

Job Description

Job Title:	Tritium Technician
Department:	Earth and Environmental Sciences, Environmental Isotope Laboratory
Reports To:	Lab Manager
Jobs Reporting:	Lab Technician Assistant (functional)
Salary Grade:	USG 8
Effective Date:	May 2021

Primary Purpose

The Tritium Technologist is responsible for the preparation and analysis of water and other samples for tritium content with the assistance of a tritium lab technician as well as maintenance and repair of existing and future tritium analysis equipment. The incumbent will be an integral part of the team to provide sample analyses results in a timely manner to clients from around the world. Duties assigned will include the set up and operation and maintenance of laboratory analytical equipment, conduct data analysis and interaction with students, co-workers, and clients.

Key Accountabilities

Prepare and Process Direct and Enriched Tritium Analysis

- Sample pretreatment for tritium analysis, including EC measurements, salt removal by using ion exchange resin, and Azeotropic Distillation.
- Setup tritium enrichment process, load sample to electrolysis and monitor the running status.
- Preparation of samples with scintillation cocktail and placement into a Liquid Scintillation Counter (LSC) for measurement of their Tritium activity.
- Answering relevant technical questions from clients and researchers.
- Reduction and calibration of raw data from the LSC which are converted to final results
- Reporting of results to the office administrator.
- Responsible for housekeeping in the work area and proper removal of all chemical wastes involved in the above procedures while observing all University safety standards.
- Helping to maintain the smooth operation of the EIL through providing assistance and knowledge to co-workers, post-docs, undergraduate and graduate students.

LSC Equipment Maintenance and Repair

- The incumbent is responsible for maintenance and repair of 3 Quantulus 1220 LSCs including electronics and servicing of autosampler belts and motors as well as peripheral equipment supporting tritium analysis.
- Provide general repairs, routine maintenance, troubleshooting, problem solving and manipulating data.

Software Application Development for Lab Automation and IT Support

- Develop and maintain automation tools for tritium analysis (automatic weight recorder, form generator, auto data correction program).
- Develop and maintain customized version of teamwork project management web applications, for tracking project progress, recording inventory and file managements for the benefit of the entire EIL.
- Develop and maintain IOT based system for lab equipment to achieve real-time status monitoring and remote control over internet for reporting to the Office Administrator and clients.
- Provide both software and hardware support on EIL computers and help configure the networks.

Job Description



- Help debug equipment specific software.
- Help solve compatibility issues on legacy software.

Method Develop And Instrument Research, Design and Upgrades

- Develop new processes for the analysis of ultra-low-level tritium samples (>0.1 TU).
- Upgrade the vacuum distillation system by redesign the vail fittings, tubes, and heating block.
- Develop and maintain an automatic liquid drain system for Azeotropic Distillation.
- Develop and maintain an IOT based lab power controller that controls the electrolysis time and monitors the real-time running status.
- Provide support and troubleshooting for both electrical and mechanical issues that arise on EIL analysis equipment including elemental analyzers, gas chromatographs, and mass spectrometers.
- Conduct research-based projects on novel tritium analytical technologies including seeking external sources of funding for research purposes.
- Continue to make plans for future hardware/software projects and tritium method development projects.
- Manage ongoing projects with frequent updates to the lab manager.

**All employees of the University are expected to follow University and departmental health and safety policy, procedures and work practices at all times. Employees are also responsible for the completion of all health and safety training, as assigned. Employees with staff supervision and/or management responsibilities will ensure that assigned staff abide by the above, and actively identify, assess and correct health and safety hazards, as required.*

Required Qualifications

Education

- University Degree, ideally in Science
- General background in science a strong asset

Experience

- More than 2 years of experience in a general lab environment, experience working in an Isotope lab environment considered an asset.
- More than 2 years of experience in R&D role conducting method development and prototype rapid design
- Experience building and maintaining responsive, highly-available lab automation applications.
- Practical experience in general lab practices and safety.
- Experience working with tritium preparation and analysis, Conductivity and pH measurements, Liquid Scintillation Counter operation, and Radioactive sample handling and analysis preferred.
- Familiar with Azeotropic Distillation and Ion exchange for water/plant/soil sample pre-treatment.

Knowledge/Skills/Abilities

- A working knowledge of MS Word, MS Excel, Email and general PC use as well as other analytical techniques is required.
- Able to manage and prioritize 100's of samples at a time.
- Strong analytical and problem solving skills.
- Excellent verbal and written communication skills.
- Sufficient programming skills on data analysis, API design, simple GUI design and web application development.
- Proficient at mechanical CAD tools (Solidworks, AutoCAD).
- Familiar with Python, Java, C++.
- Embedded system design using Arduino and STM32 microcontroller.
- Electrical circuit design.

Nature and Scope

- **Contacts:** Must be able to work with a team to accomplish client analytical requirements in a timely manner. Communicates with other staff members and at times with clients to answer questions, provide feedback and obtain more information as required for samples analysis.
- **Level of Responsibility:** Helps and directs students as required. Provides training to visitors. Must pay attention to details while dealing with large quantities of samples and result.
- **Decision-Making Authority:** Organizes sample analyses based on analytical requirement and priorities as communicated by the lab manager to be as efficient as possible. The incumbent will develop and then follow a documented Technical Procedure for each method developed. Deviations from the written procedures must be discussed with the lab manager and noted on the lab traveler to ensure tests can be recreated to exact specifications.
- **Physical and Sensory Demands:** Manual dexterity and strength are required to handle samples (open/close bottle closures), syringes, and small vials and vial cap sealers. Must be able to stand for long periods while performing routine sample preparation.
- **Working Environment:** The incumbent is required to work in a lab environment which is at times cool due to equipment requirements or hot due to sample analysis procedures and noisy. Safety issues – working with sharp needles and glass, requires the use of gloves and ability to work with an open flame, handling poisonous materials. Cleanliness - washing of glassware, must keep work areas free from contaminants.