



# LONG TERM MONITORING AND NATURAL ATTENUATION PROGRAM

ENVIRONMENTAL SCIENCES DIVISION  
“SCIENCE TO SUSTAIN OUR ENVIRONMENT”

## ORNL/ESD's Approach to LTM and NA

### LTM and NA Techniques

#### Sampling Techniques

- Direct Push
- Membrane Interface Probe
- Hollow Stem Auger
- Rotary Air Percussion
- Cone Penetrometer
- Bore-hole Geophysics
- Surface Geophysics
- Sediment Sampling
- Aquifer Analysis
- Soil Vapor Extraction
- Piezometers

#### Data Collection

#### Work Plan Development

#### Field/Laboratory Analysis

#### Data Management

#### Modeling

#### Reporting

#### Strategic Planning

In developing sampling and analysis programs for DoD involving contaminant plumes, ESD routinely characterizes the complex redox conditions of aqueous environments in addition to measuring plume dynamics, hydraulic properties, and other operating parameters. As there can be a changes in redox conditions with depth, ESD recommends collecting samples of groundwater over discrete vertical intervals to identify stratification in redox status. In addition, ESD suggests analyzing samples for a range of specific organic and inorganic analytes to estimate site-specific attenuation kinetics to accurately determine the oxidation/reduction status of groundwater. ESD plans and implements sampling and analysis programs to identify transformation and degradation products as well as the biodegradation rates and pathways based on site-

specific geochemical conditions.

Technical and legal defensibility of data is critical to effective decision-making. Data quality begins with the work plan, site sampling and analysis plan, quality assurance project plans, and health and safety plans used to collect the data. ESD is experienced in the collection of all types of media including air, soil, groundwater, sediment, and surface water. ESD's approach to sampling and analysis projects is to define goals up front and develop a concise scope of work and sampling plan. In each case, the ESD Project Team will work closely with the customer to develop a clear understanding of the objectives in order to plan a scope of work that is focused on gathering necessary data and meeting the needs of the project. In this way, data needs of decision-

makers are fulfilled while time and money are saved by not collecting unnecessary data.

ESD personnel are well-versed in a wide variety of sampling techniques. Our extensive experience includes monitoring well and piezometer installation (hollow stem auger, rotary, air-percussion, rotosonic, and direct-push), test borings, Membrane Interface Probe, Cone Penetrometer Testing, Geoprobe, and intrusive and non-intrusive geophysical methods. When appropriate, ESD advocates direct-push sampling techniques. The use of a cone penetrometer outfitted with Laser Induced Fluorescence screening devices and direct-push methods for soil and groundwater sampling has resulted in considerable cost savings to our clients.

## KEYS TO SUCCESS

Efficient and effective project teams are ORNL's most useful tool for project success and has been recognized by clients as an outstanding quality of ORNL, particularly those who have been working on Dover Air Force Base projects.

On several occasions, ORNL mobilized into the field on the

very day that authorization was received when Dover AFB's schedule required an immediate response.

*“ESD has done such outstanding work for us over the last 7 years, and so outshines the level of performance of the other service centers that I can only say how extremely grateful I am to have ESD as part of my Project Team. We literally*

*couldn't maintain the quantity or quality of our environmental work without ESD on our team. “ Jo Anne Deramo, Environmental Restoration Manager, Dover Air Force Base, Dover, Delaware*

