US Army Corps of Engineers®
Engineer Research and Development Center

Environmental Chemistry Laboratory (ECL)

Purpose

The Environmental Chemistry Laboratory (ECL) at the Construction Engineering Research Laboratory (CERL) offers current scientific equipment and expertise to meet analytical needs not commonly available at commercial laboratories. The ECL provides a one-stop service to meet these specialized requirements quickly and affordably.

Specifications

Analytical support requires a variety of instrumentation, depending on the sample and analyte composition (organic or inorganic; solid, liquid or gas) and concentration (required detection limits). Analysis can be non-specific when measuring groups of similar compounds (e.g., Total Organic Carbon, or Oil and Grease), or specific for the determination or identification of individual compounds. The following analytical instrumentation is currently available and in use at the ECL:

- Tools for Organic Analysis:
  - Gas Chromatograph / Mass Spectrometer (GC/MS)
  - Liquid Chromatograph / Mass Spectrometer (LC/MS)
  - High-Pressure Liquid Chromatograph with UV / Vis and Photodiode Array (PDA) Detector
  - Fourier Transform Infrared Spectrometer (FTIR)
  - LC/IR
  - Pyrolysis GC/MS
  - UV /Vis Absorbance Spectrophotometer
- Tools for Inorganic Analysis:
  - Flame & Graphite Furnace Atomic Absorption Spectrometer (AA)
  - Ion Chromatograph (IC)
  - Electrochemical Analysis
  - Orion Auto-Titrator
  - ATM Sonic Sifter
- Tools for Field Analyses: A fully equipped mobile laboratory including soil, water, and air sampling equipment.

Benefits

The ECL provides timely analyses of crucial samples and performs exploratory analysis of materials of unknown composition. Based on project requirements, the ECL designs experiments, develops methods, and provides research direction to best analyze and answer research questions. The ECL is the sole analytical support base for some U.S. Army projects and for those situations where analysis at an outside laboratory under contract would be prohibitively expensive due to the complexity of analysis. Where the ECL does not have the equipment, expertise, or time to analyze samples, the lab has developed a working relationship with the nearby University of Illinois Waste Management and Research Center.

Success Stories

For example, ECL has helped CERL researchers and Army customers to:

- analyze wastewater runoff from aircraft washing facilities
- identify by-products from advanced oxidation processes
- analyze grease/oil from oil/ water separator discharges
- monitor erosion on training ranges by TSS in river samples
- analyze industrial wastewaters
- determine heavy metal leaching from zebra mussels anti-foulant coatings
- analyze paint blast media residue by TCLP
- assess onsite environmental energetic contamination of soil and water
- collect and analyze hazardous waste incinerator emissions
- monitor sonolytic and photocatalytic water remediation techniques
- evaluate heavy metal stabilization products
- characterize novel carbon fiber filters.

ERDC POCs

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