

STATE OF MONTANA

JOB DESCRIPTION

Montana state government is an equal opportunity employer. The State shall, upon request, provide reasonable accommodations to otherwise qualified individuals with disabilities.

Job Title: Chemist

Position Number: 40002, 40028

Location: Helena

Department: Transportation

Program Area and Bureau: Project Development and Delivery/Materials Bureau

Section and Unit: Testing Operations Section/Chemistry Lab

Job Overview:

This position serves as a Chemist for the Chemistry Unit of the Physical Testing Section of the MDT Materials Bureau. The position is responsible for performing chemical and physical analysis of materials samples to determine the composition of samples and their compliance with materials specifications; determining appropriate analytical methods for analyses, researching and developing new analytical procedures and quality control/assurance methods and techniques to implement state-of-the-art technology, verifying instrument performance, troubleshooting and validating generated data, prioritizing sample analyses, increasing the efficiency and reliability of analyses, and to ensure program compliance with agency business needs and applicable regulations and specifications; and administering laboratory operations including reporting, communications, and related activities. The position reports to the Analytical Materials Supervisor (position #40007) and is responsible for lead worker tasks of Materials Lab Technicians.

Essential Functions (Major Duties or Responsibilities):

Analytical Chemistry - 65%

Perform chemical and physical analysis of materials samples to determine their composition, compliance with materials specifications, and whether the materials will perform appropriately.

- Determine appropriate testing protocol and methodology, based upon project and referral source objectives, sample information and condition, nature, etc. of materials to be tested.

- Prepare samples for testing.
- Ensure sample integrity to prevent cross-contamination, degradation, or mix-ups by applying standardized laboratory management procedures and sampling protocols.
- Calibrate and validate computerized analytical instrumentation to evaluate and document appropriate instrument performance by testing reference analytical standards and comparing results to standards to verify instrument performance.
- Process samples through instrumentation, analyze results to identify the presence or absence of compound(s) by interpreting data using knowledge of a wide variety of compounds.
- Identify and quantify components in cement, hydrated lime, paint, deicer, dyed diesel, asphalt, emulsified asphalt, and other materials, using Ion Chromatography, Inductively Coupled Plasma spectrometers, Atomic Absorption spectrometers, dynamic shear rheometers, and other instruments.
- Conduct further analysis and evaluation of samples and testing protocols if identification is not clear. Determine the best course of action.
- Perform the analysis of non-routine investigatory samples requiring unique or specialized handling, preparation, instrumentation, and interpretation, using chemistry procedures and instrumentation.
- Analyze all testing results not meeting specifications through evaluation, correction, and implementation of various solutions. Determine the causation of sample failure as well as evaluate if the testing method was valid, rigorous, and did not contribute to false results.
- Analyze, compile, calculate, and summarize test results; compare final results to specifications; and establish appropriate test results documentation and accompanying records based upon testing procedures and results.
- Provide documentation of test results, methods, calculations, and analytical data by entering information into spreadsheets and/or the laboratory information management system. Identify trends, errors, omissions, etc. and determination of whether corrective action is necessary in sample handling, analytical methods, instrumentation, data handling or report generation.
- Maintain, repair, and troubleshoot laboratory analytical equipment and instruments to ensure safety, accurate results, proper operation, cost containment, and extended life.
- Provide subject matter expertise in all analyses performed in the lab, including sample receiving, prioritizing analyses, instrumentation (ICP, AA, IC, UV/Vis, FTIR, etc.), and analyzing and reporting sample results. Perform concurrent applications of testing processes on multiple instruments when there is only one chemist in the lab.
- Participate in the Concrete and Cement Reference Laboratory (CCRL) reference testing program and the American Association of State Highway and Transportation Officials (AASHTO) re:source proficiency sample program by performing chemical and physical properties analyses of samples. Analyze and interpret results from proficiency testing to

make the appropriate adjustments in the laboratory to ensure both accuracy and precision in sample analysis.

Research and Development - 15%

Research and develop analytical and quality control/assurance methods and techniques to implement state-of-the-art technology, increase the efficiency and reliability of analyses, and to ensure program compliance with agency business needs and applicable regulations and specifications.

- Perform method verification, evaluation, and develop new chemical analyses and/or new applications of existing instrumentation to solve difficult chemical analysis problems by reviewing literature, consulting with application specialists, and using knowledge of advanced analytical chemistry and state-of-the-art instrumental techniques.
- Research and develop laboratory methods and procedures to provide effective analysis of new construction materials and chemical properties; ensure the scientific and legal integrity of methods and conclusions; and promote efficient and cost-effective operations and services.
- Research new methods, recent discoveries, and new products; design scientifically valid experiments to evaluate and refine methods and procedures; documenting effective methods and procedures; and provide recommendations to the Analytical Materials Supervisor on new methods or procedures.
- Perform special collaborative studies to validate and evaluate analytical methods applying scientific knowledge of QA/QC protocol, laboratory practices, statistical analysis and study requirements.
- Recommend improved laboratory policies, procedures, and guidelines that comply with State and federal requirements and allow for flexibility in implementation and coordination with other bureaus, state and federal agencies, and professional standards.
- Research and assess new scientific advances, laboratory technologies, industry practices, state and federal regulations, and other factors to develop recommendations for operational, policy, and program issues.
- Maintain the enforcement of the required laboratory Quality Control Program; develop protocols related to instrument calibration, statistical evaluation, Quality Control, check samples and related activities; recommend changes and improvements to the Analytical Materials Supervisor; and implement these changes using knowledge of QA/QC protocol, program requirements, laboratory needs, and state and Federal laws or regulations.
- Make recommendations to the Analytical Materials Supervisor on the need for new equipment and recommending budget justifications and requests.
- Develop and maintain quality control, instrument, standard, and check sample processes to record and evaluate data. Recommend appropriate changes in lab policy or procedures to the Analytical Materials Supervisor; implement the changes; and recommend and implement corrective actions for programs or procedures that don't meet QA/QC protocols.

Operations and Communications - 10%

Administer laboratory operations including reporting, communications, recordkeeping, supplies, and related activities.

- Evaluate laboratory needs related to report generation, data manipulation, information flow, information storage, record keeping, program language, lab policies, QA/QC, and Good Automated Laboratory practices.
- Communicate and discuss test results with other personnel whenever necessary. Exchange information regarding methods, conflicting test results, and technical testing methods and procedures.
- Interpret and explain standards, specifications, and other requirements to materials lab staff, field and district staff, and contractors to ensure consistency and compliance, resolve discrepancies, and ensure that project requirements and objectives are met.
- Respond to project staff or contractor requests for clarification, recommend adjustments and alternatives to prevent or mitigate compliance deficiencies, and resolve problems while maintaining standards and specifications
- Evaluate requests to determine laboratory supply, equipment, and staffing needs relative to on-going laboratory projects.
- Evaluate laboratory supplies, equipment and staffing needs to perform special laboratory projects; determine project cost and feasibility; recommend appropriate action to the Analytical Materials Supervisor.
- Report findings and statistical evaluation of proposed methods in writing based on analysis of samples in a step-by-step process to provide information and training material for other lab personnel. Write comprehensive project reports with the cooperation of other lab personnel to be utilized by other agencies and the public.
- Report laboratory findings and technical information in the form of professional papers or verbal presentations for use in educational, technical and professional meetings. Write technical papers related to Standard Operating Procedures in the laboratory.
- Represent the laboratory at technical meetings as assigned to keep current on contemporary methods and policies and/or share ideas by applying scientific knowledge and communication skill.
- Maintain contact and work with other state and private laboratories to coordinate analytical methods and techniques using knowledge of concerns and communication skills.
- Provide technical assistance concerning Materials Bureau samples electronically or to walk-in customers.
- Provide expert testimony regarding analytical methods, findings, and materials at hearings and in court as assigned.
- Maintain and keep records of instrument supplies and parts inventory using knowledge of instrument operation, use of supplies, and the service life of parts.

- Develop and maintain a Chemical Hygiene Plan (CHP) which complies with OSHA requirements and the Montana Safety Culture Act. Develop and maintain safety programs such as fire exiting, spill containment, etc. to supplement the CHP.

Lead Worker/Other Duties - 10%

Provide lead worker mentoring of lab personnel as assigned to ensure testing activities are effectively performed by qualified personnel. Perform other duties as assigned.

- Provide technical oversight, quality assurance reviews, and chemical assistance to Project Managers, field lab personnel and other materials lab personnel on specific testing projects to ensure the quality, efficiency, and cost-effectiveness of work as well as compliance with standards, specifications, and Department requirements.
- Maintain laboratory quality control to tabulate analytical data generated by in-house quality control programs; Check Sample programs; and conduct statistical analysis of data using knowledge of precision, standard deviation, and other statistical calculations for each procedure.
- Assist in the review and revision of staff work plans, priorities, and procedures. Monitor progress, disseminate data, and coordinate projects through meetings and consultation.
- Research and evaluate workflow processes, efficiencies, and problems to identify the most effective use of human and fiscal resources to meet section goals and project objectives.
- Present recommendations for improving section workflow and staff performance. Ensure unit staff has the supplies, materials, and equipment needed to carry out their work.
- Assist in planning and assigning work according to individual job descriptions, needs, and abilities of individual staff. Interpret, monitor, and implement work plans, policies, and procedures.
- Review assigned work for compliance with quality, quantity, and other standards. Assist other project staff in solving complex aspects of work assignments.
- On all projects assigned, or in the absence of the Analytical Materials Supervisor, ensure staff compliance with safety protocols, testing methods, laboratory and instrumentation techniques and related requirements through on-the-job training, observing work in process, and correcting inappropriate work procedures.
- Provide input and recommendations regarding the training needs of unit staff through analysis of program effectiveness, new methods and policies, and staff performance. Provide or coordinate formal and on-the-job training to ensure that current physical testing methods and equipment are properly applied by unit staff.
- Perform a variety of special studies, research and analysis activities, and other duties as assigned by the supervisors and bureau chief in support of the Department mission and Bureau objectives.

Supervision

The number of employees supervised is: N/A

The position number for each supervised employee is: N/A

Physical and Environmental Demands:

The predominant work is performed in a controlled lab environment involving exposure to testing equipment, caustic chemicals (lime, acids, mercury, and other chemicals), dust and fumes. The position works with hot materials and equipment (steel molds, ovens at 1100 degrees, hot plates, etc.), and solvents and chemical additives which require use of protective apparel such as lab coats, gloves, respirators, and eye protection. The position requires training in, and close observation of, safety practices and procedures.

- Occasional independent lifting required (up to 75 lbs.) of equipment, material samples, etc.
- Remaining standing or seated for extended periods of time
- Manual manipulation of testing equipment
- Visual acuity required to observe and discern material and sample conditions

Knowledge, Skills and Abilities (Behaviors):

The work requires knowledge of the principles and practices of analytical, organic, and inorganic chemistry; principles of physics, calculus and statistics; typical construction and maintenance materials are deicers, dyed diesel, paint, soils, water, cement, hydrated lime, asphalt, etc.; scientific writing methods; computerized analytical instrument methods and physical measurements; computerized analytical instrument electrical circuits, instrument design, computer function and programming, instrument maintenance procedures, appropriate manuals, and validation methods; and quality assurance and quality control methods and procedures of the analytical chemistry profession and the work unit. Requires experience with the chemical and physical behavior of compounds in various matrices and various analytical methods, ability to evaluate analytical data and statistical information, ability to interpret and professionally validate results, and skill in the operation of computerized analytical instrumentation.

Require demonstrated skill in applying this knowledge to a variety of analytical chemistry assignments, including difficult and complex assignments, ranging from quantitative trace analysis with computerized analytical instrumentation, to method validation, to method development. Ability to stay on the cutting edge as new methods, techniques, instruments are developed by searching scientific literature, talking with instrument companies and various colleagues in similar positions.

Minimum Qualifications (Education and Experience):

The required knowledge and skills are typically acquired through a combination of education and experience equivalent to Bachelor's Degree in Chemistry or Chemical Engineering. Chemistry and lab related course work must have been conducted inside a controlled lab environment at an accredited college or university.

This position requires a minimum of three (3) years of experience (or equivalent internships) in an analytical laboratory, including one (1) year of experience with computerized analytical instrumentation.

Certifications, licensure, or other credentials include:

Alternative qualifications include: A Master's Degree in Chemistry may substitute for one year of related experience.

Special Requirements:

☐ Fingerprint check

☐ Valid driver's license

☐ Background check

☐ Other; Describe

035 Union Code

Safety Responsibilities

The specific statements shown in each section of this description are not intended to be all inclusive. They represent typical elements and criteria considered necessary to perform the job successfully.

Signatures

My signature below indicates the statements in the job description are accurate and complete.

Immediate Supervisor	Title	Date
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Administrative Review	Title	Date
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My signature below indicates that I have read this job description.

Employee	Title	Date
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Human Resources Review

Job Code Title: Chemist 1 Job Code Number: E23011

Level: 1

My signature below indicates that Human Resources has reviewed this job description for completeness and has made the following determinations:

☐ FLSA Exempt

☒ FLSA Non-Exempt

☐ Telework Available

☒ Telework Not Available

☒ Classification Complete

☐ Organizational Chart attached

Human Resources:

Signature

Title

Date