Unit Policy Manual

Forensic Biology

SAN DIEGO POLICE DEPARTMENT

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Authored and Approved by: S. Montpetit, DNA Technical Manager

Issuing Authority: J. Simms, Quality Assurance Manager

1.0 QUALITY ASSURANCE

1.1 UNIT DESCRIPTION

The Forensic Biology Unit is comprised of Criminalists, a DNA Technical Manager, and two Supervising Criminalists. The unit is generally staffed from 0700-1700hrs Monday through Friday.

The Forensic Biology Unit is divided into four distinct areas on the 6th floor of the SDPD headquarters building: an area dedicated to the screening of evidence; the main laboratory area which is used for the purposes of screening some items of evidence, the DNA extraction process, and PCR setup; a separate area dedicated to the preparation and analysis of amplified DNA; and the CODIS /report writing area.

1.2 UNIT FUNCTIONS

The Forensic Biology Unit aims to provide analysis on all reasonable requests from any investigative units of the San Diego Police Department using the most current technologies available.

The Forensic Biology Unit's primary duties are to analyze items of physical evidence to locate and identify biological material, and perform DNA analysis on that biological material.

The biological materials that the Unit can presumptively identify, or confirm the presence of, are blood, semen, saliva, and feces. DNA analysis may be performed on all of these materials as well as hair, bone, and other body fluids or tissues.

The DNA testing capabilities of the Forensic Biology Unit include both autosomal and Y-chromosome STR DNA testing, as well as mini STRs. Mitochondrial DNA testing is not currently performed at the San Diego Police Department Crime Laboratory.

Additional duties performed in the Forensic Biology Unit include the validation and implementation of new technologies, courtroom testimony, and crime scene reconstruction.

1.3 PERSONNEL AND JOB DESCRIPTIONS

1.3.1 SUPERVISING CRIMINALIST

The Supervising Criminalist of the Forensic Biology Unit will oversee the Forensic Biology Unit and analysts. The responsibilities will include assigning casework, interacting with attorneys and detectives to determine case priorities, reviewing the work product of all analysts, and monitoring the overall job performance of analysts.

Duties and responsibilities: (The duties of Supervising Criminalist and DNA Technical Manager may be assigned to a single person.)

A. Establishes casework priorities based on negotiations and discussions with investigators and district attorneys.

B. Assigns casework to analysts.

C. Reviews reports and examines case notes.

D. Reviews and evaluates the performance of subordinates.

E. Works with the DNA Technical Manager to review and establish Unit specific policies and analytical procedures when appropriate.

F. Interviews and hires new employees.

G. Trains the new employees on department policies and procedures.

H. Works with the DNA Technical Manager to coordinate analyst training.

I. Keeps track of workload statistics.

J. Prepares budget requests.

K. Holds Unit meetings to disseminate department, laboratory, or unit specific information.

L. Prepares reports as required by the Crime Laboratory Manager.

1.3.2 DNA TECHNICAL MANAGER

The DNA Technical Manager will oversee the technical operation of the DNA Laboratory as outlined by the DNA Advisory Board. The DNA Technical Manager will evaluate new technologies, resolve technical problems, assess and design training programs, and ensure the unit adheres to all quality assurance guidelines. The DNA Technical Manager is authorized to shut down the DNA laboratory should a serious technical problem develop.

Duties and responsibilities:

A. Responsible for the technical operation of the laboratory as outlined by SWGDAM.

B. Reviewing, revising and approving any DNA-related technical policy or procedure prior to final approval by the QA Manager.

C. Approving and overseeing training of new employees (when applicable) in DNA analytical procedures, including completion of training documentation.

D. Overseeing, reviewing and approving DNA method validation, including completion of validation documentation, prior to final approval by QA Manager.

E. Working with the QA Manager on any QA reports involving a DNA technical issue, and reviewing and signing off on those QA reports.

F. Acting as a technical reference for the QA Manager.

G. Performing some technical reviews of DNA case files.

H. Acting as a mediator when necessary in the technical review of DNA casework in the Forensic Biology Unit.

I. Providing technical consultation as needed to the members of the Forensic Biology Unit.

J. Working with Unit Supervisor and QA Manager to ensure compliance of the DNA analysts with QA and Unit policies and procedures.

K. Reviewing the DNA proficiency tests completed by the Forensic Biology Unit.

L. Conducting casework analysis.

M. Prepares reports as required by the Crime Laboratory Manager.

1.3.3 CASEWORK CODIS ADMINISTRATOR

The Casework CODIS Administrator is responsible for the security and integrity of the local CODIS network, the CODIS software, and the data within the local database. The Casework CODIS Administrator ensures the data within the local CODIS database is in compliance with NDIS guidelines. If the Casework CODIS Administrator determines at any point that the CODIS network, software, or entered data has been compromised, the DNA Technical Manager will be immediately notified. The DNA Technical Manager and Casework CODIS Administrator will determine the proper course of action, which ultimately may include shutting down the CODIS network.

Duties and responsibilities:

A. Oversees the entering of DNA profiles from casework into the local database.

B. Ensures that DNA profiles are searched against the local CODIS database.

C. Uploads data to the California CODIS database.

D. Downloads and searches DNA profiles from the CJIS WAN website.

E. Performs upgrades to the CODIS software with the assistance of the CODIS Help Desk.

F. Ensures that a backup is maintained for the information in the local database.

G. Assists in the training of analysts in the operation of CODIS software.

H. Disseminates CODIS information to the rest of the Forensic Biology Unit.

1.3.4 CRIMINALIST (I AND II)

The job descriptions for Criminalist I and II are similar except that Criminalist II duties may be more extensive and Criminalist II analysts are expected to work more independently. In addition to the normal educational requirements of the Criminalist position, DNA Criminalists must complete college-level classes in Biochemistry, Molecular Biology, Genetics, and Statistics and/or Population Biology.

Criminalist I and II's primary duties involve locating and identifying biological material on items of physical evidence and performing DNA analysis. Analysts are required to document all exams, tests, observations, results, summarize the findings in a written report, and if necessary, testify in courts of law.

Duties and responsibilities:

A. Receives, inventories, screens, and preserves items of physical evidence.

B. Locates and identifies biological material.

C. Conducts DNA analysis to determine possible associations between the evidence and any reference samples provided.

D. Writes reports summarizing the findings and provide expert testimony in court.

E. Remains technically current and knowledgeable in appropriate analytical methods.

F. Participates in the evaluation and validation of new technologies or methodologies.

G. Participates in any special projects as assigned by the Supervising Criminalist or Laboratory Manager.

H. Informs the Supervising Criminalist or DNA Technical Manager of problems that develop at any stage of a case.

I. Uses the technical manual, unit policies manual and general quality assurance manual to deal with any procedural question or analytical method.

1.3.5 LABORATORY TECHNICIAN

The laboratory technician functions as a support position for the Forensic Biology Unit. Duties include ordering supplies, calibrating instruments, monitoring operating temperature of equipment, performing routine maintenance of equipment, and cleaning the unit on a weekly schedule. The laboratory technician maintains a database of all chemicals ordered by the Unit. If the position of Laboratory Technician is unfilled the duties and responsibilities will be shared among current employees. Certain functions described above may be performed by volunteers or interns but only under the direct supervision of the laboratory technician or other qualified analyst.

Duties and responsibilities:

A. Checks the calibration of instruments such as pipettes, thermal cyclers, and balances.

B. Orders chemicals and supplies for Forensic Biology

C. Maintains an accurate inventory of all chemicals located in the Unit.

D. Ensures that laboratory instruments, communal work areas, and floors are cleaned and decontaminated.

E. Ensures that the operating temperatures of the Unit ovens, incubators, refrigerators, and freezers are monitored.

F. Ensures that victim, suspect, and physiological, and reference mouth swab kits are prepared for departmental use or for the collection of evidence at area hospitals.

G. Performs other tasks as assigned by the Supervising Criminalist.

1.3.6 INTERN/VOLUNTEERS

The local universities serve as a source of interns and volunteers wishing to gain experience working in a crime laboratory. Interns and volunteers working in the Forensic Biology Unit will typically have earned or are working toward a four-year science degree.

Interns and volunteers will assist the Unit by performing certain clerical duties, cleaning the laboratory work areas and monitoring the operating temperature of equipment. These activities will always be performed under the direct supervision of the Laboratory Technician or Criminalist. The Laboratory Technician is ultimately responsible for making certain any duties completed by the interns and volunteers are performed correctly.

Depending on the experience level of an intern or volunteer they may also be involved in laboratory projects such as the validation of new technologies. This validation work will always be performed under the direct supervision of the DNA Technical Manager.

1.4 TECHNICAL LEAD CONTINGENCY PLAN

The Forensic Biology Unit of the San Diego Police Department currently employs multiple analysts who meet the requirements to be DNA Technical Manager. In the event of a vacancy in the DNA Technical Manager position the Crime Laboratory Manager will interview the candidates and appoint a person to fill the vacancy.

1.5 QUALITY ASSURANCE REVIEWS AND REPORTS

In general, Quality Assurance Reviews will be conducted when policy or method non-compliances are identified in administrative practices, evidence handling, casework, or in proficiency test situations. Additionally, a Quality Assurance Review will be conducted on any incident of Staff DNA Contamination or in any unexpected DNA results in controls that compromise the interpretation or results. If a non-compliance is found to exist, then a Quality Assurance Report will be issued. Additionally, a Quality Assurance Reports will be issued on any incident of Staff DNA Contamination or in any unexpected DNA results in controls that compromise the interpretation of the results. Please see policy 7.5 "Noncompliance review and corrective action protocol" in the General Quality Assurance Manual for further information.

1.6 PROTOCOL FOR UNEXPECTED RESULTS

Detectable DNA results from a reagent blank or amplification blank, unexplainable extraneous DNA results in a positive amplification control, or negative results from a positive control are considered unexpected results. Other types of unexpected results may exist.

Any unexpected results will be documented by the analyst conducting the analysis. The analyst will complete an "unexpected result summary" [*template located on the FB network H:\Worksheets\QA worksheets*] for inclusion in the "Unexpected Result Log". This log will be maintained by the DNA Technical Manager. The DNA Technical Manager and the Supervising Criminalist of the Forensic Biology Unit will be notified of any unexpected results, review, and sign off on the summary. The Quality Assurance Manager will review all unexpected results.

The summary sheet completed by the analyst will contain the following information: The case number, analyst name and ID number, date of summary, date of result, and the definition and evaluation of the problem. The summary will also detail the resolution of problem, if any, as well as the conclusion/result/interpretation. If any protocol, policy, or reagents will be changed as a consequence of the unexpected result then these will be documented as well.

For a data set containing a control (reagent blank, positive amplification, negative amplification control, formamide blanks) with unexpected types to be relied upon, the unexpected results should not affect

the interpretation (the detected types should be sample specific to the control). For any data set containing a control with unexpected detectable DNA types, the unexpected results normally will be disclosed in the report for the associated evidence samples.

1.7 FORENSIC BIOLOGY UNIT INCIDENT LOG

The FB Unit Incident Log will monitor unusual events that occur during casework that:

1. Are corrected prior to the issuance of any reports for the affected cases.
2. Do not ultimately affect the reported results.
3. Do not require formal QA documentation, unless otherwise determined by the DNATechnical Manager or Quality Assurance Manager.

The unusual incidents will be documented by the analyst conducting the analysis. The analyst will complete an "Incident Summary" [*template located on the FB network H:\Worksheets\QA worksheets*] for inclusion in the "FB Incident Log". This log will be maintained by the DNA Technical Manager. The DNA Technical Manager and the Supervising Criminalist of the Forensic Biology Unit will be notified of any unusual incident, review, and sign off on the summary.

The summary sheet completed by the analyst will contain the following information: The case number(s), analyst name and ID number, date of summary, date of the incident, and the definition and evaluation of the problem, as well as its resolution. Supporting documentation, if available, will be provided with the summary.

1.8 PROFICIENCY TESTING

Please refer to the Laboratory Quality Systems manual for additional information on the proficiency testing Program.

Each DNA analyst in the Forensic Biology Unit must complete two proficiency tests in each calendar year with an interval between the tests of no less than four months and no more than eight months. Both of these proficiency tests will be external and will involve body fluid identification and DNA typing. Each screening analyst will be proficiency tested once per calendar year. For DNA proficiency tests, the due date of the proficiency test (as listed by the test provider) will be the date by which these tests are tracked.

Proficiency tests will be worked in the same manner as casework and undergo both technical and administrative review. Under no circumstances should analysts compare proficiency test results prior to submitting them for technical review.

DNA analysts are required to perform at least one organic and one automated DNA extraction per year for the proficiency tests. Both methods may be used on a single proficiency test. Identifiler and Yfiler (for those qualified) must be run on each semiannual proficiency test. Minifiler must be run on proficiency test samples at least once each year.

Results from the DNA proficiency tests will be reported to the Quality Assurance Manager who will submit them to the test provider. When the results from the test provider are available, the DNA Technical Manager will compare the results obtained by each analyst and inform them of the outcome. Analysts will initial their proficiency test packets, acknowledging the outcome, and the test packets will be maintained by the Quality Assurance Manager.

1.9 FORENSIC BIOLOGY COMPUTER NETWORK SYSTEM

The Forensic Biology Unit employs an independent network system comprised of several servers and client computers to share electronic data among criminalists, link instrumentation, maintain a centralized storage of data, and provide a secure connection to the Combined DNA Index System (CODIS).

1.9.1 ELECTRONIC DATA STORAGE

Electronic data is saved on a daily basis (Monday to Friday) on hard drives and tapes. The tapes are secured in a fire proof safe located in the Forensic Biology Server Room when not in use. Every quarter a selected number of tapes will be removed from the Forensic Biology Server room for submission and final disposition at an off-site location. Iron Mountain is the company currently used by the San Diego Police Department for off-site data storage. Contact SDPD Data Systems regarding a schedule pickup and/or retrieval of tapes with the following information: Customer # 106062 and description of tape.

1.10 LITERATURE REVIEW

Analysts within the Forensic Biology Unit will be provided copies of relevant literature (full articles, abstracts, or miscellaneous publications) periodically throughout the year. Analysts will document their review of the circulated literature by indicating they have viewed it on the attached routing slip. The circulated literature and signed routing slips will be maintained by the DNA Technical Manager.

1.11 QUALITY CONTROL AND CRITICAL REAGENTS

The following list contains the reagents deemed critical to the DNA testing process and consists of both, solutions prepared in-house, as well as commercial kits purchased from outside vendors.

All reagents used in the organic extraction of DNA (excluding dithiothreitol (DTT))
Qiagen DNA Investigator Kits
All Quantifiler qPCR Kits
All autosomal or Y-chromosome STR Typing Kits

Reagents/kits are deemed critical if the improper preparation or production of the reagent/kit could lead to an analyst failing to obtain a DNA type or obtaining the incorrect DNA type.

1.11.1 SAMPLES AVAILABLE FOR QUALITY CONTROL TESTING

Only samples with known DNA profile results will be used to assess critical reagents. The samples currently available for quality control testing are the SAM and PTO dried blood samples and the JM and PTO extracted DNA samples that are stored frozen.

The current batch of extracted JM and PTO samples (Extract Date: 10/17/2000) have been made NIST traceable.

1.11.2 QUALITY CONTROL TESTING OF REAGENTS AND KITS

Before any critical reagent or kit can be used on casework samples it must be tested in a way that would reveal any problems with its composition and/or function. All quality control analysis will undergo both technical and administrative review. The genotypes of the positive controls, NIST SRM, and known samples must be in complete agreement with their previously known STR types. The negative control should yield no detectable DNA results. If casework analysis using the new

reagents or kits is required before the completion of the technical and administrative reviews, prior approval must be obtained from the DNA Technical Manager.

In the event that the QC data is unacceptable, a second run of the QC samples can be used to demonstrate the reliability of the reagent or kit. If the cause of any failure is deemed to be reagent or kit related, then the critical reagents tested will not be approved for casework and, if applicable, the vendor of the reagent will be contacted. In-house reagents will be re-prepared and quality tested before use.

The critical reagents/kits will be tested as follows:

Extraction Reagents: Two different QC samples and a reagent blank will be carried through DNA extraction and typing. The preparation dates of the reagents and the results of the DNA testing will be documented on the Quality Control Worksheet for Critical Extraction Reagents. This worksheet and the supporting data will be maintained in the DNA Extraction – Quality Control of Critical Reagents Binder.

Quantifiler kits: New kit lots will be tested using previously extracted known DNA samples. The samples will be carried through amplification with Identifiler. Target volume of the QC samples will be determined based on the quantification value obtained from the new Quantifiler Kit. Successful typing of the known samples will serve to demonstrate the reliability of the new kit lot(s).

Qiagen DNA Investigator kits: Two different QC samples and a reagent blank will be carried through DNA extraction and typing. The kit, reagent strip lot numbers, and the results of the DNA testing will be documented on the Quality Control Worksheet for DNA Investigator kits. This worksheet and the supporting data will be maintained in the Qiagen Robot Reagent QC binder.

Identifiler™ Plus DNA typing kits: Two known samples will be typed along with the 9947A positive control and an amplification blank. The lot numbers of all kit components and the results of the DNA testing will be documented on the Quality Control Worksheet for Identifiler. This worksheet and the supporting data will be maintained in the Identifiler Plus QC binder. (See also the NIST Testing policy below)

Yfiler DNA typing kits: New kit lots will be tested with two known samples [the PTO sample (Extraction Date: 10/17/2000) has been made NIST traceable], the 007 DNA positive amplification control, and an amplification blank. Alternatively the new kit lots may be tested with the NIST 2395 SRM samples, the 007 DNA positive amplification control, and an amplification blank. The lot

numbers of all kit components and the results of the DNA testing will be documented on the Quality Control Worksheet for Yfiler. This worksheet and the supporting data will be maintained in the Y-STR QC binder.

Minifiler DNA typing kits: Two known samples will be typed along with the 007 DNA positive control and an amplification blank. The lot numbers of all kit components and the results of the DNA testing will be documented on the Quality Control Worksheet for Minifiler. This worksheet and the supporting data will be maintained in the Minifiler QC binder.

Identifiler Direct DNA typing kits: Two known samples will be typed along with the 9947A DNA positive control and an amplification blank. The lot numbers of all kit components and the results of the DNA testing will be documented on the Quality Control Worksheet for Identifiler Direct. This worksheet and the supporting data will be maintained in the Identifiler Direct QC binder.

All QC data will be stored electronically on the FB network.

1.12 NIST TESTING OF DNA PROCEDURES

Once a year, the DNA typing process will be checked against NIST or NIST-traceable standards. The previously extracted known DNA samples (JM and PTO) have been tested alongside NIST SRM samples thus making them NIST traceable. In the future when the current batch of known samples run out, a subsequent batch of samples will be extracted and typed alongside the NIST SRM to make the new batch NIST traceable as well.

1.13 PERFORMANCE CHECKS

Performance checks will be performed on the following equipment that has been identified as being critical to the analysis of samples in the Forensic Biology Unit. The performance of this equipment will be assessed at approximately the intervals indicated.

Equipment Item	Location	Performance Check Schedule
Pipettes	Forensic Biology Main Lab and Amplification Room	Every six months
Balances	Forensic Biology Main Lab and Amplification Room	Every three months
BioRobot EZ1s Volume Test	Forensic Biology Main Lab	Every six months
BioRobot Universal	Forensic Biology Main Lab	Every six months
Hamilton Nimbus	Forensic Biology Main Lab	Every six months
Thermal cyclers	Amplification Room	Every six months
Thermocouple	Amplification Room	Annually
7500 SDS Block Contamination Check All other calibrations	Amplification Room	 Every six months Annually
Genetic Analyzers	Amplification Room	Annually
Corbett CAS-1200	Amplification Room	Annually

A performance check will be performed on any of the above listed instruments if any maintenance, repair, or service is conducted.

The QC analysis of critical reagents will serve as the performance checks of the Genetic Analyzers. The QC runs performed for the various testing kits employed by the lab will be rotated through the various Genetic Analyzers throughout the course of the year. Performance checks separate from QC runs may also be done using a minimum of the amplification positive, amplification negative and allelic ladder.

1.14 POLICY FOR MONITORING INCUBATORS, REFRIGERATORS, AND FREEZERS

The incubators, refrigerators, and freezers in the Forensic Biology Unit will be monitored approximately every week. The operating temperatures should be recorded on a worksheet attached to

the equipment. Refrigerators will be expected to operate at a temperature between 1 to 13°C and freezers at a temperature colder than -10°C. Consistent deviations from the expected temperature indicate that maintenance or repair is likely required and the Supervising Criminalist of the unit will be notified.

1.14.1 MICROSCOPES

The microscopes in the Forensic Biology Unit will be maintained according to policies outlined in the laboratory Quality Systems Manual.

1.15 QUALITY ASSURANCE LOGS FOR THE FORENSIC BIOLOGY UNIT

This list below indicates all the logs maintained by the Forensic Biology Unit:

Log Name	Location
Kit Receipt Log	Main FB
Reagent Preparation Logs	Main FB
Supply Order Log	Main FB
DNA Extraction -Quality Control of Critical Reagents	Electronic
Qiagen Robot Reagent QC	Electronic
Identifiler Plus QC	Electronic
Y-STR QC	Electronic
Minifiler QC	Electronic
Quantifiler / Quantifiler Duo QC	Electronic
Unexpected Results Log	Electronic
pH Meter Calibration	Electronic
Balance Calibration Tests	Electronic
Pipette Calibration Log	Electronic
9700 Thermal Cycler Calibration & Uniformity Log	Electronic
Ovens & Fridges Temperature Log	Electronic
Qiagen EZ1 Volume Test	Main FB

2.0 CASE PACKETS AND REPORTS

2.1 REPORT FORMAT

The Biology Unit will use the standardized report format located in the Quality Systems Manual. Case number and incident numbers will appear in the report header whenever possible. In addition to the items listed in the Report Standard Format section of the Quality System Manual, the date of the report will be included in the initial header and on each subsequent page for multi-page reports. In general, items described in the report will be limited to those examined or tested. Where available, CII numbers will be included in the report.

2.1.1 BACKGROUND SECTION

Any references to work done by another analyst or the source of external data used to render conclusions in the current report must be referenced in the background section. The use of the background section to provide additional details that may be relevant to the reader(s) of the report is optional.

2.1.2 PROFILE FREQUENCY CALCUATIONS

When profile frequency estimate calculations are provided for any evidence profiles, the allele frequencies databases used must be referenced in the report.

Example: The frequencies were generated using the DNA allele frequency data taken from J Forensic Sci 1999, 44(6): 1277-1286 and from Forensic Science Communications 2001, 3(3) for the D2S1338 and D19S433 markers.

Loci used in the profile frequency estimate calculations (or alternatively those not used in the calculations) must be listed in the report.

2.1.3 TABLES OF RESULTS

Please see section 5.1 of the autosomal STR interpretation guidelines in the FB Unit Technical Manual for additional information on the reporting of results.

When issuing a report comparing a newly analyzed reference sample to previously analyzed results: the previous table of results does not need to be reproduced for the new report if the reference sample is excluded from all previous evidence. With an inclusion, the minimum information from the previous results that must be included in the new report is the samples results relevant to the inclusion.

2.1.4 CASE-TO-CASE NOTIFICATIONS

When providing information to investigators regarding links between evidence in different cases, tabular case-to-case hit notifications will be issued detailing the various cases linked

through DNA evidence. These notifications must be technically and administratively reviewed prior to issuance.

Case-to-case notifications will be required when an unsolved SDPD case has been linked through the database to any unsolved SDPD case or any case from an outside agency. A case-to-case notification will be issued for any new solved cases linked to previously solved cases with the same suspect (no notifications are necessary for the old case(s)).

If a newly analyzed unsolved case is linked to a previously solved case or cases, a case-to-case notification will be issued for the new case. The determination of whether additional notifications will be issued for the older cases will depend on case type, the statute of limitations on the old cases, and/or the time interval between cases.

2.1.5 SCREENING REPORTS

Screening results can be summarized either through the inclusion of a table or through written explanations of the results.

2.2 CASE PACKETS

The final packet assembled by the analyst will contain the original of the final signed report, complete analytical record (or a reference as to where the data is located), and other important administrative documents (e.g. work requests) for storage by the Clerical Unit. The final packet is subject to technical and administrative reviews before the packet is filed.

Communication records (telephonic or written) will be documented and retained as either numbered pages of the case notes or as administrative documents.

Numbering of administrative documents as part of the analytical record will be at the analyst's discretion. All additional documents in the case packet (e.g. administrative documents) will include the case number and analyst's initials on the first bound page or on all unbound pages.

No loose items such as sticky notes or photos will be included in the packet. Small items must be mounted on 8 1/2" x 11" sheet paper.

If any information is referenced within the analytical record (e.g. a reference sample worked as part of a different case), a pink sheet indicating that the report relies on information contained with separate case packets. This sheet will serve to notify clerical that additional material is required in the event of a discovery request.

2.2.1 ANALYTICAL RECORD

In general, the analytical record will contain the following:

Chain of custody information
Documentation of relevant communications
Evidence inventory and analysis notes, including any serology tests results
DNA extraction, quantification, amplification, and capillary electrophoresis notes
DNA results (elctropherograms)
Interpretation information/worksheets
Profile frequency estimates/calculations
CODIS worksheets/match estimator printouts for evidentiary samples
Disposition information for work product

2.2.2 CASEWORK BATCHING

To streamline the administrative burden (case, packet assembly, technical review, and administrative review) of case processing large numbers of cases together, analysts may group the analytical records for multiple cases together into a single analytical record.

Each case in the casework batch should receive its own individual report. The analysts should attempt to keep the reports in batched cases to a single page. The analytical data for up to five cases can be grouped into a single record. Batching of cases is meant for simpler cases with a limited number of items.

2.2.3 NOTETAKING

The chain of custody worksheet requires, at minimum, the case identifier, a unique description of the item(s) received, and the date and locations obtained/returned. The Chain of Custody Worksheet together with the body of the notes must uniquely describe the packaging, condition of the item, and complete contents of the item received.

Analysts should avoid using the names of victims of sexual assault or child abuse cases on worksheets containing information from multiple cases to reduce the risk of the information being revealed through unrelated cases.

The analyst will take notes with the expectation that they, a technical reviewer, or perhaps an outside expert, upon review (even years later) will be able to reconstruct what was done in terms of examinations conducted, testing completed, and any sampling.

Photographs will be labeled with a descriptor unless it is completely evident what the photograph represents. Photographs should ideally include scale.

Digital photographs taken in the Forensic Biology Unit will be archived so that they can be easily retrieved if needed for discovery. At a minimum, the electronic files of the photographs should be saved with the item number in the name in a folder labeled with the case number.

2.2.4 MINIMUM REQUIREMENTS FOR CE DATA IN THE ANALYTICAL RECORD

The following are the minimum requirements for the capillary electrophoresis data in analytical records for DNA casework. Reference sample batches, QC analysis, or special projects may vary in the contents of the final analytical record.

The GeneMapper ID-X samples printout will document the samples injected. Supplemental samples printouts may be used to document re-injections.

Internal size standard printouts will be included to assess migration throughout the run, the robustness of the injections, and the quality of the resolution.

A single ladder printout is required per run, even if multiple ladders are averaged for analysis.

A single positive control electropherogram must be presented for every amplification within the analysis. If multiple positive controls are used per amplification, both require evaluation, but only one is required to be printed. The tabular information is not required unless needed to diagnose artifacts or other spurious peaks.

Reagent and amplification blank data are required and can be presented together.

Evidence and reference sample electropherograms will be printed with the tabular data of detected peaks. The minimum expectation is that the allele call and the peak heights will be presented.

2.3 RELEASE OF PRELIMINARY RESULTS

The analyst working on a case may verbally release preliminary results. The results being preliminarily released must be technically reviewed, and the review documented prior to release. The analyst must make it clear that the results are preliminary and final results may be reported differently based on further analysis (refer to the INFORMATION DISCLOSURE policy 10.1, in the Quality Systems Manual).

2.4 DISTRIBUTION OF FINAL REPORTS

After final signature by the analyst, technical reviewer, and administrative reviewer, the analyst will ensure the report for is distributed as follows:

- The original copy of the report will be filed with the case packet in the laboratory's main case files. The Clerical Staff will be responsible for filing the finalized case packets.
- The requesting detective will receive an electronic copy (and /or photocopy) of the final report.
- An additional electronic copy of the report will be maintained on the Forensic Biology Unit computer network so that an easily accessed archive of all reports issued exists.
- A copy (electronic or other) will be sent to Records for scanning into the Central Records Management System (CRMS). Homicide cases and cases with Lab Sequence numbers are exceptions to this.

2.5 INTERPRETATION OF CONTROLS

2.5.1 SUBSTRATE CONTROLS

For any analysis, a result obtained from a questioned stain is interpreted as being representative of the stain when the result from the substrate control is negative.

Results from questioned stains in which the substrate control yields a positive result need to be interpreted with caution. A result from a questioned stain may not be representative of the stain when the substrate control also yields a positive result. In this circumstance, the results obtained from the questioned stain need to be considered along with the results obtained from the substrate control.

Some considerations for evaluating the substrate control include:

A. The collection of the substrate control. Was the control collected from a proven negative area?

B. Results from presumptive test versus a quantitative test. Was the substrate control originally evaluated as being negative by a presumptive test, which is less sensitive than the confirmatory test?

C. Did the substrate control give a low level DNA result versus a considerably higher level DNA result from the questioned stain?

D. The source of the substrate. Is there a stain on the substrate control, which was not identified presumptively, which could be giving the result? It may be necessary to examine the substrate for other body fluids.

2.5.2 DNA CONTROLS:

Please refer to the Autosomal STR Interpretation Guidelines (or Y-STR Interpretation Guidelines section) section of the Forensic Biology Technical Manual for the policies regarding the interpretation of the ***Reagent Blanks***, ***Positive Amplification Controls***, and ***Negative Amplification Controls***.

2.6 CASEWORK REVIEW

All casework performed by the Forensic Biology Unit is subject to both technical and administrative reviews. Refer to the casework review policy in the Quality Systems Manual.

2.6.1 TECHNICAL REVIEW

Each case packet prepared by an analyst in the Forensic Biology Unit is subject to technical review by a second qualified analyst. Technical review will rotate between all qualified analysts in the Forensic Biology Unit to ensure that the process remains objective.

The purpose of the technical review is to check the accuracy of the final report and ensure that established Forensic Biology protocols are being applied to case analysis. The final report should adhere to the established laboratory format (see the Quality Systems Manual for more information) and the conclusions in the report must be supported by the data in the analytical record (case notes, sketches, photos, etc.).

The analytical record serves as the basis for all conclusions set forth in the final report and will be evaluated in the technical review process. The analytical record will be examined by the technical reviewer to ensure that it is complete and current Forensic Biology Unit procedures (including interpretation guidelines) and policies for the examination and testing of biological evidence were followed. Any material changes to the analytical record that affect the interpretation of any result, or the statistics applied to a DNA association, will be kept as part of the analytical record. Analysts must note that the changes were as a result of the technical review process.

The goal is to have the initial round of technical review completed with a two calendar week period. Any final review after a file is re-submitted to the technical reviewer should be completed within a few days of the re-submission. The date of the completion of the technical review will be documented in the report and in the analytical record. The completion dates of the report and analytical record can be different. It is the responsibility of the analyst to let the technical reviewer

know of any rush status on a case given for review. It is the responsibility of the technical reviewer to communicate with the analyst if anything (vacation, training, etc) will delay the completion of the review.

Unresolved differences between the case analyst and the reviewing analyst can be resolved by seeking the DNA Technical Manager.

The following list is meant to guide analysts in providing a complete technical review of case packets. The list is not meant to be all inclusive and a case needs to be evaluated in its entirety to make certain that a reasonable, competent, and complete analysis was performed.

Analytical Record
All additional materials in case file labeled with "Admin Document"?
Analytical record has pages that are numbered, initialed and contain the case number?
Case file contains statistics sheet and appropriate CODIS sheets?
A chain of custody exists for the evidence during its analysis in Forensic Biology?
Photographs (if affixed to page) have proper identifying information?
There is an adequate description of the evidence, including packaging, as it was received?
Analytical work sheets are complete?
All important communications concerning the case appear recorded?
There is an adequate written or pictorial representation for evidence examined?
There is an adequate written or pictorial representation for samples collected?
Are corrections lined out, initialed, and dated?
Analytical Testing
Proper methods (including testing of appropriate controls) were used to locate biological material?
Proper methods (including testing of appropriate controls) were used to identify biological fluids?
Substrate controls collected and analyzed where appropriate?
DNA extractions appear consistent with Forensic Biology protocol?
Quantitative PCR has acceptable slope, Y-intercept, and R^2 values?
No significant evidence in the case has been overlooked?
STRs
Suitable amounts of DNA amplified for evidence and controls with the STR system(s)?
Evaluation of sizing standard indicates at least one good injection for all samples?
STR controls (i.e. allelic ladders, RBs, PAC, and NAC) yielded the appropriate typing results?
GeneMapper ID-X data appears in the analytical record for all relevant samples?
If altered injection times used, were the controls injected appropriately?
Were multiple injections performed where necessary?
For multiple injections of a single sample, results are generally consistent?
Do the heterozygous peaks in apparent single source samples appear to be balanced?
In mixtures, assumptions are supported by the data?
In mixtures, was the appropriate method of assigning minor DNA types used?
All allele changes or artifact labels have been appropriately supported in the analytical record?
Report

Report is an acceptable format for Forensic Biology?
Spelling and proper grammar and punctuation have been used in the report?
Case heading information correct, page numbering correct, individuals correctly referred to?
Evidence is properly identified by property tag# or incident #, item# or barcode?
An adequate description of the evidence is included in the report?
A correct and complete summary of the analytical procedures used in the analysis exists?
Tables properly display DNA typing results?
Does the report address all probative samples and/or fractions?
Table contains explanations for any footnotes used?
Disposition of all evidence examined is recorded in the report?
Conclusions in the report are supported by DNA testing results (other test results)?
All significant test results have been summarized in the conclusions?
Suitable statistical frequency calculations have been provided where appropriate?

TECHNICAL REVIEW EXPECTATIONS

The following serves as a further clarification of the expectations with regards to the technical review process should differences of opinion arise:

1. The Analyst and Technical Reviewer will meet in person and have a **verbal** conversation in an effort to sort out any differences of opinion. Each will have the opportunity to professionally explain their point of view. This conversation should in many cases resolve the issue.
2. Assuming the Analyst and Technical Reviewer cannot come to an agreement the input of a DNA Technical Manager will be sought.
3. Should the issue raised in technical review have policy implications, there may need for the Technical Manager to consider a policy change. The Technical Manager will work with the Supervising Ciminalists and/or the Quality Assurance Manager to determine the best course of action.
4. Assuming an agreement between the Analyst, the Technical Reviewer, and Technical Manager cannot be achieved, the Quality Assurance Manager will be asked to assist the three parties in coming to a resolution for the technical issue.
5. Should the technical review issue still remain unresolved the Supervising Criminalist for Forensic Biology will be informed of the impasse.
6. Analysts involved in the discussion may elect to have further discussions with the Laboratory Director concerning the technical issue.

2.6.2 ADMINISTRATIVE REVIEW

Each case packet prepared by an analyst is subject to administrative review by a Supervising Criminalist in the Forensic Biology Unit. In the event the Supervising Criminalist is unavailable the administrative review may be performed by another analyst within the section.

The Quality Assurance Manual details the basic elements of the administrative review process. In addition to those criteria enumerated in the Quality manual, the following list is meant as a guide to providing a complete administrative review of case packets. The list is not meant to be all inclusive and a case needs to be evaluated in its entirety to make certain that the report and analytical record are complete.

Notes
The chain of custody during testing in the laboratory is documented?
Worksheets are complete?
Analytical Testing
Proper and adequate methods used to locate and identify biological fluids?
Substrate controls collected and analyzed where appropriate?
Reagent blank(s), negative control(s), and positive control(s) run with proper results?
Report
Conclusions in the report are by information contained in the result table?
Tabulated results are correct?
Statistical frequencies provided for DNA profiles when appropriate?
Evidence disposition is summarized?
General
Report and case notes have had a technical review by a qualified analyst?
Analyst has corrected or otherwise resolved all concerns raised by the analyst performing the technical review?
Statistics worksheet summarizing work performed on case?
CODIS worksheets for appropriate samples?

2.7 INTERNALLY PRODUCED DNA REQUESTS

Introduction:

If an analyst performs serological analysis on casework in the Forensic Biology Unit, in which there are positive findings for which they will not be performing the subsequent DNA analysis, they will submit a DNA request to the Unit Supervisor.

If subsequent DNA testing is being requested by a screening analyst, the screening report will indicate the submission of a DNA request and the Supervising Criminalist should be contacted concerning the status of the request.

Guidelines for Request Submission:

If no history is given or multiple suspects may be involved, all potentially probative samples must be forwarded for DNA testing in order to maximize the potential of obtaining DNA profiles from all offending parties.

A DNA analyst may request further work on unanalyzed items of evidence after obtaining the initial round of DNA testing results. Any additional work should be coordinated through the Supervising Criminalist.

DNA analysis of a case is often assisted by the inclusion of the original screening request and microscopy worksheet pages. The number of epithelial cells may also be relevant in certain evidence and scenarios and should not be overlooked when providing microscopy worksheets.

DNA analysts require additional information such as case scenario, consumption issues, reference standard availability, presence of consensual partners/multiple assailants, and the existence of other evidence that should, when available, be included on internally produced DNA requests. If only clothing samples are listed in a DNA request a summary of the screening results from the SART kit should be included in the request (if available). The DNA request form will include information on how much of the submitted sample(s) remains should additional testing be required. The DNA request will document what additional evidence is available in the case.

If a large cutting is necessary to obtain DNA results, multiple cuttings can be placed in separate tubes or the entire stain can be removed and impounded within a freezer packet in the Property Room. In some instances, the DNA analyst for the case may be known and their advice can be sought.

If the case involves a crime against a person, especially homicide, sex crimes, or child abuse cases, screening analysts will consult with the Unit Supervisor, or Deputy District Attorney, when consumption of the evidence may be required for DNA analysis (see the Consumption of Evidence Policy in section 3.2 for additional information). The goal is to determine if any impediments or issues related to consuming the evidence can be worked out prior to the DNA analyst receiving the case. This information should be documented in a communication log and added to the DNA request.

When liquid blood is being used as a reference sample, between 10-15uL of liquid blood should be submitted for DNA testing. A reference bloodstain card must be prepared in this circumstance (suggested sample size = 1mL). An additional item form must be filled out for the blood card generated and its disposition documented in the report.

3.0 EVIDENCE POLICIES

3.1 CASE SUBMISSIONS

The Forensic Biology Unit accepts case submissions from all investigative units with the Department. Case submissions are handled as described in sections 3.1.1, 3.1.2, and 3.1.3.

For homicide cases if any evidence requested will NOT be tested, a conversation between the lab (supervisor or analyst) and the investigator must take place. A follow-up email will then be sent to the detective documenting the decisions about testing that have been communicated. This process has been put in place to keep the investigator informed about the testing process, and the work being performed. This communication format is mandated for homicide cases only. Use of this process for other types of cases is at the unit supervisor's discretion.

3.1.1 WORK REQUESTS

Work requests are logged into the laboratory's computerized case tracking system by the Clerical Unit and then forwarded to the unit supervisor for prioritization, assignment, and tracking. If a request for analysis is received directly from a detective or inter-office mail, the request (or a copy of it) will be forwarded to the Clerical Unit to be entered into the tracking system.

3.1.2 CASE TRACKING

The unit supervisor is responsible for entering case information into the computerized case tracking system. The information tracked by the unit supervisor is the case number, the analyst a work request was assigned to, the date it was assigned, the date it was completed, and the number of items the analyst performed work on.

3.1.3 CASEWORK STATISTICS

Casework statistics are recorded for each case that is analyzed. A case statistics worksheet is submitted to the unit supervisor by the analyst when work on a case has been completed. These numbers are tallied in monthly statistics for the Unit. Statistics are tallied for work performed on the number of items of evidence in a given case.

3.2 CONSUMPTION OF EVIDENCE

General QA Policy Summary:

When possible, sample(s) will not be consumed in testing so that a sufficient quantity is retained for reanalysis. If

the entire sample(s) must be consumed during analysis, the assigned DDA will be consulted whenever possible. If there is an objection to the SDPD lab consuming the evidence, alternative arrangements will be made for the analysis of the sample(s) in question.

In homicide, sex crimes, and child abuse cases where no suspect is associated with the case, the analyst will consult with the Unit Supervisor prior to consuming the sample. These consultations/communications will be documented in the case notes. The case investigator will be contacted to inform them of the need to consume the evidence.

If the evidence is not related to a homicide, sex crimes, or child abuse case, and if no suspect is listed, an analyst may consume the sample(s) in an attempt to gain investigative information. In these instances, an email must be sent to the investigator informing them of the decision to consume the evidence.

Discussion:
If the decision of an analyst is that consuming an item of evidence provides the best chance of obtaining a DNA result and there is an issue with the laboratory consuming the evidence, an analyst may agree to initially consuming half of the sample (predicated on the subsequent analysis of the remaining portion of the evidence if needed) or may suggest that an independent laboratory be selected to perform the analysis.

For cases where there is no DDA assigned, the investigators will be informed of the intent to consume the evidence through an email. For cases without suspects a form email has been created for the purposes of informing investigators about the consumption of any evidence. The requirement of the email allows for documented communication.

3.3 UNIT POLICIES FOR EVIDENCE HANDLING

In an attempt to maintain a high level of quality in all aspects of the analyses performed by the Forensic Biology Unit, the following policies and practices will be adhered to wherever possible:

3.3.1 GENERAL:

See the laboratory's Quality Systems Manual for general evidence handling requirements.

- Separate areas are designated within the Unit for DNA extraction, PCR setup, and for the analysis of amplified DNA. Procedures will be performed in the appropriate area for that analysis.

- Prior to analysis, the work area must be cleaned with a 10-20% bleach solution. The work area will be covered with clean paper or bench mats. The contents of items must be inventoried and examined on a fresh piece of paper. This paper can be used to wrap the item after examination, and should be marked with the item's identifying information.

- All items examined must be marked with a minimum of the barcode and analyst initials. If circumstances prevent or preclude marking the item directly only their proximal containers will be marked. Any analysts performing verifications need only mark their initials on an item.

- When evidence to be analyzed is retrieved from the Property Room or Laboratory Vault the condition of packaging will be noted (i.e., damaged, unsealed, etc). When opening an item, care must be taken to avoid compromising any written information on the package. If possible the original seal will not be broken. If the contents of the packaging cannot be accessed without breaking the seal, then a notation will be made in the case notes.

- An analyst will wear appropriate safety gear and disposable gloves when handling evidence within the unit.

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- If slides or other exemplars are generated as a result of analysis, a notation as to final disposition will be made in the notes. It must also be noted if freezer packets are made or evidence is transferred.

- Digital images will be taken of most evidence and color laser prints of these images will appear in the case notes. In addition, an archive of all digital images taken by Forensic Biology analysts is maintained on the FB network.

- After analysis, items will be returned to the original packaging if possible. The package must be sealed with evidence tape and the analyst must initial and date the seal. The case number, barcode number, must be on the outer packaging.

- For any procedure performed in the Forensic Biology Unit only one tube evidence sample should be open at a time during any sampling and reagent/DNA addition. Use of any robotics system for sample setup is an exception to this policy.

- Within the Forensic Biology Unit there are separate refrigerators and freezers dedicated to the storage of either reagents or evidence. Evidence and reagents should be stored separately in their designated locations while in the Forensic Biology Unit.

- If an evidence item is swabbed for DNA analysis a notation will be made within the File-on-Q evidence tracking database regarding any sub-designations assigned, or additional associated barcodes created.

3.3.2 CASE APPROACH

- The sequence of examination must be determined. Communication between units is important in accomplishing this. A unit able to individualize evidence has priority over a unit, which can only determine class characteristics. Destructive examinations will be carried out as a last resort.

- The danger of cross-contamination must be recognized and steps taken to prevent it. Evidence collected from the suspect must not be analyzed or extracted at the same time as evidence collected from the victim. The DNA extraction of evidence and reference standards must be separated by time and/or place.

- Cigarette butts will go straight to DNA analysis. CSU may elect to process them for prints but this should occur after testing the cigarette butts for DNA.

- If body cavity swabs from a sexual assault kit are submitted in multiple tubes, analysts are obligated to test swabs from both tubes.

- If a single swab is collected in a Child Abuse case, the swab will be directly analyzed for DNA without an initial serological examination in an attempt to preserve as much DNA on the sample as possible.

3.3.3 DNA EXTRACTION:

- When sampling for DNA analysis a clean cutting surface should be used for each piece of evidence. Clean scissors or scalpel blades thoroughly with bleach, soap and water, alcohol, or by flaming after cutting each evidence sample. Alternatively, use a fresh scalpel blade with each evidence sample.

- All reagents and solutions will be sterilized where possible. Sterile water and sterile plastics or glassware will be used for solutions that cannot be autoclaved.

- Reagents will be stored as small aliquots to minimize the effects of any contamination events. The lot(s) of reagents used for each set of analyses will be recorded so that if contamination occurs, it can be traced more readily.

- Sterile disposable aerosol resistant pipette tips and sterile tubes will be used for any processes involved in DNA analysis. Pipette tips will be changed between adding and/or removing liquid from evidence samples.

- It is advisable to briefly centrifuge all tubes before opening to remove liquid from the caps.

- The number of samples processed at one time should be limited to a manageable number. This precaution will reduce the risk of a sample mix-up and the potential for sample to sample contamination. The manageable number of samples will vary depending on the experience and comfort level of an analyst.

- The DNA extraction/purification of questioned samples will be performed separately from the DNA extraction/purification of reference samples from the same case. This precaution will help to prevent potential cross-contamination between reference and evidence samples. In addition, it is advisable that DNA extraction/purification of samples, where high amounts of DNA are expected, (references or large bloodstains) be performed separately from samples where low amounts of DNA are expected

(single hairs or very small stains) to minimize the potential for sample to sample contamination.

- Only unamplified DNA samples will be stored in the refrigerators and freezers in the extraction area. No reagents used in the post amplification processes will be stored in any refrigerator and freezer in the DNA Extraction Area.

- A reagent blank will be employed for each set of DNA extractions/purifications to check for possible contamination of the DNA extraction reagents or DNA Extraction Area. The reagent blank is subjected to all of the reagents and manipulations of the DNA analysis process, but contains no sample. The reagent blank should be treated in the same manner as the most manipulated evidence sample associated with it. The reagent blank will be carried through amplification and analysis with its associated samples.

- Performing the initial water wash and microscopic examination will be optional for samples that have previous serological examinations performed. For reporting purposes, the previous analysts' results may be used to document the presence specific cell types or body fluids.

3.3.4 QUANTIFICATION

- The Quantifiler Duo quantification kit must be used on evidentiary samples derived from sexual assault cases. Other cases may benefit from the additional information this kit provides and the use of it on cases other than sexual assault cases will be at the discretion of the analyst.

3.3.5 PCR SETUP:

- Use dedicated pipettes for adding kit reagents and DNA to the PCR tubes.

- Always add DNA to the PCR tube last. This reduces the chances for inadvertent transfer of DNA between samples and kit reagents.

- Only one evidence sample tube should be open at a time during reagent and DNA addition.

- The negative amplification control (no DNA) allows for the detection of contamination during PCR setup.

- Avoid touching the inside surface of the tube caps.

- Change pipette tips after the addition of each DNA sample.

- Store the amplification kits in the designated reagent refrigerator. Do not store them near extracted DNA.

3.3.6 POST AMPLIFICATION ROOM:

- Only disposable lab coats are to be used in the Amplified DNA Area.
- The Amplified DNA Area is dedicated to amplified DNA and should not be used for pre-amplification purposes.
- Caution should be used when handling PCR products to minimize dispersing of the product in the Amplification Area.
- Always remove the gloves and lab coats before exiting the Amplification Area.
- Change gloves whenever contamination with PCR product is suspected.
- Use disposable bench paper to cover work areas.
- All surfaces in the Amplification Area should be cleaned with 10-20% bleach solution before and after setting up samples for analysis. The floor of the Amplification Area will be mopped with a dilute bleach solution every two weeks.
- All equipment found in the Amplification Area is dedicated to that area and will never be removed unless proper decontamination procedures have been employed.
- Store amplified DNA in the designated amplified DNA freezer. Under no circumstances should the amplified DNA be stored within the DNA Extraction Area.

3.3.7 DNA INTERPRETATION

- DNA interpretations should be documented in the analytical record.
- CODIS sheets for evidence samples must be part of the analytical record.
- The mixture interpretation guidelines and the partitioning model used to interpret complex mixtures are based upon data obtained from the examination of single source, 2-, 3-, and 4-person mixtures. While the validation data suggests that the partitioning model is effective at reliably identifying DNA types from major versus likely minor DNA contributors, it may not be suitable for all mixtures, especially mixtures of 5 or more people. Any mixtures from 5- or more people that are deemed interpretable for comparisons must be reviewed by the DNA Technical Manager to ensure that a consistent approach is taken with these complex mixtures.

3.4 DNA SAMPLE STORAGE

3.4.1 EXTRACTED DNA

Extracted DNA will be stored on a short-term basis in a dedicated freezer in the DNA Extraction Area. DNA extracts should be stored in closed containers or sealed bags.

Extracted DNA will be stored long-term frozen in the Property Room. If a new Property Tag is created for the extracted DNA then a copy of that Property Tag must be included in the case notes. If extracted DNA is to be stored under an existing Property Tag then an Additional Item Form reflecting the creation of this freezer packet must included in the case notes.

3.4.2 AMPLIFIED DNA

Amplified DNA samples will be stored in manila envelopes in a dedicated freezer in the Amplification Area. Under no circumstances will amplified DNA be stored outside the Amplification Area.

Amplified DNA samples will be maintained for a period of six months from the date the envelope was created. After this the amplified DNA will be discarded. Care must be taken to avoid contaminating other areas or evidence with amplified product.

3.5 POLICIES REGARDING FREEZER PACKETS

Freezer packets are created to store derivative evidence separated or prepared from other evidence that is customarily stored unfrozen. If a freezer packet is created for derivative evidence, the freezer packet should be stored frozen.

Anytime a freezer packet is made for derivative evidence the following information (at minimum) should be clearly marked:

-Incident number
-Case number (if available)
-Item number(s) of the evidence contained within

Any stains, cuttings, or swabs taken of items that will be impounded into the Property Room as additional evidence will require the generation of a new item in the barcode system under the appropriate incident number. Documentation of the newly generated items should be included in the case notes.

When items that already have a barcode number (or a sub-designation from an existing barcode number) are packaged together, and the packaging is given a new barcode number for the purposes of storage, the

barcode of the packaging is for temporary storage purposes and does not become the designator for the items inside.

3.6 UNIQUE IDENTIFIERS

General:

Items stored in the Property Room or Laboratory Vault should have a unique identifier. The barcode number uniquely identifies each item stored in the Property Room or Laboratory Vault under the File-on-Q system. Items stored under the old system will be uniquely identified by the case number (or lab sequence number), property tag number, and item number. Multiple items contained within a single package (e.g. the contents of a SART kit) should all be given a sub-item designation, which should be noted in the barcode system for that item.

Samples contained in microcentrifuge tubes:

During the screening and DNA analysis of evidence it is common to have samples contained in microcentrifuge tubes. These include question stains, reference samples, cell pellets being preserved for possible DNA analysis, and extracted DNA. Each sample analyzed within a batch will be labeled with an identifier that will uniquely identify it during its analysis while it is in the FB unit.

Additional descriptors may be employed to identify particular samples such as "NS" to identify non-sperm fractions of extracts. Where possible the sample label will be carried over and used as the CODIS profile identifier.
All cell pellets, extracted DNA, and amplified DNA will be considered the work product of the DNA laboratory.

Any stains, cuttings, or swabs taken of items that will be impounded into the Property Room as additional evidence will require the generation of a new item in the barcode system under the appropriate incident number.

3.7 DISCONTINUING ANALYSIS OF SAMPLES

Variables, such as the existence of other probative samples, or the case scenario may affect the decision to discontinue the analysis of a sample. Quantification information may provide additional insight into the likelihood of obtaining interpretable DNA results, and the decision to discontinue analysis may best be made after quantification of the sample(s).

In general, analysts may discontinue analysis of samples under the following circumstances:

If a sample contains insufficient DNA to reasonably obtain an interpretable DNA profile, it may be discontinued. An analyst may be reasonably sure that the sample has insufficient DNA to produce a full DNA profile if a large

enough proportion of the sample has been quantified, such that, based on the estimated amount of DNA in the rest of the sample, amplification of the entire sample is unlikely to yield an interpretable DNA profile.

The intent of this policy is to be able to discontinue analysis on single samples from items/cases that do not have enough DNA to obtain a DNA profile. In cases where multiple samples from the same item are collected for the same purpose (e.g. wearer DNA), if one sample has sufficient DNA additional samples collected for the same purpose may be discontinued.

If the amount of total DNA in the extract is less than 50pg the samples are unlikely to yield interpretable DNA results and the sample may be discontinued. If the sample is such that there is a high probability of it being single source (e.g. an apparent bloodstain), limited information may be obtained from less than 50pg.

Sexual Assault Cases

If far less than 100 total sperm cells are microscopically present in the sperm fraction of a sample, it likely does not possess enough DNA to produce a complete autosomal DNA profile and may be discontinued. Given the correlation between the amount of DNA in a sample and the likelihood of obtaining interpretable DNA, the decision to discontinue analysis may best be made after quantification of the samples.

If the sperm fraction of the sample is probative, both the sperm and non-sperm fractions should be continued through DNA analysis.

If the non-sperm fraction is probative and sufficient sperm cells are present, both the sperm and non-sperm fractions must be DNA typed.

If the non-sperm fraction is probative and insufficient or no sperm cells are found in the sperm fraction, only the non-sperm fraction needs to be typed.

If the non-sperm fraction is not probative, and its sperm fraction contains insufficient or no sperm cells, the analysis of both fraction can be discontinued.

Firearms Evidence

Swabs from firearms generally have multiple swabs for handler DNA including both “before” and “after” processing swabs. If multiple swabs yield sufficient DNA for DNA typing, then all with sufficient DNA will be DNA typed. If all swabs have insufficient levels of DNA to reasonably obtain an interpretable DNA profile, the swabs will be combined for DNA analysis. If at least one of the swabs has sufficient DNA and the others have an insufficient amount of DNA, the one(s) with insufficient DNA may be discontinued.

3.8 INSTRUCTIONS FOR PROCESSING FIREMARMS FOR DNA

OPTION A: SWABBING FOR DNA FIRST

The Forensic Biology Unit may process guns for DNA prior to latent print processing. In this instance the textured areas of the firearms such as grips, slide, magazine release, safety, trigger, hammer, cylinder release, and slide lock(s) will be swabbed. Smooth areas will be preserved for fingerprint processing.

A sticker will be placed on the packaging indicating that swabbing for potential DNA evidence has been done.

OPTION B: FINGERPRINT PROCESSING FIRST

In instances where the majority of the firearm has smooth surfaces, the Crime Scene Unit will process the firearm prior to swabbing for potential DNA evidence. The firearm will be visually examined and then processed with cyanoacrylate ester. A second visual examination will then be conducted to determine if there are any visible prints or ridge detail. If no ridge detail is present, the firearm will then be swabbed for DNA.

If the firearm will be processed using black powder or other chemical processing prior to swabbing it for potential DNA evidence then a previously unused brush and previously unused black powder will be used to avoid any possible transfer of DNA to the firearm. After the application of black powder, and any prints are lifted, the firearm can then be swabbed for DNA.

A sticker will be placed on the evidence packaging indicating that swabbing has been done.

3.9 INSTRUCTIONS FOR COLLECTING BIOLOGICAL STAINS USING SWABS

The following procedure can be used to collect most biological stains including blood, semen and saliva.

MATERIALS:

1. Plastic dropper bottle filled with sterile water.
2. Cotton tipped swabs with a wood applicator.
3. Manila envelopes.

PROCEDURE:

Small Stains

1. Being careful not to touch the swab with the dropper bottle, place a single drop of water on the end of a cotton swab. It may not be necessary to wet the swab if the stain is still wet.

2. Collect the stain using the very tip of the swab. Do not roll the swab. The small amount of material should be concentrated at the tip of the swab.

3. Place the swab in a manila envelope. The wooden stick may have to be partially broken off. The manila envelope should have all the necessary information concerning the collection of the swab.

Large Stains

1. Being careful not to touch the swab with the dropper bottle place two or three drops of water on the end of a cotton swab. It may not be necessary to wet the swab with water if the stain is still wet.

2. Collect the stain by rolling the swab in the stain so that a large amount of stain is collected on the swab. If possible, collect at least two swabs of the stain.

3. Place the swab(s) in an envelope. The wooden stick(s) may have to be partially broken off. The manila envelope should have all the necessary information concerning the collection of the swab.

REMARKS:

Control swabs of a stain free area may be collected whenever possible.

When wetting the swabs with distilled water, enough water will be applied to the swabs to make them moist but not so much that the swabs are soaked.

Stains will only be collected with swabs only if the stained substrate itself cannot be collected (e.g. stain on pavement or structure).

4.0 CODIS

The Combined DNA Index System (CODIS) is a nationwide forensic DNA database managed by the FBI. It consists of DNA databases at the local (LDIS), state (SDIS), and national (NDIS) levels. The database primarily consists of casework evidence profiles, termed Forensic Unknowns, and convicted offender profiles. Additional sample categories include Suspects, Unidentified Human Remains, Missing Persons, and Relatives of Missing Persons. The purpose of CODIS is to develop investigative leads by matching DNA profiles of two or more samples from these various categories.

The case analysts are responsible for determining what is being searched in CODIS in their assigned cases. With complex mixtures consultation with the CODIS Administrator is encouraged. If the CODIS Administrator is consulted, documentation of the consultation will be made on the CODIS sheet; however, the tech. reviewer is still mandated to assess the types and the sample itself as being acceptable for CODIS and initial the sheet as well. Any material changes made to the CODIS sheet as a result of the technical review must be documented. Any material changes made by the CODIS Administrator after technical review is complete must be discussed with case analyst and documented within the analytical record.

4.1 ENTRY OF DNA PROFILES INTO CODIS

The SDPD Forensic Biology Unit's procedures for the entry of DNA profiles into CODIS are based upon the guidelines outlined in the NDIS Procedures and the California Penal Code.

Many different situations may be encountered in forensic casework that will influence which DNA profiles, or what portion of a DNA profile, are acceptable for entry into CODIS. The following are meant as guidelines and do not cover every possible scenario.

- DNA profiles selected for entry into CODIS are submitted on forms referred to as CODIS sheets. These must be technically reviewed to ensure accuracy and acceptability for CODIS entry.
- DNA profiles (single source or mixtures) from possible perpetrators derived from evidence should be entered into CODIS unless that evidence was collected from a suspect.
- If multiple items have the same DNA profile, only one CODIS sheet should be used.
- DNA profiles or portions of DNA mixtures attributable to victims or elimination reference samples (boyfriend, husband, etc.) should not be entered into CODIS.
- CODIS sheets should be filled out for suspects that were not matched to an evidence sample or that were included as possible contributors to a DNA mixture.
- In general, CODIS sheets will be removed from the case file during the administrative review and given to the CODIS Administrator for entry. Copies of CODIS sheets from evidence samples must be retained within the analytical record as numbered pages.

- If loci that are unsuitable for statistical calculations are used in a search of the CODIS databases, analysts will designate those loci on the CODIS sheet. If the entire profile being searched cannot be utilized for stats, the CODIS sample name should contain (IL) to indicate that the profile is for investigative leads only.
- Searches of profiles in the local DNA database may be done prior to technical review of the case file.

4.2 DATABASE SEARCHES AND MATCHES

Searches of the local DNA database can occur prior to technical review and are also performed at the time of the entry of the profile into CODIS. Searches of the state and national databases occur once a week and are performed by the state (California Department of Justice) and national (FBI) laboratories, respectively. DNA profiles are uploaded to the state database at least once a week to coincide with database searches and with the uploading of DNA profiles from state to national databases.

There are two basic types of database matches that could provide an investigative lead, forensic hits and offender hits. Forensic hits involve the matching of Forensic Unknowns from two cases. Offender hits involve the matching of a Forensic Unknown to a Convicted Offender.

The matching of two evidence samples known or suspected to be from the same person is referred to as a benchwork match. When an evidence sample has already been linked to a suspect and then matches the same person who is in the database as a Convicted Offender sample, this is referred to as a conviction match.

Information regarding forensic and offender hits must be included in at least one report. Prior to a match report being written, investigators may be contacted regarding DNA matches. However, care must be taken to communicate the information accurately, and any significant communication should be documented on a communication log.

4.3 MAINTENANCE OF A STAFF INDEX IN CODIS: SAMPLES FROM LABORATORY EMPLOYEES AND INTERNS

Due to the sensitivity of the current DNA testing technology and its expanding role in the area of "touch" DNA evidence, all Criminalists, Forensic Specialists, Vault employees, and Interns in the Crime Scene and Forensic Biology Units must provide reference mouth swabs for inclusion of their DNA profile in the Staff Index of the local SDPD CODIS database. The following are the rules for the collection and analysis of these samples:

1. A SDPD Reference Mouth Swab Kit will be used to collect two swabs from the individual. Collection must occur as part of their orientation process. The Supervisor of the section involved has responsibility to both make sure the collection occurs and that appropriate protocol is followed.

2. All SDPD Reference Mouth Swab Kits from Staff and Interns will be permanently archived in the Forensic Biology Unit.
3. The Supervising Criminalist of Forensic Biology in conjunction with the DNA Technical Leader will arrange for the samples to be analyzed by a qualified DNA analyst.
4. The analysis of reference mouth swabs will follow the protocol used to analyze reference mouth swabs in criminal casework.
5. The DNA Technical Manager or CODIS Manager will enter the DNA profiles in the Staff Index of the local SDPD CODIS database.
6. The CODIS printout as well as the appropriately reviewed supporting documentation will be compiled and saved for each sample and included in the Staff DNA Profiles binder.

4.4 REPORTING DNA RESULTS MATCHING LABORATORY STAFF.

When an evidence DNA profile is found to match a staff member of the laboratory the following will be done to address the situation:

The CODIS match detail report indicating the match to a person in the staff database will be included in the analytical record.

If the DNA profile in the case was found to match (or the mixture includes) DNA from the analyst that worked on the case, then the report will state that DNA matching the analyst was found.

If the DNA profile in the case was found to match (or the mixture includes) DNA from a member of another section of the laboratory or another analyst in the Forensic Biology Unit, the report will state that a staff member of that section was found to match the DNA profile in the case. The report will also address whether any interpretations were affected by the presence of this DNA.

If the profile obtained from the evidence is a mixture and is still interpretable then the DNA profile from the staff member will be included in the table of results so that a qualified person could interpret the results as well.

A Staff Match Summary Sheet will be completed detailing the match and will include the name of the staff member. The summary will attempt to determine a likely cause for the presence of that DNA on the item (analyst from another section examined the evidence) and document any possible remediation to prevent future incidents.

The Staff Match Summary Sheet will be submitted to the DNA Technical Manager and will be routed through the Quality Assurance Manager. The Quality Assurance Manager may conduct further inquiry into the root cause of the contamination with other Laboratory Units or the Property Room.

The Staff Match Summary Sheet will be included in the log maintained in the Unit and will be available for review upon discovery request.

Suggested wording of conclusions:

Single source/predominant DNA matches staff member.

1. The DNA profile from Evidence Item X was found to match my DNA profile. No other item in this case contains this profile and therefore interpretations of these items were not affected.

2. The DNA profile from Evidence Item X was found to match DNA from a laboratory analyst from Unit X. No other item in this case contains this profile and therefore interpretations of these items were not affected.

Minor contributor scenario

1. …also detected in this sample was DNA that is consistent with my DNA profile. The presence of this DNA in the sample did not affect the overall interpretation for this item. No other item in this case contains this profile and the interpretations of these items were not affected.

2. …also detected in this sample was DNA that is consistent with a laboratory analyst from Unit X. The presence of this DNA in the sample did not affect the overall interpretation for this item. No other item in this case contains this profile and the interpretations of these items were not affected.

4.5 OUTSOURCING

In order for the SDPD Crime Laboratory to accept outsourced data for the purposes of searching the CODIS databases the following criteria must be met prior to the initiation of analysis by the vendor laboratory:

- The vendor lab chosen for the analytical testing must be accredited and the documentation of that accreditation, including the vendor laboratory's latest external audit report including responses and follow-up must be provided to the SDPD Crime Laboratory.
- Prior approval of the technical specifications of the analysis to be performed by the vendor laboratory is required.
- For any new outsourcing agreement an on-site visit to the vendor laboratory by the DNA Technical Manager, or another qualified analyst, is required.

The SDPD Crime Laboratory has currently completed the site visits and audit review for Forensic Analytical Sciences, Inc and Chromosomal laboratories, Inc., thus allowing data generated by them to be uploaded to CODIS if the last two bullet points above are met. If a laboratory other than the two mentioned above be selected for independent analysis, the process of meeting the criteria above will be coordinated with the prosecution/defense.

4.5.1 ON-SITE VISITS TO VENDOR LABORATORIES

For any new outsourcing agreement, the DNA Technical Manager, or another qualified (or previously qualified) analyst designated by the DNA Technical Manager or Supervising Criminalist, will perform an on-site visit of a vendor lab prior to the initiation of analysis on the outsourced samples.

An on-site visit to a vendor laboratory shall include at a minimum:

- An evaluation of the laboratory facilities to ensure the integrity of the evidence will be maintained while in the custody of the vendor lab.
- An evaluation of the procedures as they relate to ensuring minimal loss or contamination of the evidence while in the custody of the vendor lab.
- An evaluation of any Corrective Actions taken by the laboratory in the previous six months prior to the on-site visit.
- An interview with the vendor laboratory's DNA Technical Manager or laboratory analyst.

The on-site visit will be documented in a report that will be maintained by the DNA Technical Manager.

If an outsourcing agreement with a vendor lab is continued from one year to the next, then an on-site visit to the vendor laboratory by another NDIS participating laboratory using the same technology, platform, and typing test kit may be used. Documentation of the on-site visit by a second NDIS participating laboratory must be obtained by the SDPD Crime Laboratory before any new analysis is initiated in the new year of the agreement.

4.5.2 REVIEW OF OUTSOURCED DATA

Prior to uploading outsourced data into the databases of the Combined DNA Index System (CODIS) a technical review of the data will be performed. The review of the data will be performed by a qualified (or previously qualified) DNA analyst and will be documented and include:

- A review of the analytical record to include all controls (ladders, positive and negative amplification controls, and blanks.
- A review of the vendor laboratory's final report
- A review of the data for all submitted samples to the vendor laboratory.
- A verification of the DNA types and eligibility of any sample to be uploaded to the CODIS databases.

5.0 LABORATORY MAINTENANCE

5.1 GENERAL LABORATORY MAINTENANCE

All members of the Forensic Biology Unit are responsible for the general upkeep of the laboratory including stocking supplies, washing dishes, and cleaning common areas. Protective gloves, safety goggles, and a laboratory coat should be worn when handling chemicals and cleaning lab instruments. The following tasks are completed each week:

- Monitor the operating temperatures of all freezers, refrigerators, and incubators. Log temperatures on the log sheets. When a sheet has been completed, turn it in to the Supervising Criminalist of the Forensic Biology Unit.
- Wipe general use counters with 10% bleach solution.
- Clean common use centrifuges with 10% bleach solution followed by wiping with distilled water.
- Wipe interior of extractions hoods with 10% bleach solution (do not wipe plastic door).
- Clean interior and exterior of drying boxes with 10% bleach solution.
- Wash glassware and dishes not belonging to an analyst (analysts are responsible for their own dishes). Return washed dishes to their appropriate storage location.
- Fill distilled water carboys, reagent alcohol bottles, 10% bleach solution bottles, and Liquinox detergent bottles.

The above tasks apply to all rooms of the Forensic Biology Unit. Every two weeks, the Amplification Room floor will be mopped with 10% bleach solution. Record the completion of maintenance tasks in the Main Forensic Biology Unit Maintenance Log, and Amplification Room Maintenance Log.

5.1.1 Glassware Washing

It is the responsibility of each analyst to wash their own dishes. Protective gloves, safety glasses, and a lab coat or apron should be worn.

1. Wash glassware in warm water with Liquinox detergent.
2. Rinse detergent from glassware by rinsing in tap water three times.

3. Rinse each piece of glassware in distilled water three times.

4. Set glassware to dry.

5. Return glassware to appropriate storage location when dry.

Note: The most critical concern about glassware in the DNA Laboratory is that glassware in the Amplification room and glassware from the DNA Extraction-PCR Setup Area be kept separate. Obviously, the use of glassware dedicated to the Amplification area in the DNA Extraction-PCR Setup area is far more serious than the reverse. The only circumstance in which glassware may be transferred from the Amplification Room to the DNA Extraction-PCR Setup Area is if the glassware has been treated with bleach for 30 minutes followed by autoclaving.

5.2 CLEANING LOGS

The following cleaning logs will be maintained by the Forensic Biology Unit. They are intended to ensure common use areas are kept in a clean state.

Cleaning Log	Location	Updated
Forensic Biology Main Lab	Forensic Biology Main Lab	Weekly
Amplification Room	Amplification Room	Weekly/ Biweekly (floors)
Instrument Washroom	Instrument Washroom	Weekly
Qiagen BioRobot® EZ1	Forensic Biology Main Lab	Monthly
Qiagen Universal	Forensic Biology Main Lab	As used

5.3 CLEANING AND DECONTAMINATION PROCEDURES

Squirt bottles containing a dilute bleach solution (10-20%) are present in the different work areas in the DNA Laboratory. Following DNA extraction, PCR setup, or preparation of amplified DNA samples the work areas that were utilized will be thoroughly washed with the bleach solution making sure the entire work areas are treated.

If lab bench paper has been laid down and is thought to be contaminated with DNA, the lab bench paper should be disposed of.

Racks or glassware thought to be contaminated with amplified DNA will be treated in the manner described below.

For items that cannot be autoclaved, they will be soaked in 20% bleach for 30 minutes, rinsed thoroughly with tap water, rinsed in distilled water, and allowed to air dry.

For items that cannot be autoclaved, they will be treated first with bleach as previously described and then autoclaved for thirty minutes.

5.3.1 DECONTAMINATION OF CENTRIFUGES

Fisher "Marathon" rotors - clean the top surface of the rotor with detergent, and rinse with distilled water. For Model 16 K/M, the rotor can be removed from the spindle for cleaning.

Sorvall A384 fixed angle rotor - use clean tubes and clean tubes with soap and water after each use. Rinse thoroughly with distilled water and dry. Periodically, inspect the surface of the rotor body and cover for signs of contamination. The rotors can be removed and washed in a pan of soapy water (use Liquinox detergent). If a serious contamination problem occurs (ie spilled concentrated DNA), the rotor body, cover, and tube holders can be autoclaved.

Sorvall H1000B swinging-bucket rotor - clean the rotor buckets and tube holders with detergent. Rinse thoroughly with distilled water and dry. Periodically, inspect the rotor body for signs of contamination. The rotors can be removed and washed in a pan of soapy water (use Liquinox detergent). If a serious contamination problem occurs (ie spilled concentrated DNA), the rotor body, cover, and tube holders can be autoclaved.

5.4 DISPOSAL OF HAZARDOUS WASTE

There are six waste streams within the Forensic Biology Unit that should be handled as hazardous waste. These are as follows:

5.4.1 PHENOLPHTHALIN CONTAMINATED SWABS

Phenolphthalin contains ethanol and swabs contaminated with it will go into appropriately labeled waste buckets. After the swabs have dried the swabs can be disposed of in the regular trash.

5.4.2 PHENOLPHTHALIN AND LMG LIQUID WASTE

Phenolphthalin and LMG liquid waste contains zinc; a heavy metal. The unusable liquid waste will be stored in the Chemical Storeroom for disposal. The bottles should be appropriately labeled with the hazard (flammable for pheno and corrosive for LMG). The zinc contained in both reagents should also be noted on the log.

5.4.3 EZ1 REAGENT WASTE

EZ1 strips are flammable because of the ethanol they contain and should be placed in the blue 30gal drum by the instruments. All tips, tip holders, and tubes can be disposed of as regular trash. When the 30gal drum is full the waste can be transferred to the metal 50gal drum in the Chemical Storeroom for disposal.

5.4.4 PHENOL-CHLOROFORM-ISOAMYL ALCOHOL WASTE

Phenol-chloroform-isoamyl alcohol is an organic solvent and the liquid waste goes in the red waste containers in the hoods. Tips and tubes contaminated with phenol-chloroform-isoamyl alcohol should be allowed to evaporate in the hood. After evaporation the plasticware can be disposed of in the regular trash.

5.4.5 FORMAMIDE WASTE

Formamide is a known teratogen and the formamide waste will be disposed of in the waste bucket in the amplification room. When full the waste can be transferred to the Chemical Storeroom for disposal.

5.4.6 BIOHAZARDOUS WASTE

Large volumes of liquid blood are biohazardous. Any large volumes of blood and the materials used to clean them up should be disposed of in red biohazard containers.

5.4.7 NON-HAZARDOUS WASTE

Small volumes of blood that will dry within a reasonable amount of time can be disposed of in the regular trash. LMG test swabs can be disposed of in the regular trash. All plasticware [tips, tubes (including microcon/centricon tubes), transfer pipets, etc] and gloves can be disposed of in the regular trash. Acid phosphatase test swabs can be disposed of in the regular trash and any waste liquid down the drain.

6.0 EQUIPMENT MAINTENANCE PROTOCOLS

6.1 USE AND MAINTENANCE OF THE WATER SYSTEM

The ultra/nano pure system uses the distilled water reservoir as its water source.

Ultra pure water

The Barnstead NANOpure ultra pure water system removes ions from water. It is meant to be used with pretreated water. Hence, the water used is first distilled. The system can be set to three different modes: off, standby, and on. The system is left on standby when not actively in use to allow water to be circulated through the cartridges for five minutes out of every hour. This extends the life of the cartridges. When ultra pure water is needed, set the system to the on mode by pressing the 'ON/STANDBY/OFF' button until a numerical value appears. This number represents a resistivity measurement of the water, which indicates its purity. Wait for the number to increase to at least 18.0 before dispensing. If this number remains below 18.0, then the cartridge is no longer efficiently deionizing the water. A carboy is used to collect and store ultra pure water, as the system produces purified water rather slowly. The ultra pure water system should never be used when the distilled water reservoir is empty. A low water protection device has been built into the distilled water reservoir to prevent the ultra pure water system from operating when the still is low.

6.2 OPERATION OF THE pH METER

Thermo Scientific Orion Star A111 pH Meter Operation

Electrode Preparation

1. Disconnect electrode from meter.
2. Uncover the filling hole and add electrode filling Ag/AgCl solution.
3. Solution must be above reference junction and at least one inch above sample level.
4. **The filling hole must be open when electrode is in use and closed when in storage.**
5. Place the electrode in the electrode holder and suspend it in air for 5 minutes so that the solution in the electrode can thoroughly wet the reference junction.
6. Shake electrode downward (similar to a thermometer) to remove air bubbles.
7. Soak electrode in pH electrode storage solution for 30 to 60 minutes.
8. Connect electrode to meter.

Electrode Storage

1. Short-term Storage (up to one week)
   a. Soak the electrode in pH electrode storage solution.

b. To prevent crystallization of the fill solution, cover the fill hole whenever the electrode is being stored and open the fill hole when calibrating and measuring.

2. Long-term Storage (more than one week)
   a. Fill the reference chamber and securely cover the filling hole.

b. Cover the sensing element and reference junction with the protective cap/sleeve containing a few drops of storage solution.
c. Before returning the electrode to use, prepare it as a new electrode.

Electrode Maintenance
1. Inspect the electrode for scratches, cracks, salt crystals.
2. Rinse off salt crystals with DI water.
3. Drain the reference chamber, flush it with fresh filling solution and refill the chamber with fresh filling solution.

Electrode Cleaning
1. Soak electrode in 0.1 M HCL or HNO3 for 30 min.
   a. Can also be soaked in a 1:10 dilution of household bleach mixed with hot water (stir at fast rate).
2. Drain the reference chamber and refill it with fresh filling solution.
3. Soak the electrode in pH electrode storage solution for at least 1 hour.

Calibration
1. Prepare the electrode according to the electrode preparation instructions.
2. Connect the probe to the meter and turn on the meter.
3. Press **mode** to display pH for the pH measurement mode.
4. Select 2 pH buffers that bracket the pH you are targeting.
5. Press **Cal**
6. Rinse the electrode in DI water and blot with a kim wipe.
7. Place electrode into first buffer.
8. Wait for **"Ready"** then record value in log book.
9. Rinse the electrode in DI water and blot with a kim wipe.
10. Place electrode into second buffer.
11. Wait for **"Ready"** then record value in log book.
12. Rinse the electrode in DI water and blot with a kim wipe.

Measurement
1. Perform Calibration steps first.
2. Make sure it is in pH measurement mode.
3. Press **measure**: the meter will immediately start taking readings.
4. When **"Ready"** is displayed the meter stops measuring the pH, so you may need to press **measure** multiple times when pH-ing the solution.
5. When you reach the target pH rinse the electrode in DI water and blot with a kim wipe.
6. Turn pH meter off.

Store electrode according to the Electrode Storage directions provided.

6.3 OPERATION OF THE AUTOCLAVE

The autoclave is used to sterilize critical reagents and equipment via steam pressurization. There are two exhaust selector settings on the autoclave: FAST (Instruments) and SLOW (Liquids). Use the slow setting when only liquids or liquids and equipment are being sterilized. If sterilizing equipment use the fast setting.

1. Close the drain valve.
2. Fill with autoclave with approximately 5.5 liters distilled water and 0.5 liters tap water.
3. Load autoclave with items to be sterilized. Place autoclave tape on lids, if necessary, and be sure lids are on loosely.
4. Close autoclave door. Be sure the door closes tightly. If not, adjust the screw below the door handle latch.
5. Set the exhaust selector to "Fast or Slow", depending on the items being sterilized.
6. Set the time for 30 minutes.
7. When the sterilization is complete, carefully open the door and drain valve. Do not open the autoclave immediately after sterilization is complete due to the high heat and pressure; allow to cool and depressurize.

6.4 BALANCES

Balances and microscopes in the Forensic Biology Unit will be maintained and the calibration checked according to policies outlined in the laboratory Quality Systems Manual. Laboratory balances are calibrated by an outside company once a year.

The calibration is checked every four months by the Laboratory Technician. Balance calibration is checked by weighing various NSB certified weights, given in the tables below. The acceptable range of variation is 1% from the true value for weights less than one gram, and 5% from true value for weights greater than one gram.

If a balance is found to be out of calibration, it has to be sent to an outside company to be recalibrated. Once returned, the calibration of the balance will checked by the Laboratory Technician before use in the laboratory.

Analytical Balance	
Weight (g)	Acceptable Range (g)
0.01	0.0099 - 0.0101
0.05	0.0495-0.0505
0.10	0.0990-.0.1010
0.50	0.4950-0.5050
1.00	0.9500-1.0500
5.00	4.7500-5.2500
10.00	9.5000-1.0500
50.00	47.5000-52.5000
100.00	95.0000-105.0000

Pan Balance	
Weight (g)	Acceptable Range (g)
1.00	0.95-1.05
5.00	4.75-5.25
10.00	9.50-10.50
50.00	47.50-52.50
100.00	95.00-105.00
200.00	190.00-210.00

6.5 MAINTENANCE OF THE QIAGEN EZ1s

Each month the piercing units are cleaned and the O-rings are greased on the Qiagen EZ1 robots. Maintenance actions are recorded on the Qiagen EZ1 Maintenance Worksheet in the Qiagen EZ1 Maintenance Log. A volume test is conducted every four months to monitor the pipetting accuracy of the robots. Results of the volume test are recorded on the BioRobot EZ1 Volume Test Worksheet in the Qiagen EZ1 Maintenance Log.

6.5.1 CLEANING THE PIERCING UNIT:

The piercing unit cleaning protocol can be accessed using either the DNA Investigator Card or the Volume Test Card. If only a cleaning is required, use the DNA Investigator Card; if a volume test is also due, then use the Volume Test card. This will limit the number of times the machine is turned on and off and cards are switched. **Never remove or insert a card when the machine is on**. The DNA Investigator Card should always be in the machine so that it ready for use.

1. With the robot off, insert the Volume Test Card or ensure that the DNA Investigator Card is in the card slot.
2. With the door closed, turn the machine on.
3. Press **1. Protocols**.
4. Press **3. Clean piercing u**. The piercing unit will move forward and downward.
5. Open the door by lifting up, and clean the piercing unit with reagent alcohol.
6. Close the door and press **Esc** when finished.

6.5.2 GREASING THE O-RINGS:

Apply a small amount of silicon grease to the top of a filter tip and use it to apply the grease to the tip adapters. Wipe off any excess grease with a tissue.

6.5.3 VOLUME TEST:

The volume test requires the use of the Volume Test Card.

1. With the machine turned off, insert the Volume Test Card.
2. For each robot to be tested, individually number and weigh six empty elution tubes with caps. Record the weight of the empty elution tubes on the BioRobot EZ1 Volume Test Worksheet in the Qiagen EZ1 Maintenance Log.

3. Place the six empty elution tubes, without their caps, in row 1.
4. Place six sample tubes containing 1mL of distilled water in row 4.
5. Place six tips in tip holders in row 2.
6. With the door closed, turn the machine on.
7. Press the **Start** button. The volume test will begin.
8. When the test is complete, press **Esc** to exit the protocol and turn the machine off.
9. Remove the Volume Test Card and insert the DNA Investigator Card.
10. Replace the caps on the elution tubes and remove them from the machine.
11. Weigh each tube, now filled with approximately 500 µL of distilled water.

Record the weights of the water on the Volume Test Worksheet and calculate the variance. Allowable variance is within 5% of the volume pipetted. For the 500µL pipetted in the volume test, the allowable range is 474 to 525 µL. Recall that 500µL is equal to 500mg.

6.6 HAMILTON NIMBUS 4 MAINTENANCE

The Nimbus requires routine maintenance to be performed daily, weekly, and semi-annually in order to ensure optimal performance. Any maintenance failures should be reported to Hamilton Technical Support (1-800-648-5950) for troubleshooting assistance.

Daily Maintenance:

The daily maintenance should be performed prior to the first run of the day. It is not necessary to perform the daily maintenance prior to subsequent runs if it has already been performed on a given day. It is also not necessary to perform the daily maintenance on days the Nimbus is not used.

1. Power on the Nimbus instrument and attached computer.
2. Open the Maintenance software (on the desktop).
3. Select the "**Daily**" maintenance type and click "**Run Maintenance**".

4. Inspect deck and carriers for cleanliness.
a. Clean the deck with deionized water and/or ethanol.
b. Wipe the o-rings on the channels with deionized water.
c. Check the "**Inspect deck and carriers for cleanliness**" box.

5. Empty Tip Waste/Liquid Waste.
a. Remove the tip waste receptacle and empty tips into trash.
b. Replace plastic trash bag in tip waste receptacle if needed.
c. There is no liquid waste to empty.
d. Check the "**Empty Tip Waste/Liquid Waste**" box.

6. Select the "**Check tightness of Pipetting Channels**" box.
a. Read the message that appears, remove the tip eject plate, close the door, and click "**Continue**".
b. The system will automatically test the o-ring seals of the channels.

7. Select the "**Check LLD**" box.
a. Read the message that appears, ensure the tip eject plate is still removed and the door is still closed, and click "**Continue**".
b. The system will automatically test liquid level sensing.

8. Click "**OK**" to acknowledge that the maintenance has completed successfully.

9. Replace the tip eject plate.

10. Click "**Close**".

11. Exit the Maintenance software.

Weekly Maintenance:

The weekly maintenance should be performed once a week regardless of whether or not the Nimbus is to be used that week.

1. Power on the Nimbus instrument and attached computer.

2. Open the Maintenance software (on the desktop).

3. Select the "**Weekly**" maintenance type and click "**Run Maintenance**".

4. Clean deck and carriers.
   a. Clean the deck with deionized water and/or ethanol.
   b. Check the "**Clean deck and carriers**" box.

5. Check condition of carriers and other devices.

a. Visually inspect the instrument for any obvious signs of damage.
b. Clean the pedestals and racks with water and/or ethanol.
c. Check the "**Check condition of carriers and other devices**" box.

6. Empty and clean Tip Waste/Liquid Waste.
   a. Remove the tip waste receptacle and empty tips into trash.
   b. Replace plastic trash bag in tip waste receptacle if needed.
   c. There is no liquid waste to empty.
   d. Clean the tip eject plate with deionized water and/or ethanol.
   e. Check the "**Empty and clean Tip Waste/Liquid Waste**" box.

7. Clean each channel: stop disk, o-ring, and tip eject sleeve.
   a. Wipe the pipettor channels with a kimwipe dampened with deionized water.
   b. Check the "**Clean each channel: stop disk, o-ring, and tip eject sleeve**" box.

8. Clean the side covers
   a. Clean the Nimbus enclosure with deionized water and/or ethanol.
   b. Check the "**Clean the side covers**" box.

9. Select the "**Check tightness of Pipette Channels**" box.
   a. Read the message that appears, remove the tip eject plate, close the door, and click "**Continue**".
   b. The system will automatically test the o-ring seals of the channels.

10. Select the "**Check cLLD**" box.
    a. Read the message that appears, ensure the tip eject plate is still removed and the door is still closed, and click "**Continue**".
    b. The system will automatically test liquid level sensing.

11. Click "**OK**" to acknowledge that the maintenance has completed successfully.

12. Replace the tip eject plate.

13. Click "**Close**".

14. Exit the Maintenance software.

Semi-Annual Maintenance:

At least once a year a service engineer from Hamilton will perform maintenance and calibration of the Nimbus.

REFERENCES:

Microlab® Nimbus Independent Channel Operator's Manual. Hamilton Robotics.
Microlab® Nimbus Enclosed Version Operator's Manual. Hamilton Robotics.

Microlab® Nimbus Independent Channel Programmer's Manual. Hamilton Robotics.

6.7 CALIBRATION OF THE BIOROBOT UNIVERSAL

REAGENTS: Tartrazine Dye

Four concentrations of tartrazine dye are required to calibrate the BioRobot Universal. The dye solutions are prepared as follows:

Pipet Tip	Calibration volume	Tartrazine (g)	Water (mL)	Concentration
50uL	2uL	0.3	50	6000mg/L
300uL	8uL	0.0875	50	1750mg/L
50uL	45uL	0.015	50	300mg/L
300uL	95uL	0.005	50	100mg/L

Less than 50mL are required for the calibration protocol, if desired the solutions can be made up in 25mL instead of 50mL. The dye solutions should be prepared fresh and they are relatively stable if shielded from light for several weeks.

MATERIALS:

96- Well No Lid Flat Bottom Microplate Fisher (Costar P/N 9017)

EQUIPMENT:

Qiagen Universal BioRobot Universal Liquid Handler Qiagen Corporation

PROCEDURE:

1. Ensure that the Universal is switched ON. Switch on the computer and monitor. Start the QiaSoft 5 operating software. Run the "Syringe Calibration Check UNIV" protocol. Click the "RUN" button to start the protocol. The QiaSoft software will guide you through the remaining steps to set up the BioRobot Universal System.

2. Follow the steps detailed in each protocol message. Select the tips and volumes to be calibrated. The user will be instructed to load 2 microplates onto the BioRobot Universal System worktable: a source microplate, which the user will fill with tartrazine solution in the wells of columns 1

through 11(either 250 or 300uL depending on the calibration value), and a destination microplate, which is empty. The high speed dispensing system will dispense water into columns 1-12 of the destination plate before (and after) the transfer of the tartrazine. Please refer to the table above for the proper concentration of tartrazine to add to the source microplate. The user will be asked to manually transfer the calibration volume from column 11 of the source plate to the wells of column 11 of the destination plate. The dilutor system will transfer the calibration volume to wells of columns 1 through 10 of the destination plate.

3. After the dilutor system transfers the calibration volume to wells of columns 1 through 10 the user will be asked to measure the absorbance of the microplate at 405nm. This is accomplished by using the BioTek spectrophotometer that is attached to the BioRobot Universal computer.

4. Switch on the BioTek spectrophotometer. Start the Gen5 software. Click the wizard icon in the top left of the screen. In the Gen5 wizard dialog box click "Next". In the procedure portion of the wizard click the icon below the word "Procedure". Click the "Read" button, then select "Absorbance" from the detection drop-down menu and select 1 wavelength of 405. Click the full plate button at the top right of the dialog box. Click "OK". Click "OK" until the dialog box allows you to click "Next". Click the icon in the Plate Layout dialog box. Highlight all wells of the plate so that SPL1 through SPL96 are present in the window. Click "OK". Click "Next". Click "Next again.

5. Press the "Read Plate" icon, name the plate, then click "OK" until the plate reads (you will hear the BioTek spectrophotometer working). Once the plate has been read select 405 from the data drop-down menu then click on the Excel icon at the top of the plate window. Excel opens automatically and the information of the absorbance read is automatically entered into the worksheet. Delete column A of the data table. Save as OD.txt in the C:\Anthos folder. Close the OD.txt file.

6. Back in the QiaSoft software. Click "Continue". The absorbance values are automatically converted to liquid volumes. The protocol calculates the percentage accuracy and percentage CV for each syringe automatically.

7. Check whether the percentage CV fulfills the pass criteria presented in the table below:

Tip Size	Calibration volume (uL)	Maximum accuracy (%)	Maximum CV (%)
50	2	15	9
50	45	5	4
300	8	10	7
300	95	4	4

8. If the results do not fulfill the pass criteria, run the "Syringe Calibration Adjust (SOW-176) protocol (Note: you need service level privileges to access this protocol). Click "RUN" to start the protocol. The QiaSoft software will guide you through the remaining steps to setup the BioRobot Universal System.

9. If the pass criteria are not met a second time repeat step 16. If after running the "Syringe Calibration Adjust (SOW-176) protocol twice, the pass criteria are still not fulfilled, contact Qiagen Technical Services.

10. Print the word documents of the calibartion files showing the status (pass/fail) of all eight syringes.

References:

1. BioRobot 8000 Users manual. Qiagen Corporation.

2. Precision Pipetting BioRobot 8000 Handbook. Qiagen Corporation

3. QiaSoft 5 Software System Users Guide. Qiagen Corporation.

6.8 7500 SDS CALIBRATION / VERIFICATION PROCEDURES

The procedures detailed in this section all reference the Applied Biosystems 7300/7500/7500 fast real-Time PCR System Installation and Maintenance Guide.

6.8.1 BLOCK CONTAMINATION CHECK

Purpose: A check for contamination allows a user to determine if there are any areas of possible contamination in the wells of the plate holder that would artificially increase the fluorescence in those wells during a run, thereby increasing the quantitation result.

Preparing the Check This check is performed without a plate being positioned in the plate holder; therefore, if there is a plate in the holder, remove it, and then close the carriage door over the sample block and lock it down.

Note: This check is for information only and should not be saved using the 7500 System software during or after the check. See step 3 below for instructions on documenting the contamination check.

Performing the Check

1. Turn on the instrument and open the SDS software and select calibrate from the Instrument drop-down menu (**Instrument>Calibrate)**.

2. Using Filter A ((FAM filter position), open the ROI Inspector and take an image at 2048ms by selecting **Snapshot**.

3. Observe the background fluorescence in the 96 wells. Note any wells that have significant fluorescence; fluorescence indicates contamination. For documentation, perform a Screen Shot (**Alt + PrintScrn)** and then paste it (**Ctrl-V)** into a Microsoft Word blank document.

4. To determine an acceptable background fluorescence level:
   a. Push the instrument carriage and allow it to spring back to open it.
   b. Put a new, clean, empty reaction plate without the cover into the sample block.
   c. Push the carriage forward to close it.
   d. Take another image at 2048 ms. For documentation, perform a Screen Shot (**Alt +PrintScrn)** and then paste it (**Ctrl-V)** into a Microsoft Word blank document.
   e. Save as Calibration Contamination check (MM/DD/YY) in the appropriate instrument folder.

5. If some of the wells still appear to have significant fluorescence, clean them per the instructions in "Cleaning the Sample Wells".

Recheck the wells after cleaning, following steps 1 through 3 above.

6.8.2 7500 REGIONS OF INTEREST CALIBRATION

MATERIALS REQUIRED:

1. Applied Biosystems Real-Time PCR System Spectral Calibration Kit

2. ROI Calibration Plate (Part No. 4349415)

3. Centrifuge and vortex

Purpose:
A Regions of Interest (ROI) calibration maps the positions of the wells on the sample block so that the software can associate increases in fluorescence during a run with specific wells of the plate. A calibration image is needed for each well or filter to account for minor differences in the optical path.

Preparing the Plate
Retrieve the ROI calibration plate from the spectral calibration kit from the freezer in the amplified DNA room freezer. Allow the plate to thaw. Leave the optical film on the plate. (Do not discard the packaging as the plate can be used up to three times). Vortex and centrifuge the thawed plate to assure that the liquid is in the bottom of the plate wells.

Creating a Plate Document for the ROI Calibration

1. Start the instrument and open the SDS software. Load the ROI calibration plate into the plate holder position.

2. Click **File > New**
   In the New Document wizard or dialog box click **Finish** to accept the default parameters. (The SDS software automatically saves the ROI data to a set of calibration files on the computer hard drive). Click OK if any ROI error is displayed.

3. In the SDS software, select **Instrument > Calibrate**

4. In the ROI inspector dialog box that appears, right-click the black area of the window, then select **Display Properties**.

5. In the Image Viewer Control Properties dialog Box:
   a. Select **Show Saturation**
   b. In the Sat Threshold field, enter **4000**.
   c. Click **OK**

6. In the ROI Inspector dialog box, set the lamp control:
   a. Click **Block up**
   b. Select **Idle** from the Lamp Control drop-down list

Performing the ROI Calibration

1. In the ROI Inspector dialog box:
   a. In the Exposure Time field, enter **2048** for the 7500 and
   b. Select **Filter A.**

2. Click **Snapshot** to generate an ROI image.

3. Determine if your ROI image is acceptable. An acceptable image will not have saturated red areas in any wells. (A few red pixels in a well are acceptable).

   If the ROI image appears over saturated, continue to reduce the number in the Exposure Time Field (2048) by half until an acceptable image is obtained. Once the acceptable image is produced, print this screen by pressing **Alt + PrintScrn** and then **Ctrl V** into a Microsoft Word blank document.

4. If your image is acceptable, Click **Generate Calibration.**
   The software takes a snapshot, and then displays a message dialog box or an ROI image. A successful calibration will have green circles around all wells.

If the calibration image is not successful, see pg 45 for of the 7500 Installation and Maintenance Guide for trouble shooting.

5. Click **Save Calibration** to save the image for filter A. (An OK will appear in the dialog box for Filter A). Remember to **Save** after every filter.

6. Repeats steps 1 through 6 for the remaining filters: Filters B, C, D and E. Reset the Exposure Time to 256 or 2048 before performing the calibration for each filter.

7. Click **Done > File > Close** and click **NO** to save the plate document.

Unloading the Plate

In the ROI Inspector dialog box, click Block Down and remove the plate. Return the plate to the packaging if not performing background and optical calibration.

6.8.3 Performing the Background Calibration on the 7500 SDS Instrument

MATERIALS REQUIRED:

1. Applied Biosystems Real-Time PCR System Spectral Calibration Kit

2. Background Plate (Part No. 4330124)

3. Centrifuge and vortex

Purpose A background calibration measures the level of background fluorescence in the instrument. The run will perform continuous reads of a background plate containing PCR buffer for 10 minutes at 60°C and average the spectral results to a calibration file. The software can then use the file to remove the background fluorescence from the run data.

Perform a background calibration after replacing the lamp or monthly, depending on instrument usage.

Precautions Since the signal consists of fluorescence from several sources it is important to use gloves when handling the plate, use a clean centrifuge and vortex, and do not place the plates on the lab bench.

Preparing the Background Calibration Plate Retrieve the prepared background plate from the spectral calibration kit from the freezer in the amplified DNA room. Allow the plate to thaw (Do not discard the packaging as the plate can be used up to three times). Vortex and centrifuge the thawed plate to ensure that the liquid is in the bottom of the plate wells.

Creating a Plate Document for the Background Calibration

1. Place the prepared plate into the plate holder and close the tray/door. Start the instrument and open the SDS software. Click **File > New**.

2. Configure the New Document Dialog box:
   a. Select **Assay >Background**.
   b. Select **Container > 96-Well Clear**.
   c. Select **Template > Blank Document**
   d. In the Operator field, enter a name.
   e. In the plate Name field, enter : **Background_<date *MMDDYY*>** and click **Finish**.

3. In the SDS software select **File > Save As**. (Navigate to D\: > AppliedBiosystems >SDS Documents and Save). Select **Save as type > SDS Documents (*.sds)**.

Performing the Background Calibration In the SDS software: Select the **Instrument** tab and click **Start.** The instrument begins the calibration run after the heated cover comes to temperature. After the run is complete, click **OK**. The background run may take 10 minutes.

Analyzing the Background Calibration Data

1. Click the green arrow or select **Analysis > Extract Background**. The software extracts the background signal then displays **Background Extraction Complete**. Click **OK.**

   If the message indicates the image exposure is too low, see pg 56 of the 7500 Installation and Maintenance Guide for trouble shooting.

2. In the plate document, select the **Results** tab, then **Spectra** tab. Print this page for the Background Calibration records and to show that the instrument is free of significant contaminants.

3. Inspect the raw data for irregular spectral peaks that exceed the following fluorescent standard units (FSU). All wells should be selected.

Filter	FSU
A,B,C,D (7000/7500)	>72,000
E (7500)	>90,000

If the fluorescence exceeds the FSU indicated, see pg 64 of the 7500 Installation and Maintenance Guide for trouble shooting.

If a contaminant is observed (high fluorescent data), see pg 108 of the 7500 Installation and Maintenance Guide for cleaning contaminants.

4. Inspect the background plate image for bright areas of fluorescence and perform a Screen Shot (**Alt + PrintScrn)** and then paste it (**Ctrl-V)** into a Microsoft Word blank document for documentation.

5. Select **File > Close**

6.8.4 PERFORMING THE OPTICAL CALIBRATION FOR THE 7500 SDS INSTRUMENT

MATERIALS REQUIRED:

1. Applied Biosystems Real-Time PCR System Spectral Calibration Kit
2. ROI Calibration Plate (Part No. 4349415)
3. Centrifuge and vortex

Purpose: The optical calibration compensates for the physical effects of the additional filter present in the 7500 instrument and needs to be performed after every 7500 system background calibration.

Preparing the Optical Calibration Plate

Retrieve the prepared ROI plate from the spectral calibration kit from the freezer in the amplified DNA room. Allow the plate to thaw (Do not discard the packaging as the plate can be used up to three times). Vortex and centrifuge the thawed plate to ensure that the liquid is in the bottom of the plate wells.

Creating a Plate Document for the Optical Calibration

1. Start the instrument and open the SDS software. Load the ROI calibration plate into the plate holder position.
2. Click File>New.
3. Configure the New Document Dialog box:
   a. Select **Assay >Calibration**.
   b. Select **Container > 96-Well Clear**.
   c. Select **Template > Blank Document**
   d. In the Operator field, enter a name.
   e. In the plate Name field, enter :
   Calibration_<date *MMDDYY*> and click **Finish**.
4. In the SDS software select **File > Save As**. (Navigate to D\:>AppliedBiosystems>SDS Documents and Save)

Performing the Optical Calibration

In the SDS software: Select the **Instrument** tab and click **Start.** The instrument begins the calibration run (10 min.) after the heated cover comes to temperature. After the run is complete, click **OK.**

Analyzing the Optical Calibration Data

Click the green arrow or select **Analysis > Extract**. The software extracts the optical calibration then displays a message indicating the extraction is complete. Click **OK.**

Click on the Results and Spectral Tabs. Select all wells and print this screen. Inspect the raw background data for any irregular (peaks >72,000) spectral peaks.

For any error messages, see pg 64 of the 7500 Installation and Maintenance Guide for trouble shooting

Click **File>Close**.

6.8.5 PERFORMING THE PURE DYE CALIBRATION ON THE 7500 SDS INSTRUMENT

MATERIALS REQUIRED:

1. Applied Biosystems 7500 Real-Time PCR Systems Spectral Calibration Kit I (PN 4349180 containing Pure Dye Plates FAM, JOE, NED, ROX, SYBR Green, TAMRA, and VIC).

2. Centrifuge and vortex

Purpose During a pure dye calibration run, the system collects spectral data from a series of pure dye standards and stores the spectral information for the pure dye standards in the pure spectra run file, a calibration file in the SDS directory.

The software then uses the pure spectra data during subsequent runs to characterize pure dyes and distinguish the individual contribution of each dye in the collective fluorescence collected by the instrument during a run.

Important! Before performing a pure dye calibration, you must perform an ROI calibration, a background calibration, and an optical calibration.

Preparing the Plate Retrieve the pure dye plates from the spectral calibration kits from the freezer in the amplified DNA room. Allow the plates to thaw (~5 minutes). **NOTE: Do not remove a pure dye plate from its packaging until it is ready to be used. The fluorescent dye in the wells of each pure dye plate is photosensitive.** (Do not discard the packaging as the plates can be used multiple times). Leave the optical film on the plates. Although multiple pure dye plates are in Spectral Calibration Kit I, only the plates that are currently used for the quantitation chemistry being employed need to be run. For Quantifiler and Quantifiler Duo, only FAM, VIC, ROX, and NED need to be run.

Creating a Plate Document for the Pure Dye Calibration

1. Start the instrument and open the SDS software. Click **File > New.**

2. In the New Document Wizard dialog box:

a. Select **Assay > Pure Spectra.**
b. Select **Container > 96-Well Clear.**
c. Select **Template > Blank Document.**
d. In the Operator field, enter your initials.
e. In the Comments field, enter the plate bar code number.
f. Click **Finish**. Note: It is not necessary to name or save the pure dye plate document. The SDS software automatically saves the pure dye data to a calibration file on the computer hard drive.

Selecting the Dye

In the Pure Spectra Calibration Manager dialog box:

a. In the Dye List field, select a pure dye to calibrate.
b. Click **Calibrate.**
c. If you are prompted to disconnect the plate document, click **Yes.**
d. A message prompts you to load the plate. Do not click Yes or No at this point.

Preparing and Loading a Pure Dye Plate

1. Remove the appropriate Pure Dye plate from its packaging. Do not discard the packaging as the plate can be used multiple times. Leave the optical film on the plate.
2. Vortex and centrifuge the thawed plate to assure that the liquid is in the bottom of the plate wells.
3. Verify that the pure dye plate that you are about to load matches the dye selected in the Pure Spectra Calibration Manager.
4. Load the plate in the instrument with the notch in the upper right corner.

Performing the Pure Dye Calibration

1. In the dialog box that prompts you to load the plate click **Yes.** The run takes ~5 minutes to complete.
2. When the SDS software completes the run, remove the pure dye plate from the SDS Instrument, place it back into its packaging, and place it back into its respective spectral calibration kit in the freezer.

Calibrating remaining dyes:

1. Click **Next Dye >.**

2. Repeat the procedures in Preparing and Loading a Pure Dye Plate and Performing the Pure Dye Calibration to run the remaining pure dye plates.

3. After you calibrate the instrument with all pure dyes provided in the spectral calibration kits, click **Finish.**

Analyzing the Pure Dye Calibration Data

When each pure dye plate is run, the SDS Software automatically creates and saves a plate document for each dye. After you calibrate all of the pure dye plates, the plate documents remain open behind the plate document displayed by the software. *To complete the calibration, analyze all open pure dye documents:*

1. From the Windows menu, select the plate document to analyze.
2. Select the **Results** tab, then select the **Spectra** tab.
3. Select all wells of the plate document by clicking the upper-left corner of the plate grid.
4. Click the green arrow (or select **Analysis > Extract Pure Spectra)**. The SDS Software completes the extraction, then displays a message:

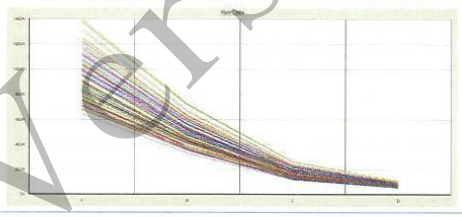
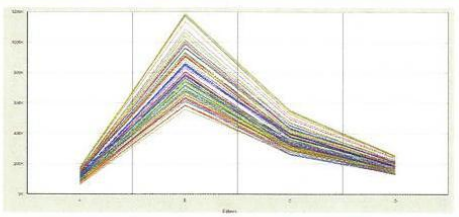
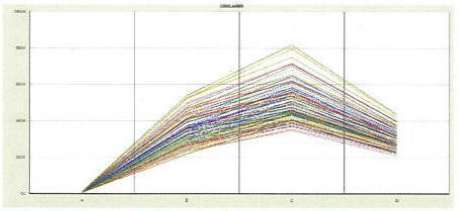
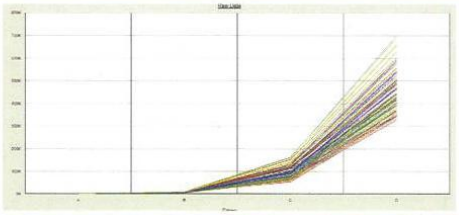
If the software displays:	Do this:
Pure Spectra Extraction Complete – The analysis is successful.	Click **OK**, then go to step 5. **Important! The pure dye calibration is not complete at this point.** Before closing the plate document you must inspect the Spectra plot as explained in steps 5 through 8 below.
Repair Message—"The following wells require repair. . ."	Click **OK**, then go to step 5. (For information on how the software auto-repairs calibration spectra, see "About Pure Dye Spectra" on pg 79 of the Applied Biosystems 7300/7500/7500 Fast Real-Time PCR System Installation and Maintenance Guide.
Error Message—"Pure Spectra Extraction Detected an Unknown Error. . ."	Click **OK**, load the plate, then run the pure dye plate again. If the calibration continues to fail, perform the calibration with a new pure dye plate.

5. In the pure dye plate document:

a. Select the **Results** tab.
b. Select the **Spectra** tab.

6. Select all wells of the plate document by clicking the upper-left corner of the plate grid.

7. Using the tables below as a reference, verify that the peak for the spectrum of the pure dye occurs at the correct filter. For documentation, **Print** the spectra for each dye (**Alt + Print Scrn**; then open a new blank Microsoft Word document and **Ctrl V** to paste the spectra). If the peak for the spectra of a dye occurs in the wrong filter, you may have run the wrong dye plate during the calibration. Repeat the procedure using the correct dye.

Instrument	Pure Dye	Filter	Peak (nm)	
7500 System	FAM	A	~520 nm	
	VIC	B	~550 nm	
	NED	C	~580 nm	
	ROX	D	~610 nm	

8. Select **File > Close. Important!** Do not close a plate document until you have extracted it. During the calibration, the software creates plate documents for each pure dye plate as it was run. You must extract each one individually before closing it.

9. Repeat steps 1 through 8 to extract the calibration data for the remaining pure dyes.

6.8.6 Running the TaqMan RNase P Plate Data on the ABI 7500 SDS

MATERIALS REQUIRED:

1. Applied Biosystems Real-Time PCR System Spectral Calibration Kit
2. TaqMan RNase P Instrument Verification Plate (Part No. 4350584)
3. Centrifuge and vortex

Purpose The TaqMan RNase P Instrument Verification Plate run verifies the performance of an Applied Biosystems 7500 SDS instrument. The RNase P plate is pre-loaded with the reagents necessary for the detection and quantification of genomic copies of the human RNase P gene.

The RNase P plate contains five replicate groups of standards, two unknown populations and four no template control wells. After the run, the SDS software will assess the instrument performance.

Preparing the TaqMan RNase P Plate Retrieve a prepared TaqMan RNase P Verification Plate kit from the freezer in the amplified DNA room and allow the plate to thaw (approximately 5 minutes). Vortex and centrifuge the thawed plate to ensure that the liquid is in the bottom of the plate wells. If the RNase P plate has a compression pad on it, remove it from the plate.

Creating a Plate Document for the RNase P Verification Run

1. Start the instrument and put the RNase P plate in the instrument.
2. Open the SDS software and click **File > New.**
3. In the New Document Dialog box:
   a. Select **Assay >Absolute Quantification (standard curve)**.
   b. Select **Container > 96-Well Clear**.
   c. Select **Template > AQ RNase P Install**
   d. In the Operator field, enter a name for the RNase P plate (i.e. RNase P *DDMMYY)* click **Finish**
   e. In the SDS software, select **File> Save As.** (Navigate to D\:>AppliedBiosystems>SDS Documents and Save)

Performing the Verification Run In the SDS software: Select the **Instrument** tab and click **Start.** (The instrument default parameters should be correct. The RNase P plate volume is 50ul). The instrument begins the run which lasts approximately 1.5 hours. After the run is complete, click **OK.**

Analyzing the TaqMan RNase P Plate Data

1. Select **Analysis > Analysis Settings**. Select **Auto C_t** >Click **OK.** Click the green arrow or select **Analyze.**

2. Assess the results. In the plate document: Select the **Results** tab then select the **Amplification Plot** tab.

1. Display the data: from the Amplification Plot tab:

   a. Click the upper-left corner of the plate grid to select all wells.

   b. Select **Data > C_t vs. Well Position** to display the plots. Print this data.

2. Verify the uniformity of each replicate population by comparing the groupings of C_t values.

   If outliers are present, omit and reanalyze (*see page 93 of the 7500 Installation and Maintenance Guide for trouble shooting, this will apply to the 7000, as well).*

3. In the results tab, select the **Standard Curve** tab and verify that the R^2 value is ≥ 0.990.

4. In the **Report** tab, calculate the verification value of the 5,000-copy and 10,000-copy populations:

   a. For the 5,000-copy populations, in the Report tab, scroll to a sample in the 5K population. Apply the value in the Mean Qty and StdDev Qty columns to the following equation:

   $$5K\ value = Mean\ Qty + 3(StdDev\ Qty)$$

   b. For the 10,000-copy populations, in the Report tab, scroll to a sample in the 10K population. Apply the value in the Mean Qty and StdDev Qty columns to the following equation:

10K value = Mean Qty – 3(StdDev Qty)

5. Compare the values of the 10K and 5K-copy populations. If the 10K value is greater than the 5K value the 7500 has passed.

6. **With all wells chosen, print the Report.** Save the Tabular Report Data and the Standard Curve Data pages. You may discard the Raw Data and the Delta Rn vs Cycle Data pages. **It is recommended that the calculations performed above be written on one of the Tabular Report Data pages.**

   Remove the plate and discard. (note: the plate cannot be re-used)

6.8.7 Monitoring and Replacing the Lamp on the 7500 SDS Instrument

6.8.7.1 Monitoring the Lamp Status

The halogen lamp has a life span of approximately 1,000 hours.

1. Select **File > New.**

2. In the New Document Wizard, click **Finish.**

   In the SDS Software, select **Instrument>Lamp Status/Replacement.** In the Lamp Status/Replacement dialog box, the usage hours and lamp current are displayed. The Condition field will indicate one of the following:

   Good—the lamp is functioning well. There is no need to replace the lamp bulb at this time. Click **Close.**
   Failed—The lamp bulb must be replaced. Click **Close**, then replace the lamp.
   Change Soon—the lamp bulb usage is above 2000 hours. It is recommended to replace the lamp soon. Click **Close**, then replace the lamp.

   Warning messages may be displayed before or during a run that indicate low lamp current. See page 121 of the Installation and Maintenance Guide for these messages, what they are describing, and how to proceed.

6.8.7.2 Replacing the Halogen Lamp on the 7500 SDS Instrument

The halogen lamp located in the 7500 SDS Instrument has a life span of approximately 1,000 hours. If the lamp has exceeded 1,000 hours, or if a message is displayed that recommends changing the lamp, this procedure should be followed.

MATERIALS REQUIRED:

1. Halogen bulb (12V, 75W)

2. Small pointed object, for example a screwdriver.

Important: Wear powder-free gloves when you handle the lamp.

1. Power off, then unplug the 7500 SDS Instrument. Allow the instrument to cool for 15 minutes.

2. Open the access door to the Instrument:
Insert a thin screwdriver or other object into the keyhole on the edge of the front access door, then push to unlatch the door. Open the door.

3. Remove the lamp from the instrument:
Slide the lamp release lever downward. Firmly grasp the lamp and lift it up and out of the slotted mount.

4. Inspect the lamp for signs of failure (see the Installation and Maintenance Guide page 124 for indications of lamp failure).

5. Place the new lamp into the instrument
Slide the lamp release lever upward. Firmly grasp the lamp, place it into the slotted mount, then carefully slide the lamp downward into place.

6. Close the access door.

7. Plug in and power on the 7500 SDS Instrument.

8. Open the ROI Inspector dialog box
If the Quick Startup document dialog box is open, select **Create New Document**. If the Quick Startup document dialog box is not open, select **File > New**. In the New Document wizard, click **Finish**. In the SDS software, select **Instrument > Calibrate**.

9. In the ROI Inspector dialog box, select **Lamp Control > Idle.**

10. While the instrument is running, look through the grating of the access door and verify that the lamp is illuminated, then click **Done**.

Important! After replacing the lamp, the following calibrations must be performed: ROI Calibration, Background and Optical Calibrations, Pure Dye Calibration, Instrument Performance Verification (RNase P Plate).

6.8.8 PROCEDURE FOR THE CALIBRATION CHECKS OF THE 9700 THERMOCYCLERS

The thermocyclers used for the polymerase chain reaction amplification of DNA are located in the Amplification Room of the Forensic Biology Unit. A calibration verification test and temperature non-uniformity test are conducted on each thermocycler every [illegible] months. The temperature non-uniformity test should be performed first. Records of the verification are kept in the Equipment Maintenance Log in the Amplification Room. Verification is conducted using a thermocoupler (a probe connected to a digital thermometer). The thermocoupler is sent to an outside company to be calibrated once each year.

6.8.9 TEMPERATURE NON-UNIFORMITY TEST

Eight wells will be tested for temperature uniformity by heating to two setpoints, 37°C and 94°C. Follow the instructions below, taken from the "Thermo Cycler Temperature Verification User's Manual" by Applied Biosystems pages 2-10 to 2-15.

1. Apply a few drops of mineral oil to a cotton swab and coat the following wells with oil: A1, A12, C4, C9, F4, F9, H1, and H12.

2. Place the 9700 Temperature Verification Frame on the sample block.

3. Connect the probe to the digital thermometer and turn the instrument on.

4. Place the probe in well A1, thread the probe wire through the channel in the Verification Frame, slide the heated cover forward and pull the lever down.

5. Turn on the system 9700 and the **Main** menu appears.

6. Press **F4** (Util) and the **Utilities** screen appears.

7. Press **F1** (Diag) and the **Diagnostics** screen appears.

8. Press **F3** (TempVer) and the **Temperature Verification** screen appears.

9. Press **F2** (TNU). This automatically configures the system 9700 for the Temperature Non-Uniformity Test, starting with the setpoint of 37°C. The **TNU Performance** screen appears.

10. Press **F1** (Run). This starts the Temperature Non-Uniformity Test. The **TNU Performance** screen appears with the setpoint value displayed.

11. Note: The sample block must be within 1.0°C of the setpoint. In addition, the cover must be within 1°C of 35°C. It may take several minutes for the system 9700 to stabilize at the setpoint temperature.
12. The **TNU Performance** screen counts down the time until the setpoint is stabilized. When the "Stabilizing at setpoint" value decrements to zero, read the digital thermometer.

13. Note: The thermocoupler will periodically shut itself off to save power. Simply press the power button and it will read the current temperature of the well.

14. Using the numeric keys, type the value displayed on the digital thermometer in the "Enter actual block temperature" field. Record this value on the Temperature Non-Uniformity Log.

15. Note: The digital thermometer displays a four-digit value; round the value off to three digits before typing it in the **TNU Performance** screen.

16. Press **Enter**. Slide the heated cover back and move the probe to well A12.

17. Repeat steps 10-13 until a temperature reading is recorded for the remaining wells at the setpoint of 37°C.

18. Press **Enter**. The system 9700 automatically begins the second reading at 94°C setpoint. The **TNU Performance** screen appears with the setpoint value displayed.

19. Note: The sample block must be with 1.0°C of the setpoint. In addition, the cover must be with 1°C of 105°C. It may take several minutes for the system 9700 to stabilize the setpoint temperature.

20. Place the probe in well A1 and repeat steps 10-13 for the second setpoint for the remaining wells.

21. The system 9700 evaluates the uniformity of the sample block temperature for the setpoint values you entered and displays the results. A summary screen appears at the conclusion of the test.

22. Press **F1** (Accept). Record the given TNU Performance results in Temperature Non-Uniformity Log.

23. Press **F5** (Exit).

24. Continue on to the Temperature Verification test or, if finished, remove the probe and clean the sample block using reagent alcohol.

25. Turn off the system 9700.

TEMPERATURE VERIFICATION:

Two temperature setpoints, 85°C and 45°C, are verified in one well, A6. Follow the instructions below, taken from the "Thermo Cycler Temperature Verification User's Manual" by Applied Biosystems pages 2-3 to 2-9.

1. Use a cotton swab to coat well A6 with mineral oil.

2. Place the 9700 Temperature Verification Frame on the sample block.

3. Connect the probe to the digital thermometer and turn the instrument on.

4. Place the probe in well A6, thread the probe wire through the channel in the Verification Frame, slide the heated cover forward and pull the lever down.

5. Turn on the system 9700 and the **Main** menu appears.

6. Press **F4** (Util) and the **Utilities** screen appears.

7. Press **F1** (Diag) and the **Diagnostics** screen appears.

8. Press **F3** (TmpVer) and the **Temperature Verification** screen appears.

9. Press **F1** (Temp). This automatically configures the system 9700 for the Calibration Verification Test. The **Calibration Verification** screen appears.

10. Press **F1** (Run). This starts the Calibration Verification Test. The **Calibration Verification** screen appears with the setpoint value (85°C) displayed.
Note: the cover must be within 1°C of 105°C, It may take several minutes for the system 9700 to ramp up.

11. The **Calibration Verification** screen counts down the time until the setpoint is reached. When the "Stabilizing at setpoint" value decrements to zero, read the digital thermometer.

12. Using the numeric keys, type the value displayed on the digital thermometer in the "Enter actual block temperature" field. Record this value in the Temperature Verification Log.

    Note: The digital thermometer displays a four-digit value; round this number off to three digits before typing it in the **Calibration Verification** screen.

13. Press **Enter**. The system automatically begins the second reading (45°C setpoint). The **Calibration Verification** screen appears with the setpoint value displayed.

    Note: The cover must be within 1°C of 105°C.

14. Repeat steps 11-13 for the second reading.

15. The system 9700 evaluates the calibration of the sample block temperature for the setpoint values you entered and displays the result. A summary screen appears at the conclusion of the test.

16. Press **F1** (Accept).

17. If the sample block module is properly calibrated, then the **Calibration Verification** screen appears with the message "Calibration is good." If the sample block module does not pass the Calibration Verification Test the **Calibration Verification** screen appears with the message "Instrument may require service. Contact Applied Biosystems Technical Support."

a. If the test fails, repeat the procedure to make sure the thermocoupler was not misread or that errors were not made when entering data.
b. If the test fails again, contact Applied Biosystems Technical Support.

18. Press **F5** (Exit).

19. Clean the sample block of mineral oil using reagent alcohol.

    Turn off the system 9700.

7.0 COLLECTION KITS AND SUPPLY ORDERING

7.1 PREPARATION OF EVIDENCE COLLECTION KITS

The Forensic Biology Unit provides officers, investigators, and sexual assault nurses with six types of kits used in the collection of biological evidence. Currently, the City of San Diego has contracts with Children's Hospital Chadwick Center and Independent Forensic Services (IFS) for conducting sexual assault examinations and collecting evidence related to sexual assault cases. In addition to kits, these medical service providers may request supplies, such as extra swabs and paper bags, used in sexual assault exams. IFS and Children's Hospital will call when they need kits and supplies. The requested kits and supplies should be gathered and taken to the main laboratory clerical office for pick-up. Communications should be contacted at 685-0451 to request the delivery of the kits to IFS or Children's Hospital. Sub-stations and other investigative units of the Police Department will call for kits as needed. Often, an officer or investigator will come to the laboratory to pick up kits; other times kits will need to be brought to the Property Room and the property clerk will deliver them to the sub-stations.

In general, the Laboratory Technician is responsible for preparing and disseminating the kits, however, the unit as a whole is responsible for these kits. A point person may be assigned the responsibility of these kits. A minimum stock should be kept on hand at all times in order to fill requests promptly. Kit components should also be prepared and kept on hand. Kits and kit components should be made on a sterile surface. Use protective gloves and a laboratory coat when preparing and handling kits and kit components.

7.1.1 REFERENCE MOUTH SWAB COLLECTION KITS

Keep 60-100 kits on hand at all times.

Place the following items in a Reference Mouth Swab Collection Kit envelope (a manila envelope with 'SDPD REFERENCE MOUTH SWAB COLLECTION KIT' printed on the front):

- 2 sterile, paper-wrapped swabs
- 1 small "SDPD Reference Mouth Swabs" envelope
- 1 smaller manila envelope
- 1 evidence seal
- 1 pair of large latex gloves
- 1 copy of 'Instructions for the Collection of Reference Mouth Swabs'

Individual kits can be packaged together in large paper bags containing 20 kits.

7.1.2 BIOLOGICAL STAIN COLLECTION KIT

Keep 60-100 kits on hand at all times.

Place the following items in a Biological Stain Collection Kit envelope (a manila envelope with 'BIOLOGICAL STAIN EVIDENCE COLLECTION KIT' printed on the front):

- 2 sterile, paper-wrapped swabs
- 1 tube containing sterile water
- 1 small 'SDPD BIOLOGICAL EVIDENCE SAMPLE' envelope
- 1 smaller manila envelope
- 1 evidence seal
- 1 pair of large latex gloves
- 1 copy of 'Instructions for the Collection of a Biological Stain'

7.1.3 VICTIM SEXUAL ASSAULT EXAMINATION KIT

Keep 60-80 kits on hand at all times.

Place the following items in a Victim San Diego Regional Sexual Assault Evidence Collection Kit envelope:

- 5 swube tubes
- 1 Pubic Hair Combings envelope with comb
- 1 Head Hair envelope with bindle
- 1 Left Fingernail Scrapings envelope with 2 fingernail swabs in a bindle
- 1 Right Fingernail Scrapings envelope with 2 fingernail swabs in a bindle
- 1 piece of tissue paper
- 1 evidence seal
- 1 victim label sheet (1 Cervical Swabs, 1 Vaginal Swabs, 1 External Genital Swabs, 1 Oral swabs, 1 Rectal Swabs sticker, 1 Left Breast Swabs, and 1 Right Breast Swabs sticker)

7.1.4 SUSPECT SEXUAL ASSAULT EXAMINATION KIT

Keep 40-60 kits on hand at all times.

Place the following items in a Suspect San Diego Regional Sexual Assault Evidence Collection kit envelope:

- 3 swube tubes
- 1 Pubic Hair Combings envelope with comb
- 1 Head Hair envelope with bindle
- 1 Pubic Hair envelope with bindle
- 1 Left Fingernail Scrapings envelope with 2 fingernail swabs in a bindle
- 1 Right Fingernail Scrapings envelope with 2 fingernail swabs in a bindle
- 1 piece of tissue paper

- 1 evidence seal
- 1 suspect label sheet (2 Penile Swabs, 2 Scrotal Swabs, and 2 Oral swabs stickers)

7.1.5 PHYSIOLOGICAL SAMPLES KIT

Keep 60-80 kits on hand at all times.

Place the following items in a Physiological Samples San Diego Regional Sexual Assault Evidence Collection Kit envelope:

- 2 grey-capped blood vials (Vacutainer®) each in a cigar tube
- 1 urine bottle with sodium fluoride
- 1 custody seal
- 1 evidence seal

Blood vials and cigar tubes are provided by the Narcotics Unit.

7.1.6 FETAL TISSUE COLLECTION KIT

Prepared as needed.

Place the following items in a manila envelope:

- 2 blue-capped 50mL conical vials (1 is a spare)
- Evidence seals
- Procedure for collecting aborted fetal material

A cooler and ice pack will be provided to any investigators for transporting the fetal material to the Property Room. Reference mouth swab collection kits should also be provided to investigators for the purpose of collecting samples from the mother and alleged father.

7.2 ORDERING AND RECEIVING COMMERCIAL KITS

7.2.1 Ordering procedure

Requests for supplies, reagents, and DNA typing kits will be placed in the Supply Order Log located in the Forensic Biology Unit.

When orders are placed, the date ordered and the order confirmation number will be logged into the Supply Order Log.

7.2.2 Receiving supplies

The date, initials of the person receiving the supplies, and the location where the supplies will be stored will be logged into the Supply Order Log.

7.2.3 Receiving chemicals

When receiving chemicals, the same procedure as receiving supplies should be followed except the lot number must be recorded in the Supply Order Log.

The chemical name/description, lot number, and other pertinent information will be recorded on the crime laboratory's chemical database, by the receiver.

Chemicals need to have the date and the initials of the receiver on the container.

The date a chemical is opened for first use and by whom must also appear on the container.

7.2.4 Receiving DNA kits

The kits used for DNA extraction, quantification, and typing must all be recorded in the Kit Receipt Log upon receipt. In general, the lot numbers of every component of the kit are recorded as well as the lot number of the kit. Kit components may be stored in different locations and, thus, all kits components must be labeled with the lot number of the whole kit. Some kits will require a quality control test before use.

7.2.4.1 QUANTIFILER KITS

Record lot numbers of the PCR reaction mix, DNA standard, primer, and whole kit in the Kit Receipt Log. The PCR reaction mix should be labeled with the whole kit lot number and stored in the reagent refrigerator. The remainder of the kit (in the original box) will be stored in the reagent freezer. Place 'Not QC'd, Do Not Use' stickers on all kit components. Replace with "QC OK" stickers once the quality control tests have been completed and reviewed.

7.2.4.2 STR TYPING KITS

Record lot numbers of all components of the kit and the whole kit lot number in the Kit Receipt Log. The PCR reagents box should be labeled with the whole kit lot number and stored in the reagent refrigerator. If AmpliTaq is part of the kit, it must be placed in a freezer holder with tube numbered (1 thru X), labeled with the whole kit lot number and stored in the reagent freezer. The ladder will be labeled with the whole kit lot number and stored in the reagent refrigerator in the Amplification Room. This kit must be quality control tested before use. Place 'Not QC'd, Do Not Use' stickers on all kit components. Replace with "QC OK" stickers once the quality control tests have been completed and reviewed.

7.2.4.3 QIAGEN DNA INVESTIGATOR KITS

Record lot numbers of all kit components, except the proteinase K, and the whole kit in the Kit Receipt Log. Discard the proteinase K. This kit must be quality control tested before use. Place 'Not QC'd, Do Not Use' stickers on all kits until quality control testing has been completed. Replace with "QC OK" stickers once the quality control tests have been completed and reviewed.