STATE OF SOUTH DAKOTA CLASS SPECIFICATION

Class Title: Senior Chemist **Class Code: 40682**
Pay Grade: GJ

A. Purpose:

Performs technical quantitative and qualitative chemical tests on samples or specimens submitted for analyses and maintains quality control over specialized testing to determine the presence and/or amount of unknown or regulated elements, chemicals, or substances and ensure the validity and reliability of analyses.

B. Distinguishing Feature:

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. Establishes test methods on a computer system linked to scientific laboratory equipment, to direct or carryout test procedures or activities.
   a. Researches method guidelines provided by the Environmental Protection Agency (EPA), equipment manufacturers, other state/federal agencies, and scientific organizations.
   b. Modifies or customizes test methods and incorporates those methods into the computer software.
   c. Tests new methods to prove reliability.
   d. Runs EPA, United States Geological Survey (USGS), or other reference samples, check samples, or performance evaluation samples against test methods.
   e. Prepares standards for samples being tested.
   f. Reviews EPA detection limits and calculates method detection limits.

2. Modifies or adjusts sampling and sample preparation and prepares samples for tests to ensure required analysis activities are completed and recognizes changes in chemical compounds being analyzed according to the particular sample matrix.
   a. Adjusts sample pH.
   b. Extracts interfering compounds.
   c. Concentrates solvents and exchanges them for other solvents.
   d. Identifies possible sources of and corrects for contamination.

e. Recommends the purchase of test chemicals, solutions, reagents, or equipment.
f. Pipets sample aliquots and adds matrix modifiers or other reagents.

3. Evaluates and determines the accuracy of test results to ensure findings are reliable.
   a. Diagnoses equipment malfunctions and determines appropriate repairs or adjustments.
   b. Considers factors inhibiting or interfering with detection methods.

4. Performs chemical, physical, or biochemical tests and analytical methods and procedures on a variety of organic or inorganic materials, which may include the use of analytical instrumentation such as gas and liquid chromatography and spectrometry to detect unknown properties or the presence of controlled and regulated elements.
   a. Operates and calibrates scientific laboratory equipment.
   b. Determines if test results are accurate and interprets findings.
   c. Responsible for quality control procedures in assigned laboratory area.
      i. Keeps a record of maintenance procedures and equipment operating parameters.
      ii. Monitors test procedures and activities within an assigned section of the laboratory.
      iii. Ensures that required duplicates, spikes, and check samples are analyzed within assigned area of responsibility and that results lie within established control limits.

5. Serves as a resource to other private and public laboratories in the state who conduct drinking water and chemical analysis to ensure proper methods and accurate results.
   a. Provides technical assistance to laboratories performing tests under an EPA licensure/certification to include how to set up their laboratory, conduct testing, defensibility of results, etc.
   b. Conducts on-site laboratory audits for laboratories conducting compliance drinking water analysis.
      i. Visits laboratories conducting testing.
      ii. Reviews testing methods and documentation.
      iii. Prepares a summary report of findings.
      iv. Establishes corrective action plans for laboratories not in compliance and monitors implementation of those plans.
      v. Recommends laboratory certification/decertification to DENR.

6. Performs other work as assigned.

D. Reporting Relationships:

Typically reports to a Health Laboratory Administrator or university faculty member and provides work direction to Chemists, Laboratory Technicians, Laboratory Aides, interns, and/or students assigned to the laboratory.

E. Challenges and Problems:

Challenged to understand the theories and principles of complex laboratory procedures and the operation of scientific equipment. The incumbent must take into consideration 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 or 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, concentration of samples going to requesting agencies, laboratory equipment repair needs, whether to call for additional sample information, test methods to use, devising experiments with deviations from standard procedures for chemical interference suppression, how to defend analyses, determining quality control, priority of samples and tests, chemical solutions or reagents to purchase, and the presence of compounds and their concentration.

Decisions referred to a superior include implementing and revising laboratory policies and procedures, approval to purchase laboratory equipment and supplies, and final approval of new or revised test methods and procedures.

G. Contact with Others:

Daily contact with the public, communities, and regulating or enforcement agencies to discuss test findings, issues, or procedures; or to respond to requests for information or test kits.

H. Working Conditions:

Works with concentrated acids, toxic chemicals, solvents, pressurized gases, radioactive materials, 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 and practices of analytical chemistry and inorganic, organic, or biochemistry as needed for the specific area of work;
- laboratory facilities, methods, equipment, and materials;
- safe laboratory practices.

Ability to:
- perform various tests, adapt techniques as required, and perform complex computations;
- assist in the development of new or improved methods and/or techniques to be used in laboratory analysis;
- follow directions, formulas, and charts;
- carry out research projects;
- keep legible, clear, and adequate records of analytical and quality control procedures and maintenance;
- assemble material and present data or findings with scientific accuracy;

- follow standard scientific laboratory methods;
- perform standardized and complex tests or analyses independently;
- prepare and present scientific reports, provide direction and training to others;
- observe and practice safety precautions;
- maintain effective working relationships with others.