State of North Carolina Office of State Personnel Position Description Form (PD-102R-92)	Approved Classification_____ Effective Date: _____ Analyst: _____ (***This Space for Personnel Department Use Only)***
1. Present Classification Title of Position **Forensic Chemist I**	7. Pres. 15 Digit Pos. # /Prop. 15 Digit Pos. #
2. Usual Working Title of Position **Forensic Chemist I**	8. Dept., University, Commission or Agency **Department of Justice**
3. Requested Classification of Position	9. Institution and Division **State Bureau of Investigation**
4. Name of Supervisor **D. Troy Hamlin**	10. Section and Unit **Trace Evidence**
5. Supervisor's Position Title & Position # **Special Agent in Charge**	11. Street Address, City and County **121 East Tryon Rd.**
10. Name of Employee	12. Location of Workplace, Bldg. and Room No. **Crime Laboratory**

I: GENERAL INFORMATION:

A. Primary Purpose of Organizational Unit:

The Trace Evidence section of the North Carolina State Bureau of Investigation exists to provide assistance to local, state, and federal law enforcement agencies. Assistance is provided in numerous areas and disciplines. Primarily these are: 1) analysis of evidence involving trace materials and the interpretation of the analysis, 2) crime scene assistance, 3) professional testimony as to the chemist's findings and, 4) training in evidence collection and handling. The mission of this section is to provide quality scientific analysis to aid in investigations that will ultimately be tried in a court of law.

B. Primary Purpose of Position:

This is journey level professional chemistry work requiring the application of established chemistry methods, chemical theory and the principles from related sciences, to conduct and interpret the results of qualitative and quantitative chemical analysis on a variety of substances. Employees operate a wide variety of complex laboratory equipment and elaborate instrumentation that often requires frequent calibration and adjustment, including making moderate repairs to many instruments and equipment. Work includes working with samples that are unknown or in minute or very difficult to work with concentrations and have substances that mask, react or

interfere with the reagents or with each other during analysis. Employees select equipment or alternate methods of testing based on sample size, need to vary conditions or the limitations of equipment. Work also may include providing work direction and review to chemical technicians, programming computerized test instruments, evaluating existing equipment, and testifying in court or at hearings as a technical expert. Employees may be required to perform other duties and responsibilities as assigned.

C. Work Schedule:

The normal work schedule for this position is five days a week and on call for crime scenes when needed. Crime scene work may involve nights and weekends. Also, court testimony often requires overnight travel. Therefore, daily hours can vary from an eight-hour day to a twenty-four-hour day.

D. Change in Responsibilities or Organizational Relationship:

N/A

II. A. DESCRIPTION OF DUTIES AND RESPONSIBILITIES: (ORDER OF IMPORTANCE)

Percentage of Total Time Spent	Duty	DESCRIPTION OF REGULAR DUTIES:
(80%)	**(1)**	**Casework**

Casework comprises 80% of the time in this position. Casework, (collection, screening and analyzing evidence) is evaluated, and written reports produced by the analyst are used in criminal investigations, in ascertaining search warrants, and in rendering expert testimony in a court of law.

Each individual case requires generation of a case file. Within the case file there are records and forms that must be accurately maintained. With the onset of the computer era, office procedures are constantly changing. The laboratory's change to a computerized evidence handling system has required learning new computer programs and word processing packages such as word perfect. In addition, the chemist has been required to be more responsible for the accuracy of the data fields and overall report.

Each analyst is required to be proficient in a specific discipline. Disciplines in the section include; hair and fiber examinations, paint analysis, glass analysis, gunshot residue analysis, arson analysis, and other examinations of trace evidence. The various instruments employed by the forensic chemist include gas chromatography, gas chromatography/mass spectrometry, infrared spectroscopy, atomic absorption spectroscopy, Scanning Electron Microscopy/Energy Dispersive X-Ray Analysis (SEM-EDS), X-ray diffraction, X-ray fluorescence, Grim 2 Glass Analysis System, light and polarized microscopy.

After training, the forensic chemist will perform routine analysis in his/her area of expertise. The work performed by the forensic chemist will be reviewed by a senior chemist or the supervisor of the section. The chemist formulates a report which includes the results and the chemist's expert opinion. The results of analysis in casework can affect the outcome of a case and the lives of individuals involved in a crime.

This chemist has the responsibility for routine maintenance and calibration of the instrument in which the chemist is operating.

This position performs routine analysis in **one of the following disciplines** (listed below):

ARSON AND SUSPICIOUS FIRE EVIDENCE

Arson and suspicious fire evidence is examined to prove or disprove that the fire was set or was of incendiary origin. The examination and/or comparison of fire evidence is performed to identify accelerants/ ignitable liquids or petroleum based products. This type of analysis is utilized in various types of cases. These cases include attempted arson, arson, assault, homicide, and sexual abuse cases.

Evidence in these cases is collected and may be visually or microscopically examined utilizing a stereo-microscope. The chemist must not only be cognizant of the potential arson evidence present but must also recognize, preserve, and collect other types of trace evidence that may be present. Depending on the nature of the sample (evidence), the chemist must first extract the accelerant from a wide variety of samples including burned clothing, soil, charred debris and human flesh. Samples are extracted using various techniques:

- **Charcoal Adsorption**
- **Diffusive Flammable Liquid Extraction (DFLEX)**
- **Heated Head Space**
- **Distillation**
- **Solvent Extraction**
- **Neat Extraction**

Fire debris samples are often very complex in nature. Pyrolysis products, charred plastic, wood, cloth and flesh often contain chemical components that mask the characteristic odor of accelerants. Therefore the chemist must rely on his knowledge and expertise to select and utilize the proper extraction procedure for each individual sample. The analysis of the extracted sample can then be performed by means of Gas Chromatography and Gas Chromatography/ Mass Spectrometry to identify any accelerants present. X-Ray Diffraction and Scanning Electron Microscopy coupled with Energy Dispersive X-Ray Analysis can also be used to identify components of ignition sources such as road flares. Other types of examinations may be required in the analysis of arson evidence including:

- **Electrical Function**
- **Physical Match**
- **Unknown Solid and Liquid Identification**
- **Identification of Alcohols**
- **Determining Behavior Properties of Questioned Chemicals**

Special Agents / Forensic Chemists conducting examinations of these types must be proficient in the use of Gas Chromatography and Gas Chromatography/ Mass Spectrometry. Many accelerants are complex mixtures of hydrocarbons. With the vast advancements in the petroleum industry, companies are constantly making changes and patenting new formulations of ignitable liquids.

Companies utilize a wide variety of processes including blending, hydro-treating, cracking, distilling, coking, and reforming to create a specific use for the ignitable liquids that complies with specific regulations. These formulated products contain:

- **Paraffins**
- **Olefins**
- **Cycloalkanes**
- **Aromatics**
- **Polynuclear Aromatics**

These make for a complex mixture of hydrocarbons. When combined with the numerous components found in pyrolysis products, the interpretation of results generated by analytical instrumentation is an essential part of the examination.

The chemist should also have extensive knowledge of the SBI Arson Canine Program. The chemist is responsible for conducting the bi-annual testing and recertification of the Bureau's arson canines. The chemist will be called upon to instruct law enforcement officers and arson investigators on the collection and submission of fire debris. The chemist should also be proficient in the instruction of the following:

- **Chemistry of Fire**
- **Collection of Fire Debris**
- **Extraction of Fire Debris**
- **Analysis of Fire Debris**

In summary, fire debris analysis requires the following areas of expertise from an analyst:

- **Training and consulting with law enforcement officers and arson investigators in proper collection and preservation of evidence**
- **Thorough examination of evidence for all types of analyses to be conducted**
- **Extraction of ignitable liquids utilizing the proper technique for the evidence in question**
- **Analysis of evidence utilizing Gas Chromatography, Gas Chromatography/Mass Spectrometry, X-Ray Diffraction and/or Scanning Electron Microscopy/Energy Dispersive X-Ray Analysis**

- **Identification of ignitable liquids by interpreting chromatograms, mass spectra, x-ray and scanning electron microscopy results**
- **Report generation and discussion of findings with investigating officers, district attorneys, and defense attorneys**
- **Expert witness testimony in court.**

HEADLIGHT/BULB FILAMENT EXAMINATIONS

Headlight/bulb filament examinations are performed in an effort to determine if the bulb was "ON" or "OFF" at the time of a motor vehicle accident. Headlights, parking lights, brake lights, turn signal lights, and marker lights can be examined. These bulbs usually originate from but are not limited to automobiles and motorcycles. The filament area of the bulb is the most valuable bulb component for laboratory analysis, and even small pieces of the remaining filament can yield valuable information. In order to examine very small filaments, an examiner must be proficient in microscopy. The analyst usually needs to contact the investigating officer to resolve and better understand the specific circumstances of the traffic accident. For example, it is important to ascertain where on a vehicle or motorcycle the contact was made. A trained examiner must be able to recognize critical characteristics of a bulb that was "on" at the time of an accident including:

- **Oxidation of filaments and/or multi-colored discoloration of filaments**
- **Black or pale yellow oxidation on filaments, hoods, filament posts, glass, or other parts**
- **Unusual distortion of filaments**
- **Glass beads or particles welded to the filament surface**
- **Melted or beaded filament ends if the filament is broken**

An examiner must also be able to recognize filament deformation **unrelated** to impact such as normal curve, manufacturing irregularities, and age sag. Due to the nature of these cases, many of these determinations can be very difficult and sometimes impossible, forcing the examiner to reach an indeterminate conclusion.

A bulb examiner must be proficient in the use of a volt-ohm meter to determine continuity. Extreme safety measures must be practiced in utilizing propane torches to extract the filament from the lamphouse.

Examination of filaments with a Scanning Electron Microscope (SEM) may be required to gain further information about the filament. The SEM gives great depth of field when viewing filaments and provides analytical information about the filament if it is equipped with an Energy Dispersive X-ray Analysis System. Elemental analysis can identify oxides and glass that may be present on the surface of the filament.

All of the information gathered during analysis must be interpreted in order to render, when possible, an opinion as to whether a bulb was "on" or "off" at the time of impact. These opinions require routine judgement calls by the examiner based on the facts of the case, the microscopic examination, as well as the training, knowledge, and experience in bulb examination. These cases

sometimes involve obtaining standards and testing them in the laboratory.

An examiner must be able to document the examination of bulbs with notes, photographs, and diagrams. The examiner must also be able to explain and defend these conclusions to the investigating officer, district attorneys, defense attorneys, and in a courtroom.

In addition to these duties, the analyst must be able to train other law enforcement officers and personnel in the following:

- **Proper techniques in preserving and collecting headlamp evidence from an accident scene**
- **Proper packaging and submission of headlamp evidence to ensure protection of fragile evidence**
- **Basic analysis procedures for headlamp analysis**
- **Analysis Report Interpretation**

In summary, headlamp analysis requires the following areas of expertise from an analyst:

- **Training and consulting with law enforcement in proper collection and preservation of headlamp evidence from accident scenes**
- **Proper handling and processing of the headlamp evidence in the laboratory including manipulation of small samples**
- **Background knowledge in the operating conditions of various bulbs and headlamps including appearance of individual bulb components subjected to various conditions**
- **Extensive knowledge in the effects of physical impact on bulbs**
- **Ability to interpret the results accurately and express these findings in a Report**
- **Ability to discuss these results with investigating officers, district attorneys, and defense attorneys**
- **Expert Witness Testimony in court as to the results and interpretation**

ANALYSIS OF EXPLOSIVE EVIDENCE

Explosive evidence is examined to identify seized intact explosive materials, explosive residues in post-blast situations and the functionality of recovered improvised explosive devices (IEDs). The examination and comparison of explosive evidence is performed to identify explosive materials such as accelerants (i.e. gasoline), dynamites, fuses, plastics (i.e. C-4), improvised mixtures (i.e. sugar/chlorates), and propellants (i.e. smokeless powder). In addition, explosive analysis involves the examination of an IED for functionality. Analyses of explosives are utilized in various types of cases including arson, assault, extortion, homicide, robbery, terrorism and vandalism.

Evidence in these cases is collected and visually or microscopically examined utilizing a stereo-microscope. The chemist must not only be cognizant of the potential explosive evidence present but must also recognize, preserve, and collect other types of trace evidence that may be present. Depending on the nature of the sample (evidence), the chemist must first extract the explosive or explosive residues from a wide variety of samples including bomb fragments, fabric, metals, fiberglass, building materials, soil, charred debris and human flesh. Samples are extracted using various techniques:

- **Micro/Neat Extraction**
- **Charcoal Adsorption**
- **Diffusive Flammable Liquid Extraction (DFLEX)**
- **Heated Head Space**
- **Solvent Extraction (Aqueous and Organic)**

Explosives and explosive residue samples can range from simple compounds to very complex mixtures. The explosive analyst must have extensive knowledge of the chemical and physical properties of all types of explosives including how they can potentially interact with each other. Post-blast products such as plastics, wood, soil, paper, fabric, and flesh can often mask the presence of explosives and/or explosive residues. Therefore the chemist must rely on his/ her knowledge and expertise to select and utilize the proper extraction procedure for each individual sample. Depending on the nature of the explosive or explosive residue the analysis of the an extracted sample can then be performed by a combined variety of analytical tools which include:

- **Polarizing Light Microscopy**
- **Solvent and Reagent Reactions**
- **Capillary Electrophoresis**
- **Fourier Transform Infrared Spectroscopy**
- **Gas Chromatography and Gas Chromatography/ Mass Spectrometry**
- **X-Ray Diffraction**
- **Scanning Electron Microscopy / Energy Dispersive X-Ray Analysis**
- **Thin Layer Chromatography**
- **Microspectrophotometry**
- **X-Ray Fluorescence**
- **Pyrolysis/Gas Chromatography**

Other types of examinations may be required in the analysis of explosive evidence including:

- **Electrical or Mechanical Function**
- **Reconstruction of Improvised Explosive Devices**
- **Physical Match**
- **Unknown Solid and Liquid Identification**
- **Identification of Alcohols**
- **Determining Behavior Properties of Questioned Chemicals**

Special Agents / Forensic Chemists conducting explosive examinations must be proficient in the interpretation of data generated by Scanning Electron Microscopy / Energy Dispersive X-Ray Analysis, Gas Chromatography, Gas Chromatography/ Mass Spectrometry, X-ray Diffraction, Capillary Electrophoresis and Fourier Transform Infrared Spectroscopy. Many explosive devices are complex mixtures of organic and inorganic compounds. With access to information on the world internet and creative imaginations, bombers are constructing explosive devices with various combinations of explosive materials which include:

- **Manufactured High and Low Explosives**
- **Household Chemicals**
- **Fertilizers**
- **Pyrotechnics (Fireworks)**
- **Military Ordnance**
- **Metal Catalysts**

The various combinations of explosive materials used by a bomber can provide law enforcement with a "signature" of the bomber that will be incriminating during prosecution. With this in mind, it is imperative that the Special Agent/ Forensic Chemist render an accurate interpretation of results and/or data generated by analytical instrumentation during the course of the laboratory examination.

The Special Agent/ Forensic Chemist should also have an extensive knowledge of the "render safe" techniques used by hazardous device units (bomb squads) throughout the state. The chemist will be called upon to instruct law enforcement officers, bomb technicians and arson investigators on the collection, preservation, and submission of explosive related evidence. The chemist should also be proficient in the instruction of the following:

- **Chemistry of Explosives**
- **Extraction of Explosives and Explosive Residues**
- **Analysis of Explosives and Explosive Residues**

In summary, explosive analysis requires the following areas of expertise from an analyst:

- **Training and consulting with law enforcement officers, bomb technicians and arson investigators in proper collection and preservation of evidence**
- **Thorough examination of evidence for all types of analyses to be conducted**
- **Extraction of explosives and explosive residues utilizing the proper technique for the particular evidence in question**
- **Analysis of evidence utilizing Polarizing Light Microscopy, Solvent and Reagent Reactions, Capillary Electrophoresis, Fourier Transform Infrared Spectroscopy, Gas Chromatography, Gas Chromatography/Mass Spectrometry, X-Ray Diffraction, Scanning Electron Microscopy/ Energy Dispersive X-Ray Analysis, Thin Layer Chromatography, X-Ray Fluorescence, Microspectrophotometry and Pyrolysis/Gas Chromatography**
- **Identification of explosives and explosive residues by interpreting spectrum, chromatograms, mass spectra, x-ray and scanning electron microscopy results**
- **Report generation and discussion of findings with investigating officers, district attorneys, and defense attorneys**
- **Technical assistance and expertise in crime scene processing**
- **Expert witness testimony in court**

ANALYSIS OF FIBER EVIDENCE

The analysis of fiber evidence is performed to provide fiber associations that will aid in resolving an individual's identity, establish a sequence of events, corroborate witness or suspect statements, establish murder or assault weapons, and give investigators leads that can determine the course of an investigation. This type of analysis is utilized in various types of cases including:

- **Arson and Explosive**
- **Homicide and Assault**
- **Robbery**
- **Burglary**
- **Hit and Run**
- **Drug Trafficking**
- **Extortion**
- **Rape and Sexual Abuse**

A meticulous examination and/or comparison of fiber evidence is performed by searching, isolating, identifying and comparing fibers that have been transferred during contact between individuals, objects and places. The searching and isolating processes are very tedious and time consuming so a great deal of patience and mental concentration is essential. Due to the minute size of the evidence, the fiber analyst must possess excellent dexterity in manipulating extremely small samples. The fiber analyst must not only be cognizant of the potential fiber evidence present but should also be aware of other types of trace evidence that may be present and significant to the case. Analysis of fiber evidence is initiated by a standard visual examination before a macroscopic examination with a stereo microscope. If further identification or

comparison is needed, then fiber evidence is analyzed on a microscopic level with the use of polarizing light microscopy, fluorescent light microscopy and comparison light microscopy. The comparison microscope enables the analyst to compare physical and optical properties of known and question fibers simultaneously. The characteristics that are observed and compared include:

- **Cross-sectional Shape and/or Diameter**
- **Surface Texture**
- **Coloration (Dyeing)**
- **Presence of Delustrant**
- **Internal Abnormalities**
- **Birefringence, Sign of Elongation and Other Optical Properties**
- **Reactions to Fluorescent Light**
- **Fiber Damage**
- **Adhering Materials**

In addition to microscopic analysis, the fiber analyst must also perform instrumental analyses on fiber evidence, utilizing Fourier Transform Infrared Spectrometry, Scanning Electron Microscopy/ Energy Dispersive X-Ray Analysis, Microspectrophotometry and X-ray Fluorescence. The fiber analyst is also occasionally required to use Thin Layer Chromatography and Solubility Tests in comparing fiber samples.

In addition to fiber comparisons, the analyst must also perform comparative analysis on yarns and fabrics. This requires the fiber analyst to have a comprehensive knowledge of yarn and fabric forming systems used by the textile industry. The analysis of fiber evidence also involves the examination and comparison of various polymeric materials, which include:

- **Cordage**
- **Plastic Bags**
- **Tapes**
- **Films and Bulk Polymers**
- **Wire Coatings**
- **Foam Insulation**
- **Molded plastic Items**

In some cases it may be necessary for the fiber analyst to go to a crime scene to evaluate and collect evidence. These cases usually involve highly complex situations or cases where large items cannot be brought to the laboratory. The analyst must have extensive knowledge of crime scene protocol and must be able to advise and direct other law enforcement officers at the scene.

In most cases involving fiber evidence, the goal is to reveal fiber transfers that may have occurred during the commission of a crime. The fiber analyst must make a judgement in each individual case based on the significance of all the tests performed. Each case is unique with regard to sample size and condition of the evidence. To competently defend his/her conclusions in court, the fiber analyst must be able to explain the significance of the analyses to a jury. In addition, the fiber analyst should be able to compare and defend his/her analytical methodology with differing analytical methods used by other laboratories.

The fiber analyst is often required to provide instruction to law enforcement officers or officer trainees in the collection, preservation, and submission of fiber evidence. He/she may be asked to give presentations to civilian and law enforcement groups touring the SBI Laboratory.

In summary, fiber analysis requires the following areas of expertise from an analyst:

- **Training and consulting with law enforcement officers and crime scene investigators in proper collection and preservation of evidence**
- **Thorough examination of evidence for all types of analyses to be conducted**
- **Analysis of evidence utilizing Fourier Transform Infrared Spectroscopy Scanning Electron Microscopy/ Energy Dispersive X-Ray Analysis, X-Ray Fluorescence and Microspectrophotometry**
- **Crime scene search and evaluation of fiber related evidence**
- **Interpretation of results from all analyses and report generation**
- **Discussion of findings with investigating officers, district attorneys, and defense attorneys**
- **Expert witness testimony in court**

GLASS EXAMINATION

Glass examination involves the recognition, collection, classification, and comparison of minute particles of glass recovered from items removed from suspects. The glass particles are usually removed from various items of clothing (coat, shoes, pants, etc.).

Once the glass particles are recovered the particles must be confirmed as isotropic glass material. If sample size permits, this may performed macroscopically. If dealing with microscopic particles, polarizing microcopy must be utilized to make this determination.

Dependent upon sample size, a number of physical characteristics and classifications may be possible by the examination of the questioned glass sample.

- **Color**
- **Type of glass (tempered, laminate, container, plate)**
- **Thickness**
- **UV characteristics to determine if float glass**

The known and questioned samples of glass are compared to determine their refractive indices employing a glass refractive index measuring instrument (GRIM-2). This instrument provides an automated method to provide extremely accurate refractive index measurements of the glass samples. The refractive index measurement of glass samples can be determined to +/- .00001.
The known and questioned samples of glass are then subjected to elemental analysis by X-Ray Fluorescence Spectroscopy to determine elemental composition.

These physical, optical, and elemental properties of unknown glass particles are then compared to the known to determine whether or not these two samples could have shared a common origin. The importance of refractive index measurements and elemental analyses lie in the fact that different sources of glass will have different properties. The variation occurs due to the fluctuation in the manufacturing process used to produce glass. The examiner must be cognizant of how the manufacturing process affects these characteristics; therefore, an extensive knowledge of glass manufacturing and variations in production must be acquired by the examiner in order to express an opinion on the significance of glass evidence.

The analyst must be well versed in the principles and applications of polarized light microscopy, refractive index and dispersion measurements, and optical, physical, and elemental properties of glass and other crystals.

In addition to comparison of glass, the analyst must also be able to make other determinations relevant to glass evidence. These other determinations include:

- **Direction of force used to break a pane of glass**
- **The differentiation of glass into several categorizes (bottle, window pane semi-tempered, tempered, laminated, and plate glass)**
- **The velocity and direction of a projectile through a glass pane**
- **The sequence of multiple projectiles through glass panes**
- **Physical matching of glass fragments**

Based on the above listed analytical techniques, a number of conclusions can be reached:

- **The known and questioned samples of glass originated from the same source (physical match).**
- **The known and questioned samples of glass are consistent with originating from a common source.**
- **The known and questioned samples of glass did not originate from a common source.**

GUNSHOT RESIDUE ANALYSIS

Gunshot Residue Analysis is the examination of gunshot residue deposited on various surfaces during the discharge of a firearm. The most common surface is the shooter's hands. However, gunshot residue analysis can also be performed on gloves, waistbands, head liners and upholstery from cars, doors in homes and cars, refrigerators, and various other objects. Usually, a tapelift is used to remove the residue from surfaces other than hands.

The gunshot residue kits used to examine the hands of individuals involved in gunshot related crimes contain both tape and swabs as a medium for removing the residue from the hands. The collected kits are submitted to the laboratory by law enforcement agencies throughout the state. The first step of the analysis is examination of the swabs under a stereo-microscope. Any visible disc shaped particles are removed from the swabs and tested for the presence of gunpowder. If a small portion of the disc particle turns blue in a diphenylamine reagent, the particle is then analyzed with Micro-Fourier Transform Infrared Spectroscopy to confirm the presence of nitrocellulose, the primary component of smokeless powders.

After removing any disc shaped particles, the gunshot residue kit is processed as follows:

- **Swabs are subjected to a physical separation or chemical extraction of the gunshot residue from the swabs.**
- **Aliquots or small samples from the separated extraction are analyzed with a flameless atomic absorption spectrophotometer to determine the elemental concentrations of the three most common elements in primer residue (lead, barium, and antimony) on each area of the hands (right back, right palm, left back, and left palm).**
- **The tapelift portion of the kit is analyzed in a scanning electron microscope equipped with an energy dispersive x-ray system which scans the surface of the tape for very small metallic particles characteristic of gunshot residue (approximately 1-5 microns).**
- **The size, shape, elemental composition, and location of the particles are stored so that the examiner can relocate the particles, confirm their elemental composition, and observe the shape and size of the particle.**

The analysis of gunshot residue requires competent, careful, and safe handling of biohazards such as bloody swabs. The analyst must be careful in handling the samples so that contamination or mislabeling does not occur. In addition, gunshot residue examinations require extensive knowledge and training in the operation and theoretical basis of sophisticated instrumentation such as scanning electron microscopy/energy dispersive x-ray analysis systems and atomic absorption spectrophotometer. The analyst must have a vast working knowledge of all types of particles, both environmental and occupational, that can produce particles similar to gunshot residue.

However, the most difficult portion of gunshot residue analysis is the evaluation and interpretive aspect. The data must be carefully examined and interpreted in order to render when possible an

opinion whether an individual could have fired a weapon. These opinions require routine judgment calls by the analyst based on the facts in the case and results obtained in analysis as well as extensive training, knowledge, and experience in gunshot residue analysis. More importantly, the analyst must be able to explain and defend these statements when testifying in court.

It is often necessary for the analyst to test fire various weapons that are submitted in connection with a particular case. The analyst will test these guns, collect the residues from the hands of the person who fires the gun, and analyze the test firings to determine if a particular weapon leaves gunshot residue. Therefore, the analyst must possess extensive knowledge of the working characteristics of many types of firearms, and the analyst must be able to conduct the testing of these firearms in a safe manner.

In addition to all of these duties, the analyst must be able to train other law enforcement officers and personnel in the following:

- **Basic Theory on Gunshot Residue Production**
- **Basic Collection and Preservation of gunshot residue from hands and other objects**
- **Basic Analysis Procedures**
- **Analysis Report Interpretation**

In summary, gunshot residue analysis requires the following areas of expertise from an analyst:

- **Training and consulting with law enforcement in the proper collection procedures for gunshot residue**
- **Proper handling and processing of the gunshot residue kit in the laboratory with removal and identification of all possible gunpowder particles**
- **Analysis of swabs with Atomic Absorption Spectrophotometer for concentration levels of lead, barium, and antimony**
- **Analysis of tapelifts with a Scanning Electron Microscope equipped with an Energy Dispersive X-ray System for identification of individual particles**
- **Interpretation of Results from all analyses and Report Generation**
- **Discussions of results with investigating officers, district attorneys, and defense attorneys**
- **Expert Witness Testimony in court as to the results and interpretation**

ANALYSIS OF HAIR

Hair evidence is found in many instances of criminal activity such as homicide, rape, hit and run, assault, burglary, and wildlife violations. The purpose of hair examinations can be described as follows:

- **Linking an object/person to another object/person**
- **Corroboration of witness statements**
- **Establish murder or assault weapon**

- **Establish a sequence of events**
- **Provides information to assist officers in their Investigation**

The work of a hair examiner involves the meticulous examination of items of evidence for the presence of hair. A subsequent detailed microscopic analysis is then performed to determine specie origin, racial origin, body origin, and microscopic properties. A microscopic comparison is then performed to determine individual origin in humans or specie family origin in animal samples. An expert opinion is rendered based on this analysis in the form of a laboratory report.

Hairs are macroscopically and microscopically analyzed, and the internal characteristics of the hairs are studied and analyzed. Instrumentation utilized for this procedure includes a comparison light microscope with polarizing capabilities.

Once the analyst has identified the microscopic characteristics of the hair, the specie is identified. If the hair is human, the following complex determinations must be made when possible:

- **Racial Origin**
  - **Caucasian**
  - **Negroid**
  - **Mongoloid (American Indian, Eskimo, Asian)**
  - **Mixed racial origin**

- **Body Origin**
  - **Facial hair**
  - **Head hair**
  - **Pubic hair**
  - **Limb hair**
  - **Axillary hair**
  - **Other body areas**

When the hair is classified as one of the following (head hair, pubic hair, or beard hair), the characteristics of the hair from the evidence are then compared directly to known standards of hair from the individuals involved in the criminal act.

The significance of the evidence is derived from the experience and training of the examiner. The analyst has examined thousands of hairs which allows them to form a mental database for establishing his/her results. The examiner formulates a expert opinion based on information that is factually viewed in the hairs from experience and training. This demands a concentrated, detailed, most often lengthy examination requiring intense mental concentration.

The basis for examination comes from variation in the characteristics associated with hair, which may include:

- **Scales**
  - **thickness**
  - **colors**
  - **scale patterns**

- **Cortex**
  - **pigment colors (all shades of brown, black, blond, red and combinations)**
  - **pigment size**
  - **pigment shape**
  - **pigment interspacial relationship**
  - **pigment distribution**
  - **pigment clumping**
  - **pigment pattern**
  - **pigment pattern variations**
  - **ovoid bodies.**
  - **cortical fusi**
  - **bleaching**
  - **amount of pigment**
  - **chemical treatment**
  - **banding**

- **Medulla**
  - **patterns**
  - **distribution**
  - **cellular size**
  - **optical relief patterns**

- **Shaft**
  - **size**
  - **shape**
  - **length**
  - **debris**
  - **cross sectional shape**
  - **parasites**
  - **damage**
  - **diseases**

- **Root**
  - **pigments**
  - **cortical fusi**
  - **follicular tagging**
  - **atrophy**
  - **bulbous**
  - **shapes**
  - **growth stage**
  - **force**

- **Tip**
  - **frayed**
  - **split**
  - **curled**
  - **cut**
  - **natural**
  - **broken**

In addition, the examiner can determine whether the hair was forcibly removed from the scalp and whether the hair was dyed or bleached. If it was dyed or bleached the examiner can determine how long ago the hair was treated. The examiner can also determine if the hair was crushed, cut or torn. The examiner can determine if a hair is animal or human. If a hair is classified as animal, the examiner then must try to assign the hair as originating from a scientific family and if possible, to a member of that family. Numerous cases involving a transfer of animal as well as human hairs are examined on a routine basis. Wildlife cases are routinely examined, and the experience of the examiner is of great value in these types of cases.

With the advent of DNA analysis of hair, the examiner must be cognizant of aspects related to the procedures involved in this type of analysis. The examiner must recognize when hair is suitable for DNA analysis. The examiner must then follow proper DNA extractions procedures to remove follicular tissue for analysis.

The examiner must possess significant knowledge in areas associated with hair analysis such as elemental analysis, gender determination, organic analysis, dye extraction procedures and scanning electron microscopic examination of hairs.

Reports are issued with several possible conclusions:

- **Microscopically consistent with, therefore could have originated from subject.**
- **Not consistent with, therefore did not originate from the subject.**
- **No transfer was found.**
- **Signs indicative of force were present.**
- **The hair was crushed, cut or torn (Indicating impact with an object).**
- **The hair was chemically treated.**
- **The hair originated from the following specie. (Animal Hair)**
- **The hair is/not suitable for DNA analysis.**

PAINT EVIDENCE

Paint chips from vehicles, buildings, and other sources may be transferred in the commission of a crime. The examination of paint evidence is most commonly performed to show contact between two surfaces and may be encountered in the following crimes:

- **Hit-and-Run Collisions**
- **Breaking and Entering**
- **Assaults**
- **Homicides**
- **Sexual Assaults**

Paint analysis may also be utilized to associate paint found in a suspect's hair or clothing to paint from file cabinets, cash registers, automobiles, buildings, tools, teller machines, and any other painted surface in order to place a suspect at a scene or in contact with an object. For vandalism and hate crimes, cans of spray paint are frequently used to write messages on vehicles and buildings. Spray paint is also often used to camouflage support poles in marijuana growing operations. The paint examiner must have extensive knowledge of the chemical composition and physical properties of all types of paint.

The paint evidence may consist of large chips with all layers intact, very small chips with all or some layers present, small chips with only a single layer present, or as paint smears. The smears may consist of only the surface layer or a mixture of more than one layer. The paint examiner must possess excellent dexterity in manipulating extremely small samples. When large intact chips are submitted for analysis, the examiner will first determine the physical properties of the paint utilizing a stereomicroscope and then perform all pertinent chemical and instrumental analyses. A full range of testing involves separating each layer of paint and subjecting each layer to the following:

- **Solvent and Reagent Reactions**
- **Fourier Transform Infrared Spectroscopy**
- **Scanning Electron Microscopy with Energy Dispersive X-Ray**
- **Pyrolysis/Gas Chromatography**
- **Microspectrophotometry**

The examiner must be proficient in sample preparation as well as instrument operation and interpretation of results.

In many cases, the paint chips and smears are not collected by the officer investigating the crime. Instead, the officer will send clothing, tools, automobile parts, and building parts such as window frames and door frames for the examiner to search for the paint transfers. A thorough knowledge of search techniques and the ability to differentiate significant evidence in the collected debris is essential. In the search process, the paint examiner may encounter hair, glass, and fiber evidence. It is also essential that the paint examiner have sufficient knowledge in these disciplines to recognize, evaluate, and collect these other types of evidence.

Paint smears pose the greatest challenge to the paint examiner. Smears typically occur when there is an impact between an automobile and another automobile, person, building, fence, mailbox, utility pole, etc. Occasionally, the smears will consist of distinct layers which can be separated. However, it is more typical that the smears will consist of intermingled layers. When a person is struck by an automobile, these intermingled layers are often embedded in the fabric of the victim's clothing making retrieval and separation very difficult. An impact between a painted surface and a nylon garment usually results in the nylon melting into the paint to the extent that physical separation is not possible. The paint examiner must be able to recognize contaminants and must be able to devise methods to either separate the contaminants from the paint or identify the components of a mixture of paint and contaminants.

The paint examiner must be able to utilize the Paint Data Query (PDQ) to identify the make and model of a hit-and-run vehicle from paint evidence left at the scene or on the victim's clothing when no suspect vehicle is available. The Paint Data Query is a computerized international paint database and is a cooperative effort between the Royal Canadian Mounted Police and the FBI to assist forensic laboratories in solving hit-and-run crimes. To effectively use PDQ, the paint examiner must have extensive knowledge of the organic and inorganic composition of paint and of the Munsell Color Classification System.

In some cases it may be necessary for the paint examiner to go to the scene and evaluate and collect the evidence. These cases usually involve highly complex situations and/or large items that cannot be brought to the laboratory. The examiner must have extensive knowledge of crime scene protocol and must be able to advise and direct other law enforcement officers at the scene.

In most cases involving paint evidence, the goal is to determine whether or not two or more items shared a common origin. The paint examiner must make a judgement on each individual case based on the significance of all the tests performed. Each case is unique with regard to sample size and condition and each case must be evaluated individually. To competently defend the conclusions in court, the examiner must be able to explain the significance of the analyses to a jury. Since there are other analytical methods that are not used in this laboratory but may be employed in other laboratories to reach the same conclusions, it is necessary for the paint examiner to have sufficient knowledge of these other methods to explain and compare their merits.

The paint examiner is often required to provide instruction to law enforcement officers or officer trainees in the collection, preservation, and submission of paint evidence and may be called upon to give presentations to civilian and law enforcement groups touring the SBI Laboratory.

In summary the paint examiner must be proficient in the following:

- **Instruction of other law enforcement officers in the proper collection of paint evidence**
- **Crime scene searches for paint evidence**
- **Utilization of PDQ to identify hit-and-run vehicles**
- **Separation of layers in a paint chip and/or separation of paint smears from a substrate**
- **Analysis of individual paint layers by Fourier Transform Infrared Spectroscopy to determine organic composition and paint classification**
- **Preparation of paint layers for analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray to identify inorganic constituents**
- **Analysis of paint layers by Pyrolysis/Gas Chromatography**
- **Color analysis by Microspectrophotometry**
- **Interpretation of results from all analyses and report generation**
- **Discussion of results with investigating officers, district attorneys, and defense attorneys**
- **Expert witness testimony in court**

PHYSICAL MATCH COMPARISONS

Physical Match comparisons involve the reconstruction of items that have been torn, cut, or otherwise separated to determine whether or not they were joined together at one time. This could involve any type of material, natural or synthetic, including but not limited to:

- **Wood**
- **Paper**
- **Garbage Bags**
- **Glass**
- **Paint**
- **Metals**
- **Fabric**
- **Fingernails**
- **Bone**
- **Plastic**
- **Paper Matches**

The items in question are systematically examined to determine if they could have originated from a common origin. This determination is made by the following protocol:

The known items are classified as type of material:

- **Amorphous**
- **Crystalline**
- **Fibrous**
- **Combination**

The known and question materials are examined for similar class characteristics:

- **Size**
- **Color**
- **Pattern**
- **Dimension**
- **Composition**

Items are compared macroscopically and microscopically for corresponding unique characteristics. These are categorized as:

- **Incidental striations or scratches**
- **Irregular fracture edge**
- **Inclusions**
- **Cross sectional contours**
- **Extrusion markings**
- **Conchoidal stress lines and Heckle marks**

If insufficient characteristics exist to establish unique comparisons, the items are analyzed for organic and/or elemental composition similarities by the following methods;

Organic:

- **Fourier Transform Infrared Spectroscopy**
- **Gas Chromatography/Mass Spectrometry**
- **Pyrolysis/Gas Chromatography**

Inorganic:

- **X-Ray Florescence**
- **Scanning Electron Microscopy/Energy Dispersive X-Ray Analysis**
- **Atomic Absorption Spectrophotometry**
- **X-Ray Diffraction**
- **Capillary Electrophoresis**

Based on the above listed analysis techniques, a number of conclusions can be reached:

- **The question and known samples were joined together at one time to form a complete item.**
- **The question and known samples did not originate from the same source.**
- **Elemental and/or Organic analysis revealed that the question and known samples could have originated from the same source..**

Percentage of Total Time Spent	Duty No.	DESCRIPTION OF REGULAR DUTIES
(5%)	**(2)**	**Crime Scene / Consultation**

The normal work schedule for this position is five days a week and on call for two weeks out of every three months. This position is an on call position to assist on crime scenes; therefore, daily hours can vary from a eight hour day to a twenty four hour day. Court may also require overnight travel.

As an "on-call" law enforcement officer, the agent/forensic chemist must be prepared to travel state-wide, on very short notice, in order to render laboratory assistance in processing and/ or directing crime scenes. The assistance requested may require on site collection and preservation of all types of physical evidence such as arson, hairs, fibers, glass, explosive residue, etc.

The forensic chemist must have the ability to draw sketches and take photographs in order to produce an accurate report of the condition of the crime scene and the work that was carried out at the scene. Knowledge of the General Statues governing search and seizure are necessary. The forensic chemist is often asked to render assistance by supplying information for the writing of search warrants as well as rendering assistance in the collection of evidence during execution of a search warrant.

Evidence is received from criminal investigators including SBI Agents, Police Officers, Sheriff's Deputies, ATF Agents, Navel Investigators, Army CID, Fire Officials, and various other law enforcement agencies. A great deal of time is spent on the phone with these law enforcement agents discussing what is required for search and arrest warrants; what evidence should be included in search warrants; how to draw up the search warrant; proper techniques for collecting and packaging of evidence; and what examinations the laboratory can and should perform.

Time is also spent with district attorneys discussing and evaluating evidence for criminal prosecution. Also potential hazards of particular evidence and hazards that may occur at crime scenes are discussed. Evidence is received from the entire state. The written results of the examinations are disseminated to the investigator and the District Attorney. Testimony is given in court to help determine the guilt or innocence of a defendant.

Percentage of Total Time Spent	Duty No.	DESCRIPTION OF REGULAR DUTIES
(5%)	**(3)**	**Court and Court Testimony**

If the suspect is brought to trial, the forensic chemist provides expert testimony in a court of law as to the results of the examination performed and conclusions drawn from them. This involves: 1) being qualified each time as an expert witness based on knowledge, experience, and current

level of proficiency, 2) providing direct testimony which as an expert witness (as opposed to a lay witness) means providing forensic judgment, 3) securing the credibility of this testimony under cross examination, which may involve the use of opposing "experts". Errors of any kind in the findings, opinions, or testimony will have two consequences 1) they may lead to false arrests and subsequent false imprisonments; and 2) they will lead to damaging the chemist's credibility as an expert witness. Approximately 5% of this position time is used to fulfill the obligations associated with the preparation organization, and presentation of testimony in a trial.

Percentage of Total Time Spent	Duty No.	DESCRIPTION OF OCCASIONAL DUTIES
(5%)	**(4)**	**Professional Development**

In-service training is received bi-annually and covers the following topics 1) Firearms training and qualification, 2) Federal and state laws regarding criminal investigation, evidence, court decisions (changes and additions), 3) Physical fitness, 4) Bureau policy, 5) Bureau advancements, and 6) DCI certification and updates. Professional development is also obtained by attending scientific meetings (American Academy of Forensic Sciences Meetings, Southern Association of Forensic Scientists Meetings, etc.) as well as courses provided by the FBI, ATF, and various universities and private industries.

The forensic chemist must maintain his/her expertise by being aware of the latest innovations, changes, and advances in forensic science and in the legal and criminal science community. The failure to remain abreast of the latest developments could impeach the credibility of the chemist, thus losing a case and permanently tainting the image and trust the legal community has place with the chemist. Expert status must be formally recognized by each court in order for the forensic chemist to testify as an expert in his field. Analysis of evidence is conducted independently with the chemist's notes and reports subject to review.

The forensic chemist is also required to participate in proficiency testing. Samples are submitted from an independent testing agency (Collaborative Testing Services) and from the "In House" program (Trace Evidence Section), with 100% accuracy required.

Percentage of Total Time Spent	Duty No.	DESCRIPTION OF OCCASIONAL DUTIES
(5%)	**(5)**	**Special Projects and Administrative Duties**

The forensic chemist is called upon from time to time to assist in panels, interviews, quality control assurance, meetings, tours, and presentations. Administrative duties for this position include talking to civic organizations, being on call 24 hours a day, automobile reports, equipment maintenance, and other duties as assigned by the SAC. The forensic chemist provides classroom instruction to the SBI Academy, Justice Academy, Highway Patrol Academy, Sheriffs, Police Departments, and numerous Law Enforcement Agencies regarding evidence handling, evidence

collection, laboratory procedures, and new scientific techniques to aid in criminal investigations.

II. B. OTHER POSITION CHARACTERISTICS:

1. Accuracy Required in Work:

Precision, exactness, and complete accuracy must be present in all work since the results can affect both the fate of an individual and the outcome of a criminal investigation. The chemist is also required to participate in proficiency testing with 100% accuracy required.

2. Consequences of Error:

Errors of any kind in the findings, opinions, or testimony will have two consequences; 1) they may lead to false arrests and subsequent false imprisonments and 2) they will result in damaging the chemists credibility as an expert witness.

3. Instructions Provided to Employee:

Evidence sheets submitted to the laboratory often contain extremely little information about the crime, the victims, and the suspects. The chemist must evaluate the evidence and decide (often by contact with the investigators) how the evidence should be analyzed to provide the most useful information to the investigation.

4. Guides, Regulations, Policies and References Used by Employee:

In the performance of the duties required of a special agent/forensic chemist, it is required that the employee utilize standard forensic and analytical procedures as outlined by the American Society of Crime Laboratory Directors, the Southern Association of Forensic Scientists, the Occupational Safety and Health Administration, the National Bureau of Standards, and the North Carolina State Bureau of Investigation Evidence Procedures Manual. The state laws of North Carolina as well as federal laws are followed concerning the handling of evidence, search and seizure, and arrest.

5. Supervision Received by Employee:

Employees perform continuing assignments with general objectives, priorities and quality and quantity of work expected, and often plan the daily or weekly assignments within those parameters. Supervision or other technical expertise is usually available to assist them with unusual situations or complex problems.

6. Variety and Purpose of Personal Contacts:

This position is exposed to a myriad of different professional contacts. The chemist is required to have knowledge of law enforcement and law enforcement agencies' functions. This position requires daily contact and liaison with other agents of the State Bureau of Investigation, Federal Bureau of Investigation, Alcohol Tobacco and Firearms, and the Naval Investigative Service. Daily contact and liaisons are also made with state and local law enforcement authorities such as wildlife officers, troopers with the state highway patrol, sheriffs and deputy sheriffs of each county within the state, police chiefs, detectives and patrol officers. Liaison functions include, but are not limited to: teaching crime scene searches, collection, preservation and submission of evidence, collection and safe guards of hazardous chemicals and materials. Duties of this position also include advising agencies on criminal procedures, updating local agencies on the latest judicial decisions involving the obtaining of physical evidence, and provides assistance in procurement of search warrants on people, places, and vehicles. Advice is also given to agencies as to the significance of physical evidence as it relates to their investigation. This position requires knowledge and exposure to the legal community. The forensic chemist has daily contact with district attorneys, public defenders, judges, and criminal and civil attorneys. Liaison functions include depositions, pretrial conferences, discovery procedures, probable cause hearings, trial testimony, rebuttal testimony, voir dire, and appellate conferences. This position is also exposed to the general public in a variety of different professional avenues. The chemist is exposed to and performs liaison functions with victims of criminal actions, their family, and suspects of crimes within the context of law enforcement activities. This position provides instructions, demonstrations, and speeches to various community organizations such as mystery writers, schools, universities, and civic groups such as the Rotary Club or the Optimist Club.

7. Physical Effort: % of time

Sitting at a desk or table with some walking, standing, bending or stooping, or carrying light objects.	50 % daily
Utilizing a visual display terminal for long periods	10 % daily
Use of arms, hands, or fingers in operating equipment, tools, instruments requiring fine eye-hand coordination.	30 % daily
Bending, crouching, stooping, stretching, crawling	10 % daily

Unaided lifting of objects up to:	# of times
10 - 20 lbs	5 daily
20- 50 lbs	2 weekly
50- 100 lbs	1 weekly
over-100lbs	1 weekly

8. Work Environment and Conditions:

The laboratory is a state of the art facility. Limited exposure to hazardous vapors and moderate exposure to bio-hazards.

Hazards Encountered on Job

Criminals when attending court and processing crime scenes
Biological hazards in evidence
Chemical usage
Firearms handling and training

9. Machines, Tools, Instruments, Equipment and Materials:

Gas Chromatograph
Mass Spectrometer
X-Ray Florescence Spectrometer
Scanning Electron Microscope
Flameless Graphite Furnace Atomic Absorption Spectrometer
X-ray Diffractometer
Micro Fourier Transform Infrared Spectrometer
Comparison Microscope

Handgun
Stereomicroscope
Polarized light microscope
Camera equipment
Computer
Car/Police radio

10. Visual Attention, Mental Concentration and Manipulative Skills.

The type of work being conducted will determine the amount of time that requires close visual attention. Complete 100% accuracy is a must in preparing samples for analysis, in monitoring the analysis process and recording data. Also close visual attention must be given to all crime scene work.

11. Safety for Others:

When firearms are being test fired, it is necessary that all present on the range use proper hearing and eye protection. It is imperative that all safety rules be followed while on the range. Other safeguards would include the proper identification of chemicals and insuring that proper ventilation is being used in any analytical procedure that requires the use of any hazardous material. Care must be used to prevent build up of hydrogen gas when using the Gas Chromatograph. Also care must be used to prevent the spreading of carbon disulfide, bromoform, benzene, and other toxic vapors used in laboratory testing.

12. Dynamics of Work:

The work required of the chemist can change depending on the nature of the case. Certain types of evidence can require modifications in its analysis, and even new analysis schemes may need to be developed in order to complete the case.

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

A. Knowledge, Skills and Abilities:

Full knowledge of the principles, concepts, theories, reference sources and laboratory applications of chemistry and other related sciences. Working knowledge of the laws, regulations and agency policies governing responsibilities. Working knowledge of scientific methodology and of laboratory safety practices. Ability to independently perform and record complex standardized and non-standardized laboratory tests and procedures. Ability to analyze results, interpret methodology, understand and solve the theoretical problems, and to provide work direction and instruction to chemical technicians. Ability to express technical information clearly, both orally

and in writing, when reporting results testifying or explaining procedures to others. Ability to perform advanced mathematics and statistical analysis, to understand and follow complex oral and written instructions, to perceive colors normally and to make olfactory distinctions, and the ability to establish and maintain effective working relationships.

B. 1. Required Minimum Training:

Graduation from a four-year college or university with a bachelors degree in chemistry or related science and a minimum of two years of progressive chemistry laboratory equipment; or an equivalent combination of training and directly related experience.

2. Additional Training/Experience:

An internship with a state or federal criminalistics laboratory is not necessary, however it is very helpful.

3. Equivalent Training and Experience:

None

C. License or Certification Required by Statute or Regulation:

None are required prior to employment. However, once employed, the chemist must become a state certified law enforcement officer and then qualify as a Special Agent of the N. C. State Bureau of Investigation.

IV. <u>CERTIFICATION:</u> Signatures indicate agreement with all information provided, including designation of essential functions.

Supervisor's Certification: I certify that (a) I am the Immediate Supervisor of this position, that (b) I have provided a complete and accurate description of responsibilities and duties and (c) I have verified (and reconciled as needed) its accuracy and completeness with the employee.

_____

Signature Title Date

Employee's Certification: I certify that I have reviewed this position description and that it is a complete and accurate description of my responsibilities and duties.

_____

Signature Title Date

<u>Section or Division Manager's Certification</u>: I certify that this position description, completed by the above named immediate supervisor, is complete and accurate.

_____

Signature Title Date

<u>Department Head or Authorized Representative's Certification</u>: I certify that this is an authorized, official position description of the subject position.

_____

Signature Title Date