Ventura County Sheriff's Office
Forensic Services Bureau

Forensic Services Handbook
The Bureau reserves the right to reject work that is beyond its scope of abilities, or which it is not prepared to complete in a timely manner. The laboratory will notify the submitting party when work is rejected by notifying the investigating officer via email.

Updates to this handbook will be made available electronically on the Ventura County Sheriff’s Office website at [http://www.vcsd.org/](http://www.vcsd.org/).
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Ventura County Sheriff's Forensic Services Bureau

Alcohol
Forensic Services Handbook
I. SERVICES PROVIDED

A. The Forensic Alcohol Section of the Forensic Sciences Laboratory (FSL or the Laboratory) analyzes blood and urine samples for the presence and concentration of ethyl alcohol in cases of driving under the influence, other criminal cases, and to assist in the determination of cause of death. The section may also analyze beverage samples when requested.

B. The section is responsible for the evidentiary breath testing program in Ventura County.

1. State regulations require that only those models of breath instruments approved by the United States Department of Transportation may be used by law enforcement to test the breath of drivers for alcohol. The Forensic Sciences Laboratory uses the AlcoSensor V-XL @ Point of Arrest breath testing instruments in its breath alcohol testing program.

2. The AlcoSensor V-XL@ Point of Arrest instruments are portable roadside breath testing instruments that can be used in both evidential and screening modes. These instruments are deployed to all of the local law enforcement agencies in the county.

3. The section performs calibration and maintenance procedures on all the AlcoSensor V-XL@ Point of Arrest instruments.

4. The section trains officers on the use of the AlcoSensor V-XL @ Point of Arrest instruments and Title 17 requirements for performing subject breath testing in California.

C. The section provides expert testimony on analyses performed in the section or on instruments maintained by the Laboratory.

D. The Laboratory complies with Forensic Alcohol Analysis pursuant to Title 17 of the California Code of Regulations governed by the California Department of Public Health (CDPH).

II. EVIDENCE SUBMISSION (bodily fluids and beverage samples)

A. An Electronic Request for Analysis (ERFA) must be completed and submitted to the Forensic Sciences Laboratory. All required fields for blood or urine collection on the ERFA must be filled out, including the “Exam Requests” and the “Requested Exam Type” sections for each item being submitted. Samples will be assigned for alcohol analysis based on the “Requested Exam Type.”

B. The Forensic Sciences Laboratory supplies blood and urine collection kits to all law enforcement agencies in the county. The kits include instructions for the
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collection and submission of blood and urine samples. The labels supplied with the kits must be filled out completely. The information on the ERFA must be the same as it appears on the vial.

C. The Laboratory provides the following sample submission guidelines:

1. When both “Alcohol Content” and “Toxicological Analysis” (drugs other than alcohol in bodily fluids) are requested on a case, the alcohol will be analyzed first.

2. When both alcohol and toxicological analysis are requested, samples will only be assigned to the Forensic Toxicology Section when the alcohol result for the sample is below 0.080 % (W/V).

3. The blood vial or urine container should be sealed with the supplied evidence tape and the officer sealing the container must place their initials on the seal. Only kits supplied by the Laboratory should be used.

4. When submitting beverage or pruno samples for analysis, a portion of the sample should be transferred to a urine container supplied by the Laboratory that contains the preservative. Unpreserved samples will only be tested on the approval of the Forensic Alcohol Section Supervising Forensic Scientist or designee.

5. Samples that cannot be submitted promptly should be refrigerated to prevent the loss of any alcohol present. Blood and urine samples should never be exposed to unnecessary heat (e.g., in the hot trunk of a vehicle).

III. METHODS OF ANALYSIS (bodily fluids and beverage samples)

A. The Laboratory utilizes methods of analysis that are generally accepted in the scientific community and appropriate for the analysis being performed.

B. Submitted bodily fluid (blood and urine) and beverage samples are analyzed utilizing a headspace gas chromatograph with a flame ionization detector (GC/FID).

   1. The samples are analyzed in a batch along with multiple requisite standards; therefore, it is difficult to perform an analysis on short notice or to give immediate results.

   2. Requests for “rush” or “expedited” analysis should be brought to the attention of the Forensic Alcohol Section Supervising Forensic
IV. SCOPE OF ANALYSIS (bodily fluids and beverage samples)

A. The following compounds are routinely tested:
   1. Ethyl alcohol (confirmed and quantitated).

B. The following compounds may be identified but not quantitated:
   1. Methyl alcohol (methanol);
   2. Acetaldehyde;
   3. Isopropyl alcohol (isopropanol);
   4. Acetone.

C. Ethyl alcohol quantitation in alcoholic beverages and pruno samples may be performed upon request.

D. When alcohol analysis is requested on sexual assault kits, only the blood sample will be analyzed for alcohol content; the urine sample will only be analyzed by special request and upon approval of the Forensic Alcohol Section Supervising Forensic Scientist or designee.

E. If the Laboratory cannot perform an analysis, the case may be sent to an outside laboratory for analysis as a toxicology request. The cost of the analysis will be discussed with the submitting agency or District Attorney’s (DA’s) Office before the sample is sent out for any analysis not previously agreed upon, and where the submitting agency or DA’s Office would be responsible for the cost of the analysis.

F. If the Laboratory knows prior to the ERFA being accepted that the Laboratory cannot perform the analysis, the request will be declined. It is the responsibility of the submitting or requesting agency to send the sample to the laboratory of their choice that performs the analysis being sought. If there are questions on whether the Laboratory can perform a particular analysis, please contact the Forensic Alcohol Section Supervising Forensic Scientist or designee at [Redacted].

V. RESULTS OF ANALYSIS AND REPORTING (bodily fluids and beverage samples)

A. Results of alcohol analysis are considered a conclusion of the analyst performing the test.
1. The analyst who authored the report is qualified to testify regarding the conclusions or results of the analyses.

B. The Laboratory may provide interpretation or opinions of the results of analyses for consultation or testimony purposes.

1. Please contact the Forensic Alcohol Section Supervising Forensic Scientist or designee at [redacted] for information about the personnel qualified to testify to the interpretation of the result or alcohol impairment testimony.

VI. MEASUREMENT UNCERTAINTY

A. Measurement Uncertainty is the variability associated with a quantitative measurement result based on the information known about the measurement method.

B. Reporting a quantitative amount of ethyl alcohol is considered to be a measurement that requires a corresponding uncertainty of measurement.

C. The uncertainty will be reported for blood and urine sample results that are between 0.020 g/100mL and 0.500 g/100mL.

D. The uncertainty for breath alcohol is applied to the reports generated from calibration procedures. A summary of the uncertainty may also be provided when requested.

VII. TESTIMONY

A. Forensic Alcohol scientists are qualified to testify about the methodology and procedures employed on the analysis of casework in the section.

B. Forensic Alcohol scientists testify to the breath testing instrumentation maintained by the Laboratory, including calibration checks, calibration adjustments, maintenance, subject test results, and procedures.

C. Forensic Alcohol scientists testify to requirements of Title 17 of the California Code of Regulations in relation to alcohol testing.

D. Forensic Alcohol scientists testify to interpretation of alcohol results and concentration as well as alcohol impairment, when they have completed the required training and are competent on the subject matter. This testimony will only be applied to results from analyses performed by the Laboratory or results from instrumentation maintained by the Laboratory.
E. Forensic Alcohol scientists will not testify to the analysis of alcohol performed by an outside laboratory or on breath instrumentation not maintained by the Laboratory.
Ventura County Sheriff's Forensic Sciences Laboratory

Comparative Analysis
Forensic Services Handbook
I. SERVICES PROVIDED

A. The Comparative Analysis Section analyzes clothing, liquids, and other material samples suspected of being involved in a crime. One of the major questions to be answered by the analyst is what investigative lead can be determined and given to the investigating officers.

B. The Laboratory also provides expert testimony in comparative analysis for court purposes.

II. EVIDENCE SUBMISSION

A. An Electronic Request for Analysis (ERFA) must be completed and submitted to the Forensic Sciences Laboratory. All required fields on the ERFA must be filled out, including the “Exam Requests” section for each item being submitted and the type of exam requested.

B. It is important that the source of each item be described, including the name of the suspect when more than one is involved. This information assists the analyst in determining whether or not an item meets the Laboratory criteria for examination. It also permits the Laboratory to associate the examination results with a specific item and source in the laboratory report.

C. The Laboratory provides the following evidence packaging guidelines. If evidence does not meet the submission guidelines, the laboratory will return the evidence unexamined for appropriate repackaging.

   1. Do not submit items that the agency does not want examined. In order to minimize the number of items handled by Laboratory staff and reduce the amount of time spent cataloging and marking evidence, only those items which need to be examined should be submitted to the laboratory.

   2. All items should be packaged in such a way to prevent loss, deleterious changes, contamination, or transfer.

   3. Envelopes, paper bags, paint cans, or boxes must be sealed with evidence tape. K-PAKS should be heat-sealed. The seal shall be initialed by the officer or property personnel placing the evidence in the packaging.

      a. All cardboard boxes must have the top and bottom flaps sealed with tape and initialed. The seals must prevent the escape of the
contents and ensure that future entrance into the package is obvious.

4. When results need to be expedited, a request should be made to the Comparative Analysis Supervising Forensic Scientist or designee at [insert contact information].
   a. Typically, cases will be examined in order by date of receipt in the Laboratory and in order of seriousness of the crime.
   b. It is important in expedited cases that the evidence be forwarded rapidly to the laboratory to provide Laboratory staff sufficient time to complete the analyses.

5. Cases requiring fingerprint analysis or DNA analysis should be submitted to the Fingerprint or DNA Section prior to submission for comparative analysis.

III. METHODS OF ANALYSIS

A. The Laboratory utilizes methods of analysis that are generally accepted in the scientific community and appropriate for the analysis being performed. These include:
   - Presumptive color/chemical tests for blood;
   - Macroscopic examination (for color, texture, appearance, and markings on evidence);
   - Microscopic examination;
   - Gas Chromatography-Mass Spectrometry (GC/MS) for ignitable liquids;

B. The following analysis guidelines have been adopted by the Laboratory:

1. The type and extent of services performed by the Laboratory will be determined based on the type of crime and the circumstances of the case.

2. The analyst receiving the evidence will screen the request for compliance with this policy. The analyst assigned to the case will determine the particular analyses to be performed.

3. Limited laboratory staffing and resources prevent the examination of all confiscated items in each case. Consequently, guidelines have been developed to ensure the efficient and successful analysis of cases for the criminal justice system while minimizing unnecessary examinations by Laboratory staff members.
IV. SCOPE OF ANALYSIS

A. The following is a list of evidence that is typically examined by the Comparative Analysis Section. The Laboratory is not limited in scope to this list and has the capacity to analyze other items. The turnaround time for analysis varies depending upon the complexity of the case.

- Clothing;
- Vehicles;
- Shoes;
- Photographs;
- Burned material;

B. The Comparative Analysis Section cannot perform confirmatory analyses on paint, glass, hair, and fibers. It is the responsibility of the submitting agency to send the sample to the laboratory of their choice that performs the analysis being sought. If there are questions on whether the Laboratory can perform a particular analysis, please contact the Comparative Analysis Section Supervising Forensic Scientist or designee at [Contact Information].

V. RESULTS OF ANALYSIS AND REPORTING

A. Results of comparative analysis cases are considered a conclusion of the analyst performing the test. The analyst who authored the report is qualified to testify regarding the conclusions or results of analyses.

B. The laboratory may provide interpretation or opinions of the results of analyses for consultation or testimony purposes. Please contact the person who signed the report at [Contact Information] for information about the report.
I. SERVICES PROVIDED

A. The Laboratory analyzes powders, liquids, tablets, capsules, plant material samples, as well as other materials suspected of being or containing controlled substances. The major question to be answered by the drug analyst is what, if any, controlled substances are present in the sample.

B. The Laboratory also provides expert testimony on controlled substance analysis for court purposes.

II. EVIDENCE SUBMISSION

A. An Electronic Request for Analysis (ERFA) must be completed and submitted to the Forensic Sciences Laboratory. All required fields on the ERFA must be filled out, including the “Exam Requests” section for each item being submitted and the type of exam requested.

B. It is important that the source of each item be described, including the name of the suspect when more than one is involved. This information assists the analyst in determining whether or not an item meets the Laboratory criteria for examination. It also assists the Laboratory in associating the examination results with a specific item and source in the laboratory report.

C. The Laboratory provides the following evidence submission, handling, and packaging guidelines. If evidence does not meet the submission guidelines, the laboratory will return the evidence unexamined for appropriate repackaging.

   1. Always use caution when handling any type of drug evidence. Some drugs, like LSD, can be absorbed through the skin (transdermal absorption).

   2. Do not submit items that the agency does not want examined. In order to minimize the number of items handled by Laboratory staff and reduce the amount of time spent cataloging and marking evidence, only those items which need to be examined should be submitted to the Laboratory.
      a. Agency instructions to the laboratory to examine or not examine certain items may be taken into account.

   3. Do not submit paraphernalia that is not to be analyzed. Items such as cigarette paper, money, roach clips, coin purses, coke spoons, cigarette packages, empty packaging materials, etc., should be separated from the items to be analyzed and retained by the agency.
4. **Do not place loose items in the envelope.** All items should be packaged in such a way to prevent loss, deleterious changes, contamination, or transfer. Pills, cigarettes, bindles, etc., should be placed in another layer of packaging or container before placing into the outer evidence packaging.

5. **Do not submit syringes.** The contents of syringes must be transferred to glass vials for submission. The Laboratory will ONLY accept syringes for drug analysis when the syringe contains a drug sold prepackaged in a syringe (e.g., steroids).

6. **Do not submit wet plant material.** Plant material must be dried by the submitting agency prior to submission to the laboratory. Wet plant material will be returned to the submitting agency for drying (and repackaging, if appropriate) before analysis. Submitted plant material that has mold, mildew, or has decayed will not be weighed or analyzed.

7. Suspected LSD and psilocybin mushrooms should be packaged in a way that minimizes exposure to light (e.g., evidence envelope, paper bag). The psychoactive components are light sensitive and exposure to light may cause decay of these components and diminish the scientist’s ability to confirm the presence of the drug.

8. **Do not submit used NIK kits to the laboratory.** These should be neutralized and disposed of by the agency.

9. **Envelopes, paper bags, or boxes must be sealed with evidence tape. Plastic pouches (K-paks) should be heat sealed.** The seal must be initialed by the officer or property personnel placing the evidence in the packaging.

    a. All cardboard boxes must have the top and bottom flaps sealed with tape and initialed. The seals must prevent the escape of the contents and ensure that future entrance into the package is obvious.

10. When results are needed for an in-custody case or for investigative purposes, a request should be made to the Controlled Substances Supervising Forensic Scientist or designee to expedite the analysis. There is a turn-around time of approximately five business days on expedited analysis of simple possession cases and 48 hours for in-custody cases.
a. Typically, cases will be examined in order by date of receipt in the Laboratory. The normal turn-around time for simple possession cases is approximately fifteen business days.

b. It is important in expedited cases that the evidence be forwarded rapidly to the Laboratory in order to provide laboratory staff sufficient time to complete the analysis.

11. Cases requiring fingerprint analysis should be submitted to the Fingerprint Section prior to submission for drug analysis.

III. METHODS OF ANALYSIS

A. The Laboratory utilizes methods of analysis that are generally accepted in the scientific community and appropriate for the analysis being performed. These include:

1. Presumptive color/chemical tests;
2. Microscopic examination;
3. Gas chromatography with nitrogen/phosphorous and flame ionization detectors (GC/NPD/FID);
4. Gas chromatography-mass spectrometry (GC/MS);
5. Fourier transform infrared spectroscopy (FTIR);
6. Raman spectroscopy (Raman);
7. Macroscopic examination (for color, texture, appearance, and markings on evidence).

B. Typically, the samples are initially screened by chemical testing and then confirmed by a gas chromatography-mass spectrometry (GC/MS) or Fourier transform infrared spectroscopy (FTIR). Additional instrumentation may be used as necessary.

1. Cannabis samples (e.g. plant material, hash, oil) are analyzed for the presence of tetrahydrocannabinol.

C. The following analysis guidelines have been adopted by the Laboratory:

1. The type and extent of services performed by the Laboratory will be determined based on the type of crime and the circumstances of the case.

2. The analyst receiving the evidence will screen the request for compliance with this policy. The analyst assigned to the case will determine the particular analyses to be performed.
3. Limited Laboratory staffing and resources prevent the examination of all confiscated items in each case. Consequently, guidelines have been developed to ensure the efficient and successful analysis of cases for the criminal justice system while minimizing unnecessary examinations by Laboratory staff members.

4. In general, when a submission contains items from different drug schedules, the items chosen for analysis are selected based on the following:
   a. The item that most closely meets the offense code listed
   b. The item with the most weight
   c. The item found on the suspect
   d. The schedule of the drugs

D. The following is a general description of the guidelines employed by the analyst in determining the analyses to be performed on a case:

1. **Possession**: In cases where the suspect is charged with possession of a controlled substance, the Laboratory may examine only one item or unit within an item (e.g., one bindle out of ten) to meet the charged offense. For example, if several powders that are the same in appearance are submitted from a single individual, only one of them will be analyzed. If multiple items of the same drug are submitted in the same case from two different suspects, one item from each suspect will be analyzed.
   a. Only the weight of the items examined may be reported. Items which are already in a dosage unit form (e.g., tablets, capsules) may not be weighed; however, the total number or approximate number will be reported.
   b. Because of these restrictions in the number of items that will be examined by the Laboratory, it is important for the submitting agency to select those items for submission that are most important to the case and to clearly specify on the ERFA the location from which each item was obtained.
   c. If multiple offenses are charged for the same suspect, additional items may need to be analyzed to meet the additional offenses

2. **Sales**: When the charge is sales or possession for sale of a controlled substance (H&S 11351, 11352, 11353, 11359, 11378, and 11379), and multiple items of the same suspected controlled substance in a similar form are submitted, a minimum of one item shall be sampled for
analysis. When more than one type of a Schedule I or II drug is submitted, one of each type will be analyzed, up to a maximum of three. It is not necessary to analyze every item, particularly for charging the suspect or for a preliminary hearing. A statement may be included in the laboratory report that the material in the unexamined units was the same in appearance as the examined one. A total gross weight with packaging of all of the material (when similar in appearance) within the item examined will be given. An estimated total net weight may be reported when the material and the packaging are similar to the extent of being virtually identical and is considered appropriate by the analyst.

3. **Enhancement:** Additional analysis for penalty enhancements will only be performed upon special request and upon approval of the section supervisor or designee. The section supervisor should be contacted when these requests are submitted.

4. **Cultivation:** When submitting plant material from a “grow,” not all of the material needs to be submitted to the Laboratory. A representative sampling should be submitted; it should be noted by the submitting agency that the item(s) submitted are only a portion of the larger item. Items that have been packaged in plastic before drying thoroughly can mold and decay very rapidly. This may alter the Laboratory’s ability to identify the plant and may pose a health hazard. Therefore, plants **must** be submitted dry. Samples that are submitted wet or in improper packaging will be returned to the submitting agency for drying or repackaging **before** examination.

5. **Pharmaceutical Drugs:** When pharmaceutical drugs are submitted to the Laboratory for analysis, only reference identification will be performed; instrumental analysis will be performed as needed. When instrumental analysis of pharmaceutical drugs is performed and the sample contains a mixture of controlled and non-controlled substances, only the controlled substance in the mixture is typically confirmed. When multiple types of tablets with different markings are submitted, the higher scheduled tablets will be identified, if possible.

### IV. SCOPE OF ANALYSIS

A. The following is a list of drugs that can be identified by the Laboratory. The Laboratory is not limited in scope to this list and has the capacity to analyze other drugs provided suitable standard reference materials are available. The turnaround time for analysis can be delayed depending on the availability of reference material. Some drugs on the list are not controlled substances and may be reported out as “No Controlled Drugs Detected.”
1. AMPHETAMINES/PHENETHYLAMINES
   a. Amphetamine
   b. Benzphetamine
   c. β-Phenethylamine
   d. Dimethylamphetamine
   e. Ephedrine and/or Pseudoephedrine
   f. Ethylamphetamine
   g. Fluoroamphetamine
   h. Fluoromethamphetamine
   i. Mephentermine
   j. Methamphetamine
   k. Methoxymethyl phenethylamine
   l. Methylphenidate
   m. N,N-Dimethylamphetamine
   n. Phenidimetrazine
   o. Phenmetrazine
   p. Phentermine
   q. 4-Methoxyamphetamine
   r. Other amphetamine or phenethylamine compounds

2. OPIOIDS
   a. 6-Acetylcocaineine
   b. 6-Monoacetylmorphine
   c. Apomorphine
   d. Butorphanol
   e. Buphrenorphine
   f. Codeine
   g. Dextropropoxyphene
   h. Dihydrocodeine
   i. Ethylmorphine
   j. Fentanyl
   k. Heroin
   l. Hydrocodone (Dihydrocodeinone)
   m. Hydromorphone
   n. Meperidine
   o. Methadone
   p. Morphine
   q. Nalorphine
   r. Norcodeine
   s. Normorphine
   t. Noscapine
   u. Opium
   v. Oxycodone
   w. Oxymorphone
   x. Papaverine
   y. Propoxyphene
z. Thebaine
   aa. Other opioids

3. CAINES
   a. Benzocaine
   b. Cocaine base
   c. Cocaine hydrochloride
   d. Egonine
   e. Lidocaine
   f. Mepivacaine
   g. Norcocaine
   h. Piperocaine
   i. Procaine
   j. Tetracaine
   k. Other caines

4. CANNABIS
   a. Cannabidiol
   b. Cannabinol
   c. Marijuana plants
   d. Tetrahydrocannabinol (THC)

5. DISSOCIATIVE ANESTHETICS
   a. Ketamine
   b. Phencyclidine (PCP) phenylcyclohexylpiperidine
   c. Piperidinocyclohexanecarbonitrile (PCC)

6. HALLUCINOGENS
   a. 2,5-Dimethoxy-4-bromoamphetamine (2C-B, Nexus)
   b. 2,5-Dimethoxyphenyl-2-aminopropane
   c. 2,5-Dimethoxy-4-iodoamphetamine (DOI)
   d. 2,5-Dimethoxy-4-n-propylphenethylamine (2C-T-7)
   e. 3,4-Methylenedioxymethamphetamine (MDMA)
   f. 3,4-Methylenedioxyethylamphetamine (MDE)
   g. 3,4-Methylenedioxymethamphetamine (MDMA)
   h. 4-Chloro-2,5-dimethoxyamphetamine
   i. 4-Methyl-2,5-dimethoxyamphetamine (DOM)
   j. 5-Methoxy-N,N-dimethyltryptamine
   k. Bufotenine
   l. Diethyltryptamine (DET)
   m. Dimethylamphetamine
   n. Dimethyltryptamine (DMT)
   o. Harmaline
   p. Harmine
   q. Lysergic acid methylpropylamide (LAMPA)
   r. Lysergic acid
s. Lysergic acid diethylamide (LSD)
t. Mescaline
t. Methoxyamphetamine
v. Methyltryptamine
w. N,N-Diethyltryptamine
x. N,N-Diisopropyl-5-methoxytryptamine (FOXY)
y. N-Acetylmescaline
z. Peyote
aa. p-Methoxyamphetamine (PMA)
bb. Psilocin and / or Psilocybin
cc. Other hallucinogens

7. BARBITURATES
   a. Allobarbital
   b. Amobarbital
   c. Aprobarbital
   d. Barbital
   e. Butabarbital
   f. Butalbital
   g. Hexobarbital
   h. Mephobarbital
   i. Methabrital
   j. Pentobarbital
   k. Phenobarbital
   l. Secobarbital
   m. Thiopental
   n. Other barbituric acid derivatives

8. BENZODIAZEPINES
   a. Alprazolam
   b. Bromazepam
   c. Chlorazepate
d. Chlordiazepoxide
   e. Clobazam
   f. Clonazepam
g. Desalkylflurazepam
   h. Diazepam
   i. Estazolam
   j. Flunitrazepam
   k. Flurazepam
   l. Halazepam
   m. Lorazepam
   n. Medazepam
   o. Midazolam
   p. Nitrazepam
   q. Nordiazepam
r. Oxazepam
s. Prazepam
t. Phenazepam
u. Temazepam
v. Other benzodiazepines

9. STEROIDS
   a. 17α-Methandrost-17β-ol-3-one (Mestaline)
   b. 17α-Methyltestosterone
   c. 17β-Dihydroandrosterone
   d. 19-Nortestosterone
   e. 19-Nortestosterone 17-decanoate
   f. Androlone
   g. Androstenediol
   h. Androstenediol dipropionate
   i. Androstenedione
   j. Androsterone
   k. Boldenone
   l. Boldenone undecylenate
   m. Dihydrotestosterone benzoate
   n. Mesterolone
   o. Methandriol
   p. Methandrostenolone
   q. Methenolone
   r. Nandrolone
   s. Nandrolone decanoate
   t. Nandrolone phenpropionate
   u. Nandrolone propionate
   v. Norethandrolone
   w. Normethandrolone
   x. Oxandrolone
   y. Oxymetholone
   z. Stanozolol
   aa. Testosterone
   bb. Testosterone 17ß-cypionate
   cc. Testosterone 17-phenylpropionate
   dd. Testosterone decanoate
   ee. Testosterone enanthate
   ff. Testosterone isocaproate
   gg. Testosterone propionate
   hh. Trenbolone
   ii. Trenbolone acetate
   jj. Trenbolone enanthate
   kk. Other steroids

10. CATHINONES
a. Methylethcathinone (MEC)
b. Buphedrone
c. Butylone
d. Cathine
e. Cathinone
f. Ethylene
g. 4-Methylmethcathinone
h. Mephedrone
i. Methcathinone
j. Methylone
k. Pentedrone
l. Pentylone
m. Other cathinones

11. TRYP TAMINES
   b. 5-Methoxy-α-methyltryptamine (5-MeO-AMT)
   c. N,N-Diisopropyl-5-methoxytryptamine (5-MeO-DIPT)
   d. 5-Methoxy-N,N-dimethyltryptamine (5-MeO-DMT)
   e. 5-Methoxy-N-methyl-N-isopropyltryptamine (5-MeO-MIPT)
   f. α-Methyltryptamine (AMT)
   g. N,N-Diisopropyltryptamine (DIPT)
   h. N,N,-Dimethyltryptamine (DMT)
   i. Other tryptamines

12. PIPERAZINES
   a. 1-Benzylpiperazine (BZP)
   c. 1,4-Dibenzylpiperazine (DBZP)
   d. 1-(3-Chlorophenyl)piperazine (mCPP)
   e. 1-(3-Methoxyphenyl)piperazine (mMeOPP)
   f. 1-(α,α,α-Trifluoro-m-tolyl)-piperazine (TFMPP)
   g. Other piperazines

13. SYNTHETIC CANNABINODS
   a. Most JWH compounds
   b. Other synthetic cannabinoids

14. MISCELLANEOUS
   a. Acetaminophen
   b. Amitriptyline
   c. Baclofen
d. Caffeine
e. Carisoprodol
f. Clenbuterol
g. Cyclobenzaprine
h. Dextromethorphan
   i. Diethylpropion
B. If the Laboratory cannot perform certain analyses (e.g., quantitative analysis, nitrous oxide testing, lead testing, dust off, etc.), the Laboratory will decline the request for analysis. It is the responsibility of the agency to send the sample to the laboratory of their choice that performs the analysis being sought. If there are questions on whether the Laboratory can perform a particular analysis, please contact the Controlled Substances Section Supervising Forensic Scientist or designee at [redacted].

V. RESULTS OF ANALYSIS AND REPORTING

A. Results of drug analysis are considered a conclusion of the analyst performing the test.

1. The analyst who authored the report is qualified to testify regarding the conclusions or results of analyses.

B. The laboratory may provide interpretation or opinions of the results of analyses for consultation or testimony purposes.
1. Please contact the Controlled Substances Section Supervising Forensic Scientist or designee at [redacted] for information.

VI. MEASUREMENT UNCERTAINTY

A. Measurement Uncertainty is the variability associated with a quantitative measurement result based on the information known about the measurement method.

B. Drugs weights are considered to be a measurement that matters as legal enhancements may be charged if certain weight limits are exceeded.

C. The uncertainty for the net weight of material will be reported when the material has reached or exceeded a weight enhancement.
Ventura County Sheriff's Forensic Services Bureau

Crime Scene Investigation Unit
Forensic Services Handbook
I. SERVICES PROVIDED

A. The Field Evidence Technicians (FETs) in the Crime Scene Investigation Unit provide crime scene documentation and processing in the field. The documentation is normally performed using digital photography, measurements, sketches, and notes. The processing tasks include many techniques including evidence collection, shoe impression casting, fingerprint processing, and swab collection. Vehicles may be booked into the Bureau for processing also.

B. The Forensic Scientists in the Crime Scene Investigation Unit perform bloodstain pattern analysis, the enhancement of bloody impressions, body fluid stain location, and bullet trajectory analysis in the field. Items may also be submitted to the Bureau for bloodstain pattern analysis.

C. Complicated crime scenes, such as homicides and officer-involved shootings, can involve various staff members. It is essential that the evidence processing aspects of the scene are coordinated so that personnel can act as a team in the field. These cases will rely on the law enforcement investigators and Bureau personnel to communicate effectively in the field.

II. EVIDENCE SUBMISSION

A. All requests for an FET or a Forensic Scientist must be made through the Patrol Watch Commander or the on scene supervisor. It shall be the responsibility of the Watch Commander or the on scene supervisor to evaluate all requests and determine the need for an FET or a Forensic Scientist. The Watch Commander will make the necessary request to the CSI Unit. The Watch Commander can contact members of the CSI Unit, the Acting CSI Supervisor, the Assistant Laboratory Manager, or the Forensic Services Bureau Manager for advice on whether a response is warranted.

1. The request is typically a phone call from the Watch Commander or from Sheriff’s Communication Center staff.
2. The request for crime scene processing in the field will be received and documented in writing by the CSIU staff.

B. For items or vehicles submitted to the Bureau, an Electronic Request for Analysis (ERFA) must be completed and submitted along with the evidence. These requests will be for items with bloodstain patterns or vehicles. Refer to the Sheriff’s Property Manual regarding the booking of evidence.
III. METHODS OF ANALYSIS

A. The Bureau utilizes methods of analysis that are generally accepted in the scientific community and appropriate for the analysis being performed. Standard Operating Procedures (SOPs) exist in the Bureau for these methods.

B. The appropriate field techniques from the SOPs will be used. If a technique cannot be applied in the field that may be available in a controlled laboratory environment, the item will be collected and preserved for later analysis.

IV. SCOPE OF ANALYSIS

A. The CSI Unit should not be dispatched on the following types of calls, unless special circumstances justify their response:

1. Vehicle burglaries when the stolen articles are of minor value;
2. Petty theft from vehicles (tires, batteries, etc.);
3. Out of county stolen vehicles;
4. Attempted entry or attempted burglary;
5. Malicious mischief;
6. Illegal dumping.

B. The CSI Unit should not be dispatched for the sole purpose of recovering or transporting property or items (including the service of search warrants).

1. The CSI Unit will not transport items listed as “Found Property,” “Safekeeping,” or “Destruction,” unless special circumstances arise.
2. The CSI Unit should not be called out to deliver alcohol kits, DNA kits, rape kits, or packaging supplies unless emergency circumstances justify their response. These kits should be available at the hospitals or the PTDF Watch Commander/Sergeant’s Office.
3. Unless involved in a persons crime, narcotics will not be transported by the CSI Unit due to the requirement for weighing them and performing a presumptive test (reference the Property Manual).

C. For submitted items, it will likely be necessary for the investigator to discuss the request with a member of the CSIU prior to the evidence being analyzed.

1. For vehicles, an investigator will likely need to be present during some portion or all of the documentation.
2. For bloodstain cases, the circumstances of the case will need to be relayed to the analyst at some point during the interpretation. Many conclusions in bloodstain pattern interpretation are directly related to proving or disproving a statement by a witness or a hypothetical situation.
V. RESULTS OF ANALYSIS AND REPORTING

A. Results of field tests are considered a conclusion of the analyst performing the test.

1. These results are sometimes crucial to the investigation and may be shared as a preliminary finding in the field. If a result is shared, it will be noted in the scene documentation.
2. The completed documentation of the field tests will be in the final report for that case.
3. The analyst who authored the report is qualified to testify regarding the conclusions or results of analyses.

B. For every crime scene response by Bureau personnel, a report will be issued covering the activities at the crime scene and the results of any testing done. The primary responder will be the author of the report and may cover some activities performed by the assisting responder(s) at the same crime scene. The photographs taken during the response will be maintained on the Sheriff’s Imaging Storage Sever and can be made available to investigators upon request.

C. The primary responder that wrote the report will be responsible to testify to the content of the report. The CSI Unit personnel that performed each task will be responsible for testifying to the techniques used in the case and may be called to testify. Each CSI Unit member is responsible for their conclusions made, the photographs taken during analysis, the contents of their notes, and the contents of their report.
I. SERVICES PROVIDED

A. The Fingerprint Unit provides latent print processing for items collected at crime scenes and submitted to the Bureau.

B. The Fingerprint Unit provides evaluation of latent prints collected at crime scenes and entry of latent prints into the Automated Fingerprint Identification System (AFIS) database. AFIS is comprised of a local database of Ventura County, a state database maintained by the California Department of Justice (DOJ), and the national database maintained by the FBI.

C. The Fingerprint Unit provides comparison of latent prints to known print exemplars from individuals.

D. The Fingerprint Unit can access the AFIS database to provide fingerprint data and comparisons for outside agencies, including the Medical Examiner’s Office and the District Attorney’s Office.

II. REQUESTS FOR SERVICE AND EVIDENCE SUBMISSION

A. An Electronic Request for Analysis (ERFA) must be completed and submitted to the Bureau along with the evidence.

B. Any request for fingerprint comparison to a suspect requires the individual’s Criminal Information and Identification (CII) Number on the request.

C. Refer to the Sheriff’s Property Manual regarding the booking of evidence.

D. Please contact the Acting Fingerprint Unit Supervisor at [redacted] for any request that is time sensitive. Fingerprint work can be prioritized, and routinely is prioritized, if there is an urgent need for investigation or for court purposes.

III. METHODS OF ANALYSIS

A. The Bureau utilizes methods of analysis that are generally accepted in the scientific community and appropriate for the analysis being performed. Standard Operating Procedures (SOPs) exist in the Bureau for these methods.

B. Many techniques are available for the processing of evidence in search of latent ridge detail. Below is a partial list of the most common types of processing techniques:

1. Physical processing techniques
   a. Powders;
b. Superglue (cyanoacrylate) fuming;
c. Small particle reagent.
2. Chemical processing techniques
   a. Ninhydrin;
   b. Dye stains;
   c. Blood enhancement reagents.
3. Various additional techniques can be used for specific surface types.

IV. SCOPE OF ANALYSIS

A. Any type of item may be suitable for fingerprint processing.
   1. Smooth surfaces are the best for developing latent ridge detail.
   2. Textured surfaces are likely not amenable to latent print processing.
   3. Porous items, such as paper, are a relatively good material to successfully develop latent prints.

B. If a case is still open, all latent prints collected in the field will be evaluated and, if found to be suitable, entered into AFIS.

C. For submitted items that have multiple requests in the Bureau, it will likely be necessary for the investigator to discuss the request with a member of the Bureau prior to the evidence being analyzed.
   1. Certain items with DNA and fingerprint requests may need to be processed using only one fingerprint processing technique.
   2. A decision may need to be made where only fingerprint processing OR only the collection of DNA is performed because both techniques cannot be done on that surface without compromising the other type of evidence.
   3. Sequencing the processing of bloody items may require a DNA scientist to assist in the collection of the stains prior to fingerprint processing.
   4. Firearms requiring fingerprint processing, DNA collection, and firearms requests will need to be properly sequenced.

D. The fingerprint examiner may contact the investigator on older cases to check on the investigative status of a case prior to starting a fingerprint comparison.

E. Comparison requests for the identification of in-custody individuals from the District Attorney’s Office will require information on the arrest dates for the records that will be used in the comparison.

F. Comparison requests of deceased individuals will likely require communication with Medical Examiner staff to clarify the records needed.
V. RESULTS OF ANALYSIS AND REPORTING

A. For all fingerprint work done, a report will be issued covering the activities taken, results obtained, and/or conclusions made.

B. Results of fingerprint processing, AFIS entry, and comparison are considered a conclusion of the analyst performing the test.

C. AFIS entry is a screening tool for latent prints. AFIS “hits” from the database may be provided to the requesting agency without a completed comparison as an investigative lead as long as the “hit” is listed as not being confirmed. An additional report will be issued for cases where a comparison is done.

D. The Fingerprint Unit personnel that performed the tasks will be responsible for testifying to the techniques used in the case, the conclusions made, the photographs taken during analysis, the contents of their notes, and the contents of their report.
Ventura County Sheriff's Forensic Sciences Laboratory

Firearms
Forensic Services Handbook
I. SERVICES PROVIDED

A. Firearm and Toolmark Section of the Forensic Sciences Laboratory (FSL or the Laboratory) analyzes firearms, ammunition, ammunition components, clothing and other items believed to have been involved in shooting incidents, and tools and toolmarks, in criminal cases.

B. The Firearms Section also provides expert testimony on firearm and toolmark analysis, firearms operability, distance determinations, and bullet path analysis.

C. The Firearms Section is also responsible for the National Integrated Ballistic Information Network (NIBIN) program in Ventura County.

II. EVIDENCE SUBMISSION

A. An Electronic Request for Analysis (ERFA) must be completed and submitted to the Forensic Sciences Laboratory. All required fields on the ERFA must be filled out, including the "Exam Requests" section for each item being submitted and the type of exam requested.

Please note that the "Date Evidence Recovered" is a critical field when being used to search for possibly related cases using NIBIN.

B. The Laboratory provides the following sample submission guidelines:

1. The evidence container should be tape sealed and the officer sealing the container should place their initials on the seal.

2. Firearms submitted to the Property Room need to have either a green sticker or a red sticker. The green sticker indicates that the firearm is unloaded and the red sticker means that the firearm is loaded. The person submitting the evidence needs to initial the green or red sticker.

G. The Laboratory utilizes methods of analysis that are generally accepted in the scientific community and appropriate for the analysis being performed.

H. Requests for “rush” or “expedited” analysis should be brought to the attention of the Firearms Section Supervising Forensic Scientist at

III. SCOPE OF ANALYSIS

A. The following types of evidence are routinely examined:

- Bullets;
- Cartridge cases;
- Shotshells;
• Live ammunition;
• Guns;
• Tools;
• Vehicles;
• Clothing.

B. The following chemical elements and compounds may also be identified:

• Copper;
• Lead;
• Nitrites.

C. The following types of examinations can be carried out by the Firearms Section:

• Firearms malfunction examination;
• Trigger pull determination;
• Rendering firearms safe (including the removal of rust from firearms);
• Caliber, shot and wadding determination;
• Microscopic examination of debris on projectiles and cartridge cases;
• General rifling characteristics (GRC) determination on fired bullets;
• Bore and chamber casting for caliber determination of firearms;
• Barrel length and overall length measurements of firearms;
• Casting of toolmarks;
• Lock examination;
• Serial number restoration;
• Bullet hole and range determination;
• Physical matching;
• Trace metal detection;
• Trajectory and bullet path analyses;
• Velocity determination;
• Cartridge case ejection pattern examination;
• X-ray of firearms;
• Full-auto (machinegun) examination;
• IBIS BrassTrax-3D;
• TESCAN SEM-EDX;
• Smokeless gunpowder analysis with FTIR.

D. The following types of examinations are not carried out by the Firearms Section:

• Gunshot residue testing (GSR);
• High explosives;
• If the Laboratory cannot perform an analysis, the case may be sent to an outside laboratory for analysis. The cost of the analysis will be paid for by the submitting agency or DA’s Office.
E. If there are questions on whether the Laboratory can perform a particular analysis, please contact the Firearms Section Supervising Forensic Scientist or designee at [Redacted]

IV. RESULTS OF ANALYSIS AND REPORTING

a. Results are considered a conclusion of the analyst performing the test. The analyst who authored the report is qualified to testify regarding the conclusions or results of analyses.

b. The laboratory may provide interpretation or opinions of the results of analyses for consultation or testimony purposes. Please contact the person who signed the report at [Redacted] for information about the report.
Ventura County Sheriff's Forensic Sciences Laboratory

Forensic Biology
Forensic Services Handbook
I. SERVICES PROVIDED

A. The Forensic Biology Section:

- Inventories and preserves sexual assault evidence collection kits;
- Screens items of evidence for the presence of blood, semen, and saliva;
- Collects samples from areas of evidence that may contain “touch” DNA (cellular material suitable for DNA analysis that is present on items simply by coming into contact with an individual);
- Examines hairs for suitability for DNA analysis;
- Performs DNA analysis on suitable evidence items for comparison with reference samples from known individuals;
- Enters qualifying evidence and suspect profiles into CODIS (Combined DNA Index System);
- Recommends alternative forms of DNA testing and probabilistic genotyping, when appropriate.
- Facilitates sending evidence to outside laboratories upon request of the submitting agency.

II. REQUEST FOR ANALYSIS SUBMISSION

A. An Electronic Request for Analysis (ERFA) must be completed and submitted to the Forensic Sciences Laboratory. If the following sections are not adequately filled out, the ERFA will be sent back with a request for more information:

- The “Details of Investigation” section must contain all of the pertinent information about the submitted evidence and how it relates to the crime.
- The “Exam Requests” section must contain a description of the evidence items submitted. For example, “swabs” is not descriptive enough; “swabs taken from the point of entry” is descriptive enough.

III. CASE SUBMISSION GUIDELINES

A. AUTHORIZATION TO CONSUME THE DNA EVIDENCE

If the evidence sample submitted for analysis is a “touch” sample, then the Laboratory requires that authorization to consume the DNA evidence be given to us. This should be from the investigator in the case, or the District Attorney’s (DA’s) Office in cases that already have involvement from the DA’s Office. **Analysis will not proceed until this information is provided.** The best place to provide this information is in the “Details of Investigation” portion of the ERFA.
B. REFERENCE SAMPLES
Reference samples are either blood samples or buccal swabs (a swab of the inside cheek area of a person’s mouth) taken from an individual. These samples are used to obtain a known DNA profile from an individual in the case for comparison to evidence profiles. Reference samples from victims and suspects must be submitted with the evidence.

C. CASES THAT WILL NOT BE ACCEPTED
At this time, the Laboratory is not accepting the following type of cases for DNA analysis:

- Misdemeanors;
- Drug possession cases.

Exceptions can be made on a case-by-case basis. Please contact the Forensic Biology Supervisor at [ ] to discuss the possibility of an exception on a particular case.

The Laboratory may decide, depending on case particulars, not to process an item on a certain case or a case in general.

D. PATERNITY CASES
The Laboratory will accept paternity cases, including products of conception (living or deceased) and miscarriage. The laboratory report will simply state that a particular person could be or could not be a parent. For a statistical analysis, the Laboratory can send the results to a paternity lab at the user agency’s expense.

E. UNKNOWN OR NO SUSPECT CASES
DNA profiles from possible perpetrators obtained from evidence in crimes with unknown or no suspects are entered into CODIS (Combined DNA Index System) for searching against DNA profiles in the local, state, and national databases. If a match that adds information to an investigation is made between the evidence profile and the local or national databases, the agency will be notified via a written report. If a match that adds information to an investigation is made between the evidence profile and the state database, a notification will be made via CHOP (CODIS Hit Outcome Project). CHOP was developed by the California Department of Justice (DOJ), Bureau of Forensic Services (BFS) in partnership with the Western States Information Network (WSIN). The CHOP database is located within WSIN’s Regional Information Sharing System Network (RISSNET). Information about the match, including the matching person’s name and CII number, is entered into CHOP by DOJ BFS. Then, CHOP sends an alert e-mail to the CODIS Administrator (CA) and the Alternate CODIS Administrator (ACA) notifying them that a match entry is available in CHOP. The CA or ACA logs into CHOP and enters the law enforcement agency, agency case number, offense, and offense date into for
the match entry. CHOP sends an alert e-mail to the CHOP contacts at the law enforcement agency and the District Attorney’s Office. The law enforcement agency CHOP contact logs into CHOP and accesses the information about the match.

Questions regarding CHOP should be directed to the Local CODIS Administrator, Christina Tokatlian, at [redacted].

Prior to analyzing evidence from crimes with no or unknown suspects, the following two requirements must be met:

- If an item is submitted for analysis with the intent of identifying perpetrator DNA and that item is likely to have DNA from people other than the perpetrator, then reference samples must be submitted from the other people. For instance, the perpetrator enters a home and uses a kitchen knife from the counter to stab the victim. The victim reference sample must be submitted, but also any other people that could have used that knife, for instance, a spouse. The Laboratory must eliminate the possibility of entering a victim or uninvolved person’s DNA profile into CODIS. Analysis will not proceed until the necessary samples are provided.

- The Laboratory must have documentation from the submitting agency explaining why the submitted item of evidence is thought to be involved in the crime. For instance, a cigarette butt is submitted for analysis with the simple explanation that it was found in a business after a burglary. The Laboratory needs to document that there is a reason the cigarette butt is thought to be associated with the crime. For instance, a surveillance camera recorded the perpetrator smoking, or the cigarette butt was not in the business prior to the burglary. The best place to provide this information is in the “Details of Investigation” portion of the ERFA.

IV. METHODS OF ANALYSIS

A. The Laboratory uses the following tests to locate and identify possible blood stains, possible saliva, and semen stains:

- Phenolphthalein, Hemastix, luminol, Takayama, Acid phosphatase spot test and mapping, methylumbelliferyl phosphate mapping, ABACard, microscopy, amylase radial diffusion and Phadebus mapping.

B. The Laboratory uses the following tests during DNA analysis:

- DNA is extracted from the samples using a QIAgen EZ1XL robot or phenol/chloroform extraction.
The recovered DNA extracts are evaluated for the quantity of DNA present using the Quantifiler® Trio DNA Quantification Kit. DNA extracts are amplified using the polymerase chain reaction (PCR) of twenty-one short tandem repeat (STR) loci (D3S1358, vWA, D16S539, CSF1PO, TPOX, D8S1179, D21S11, D18S51, D2S441, D19S433, TH01, FGA, D22S1045, D5S818, D13S317, D7S820, SE33, D10S1248, D1S1656, D12S391, and D2S1338), the gender marker Amelogenin, and two Y chromosome specific markers (Y indel and DYS391) using the GlobalFiler™ PCR Amplification Kit.

The amplified DNA is instrumentally analyzed using an Applied Biosystems® 3500 Genetic Analyzer.

The data obtained from the Genetic Analyzer is analyzed using GeneMapper ID-X software.

The Laboratory uses the NIST allele frequency data.
Ventura County Sheriff's Forensic Services Bureau

Toxicology
Forensic Services Handbook
I. TESTING PANELS BY OFFENSE TYPE

A. HS 11550, JUVENILE, PRE-EMPLOYMENT, AND VOP CASES:

1. **Presumptive Testing**

<table>
<thead>
<tr>
<th>BLOOD</th>
<th>URINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Immunoassay (ELISA):</td>
<td>By Immunoassay (EIA):</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>Amphetamines</td>
</tr>
<tr>
<td>Opiates</td>
<td>Opiates</td>
</tr>
<tr>
<td>Cocaine</td>
<td>Cocaine</td>
</tr>
</tbody>
</table>

**Notes:**

a. Upon request by a law enforcement agency and approval by the section supervisor, the laboratory can also screen for other drugs covered under California Health & Safety code 11550.

b. Confirmatory tests for HS 11550, VOP, and juvenile cases are performed upon request of a law enforcement agency only. Confirmatory tests for pre-employment cases are performed automatically.

c. Pre-employment cases are also screened for cannabinoids.

2. **Confirmatory Analyses** of positive or inconclusive screening results are performed by Gas Chromatography-Mass Spectrometry (GC/MS) using Selected Ion Monitoring (SIM) or Scan mode methods or by Liquid Chromatography-Tandem Mass Spectrometry (LC/MS/MS) using Multiple Reaction Monitoring (MRM) acquisition methods or by Gas Chromatography-Nitrogen-Phosphorus Detector-Mass Spectrometry (GC/NPD/MS).

B. DUID AND SEXUAL ASSAULT:

1. **Presumptive Testing**

<table>
<thead>
<tr>
<th>BLOOD</th>
<th>URINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Immunoassay (ELISA):</td>
<td>By Immunoassay (EIA):</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>Amphetamines</td>
</tr>
<tr>
<td>Cocaine</td>
<td>Cocaine</td>
</tr>
<tr>
<td>Opiates</td>
<td>Opiates</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Benzodiazepines</td>
</tr>
<tr>
<td>Cannabinoids</td>
<td>Cannabinoids</td>
</tr>
</tbody>
</table>
C. **Other Offenses** - For other offenses, the drug screen panel will depend on the charge and the section supervisor or designee retains final discretion about the panel.

**Notes:**

a. **Two blood vials are typically necessary to complete confirmatory testing for all possible drugs present in the case.**

b. **Upon request by a law enforcement agency and approval by the section supervisor, the laboratory can also screen for amphetamines, barbiturates, tramadol, fentanyl, methadone, and buprenorphine in blood and urine and acetaminophen, salicylic acid, valproic acid, and synthetic cannabinoids in urine only.**

c. **Carisoprodol and zolpidem may not be included in the presumptive testing of other felony charges not related to driving and sexual assault.**

d. **Confirmatory testing for buprenorphine is performed by an outside laboratory (NMS Labs).**

e. **The toxicological analysis will be assigned to DUI blood cases as follows:**
   
   i. If the requested exam type on the ERFA is alcohol only, it will be tested for alcohol. Toxicological analysis will not be automatically performed on the case when the blood alcohol result is below 0.080%. A law enforcement agency may submit an additional request for toxicological analysis based on the information on the police report.
   
   ii. If the requested exam type on the ERFA is toxicological analysis only, the case will come directly to the Forensic Toxicology Section. Alcohol analysis will not be performed on the case.

   iii. If the requested exam type on the ERFA is alcohol and toxicological analysis, the case will be assigned to the Forensic Toxicology Section only if the blood alcohol result is at or below 0.080%.

2. **Confirmatory analysis** of positive or inconclusive screening results is performed by GC/MS using SIM or Scan mode methods or by LC/MS/MS using MRM acquisition methods or by GC/NPD/MS.
Note: A blood sample whose quantitative analysis generates a result that is greater than the limit of linearity of the assay and whose ion ratios are conserved may be reported as “greater than ______ (highest calibrator)”. Those samples will not be diluted and rerun to bring the result within the calibration curve. If a written request is received, the client will be informed that the sample will be sent to a referral lab at their expense. If an exigent circumstance exists, the supervisor will assess the request.

3. **ADDITIONAL ANALYSIS:**

   i. Identification of acidic/basic/neutral drugs in blood and urine by GC/NPD and GC/MS or GC/NPD/MS. This comprehensive screening detects most, but not all, prescription drugs, designer drugs, and drugs of abuse.

   ii. Quantitation of basic drugs in blood. Drugs identified by the comprehensive screening can be sent out to a reference laboratory for quantitative analysis (refer to the send out section of this handout).

   *Note: When a toxicology case has been completed within the scope of the Toxicology Program, any request for additional analysis will ONLY be performed if the request by a law enforcement agency is supported by observations on the police report. The CRE or DAARF sent by the requesting agency for additional work MUST include the police report or sufficient information about the subject’s evaluation. This information will be required to assess logically and scientifically the signs, symptoms, and behavior displayed by the subject to support the additional testing.*

II. **PRESumptIVE TESTING IN BLOOD**

**Qualitative Analysis of Drugs of Abuse by ELISA (Enzyme-Linked Immunosorbent Assay) using the TECAN instrument:** The micro-plate ELISA is a competitive immunoassay for the qualitative determination of drugs of abuse in bodily fluid samples. The sample, calibrator, or control is added to each well along with enzyme-labeled hapten derivative. There is a competition to bind to the antibody fixed onto the well. The wells are washed, substrate is added, and a color is produced. The absorbance produced (450 nm) is inversely proportional to the amount of drug present in the sample and calibrator/control. The TECAN is an automated system that provides robotic pipetting of the samples and reagents, plate washing, plate reading, and data analysis. The required sample volume is 200 µL.
**CLASS** | **TARGET ANALYTE** | **CUTOFF**
--- | --- | ---
METHAMPHETAMINE Methamphetamine & 40 ng/mL
AMPHETAMINE Amphetamine & 40 ng/mL
COCAINE Benzoylecgonine & 50 ng/mL
OPIATES Morphine & 20 ng/mL
OXYCODONE Oxycodone & 20 ng/mL
BENZODIAZEPINES Clonazepam & 50 ng/mL
BARBITURTES Secobarbital & 100 ng/mL
CANNABINOIDS COOH-THC & 10 ng/mL
CARISOPRODOL Carisoprodol & 500 ng/mL
ZOLPIDEM Zolpidem & 20 ng/mL
TRAMADOL Tramadol & 20 ng/mL
FENTANYL Fentanyl & 2 ng/mL
BUPRENORPHINE Buprenorphine & 1 ng/mL

* Screening kits have different cross reactivity with many structurally related compounds in each class. See manufacturer for cross reactivity data.

**CONFIRMATORY ANALYSES** of positive or inconclusive screening results are performed by Gas Chromatography-Mass Spectrometry (GC/MS) using Selected Ion Monitoring (SIM) methods or by Liquid Chromatography-Tandem Mass Spectrometry (LC/MS/MS) using Multiple Reaction Monitoring (MRM) acquisition methods or by Gas Chromatography-Nitrogen-Phosphorus Detector-Mass Spectrometry (GC/NPD/MS).

** An “inconclusive” screening result means that a weak response was observed for a compound or compounds in the indicated class, but this response was below the laboratory’s reporting cutoff for this assay. Confirmatory testing for this class may or may not yield a positive finding.

### III. CONFIRMATORY TESTS IN BLOOD

1. **Amphetamines by GC/MS**: This method is used to quantitatively and/or qualitatively confirm the presence of amphetamine and methamphetamine in blood samples that previously tested positive by ELISA. This method uses a liquid-liquid extraction followed by GC/MS analysis. MDA and MDMA can also be detected with this method. Phentermine, ephedrine, pseudoephedrine, and phenylpropanolamine do not interfere with this method. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTES</th>
<th>LOD</th>
</tr>
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<tbody>
<tr>
<td>Amphetamine</td>
<td>25 ng/mL</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>25 ng/mL</td>
</tr>
<tr>
<td>MDA</td>
<td>25 ng/mL</td>
</tr>
<tr>
<td>MDMA</td>
<td>25 ng/mL</td>
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</tbody>
</table>
2. **Opiates by GC/MS:** This method is used to quantitatively and/or qualitatively confirm the presence of codeine, morphine, 6-monoacetylmorphine (6-MAM), hydrocodone, hydromorphone, oxycodone, and oxymorphone in blood samples that have previously tested positive for opiates and/or oxycodone by ELISA. This method utilizes a solid-phase extraction technique, oxime derivatization of the keto-opiates (hydrocodone, hydromorphone, oxycodone, oxymorphone) and subsequent silyl derivatization of all seven compounds. Analysis is performed by GC/MS in the SIM mode. This method can be used to identify total morphine if samples are hydrolyzed prior to extraction. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTES</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine</td>
<td>40 ng/mL</td>
</tr>
<tr>
<td>Morphine</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>6-MAM</td>
<td>10 ng/mL</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>20 ng/mL</td>
</tr>
</tbody>
</table>

3. **Cocaine and metabolites by GC/MS:** This method is used to quantitatively and/or qualitatively confirm the presence of cocaine, cocaethylene, and benzoylecgonine in blood samples that previously tested positive by ELISA. This method uses solid-phase extraction, derivatization with BSTFA followed by SIM GC/MS analysis. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTES</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Cocaethylene (CE)</td>
<td>20 ng/mL (qualitative only)</td>
</tr>
<tr>
<td>Benzoylecgonine (BE)</td>
<td>20 ng/mL</td>
</tr>
</tbody>
</table>

4. **Benzodiazepines and Zolpidem Confirmation in Blood Using LC/MS/MS:** This method is used to quantitatively and/or qualitatively confirm the presence of alprazolam, alpha-hydroxyalprazolam, clonazepam, 7-aminoconazepam, lorazepam, flunitrazepam, 7-aminoflunitrazepam, flurazepam, desalkylflurazepam, midazolam, alpha-hydroxymidazolam, chlordiazepoxide, diazepam, nordiazepam, oxazepam, temazepam and zolpidem in blood samples that previously tested positive for benzodiazepines and/or zolpidem by enzyme immunoassay. The method uses solid-phase extraction followed by LC/MS/MS analysis. The required sample volume is 1 mL.
5. **Barbiturates by GC/MS (scan mode):** This method is used to qualitatively confirm the presence of barbiturates in blood samples that previously tested positive by ELISA. The method uses solid-phase extraction followed by GC/MS analysis. The required sample volume is 1 mL.

6. **Cannabinoids by LC/MS/MS:** This method is used to quantitatively and/or qualitatively confirm the presence of delta-9-tetrahydrocannabinol (THC), 11-nor-9-carboxy-delta-9-tetrahydrocannabinol (THC-COOH), and 11-hydroxy-tetrahydrocannabinol (11-OH-THC) in blood samples that previously tested positive by ELISA. The method uses liquid-liquid extraction followed by LC/MS/MS analysis. The required sample volume is 1 mL.

7. **PCP by GC/MS:** This method is used to quantitatively and/or qualitatively confirm the presence of phencyclidine (PCP) in blood samples that previously tested positive by ELISA or GC/MS on scan mode. The
The method uses solid-phase extraction followed by GC/MS SIM analysis. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phencyclidine</td>
<td>3 ng/mL</td>
</tr>
</tbody>
</table>

8. **Carisoprodol by LC/MS/MS**: This method is used to quantitatively and/or qualitatively confirm the presence of carisoprodol and meprobamate in blood samples that previously screened positive by ELISA. The method uses “crash and shoot” sample preparation followed by LC/MS/MS analysis. The required sample volume is 100 µL.

<table>
<thead>
<tr>
<th>ANALYTES</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carisoprodol</td>
<td>250 ng/mL</td>
</tr>
<tr>
<td>Meprobamate</td>
<td>250 ng/mL</td>
</tr>
</tbody>
</table>

IV. PRESUMPTIVE TESTS IN URINE

**Drugs of abuse enzyme immunoassay**: EIA (enzyme immunoassay) is based on the competition of drug-labeled enzyme and free drug in a sample for a fixed amount of specific antibody binding sites. In the absence of free drug in the sample, the antibody binds the drug-enzyme conjugate and the enzyme activity is inhibited. This inhibition creates a direct relationship between drug concentration in the sample and enzyme activity. The enzyme activity is measured spectrophotometrically by its ability to reduce a fixed amount of substrate. The drug concentration in the sample can then be determined. The required sample volume is 250 µL.

<table>
<thead>
<tr>
<th>CLASS</th>
<th>TARGET ANALYTE*</th>
<th>CUTOFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPHETAMINES</td>
<td>d-Methamphetamine</td>
<td>1000 ng/mL</td>
</tr>
<tr>
<td>BARBITURATES</td>
<td>Secobarbital</td>
<td>200 ng/mL</td>
</tr>
<tr>
<td>BENZODIAZEPINES</td>
<td>Lorometazepam</td>
<td>200 ng/mL</td>
</tr>
<tr>
<td>COCAINE</td>
<td>Benzoylecgonine</td>
<td>300 ng/mL</td>
</tr>
<tr>
<td>PCP</td>
<td>Phencyclidine</td>
<td>25 ng/mL</td>
</tr>
<tr>
<td>PROPOXYPHENE</td>
<td>Propxyphene</td>
<td>300 ng/mL</td>
</tr>
<tr>
<td>CANNABINOIDS</td>
<td>COOH-THC</td>
<td>50 ng/ml</td>
</tr>
<tr>
<td>OPIATES</td>
<td>Morphine</td>
<td>300 ng/mL</td>
</tr>
<tr>
<td>CARISOPRODOL</td>
<td>Meprobamate</td>
<td>500 ng/mL</td>
</tr>
<tr>
<td>ACETAMINOPHEN</td>
<td>Acetaminophen (semi-quantitative)</td>
<td>10 µg/mL</td>
</tr>
<tr>
<td>SALICYLIC ACID</td>
<td>Salicylic Acid (semi-quantitative)</td>
<td>100 µg/mL</td>
</tr>
<tr>
<td>VALPROIC ACID</td>
<td>Valproic Acid (semi-quantitative)</td>
<td>10 µg/mL</td>
</tr>
<tr>
<td>METHADONE</td>
<td>Methadone</td>
<td>300 ng/mL</td>
</tr>
<tr>
<td>OXYCODONE</td>
<td>Oxycodeone</td>
<td>100 ng/mL</td>
</tr>
<tr>
<td>BUPRENORPHINE</td>
<td>Buprenorphine</td>
<td>5 ng/mL</td>
</tr>
<tr>
<td>FENTANYL</td>
<td>Fentanyl</td>
<td>2 ng/mL</td>
</tr>
<tr>
<td>K2 (Synthetic cannabinoids)</td>
<td>JWH-018</td>
<td>20 ng/mL</td>
</tr>
</tbody>
</table>
**Screening reagents have different cross reactivity with many structurally related compounds in each class. See **APENDIX II** for cross reactivity data provided by the manufacturer.

Confirmatory analyses of positive or inconclusive screening results are performed by GC/MS using Selected Ion Monitoring (SIM) or Scan mode methods or by LC/MS/MS using MRM acquisition methods or by GC/NPD/MS. Buprenorphine and synthetic cannabinoids confirmations are performed by an outside laboratory and must be approved by the Medical Examiner’s Office prior to the work being undertaken.

**An “inconclusive” screening result means that a weak response was observed for a compound or compounds in the indicated class, but this response was below the laboratory’s reporting cutoff for this assay. Confirmatory testing for this class may or may not yield a positive finding.

V. CONFIRMATORY TESTS IN URINE

1. **Amphetamines confirmation by GC/MS:** This method is used to qualitatively confirm the presence of amphetamine and methamphetamine in urine samples that previously tested positive by enzyme immunoassay. The method uses a solid-phase extraction followed by GC/MS analysis. Ephedrine, pseudoephedrine, phentermine, and phenylpropanolamine do not interfere with this method. The required sample volume is 1 mL.

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine</td>
<td>50 ng/mL</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>50 ng/mL</td>
</tr>
</tbody>
</table>

2. **Cocaine and benzoylcegonine by GC/MS:** This method is used to qualitatively confirm the presence of cocaine and benzoylcegonine in urine samples that previously tested positive by enzyme immunoassay. The method employs a solid-phase extraction technique and subsequent silyl derivatization of benzoylcegonine for improved stability, chromatography, and detectability. Analysis is done by GC/MS in the SIM mode. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Benzoylcegonine</td>
<td>20 ng/mL</td>
</tr>
</tbody>
</table>
3. **Confirmation of codeine, morphine, 6-monoacetylmorphine, hydrocodone, hydromorphone, oxycodone and oxymorphone by GC/MS:** This method is used to qualitatively confirm the presence of codeine, morphine, 6-monoacetylmorphine (6-MAM), hydrocodone, hydromorphone, oxycodone, and oxymorphone in urine samples that have previously tested positive for opiates and/or oxycodone by enzyme immunoassay. This method utilizes a solid-phase extraction technique, oxime derivatization of the keto-opiates (hydrocodone, hydromorphone, oxycodone, oxymorphone) and subsequent silyl derivatization of all seven compounds. Analysis is performed by GC/MS in the SIM mode. The method can be used to identify total morphine if the samples are hydrolyzed prior to extraction. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine:</td>
<td>40 ng/mL</td>
</tr>
<tr>
<td>Morphine:</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>6-MAM:</td>
<td>6 ng/mL</td>
</tr>
<tr>
<td>Hydrocodone:</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Hydromorphone:</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Oxycodone:</td>
<td>20 ng/mL</td>
</tr>
<tr>
<td>Oxymorphone:</td>
<td>40 ng/mL</td>
</tr>
</tbody>
</table>

4. **Barbiturates confirmation by GC/MS (scan mode):** This method is used to qualitatively confirm the presence of barbiturates in urine samples that previously tested positive by enzyme immunoassay. The method uses a solid-phase extraction followed by GC/MS or GC/NPD/MS analysis. The required sample volume is 2 mL.

5. **Benzodiazepines by GC/MS (scan mode):** This method is used to qualitatively confirm the presence of diazepam, nordiazepam, alprazolam (depending on the concentration), clonazepam (depending on the concentration), 7-aminoclonazepam and midazolam in urine samples that previously tested positive by enzyme immunoassay. The method uses a solid-phase extraction followed by GC/MS or GC/NPD/MS analysis. The required sample volume is 2 mL.

*Note: Sample will need to be sent out to an outside laboratory (NMS Labs) for confirmation of any benzodiazepines not detected by this method. Refer to the Send Out section (VIII) on this handbook.*
6. **THC-COOH confirmation by GC/MS:** This method is used to qualitatively confirm the presence of THC-COOH in urine samples that previously tested positive by enzyme immunoassay. The method uses a liquid/liquid extraction followed by GC/MS analysis. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>COOH-THC</td>
<td>10 ng/mL</td>
</tr>
</tbody>
</table>

7. **PCP confirmation by GC/MS:** This method is used to qualitatively confirm the presence of phencyclidine (PCP) in urine samples that previously tested positive by EIA or GC/MS on scan mode. The method uses solid-phase extraction followed by GC/MS analysis. The required sample volume is 2 mL.

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phencyclidine</td>
<td>10 ng/mL</td>
</tr>
</tbody>
</table>

8. **Identification of acidic/basic/neutral drugs in body fluids and tissues:** This method is used to identify acidic/basic/neutral drugs in body fluids and tissues. The method uses a solid-phase extraction followed by injection on the GC/NPD/MS instrument. This analysis is reported as a screening method only. Confirmatory testing requires an extraction of a second sample aliquot followed by injection on to a gas chromatograph-mass spectrometer (GC/MS) instrument. The required sample volume for each extraction is 1 mL of blood and 2 mL of urine.

*Note: For DUID cases, confirmatory testing will be performed only for drugs with the potential for central nervous system impairment.*

**Drugs Commonly Identified in Casework by the Comprehensive Screening:**

- 2-Ethyl-5-methyl-3,3-diphenylpyrrolidine (EMDP)
- 2-Ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine (EDDP)
- 7-aminoclonazepam
- Acetaminophen
- Alprazolam
- Amitriptyline
- Amoxapine
- Amphetamine
- Atropine
- Benzphetamine
- Benztropine
- Brompheniramine
- Bupivicaine
- Bupropion
- Caffeine
- Carbamazepine
- Carbinoxamine
- Carisoprodol
- Chlorcyclizine
- Chlordiazepoxide
- Chloroquine
- Chlorpheniramine
- Chlorpromazine
- Chlorpyramine
Citalopram  Maprotiline
Clomipramine  Meclizine
Clonidine  Meperidine
Clozapine  Mepivacaine
Cocaethylene  Meprobamate
Cocaine  Methadone
Codeine  Methamphetamine
Cotinine  Methapryline
CPP (Trazodone metabolite)  Methaqualone
Cyclazine  Methylphenidate
Cyclobenzaprine  Metoclopramide
Delta-9 Tetrahydrocannabinol (THC)  Metoprolol
Desalkylfluorazepam  Mirtazapine
Desipramine  NAPA (N-acetyl procainamide)
Desmethylclomipramine  Nicotine
Desmethylclozapine  Nifedipine
Desmethyldiazepam (Nordiazepam)  Nomephesine
Desmethyldoxepin  Norchlorcyclizine
Desmethyldoxepin  Norcodeine
Dextromethorphan  Norcyclobenzaprine
Diazepam  Norfluoxetine
Dicyclomine  Norperoxidine
Diltiazem  Nortriptyline
Diphenhydramine  Olanzapine
Doxepin  Orphenadrine
Doxylamine  Oxycodone
Ecgonine Methyl Ester (EME)  Papaverine
Ephedrine/Pseudoephedrine  Paroxetine
Fentanyl  Pentazocine
Fluoxetine  Phencyclidine (PCP)
Fluphenazine  Phendimetrazine
Flupromazine  Pheniramine
Haloperidol  Phenylpropanolamine
Hydrocodone  Phenytoin
Hydroxybupropion  Procainamide
Hydroxyzine  Procaine
Imipramine  Prochlorperazine
Ketamine  Promethazine
Lamotrigine  Propanolol
Laudanosine  Propofol
Levetiracetam  Propoxyphene
Levorphanol  Quetiapine
Librium Breakdown#1  Quinidine
Lidocaine  Quinine
Lidocaine metabolite  Selegiline
Sertraline
Tramadol
Trazodone
Trimethoprim
Trimipramine

VI. TOXICOLGY MEASUREMENT UNCERTAINTY BUDGET

1. Measurement Uncertainty (MU)
   
a. Measurement Uncertainty (Uncertainty of Measurement): Is the variability associated with a quantitative measurement result based on the information known about the measurement method. In practical terms, estimated uncertainty of a measured value is an interval around that value such that any repetition of the measurement will produce a new result that lies within this interval with a stated level of confidence.

b. Reporting a quantitative amount of drug in blood is considered to be a measurement that requires a corresponding uncertainty of measurement. Uncertainty will NOT be determined or reported for analytes that are reported qualitatively (this includes all urine analysis).

c. Due to lack of drug per se legal limits in the state of California, measurement uncertainty for quantitative toxicology testing is not included on the test report, but is available to the customer upon request.

VII. SEND OUT

1. The laboratory sends samples out to a qualified reference laboratory (NMS Labs) to perform analysis of compounds that cannot be detected and/or quantified in-house (e.g., gabapentin, duloxetine, topiramate, buprenorphine, and volatiles). The costs of the testing, the discovery packet, and the testimony from NMS staff are borne by the requesting agency. The sample sent out must be approved by the requesting agency prior to the work being undertaken.
VIII. TESTIMONY

1. The Forensic Toxicology Section scientists are qualified to testify about the methodology and procedures employed on the analysis of casework in the section.

2. The Forensic Toxicology Section scientists may testify to the effects of drugs and/or driving impairment, when they have completed the required training and are competent on the subject matter. The testimony to the effects of drugs may include drugs of abuse and/or prescription drugs.

3. The Forensic Toxicology Section scientists will not testify to the analysis of drugs performed by an outside laboratory.

4. The Forensic Toxicology Section scientists will testify to the effects of drugs that have been chemically tested by the FSB Forensic Toxicology Section. The staff will not testify on cases where “no chemical test” has been done. If it is critical to discuss another drug, a chemical test needs to be ordered first.