



Forensic Chemistry Investigations NEIC's Laboratory Capabilities

Relevant Skill Areas

- Chemical analysis
- Applied research and methods development
- Sampling consultation
- Environmental regulations

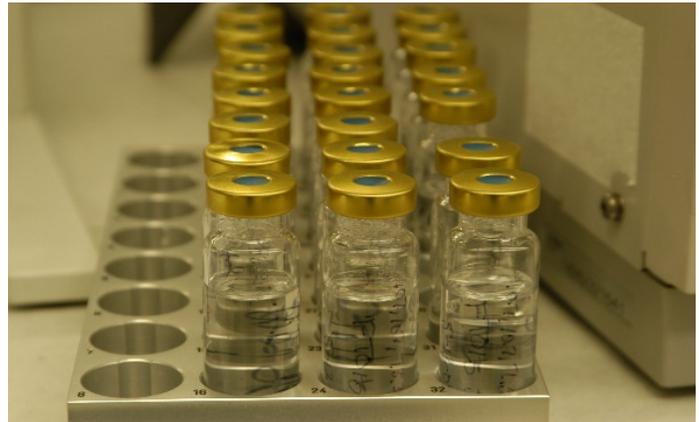
Key Testing Applications

- Organic and inorganic pollutants under CAA, CERCLA, CWA, FIFRA, RCRA, SDWA, and TSCA
- Particle and fiber analysis under CAA, CERCLA, and RCRA
- RCRA reactivity analysis and expertise including cyanide and sulfide analysis
- RCRA Characteristics testing including Flash Point, Corrosivity, and TCLP

Who we are: The National Enforcement Investigations Center (NEIC) is the environmental forensics center that supports complex civil and criminal investigations for EPA's enforcement programs across the country. NEIC's mission is to serve as EPA's fully accredited forensics laboratory and provide for multi-disciplinary expert teams to conduct field investigations to gather and evaluate evidence. NEIC provides support by gathering data, providing engineering evaluations, analyzing forensic evidence, supplying legally defensible data, serving as expert witnesses in the courtroom, and providing investigation training.

Laboratory science: EPA regulations sometimes require highly specialized testing. Often, the presence of pollutants must be established through methods requiring highly sensitive and selective tests. Analysis to evaluate chemical composition is an important component of environmental forensics – the application of environmental science to environmental law. At NEIC, chemists use sophisticated laboratory instrumentation to perform this testing in support of EPA's enforcement mission.

Project support: NEIC staff are also trained project managers who work with EPA offices and State, Local, Tribal, and Territorial partners to define each investigation's scope and objective(s). Once the investigation scope and objective are defined, NEIC chemists determine analytical and quality assurance objectives. This information, in turn, helps the project manager determine: what background information is required; the knowledge, skill, and experience mix needed on the investigation team; and the investigation strategy and required resources.



Applied research and methods development: Due to the unique and unusual variety of evidentiary samples collected to support environmental enforcement, standard analytical methods typically used for monitoring the environment may not be adequate or generate accurate results. In such cases, new methods must be developed, or existing methods must be modified, to produce appropriate analytical data. Method development is an ongoing process that requires NEIC to rely on the knowledge and experience of its scientists and engineers.

NEIC Laboratory Capability

Hazardous waste incinerators and compliance with Clean Air Act (CAA) requirements: To support CAA investigations, NEIC can analyze incinerator ash for metals content to determine if facilities are meeting Feedstream Analysis Plan requirements.



Sourcing soil contamination: NEIC has substantial experience in cases where a known pollutant is present, but the source of the pollutant is contested or unknown. NEIC has identified the source of lead contamination in soil as originating from lead-acid battery waste using X-ray techniques to identify the lead species present. These data indicated that battery waste, rather than paint waste, was the source of lead and provided investigators the information needed to determine what entity was responsible for the contamination.

Sourcing air pollution: NEIC has developed laboratory methods to analyze particulates collected on air filters. These techniques provide highly accurate data on particle composition and morphology, and trace elements contained within the samples.

Results of these analyses are compared to materials collected from

different air pollution sources in the area, allowing EPA to demonstrate which facility is predominantly responsible for high air pollution concentrations.

Pesticide formulation assays and residue determination: NEIC assists in investigations involving potential Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) violations. This support ranges from: analyzing materials to confirm that they are not legal for use in the United States; ascertaining that products have mislabeled pesticide formulations; and performing analysis on pond water to demonstrate contamination by pesticides not permitted for water application. Analytical capabilities include qualitative and quantitative testing.

Regulated ozone depleting refrigerants: NEIC can identify regulated ozone depleting refrigerants such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) to evaluate potential violations of the CAA. Cases have involved illegal importation of refrigerants such as R-22 and R-134a into the United States, and the illegal sale and disposal of CFCs and HCFCs on the black market. NEIC performs field-screening of cylinders containing suspected refrigerants, collects representative samples to perform laboratory analysis, and confirms the presence of regulated materials.

Ambient air concentrations of volatile organic compounds (VOCs): NEIC performs both qualitative and quantitative testing of ambient VOCs by deploying air canisters in areas surrounding targeted facilities. Analysis of ambient air in the canisters provides community members and decision makers information about the public's exposure to contaminants.

Refinery wastewater and allowable benzene limits: NEIC provides laboratory support to investigations of facilities to determine compliance with CAA benzene National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart FF regulations. The laboratory can provide qualitative and quantitative analysis of benzene and naphthalene in wastewater samples.

Organic pollutants in various environmental media: NEIC provides technical support in the analysis of environmental samples containing a variety of organic pollutants. The laboratory has identified and quantified: polychlorinated biphenyls (PCBs) in oils and soils to determine if concentrations exceed the Toxic Substances Control Act (TSCA) regulatory threshold; characterized perfluorinated chemicals (PFCs) in surface waters collected in proximity to suspected sources; and identified VOCs in abandoned wastes and in waste streams from treatment plants to determine if Resource Conservation and Recovery Act (RCRA) regulatory limits have been exceeded.

Contamination in drinking water: NEIC chemists have supported Safe Drinking Water Act (SDWA) investigations involving drinking water to determine if levels of inorganic contaminants such as arsenic or cadmium exceed maximum contaminant levels.

RCRA characteristic testing: In support of RCRA investigations at abandoned facilities, NEIC tests materials for corrosivity and ignitability characteristics, characterizes acid wastes, tests for cyanide, performs Toxicity Characteristic Leaching Procedure (TCLP) extractions, and tests for toxic metals and organic constituents. The results allow EPA investigators to determine if abandoned materials are hazardous and subject to RCRA requirements.

Treatment, Storage, and Disposal Facilities (TSDF) waste treatment practices: NEIC chemists support TSDF investigations by performing TCLP extractions on samples of treated waste to determine if sufficient treatment has occurred. These investigations helped ascertain if facilities accurately calculated feed rates, properly treated wastes, and met RCRA Land Disposal Restriction Treatment Standard requirements.

Wastewater compliance with National Pollutant Discharge Elimination System (NPDES) permit limits: NEIC supports Clean Water Act investigations by performing testing both in the field and in the laboratory. Sample analyses for pH, dissolved oxygen, ammonia, sulfide and VOCs allow investigators to determine if NPDES permit limits are being achieved and/or if a pollutant has been discharged. NEIC has also investigated the source/cause of elevated levels of hydrogen sulfide in sewer systems.

Asbestos: NEIC provides support for cases involving suspected illegal asbestos removal, abatement, and disposal under its National Voluntary Laboratory Accreditation Program (NVLAP) accreditation to perform asbestos analysis. NEIC's analysts can detect asbestos in single- and multi-layer samples at the 1% level by microscopy methods to determine if Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and CAA regulations have been violated. NEIC also has analysts proficient in identifying and quantifying asbestos by X-ray methods to strengthen and confirm microscopy results. In addition, NEIC has been involved in the analysis of naturally occurring asbestos in the environment, for example, assisting Region 8 and the Office of Research and Development with characterizing asbestos samples for toxicity studies.



How to obtain NEIC's support

If you would like more information on NEIC or to request field and/or laboratory support, technical assistance or training, please contact us at neic_project_requests@epa.gov. You may also contact your regional enforcement coordinator for more information on requesting NEIC's support on civil projects and EPA's Criminal Investigation Division (CID) for support on criminal projects.