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Correct Implementation of the Argonne Expedited Site Characterization (ESC) Process for Preremedial Site Investigations

by
Jacqueline C. Burton
John L. Walker
Robert Sedivy
and
Stephen Cook
Argonne National Laboratory,
Environmental Research Division

Correct Implementation of the Argonne Expedited Site Characterization (ANL ESC) Process for Preremedial Site Investigations*

Jacqueline C. Burton, Ph.D.
John L. Walker, Ph.D.
Stephen Cook, Ph.D.
Robert Sedivy

Environmental Research Division
Argonne National Laboratory, Argonne, IL 60439

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The Argonne Expedited Site Characterization (ANL ESC) methodology, developed by Argonne National Laboratory and popularly known as ESC, is an effective, cost- and time-saving approach for technically successful preremedial site characterizations. The major objective of the ANL ESC is to determine whether a site containing contamination requires remediation. The methodology is equivalent to a CERCLA RI/FS or a RCRA RFI/CMS investigation. The ANL ESC methodology is an interactive, integrated process emphasizing the use of existing data, multiple complementary characterization methods, and on-site decision making to optimize site investigations. The ANL ESC is the basis for the expedited site characterization standard of the ASTM (American Society for Testing and Materials). The methodology has been registered under the service mark QuickSite℠ to offer both clients and providers a mechanism for ensuring that they receive the ANL ESC methodology developed by Argonne.

The ANL ESC is a flexible process and is neither site nor contaminant dependent. It can be tailored to fit the unique characteristics that distinguish one site from the next, in contrast to the traditional approach of making all sites conform to the same rigid, inflexible investigation regimen. The ANL ESC has been applied successfully to remedial site investigations of landfills with multiple contaminants in the southwestern United States for the Department of Interior (DOI), to former grain storage facilities in the Midwest for the Commodity Credit Corporation of the Department of Agriculture (CCC/USDA), to weapons production facilities in Texas for the Department of Energy (DOE), and to closing and active military bases in several locations for the Department of Defense (DOD). The process can be applied both at sites that have seen little investigation and at sites that have undergone numerous previous site characterizations without reaching closure. In the latter case (e.g., at many DOE and DOD sites), the ANL ESC offers a rapid solution, frequently with little additional field work.

The ANL ESC is a high-quality, low-quantity approach to site characterization. The methodology emphasizes good scientific investigation principles and expert judgment. Key features of the process are as follows: (1) A technical team leader with a broad range of expertise in the geosciences and a multidisciplinary geoscience-based team with strong field experience conduct the program. (2) The team leader and team remain constant throughout the program and participate in all phases of the program, including all field activities. (3) The process uses multiple, complementary technical methodologies, with emphasis on nonintrusive and minimally intrusive investigative methods. (4) High-quality data are required throughout the program for accurate decision making; screening

techniques of lower quality are not used. (5) A dynamic work plan allows adjustments to the program on the basis of on-site data analysis and decision making.

The following topics will be covered in the ANL ESC Workshop:

1. When, where, and how to implement ANL ESC successfully, with emphasis on the field program.

2. The role of the team leader and the core team in designing and implementing the ANL ESC program.

3. Choosing appropriate methods and technologies for optimal field results (e.g., geophysics, geochemistry, drilling, push technologies, analytics).

4. Preparing a dynamic, multidisciplinary work plan, rather than a rigid work plan, for regulatory approval.

5. Integrating and interpreting information and data from multiple methods and technologies during field investigations for daily decision making and program direction.

6. Ensuring quality in all investigative approaches.

Examples for all topics will be drawn from the ANL ESC investigations conducted by Argonne.

Jacqueline C. Burton, Ph.D.

Jacqueline C. Burton received a Ph.D. in geology from the University of Tennessee in 1978. She worked for Exxon for eight years in minerals research following completion of her Ph.D. During her employment with Exxon, Dr. Burton led numerous research programs emphasizing the integration of geology, geochemistry, and geophysics in understanding the origin and exploration strategy for uranium and epithermal gold deposits. Dr. Burton joined Argonne National Laboratory in 1986 to develop environmental programs emphasizing the integration and application of all geological disciplines to remedial characterization and design. She is the developer of the Expedited Site Characterization Program at Argonne National Laboratory and leader of the Applied Geosciences and Environmental Management Section, Environmental Research Division. Dr. Burton is principal investigator for several programs for continued development and application of the ESC.

John L. Walker, Ph.D.

John Walker received his Ph.D. in 1964 in geology and geochemistry at Imperial College of Science and Technology, London. He has spent a large part of his career as a consultant to major mining companies, government agencies, and the United Nations. He has been in the forefront in the development and application of field geochemical techniques to advance geological and hydrogeological studies. During the past 7 years he has been involved in a number of environmental studies where he has applied his extensive knowledge of surface conditions to the integration and interpretation of geology, geochemistry, and geophysics.

Stephen J. Cook, Ph.D.

Stephen Cook received his Ph.D. in geology from the University of Utah in 1992. His research focused on the development and application of numerical models simulating reactive transport of light stable isotopes. Prior to earning his doctorate, he was employed as an exploration geologist with Shell Oil Company and as an environmental geologist with ENVIRON International Corporation. In 1994, he joined the Applied Geosciences and Environmental Management Section, Environmental Research Division at Argonne National Laboratory as a project geologist and manager with its Expedited Site Characterization Program.

Robert Sedivy

Robert Sedivy received his B.S. degree in Geology from Case Western Reserve University and his M.S. in Geophysical Sciences/Geochemistry from Georgia Tech. After serving for two years as Assistant Manager of Mass Spectrometer Services for Teledyne Isotopes, Inc., he joined Standard Oil of Ohio (later BPAmerica) as an Exploration Geochemist. During twelve years with BP, Mr. Sedivy carried out a wide range of investigations focusing on the detailed characterization of reservoir fluids and numerical modeling of their generation and migration. Upon leaving BP, Mr. Sedivy joined the faculty of the University of South Carolina as a Research Assistant Professor with the Earth Sciences and Resources Institute, where he carried out both petroleum and hydrogeologic characterization and modeling studies. In 1995, he joined the Applied Geosciences and Environmental Management Section, Environmental Research Division at Argonne National Laboratory as a Hydrogeologist.