



# Road Transportable Analytical Laboratory (RTAL)



**Developer:** Engineering Computer Optecnomics

**Contract Number:** DE-AC21-92MC29109

**Crosscutting Area:** CMST



**Problem:**

The long turnaround times and expense of central laboratories in analyzing samples critical for site characterization and remediation process control hinders site clean-up progress. In addition, on-site or off-site shipment of radioactive samples requires special handling and paperwork, extending turnaround time and increasing costs. Faster and cheaper methods of obtaining critical environmental analytical data are needed while maintaining the appropriate levels of quality assurance and quality control.



**Solution:**

The Road Transportable Analytical Laboratory (RTAL) was developed to meet the unique needs of the

Department of Energy (DOE) for rapid, on-site, low cost, and accurate analysis of environmental samples (soil, groundwater, and surface waters) for all samples of concern, including radionuclides. The RTAL design makes maximal use of laboratory automation and robotics technologies to dramatically shorten turnaround time and lower analytical costs while maintaining the highest levels of quality assurance and control.

The RTAL is designed to be able to fully analyze samples within 16 hours, providing critical analytical data several days, weeks, or months faster than is currently achievable. Cost analyses show potential savings from analytical costs alone of \$12 million per year for each RTAL system deployed compared to current central laboratory costs.

**Benefits:**

- ▶ Analysis of a full range of radiological, chemical and biological contaminants and constituents at highest levels of quality assurance
- ▶ Dramatic reduction in analytical costs and turnaround time
- ▶ Robotics incorporated to maximize

efficiency

- ▶ Full protection for operating personnel and sensitive analytical equipment against the radiological and environmental hazards encountered at DOE sites
- ▶ System easily modified to site needs since individual modules are designed to be fully road transportable, totally independent, and highly flexible

**Technology:**

The RTAL system consists of a set of individual laboratory modules deployable independently or as an interconnected group to meet individual site needs.

Each module provides full protection for operations and sensitive analytical equipment against radioactive particulates and conventional environmental contaminants. Each module is shock and vibration protected to prevent damage during transport and operation, and has its own electrical generation and HVAC systems. When interconnected, the modules provide backup utilities for each other to ensure a high degree of performance reliability. The



individual RTAL modules are:

▶The Radioanalytical Laboratory provides the shielded analytical and laboratory support equipment necessary for analysis of alpha, beta, and gamma emitting radionuclides.

▶The Organic and Inorganic Chemical Analysis Laboratories have full complements of analytical and laboratory support equipment for a wide range of analyses. The modules are designed to accommodate the linear robotic analysis systems which are being developed commercially and at the Los Alamos National Laboratory.

▶The Aquatic Biomonitoring Laboratory monitors for environmental hazards and is capable of verifying groundwater cleanliness at levels below the sensitivity of current chemical analyses.

▶The Field Analytical Laboratory contains equipment for rapid field detection of contaminants. The Laboratory is designed for automatic transmission of field data, including measurement position, directly to the RTAL's computers.

▶The Robotics Base Station provides housing and operations control for the robotic field sampling and robotic monitoring systems that are currently available and under development.

▶The Decontamination/Sample Screening Module provides a decontamination shower for personnel working (in protective ensembles) in contaminated areas and also provides a hot cell, glove

box and hood for initial screening of samples.

▶The Operations Control Center integrates laboratory and field activities and data analysis to ensure efficient performance of all phases of RTAL work functions.

▶The Protected Living Quarters Module provides full facilities for 5 operators and is deployed only for operations in remote areas where it would be inefficient to bring in new personnel every 8-12 hours.

### **Project Conclusion:**

This project was completed successfully in September 1996, meeting all the contractual goals and objectives. Demonstration of the RTAL system Organic Chemical, Radioanalytical, and Operation Control Center Laboratory modules was completed in January 1996 (Phase IIb). Demonstration of the RTAL system Inorganic Chemical and Aquatic Biomonitoring Laboratory modules was completed in April 1996 (Phase IIa).

On request from the DOE Fernald - Site Operations Office, Organic Chemical, Radioanalytical, and Operations Center laboratory modules are stationed at the Fernald Environmental Management Project (FEMP) site for deployment at the Waste Pits Remedial Action Project (anticipated duration 1997 to 2004), Soil Remediation Project, and Fernald Residues Vitrification Pilot Plant Project. However, these RTAL modules will be available on demand to other DOE sites provided the modules are not being deployed

at the FEMP site during that period.

### **Contacts:**

Engineering Computer Optecnomics, Inc., has designed and built fully transportable (road and air) and independent laboratory systems for use in contaminated areas for the Environmental Protection Agency (EPA) and the Department of Defense (DoD).

For information on this project, the contractor contact is:

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DOE's Federal Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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