

# ***DRAFT CHARGE TO U.S. EPA/SAB RAC MARSAME REVIEW PANEL***

## **Summary:**

The draft *Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual* (MARSAME) is a supplement to the *Multi-Agency Radiation Survey and Site Assessment Manual* (MARSSIM) (EPA 402-R-970-016, Rev.1, August 2000 and June 2001 update). MARSAME provides information on planning, conducting, evaluating, and documenting radiological disposition surveys for the assessment of materials and equipment. The draft document has been developed collaboratively by four Federal agencies having authority and control over radioactive materials: Department of Defense (DOD), Department of Energy (DOE), Environmental Protection Agency (EPA), and Nuclear Regulatory Commission (NRC). MARSAME encourages an effective use of resources, and when finalized, will be a multi-agency consensus document.

MARSAME provides technical information on approaches for planning, implementing, assessing, and documenting surveys to determine proper disposition of materials and equipment (M&E). The technical information in MARSAME is based on the Data Life Cycle, similar to MARSSIM. Survey planning is based on the Data Quality Objectives (DQO) Process and is discussed in MARSAME Chapters 2, 3, and 4. Implementation of the survey design is described in MARSAME Chapter 5, with discussions on selection of instruments and measurement techniques as well as handling and segregating the M&E. MARSAME also includes the concept of measurement quality objectives (MQOs) for selecting and evaluating instruments and measurement techniques from the *Multi-Agency Radiological Laboratory Analytical Protocols Manual* (MARLAP) (EPA 402-B-04-001A, July 2004). Assessment of the survey results uses Data Quality Assessment (DQA) and the application of statistical tests as described in MARSAME Chapter 6. Chapter 7 contains detailed case studies implementing specific concepts found throughout the draft supplement. MARSAME also contains seven appendices to provide additional information on specific topics.

## **Background:**

The scope of MARSSIM was limited to surfaces soils and building surfaces. The scope of the MARSAME supplement addresses materials and equipment (M&E) potentially affected by radioactivity, including metals, concrete, tools, equipment, piping, conduit, furniture and dispersible bulk materials such as trash, rubble, roofing materials, and sludge. These M&E may be containers and packages in general commerce or from licensed users of radioactivity. The wide variety of M&E requires additional flexibility in the survey process, and this flexibility is incorporated into MARSAME.

The purpose of this supplement is to provide information for the design and implementation of technically defensible surveys for disposition of M&E, where disposition is defined as the future use, fate, or final location of something. MARSAME provides information on selecting and properly applying disposition survey strategies and

selecting measurement methods. The DQO process is used for selecting the best disposition survey design based on the selected disposition option, action level, description of the M&E (e.g., size, accessibility, component materials), and description of the radioactivity (e.g., radionuclides, types of radiation, surficial versus volumetric activity).

Disposition surveys may be performed as a single event or as part of a routine process. Single event disposition surveys are usually performed once in association with a specific project. Surveying a front loader at the completion of a decommissioning project is one example of a single event disposition survey. Routine process disposition surveys are usually associated with ongoing tasks where similar surveys are performed repeatedly. One example of a routine process disposition survey would be a radiological survey of tools prior to removal from a controlled area at a nuclear facility. Another example would be the interdiction of packages or M&E that do not meet the acceptance criteria at a facility. Both single event and routine process types of surveys are included in the scope of MARSAME.

MARSAME was developed collaboratively by the MARSSIM Workgroup over the past five years by technical staff of the four Federal agencies having authority for control of radioactive materials (60 FR 12555; March 7, 1995). For a time, staff from the Department of Homeland Security participated in the development of MARSAME. Contractors to the DOE, EPA, and NRC, and members of the public have been present during the open meetings of the MARSAME work group. The techniques, methodologies, and philosophies that form the bases of this manual have been developed to be consistent with current Federal limits, guidelines, and procedures.

The EPA's Science Advisory Board (SAB) conducted the scientific peer reviews of the companion multi-agency documents MARSSIM (EPA-SAB-RAC-97-008, dated 9/30/1997) and MARLAP (EPA-SAB-RAC-03-009, dated 6/10/2003), and the Federal agencies participating in those peer reviews found the process used by the SAB to be extremely beneficial in assuring the accuracy and usability of the final manuals. Consequently, two consultations have taken place for MARSAME (EPA-SAB-RAC-CON-03-002, dated 2/27/2003, and EPA-SAB-RAC-CON-04-001, dated 2/9/2004). On behalf of the four participating Federal agencies, the EPA's Office of Radiation and Indoor Air (ORIA) is requesting that the SAB conduct the formal technical peer review of the draft MARSAME.

**Charge Questions:**

1) The objective of the draft MARSAME is to provide an approach for planning, conducting, evaluating, and documenting environmental radiological surveys to determine the appropriate disposition for materials and equipment with a reasonable potential to contain radionuclide concentration(s) or radioactivity above background. Please comment on the technical acceptability of this approach and discuss how well the document accomplishes this objective. In particular, please

- a) Discuss the adequacy of the initial assessment process as provided in MARSAME Chapter 2, including the new concept of *sentinel measurement* (a biased measurement performed at a key location to provide information specific to the objectives of the Initial Assessment).
  - b) Discuss the clarity of the guidance on developing decision rules, as provided in MARSAME Chapter 3.
  - c) Discuss the adequacy of the survey design process, especially the clarity of new guidance on using Scenario B, and the acceptability of new scan-only and in-situ survey designs, as detailed in MARSAME Chapter 4.
  - d) Discuss the usefulness of the case studies in illustrating new concepts and guidance, as provided in MARSAME Chapter 7.
- 2) The draft MARSAME, as a supplement to MARSSIM, adapts and adds to the statistical approaches of both MARSSIM and MARLAP for application to radiological surveys of materials and equipment. Please comment on the technical acceptability of the statistical methodology considered in MARSAME and note whether there are terminology or application assumptions that may cause confusion among the three documents. In particular, please
- a) Discuss the adequacy of the procedures outlined for determining measurement uncertainty, detectability, and quantifiability, as described in MARSAME Chapter 5.
  - b) Discuss the adequacy of the data assessment process, especially new assessment procedures associated with scan-only and in-situ survey designs, and the clarity of the information provided in Figures 6.3 and 6.4, as detailed in MARSAME Chapter 6.
  - c) Discuss the usefulness of the case studies in illustrating the calculation of measurement uncertainty, detectability, and quantifiability, as provided in MARSAME Chapter 7.
- 3) The draft MARSAME includes a preliminary section entitled *Roadmap* as well as seven appendices. The goal of the Roadmap is to assist the MARSAME user in assimilating the information in MARSAME and determining where important decisions need to be made on a project-specific basis. MARSAME also contains appendices providing additional information on the specific topics. Does the SAB have recommendations regarding the usefulness of these materials?

MARSSIM: <http://epa.gov/radiation/marssim/index.html>

OR: <http://epa.gov/radiation/marssim/obtain.htm> for document itself

MARSAME: <http://www.marsame.org>

OR: <http://epa.gov/radiation/marssim/publicpreview.htm#obtain> for draft document itself

MARLAP: <http://epa.gov/radiation/marlap/index.html>

OR: <http://epa.gov/radiation/marlap/manual.htm#voli> for document itself