

POSITION DESCRIPTION FORM (PD-102R-92)

APPROVED CLASSIFICATION: _____

EFFECTIVE DATE: _____

ANALYST: _____

(This space for Personnel Department Use Only)

7. Pres. 15 Digit Pos. No. | Prop. 15 Digit Pos. No.

8. Department, University, Commission, or Agency
Department of Justice

9. Institution & Division
State Bureau of Investigation / Crime Lab

10. Section and Unit
Molecular Genetics Section

11. Street Address, City and County
SBI Laboratory, 121E. Tryon Rd. Raleigh, NC

12. Location of Workplace, Bldg., and Room No.
Crime Laboratory

1. Present Classification Title of Position
Forensic Molecular Geneticist Team Leader

2. Usual Working Title of Position
DNA Database Manager

3. Requested Classification of Position

4. Name of Immediate Supervisor
Michael J. Budzynski

5. Supervisor's Position Title & Position Number
Mol. Gen. Supervisor/3613-0000-0002-100

6. Name of Employee

I. A. PRIMARY PURPOSE OF ORGANIZATIONAL UNIT:

The primary purpose of the Molecular Genetics Section is to accept and analyze evidence in criminal cases for the presence and source of body fluids and to report these findings to Law Enforcement officers and the courts. The primary purpose of the DNA Database, pursuant to NC State General Statutes 15-266, is to receive and analyze blood samples from convicted felons to produce a DNA profile to be maintained in a State and National DNA Database. These databases will be used to assist federal, State, and local criminal justice and law enforcement agencies in the identification, detection, and exclusion of individuals who are subjects of criminal investigations.

B. PRIMARY PURPOSE OF POSITION:

The primary purposes of this position include:

- To serve as the supervisor of the DNA Analysts within the Molecular Genetics Section
- Provide specialized DNA case working analysis in the Molecular Genetics Section.
- Maintain documentation of chain of custody, lab reports, and reports stating the results of analysis.
- Testify to the results in court.
- Serving as Manager of the DNA Database Unit(A Section Team Leader), the technical expert in genetics, procedures, and equipment for the Unit
- Receipt and analysis of blood samples from convicted felons
- Managing the rapidly changing technology demanded by CODIS
- STR typing of blood samples from convicted felons
- Maintaining documentation of chain of custody, lab reports, and reports stating the results of analysis
- Maintaining professional standards through training
- Communicating with public officials
- Assisting at crime scenes.
- To serve search warrants in the event of CODIS hits.

C. WORK SCHEDULE:

171 hours/28 day cycle. The regular work hours are from 7:30 am to 4:30 pm.

D. CHANGE IN RESPONSIBILITIES OR ORGANIZATIONAL RELATIONSHIP:

Since the job study concluded by the Department of Justice Personnel Section in January, 2001, this position has become a that of a sworn officer and a full team leader within the section.

of job duties to Database Analysts, and insuring each analyst is supplied with a sufficient number of samples each week to analyze. The samples originating from convicted offenders, as well as, the unit is responsible for handling and the analysis of non-suspect sexual assault kits. These kit will analyzed using standard forensic techniques to identify body fluids and to develop into a DNA profile to enter into CODIS. Other duties of the DNA Database Manager are to review all files/reports generated by the Database Analysts, to upload all files entered by DNA Database Analysts into CODIS (**CO**mbined **DNA** Indexing **S**ystem- a National DNA Database system established by the FBI consisting of known DNA profiles of convicted felons and unsolved case profiles), to maintain an inventory and to order supplies needed by this unit, and to maintain written and oral communications with the State's 100 sheriff's departments and officials at the Department of Corrections. In addition it is the responsibility of the Database Manager in conjunction with the Special Agent in Charge (SAC) of the Molecular Genetics Section to insure proper documentation and destruction of erroneously submitted blood samples which we are not entitled to under the law. The DNA Database Manager is also responsible for the Quality Assurance/Control functions within the Unit and to ensure that all National Standards set for Quality Assurance by the FBI Director (through the DNA Advisory Board are met).

The DNA Database Manager serves as CODIS Manager. The N.C.S.B.I. DNA Database is linked via our Local Area Network (LAN) to the National DNA Database established by the FBI. The DNA Database Manager is the only authorized individual to update the state and national CODIS Indexes with new DNA profiles determined by analysts from the blood standards of convicted felons. The Database Manager / CODIS Manager will also be responsible for expunging any profile as required by law. The CODIS Manager is assisted in these tasks by several assistants.

The DNA Database Manager serves as North Carolina CODIS State Administrator. The State Administrator has the authority over all local laboratories which upload to North Carolina's State Database. The State Administrator is responsible for making sure all labs under their authority is in compliance with NDIS standards. If a laboratory or a user falls out of compliance the State Administrator has the authority to discontinue the laboratory or the user's access to CODIS. It is State Administrator's responsibility to maintain all paper work required for NDIS participation for both users and laboratories.

The DNA Database Manager/ CODIS Manager both serve as the local area network administrators and must be proficient with computers, networks, various types of software. A considerable amount of computer science skills are required to perform this function and include the loading of new software, familiarity with ether net communication systems (the hardware that allows individual computers to converse with each other and the file server) , communication servers and the Criminal Justice Information System - Wide Area Network (CJIS-WAN) (the computers that "interpret" between our CODIS system and the FBI's CODIS network).

The DNA Database Manager / CODIS Manager and his assistants are the only individuals within the Molecular Genetics Section authorized to conduct searches at the state and national level between unsolved case files and convicted offender samples. The confidential nature of conducting such searches is the subject of state and national laws and criminal sanctions are unauthorized for improper use and release of information from CODIS. The DNA Database Unit Manager will have to communicate with officials of other state and federal database units when the CODIS system gets a "hit" from an unsolved case to an offender code; to identify who the code belongs to, and to re-analyze the sample as required by CODIS before release of the information to the investigating agency. The DNA Database Unit Manager is also responsible for training employees in the use of the CODIS software.

Occasionally, periodic checks of the CODIS DNA computer system will reveal a match or "hit" between a convicted offender in the database and evidence previously submitted in a case where the initial analysis revealed a non-match. Any time a "hit" or match is made by the CODIS DNA computer system, this position may have to generate and serve a search warrant. This position has been tasked with obtaining and serving search warrants pursuant to CODIS generated "hits". As more offenders are entered into the computer system and more cases are typed with DNA techniques, this job function will increase in frequency.

The DNA Database Manager is also one of the three Team Leaders for the Molecular Genetics Section. Team Leaders are the Molecular Genetics Section's front line supervisors. In this capacity they are responsible for assigning and approving work of members of their Team and for the administrative management functions associated with their unit, including but not limited to, reviewing the expense accounts, generating supply orders, time management functions, and advising the Special Agent In Charge on new technologies available. Team Leaders will also be responsible for handling the duties of the Special Agent In Charge when he is out of the office. Each trained analyst within the DNA Database Unit independently conducts DNA testing on samples retrieved from the DNA Repository. The technology

used within the DNA Database is rapidly changing. In 1995 the Unit was using first generation Restriction Fragment Length Polymorphism (RFLP) testing and hybridizing using radioisotopes. That technology required about 2 months to complete the DNA typing of a set of samples. By mid-1996 the unit was using a newer, safer hybridization process known as chemi-luminescence probing, which reduced the time taken to obtain a result to less than a month. The DNA Database Unit Manager was responsible for bringing this technology not only to the DNA Database Unit, but also trained and validated the process for the case analysis nit as well.

In 1998 the DNA Database Unit Manager was responsible for validating the use of new 4th generation DNA technology known as Short Tandem Repeat (STR) DNA testing, which is based on the use of the Polymerase Chain Reaction (PCR) principle. Again, the DNA Database unit pioneered the introduction of this new technology in our laboratory because the driving force in forensic DNA testing is CODIS. The need for national standardization, fast turn-around-time to process the thousands of samples and cases, has driven the forensic DNA community on a quest for faster, easier ways to conduct this testing. CODIS is now requiring that Database and case work labs conduct thirteen (13) individual STR tests (loci) on each sample in order to enter the sample for searching in CODIS. The Molecular Genetics Section currently has validated eight (8) of these loci, and the Database Unit Manager will be responsible for validating the additional five (5) loci. In addition, the DNA Database Unit Manager will be responsible for setting up, programing, and validating the Units new \$ 157,000.00 DNA Robotic Workstation, which should eliminate much of the manual labor associated with DNA testing procedures, freeing up analysts for the critical interpretation portion of the analysis. The Robotic workstation has the capacity to prepare dried bloodstains from liquid blood samples received, dry the stains on special impregnated paper, punch the stained paper into 96 well microtiter plates, extract and purify the DNA in the punches, and add the various reagents to carry the samples to the DNA amplification steps (see section d below).

New advances on the horizon include the use of DNA chip technology, where tests are run and results analyzed on silica chips using microprocessors. This technology s less than two years from delivery to forensic laboratories and will once again necessitate the re-validation of procedures within the DNA Database Unit.

Not only is the DNA Database Unit Manager responsible for keeping abreast of new technology, but the position is responsible for training analysts within the Database Unit in new procedures to ensure they are competent analysts capable of producing correct, reproducible results. The SBI is a nationally accredited laboratory by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB). The accrediting agency requires complete validation of new procedures and documented training programs for analysts, supplemented by an on-going proficiency testing program. The DNA Database Unit Manager is also responsible for seeing that the Database Unit is compliant with all accreditation standards (as well as previously mentioned National Quality Assurance Standards).

***a. 13% - Analyzing evidence using the PCR STR DNA typing test**

The Molecular Geneticist is responsible for analyzing evidence using DNA typing tests to compare unknown body fluids with known standards. This involves receiving evidence in the form of blood and other body fluids, performing the PCR STR form of forensic DNA analysis on that evidence, writing a report based upon that analysis and then testifying to the findings in court.

Forensic DNA analysis is conducted because it provides the best method of determining differences between two individuals. Therefore, forensic DNA analysis provides the best method of excluding individuals who have been falsely accused of committing a crime.

Forensic DNA analysis using the PCR STR method involves basically a five-step process. The first step in this process is the isolation and purification of DNA from evidentiary samples as well as known standards. Because of the extreme sensitivity of this DNA technology, great care must be exercised to ensure that there is no cross contamination between any forensic samples. For this reason, the DNA extraction procedure for the evidentiary samples is separated by time and/or space from the known standards. Also, each piece of evidence is placed into its own separate test tube and the entire procedure is performed using strict aseptic techniques. To the perform the DNA extraction, chemicals are added to the samples which break open the cells releasing the DNA into solution. The DNA for each sample is concentrated using a membrane filtration system.

Quantitation of extracted DNA is required using a slot-blot apparatus. Chemiluminescent technology is utilized to effectively determine the amount of human DNA present. This process involves taking extracted DNA from known and question samples and fixing them to a membrane through a slot-blot apparatus. The apparatus uses a vacuum to pull the sample through a well and onto

a membrane. Once the DNA is on the membrane, it is probed with a human specific probe and treated with a luminescent chemical. After the luminescent chemical is modified, it will release energy in the form of light and be detected on x-ray film. The x-ray film is developed in a large film processing machine. The relative signal strength of the image compared to known standards allows the quantitation of DNA to be performed.

Small sequences of the DNA are then copied utilizing the polymerase chain reaction process. Polymerase chain reaction (PCR) is a laboratory process where small regions of DNA are copied millions of times. The regions that are copied are called Short Tandem Repeats (STRs). To perform PCR, the DNA samples are mixed with specific primer sequences of DNA that are fluorescently tagged, enzyme, and buffer, and amplified using thermocyclers. The thermocycler acts as a molecular Xerox machine for the DNA. The thermocycler must be programmed for different temperatures and times in order to accomplish the copying process. Essentially, the DNA is “unzipped” and the primers attach to the DNA. The enzyme in the reaction mixture then allows a copy of the DNA to occur. The result is millions of copies of the DNA that is specific to the primers.

Following PCR, the amplified DNA is separated by size through a process known as electrophoresis. Electrophoresis is the separation of charged particles in an electric field. A polyacrylamide gel is prepared with wells formed in one end into which the forensic samples are injected. When placed into an electric field, the DNA fragments present in these wells separate by size forming banding patterns.

The generation of data for interpretation of the DNA samples requires the use of laser imaging equipment and extensive computer programs to evaluate the profile and compute statistical calculations. First, the DNA in the gel is then analyzed on a FMBIO gel scanner. The polyacrylamide gel containing the fluorescently-labeled DNA fragments is placed in the scanner and the laser driven fluorescent imaging equipment scans the gel and produces an image of the DNA banding patterns in the gel. The image may be further analyzed using advanced Hitachi software. The computer compiles the data and assigns allelic values to the DNA banding patterns as well as determines the relative intensity of each band. This computer analysis aids the analyst in determining stutter (a PCR artifact), band intensity differences that aids in the determination of mixtures, and allelic values of microvariants and off-ladder variants. After computer analysis, the allelic designation for each STR locus is determined for each sample by the analyst, independent of the computer. From the results of the analysis, a match/non-match determination is made. If a match of a forensic sample to a known individual is made, the allelic designations are entered into complex computer programs that enable the analyst to estimate the frequency of the particular DNA profile in the population and enter the DNA profile into the Combined DNA Indexing System (CODIS) for comparison with DNA profiles from other cases and from convicted offenders within the State and across the United States. If there is a non-match between a forensic sample and a known sample, then the CODIS system is used to perform a search for a matching profile in the SBI DNA Database.

This analyst is responsible for technically reviewing case reports written by other section analysts. This review consists of a technical critique of data analysis, statistical computations, and conclusions. The data interpretation is checked for accuracy as well as the accuracy of the statistical calculations.

This analyst is responsible for the maintaining the day to day operation of forensic casework in the STR Unit. Day to day operations include, but is not limited to, ordering supplies, performing quality control (QC) checks on equipment and reagents, making and maintaining buffers and chemical reagents, cleaning the laboratory, decontamination of equipment, and verifying the accuracy of the equipment used. Delicate instrumentation is used to perform QC checks such as temperature verification units, anemometers, NIST certified weight sets, NIST certified thermometers, and NIST DNA tests. All tests must be documented as per sectional quality assurance guidelines.

The analyst must be knowledgeable of over 2000 scientific papers regarding the analysis and typing of blood and body fluids, both to have a thorough background and to withstand cross-examination in court. He must also be aware of assorted legal decisions and requirements on both analysis and chain of custody. His expert status must be recognized by each court in order to testify, based on his background and training. He must conduct his analysis essentially independently, subject only to review of his notes and reports, but not on the actual work involved.

Maintaining the documentation of chain of custody of evidence, writing reports, stating the results of analysis, reviewing the reports of other analysts and testifying to the results of analysis in court are also mandatory responsibilities of this position. Showing the ability to perform the DNA analysis correctly by accepting blind proficiency tests regularly and obtaining an accuracy of 100% is also an important duty. This testing involves both known proficiency tests as well as blind testing and being able to identify a match or non-match between two or more unknown samples. The analyst's report and findings are used routinely for police investigations, and for court by both prosecution and defense. 100% accuracy is required or justice is

compromised, letting a guilty suspect go free to the detriment of public safety or sending an innocent one to jail or death. Often the analyst's work is the only determining factor in an investigation or trial.

***c. 3% - STR tying of blood samples from convicted felons**

The DNA Database currently receives approximately 100 to 150 convicted felon blood samples per week. It is the responsibility of the analyst to verify information on submitted blood tubes and attached database cards for any discrepancies. Blood stains are made of all received blood samples and the information on the attached cards is entered into the DNA Database Data Entry computer. These samples are subsequently packaged in heat sealed envelopes and stored in ultra cold freezers. Members of the DNA Database Unit are responsible for the STR testing of blood samples from convicted felons to obtain their DNA profile to enter into CODIS. The STR testing process is a complicated procedure demanding attention to detail and constant guarding against contamination of the samples. The process starts with the extraction of DNA from each bloodstain card. This is accomplished using a Qiagen BioRobot 9604, which processes 96 samples (including controls) in approximately 3 ½ hours. The extracted DNA is then transferred to the Qiagen BioRobot 3000, where DNA polymerases, primers, etc are added to each sample. A 96-well tray of samples can be processed in approximately one hour. Operation and maintenance of these robots requires extensive training and computer literacy to keep production running efficiently.

From the BioRobot 3000, the tray of samples is transferred to a DNA thermal cycler. The thermal cycler (PCR process) mimics nature's mechanisms for replicating DNA and acts as a miniature DNA xerox machine in that billions of copies of DNA can be generated *in vitro* in a matter of hours. During this amplification/replication step, fluorescent dyes are incorporated into the DNA replicates. Needless to say, many negative and positive control samples are run along with the samples being tested. The DNA Database Unit Manager has designed quality systems, trained employees, and implemented policies and procedures for the unit to ensure that all Quality Control functions are covered and followed, and Database analysts are required to follow these quality control measures..

The samples are then placed in a vertical electrophoresis tank, where DNA is separated based on its molecular weight differences. The final stage of the process is the most complicated and requires the highest skill levels - the interpretation of results. The gel with the two or three dye labeled DNA is then placed on the Hitachi Gene Scanner and the results become visible on the computer screen. The analysis time on the computer system takes on average between 1 and 2 hours. Analysts have to perform color separations to ensure that dyes do not overlap the spectral range of each other, that all controls reacted as expected, that the samples can be called based on allelic ladders present, and that the visual calls match those generated by the computer. In case of disagreement, the analyst must edit the computer generated calls prior to saving the profiles to an Excel file (where the DNA Database Manager will check the data and upload it into CODIS).

Due to the extreme importance of the interpretation skills involved with STR testing, analysts have to complete a rigorous in-house training program, have a four year degree in a biological science and have college course work in genetics and biochemistry. Correct DNA profiles are necessary since the results are used for police investigations, and for court by both prosecution and defense. Results obtained by Database Analysts are relied on by the Special Agent In Charge when he obtains Search Warrants for known blood, hair, and saliva samples from convicted offenders identified as perpetrators of crime by CODIS hits between convicted offenders and unsolved cases. The DNA Database Manager may be required by the courts to testify on the testing procedures and results obtained in a CODIS "hit" case that formed the basis of the probable cause in the search warrant drawn in this case.

***d. 5% -Testifying to the results in court**

Court

An examiner regularly participates in court proceedings throughout the State of North Carolina. Oral testimony in these actions is considered to be one of the most important responsibilities. Opinion testimony is given to the court as to the examiner's findings from analysis of evidence submitted to the laboratory and/or of evidence located, collected and

preserved from crime scenes (See Section IV). Approximately 5% of this position's time is used to fulfill the obligations associated with the preparation, organization, and presentation of testimony in a trial. An examiner's participation in these proceedings may average from 12 to 36 times yearly and may require an examiner to be in court from one half of a day up to one week before being released from a subpoena.

An examiner is subpoenaed almost daily to appear or to be placed on standby for court throughout the State of North Carolina. This often requires the examiner to respond on short notice to appear in court several hundred miles from the Raleigh headquarters. Occasionally, an examiner must drive to two different locations in one day to give testimony in separate trials. The examiner must possess the ability to present scientific data in layman terms while remaining scientifically accurate and possess the ability to withstand intense cross-examination during these proceedings. Testimony must be presented in a professional, believable, and understandable manner.

Assistance is rendered to court officials by providing information and opinions in pretrial conferences which may occur either by telephone or in person. The information supplied during these pre-trial conferences is used by the prosecutor or defense attorney to prepare his case for court. Visual aids are frequently made by an examiner to illustrate crime scene diagrams or to list results of laboratory analyses for presentation to the jury. This position also requires knowledge of the rules of evidence as it applies to testimony and court proceedings and in grand jury testimony. As an expert witness, the examiner is also called upon to assist the prosecutor or defense attorney with formulating questions in the cross examination of witnesses on the stand.

The court must qualify an individual as an expert in the field of Forensic Molecular Genetics before expert testimony may be given. An examiner testifies in criminal cases ranging from a simple breaking and entering case to serious felony cases involving rape and murder. To that end, the testimony given by an examiner can directly corroborate or impeach statements of suspects or victims, thus impacting the administration of justice by the North Carolina court systems. The misrepresentation of testimony can deprive an innocent man of his life or liberty, or can cause a guilty party to go free.

As expected, court regularly interferes with the completion of casework, attendance of scheduled professional schools and meetings, as well as with personal and family arrangements (scheduled vacation, anniversaries or other plans). This particular aspect of this position requires an individual to be highly flexible with any outside commitments and/or family.

3% - Preparation and Service of Search Warrants

The ability to write and serve search warrants for blood, saliva, and hair standards pursuant to a DNA CODIS "hit" and to defend the search warrant in a court of law if challenged. Any time a "hit" or match is made by the CODIS DNA computer system between a DNA profile on record from a convicted offender and an unsolved case, this position will have to generate an Affidavit to attach to a search warrant and the search warrant itself. This position shall obtain and serve search warrants pursuant to a CODIS generated "hit". As more offenders are entered into the computer system and more cases are typed with DNA techniques, this job function will increase in frequency.

f. 2% -Maintaining professional standards through training

Every DNA Database Analyst, including the DNA Database Manager, must complete an extensive training program conducted in the lab. This involves lecture material, demonstrations, practice runs, supervised runs, reading the literature, written tests, and proficiency tests. As part of this training, the DNA Database Analyst may also complete several courses, including the following courses or their equivalent taught at North Carolina State University: Genetics, Biochemistry, GN 501, GN 502, GN 560, or some other university. Proficiency tests must be passed with 100% accuracy. After being trained in the various methods of DNA analysis, the trainee then works selected samples under close supervision. Upon completion of training, the trainee is allowed to accept and analyze blood samples.

Once the DNA Database Unit Manager completes their training program, they become the individual responsible for training new Database Analysts. It is the responsibility of the analyst to keep current in both legal and scientific literature since both are constantly changing. Every analyst attends at least one professional meeting a year. Workshops and conferences are also attended in order to keep the section current with the changing technology.

The DNA Database Unit Manager also receives training in the use of the CODIS software and how the LAN system works so that they can become proficient to perform the duties of the CODIS Manager.

*** g. 2% -Communicating with public officials**

Public contact requirements are an important part of this position. The DNA Database Manager must project a professional image in dealing with the public, law enforcement officers, correction officers, and the news media by telephone, written communications, and in person. DNA Database Analysts are also responsible for training and disseminating information and Database kits to law enforcement officers.

h. 1% -Maintaining documentation of chain of custody, lab reports, and reports stating the results of analysis

Chain of Custody

The DNA Database Analysts must maintain the chain of custody of samples submitted and removed from the Database by careful and accurate documentation.

Chain of custody is a legal term which applies to the accounting of all the successive steps involved in the handling of a specimen from the time of collection to the completion of analysis.

Maintenance of the chain of custody includes the following duties which the DNA Database Analyst must be able to perform.

- A. Proper packaging and identification of any sample collected from the convicted felon.
- B. Signing the inventory form and providing the submitting officer a copy as a receipt if sample is delivered to the lab.
- C. Noting the condition (sealed or unsealed) and how the sample is received at the lab if not hand delivered (First Class Mail, Certified Mail, UPS).
- D. Identification of the sample submitted by cross checking the information on the identification card with the attached blood sample.
- E. Providing proper storage (refrigeration for blood) and security for samples while in the lab.
- F. Insuring that the remaining blood stain is stored in a sealed and secure manner.

Laboratory Records

The DNA Database Analyst must maintain files/records in the lab which provide information about the blood sample submitted to the laboratory, procedures and methods used in analysis of the evidence and quality control of these procedures and methods. Records must be maintained which document that the tests were performed under the appropriate conditions (pH, time, voltage), that the reagents used in the performance of these tests worked correctly and that the control samples gave the correct results. Temperature charts of incubators, refrigerators and other equipment are also maintained.

***i 1% - Assisting at crime scenes**

Crime Scene Investigations

As an "on call" law enforcement officer, the Forensic Molecular Geneticist must be prepared to travel state-wide, on very short notice, in order to offer laboratory assistance in the field at a crime scene to any requesting law enforcement agency. The assistance requested may require on site collection of visible blood, interpretation of blood spatter

present, searching and seizing articles with noted body fluid stains present, chemically searching with luminol for invisible traces of blood, searching for and collecting seminal stains, and collecting standards from suspects. The Molecular Geneticist must take good field notes and have the ability to draw sketches and take photographs in order to produce an accurate final written report of the crime scene investigation. Knowledge of the laws concerning search and seizure are necessary when the Molecular Geneticist is requested to either assist in writing a search warrant application prior to a crime scene search or actually collect articles of evidence from the scene or the suspect's person.

Collection of Body Fluids

A visual examination of the crime scene may reveal stains which appear to be blood or seminal fluid. On site preliminary tests may be conducted and if these results are positive, then the stain may be collected by cutting the material, absorbing the stain onto clean cotton threads with distilled water, or seizing the entire article as evidence. Notes must be taken to identify the relative location from which the evidence was taken, the date and time, and the initials of the individual who collected the evidence. The evidence must be air dried and properly packaged, sealed, and secured for transport to the laboratory for further analysis by the Molecular Geneticist.

Blood Spatter Pattern Interpretation

Requests to examine the pattern(s) of visible blood stains at the crime scene are sometimes asked of the Molecular Geneticist in order to reconstruct the scenario which occurred for the officers. Valuable information concerning the direction and velocity of travel of the blood and the height and shape of the spatters may aid in corroborating statements made by witnesses.

Search and Seizure

Prior to conducting a crime scene search for evidence, legal jurisdiction and documentation must be established. Primarily, these steps are attended to by the requesting officer. The Molecular Geneticist, however, may be asked to assist in writing the search warrant application for the specific evidence to be obtained.

Likewise, prior to the collection of items or known samples being taken from the victim or suspect, legal jurisdiction and documentation must be obtained. Often, the Molecular Geneticist is consulted as to the specific methods to document and/or collect samples. The Molecular Geneticist must maintain current knowledge of the fast changing laws concerning the search and seizure of evidence so as not to jeopardize the admissibility of evidence in court.

A portion of the visual search of the crime scene may include an extensive examination in more than one location for articles of clothing, cleaning cloths, weapons, stains on car seats or in trunks, etc. which field test positive for body fluids relevant to the case and can be collected as evidence. Once the evidence is secured, the Molecular Geneticist shares the legal burden with other officers in preparing an Inventory List of the evidence seized.

Luminol Testing

The most frequently requested field test conducted by the Forensic Molecular Geneticist is the luminol test for the presence of blood which is not readily visible to the unaided eye. Luminol is a chemical mixture which is sprayed over an area in the dark and reacts with blood by producing a very low level of light. Distinct patterns made from blood such as a body outline, wipe patterns, shoe tracks, hand prints, and seats may be detected with luminol. The interpretation of luminol reactions are not specifically confined to blood in origin. Consequently, further field testing also must be performed to identify presumptive blood stains. The indication of the presence of blood and the particular patterns which can be revealed with luminol test often serve as important investigative leads, and directly or indirectly may lead to the discovery of other evidence.

***j. 1% - Receipt of blood samples from convicted felons**

The DNA Database receives approximately 100 to 150 convicted felon blood samples per week. It is the responsibility of members of the DNA Database to verify information on submitted blood tubes and attached database cards for any

discrepancies. The processing of these samples is a function for the DNA Database Analysts, but if any discrepancies are found, the DNA Database Manager must contact the submitting institution as soon as possible. Blood stains are made of all received blood samples and the information on the attached cards are entered into the DNA Database Data Entry computer. These samples are subsequently packaged in heat sealed envelopes and stored in ultra cold freezers until they are tested.

II. B. OTHER POSITION CHARACTERISTICS:

1. ACCURACY REQUIRED IN WORK

One hundred percent (100%) accuracy is required in all results. Determinations must be conclusive and unequivocal since an error can cost an innocent individual his life or liberty and allow a guilty offender to possibly commit his crime again. Also, the reputation of the analyst, his job, and the credibility of the lab is in jeopardy when one is not exact in his work. Constant proficiency testing is undergone to assure that each analyst produces accurate results and interpretations. The DNA Database Manager is also responsible for verifying the accuracy of the work conducted by members of their Unit.

2. CONSEQUENCE OF ERROR

As noted above, the greatest error is to report an erroneous result which would assist in the conviction of a falsely accused individual. This could deny the person several years of freedom (if not his life) and could also result in a lawsuit for the State.

3. INSTRUCTION PROVIDED TO EMPLOYEE

The procedures used by the employee are fluid at this time and the position will be involved in validating and writing procedures to be used. As a front line supervisor, this position will have to be able to receive broad instructions and guidance from the Special Agent In Charge and then apply this to the running of their Unit.

4. GUIDES, REGULATIONS, POLICIES AND REFERENCES USED BY EMPLOYEE

The policies, guidelines, and procedures used by the employee include the NC General Statutes, the SBI Policy and Procedures Manual, the SBI Crime Laboratory Policy and Procedures Manual, the SBI Molecular Genetics Section Policy and Procedures Manual, the SBI Molecular Genetics Section Safety Manual, NC Department of Justice Policy and Procedures, ACSLD-LAB Certification Standards, and TWGDAM Quality Assurance guidelines, National DNA Standards, and CALEA Accreditation guidelines, and state laws governing search, seizure and arrest.

5. SUPERVISION RECEIVED BY EMPLOYEE

The work of this position is reviewed twice annually in accordance with the state's Performance Management System. After training, all daily work is completed independently, with only the final work product reviewed in accordance with section and agency quality assurance, quality control, and accreditation guidelines.

6. VARIETY AND PURPOSE OF PERSONAL CONTACT

The employee is in daily contact with members of the law enforcement community, members from the general scientific community, and members of the forensic Molecular Genetics community from across the U.S. The purposes of these contacts are to, give advise and direct law enforcement officers on procedures to be followed for the collection, preservation, and submission of DNA evidence and of Database samples, or to refine a particular technique with the assistance of a contact in another state. The DNA Database Unit Manager is often contacted by individuals from other state and federal database units for information and assistance.

7. PHYSICAL EFFORT

Although the employee may be required to perform light to medium work at times, the physical effort of this job primarily manifests itself as stress from having too much work to do and too little time to do it in, or not enough personnel to perform the work.

II. B. OTHER POSITION CHARACTERISTICS:

8. WORK ENVIRONMENT AND CONDITIONS

One hundred percent (100%) of the analyst's time involves working with blood and body fluids from an individual who may be carrying viruses for AIDS, hepatitis, herpes, VD, TB, etc. In addition, contact is also made with several carcinogenic and embryo toxic materials on a routine basis.

9. MACHINES, TOOLS, INSTRUMENTS, EQUIPMENT, AND MATERIALS USED

SigSauer Model P220 .45cal handgun, state owned automobiles, Maglite, Hitachi fluorescent DNA scanner, sophisticated computers (including PC based computers, file servers, communication hubs, and modems that form our CODIS LAN AND a separate MacIntosh network that ties the fluorescent DNA scanners together, and public domain and sensitive CODIS software, ultraviolet/visible spectrophotometer, electrophoresis tanks and power supplies, Ultraviolet illuminator, Polaroid cameras, photographic film processor, film duplicator, autoclave, incubators, vacuum oven, microwave oven, hot plates/stirrers, heat blocks, vortex, rotators, balances, centrifuges, pipetors, pouch sealer, solution dispensers, hybridization incubators, fluorimager, gene amplifier (thermocycler), and DNA Robotic Workstation.

10. VISUAL ATTENTION, MENTAL CONCENTRATION AND MANIPULATIVE SKILLS

The visual senses are used predominantly and close attention to detail is needed. This is primarily the case when examining gel scan, ensuring that samples match their respective sample numbers, that the allele calls that make up the DNA profile are correct, etc. This position requires that the individual be attentive and mentally alert at all times for mistakes can be dreadfully consequential. One must continually check the work being performed to make sure each task is correct and can be accountable before superiors and courts of law.

SAFETY OF OTHERS

Extreme care must be taken to prevent the spread of contamination by hazardous materials. Special care is taken to avoid contamination of other analyst's casework by amplified DNA product.

12. DYNAMICS OF WORK

The forensic analysis of evidence using DNA techniques is currently in a state of change and most likely will remain so for several years to come. The basic methods in use today will gradually be phased out in the near future to incorporate use of newer DNA methodology than currently in use or being implemented/validated now.

III. KNOWLEDGE, SKILLS & ABILITIES AND TRAINING & EXPERIENCE REQUIREMENTS

A. KNOWLEDGES, SKILLS AND ABILITIES

Additional knowledge, skills, and abilities to perform as DNA Database Manager are as follows:

1. Additional knowledge, skills, and abilities to perform as an SBI Agent are as follows: A working knowledge of the methods, procedures and practices used in the investigation of criminal offenses, and the principles of securing and identifying a variety of crime related evidence.
2. The ability to investigate criminal cases, to interpret and apply criminal law of North Carolina in investigations, to make arrests, to prepare comprehensive and detailed reports pertaining to individual cases, to present efficient court testimony, to apply the principles, techniques, and procedures of modern criminal investigation, and the use of evidence in criminal case investigations.
3. The ability to use firearms and tools and equipment involved in evidence collection and preservation effectively.
4. The ability to establish and maintain favorable working relationships with other law enforcement agencies and officers.
5. The Agent must maintain a physical condition which permits certification by the North Carolina Justice Standards Commission for law enforcement officers.
6. A minimum educational requirement of a Bachelor's Degree in a Biological Science for a background to understand the specialized area of forensic molecular genetics and related other related tests as well as the completion of the SBI Academy.
7. A complete and thorough knowledge of the methods, procedures and practices used in forensic analysis.
8. The ability to supervise and train personnel.
The ability to manage personnel within the DNA Database Unit, including conducting the yearly Performance Assessment Evaluation of personnel within the Unit.
10. The ability to organize and run a laboratory.
11. The ability to establish and maintain favorable working relationships with other law enforcement agencies and officers.
12. Laboratory skills demonstrating the manual dexterity and ability required to conduct forensic tests.
13. A thorough knowledge of the laws and regulations regarding the analytical and enforcement work performed.
14. Skill in organizing work and time to maintain production during periods of work overload.
15. Ability to design and carry out scientific experiments.