

STATE OF SOUTH DAKOTA CLASS SPECIFICATION

Class Title: Forensic Chemist

Class Code: 40684

Pay Grade: GK

A. Purpose:

Performs technical quantitative and qualitative chemical tests on drugs, blood, urine or physical evidence submitted for analysis and maintains quality control and chain of custody of the sample and tests to determine the presence and/or amount of unknown alcohol and/or drug substance. Ensures the validity and reliability of analyses and testifies on those results as well as physiological effects in a court setting.

B. Distinguishing Feature:

The Forensic Chemist performs detailed laboratory tests, designs and validates testing methods and procedures, and testifies in court on the substances and amount found and the effects of that substance on an individual. The Forensic Chemist is an expert witness relative to the court system.

The Senior Chemist performs detailed laboratory tests on non-routine samples, which may require the modification and validation of test methods. Directs or participates in the development of new laboratory methods; makes changes which impact existing guidelines or laboratory policies; and may serve as a lead worker over other laboratory staff.

The Chemist selects and follows established laboratory methods and procedures that are most appropriate for the test being conducted; guidelines are provided but require the use of judgment in selecting and applying the most appropriate procedures. Examples of tests and measurements include changes in light, transmittance, electrode potential, color, temperature, pH, production of gas bubbles, air volume, weight, and chromatographic separations.

C. Functions:

(These are examples only; any one position may not include all of the listed examples nor do the listed examples include all functions which may be found in positions of this class.)

1. Devises and executes appropriate extraction and separation procedures for the material being analyzed to ensure correct determination of a substance.
 - a. Analyzes tablets, capsules, powders, liquids, plant material, etc. to determine specifically if the material contains a controlled substance or drug.
 - b. Obtains and interprets gas chromatographic and mass spectral data.
 - c. Obtains and interprets infrared spectral data from extracted constituents of material.
 - d. Devises and executes series of chemical reaction tests on suspect material.
 - e. Performs microscopic examination of plant material and interprets results.
 - f. Performs microscopic crystalline examination of drug material and interprets results.
 - g. Maintains equipment necessary for analysis.
 - h. Maintains and stores evidence.
2. Performs toxicology to determine the level of foreign substances in blood and urine.
 - a. Determines level of carbon monoxide in bloods.
 - b. Maintains expertise in a variety of drug screening methods such as immunoassay and thin-layer chromatography.
 - c. Devises, modifies, and performs methods of analysis using gas chromatography and mass spectrometry to confirm presence of drugs in body fluids.

- d. Performs gas chromatographic and headspace analysis of body fluids and beverages to accurately determine ethyl alcohol concentration.
3. Provides expert court testimony and consultation to explain the validity of testing and explain the physiology and physiological effects of alcohol and other drugs.
 - a. Travels to various courts throughout South Dakota to provide testimony concerning testing procedures and results.
 - b. Defends analytical results in court against vigorous defense.
 - c. Provides extrapolation of blood alcohol test results as it applies to an individual's blood alcohol level at the time of driving.
 - d. Provides testimony relating to alcohol and/or drug's physiological effects on the accused.
 - e. Consults with attorneys and law enforcement officers in a variety of technical areas.
 4. Performs other work as assigned.

D. Reporting Relationships:

Typically reports to a Health Laboratory Administrator and may provide work direction to Chemists, Senior Chemists, Laboratory Technicians, Laboratory Aides, students, and/or interns assigned to the laboratory.

E. Challenges and Problems:

Challenges include ensuring that the methods used in the laboratory do not supply data that leads to inaccurate results, understanding the theories and principles of complex laboratory procedures and the operation of scientific equipment, explaining detrimental effects of alcohol and drugs on individuals, defending analytical results when confronted by defense expert witnesses, and taking into account the many variables which affect test results and/or the analysis of test data.

Typical problems include identifying possible sources of contamination, interference in the preparation and testing of samples, calibration and adjustment of scientific laboratory equipment, the analysis of different and unusual samples, explaining findings to the public, deciding if a test method is acceptable for the sample and/or submitting agency, and troubleshooting complex equipment.

F. Decision-making Authority:

Decisions include developing new or revised test methods or analytical procedures, laboratory equipment repair needs, whether to call for additional sample information, test methods to use, how to defend analyses in court, determining quality control, priority of samples and tests, chemical reagents or solutions to purchase, and the presence of compounds and their concentration.

Decisions referred include approval to purchase laboratory equipment and supplies, charges for testing and court testimony, revising or implementing laboratory policies and procedures, and final approval on new or revised test methods and procedures.

G. Contact with Others:

Daily contact with law enforcement personnel to provide information about test results and proper methods of preparing evidence, State's Attorney to provide consultation concerning test

results and what testimony would be in court; and weekly contact with defense attorneys, court services, and judges to provide consultation about test results and possible testimony.

H. Working Conditions:

Works with toxic chemicals, solvents, pressurized gases, and high temperature equipment; may come in contact with disease-causing microorganisms, and biological hazards.

I. Knowledge, Skills and Abilities:

Knowledge of:

- scientific methodology;
- principles of analytical chemistry and different areas of science such as biology, physics, and human anatomy;
- alcohol and drug physiological effects;
- laboratory facilities, methods, equipment, and materials;
- safe laboratory practices.

Ability to:

- interpret complex scientific data by taking into account several elements;
- deal tactfully with adversity;
- keep legible, clear, and adequate records of analytical and quality control procedures and maintenance;
- assemble material and present data or findings with scientific accuracy;
- prepare and present scientific reports;
- testify in court proceedings;
- observe and practice safety precautions;
- maintain an effective working relationship with others.