Improving Evidence Screening Efficiency Using a Biological Processing Laboratory
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ABSTRACT

Palm Beach County is the largest county per square area in Florida, has a population of over 1.2 million with nearly 30 law enforcement agencies submitting crime scene evidence to the Palm Beach County Sheriff's Office Forensic Biological Unit, the county's forensic science service provider. In 2006 there were 722.1 violent crimes per 100,000 individuals[1]. In the past thirteen years, the FBU has been annually awarded National Institute of Justice (NIJ) grant funding to increase the efficiency of the DNA analytical process, reduce DNA backlog and improve turnaround time[2]. The FBU was able to decrease the backlog from 1,700 in 2008 to 200 in 2009 by validating automation for high sample throughput, implementing case submission policies and hiring additional staff. However, the turnaround time still lagged behind expectations, the backlog continued to grow and law enforcement agencies were as frustrated as the laboratory. January 2009, the Palm Beach County Law Enforcement Planning Council (LEPC), composed of all Palm Beach County Chiefs of Police, assembled a DNA/Law Enforcement Working Group to investigate options for decreasing the DNA backlog and turn around times. One of the findings of the Working Group was that the screening of crime scene evidence for biological material is a fundamental factor in the relentless increase of caseload backlogs and that if evidentiary samples submitted to the laboratory were prescreened before submission to the FBU for DNA analysis, this would have an effect on reducing backlog and turn-around time. The Working Group proposed the creation of a central Biological Processing

Laboratory (BPL) to be designed and constructed in an existing space within the Boca Raton Police Services Department (BRPSD) to pre-screen crime scene evidence for southern Palm Beach County law enforcement agencies prior to submission to the FBU for DNA analysis. As a result of the NIJ Efficiency Improvement Program (EIP) grant monies, the BRPSD BPL opened in April, 2012 and evidence from the three largest Palm Beach County southern-most law enforcement agencies including Boca Raton, Boynton Beach and Delray Beach Police Departments are currently having evidence screened prior to PBSO submission. The BPL collects and processes evidence for the confirmation of blood and semen, determine through microscopic analysis of hair if DNA analysis should be attempted, and swab items for touch DNA evidence. Only informative evidence is submitted to the PBSO FBU unit for DNA analysis. Evidence prescreened at the BPL has been prioritized for PBSO DNA analyst assignment. Grant funding was used for renovations, information technology systems and laboratory and office supplies. The BRPSD committed a match to the grant by providing salaries and benefits for two entry level Laboratory Technicians and laboratory equipment. The BPL Laboratory Technicians successfully completed a comprehensive training program at the accredited PBSO FBU before initiation of work at the BPL. All BPL protocols, forms and laboratory information management systems mirror the PBSO FBU laboratory and the BPL is in the process of working towards accreditation status. The BRPSD signed a letter of intent to be responsible for maintaining the long-term administrative and financial support necessary to support the Biological Processing Laboratory and PBSO will be responsible for long term technical support. Advantages for participating police departments include preliminary testing information within days of evidence submission and FBU prioritization of BPL pre-screened cases. Current evaluation of the BPL and FBU collaborative casework initiative shows that there

has been a fifty percent decrease in the time it takes to accept, process and report out casework results. This program has provided faster casework turnaround times and, importantly, the Biological Processing Laboratory will serve as a template for improving DNA case management efficiency for other law enforcement regions within Palm Beach County and throughout the country.

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Palm Beach County Sheriff's Office DNA Casework Backlog Challenges

The number of unworked criminal cases awaiting DNA analysis in the Forensic Biological Unit of the Palm Beach County Sheriff's Office may have a direct effect on victims, defendants, law enforcement and the judicial system. Over the past decade there have been many and varied attempts to decrease the DNA backlog with the procurement of NIJ DNA Backlog Reduction grant monies the most significant effort. The NIJ grant awards have been used to increase laboratory capacity and ensure case management efficiency by implementing DNA automation, advancing training capabilities, effecting expert system analysis and providing salaries and benefits for additional DNA Analysts. In order to reduce the backlog the FBU also outsources hundreds of property crimes annually using the internal PBSO FBU budget in order to assure these high recidivistic crimes are analyzed. Regardless of these efforts, the goals of a zero DNA case backlog and a 45 days turn-around-time has not been realized.

The state of Florida has several law enforcement agencies with forensic DNA capabilities including the Florida Department of Law Enforcement (FDLE) which services over 60 counties. In addition there are six counties which have their own DNA laboratories. Each laboratory calculates the DNA backlog differently. A case is considered part of the backlog at PBSO when

the agency calls it into the FBU Evidence Coordinator. The case is deleted from the backlog after a report has been written and submitted to the appropriate agency. There may be hundreds of cases submitted to the PBSO Evidence Unit but the Forensic Biology Unit will only sign out those cases an agency has called in. This is because most agencies take "DNA swabs" from every crime scene yet many of these cases, nearly one-third, will either never go to court or will not need the DNA swabs tested. The only way to be sure the FBU is conducting testing on the cases that truly need DNA analysis, is to depend on the nearly 30 agencies in the county to call in those cases in which analysis is pertinent. A FBU DNA Request Form must be completed before the case is accepted (Appendix A). This form has information about each piece of evidence to be submitted and why it is informative. This is especially important for CODIS to be sure if a DNA profile is obtained, it qualifies for entry. Once all the evidence and the submission form in a case are submitted, the case will be placed on an assignment log. The process also may occur through e-mail requests and will be considered a "called-in" case. Regardless, an analyst is assigned a case based on the call-in date. This entire request procedure was adopted by the BPL staff for all cases submitted in order to coordinate and streamline casework analysis both at the BPL and the FBU.

The Forensic Biology Unit of the Palm Beach County Sheriff's Office had a DNA backlog of nearly 1,700 cases when the EIP was initiated and as of June 2012 has a backlog of approximately 300 cases. Over the past decade there have been many and varied attempts to decrease the DNA backlog with the procurement of NIJ DNA Backlog Reduction grant monies, however, the backlog continues to increase. Several Palm Beach County police departments have seriously researched the construction of a DNA laboratory but the nearly $5 million

necessary to start up a DNA forensic laboratory along with the long term financial commitment has discouraged additional DNA laboratory construction efforts. A second option Palm Beach County police departments have considered is to outsource case samples to private vendors. This too, however, would be expensive not only to outsource the samples for serological and DNA analysis but also the cost for expert witness fees. In fact, the prosecutor's office has stated expert witness depositions and/or testimony fees cannot be extracted from the State Attorney's current budget. In any event, the PBSO FBU laboratory would still have to be directly involved in the agency's cases. As per the Scientific Working Group on DNA Analysis and Methods (SWGDAM) Standard 17 [3], the PBSO Technical Leader must conduct an annual vendor site visit in order to verify compliance with all SWGDAM Standards. Once the vendor has been approved, a contract must be implemented and the DNA data generated by the vendor submitted to the PBSO FBU laboratory where it is reviewed and qualifying DNA profiles uploaded into the National DNA database. The FBU submits approximately 200-400 property crime or high volume cases to private vendors annually. These are sometimes prescreened and are usually no-suspect cases. Outsourcing is expensive and is not a long term solution to the backlog problem. The Palm Beach County Police Agencies were genuinely concerned about the FBU's ability to provide timely DNA analysis.

In September of 2008, the PBSO FBU laboratory implemented a case submission policy in order to help decrease the backlog by requesting law enforcement only submit those items that will be informative for the case. This policy regulates the number of samples that may be submitted for casework, training of agency representatives on DNA collection strategies and requires prior-to-submission law enforcement prioritization of evidence. The guidelines requires local agencies,

those best suited to prioritize their informative evidence, to research which evidentiary items are most valuable and to initially submit no more than two samples for property crimes, four samples for robberies, nine samples for homicides and for a sexual assault, the sexual assault kit and/or panties. Depending on what is found or not found, additional items may be submitted with approval. The item limit does not include reference samples. Limiting the number of submissions is a form of prescreening because usually agencies collect a significant number of items from a crime scene and will send all of the collected items for analysis. With a limitless number of submissions, the volume of potential evidence coming into PBSO was so large that it was difficult to establish priorities. Limiting the number of submissions has allowed PBSO forensic analysts to work more cases and provide more agencies and investigators with relevant, timely information.

Overview of the Efficiency Improvement Program Goals, Function and Implementation

Regardless of the resolute effort the laboratory has made to improve laboratory efficiency, the backlog and turnaround time has always been elusive. Case management consists of assigning a case to an analyst who screens the evidence for biological material, conducts DNA analysis, interprets the data, and generates a reviewed report. "How long does it take to do a case?" is the most common question posed to the FBU laboratory staff and the answer is "it depends"; it may take weeks, months or years.

The only predictable turnaround time component of the case management process is the amount of time it takes to actually conduct the DNA laboratory analysis. For example, if the analyst is conducting DNA analysis on 16 case samples it will take approximately two days to obtain and

analyze the DNA data or if analyzing 88 case samples it may take three or four days. However, the amount of time it takes to conduct the front and back end of the process i.e. screening the evidence and interpreting and reviewing the data then writing a report, is typically unpredictable. This step of the process must be performed by qualified competent analysts who have undergone a comprehensive training program.

In order to improve the capacity and efficiency of the Forensic Biological Unit, an evidence screening laboratory, the *Biological Processing Laboratory* (BPL) was designed and constructed through renovation of existing space in the Boca Raton Police Services Department in which trained Laboratory Technicians now process and screen crime scene items before submission to the FBU for DNA analysis. The goals are to provide:

1. Timely serological screening information to southern Palm Beach County law enforcement agencies including the Boynton Beach Police Department, Delray Police Department and the Boca Raton Police Department.
2. Pre-screened evidence to the Palm Beach County Sheriff's Office Forensic Biological Unit such that the DNA process may begin upon submission of evidence.
3. A template for other jurisdictions interested in increasing the efficiency of the biological process for crime scene evidence.

The proof of concept to have laboratories prescreening evidence before the item is submitted for DNA analysis was provided by a similar program implemented by Marion and Seminole Counties in Florida. These programs were used as a template for Palm Beach County to build the

first city biological screening laboratory which will be an axis laboratory for southern Palm Beach County law enforcement agencies.

The financial source for the implementation of the central Biological Processing Laboratory was the NIJ "Forensic DNA Unit Efficiency Improvement" grant solicitation. Before applying for grant monies, the participating agencies provided a commitment in writing to be the location for the southern Palm Beach County central evidence prescreening laboratory. The participating agencies include the City of Boca Raton which is 29.6 square miles with a population of 85,379 and the location for the BPL; the City of Delray Beach which is 16 square miles and has a population of 65,000 which also has a large retail and recreational daytime functioning population and, the City of Boynton Beach which is 16.25 square miles and has a population of 66,714. It is estimated that nearly twenty percent of all FBU cases are from the southern Palm Beach County region.

Successful implementation of the BPL design and construction was primarily dependent on communication with the PBSO's laboratory and grant administration Units in conjunction with the police, budget and legal departments of the cities of Boca Raton, Boynton Beach and Delray Beach.

The Biological Processing Laboratory Decision Process

The challenge was to not only design and construct the BPL but also to implement a Memorandum of Understanding (MOU) with the Delray Beach and Boynton Beach Police Departments and to train the BPL Laboratory Technicians using PBSO policies and procedures

for casefile documentation and biological screening of evidence which is "DNA ready" when submitted to the FBU.

An initial site visit to the BRPSD 6500 Building was attended by laboratory, police, budget, grant, facilities, and legal staff from PBSO and the BRPSD. This meeting was critical to evaluating the size, structure, security capabilities and proximity to the agencies which will be served (Figure 1). A considerable amount of time was spent during the site visit creating a timeline for implementation.

Identification of the points of contact within each participating agency was a critical first step in deciding if the plan would be feasible. Once it was determined the site would be ideal, everyone provided their expertise on how to proceed and conference call schedules were arranged to keep the project moving forward. The 6500 Building already had existing secure keycard access and the necessary infrastructure such as hurricane resistant walls and ceilings, access to plumbing, wiring for lights, security, telecommunications and information systems existed within the structure. Access and the relocation of some of the infrastructure would be addressed in the architectural renditions. As a result of this site visit meeting, the EIP was written, approved by internal staff and submitted for NIJ consideration in March, 2009.

Initiating the EIP Grant Award and Considerations

The general process used to accept and begin the initiation of a grant awarded to the Palm Beach County Sheriff's Office involves the acceptance of the grant award by the Sheriff of Palm Beach County. A request to accept the funds is then submitted for the Board of Palm Beach County Commissioners' agenda. The request is voted on by the County Commissioners and upon approval the PBSO Budget Office assigns a specific grant subobject code for entering and paying

for grant approved items. The EIP award was announced for in October 2009, accepted by the Sheriff, approved by the PBC Commissioners at the October 15th 2009 meeting and a procurement sub-object code designated. This was extremely rapid for a grant acceptance process.

Although the grant monies were available early on, there were unforeseen requirements that hindered the immediate implementation of the EIP. The first was a lack of understanding by the FBU regarding the time it would take for all of the legal processes necessary to accept the grant funding by the Boca Raton city council and the approval of the MOU by the police departments that will be using the BPL. This delayed the construction of the grant by twelve months. In retrospect, the delineation between the responsibilities of the PBSO and the BRPSD should have been researched more extensively to account for legal policies and procedures.

There was also a significant difference in the procurement processes used at the BRPSD compared to PBSO's procurement processes. Although meetings were held prior to the draw-down of funds, there was a misunderstanding of the timing and methods of payment. All NIJ payments for services rendered must go through PBSO. As a result, procurement policies of the BRPSD FOR the purchase of items was slow in the first year of the grant. The construction award had been decided very soon after the award monies were announced but construction could not begin until all MOU's were signed off. Since the legal aspects of the EIP took longer than expected the construction job needed to be posted out for bid a second time which delayed the employment of a contractor until July, 2011. Also, the process of hiring the two BPL Technicians took a few more months than anticipated. Lastly, the approval of the final BPL

manuals followed the documentation approval processes of the BRPSD which also took more time than originally anticipated.

Hiring of BPL Laboratory Technicians and Training

One of the most successful aspects of the BPL implementation process was the cooperation between the FBU staff and the two BPL technicians especially as it relates to training. The reason the screening lab requires at least two people is that it is a requirement that all case reports be reviewed by a competent, qualified analyst to ensure the findings are accurate and that critical information is not omitted. In addition, vacations, sick and court time would increase the BPL backlog if there were only one technician.

The BRPSD Human Resource Department used the existing PBSO Laboratory Analyst job description as a template for forming this same position within the BRPSD Department. Since the Technicians perform presumptive and confirmatory testing, they must meet the same background and educational requirements as the PBSO Laboratory Analyst including a bachelor's degree in a basic natural science.

The job posting was in November, 2010 for two Laboratory Technicians and over 100 applications were submitted. There were fifteen candidates approved for interviews of which two very well-qualified Technicians were selected. Following BRPSD hiring of the two technicians, their orientation and training was initiated in April, 2011 at the PBSO FBU approximately five months after the job posting. The analyst were employees of the BRPSD but were assigned to the PBSO Forensic Biological Unit in West Palm Beach for training. The

training program followed the identical accredited training program protocols as a PBSO employee which included signing of a *Training Contract*. Training manuals, lectures, laboratory materials, scrubs and safety equipment were provided by the PBSO FBU. The training program included safety, blood borne pathogens, reagent preparation, ethics, quality assurance/ quality control, ISO accreditation standards, evidence handling, serological analysis for blood and semen and court testimony. The FBU has two large screening rooms and a large analytical area. One of the screening rooms and an area of the laboratory were dedicated to the BPL Technicians during the training phase.

The training program focused on both the administrative and technical aspects of casework. An integral part of the screening process is the generation and maintenance of examination documents and records. The initial documentation of evidence is extremely time consuming and takes great diligence. Before screening begins, the condition of the evidence needs to be detailed to record size, shape, color, patterns and imperfections. Identification of where and how testing has occurred on the item is essential. Finally, for the greater majority of cases, it will be months and sometimes years before a case begins the judicial process and an analyst recollection may be completely dependent on comprehensive and reliable case file documents.

The technicians successfully completed a laboratory bench practicum, a comprehensive written examination and a mock courtroom training exercise in August, 2011. As a result of the successful completion of the training process, the BPL staff is qualified to conduct evidence collection and screening and serological testing for presumptive and confirmation of blood and

semen. Training in the examination of hair and the collection of epithelial cells from touch evidence was also emphasized.

Following the training program, the BPL Technicians spent the next three months at the BRPSD shadowing the BRPSD Crime Scene Investigators, writing BPL-specific manuals and developing a laboratory information management system. The BRPSD already had in place a document control software system so a separate module was activated for the BPL cases for the maintenance of chain-of-custody and evidence audits. As a result the monies in the grant targeted for Justice Trax software was not necessary. Originally it was suggested that there may be a benefit to Law Enforcement if the BPL and the FBU used the same casework tracking software but since both are administratively restricted for use and the two laboratories are completely independent it has since been determined that there is not a compatibility issue. As per ASCLD-LAB accreditation standards, the BPL will also track reagents and supplies, records for refrigerator and freezer temperatures, laboratory decontamination maintenance, laboratory manuals and forms and other notes necessary to maintain accreditation using Microsoft Office programs such as Excel.

Summary

As an independent stand-alone laboratory, the BRPSD is responsible for ordering, distributing and collecting annual proficiency examinations for the Laboratory Technicians. Results will be submitted to the PBSO Quality Assurance Manager who will then be responsible for vendor submission, evaluation and completion documentation. The PBSO Quality Assurance Manager and Technical Leader or designee will also be responsible for annual BPL audits and will guide

the laboratory to accreditation status scheduled for Spring of 2013 through FQS. An auditor FQS training class was successfully completed by the entire BPL staff in 2011"

The BPL Supervisor will also be responsible for maintaining a metric system to determine analyst case load, backlog and turn-around time. The BPL officially opened its doors for casework testing in Mid-April, 2012 but will consider metrics for evidence screened by the BPL Technicians while at the FBU. The metrics to date clearly demonstrate that pre-screened cases are increasing the efficiency of completing the cases. So far, 38 cases with 144 items were screened an average turn-around time of 11.5 days whether a violent or property crime. From March 2012 to September 30, 2012 256 cases have been requested by BPL for PBSO to process for DNA of which 145 have been assigned and 25 are on the list for processing. Many have provided early investigative leads including 56 DNA profiles entered into CODIS with 17 hits to date. Clearly this pre-screening laboratory will benefit the entire community including victims, suspects, law enforcement, FBU staff and the judicial system.

What are of import during the design, implementation and grand opening of the BPL are the lessons learned and that in the end, the entire process was conducted as per procedures and policies and the final quality-driven, fully staffed Biological Processing Laboratory that services south Palm Beach County was completed successfully due to the dedication and determination of everyone involved.

Final Technical Report

INTRODUCTION

In the fall of 2008 the Forensic Biology Unit Manager requested permission to present current DNA backlog issues to the Palm Beach County Law Enforcement Police Council (LEPC) which is composed of all PBC police chiefs as well as federal and state Directors. The presentation outlined the FBU DNA case acceptance policy which was that the Unit only accepted cases with or without a suspect that is, no case has ever been turned away. However, the result of this open-ended sixteen year policy was a 1,770 case backlog in a laboratory with 5 qualified DNA analysts. It was determined that 411 of these cases had been adjudicated yet were still on the backlog list, 115 cases requested DNA analysis but evidence had not been submitted, 618 needed more information from the submitter before analysis could be conducted and 519 were active and ready for assignment. Property Crimes made up a significant portion of these backlogged cases (80%) and included swabs from anything that can be swabbed and in the case of the backlogged samples this included: door knobs, sliding screen doors, closet doors, deadbolts, dresser drawers, end tables, jewelry boxes, cables to TV's/computers, "may have touched" items, garbage, medicine cabinets, steering wheels, dashboards, buttons to radio, latch to glove box, consoles, inside driver and passenger-front/back seats, 25-30 sets of swabs, purse straps, urine in the bathtub, rum bottle, victim's arms, countertops, cash drawer, candy wrappers, store displays, masks, shoes, duct tape, zip ties, radar detector, hats, lighters, victim cell phone, safe, wallet, pockets, boxer shorts, "liquid", edge trimmer, weed whacker, bicycles and some of which it is not certain what was swabbed. The average number of samples per case was 16 and this was a serious bottleneck in the goal of becoming an efficient DNA laboratory.

At this same LEPC meeting the new FBU Case Submission Policy was introduced to the Chiefs of police which limits the number of samples that may be submitted depending on the case type. They were informed that a "Bagels and Burglary Training Program" would be provided to introduce the policy to every law enforcement agency. This was unanimously accepted by the LEPC.

The LEPC immediately formed a DNA Working Group consisting of representatives from the FBU and law enforcement to determine if there was a way to reduce and control the backlog in the FBU. The DNA Working Group was given a detailed history of the FBU's attempts to become more efficient citing the NIJ grant awards that have been used over the past 10 years to advance the goal of DNA automation including the evaluation, validation and implementation of extraction robots, total human/total Y quantitative PCR technology, amplification using single multiplex STR analysis, transitioning the laboratory DNA allele detection platform from the Hitachi FMBIO II to the AB 3130xl, increasing evidence storage capacity, development of software programs to improve the flow of DNA casework from one method to the other, improve training facilities and provide salaries for additional DNA analysts. The purpose has been and continues to be backlog reduction and increase in capacity that is, increasing the efficiency of the FBU.

Essentially, the forensic biology casework process in the PBSO FBU is accomplished by the following steps: 1) the case is requested for analysis, 2) the case is assigned to an analyst and the evidence is screened for biological material, 3) DNA analysis is conducted on evidentiary stains, and 4) the DNA profiles are reviewed, a report written, reviewed and finally submitted to the requesting agency. The amount of time necessary to conduct Step 3 is the only predictable point

in the process. The time it takes on the front end and the back end of casework DNA testing is often unpredictable and is the major reason why there are backlogs in a typical forensic laboratory. Screening casework evidence for the purpose of collecting biological material for forensic DNA analysis is by far one of the most time consuming processes in the Forensic Biology Unit.

The working hypothesis for the DNA Working Group was if evidence was prescreened for biological material before submission to the PBSO FBU DNA lab, this would increase the efficiency of getting results back to law enforcement more expeditiously. If evidence from law enforcement agencies was submitted to the laboratory prescreened by a competent analyst, the DNA analysis process could be initiated immediately once the case is assigned. In November 2006, FDLE implemented an initiative intended to eliminate or lessen its DNA backlog, which hit a high of 4,815. "We were getting more evidence than we could possibly handle in any kind of timely manner, and we knew agencies were not satisfied with the time it was taking to get answers back to them," says Florida Department of Law Enforcement (FDLE) Assistant Commissioner Ken Tucker[4]. Lt Sowder of the Marion County Sheriff's Office visited the PBSO FBU laboratory in 2006 to determine if Marion County should construct a DNA facility but due to the short and long term costs, Lt. Sowder decided to facilitate identification of the type and scope of commitment necessary to build an evidence preprocessing laboratory instead. FDLE partnered with Marion County Sheriff's Office Florida (population 324,000[5]) to construct a successful model for an evidence pre-processing center for all law enforcement agencies within its jurisdiction. The evidence screening laboratory works closely with the FDLE for laboratory needs, training and accreditation. Since this time, a preprocessing center has also been

constructed by the Seminole County Sheriff's Office (population 410,000[6]) based on the Marion County experience. Importantly, the communication between FDLE and the Marion County laboratory has increased due to this partnership. Lt Sowder has reported Marion County screens its potential evidence items in three days and gets DNA results from FDLE in 52 or 53 days on average. Likewise, Seminole County Sheriff's Office previously submitted DNA to FDLE turnaround time was one year to 18 months. By doing their own screening and complying with FDLE protocol and standards, Seminole County Sheriff's Office Laboratory Director Jennie Ahern says the sheriff's office received the first cases they screened back from FDLE in two months. An added benefit is local agencies take ownership of their cases and will feel part of the process and a team since the more information that is known about a case early into the investigation, the more efficient and effective judgments on how to approach a case will be. Both Marion County and Seminole County pre-processing laboratories are successful and have been accredited.

Palm Beach County has a population of over 1.2 million[7] with nearly 30 law enforcement agencies submitting crime scene evidence to the PBSO Forensic Biology Unit. Impressed with the success of the Marion County pre-screening laboratory, PBSO sought input from Lt William Sowder for the EIP grant. This concept had never been attempted on a city law enforcement level with the added responsibility of screening other area law enforcement cases. All of the Palm Beach County Law Enforcement agencies were invited to volunteer space in their existing agency for a Biology Processing Laboratory. A screening laboratory in the northern and southern end of Palm Beach County was the initial request but the only police agency that had the necessary capacity and ability to provide match funds was the Boca Raton Police Services

Department which is in the southern end of Palm Beach County which would also be amenable to servicing two additional agencies, Delray Beach Police Department and the Boynton Beach Police Department.

In summary, the goal of the *Improving Evidence Screening Efficiency Using a Biological Processing Laboratory* program is to pre-screen evidence before submission to the Forensic Biology Unit for DNA analysis in order to decrease the amount of time it takes to complete DNA analysis for county casework evidence. This goal was completed and the success of the efforts is already evident through faster pre-screening turnaround times and DNA analysis.

METHODS

The following is a description of the experimental design, methods, materials and procedures that were utilized during the implementation of the Biological Processing Laboratory. Prior to generating the design and implementation strategy for the BPL, an on-site visit to the BRPSD 6500 Building was arranged in which the stakeholders participated in the decision to move forward.

Projected Renovations: It was estimated the renovations may take between nine and twelve months which includes blueprints to certificate of occupancy. The 1800 square feet includes (Figure 2):

- Evidence Reception Area: The BPL is a highly secure area of the Boca Raton Police Services Department and access is only granted to preapproved individuals who will be

escorted at all times. Agencies submit evidence in this area to the BPL which are then bar-coded and entered into a laboratory management software system for tracking.

- Evidence Vault: When an agency submits evidence to the BPL, it is important to have a secure vault area that will allow the chain-of-custody to be maintained. It is also necessary to have an area where bulk items may be stored before and during processing. This vault accommodates these submissions. Once the evidence has been bar-coded and entered in the LIMS, the evidence will be stored in the evidence vault. Access will be logged by a card reader. This is a keycard access room used to maintain the chain-of-custody and integrity of the evidence until the evidence is assigned to an analyst for testing.
- Report Writing Stations: This area accommodates report writing areas for up to three Laboratory Technicians with enough room to review casefiles and to display testing results with law enforcement or judicial representatives. These will be necessary for the Laboratory Technicians to prepare, organize and write reports, maintain the quality control logs, write procedures for the BPL manual, and maintain accreditation standards.
- Laboratory Proper: This area was designed to accommodate the screening of large and small items. The tables are used to screen smaller items or two tables hinged together to screen large items. Hoods are used to screen items that may be moldy and/or wet or to dry swabs overnight. All chemical tests whether presumptive or confirmatory are conducted in this room. A sink was also installed in this room. The area is used to document evidence, take digital photos, screen the evidence for biological material, collect the evidence, and conduct chemical presumptive and confirmatory tests. The

hood, microscopes, centrifuges, vortexes, and illuminator magnifier are located in this area of the Main Laboratory (Figure 3 and Figure 4).

- The Reagent Preparation Room is used to prepare reagents as well as to store stock reagents and working solutions used during the screening process. This room required a deionized water system, sink and safety equipment. Cabinets will also store the serological confirmatory cards including ABA HemaTrace and ABA P30. Cleaning supplies will be stored in this room as well.
- The Dark Room is needed to screen evidence using an Alternative Light Source (ALS) to locate stains such as semen and saliva especially for large bulky items. This room is also used to display evidence to investigators, prosecutors and/or defense experts. Cabinets for equipment storage were installed as well as evidence cubbies. This room has secured key access.

An architect was contracted to provide a complete set of blue prints outlining the infrastructure and renovation needs for the laboratory. The preliminary plan was to include the build out of approximately 1,800 square feet of office/lab space located on the western portion of the 6500 N Congress Avenue Building. The 2009 cost of building out or retrofitting space in the 6500 N Congress Avenue was approximately $250 per square foot. This construction price included the following

- Moving existing plumbing from the building to facilitate the needs of the lab. This plumbing will include moving drains and attaching drains to the existing pipes in the building.

- Building out the HVAC (air conditioning system) to include any future build-out possibilities in the area.
- Moving the fire sprinklers down to the existing 1,800 square foot. This may include adding more fire sprinklers.
- Establishing an entrance/exit door on the western wall of the facility. This door will have to be hurricane reinforced.
- The construction of a reinforced secure drop ceiling for the BPL laboratory.
- Any additional venting for fumes in the area.
- The moving of additional electrical power panels to the area.
- Telephone system
- Computer lines
- Fire/Burglar alarms
- Card access system
- Additional security locks for the storage of DNA evidence.
- Industrial Vinyl Flooring
- Painting
- Lighting Upgrades
- Building 3 offices within the area
- Architectural plans
- Construction Management

A basic timeline for the architectural design and development was originally 1 to 3 months with 9-12 months for renovations.

BRPSD Grant Match: The BRPSD committed to the solicitation's 25% cash match salaries and benefits for two Technicians and equipment and a long term commitment to maintain the central processing laboratory through the BRPSD budget with fees for service in the future. The original BPL diagram was nearly identical to the final architectural rendition (Figure 2).

The architectural rendition includes an area for laboratory bench work and a separate administrative area. The final blue prints shifted some of the areas to accommodate the utilities. The budget proposed to construct and staff the BPL included $519,544 from the NIJ EIP grant. The BRPSD matching funds of $173,182 included salaries and benefits for the two Laboratory Technicians, computers, laboratory instruments, sink cabinets, chemical resistant tables, a document scanner, microscope workstations with microscopes for the confirmation of semen, the presence of epithelial cells and visualization of the morphology of root hairs and shafts. The costs for these items are shown in the table below.

Salaries and Benefits	2	$61,762	$123,524
Computers: BRPSD IS Department Issued	4	$2,200	$8,800
Eppendorf Centrifuges	2	$2,500	$5,000
Microscopes	3	$4,000	$12,000
Purair 20 Fume Hood	1	$5,700	$5,700
Cabinets for sink area	1	$2,757	$2,757
Chemical resistant screening Tables-modular	3	$1,800	$5,400
Document Scanner w/CD capabilities	1	$8,000	$8,000
Microscope workstations	1	$2,000	$2,000
		TOTAL	**$173,182**

Training BPL Laboratory Technicians: The BPL Laboratory Technicians were hired using the BRPD hiring policies and procedures. The PBSO Laboratory Analyst job description was

used as a template. Training would be conducted in its entirety at the PBSO FBU facility using all training policies and procedures.

Evidentiary screening and collection methods training included:

(1) Blood- Initial analysis of a stain for presumptive blood is done using the most current, specific and sensitive chemical presumptive test to date, the Phenolphthalein test. Confirmation of a presumptive positive test is conducted using the AbaCard Hematrace test to determine if it is blood.

(2) Semen- The presumptive test for semen may include the use of an Alternate Light Source in which case the proteins in seminal fluid fluoresce. This is the least specific presumptive test for semen as there are other sources which may fluoresce. The stain will then be tested using the Acid Phosphatase Spot Test, a chemical presumptive test for semen. Confirmation for the presence of semen may be done by microscopic examination for sperm and/or the confirmatory P30 test used in those cases in which the donor is aspermic or has a low sperm count.

(3) Hair-Hair is examined using a microscope to determine if the root is suitable for nuclear STR DNA analysis. If a root exists, DNA testing will be attempted in the FBU laboratory. If a root does not exist, the hair shaft may be submitted to an external laboratory proficient in mitochondrial DNA analysis. This is a very important screening process especially if hair is the only evidence in a case.

(4) Touch DNA- Epithelial cells are collected from items using a hydrated, sterile swab. Successful generation of a DNA profile from touch evidence is dependent on three dynamics: whether the individual who touches it sheds skin cells, the length of time the

item is handled and surface type of the item. The collection technique is critical for successful DNA profiles subsequently being developed from these swabs.

Specifically the technicians were trained with the following requirements:

Pre-Presumptive Luminol Analysis

A. The literature was reviewed and a demonstration of Luminol (Blue Star and FBU Luminol Reagent) was conducted. The dilutions made from the KM sensitivity series were used to spot onto a piece of material (i.e. cotton) and luminal was used to test the spots. A variety of items including painted surface, coins, semen stain and urine stain. Reporting positive or negative Luminol results: The purpose of this exercise is to aid the analyst in the appropriate way to describe the possibility that blood may be present on an item. This was performed through recording results on the FB Evidence Worksheet

Blood:

A. Serial dilution series: The purpose of this module was to acquaint the analyst with the sensitivity of the Kastle-Meyer Test. The analyst prepared the following dilutions neat, 1:1, 1:2, 1:4, 1:8, 1:16, 1:32, 1:64, etc. (until negative KM test is achieved) using whole blood and water and spot onto filter paper and fabric (i.e. sock). Each dilution was analyzed for the presence of blood using the KM reagent and the results recorded.

B. Analysis of stains on mock evidence: The purpose of this exercise was to demonstrate the presumptive nature of a bloodstain. The analyst placed five (5) liquid blood dilutions on

several different types of materials including nylon, polyester and denim. The dilutions represented the extremes of the KM test. Specificity was demonstrated using horse-radish, celery, lettuce, rusty objects, mushroom, potato, tomato, cauliflower, cabbage, yeast, and animal blood.

C. Reporting positive or negative KM results: The purpose of this exercise was to aid the analyst in the appropriate way to describe the possibility that blood may be present on an item. This will be performed through recording results on the FB Evidence Worksheet and writing reports for five mock cases.

Confirmatory Blood

A. An introduction to PBSO ABA HemaTrace Card Test and General scientific Principles was presented as well as a demonstration of the ABA HemaTrace Card blood test
B. Serial dilution series was done to acquaint the analyst with the sensitivity of the ABA HemaTrace Card Test. The dilution-stains prepared for the KM sensitivity training were used as samples to test each stain with ABA HemaTrace Card and results were recorded as per protocol.
C. Confirmatory results were compared to KM dilution analysis in the FBU ABA HemaTrace Validation Notebook and to other analysts training results.

D. Luminol treated stains were used to demonstrate how Luminol treated stains effect the ABA HemaTrace results. Each luminol stain was tested with ABA HemaTrace Card and the results recorded.

E. Analysis of stains on mock evidence was also done to demonstrate the confirmatory nature of bloodstains. The analyst tested stains on several different types of materials and was responsible for determining if the blood may be confirmed on the items provided. The trainees reporting positive or negative ABA HemaTrace Card results to aid the analyst in the appropriate way to describe that blood is present on an item and to record the findings through report writing and case file composition.

Note that even though Palm Beach County agencies may conduct presumptive blood tests on evidence, the FBU laboratory will repeat these tests once the case is analyzed in the laboratory which is a duplication of effort and uses more evidentiary materials. This will not be necessary for any pre-screening the BPL conducts thus eliminating this step as well from the FBU protocols.

Pre-Presumptive Semen Analysis- Alternate Light Source.

A review of the literature was conducted followed by demonstrations of ALS tests. The PBSO ALS Controls were tested by the trainee using 450 nm and yellow goggles and 550 nm and orange goggles. Items of mock evidence with ALS and the recording of results were also required.

Presumptive Analysis of Semen using the Acid Phosphatase (AP) test.

Training involved reading the introduction to the literature (including the anatomy of male reproductive organs) the general scientific principles involved in the AP test.

A. Analysts were required to conduct a semen serial dilution series with the purpose to acquaint the analyst with the sensitivity of the AP Test. Dilutions using concentrated semen and water and spot onto filter paper and fabric (i.e. sock) included neat, 1:1, 1:2, 1:4, 1:8, 1:16, 1:32, 1:64, until a negative AP test is achieved. Each spot was analyzed for the presence of semen using the AP reagents and results were appropriately recorded.

B. Analysis of semen stains on mock evidence: The purpose of this exercise is to demonstrate the presumptive nature of semen on a stain. The analyst placed five (5) liquid semen dilutions on several different types of materials such as cotton and denim. Be sure the dilutions represent the extremes of the AP test. The analyst conducted the tests to test AP specificity including samples of vaginal secretions, blood, urine, rectal swabs, vegetable peroxidases such as horse radish, mushrooms and cauliflower.

C. Reporting positive or negative AP results: The purpose of this exercise was to aid the analyst in the appropriate way to describe the possibility that semen may be present on an item and to record the findings through report writing and case file composition.

Confirmatory Tests for Semen

Introduction to PBSO PSA test and slide staining and the general scientific principles, protocol review, demonstration of the P30 test, demonstration of Christmas Tree staining and the preparation of necessary reagents was conducted before specific tests were performed.

Confirmatory tests for semen included analysis of dilution series prepared by the trainee with the purpose of this exercise to acquaint the analyst with the sensitivity of the P30 Test and microscopic examination. Using the semen dilutions prepared for the AP sensitivity, ABA P30 analysis was conducted as well as microscopic examination and the sensitivity of the assays were based on results. Analysis of stains on mock evidence prepared during semen analysis training to demonstrate the confirmatory nature of semen stains included using 10 semen stains from mock evidence, prepare ABA P30 cards and microscopic slides to confirm the presence of semen. Stains with strong AP results and those with weak AP or no AP results were used to determine the sensitivity of the assays. Analysis of other body fluid stains prepared during semen analysis training to demonstrate the specificity the confirmatory test included testing saliva, urine, blood and vaginal secretions, rectal swabs, and/or other cellular material to test the specificity of the ABA P30 cards. Reporting positive or negative P30 and microscopic examination results to aid the analyst in the appropriate way to describe semen is present on an item and to record the findings through report writing and case file composition was also a requirement.

Laboratory Supplies and Equipment ($33,464): The supply and equipment lists were collated based on necessary supplies and equipment for two laboratory analysts for a year. Since the protocols and procedures will mirror those of the PBSO FBU, all supplies and equipment was ordered from the same vendors (italicized notes are changes made from the original solicitation):

a. Three modular laboratory benches that accommodate small-to-medium sized items. *This was changed to fixed benches and screening tables due to unforeseen costs.*

b. Laboratory carts for each Laboratory Analyst to transport evidence both into the Evidence vault and work areas.

c. Cabinets throughout the laboratory to store disposable items and reagents.

d. Alternative Light Source, Omniprint for presumptive identification of semen and location of other possible biological material. *The Rolphin ALS was ordered instead with appropriate goggles.*

e. Vortexes to resuspend cellular material.

f. Reagent preparation using Deionized Water Filtration system

g. Lamps and Illumination magnifier used to find latent stains

h. Each Laboratory Analyst has an under counter refrigerator to store evidence.

i. A refrigerator/freezer will be used to store reagent stocks and aliquot reagents.

j. A balance with a NIST traceable weight set for performance checks

k. Autoclave for sterilizing water and reagents. *It was determined this was not needed so it was not ordered.*

l. Digital camera with tripod for photographing evidence for the casefile folder was ordered.

m. File cabinet to store required hard copy documents.

n. Document Scanner for electronic storage of data and documents in order to establish a paperless document handling system.

o. Disposables: In order to prevent contamination of evidence the use of consumable items is preferred. Disposables such as test tubes, microscope slides, coverslips for slides, scissors, straight forceps, digital timers, scalpels, Whatman membrane paper, face masks, paper towels, bench coats, parafilm, alcohol pads, latex gloves, colored tape, disposable lab coats, autoclavable tape, polypropylene test tubes, pipette tips

for all volume ranges, conical test tubes, transfer pipettes, test tube racks and miscellaneous consumables.

p. General Supplies: Supplies also include personal protection equipment for each analyst in order to comply with all safety regulations, labeler for test tubes and serobags, barcode label maker, glassware for reagent preparation including flasks, beakers, graduated cylinders, Pyrex jars to hold autoclaved test tubes, glass test tubes, glass and plastic jars, and amber bottles for presumptive blood tests. Biohazard buckets and sharpies will also be in all rooms. Liquid handlers for pipetting must be available for 20 and ul volumes with a carousel to hold the Pipettemen are needed. *Originally only two sets of Pipettemen were requested but three more needed to be ordered to accommodate all of the areas of the laboratory.*

q. General reagents such as confirmatory tests for blood and semen i.e. the ABA HemaTrace and P30 cards, Luminol, hydrogen peroxide, ethyl alcohol, synthetic permount, semen standard, Kastle-Meyer reagents, Nuclear fast red and AP Spot test were ordered from vendors where possible.

r. Cleaning supplies: Bleach in spray bottles will be used for daily decontamination duties and hand sanitizer will be used routinely and janitorial items such as broom, mop, sponges, and buckets.

s. Three printers were purchased including two printers located in the Laboratory Analyst report writing stations and one printer is located in the Laboratory proper.

t. Office Supplies: The Report Writing Stations, Evidence Receiving Station and the Laboratory Work Stations must have the necessary supplies to conduct evidence intake, screening and reporting and important literature references.

Baseline Performance Measures

A Data Collection Plan was already in place at the Palm Beach County Sheriff's Office through the use of the *Forensic Biological Unit/ Performance Metrics Measurement System*. The BPL will be tracking similar metrics in order to routinely assess the improvement in efficiency based on this new pre-screening process. Metrics include measurements per analysts such as number of cases assigned, submissions signed out, items screened, stains tested, reports written, turnaround time and time spent in court. The metrics are collected by each FBU analyst on a daily basis using a web-based statistics program and the BPL Laboratory Analyst will provide the same performance metrics as the PBSO staff.

The FBU will be collecting specific metrics on the BPL cases including the number and type of cases submitted by the BPL, the number of cases submitted from each of the three agencies, the turnaround time for DNA analysis, the number of no-suspect cases, CODIS hits and case judicial results.

RESULTS

The goal of the FBU of the PBSO is to provide quality and efficient laboratory analysis on case work evidence. One of the means to the end of this goal is to have the pre-screening of evidence for biological materials completed before the evidence is submitted to the laboratory. This was accomplished through the diligence and support of both the PBSO and the BRPSD. The BPL is housed in the Boca Raton Police Services Department under Chief Daniel Alexander within the Field Services Division which is directed by Assistant Chief Michele Miuccio. Specifically, the

management of the laboratory is under the supervision of Captain Matthew Duggan in the Investigative Services Bureau with direct supervision by Crime Laboratory Supervisor Caralee Daugherty. Ms. Daughtery was promoted from the Crime Scene Manager to the Crime Laboratory Director. It has been proposed that in the future a Latent Print Unit be officially added as part of the Crime Laboratory and accreditation sought as well.

Boca Raton Police Services Department Space Renovations ($450,000): Identification of Laboratory Space: A site visit of the property was conducted by PBSO representatives Cecelia A. Crouse Crime Laboratory Director/Forensic Biology Unit Manager, Barbara Caraballo Forensic Sciences Division Quality Assurance Manager/Grant Coordinator, John Sheldon Contract/Grant Analyst and Boca Raton Police Services Department representatives including Police Chief Daniel Alexander, Assistant Chief Michele Miuccio, Director of Police Services James Burke, Crime Laboratory Supervisor Caralee Daugherty and Captain Matthew Duggan. After assessing the feasibility of renovating the space for laboratory services, it was determined this site would be ideal and if necessary, there would be enough space that could be set aside to expand the laboratory in the future if necessary. The 6500 Building currently has a secure keycard access. The necessary infrastructure such as hurricane resistant walls and ceilings, access to plumbing, wiring for lights, security, telecommunications and information systems exists within the structure. Access and potential relocation of some of the infrastructure would have to be conducted.

Training the BPL Laboratory Technicians:

In November, 2011 the Laboratory Technician positions were posted. Approximately 100 applications were submitted and on April 1, two Laboratory Technicians were hired. The following week on April 5, the technicians were assigned a report writing station in the PBSO "FBU Intern And Visiting Scientist Room" and one of the secure Screening Rooms which houses a series of evidence lockers, a sink, cabinets and a large screening table was dedicated to their training and future casework.

Training was comprehensive and included compiling casefile documentation with case identifiers, dates, diagrams, photographs, stain locations, and presumptive and confirmatory test results. This is an integral part of the screening process. The initial documentation of evidence is extremely time consuming and takes great diligence. Training an analyst to properly document the evidence to be screened is a critical component of the process. Before screening begins, the condition of the evidence needs to be detailed to record size, shape, color, patterns and imperfections. Identification of where and how testing has occurred on the item is essential.

The technicians were required to prepare and organize their report writing stations with office supplies, all procedures, policies and forms, MSDS sheets and at their laboratory bench their personal reagent supplies. They were given a check-off list to help with this task and they were required to initial each item once it was located and placed in the appropriate place. They were requested to have an organizational plan for their training documents and examination records in place which they submitted the same day. All requirements throughout the training modules had due dates which were completed on time or ahead of schedule. Weekly and monthly evaluations were documented on the training contracts. Training contracts are presented to the trainee and

must be agreed upon before the modules may begin. They consist of a comprehensive list of requirements that must be completed before a Certificate of Completion is awarded. The purpose of the contract is to allow the trainee to understand exactly what is required of them. Once they have signed off that they agree with the program, the training begins. Once the trainee had completed a module, the PBSO Training Contracts were signed, dated by the Technician, Technical Leader, FBU Trainers where appropriate and by the BRPSD Crime Laboratory Director Daughtery.

Training Modules

The analysts successfully completed the PBSO Quality Assurance Quality Control and Reagent Preparation Training Module on August 16, 2011

- Introduction and Orientation for PBSO Crime Laboratory Evidence Collection and Submission Procedures
- Observation of Actual Casework and Preparation of Mock samples using appropriate protocols for the preparations, screening and DNA analysis of casework evidence with qualified personnel in the Forensic Biology Unit.
- Successful Completion of an Evidence Handling Competency Test

The Serology Training Program consisted of the following requirements which were successfully completed on August 16, 2012. The purpose of this training was to provide the Laboratory Technician with a complete understanding of appropriate laboratory protocols and a historical appreciation of the scientific nature of all analyses conducted in the PBSO laboratory. The

requirements were met and the technicians considered competent in PBSO Serological techniques as a result. The serology training module was divided into three major parts:

Part I: Laboratory Bench Training which required approximately 200 serological tests. The trainee observed evidence handling and screening and kept a log of observations. A tour of the Evidence Section including Property Evidence and the Impound Lot also occurred. The trainees constructed tests for serological techniques including presumptive blood (approx. 50 stains), confirmatory blood (approx. 50 stains), presumptive semen (approx. 45 stains), confirmatory semen-sperm/P30 (approx. 45 stains), review of analyst serology case files (approx. 10 cases), mock casework with completed reports (approx. 5 cases), instrument demonstration including pH meter, stereomicroscope, and pipettes (PCS Calibration System) and sterile technique.

Part II: consisted of the competency examination requirement. Each technician must successfully identify biological stains on mock casework samples including a sexual battery evidence collection kit. All documentation must be complete regarding evidence handling and test results and successful completion of a comprehensive written exam. This exam includes evidence handling procedures as well as serological tests.

Part III: This training module in serology consisted of a mock trial. Before conducting the mock trial the trainees were lectured on courtroom protocols, legal jargon, and judicial system organization. They were required to also attend court trials to observe expert testimony and keep a log of testimony observations. Finally, the analyst successfully participated in a mock serological court testimony which was conducted in a real courtroom with State Prosecutors.

There was a mock jury and all who participated were encouraged to fill out the Court Testimony peer-review form. These forms were evaluated then given to the trainee for their records.

Legal Considerations

The legal aspects of implementing a project of this size and scope could have been more thoroughly examined before the grant was submitted such that the timeline for completion was more realistic. To ensure that evidence screening efforts would be coordinated between agencies, a memorandum of understanding (MOU) outlining the expectations was required of each agency. This was the content of the legal tasks that took nearly twelve months which delayed the hiring of BPL staff and awarding the construction contract. This is definitely an area of research that should be completed or at least understood by all stakeholders before committing to a pre-screening laboratory. The tasks associated with the legal procedures is out of the control of laboratory staff and the amount of time necessary should be provided by law enforcements Legal department attorneys.

Procurement

Prior to submitting the original grant proposal in 2009, the principals involved met to discuss the most expeditious way to conduct the procurement process as it relates to a grantee-subgrantee relationship. Each of the entities presented their internal procedures and policies and the differences were discussed. As a result of these early meetings a framework for how the process would work was proposed and accepted. Once the monies were approved there were several factors that when combined complicated the procurement process; not only were PBSO and BRPSD procurement rules different, but the grantee-subgrantee relationship added an additional

layer of complexity to the process. As an example, BRPSD's policy of using purchasing cards to purchase grant supplies led to issues of delayed reimbursement, as billing for the purchasing cards lagged up to two months behind the date of purchase. A complete list of all necessary items to stock the laboratory including instruments, equipment, reagents, furniture and office supplies was provided along with the approximate costs. BRPSD faced internal procurement delays because of the dollar amount of several purchases crossing thresholds that required approval of city management and elected officials. Though these equipment purchases had been agreed to when the grant was accepted, each individual equipment/asset purchase had to be approved individually by city management and/or elected officials as the city's regulations required. As a result, spending the grant monies was slow in the beginning.

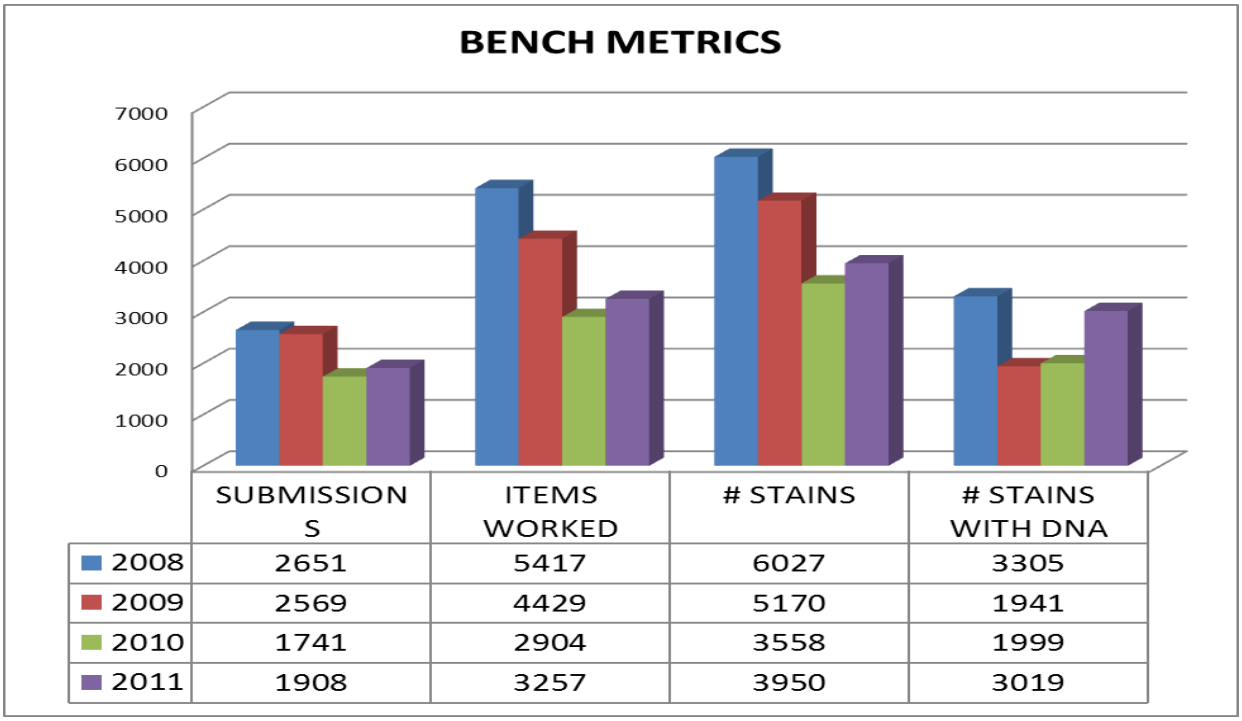
However, these challenges occurred as a result of the necessity for a grantee-subgrantee relationship. If a grant is not involved in the construction of a pre-screening laboratory, these issues need not be considered.

It is important to state that when the Laboratory Technicians were undergoing training at the FBU, the FBU's budget covered all of the reagents, office supplies, scrubs, and personal protective equipment. In addition, all FBU equipment and instruments were used as well.

MetricsThe FBU has been maintaining casework metrics for over a decade. The metrics are used to determine backlog, number and types of samples worked, reports out, turnaround time and other statistics that may aid in calculating the FBU budget, improve efficiency or improve capacity. The following chart shows the activity in the laboratory over a four year period (2008-

2011) with regards to the number of submissions (bags and boxes), the number of items (within the bags and boxes), the number of stains collected from these items and the number of those stains in which DNA analysis was conducted.

Specifically this demonstrates the effect of initiating the Case Submission Policy in 2008 on the number of submissions, items, stains and DNA stains and also the effect of the addition of four new analysts in 2010.



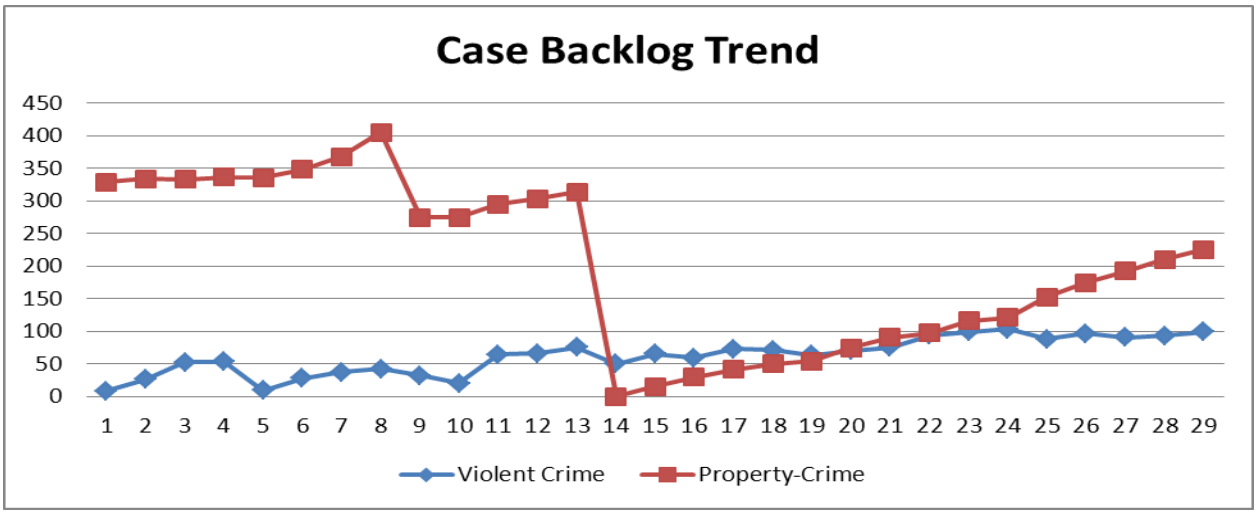
	SUBMISSIONS	ITEMS WORKED	# STAINS	# STAINS WITH DNA
2008	2651	5417	6027	3305
2009	2569	4429	5170	1941
2010	1741	2904	3558	1999
2011	1908	3257	3950	3019

In 2011 there was an increase in the number of samples tested for all the categories for which there is data. The most expensive analysis in the Forensic Biology Unit is the processing of a sample for DNA (# stains with DNA). In 2011 there was a 33% increase in the number of crime scene samples that were analyzed for DNA compared to 2010. The "# of stains with DNA" is crucial to determining budget costs as each DNA sample costs approximately $170 or $510,000

in laboratory reagents in 2011. The increase in the number of samples processed for DNA was predominantly due to the addition of four newly qualified DNA analysts in the FBU.

Clearly increasing staff has allowed for the testing of more items. During 2009 there were four new analysts who pre-screened evidence during 2009 and 2010 before they were trained in DNA. This accounts for the increase in total number of stains and supported the importance of having evidence screened before a qualified analyst conducts DNA.

The average turnaround time for 2011 over a 29 week period stayed about the same for violent crime as seen in the diagram below whereas the property crime builds up and then samples are sent to a private vendor decreasing the overall backlog (week 14).



That is why it is important to look at an extended time period for turnaround time.

The original EIP grant submission reported metrics for the last quarter of 2008/ the first quarter of 2012 *before* the BPL casework analysis was initiated:

a. 113/117 days: The length of time it takes to handle, screen, or analyze a forensic DNA sample from submission to delivery of forensic DNA test results

b. 47/40: The average number of DNA samples analyzed per analyst/per month with 4.5/6.5 Technicians conducting DNA casework.

c. 679/107: The number of forensic DNA cases in backlog. This number is significantly lower due to outsourcing of property crimes and the implementation of a case submission policy. The number of ASAP cases have increased significantly which is the primary reason the backlog is not zero and the turnaround time is still high.

This demonstrates that the FBU to date has a backlog and turnaround time which does not vary from year to year.

The BPL and PBSO laboratories have documented the following metrics from April, 2012 when the BPL opened until September 30th, 2012:

TOTAL	STATUS OF REQUEST FOR ANALYSIS AT THE BPL:	
316	NUMBER OF CASES REQUESTED FOR ANALYSIS	
	104	Violent Crimes
	212	Property Crimes
279	NUMBER OF CASES ASSIGNED TO A BPL ANALYST	
	93	Violent Crimes
	186	Property Crimes
23	NUMBER OF CASES AWAITING ASSIGNMENT TO BPL ANALYST (Backlog)	
	3	Violent Crimes
	20	Property Crimes
14	NUMBER OF CASES ON PENDING LIST (NEED MORE INFORMATION BEFORE PROCESSING CASE)	
	8	Violent Crimes
	6	Property Crimes
258	NUMBER OF REPORTS COMPLETED	
25	NUMBER OF DAYS BETWEEN THE TIME THE REQUEST IS MADE UNTIL A REPORT IS ISSUED	

TOTAL	STATUS OF BPL CASE REQUESTS AT PBSO FBU:	
256	NUMBER OF CASES REQUESTED BY BPL STAFF FOR ANALYSIS	
	84	Violent Crimes
	172	Property Crimes
145	NUMBER OF CASES ASSIGNED TO A DNA ANALYST	
	60	Violent Crimes
	85	Property Crimes
88	NUMBER OF CASES AWAITING ASSIGNMENT TO DNA ANALYST (Backlog)	
	23	Violent Crimes
	87	Property Crimes
0	NUMBER OF CASES ON PENDING LIST (NEED MORE INFORMATION BEFORE PROCESSING CASE)	
64	NUMBER OF VIOLENT AND PROPERTY CRIME REPORTS COMPLETED	
43	NUMBER OF DAYS BETWEEN THE TIME THE REQUEST IS MADE UNTIL A REPORT IS ISSUED	
	CODIS DATA	
	56	Number of DNA profiles entered from BPL evidence (from 44 cases)
	17	Number of CODIS Hits Total
	1	VIOLENT: Case-to-case
	7	PROPERTY: Case-to-case
	1	VIOLENT: Case-to Offender
	8	PROPERTY: Case-to Offender

The BPL has had 316 cases accepted for analysis since the opening of the laboratory in April, 2012. Of these 279 cases have been assigned to the BPL analyst and 258 reports, or 82% of the cases completed. The turn-around time for BPL cases is approximately 25 days. This turnaround time reflects the time saved by the FBU such that the analyst can now streamline laboratory time for DNA analysis. In other words, 117 workdays have been eliminated for the FBU due to the BPL case testing.

Approximately 80% of the BPL cases have been submitted to the FBU for DNA testing and 57% of these have been assigned. There have been 64 reports completed up until September 30th 2012 or nearly 45%. Although the BPL cases are prioritized at the FBU, there have been over

200 FBU emergency cases that have disrupted the efficiency of batching cases. Regardless, the turnaround time for BPL cases at the FBU laboratory is 43 days. Therefore, the total number of days necessary to accept, test and generate final reports for a BPL case is 68 days (25BPL+43FBU). The current turnarounds time for non-BPL cases is 102 days. The addition of the BPL services has cut the total time to conduct casework analysis in half.

It is also important to note that 44 BPL cases generated 56 CODIS qualifying profiles and there has been a 30% immediate hit rate for the entry of BPL case DNA profiles into CODIS. These cases will be tracked to determine if the judicial aspect is equally impacted by a faster analysis time.

ADDITIONAL METRICS: In addition to the daily metrics that are maintained by the FBU, during the course of the EIP grant metrics were maintained for the following:

Staffing and Hours
Forensic Biology analysts
DNA analysts
technicians
managers (included in A1 stat)
staff hired specifically for EIP
trainees
trainer hours
expert witness hours
Turnaround Time

At the beginning of the award period, what was the average number of days between the submission of a case to your laboratory and the delivery of test results to the requesting agency?
At the end of this reporting period, what was the average number of days between the submission of a case to your laboratory and the delivery of test results to the requesting agency?

At the end of this reporting period, what was the average number of days between the submission of a BPL case to your laboratory and the delivery of test results to the requesting agency?
Cases
How many cases, quarterly, were requested for analysis by the BRPSD, BBPD and DBPD beginning Oct-Dec 2009
How many cases were requested quarterly for analysis by the BRPSD, BBPD and DBPD using the BPL
case requests for analysis by the BPL
case reports completed by the BPL
of requests to PBSO for DNA analysis from BPL cases
# of reports completed by PBSO from BPL Cases
CODIS Hits
# of total profiles entered into CODIS from PBSO
# of CODIS hits from PBSO (including BPL)
# of profiles entered into CODIS from BPL cases
# of CODIS Hits from BPL cases
Samples
samples analyzed in Forensic Biology by PBSO
samples analyzed in DNA by PBSO
samples analyzed in Forensic Biology by BPL
samples analyzed in DNA by BPL
Scheduling
Total number of months EIP data collection

The data collected from this project was presented at the 2010 NIJ Grantee meeting and also in the RTI final report who suggested the collection of different metrics.

BPL Casework requests are conducted in the same manner as all of the Palm Beach County law enforcement agencies. A BPL representative must call or submit a DNA Request form. The FBU Evidence Coordinator will log the request and FBU analyst will be assigned the cases. The BPL manual has been submitted with this report. This manual describes all procedures associated with the Biological Processing Laboratory including submission requirements. Initial

communication between the BPL analysts and the FBU analyst was necessary as it had not been previously determined what BPL examination or administrative records needed to be submitted with the evidence. It was deemed necessary by the FBU staff that the BPL Evidence Summary Worksheet, BPL Communication Log if applicable and the PBSO DNA Request Form must also be submitted with the evidence so that the DNA analyst could conduct a thorough evaluation of the evidence in order to optimize the testing procedure. For example, it is necessary to know the number of sperm cells found on an item in order to determine the size of the stain that must be tested. For example, it is necessary to know the number of sperm cells found on an item in order to determine the size of the stain that must be tested.

CONCLUSIONS

There are 19,000 law enforcement agencies nationwide but only 425 crime laboratories [4]. Obviously there is a need to increase forensic casework capacity. In general, the laboratories do not have case submission policies regarding the number of samples that may be submitted and as a result, it is not unusual for a laboratory to be requested to conduct DNA analysis on every item in a case. Since the screening of evidence takes a considerable amount of time, this process is the single most instigating factor for the increase of caseload backlog. The dissatisfaction from law enforcement agencies regarding the long turn-around-time is also felt by the laboratories. Victims and those falsely accused deserve to have their cases worked by an accredited laboratory using state-of-the-art technology which PBSO FBU provides to the citizens of Palm Beach County. There are many DNA laboratories that also offer these services. However, due to the backlog, these services are delayed thereby also delaying justice. The Marion and Seminole County Florida screening laboratories are taking the lead in providing evidence screening

services thus improving the turn-around-time and helping fast track analysis by FDLE and providing investigative data to law enforcement and hope to victims.

The BPL officially opened for casework testing on April 12th 2012 with a ribbon cutting ceremony (Figure 5) in which the Boca Raton Police Chief Dan Alexander, Boynton Beach Police Chief Matt Immler, Delray Beach Assistant Police Chief Joe Milenkovic, Palm Beach County Sheriff's Office Crime Lab Director Cecelia Crouse, Boca Raton Vice Mayor Susan Haynie, County Commissioner Steven L. Abrams and other representatives from law enforcement attended (Figure 6). There were several area television stations and newspapers represented to report the story.

It was important to respond to the concerns of Palm Beach County law enforcement agencies regarding improving the efficiency of the DNA process, in other words, to have a more reasonable turnaround time for conducting DNA analysis on casework evidence. The LEPC, PBSO FBU and the BRPSD BPL consortium understood the need to improve efficiency and as a result there is now an independent laboratory that tests crime scene evidence and submits informative evidence to PBSO for immediate DNA analysis.

The key implication is greater communication between the laboratory and law enforcement. The BRPSD BPL will be an independent laboratory that tests crime scene evidence and submits informative evidence to PBSO. The BPL analysts will also submit reports and testify in court to the results. If local law enforcement agencies provide the screening process in a timely manner,

this will mean faster DNA analysis times and the true function of the laboratory, to aide in the law enforcement and judicial process, will be realized.

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3. Scientific Working Group on DNA Analysis Methods (SWGDAM), effective July 1, 2009

4. 2009 Cygnus Business Media Law Enforcement Technology (LET): Reducing the DNA Backlog

5. http://www.marioncountyfl.org/planning/Updates/CVMtg032708_files/frame.htm

6. http://www.businessinseminole.com/ecodev/population.asp

7. http://www.pbcgov.com/pzb/Planning/population/populationdemo.htm

Dissemination of Strategy to Law Enforcement

Dissemination of the benefit of the Biology Processing Laboratory was originally initiated at the Law Enforcement Planning Council in March 2009 with the introduction of the concept and the commitment by the Boca Raton Police Services Department to establish and maintain the laboratory. Dissemination of this project information was accomplished through a presentation at the 2010 NIJ Grantee Conference concentrated on the purpose, timeline and adjustments to the project. The existence of the Biological Processing Laboratory has predominantly been publicized through news media such as local television stations who covered the grand opening, the Sun-Sentinel Newspaper out of Fort Lauderdale and the Palm Beach Post. In addition the grand opening was found on many web-sites including:

- http://articles.sun-sentinel.com/2012-04-18/news/fl-brf-lab-0418-20120418_1_science-lab-cecelia-crouse-crime-lab-director
- http://articles.sun-sentinel.com/2012-04-12/news/fl-boca-dna-lab-20120412_1_cecelia-crouse-crime-lab-dna-evidence
- http://www.bocaratontribune.com/forensics-lab-opens-in-boca-raton/
- http://www.forensicmag.com/news/dna-screening-lab-speeds-investigations-city-group
- http://cbs12.com/news/features/palm-beach-county/stories/vid_64.shtml

The Palm Beach County Police Chief Association, Law Enforcement Planning Council, FL PAC (Accreditation) and Broward County Police Chiefs Association are aware of the laboratory through these devices. A presentation to the LEPC in the fall of 2012 will provide an update to all Palm Beach County Law Enforcement agencies.

In summary, the Palm Beach County Sheriff's Office Forensic Biology Unit is constantly aware of the need to reduce the DNA backlog and increase the efficiency of the laboratory. Essentially there are three major steps to the DNA process: screening evidence, conducting DNA analysis and writing a report. The addition of a Biology Processing Laboratory within the Boca Raton Police Services Department to screen evidence from southern county law enforcement agencies will provide a tangible means to achieve the goal of conducting DNA analysis on all informative case evidence.

FIGURE 1: Selected area of the 6500 Building for the construction of the BPL.

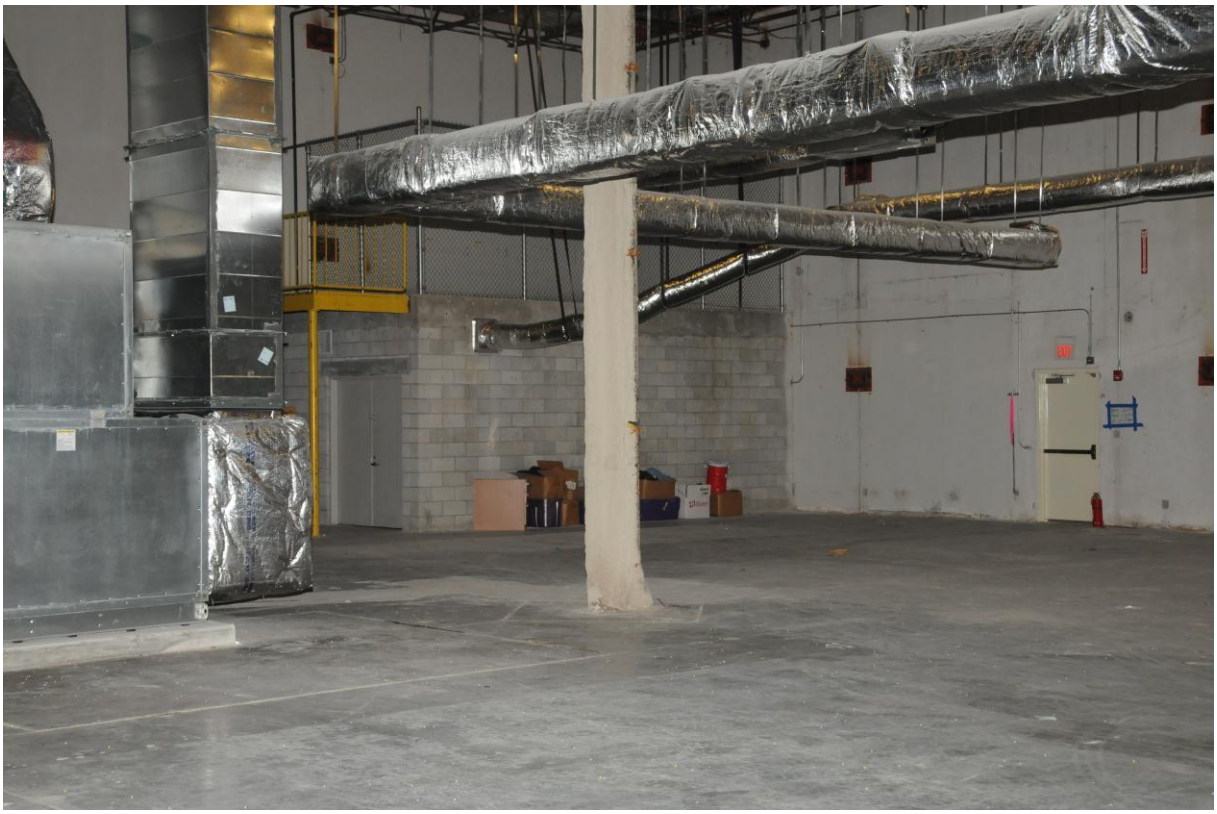

Figure 2: CAD Blueprint of the BPL

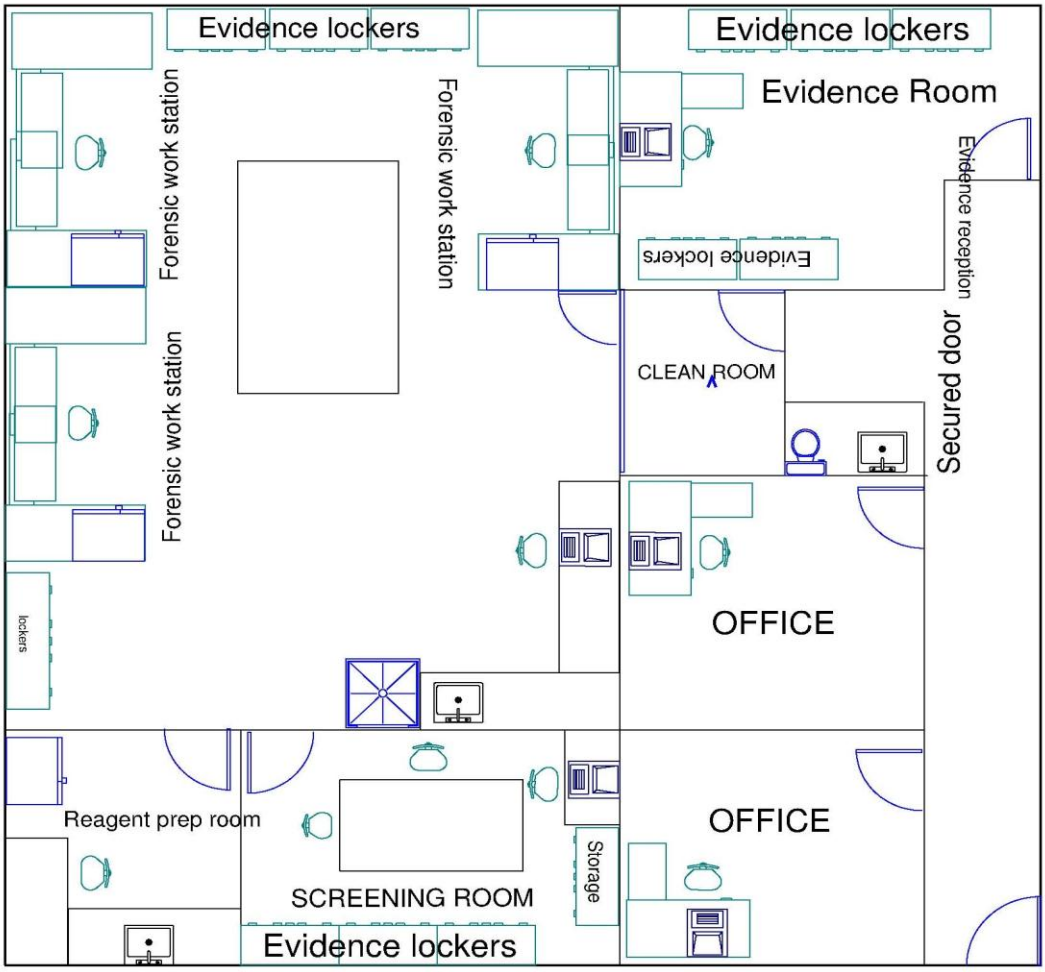

FIGURE 3: Entrance to the BPL and the area for screening large items in the rear of the laboratory.

FIGURE 4: Internal BPL Screening laboratory, Laboratory Proper.

FIGURE 5: Ribbon cutting ceremony for the BPL in April, 2012.

FIGURE 6: Dignitaries speak at the grand opening to explain the benefit of the BPL including front left to right: Palm Beach County Sheriff's Office Colonel James Stormes, Boynton Beach Police Chief Matt Immler, Palm Beach County Sheriff's Office Crime Lab Director Cecelia Crouse, Delray Beach Assistant Police Chief Joe Milenkovic, Boca Raton Vice Mayor Susan Haynie, County, the Boca Raton Police Chief Dan Alexander at the podium and Palm Beach Commissioner Commissioner Steven L. Abrams.

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

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BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

TRAINING PROGRAM

I. INTRODUCTION:

A. The Crime Lab Supervisor (CLS) must ensure the competence of all staff that operate specific equipment, perform tests, evaluate results, and sign test reports. This is accomplished through the training program.

B. This protocol is to establish guidelines for training and continuing education of Biological Processing Laboratory (BPL) personnel. The training program will provide the staff with the appropriate knowledge, skills and training to perform the testing.

C. This protocol shall apply to all lab technicians assigned to the BPL.

D. The Biological Processing Laboratory's Training Program includes the following sections:

1. Laboratory Technician
2. Serology
3. New Technologies, Methodologies, and/or Platforms
4. Bloodborne Pathogen
5. Laboratory Safety
6. Ethics
7. Courtroom training and presentation

E. This program will provide exposure to technologies, methodologies, and platforms presently used and accepted by the BPL, courts, safety, security and other forensic serology examiners.

F. This training program also provides exposure to the pertinent literature.

G. All new BPL personnel are required to read the *Biological Processing Laboratory's Quality Assurance Manual* and *Methods Manual*.

H. Upon completion of the training program the BPL technician will be given a certificate of completion indicating that the BPL technician is qualified to perform the protocols on casework analysis and the date on which authorization is confirmed.

II. TRAINING INSTRUCTIONS:

A. The BPL technician-in-training is expected to keep accurate records of all training data. It is important that this data be kept up-to-date and organized in a training notebook.

B. During training, BPL technicians will receive the most current electronic copy of the *Biological Processing Laboratory Methods Manual.* Hard copies of any protocols or individual worksheets in the training notebook are kept for reference purposes only. Each BPL technician is responsible for reading the *Quality Assurance Manual (QAM)* and *Methods Manual (MM).*

C. All training requirements are outlined in a BRPSD BPL training syllabus prepared by the CLS or his/her designee. The syllabus must be reviewed with the trainee before the initiation of the training schedule. The syllabus may be altered at the discretion of the CLS or his/her designee. A copy of the syllabus is kept in the lab technician's training notebook.

D. The BPL technician-in-training will receive and review a copy of the syllabus which details the training program and/or expected timelines for completion with the CLS or his/her designee. E. Literature references are an important part of the training program. Copies of the appropriate literature will be included in the BPL technician's training notebook, located in the BPL's electronic reference library. Required literature references will be listed in the training syllabus.

F. The BPL technician will be exposed to the evaluation of many forensic-type samples during training.

G. The CLS or his/her designee must review all training and analytical records prior to completion of the training program.

H. All appropriate safety, evidence handling, and biohazard protocols must be followed.

I. Personnel may be designated by the CLS to train BPL technicians in all or part of a laboratory protocol. The CLS will ultimately approve and sign off on all training programs and training records prior to completion.

J. Completion of any training program will be contingent upon successful completion of the requirements outlined in the training syllabus. In addition, each module of the competency examination must be successfully completed before the next module will be administered.

K. Once a BPL technician is deemed qualified, supervised casework is not required.

L. However, all initial case file analysis and reports must be submitted to the CLS or his/her designee for review. Once it is determined that there are no systemic issues, the newly qualified BPL technician will be able to perform reviews.

M. All BPL training records will be retained permanently in either in the BPL or the Crime Lab's limited access storage location.

III. BPL TECHNICIAN TRAINING:

A. The BPL Technician must be trained in the following or as deemed appropriate by the CLS:

1. Reagent Preparation
2. Reagent Documentation
3. Reagent Storage
4. Assignment of Reagent Expiration Dates
5. Quality Assurance Documentation
6. Quality Control Measures
7. Laboratory Safety
8. Clean Technique
9. General Laboratory Duties
10. Ordering of Supplies
11. Case Acceptance Protocol
12. Department records management system (RMS)
13. Courtroom Testimony (when appropriate)
14. Bloodborne Pathogens.

B. The entire BPL Technician training program should take from one to six months to complete depending on the BPL technician's background and extent of prior training.

IV. SEROLOGY TRAINING:

A. Serology training applies to BPL Technicians.

B. The training program should take from one to six months to complete and will include:

1. Training in all current serological protocols to the full extent of the BPL technician's participation in casework.
2. Laboratory Safety
3. Quality Assurance Documentation

4. Quality Control Measures

5. Evidence Handling

6. General Knowledge of Serology

7. Case Acceptance Policy

8. Department records management system (RMS)

9. Report Writing

10. Courtroom Testimony and Legal Issues

11. Bloodborne Pathogens

C. The total number of samples analyzed during the training process will be at the discretion of the CLS.

D. Successful completion of the serology training program will be measured by the following:

1. Laboratory Bench Practical:

a. The BPL technician will complete analysis of a series of five mock cases for an approximate total of 25 samples. BPL technicians must achieve 100 percent accuracy (competency test samples) for a passing grade. These samples will cover all aspects of serological methodology. If less than 100% is achieved on this competency the CLS or his/her designee will determine the appropriate number of cases/stains for retesting. In the case of an experienced BPL technician, the number of samples analyzed will be at the discretion of the CLS or his/her designee.

b. The BPL technician will also be evaluated on evidence handling, documentation, and report writing. This examination may be combined with the serological bench practical. An 85% or above must be attained to show competency in evidence handling, documentation, and report writing. Any area of deficiency that is identified may warrant additional testing at the discretion of the CLS or his/her designee.

2. Serology Comprehensive Examination:

a. This examination may be oral and/or written. The results of this examination must be recorded and reviewed with the BPL technician by the CLS or his/her designee. A passing grade will be awarded for an 85% or greater. If less than 85% is achieved, a second examination covering the areas of deficiency will be administered at the discretion of the CLS or his/her designee.

3. Mock Trial:

a. A non-probative case from the bench practical will be selected for the mock trial. Mock trials are to be held in a courtroom or courtroom-like setting

including a representative judge, prosecutor, defense and jurors. A *Court Testimony Evaluation* form will be completed by the attendees. The information on these forms must be formally reviewed with the BPL technician-in-training. All *Court Testimony Evaluation* forms will be retained. The CLS or his/her designee will determine if a passing grade was achieved or if a second mock trial is warranted.

V. ADDITION OF NEW TECHNOLOGIES, METHODOLOGIES AND/OR PLATFORMS:

A. This training program applies to any qualified BPL Technicians to the fullest extent of their participation in casework.

B. The training program will be determined by the CLS or his/her designee and outlined in the appropriate training syllabus.

C. At the CLS's discretion a written, oral, or bench practical examination or mock trial may be warranted. The design of any examination will be at the judgment of the CLS and outlined in the training syllabus.

D. The training program may include when appropriate:

1. Theory
2. Technique
3. Bench Work
4. Laboratory protocol
5. Review of Validation Studies and Results

VI. BLOODBORNE PATHOGEN TRAINING:

A. All BPL personnel will receive bloodborne pathogen training as outlined in the City of Boca Raton Safety Manual and the City of Boca Raton Bloodborne Pathogen Exposure Control Plan.

VII. SAFETY TRAINING:

A. All BPL personnel will receive training in "Laboratory Safety" as outlined in the BPL Technician and/or Serology training modules.

VIII. ETHICS TRAINING:

A. All BPL personnel must be trained in the application of ethical practices in forensic sciences.

B. Ethics training may be delivered through formal coursework or on the Internet.

C. Completion of ethics training must be recorded and retained for the length of employment.

IX. COURTROOM TESTIMONY TRAINING:

A. BPL personnel that preserve or analyze items of evidence will receive courtroom testimony training as outlined in the BPL Technician and/or Serology training modules.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

LITERATURE REVIEW

I. INTRODUCTION:

A. This protocol outlines the Biological Processing Laboratory's (BPL) program for the annual review and documentation of scientific literature.

B. This protocol shall apply to all case working BPL technicians.

C. The purpose of this protocol is to support the BPL's commitment to improving the entire management and technical system through review of up-to-date scientific literature.

II. SCIENTIFIC LITERATURE REVIEW PROGRAM:

A. The BPL will assign scientific literature for review as follows:

1. Current journal articles

2. During the course of BPL technician's training for validated protocols when there is literature that must be read regarding the new protocols.

B. Each BPL technician is responsible for copying the assigned literature and reading the selected literature circulated among the BPL personnel.

C. A date will be announced when literature review must be completed.

D. Each BPL technician must sign off on the BPL *Literature Review Log* form that they have read the assigned literature.

E. The scientific reading will be discussed.

F. The completed BPL *Literature Review Log* form will be placed in the Literature Review Log notebook.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

RECORDS

I. INTRODUCTION:

A. The protocol is used to record and organize Biological Processing Laboratory (BPL) case files/laboratory reports and to record and conduct case file reviews.

B. All case file records must support conclusions such that any qualified laboratory technician could evaluate the testing that was conducted and could interpret the data.

C. Where appropriate, the equipment operational parameters used in the course of the testing procedure will be recorded and maintained at designated sites and need not be in the case file.

D. Observations, data and calculations should be recorded contemporaneously for each specific task performed.

E. The BPL case file is composed of examination records and administrative records.

F. Examination records constitute part of the technical record and are defined in the *Quality Assurance Manual* (QAM) Standard 4.13.2 Technical Records.

G. Administrative records are defined in the QAM Standard 4.13.2.8 Administrative Records.

H. All administrative records will be identified in accordance with the QAM standard 4.13.2.8 Administrative Records.

I. All administrative records will be contained in the pocket of the case file with the exception of the *BPL Communication Log* form and the case acceptance request which will be secured to the interior back panel of the case file.

J. Property receipts that are bound to the technical data are considered an examination record.

K. Property receipts that are contained in the pocket of the case file are considered an administrative record.

II. CASE FILE COMPOSITION

A. Each BPL technician is responsible for generating a case file for each case analyzed. Each case will have its own case file. The BPL case file will follow the general record order:

B. *Case File Technical/Administrative Review Worksheet* form completed by the reviewer

C. Laboratory report

D. Case files will be organized by serological analysis:

1. Evidence worksheets arranged in chronological order

2. Data sheets arranged in chronological order

3. HB or P30 worksheets arranged in chronological order (HB-purple paper; P30-blue paper)

E. Evidence property receipts. The evidence property receipts will be organized by submission number. The BPL technician itemized submission number(s) of the evidence must be recorded on the property receipt (e.g. Swabs from gun "1A-1C", oral standard from John Doe "2"). Property receipts for items of evidence that are not signed into the BPL technician's care and custody may be placed in the case file pocket.

F. The electronic chain of custody (RMS Barcode) for derivative evidence (e.g. evidence separated from the original evidentiary item such as stain cuttings) must be placed in the case file.

G. A *BPL Communication Log* form must be present in the file.

H. Any other pertinent analytical materials/records must be placed in the case file.

I. Reviewed analytical data from outsourced evidence will be stored in an appropriate vendor notebook.

J. All records contained within a case file must have the unique case number and hand written BPL technician's initials. Records need not have original initials (e.g. records containing the BPL technician's initials that have been copied). Double sided examination records in the case files must have the case number and hand written BPL technician's initials recorded on both sides of the page. Each side is to be treated as a separate page.

K. If a record contains the BPL technician's signature, initials are not required.

L. Double sided administrative records must contain the case number on both sides of the page.

III. WORKSHEET FORMS

A. All required entries on the evidence and laboratory worksheet forms should be written or printed legibly in ink.

B. The worksheet forms are used to record any information related to a case including: dates of analysis, observations, and all unique case identifiers.

C. The worksheet forms must be written to permit adequate reconstruction of the analysis or examination performed.

D. If using abbreviations when recording notes or observations on the examination records, the abbreviations listed on the BPL Abbreviation List (Administrative or Technical) must be used. Abbreviations not listed on the BPL Abbreviation List are not to be used.

E. Corrections will be made with a single strike out and the BPL technician's initials. Where appropriate, the correct value should be entered alongside the original value. If the correction is made on a different date than the original date on the examination record, the correction shall reflect the date of the correction. Corrections must be made on all original worksheets and copies.

F. Any addition(s) to the examination record shall be initialed by the person making the addition. An addition means placing new information in the original examination record. The addition shall reflect the date(s) of the addition(s) if different than the original date on the examination record. Additions must be made on all original worksheets and copies.

G. Pencil may not be used to fill out laboratory worksheet forms.

H. Pencil may be used to label frosted glass microscope slides.

I. Each page of the examination record contained in the case file must contain the BPL technician's handwritten initials, case number, and page number. The page number will be listed on the bottom right corner of the page. *BPL Communication Log* forms, case request forms, or other administrative records placed in the pocket or back of the case file do not need to be numbered.

K. The case file record of information when appropriate will contain the following:

1. Starting date of analysis
2. BPL case number
3. Condition of seals
4. Description of packaging
5. Description of evidence
6. Submission number
7. Date of analysis
8. Type of analysis
9. BPL technician initials
10. Lot number of reagents
11. Expiration date of reagents
12. Pipettes used

13. Summary of findings

14. Date the analysis was completed need only be written on the first page of the *Evidence Summary Worksheet* form.

15. When appropriate, notation that the positive and negative controls have been tested and the analysis is working properly.

IV. BIOLOGICAL PROCESSING LABORATORY REPORT

A. The BPL report is used for reporting results and drawing appropriate scientific conclusions. In order to provide laboratory report format uniformity, the BPL Auto Text must be used as a guide.

1. Each BPL technician is responsible for generating a case report for each case analyzed. A report will be generated when:

   a. Preservation of case evidence has been performed.

   b. Evidence has been analyzed using visual or serological pre-presumptive, presumptive, or confirmatory testing.

   c. Other circumstances dictate a report is necessary, such as, obtaining negative results at a crime scene, etc.

2. It is necessary to state in the BPL report that the casework reference standards have been preserved.

3. The BPL technician must state in the BPL report when samples have been sent out for analytical procedures not provided by the BPL (e.g. microscopic hair analysis, STR, Y-STR, or mtDNA analysis) unless the samples have been submitted to an outside vendor by court order from the judicial system or the request to send out the evidence was made after the BPL report was generated.

4. It is necessary to have an authenticated chain of custody record in the case file (e.g. barcode) for derivative evidence.

5. It is necessary to state in the report items that have been signed out from the Evidence Custodian but not examined.

6. It is necessary to state in the BPL report, when appropriate, that items of evidence that were preserved had serological analysis conducted by a different BPL technician.

7. The BPL will follow the QAM Standard 5.10.1 Reporting Results for determining when a test report does not need to be written.

   a. An administrative review must be conducted as per protocol

   b. The BPL report shall include a statement indicating that a complete report may be written upon request

8. The case report will follow the format listed in the QAM standard 5.10 Reporting the Results.

9. BPL Reports must include the following:

a. The elements delineated in Section 5.10.2 of the QAM

b. Title: FORENSIC BIOLOGY REPORT

c. Case Number(s) on each page of the report. Each page of the report must be numbered.

d. Description of evidence examined. It is not necessary to include the date of receipt of the evidence as this information is not relevant or critical to the validity and application of the results and/or dates of testing. This information may be gleaned from the Department's records management system (RMS) when necessary.

e. A description of the methodology used.

f. Results and conclusions for each item.

g. Interpretations, opinions and conclusions must be clearly marked in the "Notes" section of all BPL reports (refer to BPL Auto Text Report Wording Form for report wording).

h. Date issued

i. Disposition of the laboratory evidence. This is listed in the "Notes" section of the BPL report, property receipts included in the case file, and by a secure electronic chain of custody for derivative evidence (refer to BPL Auto Text Report Wording Form for report wording).

j. The BPL technician's secured electronic or handwritten signature and title will be at the end of the report.

k. Any BPL technician who signs a report is responsible for the content and integrity of the data present therein.

10. The end of each BPL report must include any pertinent "Notes" (refer to BPL Auto Text Report Wording Form for laboratory report notes).

V. BPL REPORT/CASE FILE REVIEW

A. All BPL reports and case files must be reviewed by a qualified laboratory technician or supervisor who is not an author(s) of the test report contained in the case file.

B. The BPL *Technical/Administrative Review Worksheet* form must be used during the technical and administrative review of the case file. The technical and administrative review must be conducted by an independent authorized qualified laboratory technician as defined as an

individual with the expertise gained through training, casework experience, and knowledge of the laboratory's procedures.

C. The BPL follows the protocol for clerical reviews as outlined in QAM standard 5.9.5 Administrative Reviews.

D. The purpose of the *Technical/Administrative Review* form is to ascertain if conformance with proper technical and administrative procedures were conducted.

E. All case file records must be present in the case file when the review process is initiated. At this time all examination records are considered complete.

F. At the time of review the case file must include the following:

1. *Technical/Administrative Review* form

2. *Evidence Summary Worksheet* form(s)

3. When appropriate, data sheets or digital images

4. Property receipts. The property receipts must be signed and dated appropriately. When appropriate, all original evidence packaging/evidence must be returned to the Evidence Custodian prior to case file review

5. Secure electronic chain of custody (barcodes) for derivative evidence

6. Copies of all completed serological worksheet forms, when appropriate

7. *BPL Communication Log* form and/or *Serology Request Form*

8. Any other technical or communication notes important to the case, if appropriate

9. Reviewed analytical data from vendor laboratories will be stored in an appropriate notebook(s).

G. There must be a clear delineation of the chain of custody for the disposition of derivative evidence. The Technical/Administrative Reviewer must check the final disposition of the derivative evidence if it is in an appropriate storage location (BPL Evidence Room or BRSPD Evidence Room). The reviewer must:

1. Verify the storage location in the records management system.

2. Verify that the appropriate barcode(s) are placed in the case file.

H. The Technical/Administrative Reviewer must initial and date the file copy of the BPL report and complete the BPL *Case File Technical/Administrative Review Worksheet* form in its entirety prior to the dissemination of the report.

I. All appropriate corrections must be made before the review may be completed and signed off on.

J. If there are discrepancies in the conclusions between the BPL technician and the Technical/Administrative Reviewer, the details will be discussed and an agreement based on appropriate interpretation guidelines will be made.

K. If the interpretation discrepancy cannot be resolved between the BPL technician and Technical/Administrative Reviewer, the Crime Lab Supervisor (CLS) or his/her designee will be asked to review the conclusion.

L. The CLS or his/her designee will determine the appropriate conclusion based on interpretation guidelines.

M. The decision of the CLS or his/her designee is final.

N. The Technical/Administrative Reviewer and the CLS must initial and date the BPL *Case File Technical/Administrative Worksheet* form. In addition, a notation must be made in the comments section of the *Case File Technical/Administrative worksheet* form part II Administrative/Clerical review section indicating which report conclusion was involved. For example: "the Crime Lab Supervisor was involved in report conclusion #3".

O. The Technical/Administrative Reviewer must sign and date the *Technical Review and Administrative Review* form.

P. The review sheet must be kept in the case file.

Q. All reports disseminated must be dated and signed by the BPL technician or have a secure electronic signature.

R. All case files and BPL reports must include the identity of the BPL technician(s) responsible for the analysis and the technical, administrative, and clerical review.

S. Reviewed BPL reports will be forwarded to an Evidence Custodian for dissemination to appropriate law enforcement personnel. All BPL will be disseminated as per QAM 5.10.3 Release of Case Information.

VI. SUPPLEMENTAL REPORT

A. A supplemental report must be issued for any additional analysis, result, or conclusion conducted after a BPL report has been issued.

B. The supplemental report must clearly state in the body of the text: "SUPPLEMENTAL REPORT" and the serial Supplemental Report Number (e.g. SUPPLEMENTAL REPORT 1, SUPPLEMENTAL REPORT 2…..etc).

C. All supplemental reports must be technically and administratively reviewed.

VII. AMENDED REPORTS

A. An amended report must be issued for any corrections to an original report and/or for reporting any omission from an original report.

B. For a correction:

1. The amended report must clearly state in the body of the text: "AMENDED REPORT: Supersedes report from date (00/00/0000)".

2. To correct an error in the result and conclusion section of the BPL report, the original result and conclusion in question must be cited followed by the amended result and conclusion.

3. To correct an error other than a result and conclusion (e.g. agency case number, date of birth, victim/suspect identifier) a statement must be included as to what is being corrected (e.g. the BPL report dated 00/00/0000 identified John Doe as the suspect. The BPL report has been amended to identify John Doe as the victim, etc.).

C. For an omission:

1. The amended report must clearly state in the body of the text: "AMENDED REPORT: Supersedes report from date (00/00/0000)".

2. The amended report must report the omission.

D. The CLS must review the amended report.

E. The CLS must sign and date the *Technical Review and Administrative Review* form.

F. The review sheet form must be kept in the case file.

G. All reports disseminated must be dated and signed by the BPL technician or have a secure electronic signature.

H. Reviewed BPL reports and case information will be released as per QAM standard 5.10.3 Release of Case Information.

I. The Quality Assurance Officer will be forwarded a copy of the amended report.

VIII. RETENTION OF TECHNICAL RECORDS

A. The BPL follows the QAM Standard 4.13.1.2 for records retention.

B. Original laboratory observations, derived data, and worksheet forms (except BPL *Evidence Summary Worksheet* forms and BPL *Data Sheet* forms) for current cases will be stored in the BPL's limited access storage location or records will be scanned and placed on a limited access server.

C. Copies of the original observations, derived data and worksheet forms will be placed in the appropriate case files.

D. Archived original laboratory observations, derived data, and worksheet forms (except BPL *Evidence Summary Worksheet* forms and BPL *Data Sheet* forms) will be stored in the BPL's limited access storage location, BPL's limited access off-site storage location, or records will be scanned and placed on a limited access server.

E. The BPL *Evidence Summary Worksheet* form and BPL *Data Sheet* form are considered original worksheet forms and will be placed in the case file.

F. The BPL will retain records of original observations, derived data (where appropriate) and sufficient information to establish an audit trail, calibration record (where appropriate), staff records, and a copy of each analysis and laboratory report for a period that is defined by the Quality Assurance Manual and/or Methods Manual.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

COLLECTION OF REFERENCE SAMPLES

I. INTRODUCTION:

A. The purpose of this procedure is to assure the integrity of the forensic evidence tested in the Biological Processing Laboratory (BPL).

B. This order shall apply to any individual wishing to gain entry into the BPL proper and all BPL personnel.

C. The BPL proper is defined as any area in which case evidence, research/development, or proficiency testing is conducted.

D. Any individual entering the BPL proper must adhere to all BPL procedures.

II. MAINTAINING A RECORD OF INDIVIDUALS ACCESSING THE BIOLOGICAL PROCESSING LABORATORY:

A. Any authorized individual entering the BPL proper (e.g. prosecutors/defense experts, public defenders, BPL interns, volunteers, law enforcement, auditor, facilities, etc.) will be asked to voluntarily provide an oral reference sample and will have their name added to a *Biological Processing Laboratory Visitor Log*.

B. Admission to the laboratory without submission of a standard will be approved on a case-by-case basis.

C. All individuals must adhere to all BPL procedures, which may include any or all of the following: wearing all appropriate lab safety attire (e.g. lab coat, gloves, face mask, goggles, bouffant caps, or other approved attire), being escorted at all times by BPL personnel and/or having their name added to a *Biological Processing Laboratory Visitor's Log*.

D. Where appropriate, laboratory equipment and/or work areas will be decontaminated with a minimum of 10% bleach solution or Hype-Wipe following use.

III. SAMPLE COLLECTION

A. Oral reference samples that are voluntarily provided are to be placed into a coin envelope and labeled with the individual's name, title (e.g. ASA, intern, WPBPD CSI, etc.), date collected, and collecting analyst's initials.

B. If a standard is taken by a CST, the reference sample will be submitted to the BPL for documentation and storage.

C. The labeled envelope will be retained in a limited access area in the laboratory. The individual's name and date of collection will be entered into the *Biological Processing Laboratory Visitor Log* by the staff member receiving the sample.

D. The oral reference samples may be disposed of when requested by the donor and approved by the Crime Laboratory Supervisor (CLS) or his/her designee, or at the discretion of the CLS or his/her designee. Disposal of an oral reference sample will be documented on the *Biological Processing Laboratory Visitor's Log* along with the date of disposal and the reason for disposal.

E. Oral reference sample(s) may be sent to Palm Beach County Sheriff's Office Forensic Biology Unit for DNA analysis for elimination purposes.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

BPL FACILITIES

I. INTRODUCTION

A. The purpose of this protocol is to:

1. Outline the security of the Biological Processing Laboratory (BPL) to ensure the integrity of the analyses and evidence.

2. Delineate efforts to minimize contamination between casework samples.

3. Address housekeeping procedures within the BPL.

B. All testing and the use of equipment must use the approved energy sources and testing process in an environmentally approved condition under appropriate lighting. All environmental, energy and lighting issues must be reported to facilities management for repairs. If the conditions affect the testing procedures, the staff must be notified by the Crime Lab Supervisor CLS) or his/her designee to the extent of the issue and if casework must be halted.

C. Environmental control of the BPL is maintained by the City of Boca Raton Municipal Services Department. Issues with heating/cooling conditioning units should be immediately reported to the BRPSD Community Services Officer who is assigned to facilities maintenance.

D. Internal environmental conditions including freezer/refrigeration are monitored by BPL staff and any issues are immediately reported to the CLS or the approved monitoring vendor.

II. LABORATORY ACCESS AND KEY DISTRIBUTION

A. The BPL is divided into several sections including:

1. Administrative

2. Laboratory

   a. Serology Workstation Bays

   b. Evidence Screening Room

   c. Reagent Preparation Room

B. The entrance to the BPL is controlled by key card access and has a key lock to provide security in the event of a power failure or disabling of the key card system.

C. Key card and key access authorization is limited to personnel designated by the CLS.

D. Persons having official business will be allowed access to the BPL only when accompanied by BPL personnel. BPL personnel must be present when custodial, vendor, facility maintenance, guests or repair persons are working in the BPL.

III. GENERAL LABORATORY SET-UP

A. In General:

1. All evidence handling and evidence screening are to be conducted in designated work areas.

2. All work areas are to contain dedicated supplies and equipment. These items shall not leave the dedicated work area unless they are decontaminated.

B. Evidence handling and screening work areas are designated as *Serology Workstation Bays and the Evidence Screening Room.*

IV. LABORATORY DECONTAMINATION

A. There are three levels of general decontamination processes for the BPL: routine, weekly and bi-annually. All members must adhere to the following practices:

1. Wear proper PPE including laboratory coat, safety glasses, gloves, bouffant cap, and face mask while conducting decontamination.

2. Use disposable paper towels and a minimum of 10% bleach solution, or a Hype-wipe bleach towel.

3. Discard paper towels that contain bleach or Hype-wipe towels in biohazard containers.

4. Following decontamination discard disposable coats or launder cloth lab coats.

B. Routine Decontamination: Personnel must decontaminate the areas in which they have conducted evidence handling immediately after completion of the task(s).

1. Wipe off all areas and items touched during the procedures which may include but are not limited to items such as pens, doorknobs, faucets, forceps, counters, cabinets, laboratory instruments, laboratory equipment, phones, computer keyboards, etc.

C. Weekly Decontamination: Common areas of the BPL are decontaminated once a week by assigned personnel.

1. Wipe off all doorknobs, light switches, faucets, common area laboratory bench tops, phones, cabinet handles, etc. within the laboratory *Serology Workstation Bays, Evidence Screening Room, and Reagent Preparation Room.*

D. Full BPL Decontamination: The entire BPL is decontaminated bi-annually by the members. The bi-annual decontamination will be conducted as follows:

1. The bi-annual BPL decontamination will be conducted during a time period determined by the CLS.

2. Unless there are extenuating circumstances, no casework analysis will be conducted during the bi-annual decontamination of the common BPL work areas.

3. All BPL personnel will be assigned a specific area(s) of the BPL to decontaminate.

4. All BPL work benches, drawers, cabinet doors, cabinet handles, and laboratory equipment (when appropriate) are to be wiped down with a minimum of 10% bleach solution. Centrifuges should be taken apart and cleaned/bleached. The bleach solution must remain on the laboratory work benches, cabinet doors, cabinet handles, and laboratory equipment (when appropriate) for a minimum of 5 minutes prior to wiping.

5. All laboratory work benches, cabinet doors, cabinet handles, and laboratory equipment (when appropriate) must be wiped down with distilled water after bleaching.

6. In addition to laboratory work benches, cabinet doors, cabinet handles, and laboratory equipment (when appropriate), all laboratory drawers and cabinets must be emptied of their contents. The inside of the cabinets and drawers must be wiped down with a minimum of 10% bleach solution. The bleach solution must remain on the area for a minimum of 5 minutes prior to wiping. The inside of the laboratory cabinets and drawers must be wiped down with distilled water after bleaching.

7. All contents removed from the laboratory cabinets and drawers will be inventoried for any expired reagents. Any expired reagents will be disposed of accordingly.

8. All contents removed from the laboratory cabinets and drawers will be wiped down with a minimum of 10% bleach solution. All contents must be wiped down with distilled water after bleaching and prior to returning laboratory cabinets and drawers.

9. Wipe off all areas and items touched during the procedures which may include but are not limited to items such as pens, doorknobs, faucets, forceps, counters, cabinets, laboratory instruments, laboratory equipment, phones, computer keyboards, etc.

E. The City of Boca Raton provides contractual housekeeping services for the BPL. The CLS must be notified if housekeeping services will extend beyond operational hours such that preparations to provide a staff member to be present may be made.

1. The housekeeping services staff must wear a disposable laboratory coat, safety glasses, gloves, bouffant cap, and face mask when cleaning the laboratory proper.

2. A BPL staff member must accompany the housekeeping staff at all times.

3. Upon completion of the cleaning process, all disposable safety wear must be discarded in the appropriate biohazard container.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

CASE ACCEPTANCE PROTOCOL

I. INTRODUCTION:

A. The Biological Processing Laboratory (BPL) provides forensic serology services to Boca Raton Police Services Department, Delray Beach Police Department, and Boynton Beach Police Department for the purpose of providing assistance in criminal investigations and judicial proceedings. Evidence may be submitted, in accordance with these guidelines, by contacting the Evidence Custodian at the Boca Raton Police Services Department.

B. The submitting agency must send a serology request form to the BPL in order to notify the BPL that items in a case need to be analyzed. Cases are generally worked by request date or as soon as possible (ASAP).

C. Case submission guidelines set the standard requirements for routine submission of evidence to the BPL.

D. BPL acknowledges that in some circumstances, there may be a need to analyze evidence that falls outside the stated guidelines.

E. Requests for analysis of evidence that falls outside these guidelines should be made by the contributing agency's supervisor in writing.

F. A decision regarding additional evidence may come from the assigned BPL technician or the Crime Lab Supervisor (CLS).

II. CASE SUBMISSION PROCEDURE

A. Submissions of all exhibits must be in connection with criminal investigations. No examinations will be conducted for private individuals or corporations.

B. Exhibits must be submitted in compliance with the case acceptance guidelines of the BPL. Case acceptance guidelines provide the requirements for submission of evidence for serological testing.

C. Serological testing will be completed when an association is established from informative evidence. For example, an association is established between the subject and the victim. A scenario must be provided with the submitted evidence. The scenario will establish the value of each item as to its likelihood to provide informative results or an

investigative lead. If an investigative report is submitted, the submitter must highlight those items that establish the association.

D. In general, the following case acceptance protocols must be followed.

1. The requesting agency must complete the serology request form and submit it via e-mail to the BPL. Additional items or evidence may be requested or denied by documented correspondence.

2. If elimination standards are associated with the evidence, they must be submitted in order for a case to be assigned (e.g. owner of a hijacked vehicle).

3. If a suspect(s) has been identified, the standard from the suspect(s) must be submitted in order for the case to be assigned unless there is an extenuating circumstance.

4. Each item in the submission must be detailed on the property receipt. It must contain specific identification as to whom or what was swabbed (e.g. two DNA swabs from victim Jane Doe).

5. Only items requested for analysis may be submitted. Any ASAP case will be considered only after a written request outlining the reason(s) for the prioritization is submitted to the CLS. Exceptions will be made by the CLS depending on the type of case.

a. An emergency is defined as any instance in which serology data and/or a report is requested by law enforcement or the judicial system in an immediate and expeditious manner. For example, the request is due to circumstances that are beyond their control such as an individual who may abscond unless the serology in the case is completed or a trial certain due to speedy trial.

E. The type and number of items accepted per submission is based on case type. For all case types, known standards from victim(s) or subject(s) will not count against the number of items that may be submitted. An item is expected to be comprised of one piece of evidence (e.g. one piece of clothing, swabbing of blood from a single area, or one weapon). If items are received packaged together, the number of items in the package will be considered to be the number of these items submitted (e.g. pants, shirt, and shoes packaged together will be considered three items). Multiple stains on an item will not be considered part of the number of items worked (e.g. three bloodstains processed for serology on a T-shirt will be considered one item).

F. SEXUAL ASSAULTS

1. The first submission set is limited to a *Sexual Battery Evidence Collection Kit* (SBECK) plus one pair of underwear (if not already in kit) and one condom, if applicable.

2. If the SBECK is negative, additional items such as clothing or bedding may be submitted in separate submissions. This tier of submissions is limited to 5 items.

3. If the SBECK is positive, no additional items will be accepted for biology, unless case circumstances (such as multiple perpetrators) dictate the need for additional processing.

G. HOMICIDES

1. The investigating agency must have a conference, either in person or telephonically, to review the evidence in the case.

2. Biology evidence is limited to 9 informative items in the first submission tier.

3. If informative biology results are obtained, additional items will not be examined, unless case circumstances dictate the need for additional processing.

4. If no informative results are found on the first tier of submissions, the next tier of informative items may be submitted with the approval of the assigned BPL technician.

H. BURGLARY AND PROPERTY CRIMES

1. The first submission tier is limited to 2 items for biology, typically blood sample(s) from the scene or items left by the perpetrator (e.g. cigarette butt or item of clothing).

2. If a profile is developed, additional items will not be examined unless case circumstances (such as multiple perpetrators) dictate the need for additional analysis.

I. OTHER CASE TYPES (ROBBERY, ASSAULT, ETC.)

1. Each tier of submissions is limited to 4 items.

J. CRIMINAL PARENTAGE CASES

1. Submissions must include a buccal swab (preferred) or liquid blood (purple top tube) standard from the mother or alleged mother, father or alleged father, and the child, or if necessary the product of conception.

2. No partial submissions will be accepted unless dictated by case circumstances (such as the mother is deceased or maternity is in question and the father is known).

K. TOUCH EVIDENCE

1. Touch evidence is defined as evidence which has no visible staining and would contain DNA that only results from touching an item with the skin. Touch evidence does not include cigarette butts, swabbing from cans, bottles, straws or other items in which the substance being tested is most likely saliva. Touch evidence does not include items submitted for identifying the wearer such as shirt, shoes, hats, etc. where there is a probability of prolonged contact.

2. Touch evidence will be accepted for possible processing when there is a high likelihood that the evidence submitted will provide informative results or investigative leads. A high degree of likelihood may be established by means of witness corroboration, visual monitoring systems, or sound deductive reasoning.

3. Touch evidence will not be processed by the BPL if another investigative unit has processed the evidence without wearing gloves.

4. Items submitted for touch evidence processing will comply with existing policy relating to the number of items of evidence that may be submitted based on case type.

5. Swabbings of items such as the exterior of cars, dwellings, businesses, etc. will not be worked unless there is a high degree of likelihood an association of the perpetrator and the evidence may be established by means of witness corroboration, visual monitoring systems, or sound deductive reasoning.

6. Swabbings from public common areas **will not** be worked (public telephones, business doors, pens on a counter, etc.).

L. CASE ASSIGNMENT

1. The process of case assignment is approved by the CLS. All casework analysis will be recorded.

2. Cases will be sorted by request date. Cases shall be assigned from the earliest request date to the most recent request date.

3. All evidence must be submitted before the case will be assigned. If a case has been requested and all the evidence, including standards, is not brought to the lab within 60 days the case is automatically inactivated and can only be reactivate with a new request. The date by which the case will be sorted will be modified to the date of the new request.

4. In instances where staff members leave the employment of BRPSD or cannot finish the case analysis, the CLS is responsible for reassignment of the case any evidentiary items associated with the case.

M. CASE PRIORITY

1. BPL technicians will be assigned violent crimes cases.

2. If no violent crimes are ready for assignment, property crimes cases will be assigned.

3. All cases are to be taken in request date order unless they are related. BPL technicians shall take up to 5 related cases (greater than 5 related cases are at BPL technician's discretion) out of date order with any additional related cases left for future assignment.

4. Current cases that are or may be related to another BPL technician's past cases are to be assigned by request date order to any BPL technician (e.g. the BPL technician having the related case(s) does not need to be assigned this cases). Exceptions may be granted by the CLS.

5. *Cases for Immediate Assignment* are considered an ASAP cases. If a case is deemed ASAP, the CLS will contact the appropriate BPL technician to work the case.

6. *Inactive* cases are current cases that are no longer considered active. These cases include but are not limited to:

   a. Cases where the evidence has not been submitted after 60 days from the date of request.

   b. Cases that have pled.

   c. Cases where the victim is not cooperating.

   d. Cases that the State Attorney's Office is not prosecuting.

7. *Pending* cases are cases that have been approved by the BPL and for which the BPL is awaiting evidence submission.

8. A case is considered an *Archived* case once it is being worked by a BPL technician.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

EVIDENCE CONTROL

I. INTRODUCTION:

A. The purpose of this protocol is to outline and record the Biological Processing Laboratory's (BPL) evidence control system to ensure the integrity of physical evidence.

B. The protocol applies to all qualified BPL personnel signing out, transporting, and/or analyzing casework evidence.

II. EVIDENCE PROCUREMENT

A. The BPL will follow the guidelines set forth in the Quality Assurance Manual (QAM) Standard 5.8 Handling and Transportation of Test Items.

B. In order to sign out evidence, the lab technician must notify an Evidence Custodian. The lab technician will examine the items of evidence to verify that evidence meets the appropriate chain of custody requirements (e.g. seals are intact, initialed, and barcodes on packages and evidence). The chain of custody record elements in the QAM 5.8.1.1 must be followed. Any discrepancies must be resolved prior to signing the evidence out.

C. The case number and submission number on the barcode, property receipt, and the evidence must be the same. Any discrepancies must be resolved prior to signing the evidence out.

D. The BPL technician will sign the property receipt and obtain a copy of the property receipt for the case file.

E. Once evidence is signed out it will remain in the custody of the BPL technician. The BPL technician has the responsibility to ensure that the evidence is properly secured when not being physically analyzed. Evidence lockers, refrigerators, and freezers have been provided for this purpose.

F. If the evidence container is opened and there are significant abnormalities or departures from the original logged-in descriptions, the BPL technician must record these issues on the evidence worksheet and bring them to the attention of the Evidence Custodian.

G. It may be necessary to consult the submitting law enforcement personnel or judicial representative to discuss the suitability of an item for testing if the item of evidence does not conform to procedure. This discussion shall be recorded in the case file.

H. Prior to returning the items of evidence to the Evidence Custodian, the BPL technician must update the evidence description and/or itemize the items of evidence in the records management system (RMS).

I. Any individual not qualified in the BPL protocols may not sign-out or sign-in evidence from an Evidence Custodian.

III. ITEMIZATION OF EVIDENCE SUBMISSIONS

A. All evidence will have a unique identifier which shall remain with the evidence as long as it is retained as per QAM protocols and/or State statute. The unique identifier may not be subject to confusion with other evidence.

B. Items of evidence will be itemized by group numbers.

C. Items of evidence will be itemized by alternating numbers and letters.

D. The first identifier when itemizing an item of evidence will be the group number.

E. A single submission containing multiple items of evidence will be identified by letters starting with A and then using the next consecutive letter of the alphabet.

F. Multiple items of evidence contained in a bag, envelope, or other type of packaging within the submission that has been assigned a letter will be identified numerically starting with the number one (1).

G. No dashes are to be used between the item identifiers.

H. Following the item identifiers, a dash and numbers beginning with the number one (1) will be used to indicate the number of stains tested. For example:

1. Group 1 has a pair of jeans with four stains. The evidence is identified as follows: 1-1, 1-2, 1-3, and 1-4.

2. Group 2 contains two socks each containing two stains. The Evidence is identified as follows: 2A-1, 2A-2, 2B-1, and 2B-2.

3. Group 3 contains 1 envelope with three swabs, one envelope with four swabs, and a pair of jeans with three stains. The evidence is identified as follows: 3A, 3B, 3C-1, 3C-2, 3C-3.

4. Group 4 contains one bag containing a shirt with ten stains, jeans with four stains, and a pair of sneakers, a second bag with swabs from a door knob and a third bag with a wallet containing two stains. The evidence is identified as follows:

    a. Bag #1 = 4A1-1, 4A1-2…4A1-10, 4A2-1, 4A2-2…4A2-4, 4A3, 4A4

    b. Bag#2 = 4B

    c. Bag#3 = 4C-1, 4C-2.

I. The itemized evidence must be updated in the Department's RMS.

J. The evidence identifiers listed on the evidence worksheets, on the evidence envelopes, and in the results and conclusion section of the laboratory report must be identical.

K. The evidence identifiers listed on the evidence list in the laboratory report must follow the proper formatting.

L. Any evidence retained by the BPL shall be secured in a serology bag and its contents tracked in the Department's RMS.

M. In the case of items of evidence in which it is not practical to place the unique identifier directly on the item, the unique identifier may be placed on its proximal container or an identification tag.

IV. CHAIN OF CUSTODY AND EVIDENCE STORAGE

A. The following requirements for evidence storage must be adhered to:

1. **Evidence Not in the Process of Examination**

a. Any evidence that is not in the process of examination must be stored in a manner to protect it from loss, deterioration, cross-transfer, or contamination.

b. Evidence not in the process of examination shall be stored under proper seal.

c. Evidence must be stored in a secured, limited access storage area as defined by the BPL *Methods Manual*.

2. **Unattended Evidence**

a. All evidence in the process of examination shall be maintained in a secure, limited access storage area as defined by the BPL *Methods Manual*.

b. All evidence in the process of examination may be left on the BPL technician's bench top for short periods of time (e.g. to use the restroom) unattended (refer to BPL facilities protocol for security.).

c. When appropriate, unattended evidence shall be covered with a clean bench coat or butcher paper.

d. Evidence shall not be left unattended for prolonged periods of time (e.g. over lunch, meetings, court testimony, etc.). All evidence must be secured in an appropriate storage location as defined by the BPL *Methods Manual* when unattended.

3. **Large Items of Evidence**

a. The evidence screening rooms contain lockable evidence storage lockers.

b. If an item of evidence is stored unsealed in the evidence packaging, or if left unattended, the BPL technician must place the item in the large storage lockers.

c. The BPL technician will sign out the key to the storage locker on the *Evidence Screening Room Locker Key Log* form and retain the key until the item of evidence is returned to the Evidence Custodian.

d. Once the evidence has been returned, the lab technician will sign the key back in on the *Evidence Screening Room Locker Key Log* form and submit the key into limited-access storage.

e. If the item is too large for the storage locker, it may be placed on a bench/floor in the locked Evidence Screening Room, covered with paper and initialed with the case number, date, group number, and BPL technician's initials if the evidence is left unattended.

f. The BPL technician will lock the screening room door, update the *Evidence Screening Room Door Key Log* form, and retain the key to the screening room until the evidence is returned to the Evidence Custodian.

4. **BPL technician's Workstation Refrigerators (Immediate Storage)**

a. Immediate storage shall be defined as a temporary locked storage location for the items of evidence awaiting analysis.

b. Once analysis is completed items of evidence stored in immediate storage shall be returned to the Evidence Custodian.

c. Each BPL technician will be assigned his/her own locked refrigerator.

d. Items of evidence stored in immediate storage shall be limited to items that require refrigeration.

e. These items may include but are not limited to fetal tissue, urine samples, *Sexual Battery Evidence Collection Kits* (SBECK) with liquid blood or urine samples, bones or tissue from the Medical Examiner's Office, and purple top tubes of blood.

f. Every effort shall be made by the BPL technician to limit the length of time evidence is placed in immediate storage.

g. All evidence located in immediate storage shall remain in the BPL technician's custody in the RMS.

5. **BPL technician's Workstation Evidence Lockers**

a. Each BPL technician will be assigned his/her own locked evidence locker.

b. Evidence to be screened including but not limited to SBECKs (without liquid blood or urine), oral standards, clothing or touch evidence will be stored in each BPL technician's evidence locker.

c. The physical item or the original packaging may be stored in the BPL technician's secured evidence locker from the time the evidence is signed out from the Evidence Custodian until the laboratory report is issued.

d. All evidence located in the BPL technician's workstation evidence locker shall remain in the BPL technician's custody in the RMS.

e. Bloodstain cards or swabbings may be dried overnight in the BPL technician's laboratory bench hood (See BPL facilities protocol for laboratory security).

6. **Short-Term Storage**

a. Short-term storage shall be defined as a short-term storage location for serology bags of active cases currently in progress.

b. Stain cuttings, bloodstain cards, hairs, etc. retained in the BPL must be placed in a Tyvek envelope ("serology bag") labeled with a barcode (a new submission number will be assigned for the barcode in the RMS), biohazard label, start date, serology bag number, BPL technician's initials, case number.

c. An evidence voucher will be created in the RMS for each serology bag.

d. A copy of the barcode(s) included on each serology bag will be placed inside the appropriate case file or notebook.

e. The serology bags may be stored in the lab technician's evidence refrigerator while the case is active or until transferred to long-term storage.

f. Once analysis has been completed and a report is ready to be written, the serology bag must be sealed and submitted into evidence. An evidence voucher will be provided for each serology bag.

7. **Long-Term Storage**

a. Once analysis is completed, any original evidence not retained by the BPL and/or the original packaging will be returned to an Evidence Custodian.

b. Long-term storage shall be defined as a long-term storage location for serology bags of cases where analysis has been completed. The serology bag must be transferred to an Evidence Custodian and the chain of custody updated in the RMS before a report may be released.

V. EVIDENCE SUBMITTAL

A. General Evidence

1. Once the analysis is complete, the BPL technician will place the evidence in its original package, if possible, and seal the entire opening with evidence tape.

2. The outside packaging must also include the item identifiers.

3. The evidence tape must have the BPL Technician's initials, identification number and the date of examination. All writing will be half on the tape and half on the packaging.

4. This packaging will be signed over to an Evidence Custodian as per protocol.

5. The evidence in a case must be returned to its appropriate storage location before a laboratory report can be released.

6. It is the responsibility of the BPL technician returning the item of evidence to have the property receipt signed by the Evidence Custodian receiving the evidence.

7. One copy of the property receipt is returned to the BPL technician for inclusion with the laboratory case file.

8. Slides or serology bags that remain in the BPL will remain in the custody of the BPL technician until transferred to an appropriate storage location.

9. Stain cuttings or swabs will be placed in envelopes containing the case number, group number, BPL technician's initials, and date.

10. The stain cutting envelopes will be placed in serology bags and will remain in the BPL technician's evidence locker until transferred to long-term storage.

B. **Serology Evidence**

1. The following guidelines are procedures for appropriate electronic evidence tracking in the BPL. These guidelines include protocols for maintaining chain of custody in the RMS tracking system:

a. Evidence is signed out from an Evidence Custodian into the BPL technician's custody.

b. Evidence is screened by the BPL technician and swabs or cuttings from items of evidence are kept in labeled coin envelopes. This may include but is not limited to dried bloodstain cards, vaginal swabs, oral swabs, swabs of "touch evidence", and stain cuttings from items of clothing, etc.

c. Other items are returned to their original container, along with any empty envelopes or portions of the evidence from which cuttings were taken.

d. Touch evidence samples (e.g. swabs from door knobs, steering wheels, etc.) may be retained by the BPL technician even if serological testing was not conducted.

e. The BPL technician will place all retained evidence into a serology bag labeled with the BPL case number, serology bag number, start date, and BPL technician's initials.

f. A biohazard label will be affixed to the serology bag.

g. In the RMS, the BPL technician will perform the following to create a voucher for each split item:

i. On the main screen, click on the Voucher icon.

ii. On the "P/E Voucher" window, click "Add".

iii. Type in case number in the "Case #" field.

iv. On the "Confirm Case" window, click "Yes".

v. The name of the BPL technician that collected the split item shall be input into the "Case Offcr", "Seized By", "Stored By" and "Submitted By".

vi. Fill in the date and time that the split item was collected in the corresponding fields.

vii. The "Seized Location" field shall read "BPL 6500".

viii. The "Local Status" field shall read "Hold".

ix. Click "Save".

x. On the "Enter property data now?" window, click "Yes".

xi. On the "Property List" window, click "Add".

xii. Assign the item number for the evidence being added under "Grp/Bag #".

xiii. The "Item #" is always "1".

xiv. Choose the "Classification" of the item in the dropdown menu.

xv. In the unlabeled field to the right of the "NCI code" field, type in the item description.

xvi. After inputting all item information including description, click "Save".

xvii. To add additional items to the same Evidence Voucher, click "Add". Click "Save" after each item is input. A maximum of 5 items may be included on each voucher.

xviii. When all items to be included in the serology bag have been added to the Evidence Voucher, click "Exit". Once exited, no other items may be added to the voucher.

xix. On the "P/E Voucher" window, click the Printer icon to print the Evidence Voucher.

xx. To close the "P/E Voucher" window, click "Exit Srch", and then click "Exit".

h. In the RMS, the BPL technician will perform the following steps to accept an item as evidence:

i. Click "PE Tran" (Property Evidence Transfer System).

ii. Under "Vouchers", find the appropriate case number under and highlight by clicking.

iii. Click "Assign PR #".

iv. "Building" shall read "BPL".

v. "Room" shall read "BPL".

vi. "Bin" shall read the active bin number.

vii. Click "Assign Storage"

viii. Click "Print Label" to print barcode. Print three barcodes.

ix. Click "Accept"

x. On the "Would you like to print a receipt?" window, click "No".

xi. If there are no more vouchers to process, a "Notice" window appear, click "OK".

xii. If there are no vouchers to process, clicking the "PE Tran" icon will cause a notice to appear explaining this.

i. The BPL technician will print three barcode labels.

i. The first barcode must be affixed to the serology bag

ii. The second barcode must be affixed to the inside of the case file folder or notebook

iii. The third barcode must be affixed to the voucher.

j. Only five items will be added to a serology bag as per Boca Raton Police Services Department Evidence Guidelines.

k. In the RMS, the BPL technician will perform the following to document Chain of Custody:

i. Click on the "Evidence" icon

ii. Click "Search"

iii. Type in Case Number

iv. Click “View”

v. Select voucher from list

vi. Click on “Custody”

vii. Click “Add”

viii. Type in the date and time

ix. Transaction Type: “O”

x. Purpose: BPL

xi. Released By: Type in BPL Technician name

xii. Released To: Type in BPL Technician name

xiii. Click “Save”

xiv. If more than one item, click “Apply To” and select item

xv. Do not print signature form.

l. The BPL technician will return the items of evidence only after the serology bag has been created and the evidence itemized in the RMS. A written laboratory report does not need to be created at this time.

m. The serology bag’s final location will be in an Evidence Room at the Boca Raton Police Services Department. If additional analysis is needed, the serology bag can be retrieved from an Evidence Custodian.

VII. TRANSFERRING ITEMS OF EVIDENCE FROM BOCARATON POLICE SERVICES DEPARTMENT EVIDENCE ROOM TO THE BPL FOR ADDITIONAL ANALYSIS

A. The BPL technician will retrieve the evidence (serology bag, etc.) from an Evidence Custodian.

B. The chain of custody must be updated in the RMS to reflect the transfer of the evidence to the care and custody of the BPL technician.

C. The evidence will be considered an active case in progress and will be stored accordingly.

D. Upon completion of the analysis, the evidence will be sealed, dated, initialed, and returned to an Evidence Custodian. The chain of custody must be updated in the RMS.

VIII. SUBMISSION OF EVIDENCE TO BOCA RATON POLICE SERVICES DEPARTMENT BIOLOGICAL PROCESSING LABORATORY (BRPSD BPL)

A. The *Serology Request Form* will be e-mailed to the BRPSD BPL.

B. Upon approval of a case, evidence will be submitted to BRPSD BPL Evidence Room as per the BRPSD Evidence and Property Submission Guide.

IX. SUBMISSION OF EVIDENCE TO PALM BEACH COUNTY SHERIFF'S OFFICE FORENSIC BIOLOGY UNIT

A. The *DNA Request Form* will be submitted to the Palm Beach County Sheriff's Office Forensic Biology Unit (FBU) through the Forensic Communication Environment.

B. Upon approval of a case by the FBU Evidence Coordinator, the BPL serology bag will be transferred to the Palm Beach County Sheriff's Office by a BRPSD Evidence Custodian.

X. SUBMISSION OF EVIDENCE TO VENDOR LABS

A. Compliance with QAS standard 17.1.1 through 17.6.2.1 is not required when the BPL outsources an analysis using a technology that the BPL is not qualified to perform or when the BPL will not take ownership of the data.

B. The BPL will submit evidence to an approved vendor as defined in the BPL QA/QC protocol.

1. **Submission of Evidence – Court Order**

   a. The BPL technician must review and comply with the court order and notification of the court order shall be verified with the appropriate judicial representative.

   b. Evidence shall be sent to an accredited laboratory or an approved vendor.

   c. It is advised that court orders include an "accreditation" statement.

   d. Communication between the BPL technician and the requestor must be recorded and shall include the necessary approvals such as the approval to consume a sample during analysis.

   e. If the request is made prior to the BPL technician conducting analysis (e.g. the evidence has not been signed out from Evidence), law enforcement personnel or the State Attorney's office shall directly forward the item(s) to an accredited laboratory.

   f. Where appropriate, the entire submission and original evidence packaging may be submitted to the vendor laboratory.

g. All evidence must be shipped to the accredited laboratory or approved vendor by an approved overnight courier.

h. Chain of custody records must be completed and a copy maintained with the case record.

i. The package must contain the chain of custody records for the receiver to complete and return. This information must be maintained in the case file.

j. A copy of the overnight express mailing label must be retained in the case file.

k. The BPL technician must record that the vendor laboratory is aware that polymerase chain reaction (PCR) products must not be returned to BRPSD. DNA extracts are to be submitted to BRPSD upon completion of the analysis.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

EVIDENCE/WORK PRODUCT HANDLING

I. INTRODUCTION:

A. This protocol outlines how evidence or work product is to be handled in the Biological Processing Laboratory (BPL).

B. This protocol applies to all BPL personnel.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the Material Safety Data Sheets (MSDS) provided by the manufacturer, and observe all relevant precautions. All reagents that have MSDS information should be handled according to the manufacturer's guidelines. The hazard code label must be placed on each reagent used in the laboratory.

E. All samples must be handled aseptically using best laboratory practices in order to prevent contamination.

F. Biological samples have the potential to transmit a variety of infectious agents and care should be taken to avoid direct contact with the specimen being evaluated.

G. Never pipette by mouth.

H. Clean the work surface at regular intervals between screening of each evidentiary item.

I. Reagents that can cause chemical burns, or are known mutagens, teratogens, or carcinogens, should be handled in a manner to prevent personal contact.

III. SAVING/PRESERVING BIOLOGICAL EVIDENCE:

A. Evidence samples must be handled at a separate time than the reference samples.

B. One item at a time will be examined at either the BPL technician's bay workstation or the Screening Room.

C. All items of evidence must be labeled with the case number, BPL technician's initials, and the item number.

D. After identification and labeling of the item, documentation of appropriate testing results, package seals, submission number, and any informative description such as where the biological evidence was found is recorded on the *Evidence Summary Worksheet* form and/or the *Data Sheet* form. This is usually accomplished by drawing, taking a photograph/digital image, or describing the evidence stain.

E. Upon identification of biological evidence, if possible, a portion of the stain will be left on the item.

F. The excised item will be placed in an appropriately labeled paper container (e.g. coin envelope), with case number, BPL technician's initials, date, item number, and any additional identifier that may be helpful.

G. All DNA extracts will be stored in perpetuity.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

EVIDENCE EXAMINATION

I. INTRODUCTION

A. This protocol is to establish a guideline for the location and collection of body fluid stains and hairs from evidence submitted to the Biological Processing Laboratory (BPL).

B. This protocol is to be used by all qualified analytical personnel in the BPL.

C. Screening evidentiary materials may take place in the BPL proper at the BPL technician's individual bay area, the BPL Screening Room, crime scene, or wherever the evidence may be.

II. SAFETY

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the Material Safety Data Sheet (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. SCREENING PROTOCOL

A. BPL technicians shall Work only one case and one item at a time to avoid handling errors, examine evidence for any visible stains, using visual, tactile and/or ALS examinations.

B. Evidence shall be marked for identification. Mark the item with the case number, group number, and the BPL technician's initials in an obvious but unobtrusive area.

C. Assign each stain with a number and note appropriately on evidence worksheets; a diagram or description of the stain and its location may also be noted.

D. Observe any possible hairs/fibers (or other trace evidence) and if removed from the item, package and label accordingly; record the approximate number when possible on the *Evidence Summary Worksheet*. The abbreviation "PH/F" may be used when recording observing hair/fiber on a piece of evidence.

E. Place the collected hairs/fibers in a sealed (seals must contain BPL technician's initials and date) and labeled envelope (case number, submission number, BPL technician's initials, date, contents) and place securely with the evidence such as stapling, tying or taping the envelope to the item. At the BPL technician's discretion, the hairs/fibers may be retained in the serology bag.

F. Observation of possible hair/fiber from a piece of evidence must be recorded on the laboratory report.

G. Test suspected stains with the appropriate presumptive test reagent. If a positive result is obtained, collect the stain and package and label accordingly. If a stain is presumptive negative, note this on the *Evidence Summary Worksheet*; it will be the BPL technician's discretion as to whether or not the tested area is collected. Repackage and seal the evidence in its original packaging if possible. Mark outside packaging for identification with case number, submission number and BPL technician's initials. The seal should be initialed and dated.

H. If the evidence could not be returned to the original packaging, repackage the evidence and label the seal accordingly. The original packaging must be attached to the new packaging.

I. The collected stains should be placed in a serology bag labeled with the BPL case number, serology bag number, date, BPL technician's initials, biohazard label, and appropriate submission barcode(s). The evidence will be stored in the BPL technician's evidence locker.

J. Once analysis is completed and a report is ready to be written, the serology bag must be sealed and submitted to the BRPSD BPL Evidence Room. An evidence voucher will be provided for each serology bag.

K. All evidence stains will be kept in perpetuity.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

PRESERVATION OF EVIDENCE

I. INTRODUCTION:

A. This protocol provides guidelines for recording and preserving casework evidence.

B. This protocol is to be used by all qualified personnel in the Biological Processing Laboratory (BPL).

C. The BPL technician may take custody of casework evidence for the purpose of preserving the evidence in order to maintain its integrity.

D. Working from one case and one evidentiary sample at a time to eliminate handling errors, the samples will be handled in the appropriate designated areas of the BPL.

E. The transfer of evidence must be updated in the Department's records management system.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn..

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the Material Safety Data Sheet (MSDS) provided by the manufacturer and observe all relevant precautions.

III. BLOOD:

A. The BPL technician will obtain custody of the Palm Beach County Medical Examiner's Office samples or casework samples by following proper evidence and chain of custody protocols.

B. This includes obtaining the evidence from the Evidence Custodian, documentation of packaging and package contents, and adhering to all safety and biohazard rules.

C. All packaged items, blood tubes, bloodstain card, and envelopes will be labeled with the case number, submission number, and BPL technician's initials and date where appropriate.

D. The preparation of a bloodstain card will be conducted in a hood. Only one tube of blood and bloodstain card will be prepared at a time.

E. Upon completion of the bloodstain card, the blood tube and all packaging materials will be sealed, initialed, and dated.

F. The case number must be present on all packaging.

G. The BPL technician will be responsible for returning the evidence to the Evidence Custodian.

IV. SWABS:

A. Transfer swabs from original packaging to a coin envelope.

B. Label the coin envelope with case number, date, BPLtechnician's initials, description of contents, and submission number.

C. The original packaging should be sealed and sent back to the Evidence Custodian.

V. STAIN CUTTINGS:

A. Areas of interest from evidence that are cut out of the original evidence will be placed into a coin envelope that is labeled with case number, submission number, BPL technician's initials, date, and description of contents.

B. The original packaging should be sealed and submitted to the Evidence Custodian.

VI. *SEXUAL BATTERY EVIDENCE COLLECTION KIT* MICROSCOPE SLIDES:

A. Microscope slides may be submitted in the *Sexual Battery Evidence Collection Kit* (SBECK).

B. The presence of microscopic slides in a SBECK must be listed on the *Evidence Summary Worksheet*.

C. The slides will be prepared for microscopic analysis as per protocol including writing the BPL case number, BPL technician's initials, group number, and source of slide material. The slide will then be processed using the Christmas Tree Staining procedure as described.

D. All slides will be retained and stored in a secured lock box at the BPL technician's laboratory bay, unless requested for analysis by the Palm Beach County Sheriff's Office Forensic Biology Unit.

VII. SWABBING ITEMS FOR BIOLOGICAL MATERIAL:

A. Evidence such as blood, semen, and "touch" DNA (epithelial cells) will be obtained from swabbing areas that are to be analyzed for biological evidence.

B. To transfer the biological evidence to a swab, perform the following:

1. Use a sterile cotton swab and moisten with one or two drops of sterile distilled water or autoclaved water.

2. Swab area, applying pressure. If the item/stain is large enough, use at least two swabs to collect the biological evidence. The item/stain should be swabbed while holding both swabs at the same time. If the item/stain is not large enough to use multiple swabs at the same time, swab the item/stain with one swab at a time. The BPL technician will use their discretion to determine how many swabs are used to collect the biological evidence.

3. Swabs may be allowed to dry in the hood prior to preservation.

4. When appropriate, scraping the item/stain may be used in the place of swabbing. To scrape an item of evidence use a sterile scalpel for each item/stain to be collected.

5. Place the scrapings into a Whatman®-type filter paper.

6. Place the swabs or scrapings into a coin envelope labeled with case number, submission number, BPL technician's initials, date, and description of item/stain swabbed or scraped.

7. The number of swabs for an item/stain will be listed on the BPL *Evidence Summary Worksheet* Form.

C. If other evidence such as hair, debris, etc. is packaged with the evidence, it will be noted and labeled appropriately.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

LUMINOL

I. INTRODUCTION:

A. This protocol is to provide a process for determining a pre-presumptive indication of blood.

B. This protocol is to be used by all qualified analytical personnel assigned to the Biological Processing Laboratory (BPL).

C. Luminol is a solution derived from chemicals that are known irritants. Proper safety and protective equipment should be used at all times.

D. Presumptive and/or confirmatory testing for bloodstains must be completed on all marked stains/areas where appropriate.

II. SAFETY

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the Material Safety Data Sheets (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. REAGENT PREPARATION

A. The Luminol working solution is prepared by combining 1 tube of Luminol reagent with 237 mL (8 oz.) deionized or autoclaved water.

B. Gently mix the powder and water with a gentle swirling action in order to avoid mixing an excessive amount of air into the solution.

C. Decant the liquid into a spray bottle and allow the solution to sit for a few minutes before use.

D. The mixed solution should be used within 20 – 30 minutes.

IV. VERIFYING CONTROLS

A. A positive and negative control must be tested prior to using the Luminol solution.

B. Use a penny for the positive control and piece of paper (filter or butcher paper may be used) for the negative control.

C. In a dark room, apply a fine mist to the positive (penny) and negative (paper) controls.

D. A blue fluorescent chemiluminescence observed on the penny and no chemiluminescence observed on the paper indicates the test has worked properly.

E. Record the control results on the BPL *Evidence Summary Worksheet* form in the remarks section as "Luminol" "+√" and "-√".

V. PRE-PRESUMPTIVE SCREENING OF BLOOD ON EVIDENCE

A. In a dark room, apply a fine mist (over-spraying may dilute existing bloodstains) to the item or area of interest and mark the areas/stains that chemiluminesce.

B. Record results on the BPL *Evidence Summary Worksheet* form in the remarks section.

C. The presence of chemiluminesce will be recorded as "luminol +".

D. The absence of chemiluminesce will be recorded as "luminol -".

VI. REFERENCES

A. Gaensslen RE. Sourcebook in Forensic Serology, Immunology, and Biochemistry. U.S. Government Printing Office: Washington, D.C., 1983:113-114.

B. Laux DL. Effects of Luminol on the Subsequent Analysis of Blood Stains. *J Forensic Sci* 1991; 39(5):1512-1520.

C. Gross AM, Harris KA, Kaldun GL. The Effect of Luminol on Presumptive Tests and DNA Analysis using the Polymerase Chain Reaction. *J Forensic Sci* 1999; 44(4): 837-40.

D. Lytle LT, Hedgecock DG. Chemiluminescence in the Visualization of Forensic Bloodstains. *J Forensic Sci* 1978; 23(3):550-62.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

OMNIPRINT 1000A

I. INTRODUCTION:

A. This protocol is to provide the process for determining a pre-presumptive indication of the presence of biological stains.

B. This protocol is to be used by all qualified analytical personnel assigned to the Biological Processing Laboratory (BPL).

C. Characteristic fluorescence from the OmniPrint 1000A does not establish the presence of biological stains, but is a simple, non-destructive screening technique. The fluorescence is used as a guide to localize areas for a more detailed examination; it does not have any value by itself in the identification of any specific body fluid stain.

D. Presumptive and/or confirmatory testing for biological stains must be completed on all marked stains/areas when appropriate.

E. The BPL technician must record the amount of time the OmniPrint 1000A is used (minutes or hours) in the OmniPrint 1000A Light Log book.

II. SAFETY:

A. This system should only be operated by qualified personnel in the designated area of the BPL.

B. Do not leave equipment unattended while lamp is operational.

C. The light emitted from the Omniprint 1000A and from the end of the light guide is very intense and direct viewing could potentially cause permanent damage to the unprotected eyes.

D. Under no circumstances shall the eyes be exposed to the direct beam produced by the Omniprint 1000A.

E. Proper eye protection must be worn at all times. The appropriate colored goggles must be worn.

F. Remove all unnecessary reflective surfaces from the examination area. Avoid looking at reflections in shiny spherical objects such as door knobs, watch crystals, jewelry, window panes, mirrors, or any other surface that may reflect light.

G. Care must be taken to avoid exposure to direct beam from the OmniPrint 1000A. BPL technicians must wear appropriate protective clothing such as gloves, face masks, lab coats, bouffant caps, and closed toe and closed back shoes when operating the OmniPrint 1000A.

H. Total skin exposure to direct light beam should not exceed 12 minutes per day and 4 minutes of continuous exposure**.**

I. All individuals within 15 meters radius of the Omniprint 1000A should have appropriate eye and skin protection to avoid exposure from passing glimpses and from highly reflective surfaces.

J. Keep all flammable materials at least 6 inches away from direct light output and the ends of the fiber optic cable.

III. TURNING ON THE OMNIPRINT:

A. Open the lid and check to see that both switches are in the "Off" position**.**

B. Insert liquid light guide or fiber optic cable into aperture. For use without a light guide, a direct output optical piece is provided that allows direct illumination from the system when a large area must be examined.

C. Plug the unit into a three-prong, grounded outlet.

D. Turn on the power rocker switch. The switch will light, and the fan will begin to operate. Turn lamp switch "on". The lamp should light within a few seconds.

E. Allow the system to warm up for at least 5 minutes before use.

F. If the lamp fails to ignite within two minutes and a ticking noise is heard, turn the system "off". Refer to Omniprint 1000A Operating Instructions page 6 for troubleshooting.

IV. SELECTION OF COLORED GOGGLES AND WAVELENGTH:

A. Select wavelength by turning the knob marked "Wavelength Selector", a green light will appear next to the selected wavelength.

B. Goggles are worn to protect the eyes from the intense light emitted from the OmniPrint 1000A.

C. Each color of goggle is designed for use with particular wavelengths. Choose the goggle that eliminates the excitation light and allows fluorescence through.

D. Select the appropriate colored goggles depending on the wavelength used. Typically, 450 nm is used with the yellow goggles, and either 485 nm or 525 nm is used with the orange goggles for pre-presumptive screening. However, any combination of filter and goggles denoted in the table below may be used if they yield the expected results for the positive and negative Alternative Light Sources (ALS) controls.

Goggles to use for eye protection				
Filter	**Clear**	**Yellow**	**Orange**	**Red**
White	Not Applicable			
450		☐		
485			☐	
525			☐	
530			☐	
570				☐

V. PRE-PRESUMPTIVE SCREENING AND DETECTION:

A. Pre-presumptive screening and detection results are dependent on color, pattern, texture, and condition of the article being examined.

B. VERIFYING CONTROLS

1. Verify controls prior to use as follows:

   a. Positive (+) controls include dried stains of semen, saliva, and urine.

   b. Fluorescence using the appropriate wavelength and colored goggles indicates the instrument is working properly.

   c. Negative (-) controls include a negative sample (fabric swatch) including no biological stains and a dried bloodstain.

   d. No observed fluorescence for the negative controls using the appropriate wavelength and colored goggles indicates the instrument is performing properly.

   e. Controls must be verified using the same goggles/filter combination that is used in the evidence screening.

2. Place a check mark next to ALS "+"and "-" on the BPL *Evidence Summary Worksheet* form and indicate the ALS (e.g. PL400 or OP), wavelength, and colored goggles used.

3. If a different set of goggles, wavelength, or type of cable source (other than the Liquid Light Guide) are used, the goggle color, wavelength, and cable source must be noted on the BPL *Evidence Summary Worksheet* form.

C. SCREENING ITEMS OF EVIDENCE

1. Shine light on the item of evidence and mark probative areas/stains that fluoresce. Use caution as the liquid light guide gets extremely hot.

2. Indicate fluorescence for a stain by writing "+" in the ALS column of the BPL *Evidence Summary Worksheet* form.

3. If no fluorescence is observed, the area/stain does not need to be marked.

4. Indicate the absence of fluorescence for an area/stain by writing "ALS -" in the remarks section of the BPL *Evidence Summary Worksheet* form.

VI. SHUTTING DOWN THE OMNI-PRINT 1000A:

A. Push the lamp rocker switch "off".

B. Wait for the system to cool down (approximately 5 minutes).

C. Turn off power rocker switch.

D. Remove the light guide/fiber optic cable by gently pulling the cable out of the aperture.

E. Allow the guide to cool and then place in the storage bag. Do not wrap or coil the liquid light guide too tightly as this can permanently damage the cable**.** The liquid light guide is very fragile and will damage if it is kinked, stepped on, bent, pulled, or frozen.

VII. REFERENCES:

A. Gaensslen RE. Sourcebook in Forensic Serology, Immunology, and Biochemistry. U.S. Government Printing Office: Washington, D.C., 1983. pg 178.

B. Omniprint 1000A - Operating Instructions- Melles Griot.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

POLILIGHT PL400

I. INTRODUCTION:

A. This protocol is to provide the process for determining a pre-presumptive indication of the presence of biological stains.

B. This protocol is to be used by all qualified personnel assigned to the Biological Processing Laboratory (BPL).

C. Characteristic fluorescence from the Polilight PL400 does not establish the presence of biological stains, but is a simple, non-destructive screening technique. The fluorescence is used as a guide to localize areas for a more detailed examination; it does not have any value by itself in the identification of any specific body fluid stain.

D. Presumptive and/or confirmatory testing for biological stains must be completed on all marked stains/areas when appropriate.

E. The BPL technician must record the amount of time the Polilight PL400 is used (minutes or hours) in the *Polilight PL400 Light Log Book*.

II. SAFETY:

A. This system should only be operated by qualified personnel in the designated area of the BPL.

B. Do not leave equipment unattended while lamp is operational.

C. The light emitted from the Polilight PL400 and from the end of the light guide is very intense and direct viewing could potentially cause permanent damage to the unprotected eyes.

D. Under no circumstances should the eyes be exposed to the direct beam produced by the Polilight PL400.

E. Proper eye protection must be worn at all times. The appropriate colored goggles must be worn.

F. Remove all unnecessary reflective surfaces from the examination area. Avoid looking at reflections in shiny spherical objects such as door knobs, watch crystals, jewelry, window panes, mirrors, or any other surface that may reflect light.

G. Care must be taken to avoid exposure of the direct beam from the Polilight PL400. BPL technicians must wear appropriate protective clothing such as gloves, face masks, lab coats, bouffant caps, and closed toe and closed back shoes when operating the Polilight PL400.

H. Total skin exposure to direct light beam should not exceed 12 minutes per day and 4 minutes of continuous exposure**.**

I. All individuals within 15 meters radius of the Polilight PL400 should have appropriate eye and skin protection to avoid exposure from passing glimpses and from highly reflective surfaces.

J. Keep all flammable materials at least 6 inches away from direct light output and the ends of the fiber optic cable.

III. TURNING ON THE POLILIGHT PL400:

A. The Polilight PL400 has a power selection switch on the rear of the unit. 115VAC must be selected. The power selection will not be changed.

B. Ensure that the light guide is attached tightly.

C. Plug the unit into a three-prong, grounded outlet.

D. Turn on the power rocker switch (back panel). The fan will begin to operate.

E. After initial power up, the Polilight PL400 microprocessor conducts an initialization process that ensures that the filter wheel is in the correct position. This takes about 10 seconds. During this process, “tst” will be displayed in the front panel. If an internal error is detected, “err” will be displayed.

F. Allow the system to warm up for at least 5 minutes before use.

G. If the lamp fails to ignite after several attempts contact the manufacturer.

H. The default setting from power up is the 450 nm filter.

IV. SELECTION OF COLORED GOGGLES AND WAVELENGTH:

A. The two buttons on the front panel control the internal filter wheel. Press and release the left or right buttons to turn the filter wheel.

B. Goggles must be worn to protect the eyes from the intense light emitted from the Polilight PL400.

C. Each color of goggle is designed for particular wavelength cut off. Choose the goggle that eliminates the excitation light and allows fluorescence through.

D. Select the appropriate colored goggles depending on the wavelength used. Typically, 415 nm, 450 nm, or 490 nm are used with orange goggles for pre-presumptive screening. However, any combination of filter and goggles denoted in the table below may be used if they yield the expected results for the positive and negative alternative light source (ALS) controls.

Goggles to use for eye protection					
Display	**Filter**	**Clear**	**Yellow**	**Orange**	**Red**
≡≡≡	No light	Not Applicable			
≡0≡	Low White			☐	
000	White			☐	
350	UV	☐	☐	☐	☐
415	415		☐	☐	
450	450			☐	
490	490			☐	
LP1	<530	☐		☐	
505	505			☐	
530	530				☐

E. The Polilight PL400 has an automatic stand-by mode. If no user input is detected within 30 minutes the light will turn off. If left alone for another 15 minutes the lamp will shut off.

F. The Polilight PL400 may be set to standby mode at any time. In standby mode the lamp is off and the fan remains on. To go into standby mode, hold down the right hand button on the front panel for 3 seconds. To restart the lamp, hold down the same button.

V. PRE-PRESUMPTIVE SCREENING AND DETECTION:

A. Pre-presumptive screening and detection results are dependent on color, pattern, texture, and condition of the article being examined.

1. VERIFYING CONTROLS:

a. Verify controls prior to use as follows:

i. Positive (+) controls include dried stains of semen, saliva, and urine.

ii. Fluorescence using the appropriate wavelength and colored goggles indicates the instrument is working properly.

iii. Negative (-) controls include a negative sample (fabric swatch) including no biological stains and a dried bloodstain.

iv. No observed fluorescence for the negative controls using the appropriate wavelength and colored goggles indicates the instrument is performing properly.

v. Controls must be verified using the same goggles/filter combination that is used in the evidence screening.

b. Place a check mark next to ALS "+"and "-" on the BPL *Evidence Summary Worksheet* form and indicate the ALS (e.g. PL400 or OP), wavelength, and colored goggles used.

c. If a different set of goggles, wavelength, or type of cable source (other than the Liquid Light Guide) are used, the goggle color, wavelength, and cable source must be noted on the BPL *Evidence Summary Worksheet* form.

2. SCREENING ITEMS OF EVIDENCE:

a. Shine light on the item of evidence and mark the probative areas/stains that fluoresce. Use caution as the liquid light guide gets extremely hot.

b. Indicate fluorescence for a stain by writing "+" in the ALS column of the BPL *Evidence Summary Worksheet* form.

c. If no fluorescence is observed, the area/stain does not need to be marked.

d. Indicate the absence of fluorescence for an area/stain by writing "ALS -" in the REMARKS section of the BPL *Evidence Summary Worksheet* form.

V. SHUTTING DOWN THE POLILIGHT PL400:

A. Push the power rocker switch off.

B. Gently wrap the liquid light guide around cart so that the focusing optic lens is protected against damage. Do not wrap or coil the liquid light guide too tightly as this can permanently damage the cable**.** The liquid light guide is very fragile and will damage if it is kinked, stepped on, bent, pulled or frozen.

C. Do not restart the lamp for 30 seconds after shut down. Very quick turning on and off of the instrument can cause internal electrical damage to the unit.

VI. REFERENCES:

A. R.E. Gaensslen, Sourcebook in Forensic Serology, Immunology, and Biochemistry (Washington, D.C., U.S. Government Printing Office, 1983). pg 178.

B. Rofin Polilight 400 User's Manual. Version 1, 11/2001

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

PHENOLPHTHALEIN TEST

I. INTRODUCTION:

A. This protocol is to provide a presumptive indication of the presence of blood in an unknown stain.

B. This protocol is to be used by all qualified analytical personnel assigned to the Biological Processing Laboratory (BPL).

C. The Phenolphthalein test is a catalytic test for the detection of blood. It is also known as the Kastle-Meyer or KM test for presumptive blood.

D. This test is non-specific for the presence of blood.

E. A confirmatory blood test must be conducted to confirm the presence of blood. Performing a confirmatory test will be based on sample size and analyst discretion.

F. Testing vaginal (or penile), rectal, and oral swabs contained in Sexual Battery Evidence Collection Kits (SBECKs) for the presence of blood will be based on analyst discretion and the facts of the case, if known.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn. .

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the Material Safety Data Sheets (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. REAGENT PREPARATION:

A. The Phenolphthalein stock solution is purchased from MedTech Forensics, Tallahassee, Florida.

B. Prepare a working solution as follows:

1. Dilute 1:1 phenolphthalein to ethanol solution.

2. Keep these reagents at 4°C when not in use.

C. A 3% hydrogen peroxide solution is prepared by diluting the 30% hydrogen peroxide solution with deionized water (see the Hydrogen Peroxide Reagent Preparation form for formulation of 3% H_2O_2). Alternatively, 3% hydrogen peroxide may be purchased.

IV. VERIFYING THE CONTROLS:

A. The KM reagent performance must be verified before using on casework.

B. Test a known bloodstain as a positive control and a blank (filter paper) as a negative control (see interpretation of results to determine a positive and negative result).

C. Record the KM and 3% hydrogen peroxide lot number, expiration date, and the results of the controls on the BPL *Evidence Summary Worksheet* form.

D. If the controls do not give the appropriate results (pink color change for positive control, no color change for negative control) new KM reagents must be obtained and the controls retested.

V. TEST PROCEDURE:

A. Remove a small portion of the stain, scraping, or swab and place it on a piece of filter paper or absorb a portion of the stain onto a swab or a piece of filter paper moistened with deionized water.

B. Add one or two drops of the KM solution to the questioned sample or the controls. Wait 1-3 seconds. If a pink discoloration occurs, this may indicate the presence of an interfering substance and a possible false-positive reaction may occur.

C. Add one or two drops of the 3% hydrogen peroxide solution and record the results.

D. The vaginal (or penile), rectal, and oral swabs in a Sexual Battery Evidence Collection Kit will be tested for the presence of blood based on sample size, analyst discretion and the facts of the case, if known.

E. The KM test must be read immediately after the reagents are applied to the evidentiary stain.

F. Once a result is obtained, either positive or negative, it will be the analyst's discretion if the additional swabs are to be tested.

G. The result of each swab tested must be noted on the BPL *Evidence Summary Worksheet* form.

H. It is not necessary to take photographs or store the KM results.

VI. INTERPRETATION:

A. POSITIVE RESULTS:

1. A rapidly developing, bright pink color is a positive test result and indicates the presumptive presence of blood.

2. Positive results will be reported as "+" on the BPL *Evidence Summary Worksheet* form in the column labeled KM.

3. If the color change is gradual or weak, a positive result may still be reported.

4. The analyst will report this type of positive result as "v.wk +" or "wk +" on the BPL *Evidence Summary Worksheet* form in the column labeled KM.

B. NEGATIVE RESULTS:

1. A pink color may occur after 10-30 seconds. This is a normal catalytic reaction that may occur without the presence of blood. Therefore, any test read after 10 seconds should be interpreted with caution.

2. A negative result will be reported as "-" on the BPL *Evidence Summary Worksheet* form in the column labeled KM.

C. INCONCLUSIVE RESULTS:

1. Inconclusive results may be obtained when the color of the stain is the same color as the test or there appears to be interference in reading the test color change.

2. The analyst may indicate this as "INC" on the BPL *Evidence Summary Worksheet* form in the column labeled KM.

3. If discoloration occurs as the test is being conducted, there may be an interfering substance. The analyst should proceed with the test and determine if the test is truly KM presumptive positive, inconclusive, or negative.

4. If an inconclusive KM test result is obtained and enough of the sample is available, then a confirmatory test for blood must be conducted.

VII. REFERENCES:

A. Saferstein R, Lee HC. Forensic Science Handbook, Vol. I. Prentice Hall, Inc.: Englewood Cliffs, N.J, 1982. pp. 267-337.

B. Gaensslen RE. Source Book in Forensic Serology, Immunology, and Biochemistry. U.S. Government Printing Office, Washington, D.C., 1983.

C. Phenolphthalein Presumptive Blood Test. MedTech Forensics product insert.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

ABA HEMATRACE

I. INTRODUCTION:

A. This test is used to confirm the presence of blood in a stain by qualitatively detecting hemoglobin using a rapid immunoassay test.

B. This protocol is to be used by all qualified analytical personnel in the Biological Processing Laboratory as a confirmatory blood test.

C. Bloodstain extracts used in the confirmatory test may be discarded after all testing has been completed.

D. All the reagents are supplied in the *OneStep* ABAcard HemaTrace (Hemoglobin) kit, Abacus Diagnostics, West Hills, California.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

C. Before handling any chemicals, refer to the *Material Safety Data Sheet* (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. SAMPLE PREPARATION:

A. CONTROLS:

1. Each test device contains an internal control.

2. A positive blood control and a negative control (included extraction buffer) must be run along with each test series.

3. Record the *OneStep* ABAcard HemaTrace kit lot number, expiration date, pipette number, and the results of the controls on the BPL *Evidence Summary Worksheet* form by placing a check mark by the "+" and "-" controls.

B. UNKNOWN SAMPLES:

1. Place stain cutting in a labeled extraction buffer tube (supplied with test kit), vortex briefly, and incubate at room temperature for approximately thirty (30) minutes.

IV. TEST PROTOCOL:

A. Remove the test device from the sealed pouch.

B. Label the test device with the test device number, date, case number, submission number, and BPL technician's initials.

C. Add 150 μL – 200 μL of the post incubation extract to the sample well "S" of the test device.

D. Positive results can be seen as early as 2 minutes depending on the hemoglobin concentration. For negative results, wait 10 minutes to read results. Do not exceed 10 minutes for interpretation of results.

E. HemaTrace cassettes shall be discarded in appropriate biohazard container.

V. INTERPRETATION OF SAMPLES:

A. POSITIVE:

1. If there are two pink lines, one in the test area "T" and one in the control area "C", the test result is positive and indicates that the hemoglobin level is at least 0.05 μg/mL.

2. The intensity of the bands should not be compared and no quantitative interpretation should be made based on intensity differences.

3. Mark the samples as "+" on the BPL *Evidence Summary Worksheet* form in the column labeled "HB".

B. NEGATIVE:

1. If there is only one pink line in the control area "C", the test result is negative.

2. A negative test result may indicate that:

   a. No hemoglobin is present above 0.05 μg/mL

   b. A false negative due to the presence of High Dose Hook Effect resulting from a high concentration of hemoglobin in the sample. If High Dose Hook Effect is suspected, dilute the sample to 1/1000 and repeat the test according to test protocol. A new set of Positive and Negative controls must be run.

3. Mark the samples as "-" on the BPL *Evidence Summary Work*sheet in the column labeled "HB".

C. INCONCLUSIVE:

1. No pink line in the visible control area "C".

2. Repeat the test according to test protocol.

3. Mark the sample as "INC" on the BPL *Evidence Summary Worksheet* form in the column labeled "HB".

VII. INTERPRETATION OF CONTROLS:

A. The positive control device must contain a "C" and "T" line.

B. The negative control device must have no indication of a result in the "T" area.

C. If there is an indication of a result in the "T" area, then all samples and controls must be re-run.

VIII. REFERENCES:

A. Swander CJ, Stites JG. Evaluation of the ABAcard HemaTrace for the forensic identification of human blood. MAFS 1998 Annual Meeting.

B. Kristaly A, Smith DAS. Validation of the OneStep ABAcard HemaTrace for the rapid forensic identification of human blood. 1999.

C. Spear TF, Binkley SA. The HemeSelect Test: a simple and sensitive forensic species test. *J. For. Sci. Soc*. 1994; 34(1): 41-46.

D. Fernando SA, Wilson GS. Studies of the 'hook' effect in the one-step sandwich immunoassay. *J. Imm. Methods* 1992; 151(1-2): 47-66.

E. Laux DL. Effects of luminol on the subsequent analysis of bloodstains. *J. For. Sci*. 1991; 36(5): 1512-20.

F. Cox M. A study of the sensitivity and specificity of four presumptive tests for blood. *J. For. Sci.* 1991; 36(5): 1503-11.

G. Doherty PE, Mooney DJ. Deciphering bloody imprints through chemical enhancement. *J. For. Sci.* 1990; 35(2): 457-65.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

ACID PHOSPHATE TEST

I. INTRODUCTION:

A. This protocol is used to provide a presumptive indication of the presence of semen in an unknown stain.

B. This protocol is to be used by all qualified analytical personnel assigned to the Biological Processing Laboratory (BPL).

C. "Semen" is defined as a viscous whitish secretion of the male reproductive organs consisting of secretions of the testes, seminal vesicles, prostate, and bulbourethral glands that may or may not contain sperm cells.

D. The presumptive test for seminal fluid is based upon the detection of the enzyme acid phosphatase. This enzyme is not specific for seminal fluid.

E. When Acid Phosphate (AP) test results are positive the following confirmatory test sequence must be followed:

1. Microscopic examination

   a. If positive for sperm cells a PSA confirmatory test need not be conducted.

   b. If negative for sperm cells a PSA confirmatory test must be conducted

2. A decision not to conduct confirmatory tests will be based on available sample or permission of the Crime Laboratory Supervisor (CLS).

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the *Material Safety Data Sheets* (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. REAGENT PREPARATION:

A. The Acid Phosphatase reagent (AP Spot test) is purchased from the SERI Company.

B. The AP Spot Test stock reagents are stored at –20°C.

C. The AP working solution must be made fresh each day.

D. Add 0.26 grams of the AP Spot Test to 10 ml of deionized water. The reagent volume maybe reduced as long as the ratio of AP spot Test to deionized water remains constant.

E. Mix the solution thoroughly.

IV. VERIFYING THE CONTROLS:

A. The AP reagent performance must be verified before using on casework evidence.

B. Test a known semen stain as a positive control and a blank (filter paper) as a negative control (See interpretation of results for determining a positive and negative result).

C. Record the AP lot number, expiration date, and the results of the controls on the BPL *Evidence Summary Worksheet* form by placing a check mark by the "+" and "-"controls.

D. If the controls do not give the appropriate results (purple color change for positive control, no color change for negative control) the AP reagent must be remade and the controls retested.

V. TEST PROCEDURE:

A. Cut a small portion of a stain cutting or dampen a sterile swab and swab the stain.

1. If a large area needs to be screened, a technique referred to as "mapping" (dividing the whole into separate areas) may be used. Use filter paper moistened with deionized water and gently press down on the designated areas. Be sure to mark the filter paper for orientation. Deposit the AP reagent over the entire filter paper.

B. The vaginal (or penile), rectal, and oral swabs in a *Sexual Battery Evidence Collection Kit* will be tested for the presence of AP based on sample size and analyst discretion.

1. If a negative result is obtained, the analyst must continue testing remaining swabs until a positive result is obtained or all swabs have been tested. If a positive AP result is obtained it will be the analyst's discretion if the additional swabs are to be tested. The case facts may not support screening for semen, e.g. digital penetration. The analyst may want to confer with the case contact to confirm before performing further testing.

2. It must be noted on the BPL *Evidence Summary Worksheet* form the result of each swab tested.

C. It is not necessary to take photographs or store the AP results.

VI. INTERPRETATION OF RESULTS:

A. POSITIVE RESULTS:

1. If acid phosphatase is present, a purple color will appear within a short period of time (30 seconds). Weak stains may take between 1 to 3 minutes.

2. A positive reaction indicates the presumptive presence of semen.

3. A positive test result is indicated by a purple color change.

4. A positive result will be reported "+" on the BPL *Evidence Summary Worksheet* form in the column labeled AP.

5. If the color change is gradual or weak, a positive result may still be reported.

6. The analyst will report this type of positive result as "v.wk +" or "wk +" on the BPL *Evidence Summary Worksheet* form in the column labeled AP.

B. NEGATIVE RESULTS:

1. The AP test must be read within 3 minutes after the AP reagents are applied to the evidentiary stain.

2. A purple color may occur immediately or at about 3 minutes. Allowing the reaction to proceed beyond 3 minutes may elicit a purple color in the absence of semen. This is a normal catalytic reaction that may occur without the presence of semen. Therefore, any test read after 3 minutes should be interpreted with caution.

3. An indication of negative should be written as "-" on the BPL *Evidence Summary Worksheet* form in the column labeled AP.

C. INCONCLUSIVE RESULTS:

1. Inconclusive results may be obtained when the color of the stain is the same color as the test or there appears to be interference in reading the test color change.

2. The analyst may indicate this as "INC" on the BPL *Evidence Summary Worksheet* form in the column labeled AP.

3. If discoloration occurs as the test is being conducted, there may be an interfering substance. The analyst should proceed with the test and determine if the test is truly AP presumptive positive, inconclusive, or negative.

4. If an inconclusive AP test result is obtained and enough of the sample is available, then a confirmatory test for semen must be conducted.

VII. REFERENCES:

A. Saferstein R, Baechtel FS. Forensic Science Handbook, Vol. II. Prentice Hall, Inc.: Englewood Cliffs, NJ, 1988. pp. 347-390.

B. Gaensslen RE. Sourcebook in Forensic Serology, Immunology, and Biochemistry. U.S. Government Printing Office: Washington, D.C., 1983. pp 155-166.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

SEMEN AND EPITHELIAL CELL MICROSCOPY

I. INTRODUCTION:

A. This protocol is used to confirm the presence of semen or epithelial cells in a stain by microscopic examination.

B. This protocol is to be used by all qualified analytical personnel assigned to the Biological Processing Laboratory (BPL).

C. Microscopic identification of spermatozoa in a stain extract is considered confirmatory for the presence of semen.

D. The presence of epithelial cells may indicate the presence of sweat or saliva although the source cannot be confirmed.

E. The Christmas Tree Stain reagents are purchased from the SERI Company. The Christmas Tree Stain Kit contains the following, which are stored at room temperature:

1. Christmas Tree Stain A, R540

2. Christmas Tree Stain B, R540

F. Microscopic analysis of vaginal (or penile), oral, and rectal swabs contained in the *Sexual Battery Evidence Collection Kit* (SBECK) must be conducted regardless of presumptive acid phosphatase results.

G. If more than one window on the microscope slide is used per stain or more than one slide is made, all windows and slides must be analyzed for the presence of spermatozoa and/or epithelial cells and the results must be recorded. The source of the sample for each window must be noted on the slide.

H. The BPL *Evidence Summary Worksheet* form must indicate how many times a slide was generated from each sample.

I. The extraction tube may be discarded after completion of the test. Optimum DNA results are usually obtained when approximately 10 sperm cells are located on a slide.

J. All microscope slides are considered work product.

K. All slides will be retained and stored in a secured lock box at the BPL technician's laboratory bay, unless requested for analysis by the Palm Beach County Sheriff's Office Forensic Biology Unit.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn..

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the *Material Safety Data Sheets* (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. SLIDE PREPARATION:

A. Place stained material in a 1.5 ml labeled tube with a recessed cap (without recessed cap if using spin basket).

B. Add 200 µl of deionized water, vortex, and let incubate at room temperature for approximately thirty (30) minutes.

C. Punch 2-3 holes in the recessed cap, if using.

D. Remove stained material with **clean** forceps and place in recessed cap or spin basket (and place spin basket in tube).

E. Centrifuge at maximum speed for 5 minutes.

F. Pipette 2-5µl of the cellular pellet from tube on a labeled microscope slide. Slide identifiers should include case number, group number, date and initials of the technician.

G. Save the tube with the extract in case it is needed later. The tube may be discarded once the analysis has been completed.

H. Dry the cellular pellet at room temperature, in a laboratory incubator or on a heat block.

I. Place 1 drop of Christmas Tree Stain A on the residue area of the dried slide. Use a toothpick, if necessary, to spread the stain over the entire dried residue area.

J. Allow to the stain to stand for **10 minutes**.

K. Rinse Christmas Tree Stain A with methanol and allow the slide to dry.

L. Place 1 drop of Christmas Tree Stain B on slide and quickly spread to cover the whole residue area. Allow the stain to set for **only about 9 seconds** and rinse with methanol.

M. Allow the slide to dry.

N. Check the dried slide and remove all flecks of large dark residue that might prevent proper seating of the cover slip. Add Permount Solution to the residue area and allow cover slip to settle.

Avoid using too much Permount. Too much Permount will ooze out from under the cover slip and adhere to other slides when stored.

IV. MICROSCOPIC EVALUATION AND REPORTING RESULTS:

A. Place the slide on the microscope stage noting the side where the identifiers are located.

B. Use the 40x phase objective and set the sub stage condenser to correct setting for phase contrast analysis or to "0" for light microscopy analysis.

C. Scan the slide. Under light microscopy ("0" sub stage condenser) spermatozoa will appear as small ovoid or teardrop-shaped bodies with thin, thread-like tails. The posterior head and neck area will appear bright pink or magenta, while the tail will appear gray or dark green. Under phase contrast the spermatozoa head will appear lighter than the surrounding background.

D. When a suspected spermatozoon (sperm cell) is located, place it in the center of the field, if the object is a sperm cell, the coloring of the anterior head will appear white to light pink, while the posterior head and neck areas will be medium to dark magenta.

E. After completing the search for spermatozoa, the technician may grade the number of spermatozoa observed (e.g. sp+ ≤5, sp+ ≤10, sp+ ≤20, sp+ >20 etc.). The grading will be reported in the BPL *Evidence Summary Worksheet* column labeled "Microscopic". If there are only a few sperm, the coordinates should be noted on the BPL *Evidence Summary Worksheet* form in the "REMARKS" section.

F. If no sperm cells are observed, the results will be reported as "sp –" in the column labeled "Microscopic" on the BPL *Evidence Summary Worksheet* form.

G. Epithelial cells appear as large "fried eggs" with their cell mass giving the appearance of green tissue paper and their nuclei colored light pink to dark magenta or even brown.

H. After completing the search for spermatozoa the technician may grade the epithelial population based on the number of cells observed (e.g. EC- = No Epithelial cells, EC+ = 1-10, EC++ = 10-20, EC+++ = greater than 20).

I. Microscope slides are considered work product.

V. REFERENCES:

A. Saferstein R, Baechtel F.S. Forensic Science Handbook, Vol II. Prentice Hall, Inc: Englewood Cliffs, NJ, 1988. pp. 347-392.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

ABA PSA SEMEN

I. INTRODUCTION:

A. This protocol is used to confirm the presence of semen in a stain by qualitatively detecting p30 using a rapid immunoassay test.

B. This protocol is to be used by all qualified analytical personnel assigned to the Biological Processing Laboratory (BPL).

C. This protocol may be used to confirm the presence of semen in the absence of sperm cells or when the morphology of a sperm cell observed is questionable.

D. All the reagents are supplied in the *OneStep* ABAcard p30 kit, Abacus Diagnostics, West Hills, California.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the *Material Safety Data Sheets* (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. SAMPLE PREPARATION:

A. CONTROLS:

1. Each test device contains an internal control.

2. A positive semen control and a negative control (water) must be run with each test series.

3. Record the *OneStep* ABAcard p30 kit lot number, expiration date, pipette number, and the results of the controls on the *BPL Evidence Summary Worksheet* form by placing a check mark by the "+" and "-" controls.

B. UNKNOWN SAMPLES:

1. The unknown sample is the 200 µl extract supernatant from the BPL *Semen and Epithelial Cell Microscopy* protocol.

IV. TEST PROTOCOL:

A. Remove the test device from the sealed pouch**.**

B. Label the test device with the test device number, date, case number, submission number, and BPL technician's initials.

C. Add 200 µl of the extract to the sample well "S" of the test device.

D. Read the results at 10 minutes. Positive results can be seen as early as 1 minute depending on the p30 concentration. For negative results, wait the full 10 minutes. Do not exceed 10 minutes for interpretation of results.

E. The p30 cassettes shall be discarded in appropriate biohazard container.

V. INTERPRETATION OF SAMPLE RESULTS:

A. POSITIVE:

1. If there are two pink lines, one in the test area "T" and one in the control area "C", the test result is positive and indicates that the PSA level is at least 4 ng/ml.

2. The intensity of the bands should not be compared and no quantitative interpretation should be made based on intensity differences. To report the positive result, mark the appropriate samples as "+" on the *BPL Evidence Summary Worksheet* in the column labeled "p30".

B. NEGATIVE:

1. If there is only one pink line in the control area "C", the test result is negative.

2. A negative test result may indicate that:

   a. No PSA is present above 4 ng/ml.

b. False negative due to the presence of a high dose hook effect resulting from a high concentration of PSA in the sample.

c. If high dose hook effect is suspected, dilute the sample to 1/1000 and repeat the test according to test protocol. The appropriate controls must be run with the test.

3. To report the negative result, mark the appropriate samples as "-" on the *BPL Evidence Summary Worksheet* in the column labeled "p30".

C. INCONCLUSIVE:

1. No pink line is visible in the control area "C".

2. Repeat the test according to test protocol.

3. Mark the samples as "INC" on the *BPL Evidence Summary Worksheet* in the column labeled "p30".

VI. INTERPRETATION OF CONTROL RESULTS:

A. The positive control device must contain a "C" and "T" line.

B. The negative control device must have no indication of a result in the "T" area.

C. If there is an indication of a result in the "T" area of the negative, all samples and controls must be re-run.

VII. REFERENCES:

A. Willot GM. Frequency of azoospermia. *For. Sci. Int*. 1982; 20(1): 9-10.

B. Sensabaugh GF. Isolation and characterization of a semen-specific protein from human seminal plasma: a potential new marker for semen identification. *J. Forensic Sci*. 1978; 23 (1): 106-115.

C. Stamey TA, Teplow DB, Graves HC. Identity of PSA purified from seminal fluid by different methods: comparison by amino acid analysis and assigned extinction coefficients. *Prostate.* 1995; 27(4): 198-203.

D. Graves HCB, Sensabaugh GF, Blake ET. Postcoital detection of a male-specific semen protein. Application to the investigation of rape. *New. Engl. J. Med.* 1985; 312(6): 338-343.

E. Hochmeister M, Rudin O, Borer UV, Gehrig C, Kratzer A, Dirnhofer R. Evaluation of prostate specific antigen (PSA) membrane tests for the forensic identification of semen. *J. For. Sciences*. 1998. Submitted.

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G. Sokoll LJ, Chan DW. Prostate-specific antigen. Its discovery and biochemical characteristics. *Urologic Clinics of North America*. 1997; 24(2): 253-9.

H. Jimenez-Verdejo A, Osuna E, Garcia-Olivares E, Luna A. Study of the enzymatic activity of GGT, LDH, PAP and PSA in semen stains: application to age calculation. *For. Sci. Int.* 1994 68(1): 7-15.

I. Armbruster DA. Prostate-specific antigen: biochemistry, analytical methods, and clinical application. *Clinical Chemistry*. 1993; 39(2): 181-95.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

EQUIPMENT

I. INTRODUCTION:

A. The purpose of this protocol is to outline the safe handling, transport, maintenance, and performance check requirements for the Biological Processing Laboratory (BPL) equipment.

B. The BPL capital equipment used in the laboratory is recorded in the Department's RMS Quartermaster Inventory and Equipment Module.

C. Any BPL equipment that can affect the results of an examination and any associated software will be uniquely identified (e.g. serial number, asset tag, bay number).

D. Maintenance and performance verification will be conducted as defined in this protocol.

E. The BPL shall follow the procurement procedures of the City of Boca Raton.

F. All equipment utilized by the BPL has been selected based on available customer support and the equipment/manufacture's ability to provide quality results during testing procedures.

G. The requirements of an approved vendor are listed in the BPL Quality Assurance and Control protocol (QA/QC).

H. All computers and equipment must use the approved energy sources and testing process in an environmentally approved condition under appropriate lighting. All environmental, energy and lighting issues must be reported to CSO assigned to facility maintenance.

I. Unless noted in the *Biological Processing Laboratory Methods Manual*, all computers used in the BPL are maintained by the Information Technology Services Division.

J. Staff must be notified by the Crime Lab Supervisor (CLS) or designee of all computer and equipment issues that affect the testing procedures and if casework must be halted. Information Technology personnel must be contacted for computer related issues. All equipment that is taken out of service must be clearly identified with a label and appropriate staff notified. The CLS will determine if the extent of the equipment issue warrants examination of previous tests conducted on the equipment.

K. All BPL equipment implemented for use on casework must be validated in accordance with Standard 8 of the Quality Assurance Standards for Forensic DNA Testing Laboratories. The validation studies will take into account the correctness of use and reliability of results and will include consideration of human factors, accommodation and environmental conditions, the type of equipment, measurement traceability where appropriate and the handling of casework samples.

L. Equipment must undergo calibration or performance checks to verify it meets testing specification requirements and complies with all relevant standard elements.

M. When equipment undergoes maintenance, upgrades, or calibration the BPL must verify through a performance check, when appropriate, that the equipment meets testing specifications before use on casework evidence. An equipment maintenance, service, and performance check log is maintained in the Department's RMS Quartermaster Inventory and Equipment Module.

N. The performance check is conducted on equipment using a defined procedure as outlined in this protocol, depending on the equipment, which will provide the confidence necessary to approve the use of the equipment for casework evidence.

O. The CLS or his/her designee is responsible for safe guarding all equipment and software programs from adjustments which may invalidate the specifications for testing.

P. All up-to-date instructions on the use and maintenance of equipment including any relevant manuals provided by the manufacturer will be readily available for use by the approved laboratory personnel. All operation parameters integral to operational testing may also be found in the equipment's user manual or analytical procedure.

Q. Upon completion of calibration by an approved vendor, all equipment must contain a calibration identifier which includes last calibration date and/or expiration criteria when a recalibration is due.

R. The BPL will retain all equipment maintenance records, performance check data, and calibration records in perpetuity. Maintenance records, performance check data, and calibration records may be archived once the equipment is no longer utilized by the BPL or with approval of the CLS. Archived equipment maintenance records, performance check data, and calibration records will be stored in a BPL limited access storage location.

II. SAFETY

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn.

B. No open toe or open back shoes are to be worn.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the *Material Safety Data Sheets* (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. THERMOMETERS

A. NIST-traceable thermometers will either be replaced once certification has expired or will be sent out for re-certification once a year to an approved vendor.

B. Thermometers that are out of range or broken should be discarded in the sharps container and replaced with a new thermometer.

IV. BALANCES

A. Annual calibration of balances is conducted by an approved vendor. Records of the yearly calibration will be stored in the appropriate QA/QC notebook.

B. The BPL weights are performance checked against NIST-traceable weights annually. Records for the in-house performance check will be stored on the BPL *Annual NIST Traceable Weight Performance Check Log* form.

C. The tolerance of the individual in-house weights is listed on the BPL *Annual NIST Traceable Weight Performance Check Log* form.

D. The NIST-traceable weights are sent out for recertification every three years to an approved vendor. Records for the recertification of the NIST-traceable weights are maintained in the appropriate QA/QC notebook.

E. Balances are checked against known weights before each use *or* once per day. This data is recorded on the appropriate balance and stored in the Reagent Preparation Room.

F. If a balance is out of tolerance, the CLS must be notified and the appropriate corrective actions taken and recorded.

G. A cloth and soapy water are sufficient for cleaning the weighing pan and balance housing. ***Do not*** use strong solvents to clean the balances.

H. Use a small brush to remove any foreign material from the balance.

V. REFRIGERATORS AND FREEZERS

A. The temperature of the laboratory's refrigerators and freezers are performance checked against a NIST-traceable thermometer once a month. The temperature comparisons must be recorded on the appropriate BPL *Temperature Log* form and stored in the appropriate QA/QC notebook.

B. The temperatures of the refrigerators and freezers are logged each day of use *or* once per day on the appropriate temperature log. The temperature logs are stored in the appropriate QA/QC notebooks.

C. If the temperature of a refrigerator or freezer is out of range, the CLS must be notified. All temperature adjustments or root cause analysis must be recorded on the temperature log or in the appropriate QA/QC notebook.

VI. LABORATORY HOODS

A. Annual maintenance will be conducted on the laboratory's free standing ductless hoods by an approved vendor once a year.

B. The annual maintenance includes filter replacement and monitoring of airflow.

C. All maintenance records will be stored in the appropriate QA/QC notebook.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

REAGENTS

I. INTRODUCTION:

A. This protocol outlines the procedures for purchasing reagents, identifying critical reagents and test kits, preparation of reagents, and quality assurance and quality control (QA/QC) of critical reagents and test kits.

B. This protocol applies to all Biological Processing Laboratory (BPL) personnel.

II. PURCHASING REAGENTS:

A. Reagent purity needs shall be noted for each chemical substance.

B. Reagent Grade: Defines chemicals with the highest quality for laboratory use.

C. It is recommended that once a reagent has been purchased and meets the laboratory's QA/QC requirements that the same chemical supplier be used. This is not mandatory.

D. The BPL shall follow the procurement procedures of the City of Boca Raton.

III. REAGENT RECORDS:

A. All BPL *Reagent and Chemical Inventory Logs* are located in the Reagent Preparation Room in labeled notebooks.

B. All stock containers must be labeled with the identity of the reagent, date the reagent was received, initials of the BPL technician logging in the reagent, and where appropriate the expiration date (manufacturer's expiration date or date determined by the BPL personnel).

C. Each reagent must be catalogued in the *Reagent or Chemical Inventory Log* notebook on the appropriate form.

D. For each reagent prepared for use in the BPL, a *Reagent Preparation Log* must be completed. The *Reagent Preparation Log* contains the formulation of the reagent.

E. All reagent preparation sheets must be stored alphabetically in the *Reagent Preparation Log* notebook.

F. All in-house reagents must contain a label with the following: identity of the reagent including the concentration of the reagent if applicable, lot number (the lot number is the date of

preparation), initials of the BPL technician preparing the reagent, the expiration date, and the hazard code.

G. All reagents must be stored at the manufacturer's recommended temperatures.

H. The refrigerator and freezer numbers listed on the *Reagent Preparation Sheets* and/or the *Chemical Inventory Logs* refer to the number assigned to the refrigerator or freezer.

I. The BPL will maintain all *Reagent Preparation Logs, Chemical Inventory Logs,* and performance check data for all critical reagents and test kits in perpetuity. The *Reagent Preparation Logs, Chemical Inventory Logs*, and performance check data for critical reagents and test kits may be archived with the approval of the Crime Lab Supervisor (CLS) or once the chemical, reagent, or test kit is no longer utilized. Archived *Reagent Preparation Logs, Chemical Inventory Logs*, and performance check data for critical reagents and test kits may be stored in a BPL's limited access storage location.

IV. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

C. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

D. Before handling any chemicals, refer to the Material Safety Data Sheet (MSDS) provided by the manufacturer, and observe all relevant precautions.

V. PREPARATION OF REAGENTS:

A. All *Reagent and Chemical Inventory Logs* are located in the Reagent Preparation Room in labeled notebooks.

B. All appropriate information must be filled out on the appropriate *Reagent Preparation or Chemical Inventory Log*.

C. All reagents must be prepared in the designated area of the laboratory.

D. Use deionized (dH_2O) water directly from the purifier on all chemical reagents.

E. All micropipetting must be done with the designated pipette and barrier tips.

F. Always use the pipette that dispenses liquids closest to the desired volume.

G. All pipettes used in reagent preparation must be wiped down with a minimum of 10% bleach solution, a Hype-Wipe bleach towel, or an isopropanol pad prior to and after use by a BPL technician.

VI. BLEACH SOLUTION:

A. The BPL uses a minimum of 10% bleach solution for cleaning and decontaminating laboratory work areas and equipment when appropriate.

B. The BPL purchases 10% bleach in pre-made stock bottles.

C. The BPL dilutes household bleach to make 30% working bleach solution. The expiration date of the household bleach is one year from the date of receipt. The expiration date of the household bleach must be placed on the bottle.

D. The formulation of the 30% working bleach solution is documented on the *30% Bleach Reagent Preparation* form located in the Reagent Preparation Room.

E. The 30% working bleach solution must be made fresh weekly.

F. The expiration date of the 30% bleach solution must be placed on the spray bottles.

VII. CRITICAL REAGENTS:

A. Critical reagents are determined by empirical studies or routine practice to require testing on established samples **before** use on evidentiary samples or casework reference samples by the CLS or his/her designee.

B. The following reagents or test kits have been defined as critical reagents by the BPL personnel:

1. OneStep ABA Card PSA (p30) Test

2. OneStep ABA Card Hematrace Test

3. Christmas Tree Stain (Stains A and B)

C. Approval of the QA/QC results of all critical reagents must be obtained by the Quality Assurance (QA) Officer prior to use on evidentiary samples or casework reference samples.

D. The following procedures for each critical reagent must be followed in order to determine the acceptable range of results, address unacceptable data, record QA/QC results, and record the approval or rejection of quality control data.

E. Verification of critical reagents specifications for use on casework must be recorded in the QA/QC Critical Reagents and Test Kits Notebook.

F. ONESTEP ABA CARD PSA (P30) TEST:

1. A positive (dried semen stain) and negative (dH_2O) control will be analyzed for each lot number as per protocol.

2. Acceptable QA/QC results for the positive control are achieved when the control line and test line produce a solid pink band that stretches the length of the control and test line area.

3. Acceptable QA/QC results for the negative control are achieved when the control line produces a solid pink band that stretches across the length of the control line area and no pink band is produced in the test line area.

4. Unacceptable QA/QC results for the positive control are no pink band or a partial pink band obtained in the control and/or test line area.

5. Unacceptable QA/QC results for the negative control are no pink band or a partial pink band obtained in the control line area and/or a pink band or partial pink band obtained in the test line area.

6. If an unacceptable QA/QC result is obtained for the positive control, the QA/QC will be repeated a second time using a larger cutting of the dried semen stain and/or a dilution(s) of the "extracted" semen stain to rule out technician error and/or possible high dose hook effect.

7. If an unacceptable QA/QC result is obtained for the negative control, the QA/QC will be repeated a second time to rule out technician error.

8. If the lot produces unacceptable QA/QC results after a second test the QA Officer must be notified.

9. If a lot fails to produce acceptable QA/QC results, the QA Officer or his/her designee must contact the manufacturer in order to attempt to resolve the unacceptable QA/QC results and/or request a replacement of the lot in question.

10. Failure of the QA/QC for the lot in question will be logged in the Critical Reagents and Test Kits QA/QC Notebook.

11. Once a lot passes QA/QC and is approved for use on evidentiary samples or casework reference samples by the QA Officer, the date the QA/QC was approved will be placed on the test kits and logged in the Critical Regents and Test Kits QA/QC Notebook.

12. All QA/QC test results must be recorded, initialed by the individual conducting the QA/QC, initialed by the QA Officer, and placed in the QA/QC Critical Reagents and Test Kits Notebook.

G. ONESTEP ABA CARD HEMATRACE TEST:

1. A positive (dried bloodstain) and negative (extraction buffer) control will be analyzed for each lot number as per protocol.

2. Acceptable QA/QC results for the positive control are achieved when the control line and test line produce a solid pink band that stretches the length of the control and test line area.

3. Acceptable QA/QC results for the negative control are achieved when the control line produces a solid pink band that stretches across the length of the control line area and no pink band is produced in the test line area.

4. Unacceptable QA/QC results for the positive control are no pink band or a partial pink band obtained in the control and/or test line area.

5. Unacceptable QA/QC results for the negative control are no pink band or a partial pink band obtained in the control line area and/or a pink band or partial pink band obtained in the test line area.

6. If an unacceptable QA/QC result is obtained for the positive control, the QA/QC will be repeated a second time using a larger cutting of the dried bloodstain and/or a dilution(s) of the "extracted" bloodstain to rule out technician error and/or possible high dose hook effect.

7. If an unacceptable QA/QC result is obtained for the negative control, the QA/QC will be repeated a second time to rule out technician error.

8. If the lot produces unacceptable QA/QC results after a second test the QA Officer must be notified.

9. If a lot fails to produce acceptable QA/QC results, the QA Officer or his/her designee must contact the manufacturer in order to attempt to resolve the unacceptable QA/QC results and/or request a replacement of the lot in question.

10. Failure of the QA/QC of the lot in question will be logged in the Critical Reagents and Test Kits QA/QC Notebook.

11. Once a lot passes QA/QC and is approved for use on evidentiary samples or casework reference samples by the QA Officer, the date the QA/QC was approved will be placed on the test kits and logged in the Critical Reagents and Test Kits QA/QC Notebook.

12. All QA/QC test results must be recorded, initialed by the individual conducting the QA/QC, initialed by the QA Officer, and placed in the Critical Reagent and Test Kit QA/QC Notebook.

H. CHRISTMAS TREE STAIN (STAINS A AND B):

1. For the Christmas Tree Stain, a slide created from a buccal swab will be analyzed for each lot number as per protocol.

2. Acceptable QA/QC results are attained when microscopic analysis of the slide under the 40x phase objective reveals cellular material in which the cytoplasm of a cell appears greenish in color while the nucleus appears light pink to dark magenta or even dark brown.

3. Unacceptable QA/QC results are indicated when microscopic analysis of the slide under the 40x phase objective reveals little to no staining of cellular material, a slide completely saturated with one color, or if cellular material is not present on the slide.

4. If unacceptable QA/QC results are suspected, a second buccal swab slide will be created and analyzed as per protocol to rule out technician error during slide preparation.

5. If the lot produces unacceptable QA/QC results after a second slide is analyzed the CLS must be notified.

6. If a lot fails to produce acceptable QA/QC results, the CLS or his/her designee must contact the manufacturer in order to attempt to resolve the unacceptable QA/QC results and/or request a replacement of the lot in question.

7. Failure of the QA/QC for the lot in question will be logged in the appropriate QC notebook.

8. Once a lot passes QA/QC and is approved for use on evidentiary samples by the CLS or his/her designee, the date the QA/QC was approved will be placed on the reagents and logged in the appropriate QC notebook.

9. All QA/QC test results must be recorded on a BPL *Evidence Summary Worksheet*, initialed by the individual conducting the QA/QC and the CLS and placed in the appropriate QC notebook.

VIII. EXPIRATION DATES:

A. All non-critical reagents may be used beyond the manufacturer's expiration date. Non-critical reagents used beyond manufacturer's expiration date will be determined by:

1. The BPL's expiration date assigned based on accumulated empirical data or weekly QA/QC performance checks. Weekly QA/QC performance checks will be run until the lot is consumed or until enough empirical data is accumulated to assign a BPL determined expiration date. Assignment of expiration dates will be with the approval of the QA Officer or his/her designee.

2. The sample type chosen and the criteria for acceptable QA/QC results will be determined by the QA Officer or his/her designee on a case by case basis. Every effort should be made to keep the sample type used for weekly QA/QCs consistent.

3. All QA/QC data for expired reagents will be documented in the Expired Non-critical Reagents QA/QC Notebook. The reagent name, manufacturer's expiration date and lot number must be recorded on the QA/QC documentation.

B. Reagents that have no expiration date provided by the manufacturer and in-house reagents will be assigned an expiration based on empirical data.

C. Expiration dates for in-house reagents, or manufactured reagents that require reconstitution or dilution will be based on the assigned expiration date of the chemical or reagent that expires first.

D. All individual chemical and reagent expiration dates will be recorded on the appropriate case file worksheet or electronic log.

IX. LOT NUMBERS:

A. All individual chemical and reagent lot numbers will be recorded on the appropriate case file worksheet or electronic log.

B. Individual reagents or test kit components that do not have a lot number separate from the kit lot number will have the kit lot number recorded on the appropriate case file worksheet or electronic log.

C. Kit lot numbers and their respective components will be recorded in the Critical Reagents and Test Kits QA/QC notebook.

D. The lot number for in-house reagents, any chemical or reagent that has been reconstituted or diluted (e.g. Phenolphthalein, 3% H_2O_2, AP, Luminol) will be the date that the reagent was made, reconstituted, or diluted.

E. All other individual chemical or reagent lot numbers will be listed as the manufacturer's lot number.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

BALANCES

I. INTRODUCTION:

A. The purpose of this protocol is to provide general operating instructions for the Denver MAXX Balance.

II. SAFETY:

A. Personal protection equipment including safety glasses, gloves, face masks, bouffant caps, and laboratory coats must be worn when conducting this procedure.

B. No open toe or open back shoes are to be worn.

C. Make sure the surrounding laboratory bench area and balances are clean before and after use.

D. Paper waste must not come in contact with biohazard material if discarded into garbage containers.

E. Before handling any chemicals, refer to the *Material Safety Data Sheet* (MSDS) provided by the manufacturer, and observe all relevant precautions.

III. WEIGHING FUNCTION:

A. Press the On/Off button to turn power on. The balance will perform a self-test.

B. The balance must be performance checked against known weights before each use or once per day. The performance check results are recorded on the *Balance Performance Check Log* form.

C. Place a weigh boat or paper on the pan. The weight of the container will be displayed. Press the “Zero” button. The display will read 0.0. The balance is ready to weigh the sample.

D. Add the sample to be weighed to the weigh boat or paper.

E. The net weight of the sample is displayed.

F. To clear the zero value, remove the weigh boat from the pan and press the “Zero” button.

G. Press the “On/Off” button to turn power off.

IV. CALIBRATION/SPAN ADJUSTMENT

A. Calibration is recommended after initial installation and each time the balance is moved.

B. Press the “On/Off” button to turn power on. The balance will perform a self-test.

C. To start the calibration, press the “Cal” button. The preset calibration weight is displayed without the weight unit.

D. To select a different calibration weight value, press the “F” button repeatedly.

E. To start the calibration/span adjustment, press the “Enter” button.

F. Place the required calibration weight on the balance. The readout stops flashing if the weight is applied within the defined time limit and tolerance. If the weight value is accepted, the display stops flashing and the stability symbol will appear on the display.

G. Remove the calibration weight. The calibration/span adjustment has been completed.

H. Press the “On/Off” button to turn power off.

V. REFERENCES

A. Denver Instrument Operating Manual for the Denver MAXX Balance.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BOCA RATON POLICE SERVICES DEPARTMENT

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

PIPETTE LABELING AND TRACKING

I. INTRODUCTION:

A. The purpose of this protocol is to outline how micropipettes are named in the Biological Processing Laboratory (BPL) for quality assurance and quality control (QA/QC) purposes.

II. LABELING:

A. All micropipettes that undergo an annual in-house performance check must be identified and labeled as follows (Room.Carousel#.Pipette#).

1. The rooms in which micropipettes are located will be designated as follows:

   L#= Laboratory Bay and Bay Number (e.g. L1)

   R= Reagent Preparation Room

2. The carousel containing the micropipette must be labeled with the designated room code and the carousel number (e.g. L1.2).

3. The micropipettes contained within a carousel will be designated as follows:

   1= 10 µl

   2= 20 µl

   3= 200 µl

   4= 1000 µl

B. Examples of a properly identified and labeled pipette are:

   L2.1.1 = Laboratory Bay #2, Carousel #1, 10 µl pipette

   R.2.3 = Reagent Preparation Room, Carousel #2, 200 µl pipette

C. An example of a properly identified and labeled carousel are:

L1.1 = Laboratory Bay #1, Carousel #1

D. All micropipettes must be located in the appropriate room and carousel based on the identification present on the pipette label.

II. TRACKING:

A. The micropipettes used to prepare and/or aliquot reagents will be tracked on the appropriate *Reagent Preparation Log*, case file worksheet or electronic log.

Approved:

_____ **Dated: _____**

Daniel C. Alexander
Chief of Police

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

PROFICIENCY TESTING

I. INTRODUCTION:

A. Proficiency tests are used as a tool to assess the technician's ability to determine factual information from physical evidence. The tests can also be designed to determine the Biological Processing Laboratory (BPL) technician's ability to establish accurate and sound conclusions. Proficiency testing aids in the assurance of the quality of the BPL technician's case test results.

B. Proficiency test samples may be obtained from an external agency and/or intra-laboratory using blind, re-examination, or known standards technique.

C. Proficiency test samples will be assigned to the technician by the Crime Lab Supervisor (CLS) or the technician assigned as BPL Quality Assurance Officer (QAO). The proficiency test will be treated as a routine case and all testing, review, and non-conformance procedures must be followed.

D. Due dates must be indicated and must be met. Extensions may be granted as per the Quality Assurance Manual (QAM).

E. The BPL technician must fill out the vendor data sheets as directed by the test instructions and follow the same format for establishing a case file as they would actual case samples.

F. Each year the technicians assigned to the Biological Processing Laboratory will be required to take one (1) serology proficiency test.

G. For the purposes of tracking compliance with the annual proficiency testing requirement, the BPL will use the received date to document when the proficiency test is performed.

H. The proficiency test result vendor data sheets, original notes, data, and other documentation will be retained in a permanent file by the QAO or CLS.

I. BPL technician proficiency test records will be maintained by the QAO or CLS in a secured location.

J. In addition to the QAM requirements, the BPL shall maintain the following records for proficiency tests:

1. Name of test provider

2. The test set identifier

3. Identity of the BPL technician and other participants, if applicable

4. Date of analysis and completion

5. Copies of all data and notes supporting the conclusions

6. The proficiency test results

7. Any discrepancies noted

8. Review process has been conducted as per BPL records protocol

9. Corrective actions taken

K. The technical and administrative review of an external proficiency must be conducted by an individual not currently taking the same proficiency, e.g. the BPL technician is not on the same proficiency test cycle.

L. Following successful completion of training, competency, and mock trial, a technician must conduct an external proficiency within one year of initiating casework analysis.

M. The CLS will notify the BPL technician if the proficiency was satisfactory or unsatisfactory.

N. In the event a discrepancy occurs in a proficiency test result, the guidelines defined in the QAM will take effect.

O. All discrepancies/errors and subsequent corrective actions shall be documented.

P. Administrative errors and corrective actions, as applicable, shall be documented.

Q. The BPL shall use an external proficiency test provider that is in compliance with the current proficiency testing manufacturing guidelines established by the American Society of Crime Laboratory Directors/ Laboratory Accreditation Board.

R. Proficiency vendor results and notification of results must be kept in perpetuity. All other documents associated with proficiency tests will be retained as per the QAM. If there has been a non-conformance associated with proficiency, all documents must be retained in perpetuity.

S. The CLS may archive proficiency documents off site when a BPL technician leaves the employment of the agency or when additional space is required to house current proficiency documents.

II. SEROLOGY PROFICIENCY:

A. The BPL technician must conduct all available serological testing protocols used on casework evidence.

B. To satisfy the proficiency testing requirements for bloodstains, the BPL technician must conduct a presumptive Kastle-Meyer (KM) test and a confirmatory ABA OneStep Hematrace (Hb) Test. All appropriate controls must be utilized.

C. To satisfy the proficiency testing requirements for semen, the BPL technician must conduct a presumptive Acid Phosphatase (AP) test, a confirmatory microscopic slide examination, and a confirmatory ABA OneStep PSA (p30) test. All appropriate controls must be utilized. A positive control for a microscopic examination (e.g. a microscope slide containing sperm cells) must be utilized and documented on the *BPL Evidence Summary Worksheet* form.

III. PROFICIENCY TESTS FOR TECHNICAL REVIEWERS:

A. Technical Casework Review will include a thorough review of bench notes, data, drawings, photographs and other documents that form the basis for the conclusions.

B. The technician conducting the technical/administrative casework review must be proficient in the BPL technical protocols in order to ensure compliance with all discipline procedures and/or protocols, correct conclusion(s), reporting procedures and evidence handling policy and procedures. The CLS is responsible for documenting the BPL technicians who are qualified to perform technical and administrative reviews for serology.

C. At a minimum, the individual conducting and signing the technical review must be or have been a case working technician in the discipline or testing method being reviewed. The technical reviewer must have passed a competency test in the testing method. This does not necessarily mean laboratory bench work has been conducted during the training phase of a method.

D. In the event a discrepancy occurs in a proficiency test result, the guidelines defined by the QAM will take effect.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

BIOLOGICAL PROCESSING LABORATORY METHODS MANUAL

SAFETY

I. INTRODUCTION:

A. The purpose of this protocol is to provide guidance to laboratory personnel in the Biological Processing Laboratory (BPL) with regard to safety.

B. This protocol shall apply to all personnel assigned to the BPL.

C. The BPL must adhere to the policies and procedures listed in the City of Boca Raton Safety Manual, the City of Boca Raton Bloodborne Pathogen Exposure Control Plan, and the BPL Chemical Hygiene Plan.

D. All new staff members, interns, visiting scientists and volunteers must be trained in BPL safety procedures.

II. RESPONSIBILITY FOR SAFETY

A. The primary responsibility for safety must remain with each individual.

B. Management has the responsibility to offer a safe environment and the means for maintaining a safe work area.

C. The Crime Lab Supervisor (CLS) carries the responsibility for compliance with safety regulations for the BPL and all staff.

D. The technician assigned as BPL Safety Officer shall monitor operations for safety, advise management on safety matters and in general, serves as a focus for the safety concerns of the staff. Some of the duties and responsibilities of the BPL Safety Officer are as follows:

1. Periodically review safety protocols and update as new information or circumstances warrant.

2. Oversee the maintenance of general safety equipment such as fire extinguishers, safety showers, and eyewash stations.

3. Assists the CLS in training personnel in safe procedures, safe operation, and the use of personal safety equipment.

4. Monitors fire drills and emergency and disaster drills.

5. Investigates accidents, at the direction of management, and recommends corrective measures.

6. Monitors and oversees the disposal of hazardous waste.

7. Monitors storage, labeling, and use of hazardous chemicals.

8. Maintains safety related files, such as information on waste disposal, *Material Safety Data Sheets* (MSDS), and lists of hazardous chemicals.

III. SAFE WORKING ENVIRONMENT

A. There shall be no eating or drinking within the laboratory working areas.

B. Personal protection equipment such as safety glasses, gloves, face masks, bouffant caps, lab coats, etc., must be used when working with potentially hazardous procedures, conditions, chemicals, or ultraviolet light.

C. No open toe or open back shoes are allowed..

D. Always use a lab hood when potentially hazardous aerosols, solvents, dust, etc. can be involved in a mechanical or chemical procedure.

E. Mouth pipetting is strictly forbidden.

F. Keep workbenches clean and orderly and free of unnecessary chemicals and apparatus.

G. Keep all hoods orderly and clean.

H. Discard all chipped or cracked glassware in the appropriate container.

I. Keep routes to exits free of impediments or obstructions.

J. All spills must be cleaned up as soon as possible.

K. All BPL evidence is to be considered a potential biohazard and should be treated as such.

L. All waste from the BPL instruments used for testing specimens is considered a potential biohazard and must be discarded into a biohazard container.

M. Any biological specimens to be destroyed must be discarded into plainly marked biohazard containers.

IV. PERSONAL SAFETY EQUIPMENT

A. **Safety Glasses** - Safety glasses must be worn whenever a hazardous condition exists. Eye glasses for corrective vision may be worn with the appropriate safety glasses.

B. **Gloves** - Either nitrile or latex gloves are to be worn at all times whenever a potentially infective biohazard agent is being handled and when conducting any type of evidence screening or serological analysis within the laboratory.

C. **Face Masks -** Face masks must be worn at all times when conducting any type of evidence screening or serological analysis within the laboratory.

D. **Bouffant Caps** - Bouffant caps must be worn at all times when conducting any type of evidence screening or serological analysis within the laboratory.

E. **Respiratory protection** - Each technician is assigned their own respirator that is NIOSH approved. All personnel using respirators will undergo mandatory respirator training and fit test on a yearly basis.

V. GENERAL SAFETY EQUIPMENT

A. Each individual should be familiar with the location and use of the following:

1. **Fire Extinguisher** - All fire extinguishers in the BPL will be clearly marked and easily accessible by all personnel.

2. **Safety Shower** - The safety shower located in the BPL will be clearly marked and easily accessible by all personnel.

3. **Eyewash Fountain or Station** - All eyewash fountains or stations will be clearly marked and easily accessible by all personnel.

4. **Spills** - Spill control materials are available for any spills that should take place. They are prominently displayed for easy recognition within the laboratory.

5. **Ventilation** - Hoods are central to the basic safety of any laboratory.

a. **Lab Hoods -** Must be used whenever any toxic or chemicals with toxic vapors are used, when any noxious item is to be opened or examined, or when opening tubes of blood.

b. The hood should have proper airflow to keep noxious odors and vapors confined.

c. The area within the hood should be kept clean and neat.

d. The protective shields should operate properly to provide safe protection.

VI. DISPOSAL OF WASTE

A. CHEMICAL WASTE

1. All wastes derived from chemical procedures involving disposal of chemicals should be washed down the sink with copious amounts of water when appropriate.

2. All chemical waste requiring special disposal will be stored in proper containers until a disposal waste company pick-up.

B. BIOHAZARD WASTE

1. Biohazard waste is to be disposed of in special containers, clearly labeled as either biohazard waste or biohazard sharps. The biohazard waste is to be sealed in the appropriate containers. A date must be placed on the container when brought into the lab. The biohazard containers must be used to discard any potential biohazard item. Full biohazard containers will be properly secured until monthly biohazard company pick-up. The following is to be considered biohazard waste:

   a. Blood contaminated test tubes, pipette, pipette tips, wipes, and gloves

   b. Blood serum and cells

   c. Semen

   d. Saliva

   e. Vaginal secretions

   f. Tissues from all sources

   g. Sample cups, trays, or anything that comes into contact with body fluids

   h. Gloves

   i. Paper towels, Hype-Wipe towels, or isopropyl alcohol pads used to decontaminate laboratory surfaces or equipment.

C. GENERAL WASTE:

1. This is the waste not covered under any of the above.

2. **Paper waste** must not come in contact with biohazard material if discarded into garbage containers.

D. BIOHAZARD WASTE:

1. A signed record is kept of all waste. A manifest is prepared at the time of collection. A copy of the manifest records will be maintained for a minimum of two years.

VII. STORAGE OF CHEMICALS

A. Chemicals must be stored in the specified areas.

B. Acids must be separated from alkalis; oxidants from reductants; etc.

C. Acids should be stored in such a manner that if the container was broken or leaked, the acid would be contained.

D. Explosive and flammable solvents must be stored separately.

E. A chemical inventory will be maintained.

F. All reagents (chemical mixtures) that are prepared in the laboratory must be labeled in accordance with the general BPL guidelines.

VIII. GLASSWARE SAFETY

A. Cracked or chipped glassware should never be used for any type of analysis. It should be discarded promptly upon discovery into the broken glassware container.

B. Glass chemical or reagent bottles shall be placed in the red chemical transport container when being transported through the laboratory.

IX. GENERAL HOUSEKEEPING

A. Workbench surfaces must be cleaned with at a minimum 10% bleach solution each day of use.

B. Laboratory floors should be cleaned thoroughly at least once a week.

C. Sinks should be free of residue and kept clean so as not to be a breeding site of germs or residual chemicals that might interact harmfully.

X. GENERAL EQUIPMENT

A. Centrifuges must be kept clean both inside and outside. Any residue on the inside of the centrifuge should be regarded as contaminated and treated as such. The centrifuge should be cleaned the day of use with ethanol or wiped with an isopropyl alcohol pad. Centrifuge rotors should be cleaned with ethanol or wiped with an isopropyl alcohol pad.

B. Test tube racks should be cleaned with either at a minimum 10% bleach or ethanol after use.

C. Pipettes should be cleaned as per protocol by rinsing with ethanol, isopropyl alcohol pad, at a minimum 10% bleach solution, or Hype-Wipe bleach towels.

D. Refrigerators and freezers should be cleaned with at a minimum 10% bleach solution when appropriate.

XI. CLEANING SPILLS

A. All spills should be cleaned immediately.

B. All spills are to be cleaned up according to the chemical or reagent's MSDS sheet.

C. Wear appropriate protective equipment and clothing.

XII. FIRST AID KITS

A. First aid kits are available in the BPL.

B. Kits should be inventoried and resupplied at least twice per year.

XIII. INSPECTIONS

A. Chemical inspections/inventories should be performed on a regular basis to ensure laboratory safety.

B. Safety equipment needs to be inspected periodically to ensure their proper functioning.

C. A complete safety inspection will be conducted ***at least once annually*** by the BPL Safety Officer or his/her designee. If there are any safety violations, the BPL Safety Officer will confer with the CLS or designee for proper resolution.

D. General housekeeping should be done on a regular basis to provide for a healthy laboratory environment. Infectious agents are opportunistic and must be guarded against through proper sanitary habits.

Approved:

_____ **Dated:** _____

Daniel C. Alexander
Chief of Police

Administrative abbreviations are used for documenting case acceptance and priortization and for documenting phone conversations with law enforcement on the phone log or on the Serology request form. Administrative abbreviations are not to be used on any analytical worksheet.

Abbreviation	**Translation**
ASLT	Assault
ACC	Accident
AGG	Aggravated
ANM	Animal Attack
AOD	Assist other department
AR	Armed
ASA	Assistant State Attorney
ASN	Arson
ATT	Attempted
B	Burglary
BE	Breaking/entering
BK	Bank
BT	Battery
CAR	Crimes involving a vehicle
CCF	Carrying a Concealed Firearm
CHA	Child Abuse
CHEM	Chemical(s)
CM	Criminal Mischief
D	Drug
D/S	Deputy sheriff
DI	Death Investigation
DUI	Driving under the influence
DV	Domestic Violence
ESC	Escape
FEL	Felony
FG	Forgery
FP	Found Property
FRD	Fraud
FRE	Fire
GT	Grand theft
GTA	Grand theft auto
H	Homicide
HI	Home Invasion
INFO	Information
JSA	Juvenile sexual assault
K	Kidnapping
LL	Lewd acts or Lewd and lascivious
LM	Left Message

LP	Loitering, Prowling
MAL	Malicious Mischief
MOU	Memorandum of understanding
PAT	Paternity
PO	Purchase order
RB	Robbery
RA	Resisting arrest
SA	Sexual Assault
SAO	State Attorney's Office
SHTG	Shooting
SI	Suspicious Incident
STB	Stabbing
STLK	Stalking
SWT	Search warrant
T	Theft
TDM	Throwing Deadly Missiles
TRSP	Trespassing
VDL	Vandalism
VH	Vehicle Homicide
VM	Voicemail
VMM	Voicemail message
VYR	Voyeurism
W	Weapon

Note: The foregoing abbreviations are independent of upper or lower case and may be combined to generate new abbreviations (i.e. RGTFNS, LFNS, WK +). Customary scientific and mathematic abbreviations (<, >, #, MSDS, O2, H20, etc.) are considered common knowledge and are not oncluded here.

Technical abbreviations are referenced in the BPL protocols and may be used to document observations, procedure, or case notes on analytical worksheets or logs.

Abbreviation	**Translation**
-	Negative
~, approx, ca	Approximately
+	Positive
ALS	Alternative light source
AMT	Amount
AP	Acid phosphatase
L#	Laboratory Bay number
B/T	Between
BC	Buccal collector
BK	Back
BLD	Blood
BLK	Black
BLS	Blood like substance
BP	Brown paper
BPL	Biological Processing Laboratory
BPLMM	Biological Processing Laboratory Methods Manual
BRPD	Boca Raton Police Department
CF	Centrifuge
CIG	Cigarette, Cigarette butt
CON	Conical Tube
CONT	Containing
CON'T	Continued
CTR	Center
CTRL	Control
DH2O	Distilled or purified water
Dil	Dilute
DISC	Discoloration, discolored
DJJID	Department of Juvenile Justice Identification
DOB	Date of Birth
DOC	Department of Corrections
DRS	Driver's Side
EC	Epithelial cells
ENV	Envelope
ETOH	Ethanol
EVID	Evidence
EXP	Expiration date
EXT	Exterior
F	Front
FB	Forensic Biology
FBI	Federal Bureau of Investigation

FBU	Forensic Biology Unit
FL	Fluoroscein
FNC	Fingernail clippings
FNS	Fingernail scrapings
FSD	Foresnic Science Division
FZR	Freezer
GTB	Gray top tube of blood
HB	Blood Confirmation
HBK	Heat Block
HOSP	Hospital
HRS	Hours
I/O	Inside out
INT	Interior
INV	Inventory
KM	Kastle-Meyer
L	Left
LIMS	Laboratory Information Management System
LIQ	Liquid
LLG	Liquid light guide
LN	Lot number
LT	Light
MEO	Medical Examiner's Office
MFG	Manufacturer
Micro	Microscope, Microscope slide
MIN	Minute
ml	Milliliter
MNL	Main lab
N/C	Not collected
N/E	Not examined
N/O	Not observed
NA	Not applicable
NAD	No apparent discoloration
NEG	Negative
NIST	National Institute of Standards and Technology
NR	No Result
NT	Not tested
O/N	Overnight
OBSV	Observed
OP	Omni Print
OSS	Off-site storage building
OTCC	Opened to check contents
P#	Pipette
P/S	Passenger side
PB	Paper bag

PBSO	Palm Beach County Sheriff's Office
PH/F	Possible hair/fiber
PHC	Pubic hair combing
photo	Photograph, picture
PKG	Package
PL	Plastic
PL400	Rofin Polilight 400
PLB	Plastic bag
POS	Positive
PR	Property receipt
PREP	Preparation
PRES	Preserved
PROF	Proficiency
PSA	Prostate Specific Antigen semen confirmation test
PT	Purple top tube of blood
PW	Autoclaved or pyrogenated water
QA	Quality Assurance
QAS	The FBI Quality Assurance Standards
QC	Quality Control
QS	Bring up to
R	Reagent Prep Room
R/O	Right side out
RCVD	Received
REF	Refrigerator
RGT	Right
RPM	Revolutions per minute
RT	Room temperature
RTB	Red Top Tube of Blood
RXN	Reaction
SBECK	Sexual Battery Evidence Collection Kit
SBP	Sealed brown paper
SEC	Second
SERO	Serology
SM	Small
SN	Serial number
SOLN	Solution
SP	Sperm
SPB	Sealed paper bag
SPE	Sealed paper envelope
SPLB	Sealed plastic bag
SSWBOX	Sealed swab box
STD	Standard
SUB	Submission
SW	Swab, Swabbed

SWBOX	Swab Box
SWC	Swab container
SWWRP	Swab Wrapper
TEMP	Temperature
tt	Test tube or microcentrifuge test tube
UNK	Unknown
V WK	Very weak
VAG	Vaginal
W/	With
WH	White
WK	Weak
Xmas	Christmas tree stain
YR	Year

Note: The forgoing abbreviations are independnt of upper or lower case and may be combined to generate new abbreviations (i.e. RGTFNS, LFNS, WK +). Customary scientific and mathematic abbreviations (<, >, #, MSDS, O2, H20, etc.) are considered common knowledge and are not included here.

BOCA RATON POLICE SERVICES DEPARTMENT

BPL 10% BLEACH FORM

FORMULATION	REAGENT	STOCK	FINAL	AMOUNT	COMMENTS
10% Bleach	Bleach		30%	30 ML	Store at RT
	dH20			70 ML	
			TOTAL	**100 ML**	***exp date is 1 week from***
					date made

DATE:1	***ANALYST:***	***AMOUNT PREPARED:***	100 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Bleach			30ML		
dH20			70 ML		

DATE:	***ANALYST:***	***AMOUNT PREPARED:***	100 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Bleach			30 ML		
dH20			70 ML		

DATE:	***ANALYST:***	***AMOUNT PREPARED:***	*100 ML*	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Bleach			30 ML		
dH20			70 ML		

DATE:	***ANALYST:***	***AMOUNT PREPARED:***	*100 ML*	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Bleach			30 ML		
dH20			70 ML		

DATE:	***ANALYST:***	***AMOUNT PREPARED:***	*100 ML*	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Bleach			30 ML		
dH20			70 ML		

DATE:	***ANALYST:***	***AMOUNT PREPARED:***	*100 ML*	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Bleach			30 ML		
dH20			70 ML		

BOCA RATON POLICE SERVICES DEPARTMENT

BPL ALCONOX CLEANING DETERGENT INVENTORY FORM

Alconox Cleaning Detergent	
Storage Location:	
Use:	Cleaning Detergent
Company	Alconox

Product Name	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL ANNUAL PROTOCOL REVIEW FORM

Protocol	Revision	Date Implemented	Date Reviewed
BPL ABA HemaTrace			
BPL ABA PSA Semen			
BPL Acid Phosphatase Test			
BPL Balances			
BPL Case Acceptance			
BPL Collection of Reference Samples			
BPL Equipment			
BPL Evidence Control			
BPL Evidence Examination			
BPL Evidence Work Product Handling			
BPL Facilities			
BPL Literature Review			
BPL Luminol			
BPL OmniPrint 1000A			
BPL Phenolphthalein Test			
BPL Pipette Labeling and Tracking			
BPL Polilight PL400			
BPL Preservation of Evidence			
BPL Proficiency Testing			
BPL Quality Assurance and Quality Control			
BPL Reagents			
BPL Records			
BPL Safety			
BPL Semen and Epithelial Cells Microscopy			
BPL Training Program			

Approved: Caralee Daugherty, Laboratory Supervisor

AP Spot Test	
Storage Location	
Use:	Presumptive test for Semen

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

FORMULATION	REAGENT	STOCK	FINAL	AMOUNT	COMMENTS
AP Spot Test PMR	AP Spot Test	premixed powder		0.26 g	***make fresh daily***
Presumptive Test	dH_20	liquid		10 ml	
for Semen					
			total	**10 ml**	

DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		
DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		
DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		
DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		
DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		
DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		
DATE:	***TECHNICIAN:***	***AMTOUNT. PREPARED:***	***10 ml***	***REAGENT EXP DATE:***	**Make Fresh Daily**
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXPIRATION DATE**	**COMMENTS**
AP Spot Test	SERI		0.26 g		
dH_20			10 ml		

These auto texts are to be used for all reports.

Names of individuals:

- ***Use the name on the envelope containing the standard***
- ***If no name, use the name on the outside package***
- ***If necessary, clarify name through submitting agency, document in case file***

In general, the report format should follow the Evidence List sequence with appropriate capitalized headers for each submission.

If appropriate, use "SUBMISSION NOTES" at the end of a report.

BLOOD	KM-	1	A chemical reaction, indicative but not specific to blood, was not detected on stains # on the ____(1).
	KM+ only	2	A chemical reaction, indicative but not specific to blood, was detected on stains # on the ____(1). The confirmatory test for blood was not conducted.
	KM+, HB-	3	A chemical reaction, indicative but not specific to blood, was detected on stains # on the ___(1). The confirmatory test for blood provided negative results.
	KM+, HB+	4	A chemical reaction, indicative but not specific to blood, was detected on stains # on the ___(1). The confirmatory test for blood provided positive results.
SEMEN	AP-	5	A chemical reaction, indicative but not specific to semen, was not detected on stains # on the ____(1).
	AP-, SP -		A chemical reaction, indicative but not specific to semen, was not detected on stains # on the ____(1). Microscopic examination did not identify the presence of sperm cells.
	AP+, SP-, PSA-	6	A chemical reaction, indicative but not specific to semen, was detected on stains # on the _____(1). Further microscopic examination and prostate specific antigen tests for semen provided negative results.
	AP+, SP+	7	A chemical reaction, indicative but not specific to semen, was detected on stains # on the _____(1). Further microscopic examination identified the presence of sperm cells.

	AP+, SP-, PSA+	8	A chemical reaction, indicative but not specific to semen, was detected on stains # on the _____(1). Microscopic examination did not identify the presence of sperm cells, however the presence of prostate specific antigen was confirmed for the presence of semen. "# stains on the" can be replaced with "the swabs of the".
ALS	ALS- or ALS+	9	Fluorescence from the alternative light source was not detected on the _____(1). Or An alternative light source was used to detect fluorescence on the ____(1).
			Miscellaneous
		10	Possible hair/fiber was collected from the ____ (4A) and returned with the submission. Hair put in env, placed w/ the item AND RETURNED with the submission.
		11	Possible hair/fiber was collected from the ____ (4A) and was retained by the Boca Raton Police Department. Hair put in env, place in the Sero Bag.
		12	Possible hair/fiber was observed on the ____ (4A). Hair not put in separate env, left on the submission and returned.
		13	Possible hair/fiber was observed/not observed in the pubic hair combing (1F).
		14	Debris was observed/ not observed in the fingernail scrapings (1E). Debris was not tested. THIS IS FOR FNS ONLY. No need to make this observation for PHC etc
		15	The possible hair/fiber from the ____ (4A) was sent to the FBI Laboratory in Washington, D.C. (or other approved Hair/Trace examiner) on 00/00/0000 for microscopic analysis.
		16	The ____ (4A) was sent to the FBI Laboratory in Washington, D.C. (or name of lab evidence sent to) on 00/00/0000 for Y-STR analysis or mitochondrial DNA analysis (or other form of analysis).

If a submission is sent out AFTER the report has been generated, it is NOT necessary to write another report if a request from law enforcement OR the judicial system through a court order necessitates sending out the submission. It IS necessary to have an authenticated chain of custody documented in the case file such as the updated bar code and property receipt.

GENERAL STATEMENTS

17 The purple top tube of blood from Jane Doe (1) has been preserved on a bloodstain card in the event that a standard becomes necessary in this case.

18 The evidence in the Sexual Battery Evidence Collection Kit has been preserved. Please notify the Biological Processing Laboratory if further analysis is necessary in this case (561) ###-####.

19 The evidence in the Standards Kit has been preserved. Please notify the Biological Processing Laboratory if further analysis is necessary in this case (561) ###-####.

20 The blood standard obtained from the Medical Examiner's Office has been preserved. Please notify the Biological Processing Laboratory if further analysis is necessary in this case (561) ###-####.

21 The swabs from ___ (2B) have been preserved.

This auto text should be used for reports where no analysis was conducted but evidence was retained by the analyst.

22 Submissions 1A- 1C, 2B, 16 and 25 were not examined.

This auto text should be used for items obtained from evidence but not analyzed and/or not opened.

NOTES

23 NOTES:
1. Submission(s) ____ will be sent to the Palm Beach County Sheriff's Office for DNA analysis. *OR* Submission of evidence to Palm Beach County Sheriff's Office for DNA analysis can be conducted upon request.

2. This report contains the conclusions of the individual whose signature appears on the report.
3. All stain cuttings, slides and standards will be retained at a secure Boca Raton Police Department storage location.
4. All original packaging and when appropriate original items of evidence will be returned to a Boca Raton Police Department Evidence
5. Only the items discussed in the results and conclusions above were examined in this report.

Evidence Worksheet Notes:

SBECK for Worksheet

24 Sub 1 Sexual Battery Evidence Collection Kit from "exactly as written on MEO/hospital evidence" containing:

1A 6 vaginal swabs
1B 2 oral swabs
1C 2 rectal swabs
1D Right fingernail scrapings
1E Left fingernail scrapings
1F Pubic hair combing

(BE SURE TO LIST ITEMS NOT COLLECTED ON THE EVIDENCE WORKSHEET)

STANDARD COLLECTION KIT for Worksheet

25 Sub 3 Standards collection kit from "exactly as written on MEO/hospital evidence" containing:

3A Purple top tube of blood
3B 2 oral standards
3C Top hair
3D Back hair
3E Right hair
3F Left hair
3G Pubic hair

The correct spelling of a name will be used in the report.

BOCA RATON POLICE SERVICES DEPARTMENT

BPL BLEACH (SODIUM HYPOCHLORITE) INVENTORY FORM

Bleach (Sodium Hypochlorite), Hype-wipes	
Storage Location	
Use:	Cleaning/Decontamination

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL CASE FILE TECHNICAL/ADMINISTRATIVE REVIEW WORKSHEET FORM

CASE NUMBER:	**TECHNICIAN:**	# of pages in file:
REVIEWER:	**DATE OF REVIEW:**	

	Technical Review	YES	NO	NA
1	Has there been a review of the chain of custody for Serology Bag evidence?			
2	Has there been a review of the chain of custody for the evidence returned to the Evidence Custodian?			
3	Were samples sent to a vendor lab?			
4	Was the chain of custody reviewed for samples sent to a vendor lab?			
5	Are lot numbers and expiration dates for all reagents recorded on the appropriate worksheets?			
6	Have the appropriate Quality Control samples been analyzed with this case? (i.e.:KM, HB, AP, P30, etc.)			
7	Are all Technical pages marked with case number and technician's initials?			
8	Are the BPL Evidence Summary Worksheet Forms filled out properly?			

Additional comments regarding Technical Review:

	Administrative/Clerical Review	YES	NO	NA
1	Does the final report account for each sample analyzed?			
2	Are all submissions accounted for in this case?			
3	Are all Administrative pages marked with case number and technician's initials?			
4	Is the BPL Communication Log present in the case file?			
5	Is the DNA Request Form present in the case file?			
6	Is the technician's manual or electronic signature and date present on all copies of the report?			
7	Has the report been written in the proper format?			
8	Are all of the appropriate pages numbered and the technical data bound together?			
9	Has there been a review of the case file and final report for clerical errors and accuracy of information?			

Additional comments regarding Administrative/Clerical Review:

Christmas Tree Stain - Stain A & B	
Grade:	
Storage Location	
Use:	Slide Staining

Company	Quantity Received	Catalog #	Stain A A	Stain B B	Date Received	Technician	Expiration Date

BRPSD CASE#						AGENCY CASE NUMBER:		
DATE	TIME	TO	FROM	Voice Mail	NAME	PHONE #	Technician Initials	MESSAGE

CASE#_____

BOCA RATON POLICE SERVICES DEPARTMENT

BPL DENVER MAXX BALANCE PERFORMANCE CHECK LOG

DATE	ZERO	KNOWN	ACTUAL	KNOWN	ACTUAL	TECHNICIAN

BOCA RATON POLICE SERVICES DEPARTMENT

BPL ETHANOL INVENTORY FORM

Ethanol	
Grade:	ACS
Storage Location:	
Use:	Phenopthalein Preparation

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL EVIDENCE PRESERVATION TECHNICAL/ADMINISTRATIVE REVIEW WORKSHEET FORM

ANALYST: **# PAGES IN FILE:**

CASE NUMBER:

REVIEWER: **DATE OF REVIEW:**

			YES	NO	NA
1	Are all the pages marked with the case number and technician's initials?				
2	Do all the BPL Evidence Summary Worksheet Forms contain:	Case Number			
		Start/Finish Date			
		Description of Evidence			
		Packaging, seals, etc			
3	Is the BPL Communication Log Form present?				
4	Has there been a review of the case file and final report for clerical errors and accuracy of information?				
5	Has the reviewer verified the disposition of the Serology Bag evidence?				
6	Has the reviewer verified the Evidence has been returned to the Evidence Custodian?				
7	Has the report been written in the proper format?				
8	Are all of the appropriate pages numbered and the Technical Data bound together?				
10	Is the technician's manual or electronic signature and date present on all copies of the report?				

ADDITIONAL COMMENTS

BOCA RATON POLICE SERVICES DEPARTMENT

BPL EVIDENCE SCREENING ROOM KEY LOG FORM

ROOM NUMBER ________

Date Removed	Date Returned	Technician	Case Number	Comments

BOCA RATON POLICE SERVICES DEPARTMENT

BPL EVIDENCE SCREENING ROOM LOCKER KEY LOG FORM

ROOM NUMBER ______ LOCKER NUMBER ______

Date In	Date Out	Technician	Case Number	Comments

BOCA RATON POLICE SERVICES DEPARTMENT

BPL EVIDENCE SUMMARY WORKSHEET FORM

CASE #:			**START DATE:**				**FINISH DATE:**
	KM		**+**	**-**	**Lot #:**	**Exp:**	**ALS + -**
	H2O2				**Lot #:**	**Exp:**	**P10:** **P200:**
ANALYST:	**AP**		**+**	**-**	**Lot #:**	**Exp:**	**Christmas Tree Stain Lot #: / Exp:**
	HB		**+**	**-**	**Lot #:**	**Exp:**	**P200:**
	p30		**+**	**-**	**Lot #:**	**Exp:**	**P200:**

ITEM	KM	HB	ALS	AP	Microscopic	p30	REMARKS

Household Bleach	
Storage Location	
Use:	Cleaning/Decontamination

Company	Quantity Received	Date Received	Technician	Expiration Date

Hydrogen Peroxide, 3%	
Grade:	3% w/w Reagent
Storage Location:	
Use:	Serology- Presumptive testing

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

Hydrogen Peroxide, 30%	
Grade:	30% w/w Reagent
Storage Location:	
Use:	Serology- Presumptive testing

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL 3% HYDROGEN PEROXIDE FORM

FORMULATION	REAGENT	STOCK	FINAL	AMOUNT	COMMENTS
3% Hydrogen peroxide	Hydrogen peroxide	30%	3%	3 ML	store in refrigerator
	dH20			27 ML	
			TOTAL	**30 ML**	***exp date is 1 yr from***
					made or exp of stock
					H2O2 if less than 1 yr

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	30 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Hydrogen peroxide			3 ML		
dH20			27 ML		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	30 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Hydrogen peroxide			3 ML		
dH20			27 ML		

DATE:	***TECHNCIAN:***	***AMOUNT PREPARED:***	30 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Hydrogen peroxide			3 ML		
dH20			27 ML		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	30 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Hydrogen peroxide			3 ML		
dH20			27 ML		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	30 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Hydrogen peroxide			3 ML		
dH20			27 ML		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	30 ML	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**
Hydrogen peroxide			3 ML		
dH20			27 ML		

FORMULATION	REAGENT	STOCK	FINAL	AMOUNT	COMMENTS
Phenolphthalein Soln	Phenolphthalein	liquid		125 ml	store in refrigerator
(KM - Kastle-Meyer)	ethanol	liquid		125 ml	mix equal amounts of ethanol
Reagent)					and phenolphthalein soln
1:1 KM:ethanol			**TOTAL**	**250 ML**	store in refrigerator
					expires 1 year from receipt

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	500 ml	***REAGENT EXP DATE:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**EXP DATE**	**COMMENTS**
Phenolphthalein	MedTech Forensics		250 ml		
ethanol			250 ml		

Analyst	Initials	Date	Comment
CD			
ACM			
MS			

BOCA RATON POLICE SERVICES DEPARTMENT

BPL LUMINOL POWDER INVENTORY FORM

Luminol Powder (3-aminophthalhydrazide)	
Storage Location:	
Use:	Pre- Presumptive test for blood

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL LUMINOL REAGENT FORM

FORMULATION	REAGENT	STOCK	FINAL	AMOUNT	COMMENTS
Luminol Reagent	Luminol powder	solid		entire vial	8 oz = 237 ml
	dH20	liquid		8 oz	swirl or shake gently to mix
					allow grains to settle, decant liquid
			TOTAL	**8 oz**	mixture must be used within
					20 -30 min

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH2O			237 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH20			237 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH20			237 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH20			237 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH20			237 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH20			237 ml		

DATE:	***TECHNICIAN:***	***AMOUNT PREPARED:***	237 ml	***Time:***	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**COMMENTS**	
Luminol powder	Crime Scene Supply Co.		entire vial		
dH20			237 ml		

BOCA RATON POLICE SERVICES DEPARTMENT

BPL METHANOL INVENTORY FORM

Methanol	
Grade:	ACS
Storage Location:	
Use:	Slide Staining

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

ONE STEP ABA HEMA TRACE CARD

Catalog # 708424

Storage:

Quantity Received	Date Kit Received	Initials	Lot #	Exp. Date	Kit Inventory	QA/QC'd

ONE STEP ABA PSA (P30) CARD

Catalog # 308332

Storage:

Quantity Received	Date Kit Received	Initials	Lot #	Exp. Date	Kit Inventory	QA/QC'd

Permount (AKA Acryloid B-72 50% Resin & Pro-Tex Mounting Medium)	
Storage Location:	
Use:	Cover Slip Mounting

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

Phenolphthalein Reagent	
Storage Location:	
Use:	Presumptive Blood testing

Company	Quantity Received	Catalog #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL REAGENT FORM

FORMULATION	REAGENT	STOCK	FINAL	AMOUNT	COMMENTS
					exp date is 1 year from
					made or exp of stock
					expiration date is 1 year from
					made or expiration date
					of chemical used

DATE:	*TECHNICIAN:*	*AMT. PREPARED:*		*REAGENT EXP DATE:*	
REAGENT	**BRAND**	**LOT**	**AMOUNT**	**CHEMICAL EXP DATE**	**COMMENTS**

BOCA RATON POLICE SERVICES DEPARTMENT

BPL SOFT-CIDE DETERGENT INVENTORY FORM

Soft-Cide Detergent	
Storage Location:	
Use:	Detergent

Company	Quantity Received	Catalog #	Lot #	Date Received	Technician	Expiration Date

BOCA RATON POLICE SERVICES DEPARTMENT

BPL TEMPERATURE MONITORING RECORD FORM

YEAR _____
RANGE _____

REFRIGERATOR/FREEZER _____
LOCATION _____

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL	TEMP / INITIAL
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BOCA RATON POLICE SERVICES DEPARTMENT

BPL VISITOR LOG FORM

Name	Reason for Access	Date	Time of Entry	Time of Exit

BOCA RATON POLICE SERVICES DEPARTMENT

BPL ANNUAL NIST TRACEABLE WEIGHT PERFORMANCE CHECK LOG FORM

Calibration Certificate Date: 25-APR-2011 **Accuracy Class:** Ultra

Certificate # 607459 **NIST weight set #**

House NIST Weights: Troemner **Weight ID #: 4000012171**

Date of house weights calibration:

Weight size	NIST weight	House weight	Tolerance	N - H difference	Pass/fail
500 g			0.700 mg		
200 g			0.300 mg		
200 g *			0.300 mg		
100 g			0.150 mg		
50 g			0.070 mg		
20 g			0.044 mg		
20 g *			0.044 mg		
10 g			0.030 mg		
5 g			0.020 mg		
2 g			0.020 mg		
2 g *			0.020 mg		
1 g			0.020 mg		
500 mg			0.005 mg		
200 mg			0.005 mg		
200 mg *			0.005 mg		
100 mg			0.005 mg		
50 mg			0.005 mg		
20 mg			0.005 mg		
20 mg *			0.005 mg		
10 mg			0.005 mg		
5 mg			0.005 mg		
2 mg			0.005 mg		
2 mg *			0.005 mg		
1 mg			0.005 mg		

* Denotes weight is marked with a dot

Note: If In house weight are out of range, notify the Laboratory Supervisor.