

USE OF THE MULTI-AGENCY RADIOLOGICAL LABORATORY ANALYTICAL PROTOCOLS MANUAL (MARLAP) FOR SITE CLEANUP ACTIVITIES

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Abstract

MARLAP is being developed as a multi-agency guidance manual for project managers and radioanalytical laboratories. The document uses a performance based approach and will provide guidance and a framework to assure that laboratory radioanalytical data meets the specific project or program needs and requirements. MARLAP supports a wide range of data collection activities including site characterization and compliance demonstration activities. Current participants include: U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), U.S. Nuclear Regulatory Commission (NRC), U.S. Department of Defense (DoD), U.S. National Institutes of Standards and Technology (NIST), U.S. Geologic Survey (USGS), U.S. Food and Drug Administration (FDA), Commonwealth of Kentucky, and the State of California. MARLAP is the radioanalytical laboratory counterpart to the Multi-Agency Radiological Survey and Site Investigation Manual (MARSSIM). MARLAP is currently in a preliminary draft stage.

Background

Each year hundreds of millions of dollars are spent on projects and programs which rely to varying degrees on radioanalytical data for decision making. These decisions often have a significant impact on human health and the environment. Of critical importance to informed decision making is data of known quality appropriate for its intended use. Making incorrect decisions due to data inadequacies, such as failing to remediate a radioactively contaminated site, necessitates the expenditure of additional resources, causes delays in project completions and, depending on the nature of the project, can result in the loss of public trust and confidence. The Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (hereafter referred to as MARLAP) addresses the need for a nationally consistent approach to producing radioanalytical laboratory data that meets a project's or program's data requirements. MARLAP is a document which provides guidance for the planning, implementation and assessment phases of those projects which require the laboratory analysis of radionuclides. The guidance provided by MARLAP is both scientifically rigorous and flexible enough to be applied to a diversity of projects and programs. This guidance is intended for project planners, managers and laboratory personnel.

MARLAP is divided into two main parts. Part I is aimed primarily at project planners and managers and provides guidance on project planning with emphasis on analytical planning issues and analytical data requirements. Part I provides guidance on preparing project plan documents and radioanalytical statements of work (SOWs), obtaining and evaluating radioanalytical laboratory services, data validation and data quality assessment. The guidance provided in Part I of MARLAP covers the entire life of a project that requires the laboratory analysis of radionuclides from the initial project planning phase to the assessment phase. Part II of MARLAP

is aimed primarily at laboratory personnel and provides guidance in the relevant areas of radioanalytical laboratory work. The chapters in Part II are intended to serve as a resource base of information on the laboratory analysis of radionuclides and provide guidance on a variety of activities performed at radioanalytical laboratories including sample preparation; sample dissolution; chemical separations; instrument measurements; data reduction, etc. While the chapters in Part II do not contain detailed step-by-step instructions of how to perform certain laboratory tasks, the chapters do provide information on many of the options available for these tasks and discuss advantages and disadvantages of each.

MARLAP was developed collaboratively by the following federal agencies: the Environmental Protection Agency (EPA), the Department of Energy (DOE), the Nuclear Regulatory Commission (NRC), the Department of Defense (DOD), the National Institute of Standards and Technology (NIST), the United States Geological Survey (USGS), and the Food and Drug Administration (FDA). State participation in the development of MARLAP involved contributions from representatives from the Commonwealth of Kentucky and the State of California. Brief mission statements of each of the participating federal agencies are located in the Preface.

Purpose of the Manual

MARLAP's basic goal is to *provide guidance and a framework for project planners, managers and laboratory personnel to ensure that radioanalytical laboratory data will meet a project's or program's data requirements and needs*. To attain this goal, the manual seeks to provide the necessary guidance for national consistency in radioanalytical work in the form of a *performance-based approach* for meeting a project's or program's data requirements. In general terms, a performance-based approach to laboratory analytical work involves clearly defining the analytical data needs and requirements of a project or program in terms of measurable goals during the planning phase of a project. These project-specific analytical data needs and requirements then serve as measurement performance criteria for selections and decisions as to exactly how the laboratory analysis will be conducted during the implementation phase of a project and they are subsequently used as criteria for evaluating analytical data during the assessment phase. Therefore, through a performance-based approach, MARLAP provides guidance in the planning, implementation and assessment phases for those projects which require the laboratory analysis of radionuclides. The manual focuses on activities performed at radioanalytical laboratories as well as activities and issues which direct, affect or can be used to evaluate activities performed at radioanalytical laboratories. *The guidance in MARLAP is intended to help ensure the generation of radioanalytical data of known quality appropriate for its intended use.*

Specific objectives of MARLAP include:

- Promoting a directed planning process involving individuals from relevant disciplines including radiochemistry,
- Highlighting common radioanalytical planning issues,
- Providing a framework and information resource for using a performance-based approach for radioanalytical work,
- Providing guidance on linking project planning, implementation and assessment,
- Providing guidance on obtaining and evaluating radioanalytical laboratory services,

- Providing guidance for evaluating radioanalytical laboratory data, i.e., data verification, data validation, and data quality assessment,
- Promoting high quality radioanalytical laboratory work, and
- Making collective knowledge and experience in radioanalytical work widely available.

As indicated by the list of objectives, MARLAP provides guidance to project planners, managers and laboratory personnel for a range of activities for those projects and programs which require the laboratory analysis of radionuclides.

Use and Scope of the Manual

MARLAP can be used for a wide variety of projects and programs that require the laboratory analysis of radionuclides. The guidance contained in MARLAP is intended for both governmental and private sectors. Examples of data collection activities that MARLAP supports include:

- Site characterization activities,
- Site cleanup and compliance demonstration activities,
- Decommissioning of nuclear facilities,
- Remedial and removal actions,
- Effluent monitoring of licensed facilities,
- License termination activities,
- Environmental site monitoring,
- Background studies,
- Routine ambient monitoring, and
- Waste management activities.

In support of cleanup and decommissioning activities, MARLAP and the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) are complimentary guidance documents. MARSSIM provides guidance to demonstrate that a site meets appropriate release criteria. Specifically MARSSIM describes a methodology for planning, conducting, evaluating, and documenting environmental radiation surveys conducted to demonstrate compliance with cleanup criteria. MARLAP provides guidance and a framework for both project planners and laboratory personnel to ensure that radioanalytical data will meet the data needs and requirements of cleanup and decommissioning activities.

Users of MARLAP include: project planners, project managers, laboratory personnel who perform radioanalytical work, regulators, auditors, inspectors, data evaluators, decision makers, other end users of radioanalytical laboratory data and other stakeholders.

Since MARLAP employs a performance-based approach to laboratory measurements, the guidance contained in the manual is applicable to a wide range of programs, projects and activities which require radioanalytical laboratory measurements. While MARLAP is designed to support a wide range of projects, some topics are not specifically discussed in the manual. These include high-level waste, mixed waste, and medical applications involving radionuclides. While not specifically addressed, much of MARLAP's guidance may be applicable in these areas. While

the focus of the manual is to provide guidance for the planning, implementation and assessment phases of those projects which require the laboratory analysis of radionuclides, much of the guidance on the planning and assessment phases can be applied wherever the measurement process is conducted, for example, in the field. *In addition, MARLAP does not provide specific guidance on sampling design issues, sample collection, and field measurements*, however, a brief discussion of some aspects of these activities can be found in the manual for completeness.

References

- [1] U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, U.S. Department of Defense, and U.S. Department of Energy. *Multi-agency radiation survey and site investigation manual (MARSSIM)*. Final. Washington, DC; U.S. Environmental Protection Agency; EPA 402-R-97-016; and U.S. Nuclear Regulatory Commission, NUREG-1575, 1997. Appendix C.