any visible narcotic residue, it must be impounded in the EvidenceOnQ database. When the impound is up for disposal, any money with narcotic substance or narcotic residue will be destroyed per vault policy.

3.8.3.3 Documenting the serial numbers of all currency in the case notes is recommended.

3.8.4 Impounds annotated "Hold for Prints" of "Hold for DNA" will be handled in a manner to preserve possible fingerprints and prevent DNA contamination.

3.8.4.1 Analysts will wear a fresh pair of gloves when working with these cases to prevent the possibility of depositing their prints or DNA on items.

3.8.4.1.1 Cotton liners can also be worn under the gloves to further prevent the deposit of prints.

3.8.4.2 Analyst should wear masks while working cases marked "Hold for DNA."

3.8.4.3 Items that may be processed for fingerprints should be handled as little as possible and in areas generally not suitable for print processing. The Analyst should handle the evidence carefully to prevent the obliteration of possible prints.

3.8.4.4 Paraphernalia such as pipes or spoons are generally not examined. They can be left in the impound envelope without processing or analysis.

3.8.4.5 These cases do not need special repackaging at this stage.

3.8.5 Requests to process seized drug evidence for fingerprint or DNA processing must go through the Forensic Chemistry supervisor.

3.8.5.1 The Analyst will obtain the impounds needing separation from the Narcotics Vault.

3.8.5.2 The Analyst will remove and repack any suspected controlled substances from the items of interest into appropriate containers annotating that it is a repack and labeling them with the barcode, date, and their initials.

3.8.5.2.1 Powdered fentanyl in closed containers, bags, etc. will not be repacked.

3.8.5.3 The Analyst will repack the original packaging to be processed for fingerprints into a second package and annotate that it is the original packaging with the barcode, date, and initials. Other items that may be suitable for fingerprint processing should also be placed in this second package.

3.8.5.4 The crime scene unit can be contacted if the Analyst has any questions about items suitable for fingerprint processing.

3.8.5.5 Once the original packaging has been repacked for latent print processing, a new barcode must be generated in the EvidenceOnQ system.

3.8.5.6 The Analyst will edit the annotation at the top of the request to indicate that the items have been repacked, and will include the new barcode number, date and their initials.

3.8.5.7 A copy of the request will remain with the case packet as an notes page. The original will be placed in the crime scene unit's mail bin for processing.

3.8.5.8 The Analyst will not repack large seizures of controlled substances for processing.

4.0 POLICIES

4.1 SEIZED DRUG ANALYSIS

4.1.1 Only one case shall be open in the Analyst's work area at a time.

4.1.2 All impounds will be thoroughly inventoried.

4.1.3 Each Analyst must determine the appropriate tests to use based on the type of suspected drug.

4.1.4 If, after performing initial testing, an Analyst decides not to conduct further testing on an item, provided that a controlled substance is being reported for that incident and individual, the Analyst may write "initial exam only" (IEO) in their notes and stop testing. This does not need to be written in the printed report.

4.1.4.1 This can also be done with federally controlled or non-controlled medication with a visual inspection or preliminary identification as well as marijuana and its products. If it is the only item, the report will reflect the apparent visual identification or test performed. No further analysis will be done.

4.1.4.2 Taking a weight without any analysis in not considered an initial exam and the item will still be listed as not examined.

4.1.5 Color tests may be done in the main hood or at the Analyst's laminar flow station. Crystal tests may be done at the Analyst's laminar flow station.

4.1.6 The base form of cocaine is distinguished from the salt, except in cases where it is mixed with fentanyl (see 4.1.6.3 for reporting).

4.1.6.1 The base form is distinguished during preliminary examination in one of the following ways*:

4.1.6.1.1 An appropriate wagner color test
4.1.6.1.2 Fourier Transform Infrared Spectrscopy (FTIR)
4.1.6.1.3 Raman
4.1.6.1.4 GCMS in Hexanes with one of the above methods

*note: the physical form (waxy/rock-like versus powder/compressed powder) of the sample, while not sufficient for identification, can be useful information to direct testing and understand results.

4.1.6.2 A second confirmatory test must be performed in, addition to the preliminary testing above, to report the base form for the Final report.

4.1.6.3 If the base form cannot be confirmed the sample will be reported as cocaine, not as cocaine base, due to cocaine base being a higher schedule.

4.1.7 Weights will be taken of all solid, non-tablet/capsule, samples analyzed and reported, with the exception of NCSDs.

4.1.7.1 Gross weights can be taken for any preliminary case that is not a felony drug case.

4.1.7.2 Gross weights can be taken for all fentanyl cases regardless of felony or court status.

4.1.7.3 Net weights will be taken for all felony drug cases and all court cases.

4.1.7.4 All weights taken on Analyst's balances will be taken to two decimal places.

4.1.7.5 Individual weights of ≤ 200 grams may be taken on Analyst's balances.

4.1.7.6 All weights taken on Analyst's balances must be taken dynamically unless the sample consistency prevents it.

Note: Dynamic weighing means transferring the contents of the item directly on to the balance and noting the weight. Static weighing refers to being able to tare a weigh boat or paper, remove it from the balance to add contents of the item to it, then returning to the balance for a weight.

4.1.7.7 Individual weights > 200 grams must be taken on the bulk balance.

4.1.8 If other items are present in a submission that could be controlled but were not examined, that should be made clear in the notes.

4.1.9 If an item is only being weighed for a detective or attorney, this will be documented in a printed email or using a communication log. If there is no analysis on the item, a report does not need to be created.

4.1.9.1 The added weights must be technically reviewed. This can be done in the notes next to the data.

4.1.9.2 Communication documentation must be administratively reviewed. This can be documented on the communication log or printed email.

4.1.10 Volumes of tested liquids will be estimated and documented in the notes but will not be listed on reports.

4.1.11 If an Analyst begins a case and determines that the substances present may be outside the scope for which they are approved, they must:

4.1.11.1. Stop testing
4.1.11.2 Document the reason for stopping in their notes
4.1.11.3 Find a qualified analyst to rework the case and document the Analyst in their notes
4.1.11.4 Seal and return the evidence to the Narcotics Vault.
4.1.11.5 Transfer their notes and documentation to the qualified Analyst
4.1.11.6 The qualified Analyst will obtain the case from the Narcotics Vault and rework it.
4.1.11.6.1 The original notes from the first Analyst will be maintained in the new case packet.

4.1.11.7 If the Analyst has already begun work on additional items in the case that are within the scope for which they are approved, they may continue testing and reporting on those items.
4.1.11.7.1 If it's possible without creating a new barcode, the items for which they are not approved to do casework should, be separated from the other items and from the original outer packaging and repackaged separately into new appropriate outer packaging.
4.1.11.7.1.1 This separation will be documented in the Analyst's notes.
4.1.11.7.2 These items will then follow steps 4.1.11.1-4.1.11.4
4.1.11.7.3 The qualified Analyst in these cases will rework only these items and will produce a Supplemental Report.
4.1.11.4.4 The work done by the first Analyst must be acknowledged in the subsequent Analyst's note packet.

4.2 CATEGORIES OF TESTING

4.2.1 The following techniques are available for use in the analysis of suspected drugs and are grouped into categories by their selectivity (amended from *SWGDRUG Recommendations Edition 8.0)*.

Category A	Infrared spectrometry Mass spectrometry Raman spectroscopy
Category B	Gas chromatography Microcrystalline tests Macroscopic examinations (Cannabis only) Microscopic examinations (Cannabis only)
Category C	Color tests Pharmaceutical identifiers

4.2.2 Techniques may not provide sufficient selectivity in all situations (ex: isomers with the same mass spectra, IR of mixtures, etc.).

4.2.2.1 When possible, the analyst must make use of additional techniques to compensate for the lack of specificity.
4.2.2.2 When additional available techniques are not sufficient, the limitations of the testing must be clearly communicated in the report. (Ex: If standards are not available for GC retention time comparison, without another instrumental test or crystal test

the MS data alone can be used for identification. The final result will be reported as "MS only" indicating that a retention time identification was not made.)

4.2.3 See specific sections for details of each technique.

4.3 ACCEPTABLE CRITERIA FOR PRELIMINARY REPORTS

4.3.1 Preliminary testing will be performed on suspected seized drugs for use at preliminary hearings. If a case goes on to trial, a final report will be prepared.

4.3.2 Preliminary analysis will consist, at a minimum, of:

- 4.3.2.1 A combination of two different Category B tests,
- 4.3.2.2 A combination of one Category B test and one Category C test,
- 4.3.2.3 One Category A test.

4.3.3 The Analyst may only report out results for those items that have been analyzed.

4.3.4 All reports will be technically and administratively reviewed prior to release.

4.4 ACCEPTABLE CRITERIA FOR FINAL REPORTS

4.4.1 Final analysis will consist, at a minimum, of:

- 4.4.1.1 A combination of one Category A test and a second (different) test from either Category A or B.
- 4.4.1.2 A combination of two (different) Category B tests and a third (different) test from either Category B or C.
- 4.4.1.3 A minimum of two aliquots must be used during testing.
  - 4.4.1.3.1 Color testing is considered one aliquot regardless of the number of tests performed because the results are used in conjunction with each other.

4.4.2 The Criminalist may only report out results for those items that have been analyzed.

4.4.3 All reports will be technically and administratively reviewed prior to release.

4.5 MINIMUM TESTS FOR "NO CONTROLLED SUBSTANCE DETECTED" (NCSD) RESULTS

4.5.1 The minimum testing to be performed on substances to determine that no controlled substances were detected include any the following options:

- 4.5.1.1 Analysis by GCMS using the universal program
  - 4.5.1.1.1 Samples containing acetaminophen must be extracted or run on an appropriate GCMS method to remove acetaminophen from the analytical

results to ensure no controlled substances are present prior to an NCSD determination.

4.5.1.1.2 Mushroom material must be soaked overnight and run on GCMS prior to an NCSD determination. See Botanicals section

4.5.1.2 Analysis by FTIR if analysis identifies the presence of a non-controlled substance

4.5.1.3 Analysis by Raman if analysis identifies the presence of a non-controlled substance

4.5.2 If the results of testing are negative, or do not indicate the presence of a controlled substance, the report will read, "no controlled substance were detected."

4.5.3 If the material appears to be an identifiable non-drug substance (ex: soap or nuts) the Analyst will describe the material in their notes and on the report as "apparent …," and proceed with chemical testing if necessary. If chemical testing leads the Analyst to conclude that no controlled substances are present, then "No controlled substance were detected" will be reported.

4.5.4 If the material cannot be cut with a knife or does not appear suitable for chemical testing (ex: stone, glass, cotton) the Analyst will describe the item in their notes and report as "apparent …" and:

4.5.4.1 If no testing was attempted, "Item … is not suitable for analysis and was not laboratory examined," will be reported.

4.5.4.2 If microscopy was conducted, the test performed will be included in the report. "Item … was determined by microscopy not to be suitable for analysis. No further analysis was conducted," will be reported.

4.6 CONSUMING SAMPLES FOR ANALYSIS

4.6.1 Occasionally, consuming a sample during analysis is required. In these instances, the unit supervisor is notified. In addition, permission to consume the sample must be obtained from the attorney assigned to the case or, if an attorney has not been assigned to the case, the detective assigned to the case. Three business days will be allowed after the Criminalist has reached out to the attorney or detective before proceeding with evidence consumption in the absence of a response. This process should be documented in the case notes.

4.6.2 After consuming the samples, Criminalists should save any remaining extracts. These extracts would be available should additional work be required by the original Criminalist, another Criminalist if necessary, or a defense expert. Extracts can be placed in crimped GC/MS vials and maintained with the original impound. Notes will indicate how the sample was prepared and maintained. At a minimum, all extracts will be labeled with the incident number, item number, and initial, or the barcode number and initials.

4.7 MARKING ANALYZED ITEMS

4.7.1 If multiple tablets or capsules are housed in the same container, the Analyst must repack or put some marking on the specific substance analyzed.

4.8 REQUESTS FOR EVIDENCE

4.8.1 The laboratory will comply with court orders for release or splits of evidence.

4.8.2 Samples will not be released until a final laboratory analysis has been completed, unless it is to another law enforcement agency.

4.8.3 Whenever possible, the original Analyst will prepare the sample for release.

4.8.4 When splitting a sample for release, the Analyst must generate a new barcode in the EvidenceOnQ system for the newly generated sample following the procedure outlined in section 3.8 of this manual.

4.8.5 The case packet will be annotated indicating the weight of the material prepared, the incident number, barcode, date and initials of the Analyst. A copy of the court order will be attached to the case packet.

4.8.6 The item to be released, and the copy of the court order received, will be turned in to the Vault for release.

4.9 ACID NEUTRALIZATION PROCEDURE

4.9.1 During analysis of seized drugs, small amounts of acid are generated in spot wells on plates. The plates are placed in a stoppered sink with water and sodium bicarbonate. Disposable plates may be placed in a neutralizing jar in a laminar hood prior to being placed in the sink or disposed of.

4.9.2 Prior to discharge into the sewage system, the water solution will be checked with pH paper to ensure a neutral pH (pH range of 6.0-9.5). The minimum safety equipment worn by the Criminalist or technician neutralizing the acid or washing spot plates includes gloves, safety glasses, and a lab coat.

4.9.3 A neutralization log will be kept to record the date, operator initials, type of waste treated, approximate amount, and the pH determined after treatment.

4.10 CRYSTAL TEST WASTE

4.10.1 Waste generated by crystal testing will be placed in a sharps container that has had the biohazard labels defaced. These containers will be taken to the Narcotics Vault when full.

4.11 FENTANYL CLEAN-UP

4.11.1 Wear appropriate personal protective equipment (PPE).

4.11.2 Add 1 teaspoon full of powder OxiClean to 500 mL of water in a spray bottle. Shake gently until all powder is in solution.

4.11.2.1. Completely cover any potentially contaminated area with spray.

4.11.2.2. Within 15 minutes, scrub with a paper towel until dry. Do not let the solution evaporate.

4.11.2.3. Dispose of paper towels and disposable PPE in a biohazard bin.

5.0 CASE DOCUMENTATION

5.1 NOTES

5.1.1 Case note requirements follow the requirements stated in the laboratory quality assurance manual for technical records.

5.1.2 All note pages will contain the incident number, Analyst's initials, page number, and the date. Barcodes are used to identify items within the note pages. Abbreviated item identifiers may be used instead of barcodes, if a key clearly associates those numbers with the barcodes.

5.1.2.1 For case types other than Seized drugs (ex: homicides), the case number must be included on each note page.

5.1.3 Notes must be legible and permanent ink must be used.

5.1.4 Reference materials and sources relied on to form conclusions will be noted and included. This includes the instrument library spectra, Drug I.D. Bible edition and page, pill identifier, etc.

5.1.5 Evidence disposition must be listed in notes.

5.1.6 Notes must include the start and end dates of analysis

5.1.7 Any weights, measurements, or estimated volumes made must be included in the notes.

5.1.7.1 Material may be described as "apparent trace" in notes based on the amount of material present.

5.1.7.1.1 Any material weighing less than or equal to the reported uncertainty of measurement is reported as trace.

5.1.7.2 Residue is a descriptive term, not a qualitative one, and will not be used in place of a recorded weight.

5.1.7.2.1 Residue refers to material in an item that is not conducive to collection for weighing and testing. Examples: melted material in a pipe, traces of powder that cannot be removed from a bag, material thinly smeared on foil.

5.1.8 Opinions and interpretations will be included in the notes.

5.1.9 Documents such as work requests and communication logs will be included in the case packet as notes. All pertinent case information and date of inclusion must be present.

5.1.10 Communications affecting testing, or giving opinions or results beyond those already released, must be documented.

5.1.10.1 The Analyst may document the communication via a printed email added to the case packet, by writing it into the case notes pages, or by using a communication log.

5.1.10.2 The documentation must include who the communication was between, the date, a brief description of the topics or results discussed, and any decisions made during the communication.

5.2 REPORT FORMAT

5.2.1 Analyst's conclusions are typically entered into the Narcotics Database prior to generating a written report. A Microsoft Word report template, is then used to generate the report.

5.2.1.1 Reports can be hand typed using a template when necessary (ex. Database is offline, reports for Internal Affairs).

5.2.2 Each report must include:

5.2.2.1 The last name/identifier of the defendant(s) listed on the barcodes analyzed

5.2.2.2 Incident number

5.2.2.3 Incident type

5.2.2.4 Analyst's name and PD ID number

5.2.2.5 Arrest/incident date

5.2.2.6 Requesting Officer

5.2.2.7 Barcode numbers of the items analyzed

5.2.2.8 Packaging information, including the type of containers

5.2.2.9 Descriptions of the items reported

5.2.2.10 Weights (to two decimal places) or measurements, if applicable, and the associated U of M at k=3.

5.2.2.10.1 If a total weight of items is being reported, the U of M statement must indicate that the U of M is per each weight taken or must list the total uncertainty of the weight (determined as the U of M multiplied by the total number of weights taken)

5.2.2.10.2 Static weights taken on Analyst's balances must include the corrected U of M (twice the U of M of a dynamic weighing) and must be documented in the notes.

5.2.2.10.3 Since samples weighing less than 0.04 grams are not routinely tested, these items only need to be listed on the report if nothing else was tested for that suspect.

5.2.2.10.3.1 Weights of less than or equal to the reported uncertainty of measurement will be reported as "trace" when included on reports.

5.2.2.10.4 Volumes are not reported

5.2.2.11 Examinations performed on the reported items

5.2.2.12 Opinions and interpretation (when reports are being issued by criminalists)

5.2.2.12.1 Results will take the place of opinions and interpretation for reports issued by technicians.

5.2.2.13 Date of issuance

5.2.2.14 Initials and date of technical and administrative reviewers and date of issuance

5.2.3 If multiple items are examined, the report must specify which items are included in the color, crystal, visual, and instrumental testing.

5.2.4 When weights are reported, the footer of the report and will indicate the confidence level used.

5.2.5 Disposition of evidence will be included on the report.

5.2.6 Example report header:

SUSPECT:	DOE, JOHN
INCIDENT #:	XXXXXXXXXXX
INCIDENT TYPE:	NARCOTICS
INCIDENT DATE:	
OFFICER:	
CRIMINALIST:	

5.2.7 Reports for investigative units other than Narcotics will need the following additional information added to the header:

5.2.7.1 Victim

5.2.7.2 Case number

5.2.7.3 Detective, if listed, in place of the Officer

5.2.7.4 Charge

5.2.8 The title of the report will state if the report is Preliminary, Final, or Supplemental.

5.2.8.1. Supplemental worked done to produce the first Final report will not be titled as supplemental and will be kept with the original case packet if done by the same analyst.

5.2.8.2. Supplemental work done to produce additional Preliminary or additional Final reports will be titled as Supplemental Preliminary or Supplemental Final reports and will be kept with the original case packet if done by the same analyst.

5.3 DISTRIBUTION AND RETENTION

5.3.1 Original report packets will be filed in the Narcotics Files located in the laboratory.

5.3.2 Case packets are scanned to be filed electronically on the LAN. Hard copies are filed after scanning and will be maintained for the current year plus the previous 2 years; only the electronic file will be kept after this time period.

5.3.3 Requests for copies of reports will be referred to the clerical staff.

5.3.4 Defense attorneys will be referred to the prosecutor's office for copies of reports involving criminal cases.

5.3.5 Requests for copies of reports for civil cases will be referred to the unit supervisor.

5.3.6 Requests for reports by other agencies will be referred to the narcotics detective to avoid possible conflict with criminal investigations.

5.4 NARCOTICS DATABASE

5.4.1 Each impound must be imported into the Narcotics Database from the EvidenceOnQ database by the case analyst. Impounds are imported using the following steps:

5.4.1.1 Open the Narcotics Database.

5.4.1.2 Click the "Scan Barcode" button.

5.4.1.3 Type or scan the barcode numbers of the items to be reported, this can be done individually or in a batch.

5.4.1.4 Select "Import." Close the window by selecting "Return" after the hourglass disappears.

5.4.2 To enter data into the database

5.4.2.1 Type or scan the barcode of one of the items. All previously entered items for that incident number should populate.

5.4.2.2 Click on the barcode item line and then click edit.

5.4.2.2.1 If the item was previously reported, click the barcode item line and then click "Court analysis" and continue as listed below.

5.4.2.3 Add all necessary information and click “save and return,”

5.4.2.3.1 Or, if more items need to be entered under the same barcode, click “save and add next,” enter the information, repeat as necessary, and then click “save and return.”

5.4.2.4 Repeat for all items to be reported.

5.4.3 Generate report

5.4.3.1 Select all item lines to be reported and click “Forensic Report.”

5.4.3.2 Edit generated report as needed.

5.4.3.2.1 Verify all necessary information is present and correct in the header.

5.4.3.2.2 Ensure that descriptions are correct and complete.

5.4.4 Reviewing and releasing results

5.4.4.1 After conducting a technical review of the case packet, the reviewer will review and release the data entered into the Narcotics Database.

5.4.4.1.1 Click “Bar Code” or “Incident Number” and type in the appropriate number.

5.4.4.1.2 Ensure that all provided header information matches the report and notes.

5.4.4.1.3 For each item click the line of that item then click “Edit” and ensure that all of the item testing information matches the report and notes.

5.4.4.1.3.1 Click “Return” after reviewing each one.

5.4.4.1.4 For each item, if the information is correct, click the line of that item and then click “Tech Review.”

5.4.4.1.5 For each item, if the information is correct, click the line of that item and then click “Admin Review.” This will release the results.

5.4.4.1.6 If any information is incorrect, work with the Analyst who did the work to correct the issues before clicking on “Tech Review.”

6.0 EQUIPMENT

6.1 SEIZED DRUG EQUIPMENT LIST

6.1.1 The Forensic Chemistry Unit utilizes the following items of equipment (see chart below for specifics):

6.1.1.1 GCMS: for rapid separation of compounds.

6.1.1.2 Polarized Light Microscope: For monitoring the various stages of crystal growth during a microcrystalline test and observing spores. Minimum magnification required: 100x.

6.1.1.3 Stereomicroscope: The stereomicroscope is used for examining plant structures. Low power magnification needed (4-40x approximately).

6.1.1.4 Electronic Balance: For the weight determination of apparent drug substances and in making reagents.

6.1.1.5 Incubation Oven: For drying or catalyzing chemical reactions through the addition of heat.

6.1.1.6 Fume Hood: Provides a safer environment by providing a place to work with chemicals (color tests, extractions, etc.).

6.1.1.7 FTIR: For rapid identification of drug compounds and their isomers.

6.1.1.8 Raman: For rapid identification of drugs, including some mixtures, and ones contained in packaging.

6.1.1.9 Refrigerator/Freezer: To store standards, samples, and solutions.

6.1.1.10 Hot plates: For heating and/or stirring solutions.

6.1.1.11 UV box: For testing substances for UV reactivity.

6.1.1.12 Vortex: To rapidly mix solutions.

6.2 GCMS PERFORMANCE CHECKS

6.2.1 A STANDARD or AUTOTUNE is performed, and evaluated, weekly when the instrument is in use and after any maintenance that directly effects separation or identification is performed.

6.2.1.1 QUICKTUNES and TARGET TUNES can be performed at the Analyst's discretion.

6.2.1.2 Peak widths should be between .45 to .65 amu.

6.2.1.3 Peaks should be smooth and symmetrical.

6.2.1.4 Mass peaks should be +/- 0.2 amu

6.2.1.5 EM Volts approaching 3000 may indicate that source cleaning is needed.

6.2.1.6 N_2 and H_2O relative abundances should each be less than 10%.

6.2.1.7 Relative abundances should be within the following limits:

69.00	70 - 100%
219.00	>30%*
502.00	> 1%

* 219.00 may be greater than 100% if it's normalized to the 69.00 peak.

6.2.1.8 Iso Ratio: Isotope Mass Ratios should be within the following limits:

70.0	0.5 - 1.6%
220.0	3.2 - 5.4%
503.0	7.9 - 12.3%

6.2.1.9 Tune reports are kept on file, in chronological order, in binders kept near the instruments.

6.2.1.10 The Criminalist or laboratory technician who evaluates the tune will initial it.

6.2.1.11 If the result of the tune does not meet acceptable criteria mentioned above, no casework will be conducted until the tune problem is resolved. See section 7.2.

6.2.2 Quarterly, a mix of laboratory standards with close elution times along with low and high molecular weights will be run on the universal method.

6.2.2.1 This system check will ensure that the retention times of related compounds can be separated and each component identified.

6.2.2.2 The results will be evaluated as per 6.2.2.1 by an Analyst and initialed before being filed in the instrument binder.

6.2.2.3 If the result of the check does not meet acceptable criteria, no casework will be conducted using that instrument until the problem is resolved. See section 7.2.

6.2.3 Unit Criminalists and laboratory technicians can conduct periodic cleaning and maintenance of the GCMSs when needed.

6.2.4 Problems, maintenance, etc., are documented in the individual instrument maintenance binder located in the GCMS room.

6.3 FTIR CALIBRATION AND PERFORMANCE CHECKS

6.3.1 Quarterly, and after any maintenance is performed, a VAL-Q calibration check will be run.

6.3.1.1 The check is automated, ensure that all criteria read "PASS"

6.3.1.2 A Thermo Fisher polystyrene standard will then be run under the same conditions as evidential samples.

6.3.1.2.1 The polystyrene standard will be treated as an unknown and evaluated and compared to the libraries as per sections 12.2 and 12.3 of this manual.

6.3.1.3 The results will be evaluated as per sections 12.2 and 12.3 by an Analyst and initialed before being filed in the instrument binder.

6.3.1.4 If the result of the check does not meet acceptable criteria, no casework will be conducted using that instrument until the problem is resolved. See section 7.2.

6.3.2 Problems, maintenance, etc., are documented in the individual instrument maintenance binder located near the instrument.

6.4 RAMAN CALIBRATION AND PERFORMANCE CHECKS

6.4.1 Alignment and calibration of the laser on the Raman must be performed every 30 days or less, and after any maintenance is performed, using the calibration platform.

6.4.1.1 The checks are automated and a Criminalist or laboratory technician must ensure that each has passed.

6.4.1.2 One of the 30 day alignments and calibrations should be additionally recorded as a quarterly check.

6.4.2 In addition to the 30 day alignment and calibration, a Thermo Fisher polystyrene standard will be run quarterly, and after any maintenance is performed, under the same conditions as evidential samples.

6.4.2.1 The polystyrene standard will be treated as an unknown and evaluated and compared to the libraries as per sections 13.2 and 13.3 of this manual.

6.4.3 The results for the quarterly checks will be evaluated by an Analyst and initialed before being filed in the instrument binder.

6.4.4 If the results of the checks do not meet acceptable criteria, no casework will be conducted using that instrument until the problem is resolved. See section 7.2.

6.4.5 Problems, maintenance, etc., are documented in the individual instrument maintenance binder located near the instrument.

6.5 BALANCE AND WEIGHT CALIBRATION CHECKS

6.5.1 Calibration checks will be performed on a quarterly basis, after any maintenance is performed, and when a balance is moved to a new location (bay, desk, or room) using NIST traceable standard weights.

6.5.1.1 Checks will be performed to three decimal places.

6.5.1.2 Worksheets will be completed by the laboratory technician or Criminalist performing the checks.

6.5.1.3 Weights must fall within the current specified Uncertainty of Measurement for the balance being checked to be acceptable.

6.5.1.4 If the results of the checks do not meet acceptable criteria, no casework will be conducted using that balance until the problem is resolved. See section 7.2.

6.5.1.5 Completed worksheets will be maintained in the Maintenance binder, which is kept in the Forensic Chemistry Unit.

6.5.1.5.1 Values from analytical balance quarterly checks will also be input into control charts for each balance.

6.5.1.6 Control charts will be used to assess the potential need for a UM evaluation of analytical balances on an ongoing basis.

6.5.2 An outside vendor will perform calibration and maintenance of the balances on an annual basis, per Lab Quality Manual.

6.5.2.1 A label affixed to the balance will indicate the date of last calibration.

6.5.3 The NIST traceable standard weights will be calibrated once per accreditation cycle by an outside vendor.

6.5.3.1 The outside vendor must be accredited by an accrediting body subject to ILAC.

6.5.3.2 The weights will then be checked annually after balance calibration.

6.5.4 An Uncertainty of Measurement evaluation will be done if there is any maintenance done on a balance that would affect weighing capability, a new balance is purchased, a new analyst starts in the Unit, or the control charts show a need for an evaluation. If an evaluation shows a UM higher than the one currently reported, the reported uncertainty of measurement will be recalculated.

6.5.4.1 The maximum calculated repeatability and linearity measurements along with manufacturer specifications and vendor calibration data are evaluated for incorporation into the calculation of combined standard uncertainty.

6.5.4.2 Expanded uncertainties are calculated at the 99.7% confidence interval.

6.5.4.3 For analyst's benchtop analytical balances, a minimum of ten replicates of each of 0.010 g, 0.020 g, 0.050 g (additive), 0.500 g, 1.000 g, 40.000 g (additive), 100.000 g, and 200.000 g (additive) will be taken.

6.5.4.3.1 Measurements will be taken using NIST-traceable weights.

6.5.4.3.2 Analysts will do individual placement of the weights needed to achieve the target measurement.

6.5.4.3.3 Analysts will also place the weights in different positions on the weighing pan.

6.5.4.3.4 Measurements will be taken in both the morning and the afternoon.

6.5.4.3.5 The maximum standard deviation from all of the weights on all of the analytical balances is used in the uncertainty of measurement calculations.

6.5.4.4 For the bulk balance, a minimum of ten replicates of each of 0.100 kg, 0.200 kg, 0.300 kg, 0.500 kg, 1.000 kg, and 2.100 kg (additive) will be taken.

6.5.4.4.1 Measurements will be taken using NIST-traceable weights.

6.5.4.4.2 Analysts will do individual placement of the weights needed to achieve the target measurement.

6.5.4.4.3 Analysts will also place the weights in different positions on the weighing pan.

6.5.4.4.4 Measurements will be taken in both the morning and the afternoon.

6.5.4.5 The calculated standard uncertainties are plugged into the following formula to determine the combined uncertainty (U_c):

$$U_c = \sqrt{u(x)^2 + u(y)^2 + u(z)^2 \ldots}$$

The combined uncertainty is them plugged into the following formula to determine the expanded uncertainty (U):

$U = k * U_c$ where k is the coverage factor selected.

6.5.4.6 All measurements will be kept in the uncertainty binder in the lab, or stored electronically, including the worksheets generated to record balance measurements.

6.6 OTHER EQUIPMENT PERFORMANCE EVALUATION

6.6.1 Refrigerators and freezers housing standards have thermometers and are checked weekly to ensure they are within established ranges.

6.6.1.1 Current records are kept on the individual refrigerator and archived records will be kept in binders in the Unit.

6.6.1.2 If temperatures are found to be out of range, temperature sensitive materials will be moved to another suitable location.

6.6.1.3 Color and crystal testing reagents do not require specific temperature storage or temperature tracking.

6.6.2 The UV light box is checked at time of use with UV sensitive materials.

6.6.2.1 If the UV box is not working properly (ie the UV sensitive material does not fluoresce), no casework will be conducted using it until the problem is resolved. See section 7.2.

6.6.2.2 Current records are kept near the UV box and archived records will be kept in a binder in the Unit.

6.6.3 Hoods are checked on a monthly basis by a Lab Safety representative.

6.7 USE OF EQUIPMENT

6.7.1 Use and maintenance of equipment will be restricted to those properly trained to do so.

6.8 REAGENT PREPARATION/TESTING

6.8.1 A reagent log will be maintained on all reagents used within the unit and will include:

6.8.1.1 Name of the reagent
6.8.1.2 Type of test it is used for
6.8.1.3 Specific directions for preparation (see section 16)
6.8.1.4 The test used to verify the reagent and the expected results

6.8.1.5 Verification test results

6.8.2 Each reagent will be tested by a analyst prior to use in casework, or being placed in an analyst's hood, with a verified standard.

6.8.2.1 The lot number for the new reagent will not be assigned until the reagent has been verified.

6.8.2.1.1 The test date will indicate the first date of use and will be used as the lot number for the reagent.

6.8.2.2 Results of testing will be recorded in the reagent log along with the initials of the Analyst performing the test.

6.8.2.3 If the expected results are not obtained during reagent verification, the reagent will not be put in to use. See section 7.2.

6.8.3 All reagents located in the main hood or at the Analyst's benches will be tested on a quarterly basis.

6.8.3.1 Analysts will perform the tests on color and crystal test reagents in bench hoods as well as on the color test reagents in the main hood.

6.8.3.2 Test results will be documented in the Color/Crystal Reagent Working Solution QC logs, which are maintained in the forensic chemistry unit reagent log binder.

6.8.3.3 If the results of the checks do not meet acceptable criteria, no casework will be conducted using that reagent until the problem is resolved. See section 7.2.

6.8.4 Stock bottles containing reagents will be labeled with the name of the reagent, a lot number, and specific hazards.

6.8.4.1 Working solutions obtained from the stock bottles will be labeled with the same lot number, as well as with the name of the solution and specific hazards.

6.8.5 Reagents housed in the main fume hood are monitored for label condition.

6.9 STANDARD PREPARATION

6.9.1 A standard log will be maintained on all standards used within the unit and will include:

6.9.1.1 Name of the standard
6.9.1.2 Storage location
6.9.1.3 Manufacturer lot number
6.9.1.4 Expiration dates, if known
6.9.1.5 Lab standard number

6.9.2 Standards must be labeled with the name of the standard, lab standard number, the date received or date inspected, and initials.

6.9.2.1 This does not apply to GCMS vials which must be labeled with the lab standard number at a minimum.

6.9.3 Verification of standards will be done prior to casework via instrumental analysis and manufacturer certificates, when possible.

6.9.3.1 When both is not possible, either of the two is sufficient.

6.9.3.2 The instrumental data will be evaluated as outlined in either sections 11.5-11.7, 12.2-12.3, or 13.2-13.3.

6.9.3.3 Secondary drug standards may be used if they have met verification requirements

6.9.3.4 Standards that do not pass verification will not be used.

6.9.4 Verification information and manufacturer certificates of analysis will be kept in binders labeled "Standard Verifications," located in the Forensic Chemistry Lab.

6.9.5 Verified standards will be identified by a green sticker and the letter "V" for verified. Non-verified standards will be stored in a different location.

6.9.6 Standards will be stored according to manufacturer specifications.

6.9.6.1 Refrigerators and freezers where standards are stored will be monitored weekly using thermometers.

6.9.6.1.1 If temperatures fall out of range, the standard will be verified before use. If the standard cannot be verified it will be discarded.

6.9.7 Use of standards and the checking out/in of standards will be tracked using the appropriate FCU Drug Standard Book.

6.9.7.1 Information tracked will include: standard name and lab lot number, date of check out/check in, analyst's initials, gross weight of the standard at checkout and again at check in, reason for checking out the standard, and verifier's initials.

6.9.7.2 Standards must be checked out/in by the analyst requesting them. Checking out standards is limited to FCU personnel only.

6.9.7.3 Verification will include checking all tracked information, will be done at the time of the check out and again at check in, and must be done by the technical lead of FCU or the FCU supervisor.

6.9.7.2.1 Neither the technical lead nor the supervisor may act as their own verifier.

6.9.7.2.2 If the technical lead is taking out standards and the FCU supervisor is unavailable, trained upper management staff (ie: LabProgram Coordinators

or Manager or the sworn equivalent in lab) may perform the verification.

6.9.7.4 For typical use (i.e. QA checks and preparing GCMS vials) of solid standards other than mushrooms, no more than 0.05 grams of a standard is expected to be used. For mushrooms and liquids, no more than 0.20 grams is expected to be used.

6.9.7.4.1 At the time of check in, the analyst and verifier will check the difference in weight between check out and check in. If the weight is more than 0.05 grams, or more than 0.20 grams for mushrooms and liquids, a QIS must be written by the analyst.

6.9.7.4.2 Any reason that would have caused more of the standard to be used (ex: spillage, performing QA checks in multiple hoods) should be documented in the Standard Book.

6.9.7.5 Standards needed for training will be aliquoted from bulk standards in amounts no greater than 0.10 grams (with the exception of mushrooms, plant materials, liquids, and solid dose training standards such as tablets and capsules).

6.9.7.5.1 Only one tablet or capsule, per standard, can be issued at a time.

6.9.7.5.2 Standards for which too little remains to be aliquoted can be signed out as is.

6.9.7.5.3 Notation will be made in the standard log about who the aliquot is for and will be signed for by the analyst receiving the sample.

6.9.7.5.4 Remaining aliquoted samples will not be reintroduced to the bulk standard.

6.9.7.6 The amount of a standard used for atypical purposes (i.e. validations/verifications, method development, research studies) will be addressed on a case-by-case basis.

6.9.7.7 Transfer of standards between analysts is not allowed.

6.9.7.8 Depletion of standards must also be reflected in the Standard Book.

6.9.8 Standard material may not be removed from its container to be saved for later use by an analyst unless this material has separate tracking (ex: QA packets, Raman training packets).

6.9.8.1 With the exception of training samples as described in 6.9.7.5 and of specifically approved amounts as determined in 6.9.7.6.

6.9.9 To streamline QA testing of reagents and quarterly checks, samples of standards may be placed into appropriate containers/packets

6.9.9.1 When making these packets, the standards used to create them must be properly documented

6.9.9.2 The newly created packets must be given unique identifiers (ex: “QA pack A,” “meth QA sample C”) and added to the Drug Standard Books for tracking.

6.9.9.3 Tracking requirements of these samples are the same as for other standards

6.9.10 Adding standards to the Standards Log and to the Standards Books will be the responsibility of the FCU technical lead or supervisor.

6.9.10.1 Ordering and receiving standards can still be done by analysts and technicians; Verification of standards can still be done by analysts.

6.9.10.2 The individuals performing these tasks are responsible for getting the information or items necessary for tracking and inventory of the standards to the technical lead or supervisor.

6.9.11 The standards will be audited yearly.

6.9.11.1 A minimum of 25% of the standards will be weighed or counted, depending on how they are tracked, each year. Standards to be included in the audit will be randomly selected.

6.9.11.2 Once per accreditation cycle all standards will be in audited.

6.9.11.3 Audits will be conducted by a criminalist, excluding the FCU tech lead and FCU supervisor.

6.9.11.4 Any weight or count discrepancies found during an audit will be written up in a QIS to be shared with the Quality Manager.

7.0 QUALITY ASSURANCE

7.1 GENERAL QUALITY ASSURANCE

7.1.1 General Quality Assurance Policies are covered by the Quality Manual.

7.2 PERFORMANCE CHECKS

7.2.1 If the result of any performance check does not meet acceptable criteria, no casework will be conducted using that piece of equipment, reagent, or standard until the performance problem is resolved.

7.2.1.1 A Quality Incident Summary Form will be filled out, if applicable (see section 7.6).

7.2.2 Whenever possible, the Criminalist or technician discovering the problem should attempt to troubleshoot the issue while communication with the rest of the unit that the piece of equipment, reagent, or standard should temporarily not be used in casework. This communication must be done through the use of a filled out "Troubleshooting" tag, at a minimum.

7.2.2.1 If this issue is temporary, for example the GCMS needs to be baked out due to high air and water after changing the liner, it does not need to be recorded in the maintenance log.

7.2.3 If troubleshooting fails, or the issue is persistent, the Technical Lead or Supervisor will be notified to determine if the piece of equipment, reagent, or standard needs to be pulled from service.

7.2.3.1 If the equipment, solution, or standard needs to be pulled from service, this must be communicated to the rest of the unit through the use of a filled out "Out of Service" tag, at a minimum.

7.2.4 If the issue has potentially affected released casework results the Technical Lead and Supervisor should be notified immediately to evaluate.

7.2.5 All equipment maintenance, and any time a piece of equipment is removed from or returned to service, must be documented in the applicable maintenance log.

7.3 TECHNICAL AND ADMINISTRATIVE REVIEWS

7.3.1 Reports will be technically and administratively reviewed prior to dissemination following established review criteria.

7.3.1.1 Results can be released following a technical review.

7.3.2 Technical reviewers must have a current satisfactory proficiency test or be signed off in the drug category in forensic chemistry.

7.3.2.1 Technicians cannot perform technical review for criminalists.

7.3.3 The reviewers will look at all technical worksheets, datasheets, and printouts within the case packet.

7.3.4 At the completion of their review, the reviewer will sign and date the report and the first page of the Analyst's notes.

7.3.5 Administrative reviews are generally performed by the unit supervisor.

7.3.6 The type of review conducted must be identifiable. If not otherwise specified, a "T" by the initials indicates a technical review, and an "A" indicates an administrative review.

7.3.7 Narcotics database entries are checked and released by the technical reviewer (see section 5.4.4.).

7.3.8 The Analyst that performed the work must address (correct or otherwise resolve) all concerns raised by the technical reviewer.

7.3.8.1 Cases may not be transferred to another technical reviewer because of disagreements in the review process.

7.3.8.2 If no agreement can be reached, the Analyst will consult with the Technical Lead, together with the technical reviewer, to resolve the disagreement.

7.3.8.3 Quality Incident Summary Forms must be filled out, if applicable (see section 7.6).

7.4 CASE REVIEW CRITERIA

TECHNICIAL REVIEW **Performed by qualified Analyst on all preliminary and final reports.**
Name(s), incident number and barcodes (or defined identifiers) are properly recorded on notes and reports
Barcodes (or defined abbreviations) are used to identify items within the note pages
Evidence packaging and seals are described
Proper laboratory approved procedures were used
Tests conducted or attempted and results obtained were documented
Appropriate controls, standards, and blanks were used
Supporting data, records, photos, printouts, diagrams, etc. are included
Instrument operating parameters are recorded
Analyst's results or conclusions are reasonable, appropriate, and supported by the data, notes, and comments
Addresses all technical concerns with the Analyst who performed the analysis.

Consults with the Technical lead, together with the Analyst who performed the analysis, to resolve any conflicts that arise during technical review as necessary
ADMINISTRATIVE REVIEW **Performed by unit supervisor or designee.**
Reports are complete
All pages are numbered appropriately
Writing is legible
Notes and records are permanent (i.e. ink)
Corrections are made by an initialed single strikeout, and date if needed; no info is obliterated or erased
Incident number, Analyst's initials, and dates are on each page
A technical review has been performed by a qualified Analyst

7.5 PROFICIENCY TESTING PROGRAM

7.5.1 Each analyst signed off to do seized drug analysis must satisfactorily complete one proficiency test in seized drug analysis per calendar year.

7.5.1.1 Analysts still in seized drug training may do an intralaboratory comparison in lieu of a proficiency test.

7.5.2 Analysis of the samples will follow the procedures and policies used to test unknown case samples.

7.5.3 All samples will be taken through final analysis.

7.5.4 All results of proficiency and intralaboratory testing must be consistent with the test provider's results to be deemed satisfactory.

7.5.4.1 If the test results are unsatisfactory, the Technical Lead and Supervisor will assess the situation and determine the best course of action.

7.5.4.1.1 Actions may include, but are not limited to, change in procedure, reanalysis of samples, retraining, and removal from casework.

7.5.5 Analysts will be notified of proficiency test results via a Proficiency Test Record form.

7.6 QUALITY INCIDENT SUMMARY FORM

7.6.1 For any equipment failure, unexpected control result, or when a technical policy was violated in the process of analysis, a Quality Incident Summary Form (QIS) must be filled out.

7.6.2 QISs will be filled out by the Criminalist or Technician who discovered the issue when the issue is regarding an equipment failure or unexpected control result. When the issue is regarding a failure to follow a technical policy, the Analyst conducting the analysis will fill out the form.

7.6.3 After filling out all pertinent information on the QIS, the form, along with all supporting documentation, will be submitted to the Technical Lead for tracking and any necessary follow up.

7.6.4 QISs will be tracked and monitored by the Technical Lead to check for trends that could indicate issues such as problems with lab equipment, training inadequacies, or process failures.

7.6.4.1 The Technical Lead will follow up on each issue, and as appropriate:

7.6.4.1.1 Take action to control and correct the issue.

7.6.4.1.2 Address the consequences, to include evaluating potentially effected casework.

7.6.4.1.3 Ensure follow up action is completed and is effective.

7.6.4.1.4 Escalate the issue to a CAR (see Quality Manual).

7.6.5 Copies of QISs will be kept in maintenance, reagent, or standards binders, associated case packets, and/or electronically as appropriate.

7.6.5.1 QISs included in case packets will be treated as notes.

8.0 PROCEDURES FOR COLOR TESTS

8.1 COLOR TESTS (General Procedure)

8.1.1 Transfer small portions of the sample to the depressions of a white spot plate as needed.

8.1.2 Transfer drop-wise volumes of each appropriate color test reagent(s).

8.1.3 Mix regent(s) and sample when necessary.

8.1.4 Allow appropriate time to observe any color reaction. Document results in notes.

8.1.5 Run blanks when appropriate.

8.1.6 A standard may be run for comparison.

8.1.7 Used spot plates are placed in sodium bicarbonate baths.

8.1.7.1 If no reaction has occurred for a given substance and color test reagent combination, the mixture must either be reacted with another color test reagent to obtain a color change prior to being placed in the sodium bicarbonate bath or the liquid from the test must be disposed of into a container of solid sodium bicarbonate for disposal to the drug burn.

8.2 COLOR TESTS (Specific Drugs)

8.2.1 The results of color tests are presumptive and can direct subsequent confirmatory testing. The number of color tests used is at the discretion of the Analyst however, the color tests in bold are required if the results are to be used as a Category C test for the specific drug listed.

8.2.1.1. <u>Amines</u>

Amphetamine:
Wagner: No Reaction
Marquis: Orange or Orange ⟶ Brown
Nitroprusside: No Reaction
Liebermann: Red ⟶ Orange

Methamphetamine:
Wagner: Brown Precipitate
Marquis: Orange or Orange ⟶ Brown
Nitroprusside: Blue
Liebermann: Orange

MDMA: **Wagner:** Brown precipitate
Marquis: Grn and/or Purple → Black
Nitroprusside: Blue
Mecke: Green/Blue

MDA: **Wagner:** Brown Precipitate
Marquis: Grn and/or Purple → Black
Nitroprusside: No Reaction
Mecke: Green/Blue

8.2.1.2. Cocaine

Cocaine: **Wagner:** Brown Precipitate
CoSCN: Blue spots

Cocaine Base: **Wagner:** Weak or No reaction
Wagner/HCl: Brown Precipitate
CoSCN: Blue spots

8.2.1.3. Opiates

Heroin : **Wagner**: Brown Precipitate
Marquis: Purple
Mecke: Green

8.2.1.4. Phencyclidine: Wagner: Weak Brown Precipitate
Wagner/HCl**:** Brown Precipitate
CoSCN: Blue

8.2.1.5. GHB/GBL/1,4-Butanediol

GHB: **Ferric Chloride:** Reddish Orange
Duquenois/Chens #2: Blue/Green
Chens #2: Blue

GBL:
CoSCN: Blue
+HCl**:** Light Green

1, 4 Butanediol:
Lieberman: Fizzy Purple

9.0 PROCEDURES FOR CRYSTAL TESTS

9.1 CRYSTAL TESTS (General Procedure)

9.1.1 Transfer a small portion of the sample to a slide or spot plate well as appropriate for analysis.

9.1.2 Add a small drop of the reagent(s) needed to produce crystals.

9.1.3 Mix the sample and reagent, if needed.

9.1.4 View with a microscope and record the results of the crystal formation.

9.2 CRYSTAL TESTS (Specific Drug Procedures)

9.2.1. Amines

9.2.1.1 Amphetamine/Methamphetamine: Gold Chloride/Phosphoric Acid (Hanging Drop Crystal Test)

9.2.1.1.1 Put a small portion of the sample in a spot plate well

9.2.1.1.2 Add a drop of saturated NaOH to the well and place a drop of gold chloride/phosphoric acid reagent on a microscope slide

9.2.1.1.3 Invert the microscope slide over the spot plate well to allow the fumes produced from the sample to interact with the reagent on the slide

9.2.1.1.4 Allow approximately 2 minutes for the fumes to react with the reagent (longer times may be necessary)

9.2.1.1.5 Invert the slide and examine microscopically with a minimum of 100x magnification

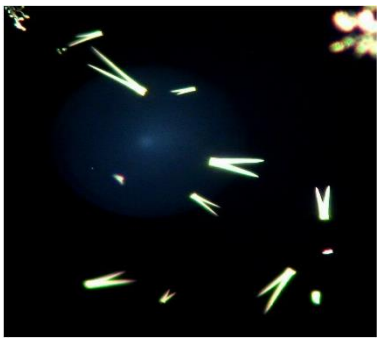
9.2.1.1.5.1 Amphetamine produces fan-shaped crystals (see photo on next page)

9.2.1.1.5.2 Methamphetamine produces clothespin-shaped crystals (see photo on next page)

9.2.1.1.5.3 DL-Methamphetamine produces crystals that appear as clothespin crystals linked back-to-back (see photo on next page)

Amphetamine

Methamphetamine

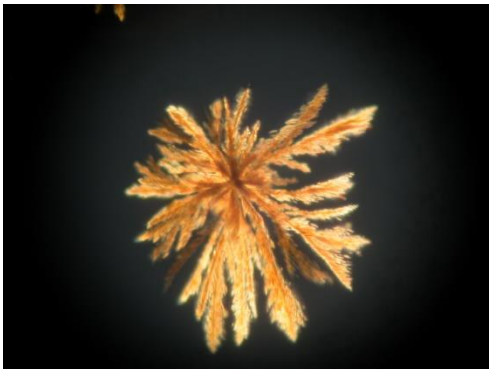


DL Meth

9.2.1.2 MDMA: Gold Chloride (Direct)

9.2.1.2.1 Place a small amount of material on a microscope slide
9.2.1.2.2 Add a small amount of reagent to the material (note: this procedure may be done in reverse where the material is added to the reagent)
9.2.1.2.3 Examine microscopically
9.2.1.2.3.1 Crystals are gold-colored 3-dimensional maple-leaf shapes (see photo below)

MDMA



9.2.2 Cocaine and Cocaine Base: Gold Chloride (Direct)

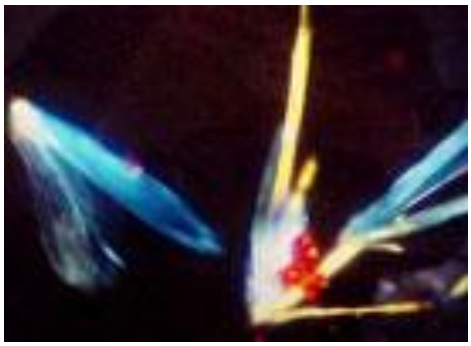
9.2.2.1 Place a small amount of material on a microscope slide
9.2.2.2. Add 1 drop of 0.5N HCl to sample and mix
9.2.2.3 Place one drop of aqueous gold chloride near mixture
9.2.2.4 Mix the two together and examine microscopically with a minimum of 100x magnification
9.2.2.4.1 Crystals are feathered X-shaped crystals (see photo below)

Cocaine

9.2.3 Heroin: Mercuric Iodide

9.2.3.1 Place a small amount of material on a microscope slide
9.2.3.2 Add 1-2 drops of Mercuric Iodide reagent and mix
9.2.3.3 Crystals may take several minutes to grow
9.2.3.4 Examine microscopically
9.2.3.4.1 Additional mixing or adding more reagent and mixing may assist with crystal formation.
9.2.3.4.2 Crystals are gold-colored crystals with blue blades (see photo below)

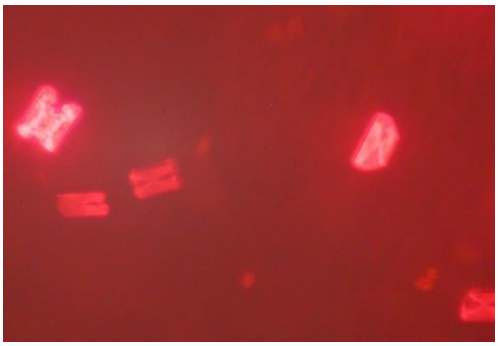
Heroin



9.2.4. PCP: Potassium Permanganate ($KMnO_4$)

9.2.4.1 Place a small amount of material on a microscope slide
9.2.4.2 Add a drop of 0.5N HCl or distilled water to the material
9.2.4.3 Add a few small $KMnO_4$ crystals to the slide and mix
9.2.4.4 Immediately examine microscopically with a minimum of 100x magnification
9.2.4.4.1 Crystals are pink bow-tie shapes (see photo below)

PCP



9.2.5 GHB: Silver Nitrate/Cupric Nitrate

9.2.5.1 Place a small amount of material on a microscope slide
9.2.5.2 Add a drop of reagent to the material on the slide and mix
9.2.5.2.1 OR place a drop of the reagent near the sample and combine via a "neck" by drawing one drop into the other
9.2.5.3 Crystals will often grow on the edges of the drop after about five minutes
9.2.5.4 Examine microscopically
9.2.5.4.1 Crystals are gray plate-like crystals which often are overlapping (see photo below)

GHB

10.0 IDENTIFICATION OF PHARMACEUTICAL PREPARATIONS

10.1 General Apparent Visual and Preliminary Identification Procedures

10.1.1 For a positive visual examination, the type of pharmaceutical (capsule/tablet), the color, shape, and logo/code must all be consistent with the reference description.

10.1.1.1 The following resources can be utilized for visual examinations of pharmaceutical preparations when the manufacturer's code/logo is clearly visible.

10.1.1.1.1 Drug ID Bible
10.1.1.1.2 Rx-ID CD
10.1.1.1.3 Imprint code on the prescription label matching that visible on the tablet or capsule
10.1.1.1.4 On-line drug identification websites
10.1.1.1.5 When a capsule/tablet clearly states the brand name of a non-controlled substance (ex: Motrin, Benadryl, Viagra), and the conclusions will only be that the capsule/tablet is an apparent non-controlled medication, no other reference is needed.

10.1.1.2 A photocopy or printout from a reference source is included in the case notes, when utilized for apparent tablet identifications.

10.1.1.3 If the visual examination leads to an apparent non-controlled medication, testing will be stopped at this point and the tablets/capsules will be listed and/or reported as containing an "apparent non-controlled medication".

10.1.1.4 If the visual examination leads to an apparent controlled substance, further testing is required in order to include the tablets/capsule in the report.

10.1.1.4.1 If the tablets/capsules are not going to be reported, no additional testing is required, but the notes must list the tablets or capsules as "apparent" controlled substance.

10.1.2 For sealed pharmaceutical preparations and liquids, including blister packs, the label information may be used for identification.

10.1.3 For the identification of pills without markings and liquids in unsealed containers, an instrumental or crystal test is required for identification.

10.1.4 If acetaminophen is identified in a tablet, the Analyst must remove the acetaminophen, either chemically or by using an appropriate instrumental method, and retest the sample before reporting no controlled substance detected.

10.2 Final Identification Procedures

10.2.1 A final analysis requires a crystal test with an instrumental test, GC/MS with a standard, or GCMS with a second instrumental test.

11.0 GC/MS ANALYSIS

11.1 General Sample Preparation Guidelines

11.1.1 Powder, Crystal, or other Solid

- 11.1.1.1 Place a small amount, generally about 0.01 grams or less of the material, into a test tube or vial (amount of material may be varied based upon concentration).
- 11.1.1.2 Dissolve in approximately 1-1.5 ml of solvent (typically methanol or hexane).
- 11.1.1.3 Analyze using an appropriate method.

11.1.2 Liquid

- 11.1.2.1 Dilute the liquid into approximately 1 ml of methanol (amount of liquid used is based upon suspected concentration).
- 11.1.2.2 Analyze using an appropriate method.

11.1.3 Other

- 11.1.3.1 Dilute with approximately 1 ml of methanol
  - 11.1.3.1.1 Or extract the sample with the appropriate solutions/methods.
  - 11.1.3.1.2 Concentrate the extract if necessary.
- 11.1.3.2 Analyze using an appropriate method.

11.1.4 An appropriate negative control will be run prior to each sample.

- 11.1.4.1 Case sample results will not be accepted if the blank prior to the case sample contains identifiable peaks attributed to possible carryover, reinjection, or reagent contamination

11.1.5 Unknown sample runs will be labeled with the incident or case number, unique identifier, and the initials of the Analyst working the case.

11.1.6 Instrument printouts are considered the original documentation.

- 11.1.6.1 Any printouts not used to form final conclusions, interpretations, or opinions may be discarded, but the notes must indicate that the test was conducted and why the data was not kept.

11.1.7 All vial placements for unknown runs must be verified by a second analyst or technician. The incident or case number, unique identifier, and vial location must be compared between the sequence sheet and vials.

- 11.7.1 Verifier will initial on the cover sheet for each verification.

11.2 Specific Sample Preparations

11.2.1 Cocaine Base

- 11.2.1.1 Dissolve samples of cocaine base in hexane.
- 11.2.1.2 Analyze using an appropriate method.

11.2.2 LSD

- 11.2.2.1 Liquids
  - 11.2.2.1.1 Dissolve a small amount of sample into approximately 1 ml of methanol.
  - 11.2.2.1.2 Analyze using an appropriate method.
- 11.2.2.2 Sugar cubes
  - 11.2.2.2.1 Examine under UV light (both short and long wavelength) to find the most concentrated spot of fluorescence
  - 11.2.2.2.2 Wash the concentrated area of the cube with methanol dropwise over the spot well.
  - 11.2.2.2.3 Collect the concentrated methanol and place into a test tube.
  - 11.2.2.2.4 Dry down the concentrated methanol.
  - 11.2.2.2.5 Reconstitute with a small amount of methanol.
  - 11.2.2.2.6 Place the sample into a GCMS micro vial insert, and analyze using an appropriate method.
- 11.2.2.3 Blotter paper
  - 11.2.2.3.1 Extract directly with a small amount of methanol.
  - 11.2.2.3.2 Allow the sample to sit in the dark for at least 20 minutes
  - 11.2.2.3.3 Place the sample into a GCMS micro vial insert, and analyze using an appropriate method.
- 11.2.2.4 LSD will be finalized due to the breakdown of the product over time.

11.2.3 PCP

- 11.2.3.1 Plant material,
  - 11.2.3.1.1 Extract by briefly placing a small amount of plant material in a test tube and washing with methanol.
  - 11.2.3.1.2 Vortex the sample for 5-10 seconds and allow the plant material to settle.
  - 11.2.3.1.3 Analyze using an appropriate method.
- 11.2.3.2 Liquid
  - 11.2.3.2.1 Using a microcap, place one drop of the liquid into a vial.
  - 11.2.3.2.2 Add approximately 1.5-2 ml of methanol
  - 11.2.3.2.3 Analyze using an appropriate method.

11.2.4 Steroids

- 11.2.4.1 Using a microcap, place one drop of the liquid into a vial.
- 11.2.4.2 Add approximately 1 ml of methanol.
- 11.2.4.3 Analyze using an appropriate method.

11.2.4.4 To clean-up oil based steroids, an extraction can be done as follows:

11.2.4.4.1 Vortex one part oil containing the steroid with two parts hexanes.

11.2.4.4.2 If the oil and hexane mix, add the methanol to the oil/hexane mixture and vortex.

11.2.4.4.2.1 The steroid will elute into the methanol.

11.2.4.4.2.2 Pull off the methanol layer (top layer).

11.2.4.4.2.3 Analyze using an appropriate method.

11.2.4.4.3 If the oil and hexane solutions do not mix, the steroid will elute into the hexane.

11.2.4.4.3.1 Pull off the hexane layer (hexane layer may be the upper or lower layer depending on the type of oil used in the preparation).

11.2.4.4.3.2 Mix the hexane layer with methanol.

11.2.4.4.3.3 The steroid will elute into the methanol layer.

11.2.4.4.3.4 Pull off the methanol layer (lower layer).

11.2.4.4.3.5 Analyze using an appropriate method.

11.2.5 GHB/GBL/1,4-Butanediol

11.2.5.1 Place one drop of the liquid into a vial.

11.2.5.2 Add approximately 1.5-2 ml of methanol.

11.2.5.3 Analyze using an appropriate method.

11.2.5.4 Note: If GC/MS confirmation is positive for GBL and if GHB crystals were produced, results are reported as GHB. If no crystals were produced during the preliminary tests, results are reported as GHB/GBL.

11.2.6 Tablets

11.2.6.1 Pulverize the tablet, or a portion of, into a fine powder (use enough of the tablet to get approximately 1mg of the active ingredient)

11.2.6.2 Dissolve the material into approximately 1 ml of methanol in a test tube or vial.

11.2.6.3 Mix the sample and then allow the material to settle.

11.2.6.3.1 If the powdered sample was placed directly into a vial, the powder must not be more than approximately 0.25ml. If it is, the liquid must be transferred to a separate vial before instrumental analysis.

11.2.6.4 Analyze using an appropriate method.

11.2.6.5 To clean out unwanted fillers, utilize the following technique:

11.2.6.5.1 Pulverize the tablet, or a portion of, into a fine powder.

11.2.6.5.2 Make an aqueous solution by placing the powder into a test tube and adding approximately 2 ml of water.

11.2.6.5.3 Make the aqueous solution basic by adding 1-2 drops of saturated NaOH.

11.2.6.5.4 Vortex the solution and add approximately 1-2 ml of hexanes to the tube.

11.2.6.5.5 Vortex, then allow the two phases of the solution to separate.

11.2.6.5.6 Remove the hexanes layer and place it into a GC/MS vial for analysis.

11.2.6.5.7 Analyze using an appropriate method.

11.3 Methods

11.3.1 The Analyst will run an appropriate method for the suspected drug.

11.3.2 The current method parameters are retained in the GCMS's methods binder and must be approved by the Technical Lead before being used in casework.

11.3.2.1 Methods will be re-verified any time a substantial change is made to the instrument (ex: changing the column or removing several inches of it).

11.3.2.1.1 Documentation of verification and approval will be included in the methods binder.

11.3.3 Editing or creating methods:

11.3.3.1 Only appropriately trained analysts will be allowed to edit or create methods.

11.3.3.2 Prior to editing an existing method or creating a new method, the analyst will submit a written request to the Technical Lead explaining the reason the change is needed.

11.3.3.3 The Technical lead will determine if the change is appropriate and either approve or deny the request.

11.3.3.4 Methods under development will be named with the analyst's initials to avoid accidental use in casework. If several methods are being developed, they should be stored in a separate folder (ie. The "unverified" folder).

11.3.3.5 Upon completion, the analyst will submit the method parameters, verification form, and chromatographic and spectral printouts showing that the method works as intended to the Technical Lead for approval.

11.3.4 Methods no longer in use will have the end date written on the printout of the parameters and will be archived and kept per the Laboratory's retention policy.

11.4 Reference Standards and Retention Time

11.4.1 Reference standards will be verified prior to being utilized for casework.

11.4.2 Reference spectra of drugs can be acquired and maintained on the GCMSs.

11.4.2.1 Retention time comparisons may only be used when the standard and questioned samples are run using the same instrument and method parameters.

11.4.2.2 Retention times for standards are stable over a period of time, but must be re-established when the instrument conditions are significantly varied (change of method parameters, changing the column, etc.).

11.5 GCMS Unknown Evaluations

11.5.1 Prior to comparisons to standards or libraries, the unknown data will be evaluated for suitability as follows:

11.5.1.1 Negative controls do not include peaks of any drug or controlled substance. Any peaks in the blank are be related to column bleed, phthalates, etc.

11.5.1.2 Unknown peaks of interest are single, smooth, symmetrical, narrow peaks. Some tailing may be present.

11.5.1.3 There is sufficient mass fragments for comparison and identification without saturating the detector.

11.5.2 If the above criteria are not met, no comparisons will be conducted.

11.5.2.1 Printouts do not need to be kept but the notes must reflect the testing that was conducted and why the results were not used for comparison.

11.5.3 Evaluations will be documented in the notes.

11.5.4 Samples may be reanalyzed to obtain better results (ex: different method, change in concentration).

11.5.5 The Analyst will examine all integrated and significant nonintegrated peaks to determine if they are suitable for comparisons.

11.5.6 Any printouts not used to form final conclusions, interpretations, or opinions may be discarded, but the notes must indicate that the test was conducted and why the data was not kept.

11.6 Retention Time Identification

11.6.1 When the retention time of a unknown sample is being utilized as a confirmatory test, the following applies:

11.6.1.1 The retention time of the standard was determined in-house.

11.6.1.2 The standard and the unknown were analyzed under the same instrumental conditions and method.

11.6.1.3 The retention time of the unknown must be within ± 5% of the retention time of the reference standard.

11.7 Mass Spectra Identification

11.7.1 When comparisons are being made to the mass spectrum of an unknown, the following apply:

11.7.1.1 Reference spectra acquired either on the instrument used or stored in a retrievable library (either computer or hard copy) may be used.

11.7.1.1.1 An abbreviated/condensed library spectrum should only be considered a tentative identification.

11.7.1.2 The base peak and other prominent ions of the unknown spectrum should match that of the reference.

11.7.1.2.1 The relative intensities of the prominent ions should agree between the reference and the unknown spectrum.

11.7.1.2.2 Prominent ions with a relative intensity greater than 10% of the base ion in the reference spectrum should be present (depending upon concentration) in the unknown spectrum.

11.7.1.3 There should not be any major differences or additional prominent ions that are not explainable.

11.7.1.4 The overall fragmentation pattern, and relative ion abundances are compared for consistency.

11.7.1.5 The mass spectrum of the unknown should contain the molecular ion, if present in the reference.

12.0 FTIR USER GUIDELINES

12.1 Analyzing Samples

12.1.1 Solids

12.1.1.1 Place enough sample to cover the sample window.

12.1.1.1.1 Avoid damaging the sample window by minimizing its contact with tools.

12.1.1.2 Appropriately close the Golden Gate attachment.

12.1.1.3 Run with an appropriate method.

12.1.1.4 Or, the sample can be dissolved in an appropriate solvent prior to application onto the sample window and run as a liquid (see below).

12.1.2 Liquids

12.1.2.1 Place a drop of sample on the sample window.

12.1.2.2 Run with an appropriate method.

12.1.3 Cast film from a volatile liquid sample

12.1.3.1 Place a drop of sample on the sample window.

12.1.3.2 Allow to evaporate and leave a cast film on the sample window (repeat to layer if necessary).

12.1.3.3 Run with an appropriate method.

12.1.4 An appropriate background will be taken prior to each sample.

12.1.5 Unknown sample runs will be labeled with the incident or case number, unique identifier, and the initials of the Analyst working the case.

12.1.6 Instrument printouts are considered the original documentation.

12.1.6.1 Any printouts not used to form final conclusions, interpretations, or opinions may be discarded, but the notes must indicate that the test was conducted and why the data was not kept.

12.2 FTIR Unknown Evaluations

12.2.1 Prior to comparisons to standards or libraries, the unknown data will be evaluated for suitability as follows:

12.2.1.1 Blanks consisted mainly of broad peak complexes centered approximately around the areas of 2500 and 1300 cm^{-1}. They did not include unexpected significant peaks.

12.2.1.2 The unknown spectra have smooth, well-formed peaks with appropriate reflectance percentages to allow for comparisons.

12.2.1.3 The fingerprint region contains a sufficient amount of peaks to allow for comparison.

12.2.2 If the above criteria are not met, no comparisons will be conducted.

12.2.2.1 Printouts do not need to be kept but the notes must reflect the testing that was conducted and why the results were not used for comparison.

12.2.3 Evaluations will be documented in the notes.

12.2.4 Samples may be reanalyzed to obtain better results (ex: different change in concentration, different sample preparation).

12.2.5 Any printouts not used to form final conclusions, interpretations, or opinions may be discarded, but the notes must indicate that the test was conducted and why the data was not kept.

12.3 Library Matches

12.3.1 When comparisons are being made to the FTIR spectrum of an unknown, the following apply:

12.3.1.1 Reference spectra acquired either on the instrument used or stored in a retrievable library (either computer or hard copy) may be used.

12.3.1.1.1 An abbreviated/condensed library spectrum should only be considered a tentative identification.

12.3.1.2 The principle peaks of the unknown spectrum should match that of the reference.

12.3.1.2.1 The relative intensities of the principle peaks should agree between the reference and the unknown spectrum.

12.3.1.3 There should not be any major differences or additional significant peaks that are not explainable.

12.3.1.4 The peak pattern of the fingerprint region and relative intensities are compared for consistency.

12.4 Printing the Spectrum

12.4.1 At this time spectra should be printed in either black or dark blue, and at a line thickness of 3 or 4 to provide the best resolution when they are scanned for record retention. Requirements are subject to change.

12.5 Additional Information

12.5.1 The spectrum is recorded from 4000 – 650 cm^{-1}, a minimum of 16 scans are used per sample, and the time the last background sample was run is automatically included on the FTIR printout.

13.0 Raman User Guidelines

13.1 Analyzing Samples

13.1.1 Solid or Liquid

13.1.1.1 Place sample into an appropriate package, if not already in one.

13.1.1.2 Place the sample in its package over the circular opening on the universal platform sampling accessory ensuring the sample is over the window.

13.1.1.3 Run an appropriate scan.

13.1.2 Unknown sample runs will be labeled with the incident or case number, unique identifier, and the initials of the Analyst working the case.

13.1.3 Instrument printouts are considered the original documentation.

13.1.3.1 Any printouts not used to form final conclusions, interpretations, or opinions may be discarded, but the notes must indicate that the test was conducted and why the data was not kept.

13.2 Raman Unknown Evaluations

13.2.1 Prior to comparisons to standards or libraries, the unknown data will be evaluated for suitability as follows:

13.2.1.1 The unknown spectra have smooth, well-formed peaks with appropriate reflectance percentages to allow for comparisons.

13.2.1.2 The unknown spectrum contains a sufficient amount of peaks to allow for comparison

13.2.2 If the above criteria are not met, no comparisons will be conducted.

13.2.2.1 Printouts do not need to be kept but the notes must reflect the testing that was conducted and why the results were not used for comparison.

13.2.3 Evaluations will be documented in the notes.

13.2.4 Samples may be reanalyzed to obtain better results (ex: different packaging, different sample preparation).

13.2.5 Any printouts not used to form final conclusions, interpretations, or opinions may be discarded, but the notes must indicate that the test was conducted and why the data was not kept.

13.3 Library Matches

13.3.1 When comparisons are being made to the Raman spectrum of an unknown, the following apply:

13.3.1.1 Reference spectra acquired either on the instrument used or stored in a retrievable library (either computer or hard copy) may be used.

13.3.1.1.1 An abbreviated/condensed library spectrum should only be considered a tentative identification.

13.3.1.2 The principle peaks of the unknown spectrum should match that of the reference.

12.3.1.2.1 The relative intensities of the principle peaks should agree between the reference and the unknown spectrum.

13.3.1.3 There should not be any major differences or additional significant peaks that are not explainable.

13.3.1.4 The overall peak pattern and relative intensities are compared for consistency.

13.4 Printing the Spectrum

13.4.1 At this time, spectra should be printed in either black or dark blue to provide the best resolution when they are scanned for record retention. Requirements are subject to change.

13.5 Subtracting

13.5.1 When a sample to be analyzed is diluted by a known chemical, the chemical can be subtracted from the sample to identify the controlled substance present.

13.5.1.1 Open the chemical spectrum, if saved, or add the spectrum to the same window as the diluted sample.

13.5.1.2 Select both spectra in the display window and click on Subtract in the Process menu.

13.5.1.3 The top spectrum should be the diluted sample. The middle spectrum should be the chemical to subtract. The bottom spectrum is the subtracted diluted sample

13.5.1.3.1 If not, an arrow on the right of the window will switch the order.

13.5.1.4 The subtracted spectrum is changed using the Factor Scale on the left to subtract out the chemical to the desired level.

13.5.1.5 Once done, select “Add” to add the subtracted sample to a new window.

13.5.2 The sample spectrum can now be processed by following the Library Match and Printing steps.

14.0 Botanicals

14.1 Cannabis/Concentrated Cannabis/THC

14.1.1 Cannabis cannot be confirmed at this time due to a percent THC requirement in California law.

14.1.2 All weights for suspected cannabis cases will be reported as gross weights due to California law.

14.1.3 Suspected cannabis cases will have only the active components reported once confirmed (ex "contains THC" or "contains CBD").

14.1.4 Analysis

14.1.4.1 Modified Duquenois-Levine Color Test

14.1.4.1.1 Place some of the material into a test tube

14.1.4.1.2 Cover the material with Duquenois reagent and mix

14.1.4.1.3 Add an approximately equal amount of concentrated HCl and mix

14.1.4.1.3.1 A violet color should form

14.1.4.1.4 Add an approximately equal amount of chloroform

14.1.4.1.3.1 A violet color should form in the $CHCl_3$ layer

14.1.4.1.5 This test can also be run by first extracting the material with petroleum ether, which is then dried down prior to the addition of the Duquenois reagent.

14.1.4.2 GCMS

14.1.4.2.1 A small portion of the sample can be extracted with methanol and analyzed with an appropriate GC/MS method.

14.1.4.2.2 Or, a small portion of the sample can be extracted with petroleum ether, dried down, reconstituted with methanol, and analyzed with an appropriate GC/MS method.

14.1.4.3 Extraction of Cannabinoids from Food Products

14.1.4.3.1 <u>Reagents</u>:
0.2N Methanolic KOH
1.0 N HCl
10% Ethyl Acetate: Hexane

14.1.4.3.2 <u>Extraction Procedure</u>:

14.1.4.3.2.1 Add sample to a 15ml screw-cap conical vial.

14.1.4.3.2.2 Add approximately 4ml hexane to sample vial and vortex until the sample is dissolved.

14.1.4.3.2.3 Add approximately 4ml hexane to an empty vial to act as a negative control.

14.1.4.3.2.4 Add approximately 4ml 0.2N methanolic KOH to each vial and shake for 5 minutes.
14.1.4.3.2.5 Centrifuge to separate the layers.
14.1.4.3.2.6 Remove and discard the top hexane layer.
14.1.4.3.2.7 Add approximately 6ml hexane to each vial and shake for 5 minutes.
14.1.4.3.2.8 Centrifuge and discard the top hexane layer.
14.1.4.3.2.9 Repeat steps 14.1.4.3.2.7. and 14.1.4.3.2.8.
14.1.4.3.2.10 Add approximately 1ml deionized water to each vial.
14.1.4.3.2.11 Add approximately 6ml hexane to each vial and shake for 5 minutes.
14.1.4.3.2.12 Centrifuge and discard top hexane layer.
14.1.4.3.2.13 Add approximately 1.5ml 1.0N HCl to each vial and check pH to ensure the solution is acidic. Add more HCl if necessary.
14.1.4.3.2.14 Add approximately 3ml 10% ethyl acetate: hexane to each vial and shake for 5 minutes.
14.1.4.3.2.15 Centrifuge to separate layers.
14.1.4.3.2.16 Transfer top organic layer to a new tube.
14.1.4.3.2.17 Dry down the organic layer and reconstitute with methanol.
14.1.4.3.2.18 Analyze using an appropriate GCMS method.

Reference: AFIP, Department of Defense Drug Detection Quality Assurance Laboratory: THC Quantitation in Hemp Oil.

14.2 Psilocin/Psilocybin

14.2.1 A preliminary result for psilocin/psilocybin consists of a positive instrumental test with or without color testing.

14.2.2 A final result for psilocin/psilocybin consists of positive preliminary results and an additional positive instrumental result.

14.2.3 Analysis

14.2.3.1 Macroscopic Characteristics Common to Psilocin/Psilocybin Mushrooms
14.2.3.1.1 Fluted stem
14.2.3.1.2 Inky blue coloring on various areas of the stem
14.2.3.1.3 Gold colored crinkled cap
14.2.3.1.4 Dark gills

14.2.3.2 Color Tests

14.2.3.2.1 Scrape or cut very small pieces of the caps and/or stems and place in a spot plate well.

14.2.3.2.2 Apply reagent directly to the pieces of caps or stems.

14.2.3.2.3 <u>Psilocybin</u>

Marquis: Yellow ⟶ Green/Yellow
Mecke : Green/Yellow ⟶ Brown/Green
Weber: Red

14.2.3.2.4 <u>Psilocin</u>

Marquis: Green ⟶ Black
Mecke : Green ⟶ Green/Black
Weber: Red
+ HCl: Blue

14.2.3.3 Extraction and GCMS analysis

14.2.3.3.1 Grind the mushroom material using a mortar and pestle.

14.2.3.3.1.2 For fresh plant material, it may be necessary to place a mushroom cap in a plastic cup containing liquid nitrogen and allow the mushroom to equilibrate prior to grinding.

14.2.3.3.2 Soak in methanol for at least one hour.

14.2.3.3.3 Analyze using the appropriate method.

14.2.3.3.4 Mushroom samples negative for psilocin/psilocybin must be soaked in methanol overnight prior to GCMS analysis in order to be reported as NCSD.

14.2.3.4 When identification is made using GCMS, the results are reported as "psilocin/psilocybin."

14.3 KHAT

14.3.1 The presence of cathinone, with or without cathine/phenylpropanolamine, indicates that the plant material is Khat.

14.3.2 A preliminary result consists of a positive result for the presence of cathinone and/or cathine/phenylpropanolamine with GCMS analysis.

14.3.3 A final result consists of the preliminary result and a GCMS retention time comparison of the unknown and the appropriate standards of cathinone and/or cathine/phenylpropanolamine.

14.3.4 If only cathine/phenylpropanolamine is found, the report will reflect those substances and will not differentiate between the two.

14.3.5 Extraction and GCMS analysis

14.3.5.1 Use approximately 4 grams of dried material or chop up fresh material to obtain the same amount.
14.3.5.2 Place material in a 250 ml Erlenmeyer flask and cover with 0.2N H_2SO_4.
14.3.5.3 Add approximately the same amount of 0.2N H_2SO_4 to a second flask as a negative control.
14.3.5.4 Sonicate flasks in water bath for 30 minutes
14.3.5.5 Pour off liquid through filter funnel into a second 250 ml Erlenmeyer flask
14.3.5.6 Make solutions basic with concentrated NaOH (dropwise until a color change is noted).
14.3.5.7 Add approximately 30 ml of chloroform to each flask. Mix well.
14.3.5.8 Remove the chloroform layer (bottom) using separatory funnel or a by pipetting into large test tubes.
14.3.5.9 Evaporate to dryness using air.
14.3.5.10 Reconstitute in no more than 2 ml of methanol.
14.3.5.11 Analyze using an appropriate GCMS method.

14.4 OPIUM/OPIUM POPPIES

14.4.1 Extraction Procedure for Poppies

14.4.1.1 Fresh Poppies:
- 14.4.1.1.1 Score and extract the sap from the pods
- 14.4.1.1.2 Dissolve the sap in methanol.
  - 14.4.1.1.2.1 Or, freeze dry the pods with liquid nitrogen and grind them into a powder.
  - 14.4.1.1.2.2 Extract powder in methanol about 20 minutes.
- 14.4.1.1.3 Analyze using an appropriate GCMS method.

14.4.1.2 Dried Poppies:
- 14.4.1.2.1 Grind pods to a powder.
- 14.4.1.2.2 Extract powder in methanol about 20 minutes.
- 14.4.1.2.3 Analyze using an appropriate GCMS method.

14.4.2 Three of the five principal alkaloids found in opium (morphine, codeine, thebaine, noscapine, and papaverine) must be present before the sample can be classified as containing opium, or the poppies can be classified as opium poppies, *Papaver somniferium*.

15.0 COURT

15.1 GENERAL

15.1.1 General court policies are covered by the following references:

15.1.1.1 Quality Manual
15.1.1.2 City of San Diego Employee Code of Conduct Handbook
15.1.1.3 SDPD Procedure 1.11

15.2 TESTIMONY REGARDING EFFECTS

15.2.1 Testimony to the physiological effects of seized drug substances are handled by the on-call detective experts in the narcotics section or Bio-Tox.

15.2.2 Criminalists can only testify about general effects of classes of drugs.

15.3 COURT EVALUATIONS

15.3.1 Evaluations will be done a minimum of once per accreditation cycle in each discipline.

15.3.2 Evaluations will be performed by another qualified Criminalist.

15.3.3 If a criminalist has not testified in a discipline during the accreditation cycle, they will notify the QA Manager by email.

15.3.4 Evaluation forms or emails are kept by the QA Manager.

15.4 COURT POLICY

15.4.1 Criminalists generally operate on an "on-call" basis and should not appear on the basis of a subpoena alone.

15.4.2 A criminalist should be placed on-call by the subpoenaing agency when the actual date of the trial is finalized and no later than the day before they are needed to allow time to prepare the court packet.

15.4.3 The subpoenaing agency should maintain close communication with the Criminalist on the day needed and allow a one-hour response time for court.

15.4.4 If a Criminalist is unavailable for court, the unit supervisor will assign another Criminalist to reanalyze the case or have the technical reviewer testify.

15.4.5 When a Criminalist is planning to be away from the office for three or more business days, they must have an out of office memo issued to the district and

city attorneys, put an out of office autoreply on their email, and change their voicemail to an out of office message for the duration of their absence.

15.5 PROCESSING SUBPOENAS FOR DRUG CASES

15.5.1 Subpoenas are placed in the Forensic Chemistry Supervisor's bin for dissemination.

15.5.2 Each Analyst is responsible to follow-up on their subpoenas.

15.5.2.1 The Analyst will need to track their cases electronically and ensure final reports are completed prior to set trial dates.

15.5.3 Court cases can be tracked as follows:

15.5.3.1 Trial-Jury court cases can be checked for readiness hearing dates in SDLaw.

15.5.3.2 To access SDLaw, go to the department intranet. Enter your ID# and your password then select "Log In".

15.5.3.2.1 Type in DA10 followed by a space and then the Prosecutor's Case Number listed on the subpoena and hit enter.

15.5.3.2.2 If the Pros. No. has an "M" or no letter, a Q must be added to the front.

15.5.3.2.3 The number must be 7 digits long. If only 5 are listed, add a 01 (1st defendant), 02 (2nd defendant), etc, at the end.

15.5.3.3 Write the readiness date on each subpoena to follow up.

15.5.3.3.1 If no readiness hearing is listed, you must assume the case is "set"/"confirmed" unless you find out otherwise.

15.5.3.3.2 Sometimes the readiness will have taken place before you check it on the computer. If so, the results will be listed.

15.5.3.4 All "Superior Court" or "Jury-Trial" cases can be checked on the computer a couple of days following the readiness. If not listed, the appropriate phone number on the subpoena must be contacted.

15.5.3.5 Subpoenas with the following readiness result do not need to be finalized and should be marked as such and filed:

VACATED
PC1000
CALLED OFF
PLEAD GUILTY
PRELIMINARY EXAM CONTINUED
SENTENCING INFORMATION
OTHER DISCRETIONARY REASON
ERROR CHANGE EVENT

15.5.3.6 Any subpoenas with the following readiness results must be finalized prior to the trial date:

SET
CONFIRMED

16.0 REAGENT PREPARATION

16.1 0.2N H_2SO_4

16.1.1 Add 2.8 mL concentrated H_2S0_4 to approximately 300 mL of distilled H_2O in a volumetric flask.

16.1.2 Bring up to volume with distilled H_2O.

16.2 0.2N Methanolic KOH

16.2.1 Dissolve 5.611 g KOH into a 500 mL flask containing approximately 400 mL of MeOH.

16.2.2 Bring up to volume with MeOH.

16.3 1.0N HCl

16.3.1 Add 42 mL concentrated HCl to 500 mL flask containing approximately 300 mL of distilled H_2O.

16.3.2 Bring up to volume with distilled H_2O.

16.4 0.5N HCl

16.4.1 Add 21 mL concentrated HCl to 500 mL flask containing approximately 300 mL of distilled H_2O.

16.4.2 Bring up to volume with distilled H_2O.

16.5 10% Ethyl Acetate: Hexane

16.5.1 Combine 10 mL ethyl acetate with 90 mL hexane.

16.6 Chens 2 (1% CuSO4)

16.6.1 Dissolve 1 g of cupric sulfate in 100 mL of H_2O.

16.7 Cobaltous Thiocyanate (CoSCN)

16.7.1 Dissolve 1.0 g of cobalt acetate and 1.5 g potassium thiocyanate in 90 mL H_2O.

16.7.2 Add 10 mL of glacial acetic acid.

16.7.3 Add 100 mL of glycerin.

16.7.4 Mix thoroughly

16.8 Duquenois-Levine

16.8.1 Dissolve 2.8 g Vanillin and 5.8 mL Acetaldehyde in 200 mL of 200 proof Ethanol.

16.8.2 Bring total volume to 400 mL with additional ethanol.

16.9 Ferric Chloride

16.9.1. Dissolve 10.0 g of ferric chloride in 100 mL of H_2O.

16.10 Gold Chloride

16.10.1 Dissolve 1.0 g of gold chloride in 20 mL of H_2O

16.11 Gold Chloride/phosphoric Acid
- 16.11.1 Prepare 1+2 phosphoric acid
  - 16.11.1.1 Add 13.2 mL of conc. phosphoric acid to 6.6 mL of H_2O
- 16.11.2 Dissolve 1.0 g of gold chloride in 20 mL of 1+2 phosphoric acid.

16.12 Lieberman's
- 16.12.1 Dissolve 10.0 g of potassium nitrite in 100 mL of concentrated sulfuric acid.

16.13 Marquis
- 16.13.1 No preparation. Marquis reagent is concentrated Sulfuric Acid and 40% Formaldehyde kept in separate containers.

16.14 Mecke
- 16.14.1 Dissolve 0.25 g of selenious acid in 25 mL of concentrated sulfuric acid.

16.15 Mercuric Iodide
- 16.15.1 Dissolve 5 g of Mercuric Iodide in 73 mL of H_2O.
- 16.15.2 Add 27 mL of concentrated HCl.

16.16 NaOH (Saturated)
- 16.16.1 Add approximately 5 g of NaOH solid to 500 mL of distilled H_2O.
- 16.16.2 Continue adding approximately 5 g of NaOH at a time to the solution until crystals no longer dissolve completely. Note: the total amount needed will be over 500 g but adding larger amounts of NaOH at a time slows dissolution. A water bath is recommended as the process is exothermic.
- 16.16.3 Let sit overnight, there should be a thin crystal layer settled on the bottom.

16.17 Nitroprusside
- 16.17.1 Prepare sodium nitroprusside
  - 16.17.1.1 Dissolve 2.0 g of sodium nitroprusside in 40 mL of MeOH.
  - 16.17.1.2 Add 5 mL of H_2O.
  - 16.17.1.3 Add 5 mL acetaldehyde.
- 16.17.2 Prepare 2% sodium carbonate
  - 16.17.2.1 Dissolve 2.0 g of sodium carbonate in 100 mL of H_2O.

16.18 Platinum (Platinic) Chloride
- 16.18.1 Dissolve 1.0 g of chloroplatinic acid in 20 mL of H_2O.

16.19 Potassium Permanganate ($KMnO_4$)
- 16.19.1 No preparation, Potassium permanganate used in crystal form

16.20 Silver Nitrate
- 16.20.1 Dissolve 100 mg of silver nitrate and 100 mg of cupric nitrate in 10 mL of distilled H_2O.

16.21 Wagner
- 16.21.1 Dissolve 1.27 g of iodine and 2.75 g potassium iodide in 5 mL of distilled H_2O.

16.21.2 Bring volume to 100 mL with distilled H_2O.

16.22 Weber

16.22.1 Dissolve a small amount of Fast Blue B in approximately 2 mL of H_2O. Color should be light straw.

16.2.2 This solution must be made the day of use.

17.0 APPROVED ABBREVIATIONS

Definition	Abbreviation (no regard to capilalization or periods)
side 1 and side two (tab/cap)	< >
Acetaminophen	APAP, ACETA
Administrative Review	A, AR
Aliquot	ALQ
Alprazolam	Alp
Aluminum	Al
Amount	Amt
Apparent	App
Barcode	BC
Black	Blk
Blue	Bl
Bottle	Btl
Brown	Brn
Cannabidiol	CBD
Capsule, Capsules	Cap, Caps
Carry over	C/O
Cellophane	Cello
Change due to tech review	TR
Chunky material	CHM
Chunky white material	CWM
Chunky powder	CHP
Chunky powder material	CHPM
Cigarette	Cig
Cocaine	Coc
Combined	Comb
Concentration	Conc

Container	©
Container containing	C^2
Containing	$\overline{C}$
crystal/crystalline material	CM
Cut to open	CTO
Desiccant packet	des
Did not label	DNL
Each	ea
Envelope	Env
Estimated	Est
Faint	Ft
Federally	Fed
Federally Controlled	FC
Federally Controlled Medication	FCM
Fentanyl	Fen
Flash	Fl.
Fragment	Frag
Factory Sealed Packet	FSP
Green	Grn or Gr
Gross weight	GW
Heat Sealed	HS
Heroin	Her
Hexane	Hex
Hydrocodone	Hydro
Initial Color Observed, Turned to Second Color	→
Color containing a color, or 2 sides of tablets or capsules	_____/_____
Identification	ID
Including/ Included	Inc.
knotted	k
Knotted plastic	kp
Knotted plastic baggie(s)	Kpb(s)
Labelled to contain	LTC

Light	Lt
Manila Envelope	ME
Marijuana	MJ
Material	Mtl, Mtrl, Matl, Mat
Methamphetamine	Meth
Mushroom(s)	mush
Net weight	NW
No Change	No Δ
No Controlled Substance Detected	NCSD
No initials on seal	NIOS
No Reaction	NR, No Rxn, -
Not a/non Controlled	NC
Not a/non Controlled Substance	NCS
Non-Controlled Medication	NCM
Not Laboratory Examined	NLE
Opioids	OPS
Orange	Or, O, and Org
Over the Counter	OTC
Oxycodone	Oxy
Paper	Ppr
Paper bag	Ppr b
Paraphernalia	Para
Piece	pc
Plant	Plnt
Plastic Baggie	PB
Positive Reaction	+
Possible	poss
Powder material	PM
Precipitate	Ppt
Prescription	Rx
Prosecution	Pros
Purple	Purp

Reaction	Rxn
Rectangular	Rec
Residue	Res
Residue amount of debris	RAD
Rock-like material	RM
Room Temperature	RT
Sealed	Sld
Slight	Slt.
Small	Sm
Tablet, Tablets	Tab, Tabs
Tar/Tar-like material	TM
Technical Review	T, TR
Total Gross Weight	TGW
Total Net Weight	TNW
Universal	Uni
Very	V
Volume	Vol
Weight	Wt
White material	wm
White powder / white powder material	Wp / wpm
Ziploc	Zip
Ziploc Plastic Baggie	Zip Pb, zpb