## *ABSTRACT (BASE FUNDS)*

## *INCREASED EFFICIENCY OF EVIDENCE SCREENING, PROCESSING, & REPORT WRITING FOR CRIME SCENE, PROCESSING, TOXICOLOGY & QUESTIONED DOCUMENT ANALYSTS*


### *PROJECT SCOPE AND OBJECTIVES*

The scope of this proposal is to optimize productivity and enhance efficiency in evidence screening, processing and report writing for several disciplines by providing support for training, personnel, equipment and supplies. The objectives are to 1.) provide support for one Forensic Scientist position, 2.) provide training and continuing education opportunities, 3.) provide microscopy equipment and updated reference materials, and 4.) to complete an ongoing renovation project of existing lab space.

### *PROJECT DESIGN AND METHODOLOGY*

For objective 1, the grant will provide personnel and fringe benefits for one crime scene/screening and processing forensic scientist position. We are faced with elimination of several positions due to state budget shortfalls. One position of critical importance is a crime scene/primary examination position. This Forensic Scientist will respond to crime scenes as well as perform the primary screening and processing of the crime scene evidence for biological, firearms and trace evidence.

To meet objective 2, analysts will participate in various in-state and out-of-state training opportunities to fulfill training requirements for competency or to maintain proficiency. In-state training will include courses in basic statistics, digital IR photography, advanced bloodstain pattern analysis, and difficult latent print analysis as well as participation at the Northwest Association of Forensic Scientists meeting. Out-of-state training opportunities may include attendance at professional conferences (e.g., CLIC, SOFT, & AFTE). Attendance at in-state or out-of-state meetings, professional conferences and workshops will assist analysts in meeting requirements to obtain competency and assist senior analysts in maintaining their proficiency and keeping current with new technologies.

To meet objective 3, we will purchase microscope objectives to upgrade six of our compound microscopes used primarily for screening of sexual assault evidence. In addition, several crime scene books will be purchased for each laboratory to update the laboratory library. The microscope objectives will improve the screening efficiency of sexual assault evidence. The books will provide current literature for our crime scene analysts on photography, bone identification and bloodstain pattern analysis.

In 2008, we initiated a renovation project to provide office space and work/office space for Toxicology and Questioned Document (QD) analysts. To meet objective 4, funds from this grant will be used to continue and complete this renovation project. Specifically, funds will complete the general infrastructure for electrical, plumbing, HVAC, walls and floor and the cubicle installation for the work/office space.

Support of this proposal will provide training opportunities, provide support for an analyst, provide equipment to improve the efficiency of evidence screening, and provide updated books for our crime scene library. In addition, support of this proposal will assist with the completion of a renovation project initiated in 2008. Meeting the objectives will result in maintaining a proficient, confident workforce, will provide additional space for more efficient workflow for toxicology and QD analysts, and provide resources to increase the efficiency of evidence screening and processing. The subsequent expected outcome will be increased efficiency of evidence screening, analysis and report writing which will lead to increased productivity and more timely quality service to our customers.

## *ABSTRACT (COMPETITIVE FUNDS)*

## *ENHANCEMENT OF TRACE EVIDENCE ANALYSIS SERVICES FOR* [redacted]

### *PROJECT SCOPE AND OBJECTIVES*

The primary scope of this proposal is to enhance the [redacted] Trace sections in the [redacted] and [redacted] laboratories. The objectives are 1.) to provide specific trace training opportunities to a number of trace analysts to enhance their skills and knowledge in various trace disciplines, 2.) to assemble a digital image management system for image capture, enhancements, analysis and archiving, 3.) to purchase and upgrade trace equipment to minimize bottlenecks and enhance workflow and 4.) to purchase reference standards and materials for use in hair, fibers and impression comparisons.

### *PROJECT DESIGN AND METHODOLOGY*

To meet the scope and objectives, we will provide various training opportunities to our Trace analysts to enhance their analysis and comparison skills. In-state training will include a course in polarized light microscopy and a trace in-service as well as participation at the Northwest Association of Forensic Scientists meeting. Out-of-state training may include attendance at professional conferences (e.g., AAFS & IAI) and participation specific trace workshops and courses (e.g., McCrone microscopy courses or TWGFEX). Attendance at in-state or out-of-state meetings, professional conferences and workshops will assist analysts in maintaining their proficiency and keeping current with new technologies.

For objective 2, we will purchase a digital image management system for image capture, enhancement, analysis, tracking and archiving for the [redacted] and [redacted] trace sections. This equipment will provide these laboratories with a complete image management system. To meet objective 3, we will upgrade and purchase trace equipment. We will upgrade five stereomicroscopes with ergonomic heads, the [redacted] FTIR CsI window will be replaced with a KBr window, the Pendleton lab trace processing microscopes will be upgraded with a new ring-light and polarizing filters, and the [redacted] comparison

microscope will be upgraded with a fluorescence attachment. In addition, we will purchase an additional MZ16 stereoscope for the [redacted] lab.

To meet objective 4, we will purchase a particle atlas and various hair, fiber and/or paint reference standards. The particle atlas and reference standards will provide quality known references for comparisons to the vast array of evidence samples. In addition, we will continue our subscription to SoleMate and subscribe to TreadMate. These databases will assist analysts with impression evidence analyses.

Meeting these objectives and the scope of this proposal will allow the [redacted] to minimize bottlenecks and increase efficiency of evidence processing and analysis in our trace sections. This will ultimately enhance our trace services to the state of [redacted] by providing better digital image management tools, and training, equipment and reference materials to our analysts to perform their job more efficiently. Ultimately, this will result in a decrease in turn around time and a decrease in the case backlog.

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***Program Narrative (Base Funds)***

***Increased Efficiency of Evidence Screening, Processing, & Report Writing for Crime Scene, Processing, Toxicology & Questioned Document Analysts***

## *I. SCOPE*

The scope of this proposal is to optimize productivity and enhance efficiency in evidence screening, processing and report writing for several disciplines by providing support for training, personnel, equipment and supplies. The objectives are to 1.) minimize the impact of state budget shortfalls by providing support for one Forensic Scientist position, 2.) maintain analyst proficiency and knowledge base by providing training and continuing education opportunities, 3.) enhance efficiency of evidence screening and processing by providing microscopy equipment and updated reference materials, and 4.) optimize productivity by providing work space and office space to Questioned Document examiners and Toxicology analysts.

For objective 1, the grant will provide personnel and fringe benefits for one crime scene/screening and processing forensic scientist position. The [redacted] is faced with the potential elimination of 18 positions in the next biennium due to State budget shortfalls. One position of critical importance is a crime scene/evidence screening and processing position. This Forensic Scientist responds to crime scenes as well as performs the primary screening and processing of the crime scene evidence for biological, firearms and trace evidence. To maintain this position and a basic level of service to our customers, grant funds will be used to support one forensic scientist position.

To meet objective 2, analysts will participate in various in-state and out-of-state training opportunities to fulfill training requirements for competency or to maintain proficiency. In-state training will include courses in basic statistics, digital IR photography, advanced bloodstain pattern analysis, and difficult latent print analysis as well as participation at the Northwest Association of Forensic Scientists meeting. Out-of-state training opportunities may include attendance at professional conferences (e.g., CLIC, SOFT, & AFTE). Attendance at in-state or out-of-state meetings, professional conferences and workshops will assist

analysts in meeting requirements to obtain competency and assist senior analysts in maintaining their proficiency and keeping current with new technologies.

To meet objective 3, we will purchase microscope objectives to upgrade six of our compound microscopes that are used primarily for screening of sexual assault evidence and trace evidence. In addition, several crime scene books will be purchased for each laboratory to update the laboratory library. The microscope objective will improve the screening efficiency of sexual assault and trace evidence by providing an optimal dry mount magnification. The books will provide current literature for our crime scene analysts on photography, bone identification and bloodstain pattern analysis.

In 2008, we initiated a renovation project to provide office space for Toxicology analysts (~870 sq ft) and work/office space for Questioned Document Analysts (~720 sq ft). To meet objective 4, funds from this grant will be used to continue and complete this renovation project. Specifically, funds will complete the general infrastructure for electrical, plumbing, HVAC, walls and floor and the cubicle installation for the work/office space.

Support of this proposal will provide training opportunities, provide support for an analyst, provide equipment to improve the efficiency of evidence screening, and provide updated books for our crime scene library. In addition, support of this proposal will assist with the completion of a renovation project initiated in 2008. Meeting the objectives will result in maintaining a proficient, confident workforce, will provide additional space for more efficient workflow for toxicology and questioned document analysts, and provide resources to increase the efficiency of evidence screening and processing. The subsequent expected outcome will be increased efficiency of evidence screening, analysis and report writing which will lead to increased productivity and more timely quality service to our customers.

## *II. INCREASED EFFICIENCY OF EVIDENCE SCREENING, PROCESSING & REPORT WRITING*

### *A. BACKGROUND*

The [NAME Of AGENCY] provides the only full service forensic laboratory system in the state. The [redacted] operates six forensic laboratories located at strategic points throughout the state with laboratories

located in [redacted] laboratories (Figure 1). The [redacted] is also responsible for the Implied Consent Unit that serves [NAME of STATE's] Breath Alcohol Program. The laboratories serve a population of about 3.7 million people spread over an area of approximately 97,000 square miles. The [redacted] currently has a staff of 127 authorized positions with 124 assigned to the laboratories. Seventeen of those positions were new hires during the 07-09 biennium with the last new hire on January 1, 2009. In the 09-11 biennium we requested an additional 15 staff positions. However, due to a declining national economy and state budget shortfalls, we may need to eliminate 18 staff positions and take cuts in supplies and services, and capital outlay.

The [redacted] has a Division of Professional Standards. Both the Division of Professional Standards and the Attorney General's Office are government entities that have an appropriate process in place to conduct independent external investigations into allegations of serious negligence or misconduct substantially affecting the integrity of the forensic results committed by employees or contractors of any forensic laboratory system, medical examiner's office, coroner's office, law enforcement storage facility, or medical facility in the State that will receive a portion of the grant amount.

The [redacted] received its first ASCLD/LAB accreditation in 1985 and most recently in 2006 received ASCLD/LAB-International accreditation to the ISO:IEC 17025:2005 standards. All laboratories provide crime scene assistance, perform primary evidence screening and processing for biological, trace and firearms evidence, and provide controlled substance analysis. The [redacted] laboratories provide latent print processing and comparisons. Other disciplines (toxicology, trace, DNA, Firearms/Toolmarks) are provided at various locations throughout the state (Table 1).

Approximately, 90% of the [redacted]'s forensic requests are submitted by agencies other than the [redacted]. The city police departments submit 66.2%, the county sheriff offices 21.6%, the [redacted] 10% and other agencies submit 2.2% of the forensic requests. Forensic requests have continued to increase in the last 10 years with pending requests averaging 10-15% of the total requests submitted per year.

| TABLE 1. LOCATION OF DISCIPLINES WITHIN THE [redacted] | |
|---|---|
| **Laboratory** | **Disciplines** |
| | Field Investigations/Crime Scenes<br>Controlled Substance<br>Primary Examination - Trace, Biology, Firearms<br>Firearms/Toolmarks<br>Latent Print Comparisons<br>Latent Print Processing |
| | Field Investigations/Crime Scenes<br>Controlled Substance<br>DNA<br>Firearms/Toolmarks<br>Latent Prints<br>Primary Examination - Trace, Biology, Firearms<br>Questioned Documents<br>Toxicology (Urine, BA) (Post-mortem)<br>Trace (hair, fiber, impressions, paint, physical match) (arson & glass) |

As indicated above, due to state budget shortfalls, we may potentially cut 18 positions and approximately 1.8 million from our supplies & services and capital outlay budget. The impact of these cuts will be devastating on the forensic services that we provide to the state of [redacted]. While the majority of the positions cut will be in support staff (lab techs & evidence techs), forensic scientist productivity will decrease as they step in to fill the hole vacated by the support staff. Thus, there will be fewer forensic scientists on the bench processing, screening and analyzing forensic evidence. To help minimize the impact of lost resources and to try to maintain some level of productivity, we are requesting funds for personnel and fringe benefits to support a forensic scientist position. We are also requesting funds to assist with our continuing education and training needs, and to support the procurement of supplies and equipment. Lastly, we are requesting funds for the completion of the [redacted] lab mezzanine renovation project. This renovation was initiated in 2008 when the state economy and budget were stable. Subsequent to the initiation of this renovation, the state general fund money allocated for this renovation project was reallocated by the state legislature to compensate for the budget shortfall.

### *B. OBJECTIVES AND ACTION PLAN*

***Objective 1: Minimize the Impact of State Budget Shortfalls***

We are requesting funds for personnel and fringe benefits to support a forensic scientist position. We are faced with potentially eliminating18 positions in the [redacted] in the next biennium (July 1, 2009 to June 30, 2011). We currently have six vacancies, leaving 12 positions needing to be cut. One position of critical importance is a crime scene/evidence screening and processing position. This Forensic Scientist responds to crime scenes as well as performs the primary screening and processing of the crime scene evidence for biological, firearms and trace evidence. To save the position and not have to lay off the individual, we want to transfer this position to grant funds. This will allow us to maintain a basic level of service to our customers.

***Objective 2: Maintain Analysts Proficiency and Knowledge Base***

To accomplish objective 2, we will evaluate and identify training needed by multiple individuals and schedule in-state training workshops. Some of these workshops may include a course on basic statistics and uncertainty of measurement, digital IR photography, advanced bloodstain pattern analysis, difficult latent print analysis and participation at the Northwest Association of Forensic Scientists which will be held in [redacted], OR in 2010. Instructors for these workshops will be brought in-state to minimize the per diem and travel costs. This will allow us to train multiple analysts in a more cost effective way. In-state training will be conducted at the [redacted] lab which has a training room, access to a vehicle bay, computers and forensic supplies.

Out-of-state training opportunities will be identified for individuals requiring specialized technical training. Some of this training may include attendance at the Borkenstein School for the toxicologists and attendance at professional meetings such as the AAFS, PNWIAI, SOFT or the IAI. Any trainees requiring a course to obtain competency or senior staff requiring a course to maintain proficiency will be given priority. In addition, priority for attendance at professional meetings will be given to current staff to assist them with maintaining proficiency and keeping current in their discipline.

***Objective 3: Enhance the Efficiency of Evidence Screening and Processing***

For objective 3, we will purchase microscope objectives to upgrade six compound microscopes that are used primarily for screening of sexual assault and trace evidence. In addition, several crime scene books will be purchased for each laboratory. The microscope objective will improve the screening efficiency of sexual assault and trace evidence by providing an optimal dry mount magnification. The books will provide current literature for our crime scene analysts on photography, bone identification and bloodstain pattern analysis.

***Objective 4: Optimize Productivity by Providing Work & Office Space***

We initiated the renovation of existing lab space (~8,720 sq ft) in the [redacted] Lab in 2008. A portion of this space is designated work space for Questioned Document (QD) examiners (~720 sq ft) and office space for Toxicology analysts (~870 sq ft). The total estimated cost of the renovation is 1.3 million. We initially anticipated [redacted] general fund dollars to contribute to the cost of the majority of the renovations (~700K) and requested $155K in the 2008 CODIS backlog reduction grant, $199K in the 2008 DNA casework backlog reduction grant and $116K in the 2008 Coverdell grant to assist with this renovation project. However, after the initiation of the renovation project, the anticipated general fund dollars were reallocated by the state legislature to compensate for a state budget shortfall. Thus, we are requesting additional grant monies to assist with the completion of this renovation project. Specifically, funds will complete the general infrastructure for electrical, plumbing, HVAC, walls and floor and the cubicle installation for the work/office space.

Renovation of this space will provide our two QD analysts with office and work space. The QD analysts currently share space with the latent print examiners. This space is at full capacity. The plan is to provide a separate work and office space for the two QD examiners in a location where there is sufficient ambient sunlight. This will also allow the latent print examiners to remain close to the latent lab for processing of evidence. Making such accommodations for both the latent and QD examiners will allow for efficiencies of work flow and eliminate potential bottlenecks in finding office space for report writing.

At the beginning of 2008 we implemented a post-mortem toxicology program, hired an additional toxicologist and transferred another forensic scientist into the toxicology unit to help manage the case load. In total, the [redacted] Lab toxicology unit consists of one lab technician, one supervisor and eight forensic toxicologists. The current office space accommodates five. To that end, the additional office space will accommodate the remaining toxicologists and provide the much needed space for report writing and case management.

### *III. BENEFITS & CONCLUSIONS*

Support of this proposal will assist us in optimizing productivity and enhancing efficiency in evidence screening, processing and report writing. The grant funds will help us minimize the impact of state budget shortfalls by providing support for a forensic scientist position. We will also be able to maintain analyst proficiency and knowledge base by providing training, continuing education opportunities and updated literature references and books. Evidence screening and processing will be enhanced by providing microscopy equipment and the additional work and office areas will provide for a more efficient workflow process for toxicology and questioned document analysts. The subsequent outcome will be increased productivity and more timely quality service to our customers.

### *IV. COLLECTION OF PERFORMANCE MEASURE DATA*

Several performance measures including the total turn-around time and the analytical turn-around time will be monitored. Total turn-around time is the number of days between the submission of a request to the lab to the mailing of the test report to the requesting agency. The analytical turn-around time is the number of days from when the analyst begins the analysis of the evidence to the mailing of the test report. We will calculate the change in turn-around time every six months and compare this to the initial turn-around time at the beginning of the grant period. The change in the number of backlogged cases will be evaluated every six months. This data is available and tracked in our laboratory information management system. The number of individuals receiving training or participating in continuing education opportunities will be tracked. Training information is tracked in a training database.

***Program Narrative (Competitive Funds)***

***Enhancement of Trace Services for*** [redacted]

## *I. SCOPE*

The primary scope of this proposal is to enhance and improve the quality of the [redacted]'s trace sections in the [redacted] laboratories. The objectives are to 1.) enhance trace analyst's skills and knowledge in various trace disciplines by providing specific trace training opportunities, 2.) optimize workflow by increasing the efficiency of digital image capture, enhancement, analysis and archiving by compiling a complete digital image management system, 3.) minimize bottlenecks and increase capacity by purchasing and upgrading trace equipment and 4.) improve the quality of trace analysis by purchasing reference standards and materials for use in hair, fibers, paint and impression comparisons.

To meet the scope and objectives, we will provide various training opportunities to our trace analysts to enhance their analysis and comparison skills. In-state training will include a course in polarized light microscopy and a trace in-service as well as participation at the Northwest Association of Forensic Scientists meeting. Out-of-state training may include attendance at professional conferences (e.g., AAFS) and participation in trace specific courses and workshops (e.g., microscopy courses, TWGFEX symposium).

For objective 2, we will purchase a complete digital image management system to include image capture, enhancement, analysis, tracking and archiving for the [redacted] and [redacted] trace sections. To meet objective 3, we will upgrade five stereomicroscopes with ergonomic heads, the [redacted] FTIR CsI window with a KBr window, the Pendleton lab trace processing microscopes with a ring-light and polarizing filters, and the [redacted] compound microscope with a fluorescence attachment. In addition, we will purchase an additional Leica MZ16 stereoscope for the [redacted] lab. We will

purchase a particle atlas and various hair, fiber and/or paint reference standards to meet objective 4. In addition, we will continue our subscription to SoleMate and subscribe to TreadMate.

Meeting these objectives and the scope of this proposal will increase the capacity of our trace services, minimize bottlenecks, and increase efficiency of trace evidence processing, screening and analysis. This will ultimately enhance our trace service to the state of [redacted] by providing better digital image management tools and training, equipment and reference materials to our analysts to perform their job more efficiently. The expected outcome of which will result increased quality of casework, a decrease in turn-around time and a decrease in the trace case backlog.

## *II. Enhancement of Trace Services for* [redacted]

### *A. Background*

All six [redacted] laboratories perform trace processing and screening, only two laboratories, [redacted] and [redacted], have analysts that perform trace analysis and comparisons. The [redacted] lab currently has three FTEs (two full time trace analysts), spread across seven analysts that perform trace analysis and comparisons in hairs, fibers, paint, glass, arson, impressions (shoe & tire) and physical match. The [redacted] laboratory has 1.5 FTEs (one full time), spread across three analysts that perform trace analysis in hairs, fibers, paint, impressions (shoe & tire) and physical match. Two analysts, one in [redacted] and one in [redacted], are currently in training for trace paint analysis.

Trace processing and screening is the initial evaluation of physical evidence by forensic scientists for trace evidence. The processing analyst uses physical, microscopic and chemical analysis to locate and isolate items of probative value, provides timely investigative leads to submitting agencies, excludes evidence from further examination, issues reports and testifies in court regarding their examinations. Any probative evidence that requires further analysis or comparison is forwarded to other forensic scientists who specialize in trace analysis and comparisons. The [redacted] currently has seven trace processing analysts; one in [redacted] and two in

[redacted]. Three analysts are in training in [redacted] and one is in training in [redacted]. All trace comparison analysts are also qualified to perform trace processing and screening.

***Trace Case Backlog and Turn-Around Time***

Trace comparison requests have increased by 44.7% since 2005 with the largest increase in requests in impressions; we have had a 58.8% increase in impression requests in the first five months of 2009 compared to the total number of requests received during 2005. Pending cases or the case backlog has also increased since 2005. The trace comparison case backlog has increased by 55% since 2005 (18 requests in 2005 to 40 requests in the first five months of 2009). The trace processing and screening case backlog has increased by 52% since 2005 (27 requests in 2005 to 56 requests in the first five months of 2009). The biggest increase in backlog has occurred in the impression sub-discipline. We have worked to minimize the trace backlog by hiring and training forensic scientists in the various trace sub-disciplines. Since 2007, we have trained two individuals in impressions, one in glass and one in hair analysis.

Trace requests turn-around times have decreased since 2005. The total turn-around time (TTAT) for a trace request in 2005 was 113 days with the analytical turn-around time (ATAT[1]) being 58 days. Both TTAT and ATAT have decreased in the first five months of 2009 to 81 days and 27 days respectively. A decrease in turn-around time with an increase in backlog indicates that we are working rush cases or priority cases only.

***Statement of Problem***

We have had both an increase in trace requests as well as an increase in the trace backlog since 2005. Initially, the plan was to train additional analysts to keep up with the increase in the number of requests. However, training analysts alone has proven insufficient to provide quality service to our customers in a timely fashion. Through evaluation of the trace workflow, several inefficient workflow

[1] ATAT is the time the analyst starts working the case to the time the report is mailed to the customer.

processes and bottlenecks have been identified. Primarily, there is a lack of fully optimized, compatible and dedicated equipment in the trace sections. Equipment and instruments used routinely for trace analysis have not been upgraded for several years, some equipment (e.g., cameras) is shared with other sections and is not dedicated equipment for trace analysis, and some equipment, purchased as individual elements, has been pieced together to meet the needs of the unit but often does not function as a fully compatible system. In addition, as the number of analysts performing trace analysis has increased, we are having bottlenecks at microscopes as analysts wait to use the equipment.

Reference materials for comparisons and the identification of unknown materials are outdated and reference standards are typically collections that have been pieced together from various sources which often lack true traceability. In some cases, we simply do not have the references needed for comparison (e.g., particle atlas or TreadMate). As such, the identification of an unknown material may not occur. While specific trace training and workshops are available, we often do not have the resources to send an analyst as the priority is to participate in the broader professional meetings (e.g., AAFS or IAI).

### *B. OBJECTIVES AND ACTION PLAN*

The objectives are to 1.) enhance trace analysts' skills and knowledge in various trace disciplines by providing specific trace training opportunities, 2.) optimize workflow to increase the efficiency of digital image capture, enhancement, analysis and archiving by compiling a complete digital image management system, 3.) minimize bottlenecks and increase capacity by purchasing and upgrading trace equipment and 4.) improve the quality of trace analysis by purchasing reference standards and materials for use in hair, fibers, paint and impression comparisons.

#### *Objective 1 – Enhance Trace Analyst's Skills & Knowledge*

We will provide various training opportunities to our trace analysts to enhance their analysis and comparison skills. We will host a polarized light microscopy (PLM) course. This course will be offered to all our trace comparison and processing analysts as all use PLM. We will also host a trace

in-service for all our trace and trace processing analysts. This two day in-service will provide opportunity for these analysts to discuss the various trace disciplines needs, current trends, and new technologies. We will pursue trace specific training (e.g., microscopy courses or the arson symposium) to build the skills and knowledge base of our trace analysts. In addition, analysts will be provided with opportunities to attend various workshops and professional meetings (e.g., AAFS or IAI).

***Objective 2 – Optimize Workflow to Increase Efficiency***

The trace sections in both [redacted] and [redacted] labs do not have appropriate, dedicated photographic equipment and often borrow this equipment from the crime scene section; when not in use, this equipment is stored in the crime scene section. Even if the equipment is available, the inefficiency of having to track down the appropriate photographic gear would be eliminated with dedicated photographic equipment for the trace section. Thus, to optimize workflow and minimize this inefficiency, we will purchase a dedicated SLR digital camera and zoom lens for the [redacted] and [redacted] trace sections. These cameras will be used for the capture of trace digital images which are used primarily for examination documentation and for comparisons. Dedicated cameras will increase productivity by reducing the need for the analyst to search for an available camera as well as optimize workflow since the camera capture station will not need to be broken down to make the camera available for crime scene work.

The trace sections lack a digital image management system. The trace impressions sub-discipline receives the most requests; for every impression, whether known or unknown, the impression must be digitally photographed or scanned, often multiple times if there are multiple enhancement processes. Standard digital imaging requirements mandate archiving the original captured image files, along with all copies of any image files that were subjected to computerized enhancement. On average, each digital image file of a single impression exceeds 15MB of file space and frequently there are over a dozen files per case. The quantity of archived images gathered in routine cases rapidly exceeds the

hard drive capacity of the computers. Capturing, archiving, moving, and otherwise managing the digital image workflow must be performed manually by the analyst, significantly slowing down the work flow. The management of these images is cumbersome and each analyst and laboratory manages these images differently. To streamline the digital image process from capture to archive, create uniformity within the division between analysts and among the laboratories, minimize the chance of mishandling, increase image security, and to have a system that will verify the authenticity of our digital images, we will purchase and implement a total digital image management system, similar to the ADAMS system used in latent prints. Implementation of such an image management system would increase workflow efficiency as well as enhance the quality of the work performed.

***Objective 3 – Minimize Bottlenecks & Increase Capacity***

We will purchase new equipment as well as upgrade current equipment to minimize bottlenecks and increase our capacity in trace analysis casework. The [redacted] trace lab has two Leica MZ16 stereoscopes, each with a camera attachment and ergonomic head. These scopes are used to screen, photograph and examine evidence in the trace sub-disciplines of hair, paint, fibers, glass, physical match and miscellaneous trace. When in use, the scopes are generally occupied for hours or days at a time by the caseworker. With four [redacted] analysts trained in these disciplines, we currently have to schedule around each other to access these scopes. This may delay the start of casework or create gaps mid-case in which an analyst is storing items of evidence awaiting scope time. Due to the nature of trace work and the minuscule evidence involved, the stereoscope bench spaces must be thoroughly cleaned between cases and sometimes between exhibits. Having an additional stereoscope would increase our ability to maintain a more steady workflow, as well as allow for rush cases to be processed immediately without disrupting the work of other analysts mid-examination.

Screening for trace evidence is often a tedious and time consuming process which forces the analyst to sit in one position for a long period of time. Therefore, it is essential to find the most

comfortable position possible and maintain proper posture to minimize strain and fatigue. Strain and fatigue can cause a loss of focus and a desire to rush; this increases the possibility that evidence will be mishandled or incompletely or inaccurately examined. To minimize the strain, we will purchase five ergonomic heads, one each for the [redacted] trace processing stereoscopes. Ergonomic heads combined with adjustable chairs, allows the analyst to maximize comfort, thus, optimizing workflow, increasing efficiency, and enhancing quality.

The [redacted] comparison microscope will be upgraded with a fluorescence attachment. This will be used for fiber and paint analysis and will enhance the capabilities of our trace unit by providing fluorescence fiber comparison capabilities. A ring-light and polarizing filters will be purchased to upgrade the Pendleton lab trace processing microscopes. A ring-light will add optimal, even illumination to the stereoscope without having to continually, manually adjust the light source and will provide freedom of movement around the specimen. Polarizing filters will be added to the compound microscope. These filters will aid in reducing glare and will provide an additional screening tool for the determination of mixtures, thus, increasing the labs screening capabilities.

The [redacted] FTIR will be upgraded with a potassium bromide (KBr) window. The instrument currently uses a cesium iodide (CsI) window. The CsI window is currently clouded due to atmospheric water. Replacing this window with the KBr window will eliminate this problem as the KBr window is resistant to atmospheric water. Replacing this window on the FTIR will enhance the laboratories capabilities and the quality of the work product.

***Objective 4 – Improve Quality of Trace Analysis***

To improve the quality of trace analysis, a particle atlas and various hair, fiber, and/or paint reference standards will be purchased. In addition, a subscription to SoleMate will be continued and a subscription to TreadMate will be initiated. These types of references will aid the analyst in the identification of unknown evidence items. The SoleMate reference database (Shoeprint Image,

Capture, and Retrieval or SICAR) offers the analyst the opportunity to review thousands of known shoes, and can aid in the identification of the make and model of the shoe that created the print. As expected, new shoes are always in development and as such new shoe standards are added to the database regularly. SoleMate updates are offered quarterly and are paid for through a yearly subscription. TreadMate is a database of tire treads. Currently, we use a hard copy of *Tread Design Guides* in addition to an electronic version of the same guide. It is not integrated into SICAR, but TreadMate would be. Reference standards will provide the analysts with a larger variety of materials for comparisons while ensuring traceability. This will increase productivity by reducing research time as well as enhance the trace sections capabilities by being able to more easily identify a variety of materials.

## *III. BENEFITS AND CONCLUSIONS*

The expected benefits and outcomes are:

1. Increased efficiency of trace services by eliminating bottlenecks and optimizing workflow processes which results in a decreased turn around time and a decreased backlog in trace casework
2. Enhanced quality of service in Trace processing, screening and analysis by providing upgraded equipment (microscopes & FTIR), a digital image management system and traceable standard reference collections
3. Enhanced skills & knowledge base of Trace analysts by providing training on specific trace discipline topics
4. Enhanced capabilities by incorporating fluorescence microscopy analysis, a digital image management system and by providing reference materials & impression databases for comparison

## *IV. COLLECTION OF PERFORMANCE MEASURE DATA*

Several performance measures including the total turn-around time and the analytical turn-around time will be monitored. Total turn-around time is the number of days between the submission of a request to the lab to the mailing of the report to the requesting agency. The analytical turn-around time is the number of days from when the analyst begins the analysis of the evidence to the mailing of the

report. We will calculate the change in turn-around time every six months and compare this to the initial turn-around time from the beginning of the grant period. The change in the number of backlogged cases will be evaluated every six months. This data is available and tracked in our laboratory information management system. The number of individuals receiving training or participating in continuing education opportunities will be tracked.

## *APPENDICES*

## APPENDIX 1

### *FIGURE 1. STATE LABORATORIES*

Insert picture of State with State Laboratories Identified.

## APPENDIX 2

### *LIST OF KEY PERSONNEL*

### *BASE AND COMPETITIVE FUNDS*

| | |
|---|---|
| Department of XXX<br><br>Administrating Representative and Point of Contact: | |
| Key Personnel: | |

# Budget Detail Worksheet & Budget Narrative

***Paul Coverdell Forensic Science Improvement Grants Program***
***October 1, 2009 through September 30, 2010***
**Competitive Grant**

A. Personnel--List each position by title and name of employee, if available. Show the annual salary rate and the percentage of time to be devoted to the project. Compensation paid for employees engaged in grant activities must be consistent with that paid for similar work within the applicant organization.

| Name/Position | Computation | Cost |
|---|---|---|
| ***NONE*** | | |
| | **TOTAL** | **$0.00** |

**B. Fringe Benefits**--Fringe benefits should be based on actual known costs or an established formula. Fringe benefits are for the personnel listed category (A) and only for the percentage of time devoted to the project. Fringe benefits on overtime hours are limited to FICA, Workman's Compensation, and Unemployment Compensation.

| Name/Position | Computation | Cost |
|---|---|---|
| ***NONE*** | | |
| | **TOTAL** | **$0.00** |
| | **Total Personnel & Fringe Benefits (Competitive )** | **$0.00** |

**C. Travel**-- Itemize travel expenses of project personnel by purpose (e.g., staff to training, field interviews, advisory group meetings, etc. Show the basis of computation (e.g., six people 3-day training at $X airfare, $X lodging, $X subsistence). In training projects travel and meals for trainees should be listed separately. Show the number of trainees and unit cost involved. Identify the location of travel, if known. Indicate source of Travel Policies applied, Applicant or Federal Travel Regulations.

***Purpose of Travel***

| **In-State Training (Competitive Funds)** | ***Location*** | ***Item*** | ***Computation*** | | | ***Cost*** |
|---|---|---|---|---|---|---|
| | | | ***$ per day*** | ***# students*** | ***# days*** | |
| Polarized Light Microscopy Course | Lab Training Room | Meals | $39.00 | 8 | 5 | $1,560.00 |
| Spring 2010 | (16 total with 8 commuting) | Lodging | $85.00 | 8 | 5 | $3,400.00 |
| Trace In-Service for all trace analysts (hair, fiber, paint, impressions, arson, glass, processing, physical match) | Lab Training Room (20 total with 10 commuting) | Meals | $39.00 | 10 | 3 | $1,170.00 |
| Summer 2010 | | Lodging | $85.00 | 10 | 3 | $2,550.00 |
| Northwest Association of Forensic Scientists (NWAFS) | | Meals | $44.00 | 2 | 5 | $440.00 |
| September 2010 | Portland, OR | Lodging | $98.00 | 2 | 5 | $980.00 |
| | | | | | **Total In-state Training (Competitive Funds)** | **$10,100.00** |

| ***Purpose of Travel*** | ***Location*** | ***Item*** | ***Computation*** | | | ***Cost*** |
|---|---|---|---|---|---|---|
| **Out-of-State Training (Competitive Funds)** | | | ***$ per day*** | ***# Students*** | ***# days*** | |
| IAI joint with PNW-IAI | | Meals | $49.00 | 2 | 5 | $490.00 |
| July 11-17, 2010 | Spokane, WA | Lodging | $83.00 | 2 | 5 | $830.00 |
| | | Airfare | $500.00 | 2 | | $1,000.00 |
| American Academy of Forensic Scientist (AAFS) | | Meals | $64.00 | 2 | 5 | $640.00 |
| February 22-27, 2010 | Seattle, WA | Lodging | $158.00 | 2 | 5 | $1,580.00 |
| | | Airfare | $0.00 | Driving | | $0.00 |
| McCrone Research Institute | | Meals | $64.00 | 1 | 5 | $320.00 |
| Microscopy of Explosives | Chicago, IL | Lodging | $218.00 | 1 | 5 | $1,090.00 |
| October 2009 | | Airfare | $550.00 | 1 | | $550.00 |
| TWGFEX Arson Symposium | | Meals | $49.00 | 1 | 5 | $245.00 |
| September 2010 | Orlando, FL | Lodging | $133.00 | 1 | 5 | $665.00 |
| | | Airfare | $550.00 | 1 | | $550.00 |

**Total Out of State Travel/Training (Competitive Funds)** **$7,960.00**

**TOTAL IN-STATE & OUT-OF-STATE TRAVEL/TRAINING (Competitive Funds)** **$18,060.00**

**Budget Narrative:** We will provide in-state training in polarized light microscopy for ~16 Trace analysts. A Trace in-service will also be scheduled for all trace and trace processing analysts. This will provide these analysts the opportunity to discuss the Trace unit needs, issues and current technologies. Two analysts will also participate at the NWAFS meeting. In-state training will occur primarily in the Forensic Laboratory which has a training room, access to a vehicle bay, computers and forensic supplies. Out-of-state training opportunities will be evaluated as they occur and may include attendance at the IAI, AAFS, TWGFEX symposium and a McCrone Research Institute workshop on explosives. Lodging, meals and transportation costs will be at the State per diem rate for in-state training and at the Federal per diem rates for out-of-state training. The Agency and Department of Administrative Services travel polices will be followed.

**D. Equipment**-- List non-expendable items that are to be purchased. (Note: Organization's own capitalization policy for classification of equipment should be used. Expendable items should be included in the "Supplies" category. Applicants should analyze the cost benefits of purchasing versus leasing equipment, especially high cost items and those subject to rapid technical advances. Rented or leased equipment costs should be listed in the "Contractual" category. Explain how the equipment is necessary for the success of the project. Attach a narrative describing the procurement method to be used.

| **Item** | **Computation** | **# per lab** | **Unit** | **Cost** |
|---|---|---|---|---|
| 1. Digital Image processing, management & repository system | $8,909.50 | | 2 | $17,819.00 |
| 2. SLR Digital Camera | $2,000.00 | | 2 | $4,000.00 |
| 3. Zoom Lens | $485.00 | | 2 | $970.00 |

| | | | |
|---|---|---|---|
| 4. Stereomicroscope Ergonomic Heads | $3,860.00 | 5 | $19,300.00 |
| 5. MZ16 Stereoscope | $18,000.00 | 1 | $18,000.00 |
| 6. KBr window for FTIR | $1,850.00 | 1 | $1,850.00 |
| 7. Ring-light and polarizing filters for Pendleton Lab Trace-Processing Stereoscope | $578.00 | 1 | $578.00 |
| 8. Fluorescence attachments for Comparison Microscope | $19,221.00 | 1 | $19,221.00 |

**TOTAL EQUIPMENT (Competitive Funds)** **$81,738.00**

**Budget Narrative:** Two Trace Impression examiners, a Trace Glass examiner and a Trace Hair examiner have recently been added to the Division. In addition, we currently have another examiner training in Trace Paint. This has necessitated a need for equipment that will aid in improving workflow and increased productivity in both laboratories.

**Equipment Items 1-3** - Images of exemplars and evidence are essential for trace evidence analysis and comparisons. We will purchase two digital image managment systems which will include processing and mangement software & an image repository for image tracking and archiving. An SLR digital camera with a zoom lens will be purchased for image capture.

**Equipment Item 4** - Ergonomic heads will be purchased for five of our stereomicroscopes used for trace processing. These ergonomic heads will reduce stress on a person's neck while viewing through a microscope for a long period of time.

**Equipment Item 5** - An additional MZ16 Stereoscope will be purchased for the Lab Trace Unit. There are currently four trace examiners and two stereoscopes available. The stereoscopes are used in nearly all trace evidence examinations and it is not uncommon for a bottleneck to occur waiting for a stereoscope to become available. An additional stereoscope will minimize this bottleneck and increase productivity.

**Equipment Item 6** - The KBr window for the lab FTIR will replace the CsI window that is currently clouded due to atmospheric water; KBr is resistant to atmospheric water.

**Equipment Item 7** - A ring-light and polarizing filters will be purchased to upgrade the Lab trace processing microscope. A ring-light will add optimal, even illumination without having to manually adjust the light source. In addition, the ring-light will provide freedom of movement around a specimen. Polarizing filters will aid in reducing glare and will provide an additional screening tool for the determination of mixtures.

**Equipment Item 8** - A fluorescence attachment will be purchased for the comparison microscope. This will be used for fiber and paint analysis and will enhance the capabilities of our trace unit by providing fluorescence fiber comparisons.

**E.-Supplies**--List items by type (office supplies, postage, training materials, copying paper, and other expendable items such as books, hand held tape recorders) and show the basis for computation. Generally, supplies include any materials that are expendable or consumed during the course of the project.

| Supply Items | Computation | Unit | # of Labs | Cost |
|---|---|---|---|---|
| Particle Atlas on CD-ROM | $210.00 | 1 | 2 | $420.00 |
| Reference Standards & Collections (e.g., Hair, Fiber) | $2,000.00 | 2 | 2 | $8,000.00 |

**TOTAL SUPPLIES (Competitive Funds)** **$8,420.00**

**Budget Narrative:** The comparative nature of trace analysis requires known samples to be available for comparison to unknown samples submitted for analysis. The particle atlas and hair & fiber reference standards will provide quality known references for the vast array of substances that could be received as trace evidence.

**F. Construction**-- As a rule, construction costs are not allowable. In some cases, minor repairs or renovations may be allowable. Consult with the program office before budgeting funds in this category.

| Purpose | Description of Work | Cost |
|---|---|---|
| ***NONE*** | | $0.00 |

**TOTAL** **$0.00**

**G. Consultants/Contracts**-- Indicate whether applicant's formal, written Procurement Policy or the Federal Acquisitions

**Consultant Fee:** For each consultant enter the name, if known, service to be provided, hourly or daily fee (8-hour day), and estimated time on the project. Consultant fees in excess of $450 per day require additional justification and prior approval from OJP.

| Name of Consultant | Service Provided | Computation $/day | Computation # of days | Cost |
|---|---|---|---|---|
| ***NONE*** | | | | $0.00 |

**Consultants (Competitive Funds)** **$0.00**

**Consultant Expenses:** List all expenses to be paid from the grant to the individual consultant in addition to their fees (i.e., travel, meals, lodging, etc.)

| Item | Location | Computation | Cost |
|---|---|---|---|
| ***NONE*** | | | |

**Consultant Expenses** **$0.00**

**Contracts**: Provide a description of the product or services to be procured by contract and an estimate of the cost. Applicants are encouraged to promote free and open competition in awarding contracts. A separate justification must be provided for sole source contracts in excess of $100,000.

| Item | Location | Computation | Cost |
|---|---|---|---|
| ***NONE*** | | | |

**Contracts (Competitive Funds)** **$0.00**

**CONSULTANTS/ CONTRACTS TOTAL** **$0.00**

**H. Other Costs**-- List items (e.g., rent, reproduction, telephone, janitorial or security services, and investigative or confidential funds) by major type and the basis of the computation. For example, provide the square footage and the cost per square foot rent, and provide a monthly rental cost and how many months to rent.

| Description | | Registration | Analysts | Cost |
|---|---|---|---|---|
| **In-State Training Registration** | | | | |
| Polarized Microscopy Course | Lab Training Room | $350.00 | 16 | $5,600.00 |
| **Out-of-State Professional Conferences/Meetings Registration** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| IAI | Registration | $400.00 | 2 | | $800.00 |
| AAFS | Registration | $300.00 | 2 | | $600.00 |
| Microscopy of Explosives | Registration | $1,700 | 1 | | $1,700.00 |
| | | **Subscription** | **Years** | **Lab** | |
| SoleMate annual subscription | | $2,870.00 | 1 | 2 | $5,740.00 |
| TreadMate annual subscription | | $1,171.00 | 1 | 2 | $2,342.00 |
| | | **OTHER TOTAL (Competitive Funds)** | | | **$16,782.00** |

**Budget Narrative:** Other costs include registration for in-state and out-of-state training at professional conferences and workshops. In addition, we have other costs for the purchase of an annual subscription for SoleMate and TreadMate shoe impression databases. Our current SoleMate version is from 2009. Obtaining the 2010 version will keep this subscription current. The purchase of TreadMate will be our initial purchase of this subscription.

**I. Indirect Cost**--Indirect costs are allowed only if the applicant has Federally approved indirect cost rate. A copy of the rate approval, (a fully executed, negotiated agreement), must be attached. If the applicant does not have an approved rate, one can be requested by contacting the applicant's cognizant Federal agency, which will review all documentation and approve a rate for the applicant organization, or if the applicant's accounting system permits, costs may be allocated in the direct costs categories.

| **Description** | **Computation** | **Cost** |
|---|---|---|
| ***NONE*** | | |
| | **TOTAL** | **$0.00** |

**Budget Summary**--When you have completed the budget worksheet, transfer the totals for each category to the spaces below. Compute the total costs and the total project costs. Indicate the amount of Federal requested and the amount of non-Federal funds that will support the project.

| **Budget Category** | **Competitive Funds Amount** |
|---|---|
| **A. Personnel** | $0.00 |
| **B. Fringe Benefits** | $0.00 |
| **C. Travel** | $18,060.00 |
| **D. Equipment** | $81,738.00 |
| **E. Supplies** | $8,420.00 |
| **F. Construction** | $0.00 |
| **G. Consultants/Contracts** | $0.00 |
| **H. Other** | $16,782.00 |
| **Total Direct Costs** | $125,000.00 |
| **I. Indirect Costs** | $0.00 |
| **TOTAL PROJECT COSTS** | **$125,000.00** |
| **Federal Request** | **$125,000.00** |
| **Non-Federal Amount** | $0.00 |

**NOTE:** If a Non-Federal amount is entered, make sure those items for which they will be used must be incorporated into your overall budget. Indicate clearly throughout you budget narrative and detail worksheet for which items these funds will be used.