ENERGYSOLUTIONS

CS-WM-PG-001

Radioactive Materials Management Program for Commercial Services Projects

Revision 1

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Table of Contents

1. SCOPE

1.1 Purpose

The Energy*Solutions* Commercial Services Radioactive Materials (RAM) Management Program provides protocols for managing radioactive materials and radioactive waste on field projects. Adherence to this program is the responsibility of each individual who handles RAM or radioactive waste, as well as Commercial Services management.

The RAM Management Program establishes the basic practices that will be followed when performing activities associated with RAM on field projects. Such activities include ordering and receiving radioactive sources, handling, sampling, storage or packaging of RAM and low-level radioactive waste (LLRW), and preparation of RAM/LLRW for transportation. Documents prepared under the umbrella of the RAM Management Program include this program manual, certain Commercial Services procedures and plans (e.g., References 2.9 and 2.10), and project-specific supporting procedures and plans.

1.2 Applicability

This program is for the exclusive use of the Energy*Solutions* Commercial Services organization. Requirements herein are applicable to no other operational entities of Energy*Solutions*. This program operates in parallel with the Commercial Services Radiation Protection Program (RPP) (Reference 2.1).

This program is applicable to radioactive materials and LLRW generally encountered at Commercial Services project sites in industrial and nuclear power plant settings. The program does not address management of radioactive material such as certain fissile materials, spent fuel, transuranic (TRU) waste, greater than Class C waste, and Highway Route Controlled Quantities. This program may not be applicable if Energy*Solutions* is working under a client Radioactive Materials License or Waste Management Program.

2. REFERENCES

2.1 Energy*Solutions*, LLC, CS-RS-PG-001, *Radiation Protection Program, Commercial Services Projects*,

2.2 U.S. Code of Federal Regulations (CFR), Title 49, Part 173 (49 CFR 173), *Pipeline and Hazardous Materials Safety Administration, Shippers General Requirements for Shipments and Packaging,* U.S. Department of Transportation

2.3 U.S. Code of Federal Regulations (CFR), Title 10, Part 20 (10 CFR 20), *Standards for the Protection Against Radiation*, U.S. Nuclear Regulatory Commission

2.4 Energy*Solutions*, LLC, ES-BR-PR-001, *Broker Program Administration*

2.5 Energy*Solutions* LLC, ES-BR-PR-003, *Operating Procedure for Brokering of Hazardous Materials*

2.6 Energy*Solutions* LLC, CS-RS-PR-003, *Commercial Services Radiation Worker and Authorized User Training*

2.7 49 CFR 172, *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements and Security Plans*, U.S. Department of Transportation

2.8 Energy*Solutions* LLC, CS-WM-PR-003, *Handling, Characterization, Packaging, Storage and Inspection of Mixed Waste*

2.9 Energy*Solutions* LLC, CS-WM-PR-001, *Handling, Storing, and Characterizing Radioactive Materials and LLRW*

2.10 Energy*Solutions* LLC, CS-WM-PR-002, *Preparation of Radioactive Material and LLRW for Transportation*

2.11 Energy*Solutions* LLC, ES-QA-PG-001, *Quality Assurance Program*

2.12 Energy*Solutions* LLC, ES-AD-PR-005, *First Notifications*

2.13 Energy*Solutions* LLC, ES-AD-PR-008, *Condition Reports*

3. GENERAL

3.1 Definitions

3.1.1 *Characterization* - The determination of the biological, chemical, physical and radiological properties of a waste stream to support proper hazard segregation for storage, treatment and disposal.

3.1.2 *HazMat Employees* – Personnel who are involved in the management, receipt and/or transportation of hazardous materials (e.g., radioactive material or LLRW receipt, storage, sampling, packaging, container loading and other preparations for transportation), including Class 7 radioactive materials. Hazmat Employees are required to receive Hazmat Training.

3.1.3 *Radioactive Material* (General) - Any solid, liquid, or gas that spontaneously gives off radiation. This includes naturally occurring radioactive material (NORM), technologically enhanced naturally occurring radioactive material (TENORM), byproduct material, source material, and special nuclear material.

3.1.4 *Radioactive Material* (for transportation in the U.S.) - Any material containing radionuclides where both the activity concentration and the total activity in the transportation consignment exceed the values specified in Section 436 of 49 CFR 173 (Ref. 2.2).

3.1.5 *Radioactive Materials Area* - An area or room in which licensed material is used or stored which contains radioactive material in an amount exceeding 10 times the quantity of such material specified in Appendix C of 10 CFR 20 (Ref. 2.3) or applicable state regulations.

3.1.6 *Radioactive Waste* - Radioactive material no longer useful for any purpose and any equipment or supplies contaminated with such material.

3.2 Responsibilities

3.2.1 Commercial Services Radiation Safety Officer

The Commercial Services Radiation Safety Officer (RSO) maintains and oversees implementation of the Commercial Services Radiation Protection Program (RPP) (Ref. 2.1). This includes ensuring that radiation safety, radioactive materials management, and radiological operations procedures and programs are kept up to date such that they comply with current regulations and incorporate current and relevant industry practices and regulatory guidance. The Commercial Services RSO shall also make applicable notifications to the appropriate regulatory agencies as required.

3.2.2 Project Manager

The Project Manager (PM) is responsible for ensuring that the proper procedures/programs are implemented on the project site as required by customer agreements and contracts. The PM is responsible for ensuring that these programs and procedures are properly incorporated into project-specific plans and procedures, ensuring that Commercial Services and/or client programs/procedures are available for use by field personnel and that field personnel have proper training.

3.2.3 Certified Brokers and Assistant Brokers

Certified Brokers and Assistant Brokers are responsible for preparing and certifying shipments in accordance with References 2.4 and 2.5.

For waste shipments going to the Energy*Solutions* Containerized Waste Facility in Clive, Utah, the Broker will examine the contents of waste packages during loading operations or after they are loaded, and determine if nonconforming waste exists. The Broker will report his/her findings directly to the PM. Non-conformance observations will be reported and tracked in accordance with References 2.12 and 2.13.

3.2.4 Project Personnel

All project personnel (including radiological engineers, technicians, etc.) have a responsibility to conduct themselves in accordance with this RAM Management Program. Project personnel should not perform activities that are beyond their level of training and experience. Should there be a question regarding site operations involving the management of RAM, project personnel should contact the PM.

3.3 Precautions and Limitations

3.3.1 Proper radiation, health and safety protection practices shall be observed at all times when handling RAM to maintain personnel exposures as low as reasonably achievable (ALARA).

3.3.2 RAM shall only be handled by qualified Radiation Workers trained in accordance with Reference 2.6. In addition, "Hazmat" training is required for certain workers who are involved in the preparation of radioactive material/LLRW shipments (see Section 4.1.2).

3.4 Records

3.4.1 The Commercial Services RSO, through communications with the PM, shall maintain complete and accurate records of the receipt and disposal of radioactive material/LLRW managed under an Energy*Solutions* radioactive materials license used in the field (i.e., other than an Energy*Solutions* disposal or waste treatment license).

3.4.2 A written record of all radioactive waste controlled under any Energy*Solutions* radioactive materials license shall be maintained until it has been shipped to an authorized recipient in accordance with all applicable regulations or it has been determined by a suitable survey or

measurements that it has decayed or been decontaminated to background levels.

3.4.3 Accountability of radioactive material and/or LLRW prepared for shipment under an Energy*Solutions* radioactive materials license, but not yet shipped from the premises, shall be maintained by the Commercial Services RSO using an internal record system such that the RSO is aware of the RAM location and planned shipment time/date.

3.4.4 The PM is responsible for maintaining Hazmat Employee [Department of Transportation (DOT) training] records for non-Broker employees for as long as the employee is employed and for 90 days thereafter. Records include copies of training certifications and completed tests.

4. REQUIREMENTS AND GUIDANCE

The procedures and plans developed as part of this RAM Management Program are based on the recommendations and requirements of the U.S. Nuclear Regulatory Commission (NRC) and the DOT.

Each employee involved in radiological work is expected to demonstrate responsibility and accountability through an informed, disciplined and cautious attitude toward the handling and management of RAM. Also, each person associated with the handling of RAM shall receive periodic instruction in the general and specific radiological aspects which they may encounter, and shall also be made aware of their responsibility to the company, the public, and their co-workers for safe handling of RAM. Worker responsibilities in the areas of radiation protection are covered in Reference 2.1.

In addition to radiological materials safety training, employees who are responsible for the preparation of radioactive material/LLRW shipments or for the oversight of contractors performing these functions on behalf of Energy*Solutions* or a client are required to have **Hazmat training**.

4.1 Program Training Requirements

4.1.1 General Requirements

Commercial Services employees shall receive training commensurate with their job responsibilities on field projects. Commercial Services Radiation Worker training requirements are managed under the RPP and are described in References 2.1 and 2.6. The training requirements set forth under the RAM Management Program are described in the following sections.

4.1.2 DOT Hazmat Training

The DOT Hazardous Material Regulations (HMR) found in References 2.2 and 2.7 require that certain employees be trained in the requirements pertaining to packaging and preparation of hazardous materials (Hazmat) for transportation, commensurate with their job responsibilities. Supervisors, engineers, safety personnel, Health Physicists, technicians and operators/laborers who work on field projects will normally meet the definition of a "Hazmat Employee" and require Hazmat training. Other field or project employees who will be involved in the preparation of radioactive material/LLRW shipments, or for the oversight of Energy*Solutions* contractors performing these functions on behalf of Energy*Solutions* or a client, are required to have Hazmat training. This training is normally project-specific and it must be documented.

The PM must ensure that all project personnel who are involved in the management, receipt or transportation of RAM or LLRW (e.g., receipt, storage, sampling, packaging, container loading and other preparations for transportation) have the required DOT Hazmat training and other required training, such as Radiation Worker and project specific training

Note: Hazardous Waste Operations and Emergency Response (HAZWOPER) training does not meet the requirements for DOT Hazmat training.

Hazmat Training shall include general requirements for radioactive material receipt, loading waste into containers, sealing containers, labeling containers, container loading on/in conveyances, disposal site waste acceptance criteria (WAC), general shipping requirements and shipment security, at a level appropriate for personnel performing or overseeing such tasks.

Field or project personnel who prepare hazardous waste shipments (including radioactive or mixed waste shipments) or with responsibilities beyond those described in the previous paragraph must receive Broker or Assistant Broker training, in accordance with Reference 2.4.

The HMR require that **Hazmat retraining** must take place at least once **every three (3) years**. Relevant training from a previous employer or another source may be substituted for certain portions of the training, as long as appropriate documentation is provided.

4.1.3 LLRW Management Training

While there are no specific regulatory requirements governing training in general LLRW management, Commercial Services PMs may require that project personnel undergo project-specific waste management training. Topics of such training may include the project Waste Management Plan, waste minimization and segregation, surveying incoming, empty or full waste containers, storage of waste, waste classification, waste forms, waste treatment techniques, waste packaging, sampling waste and the hazards associated with project waste streams should also be included in the training. Project-specific training requirements will normally be spelled out in the project Work Plan or the Waste Management Plan.

4.1.4 Broker Training

Certified Brokers and Assistant Brokers are trained in accordance with Reference 2.4, which contains Broker certification prerequisites and requirements.

4.2 Radioactive Materials (RAM) Management Program Components

4.2.1 Management of Radioactive Sources

Energy*Solutions* owns and uses various radioactive sources for performing response tests on radiation detection instruments. These "check" sources are distributed to project sites as needed, typically from the Energy*Solutions* Instrumentation facility located in Oak Ridge, Tennessee.

The Commercial Services RSO must **approve all purchase orders** for and be **notified** in a timely manner of **all receipts of licensable RAM** to be owned or possessed by Commercial Services. These requirements apply whether the RAM will be possessed or used at Commercial Services facilities or at field project sites (this excludes instrument check sources that are exempt from licensing requirements). The Commercial Services RSO must ensure that the quantity limits of the NRC mobile Radioactive Materials License (License No. 06-20775-01) and applicable agreement state licenses are not exceeded due to purchases or receipt of radioactive material by Commercial Services.

4.2.2 Management of RAM and LLRW

On temporary project sites, there is typically a need to handle, store, stage, and characterize RAM and LLRW. The procedures for management of these materials are provided in Reference 2.8. This document provides

procedures for proper storage of RAM including postings and material segregation. The document also describes proper LLRW management procedures such as waste minimization, inspection of waste containers, and waste packaging.

A Waste Management Plan should be developed for projects that have non-routine RAM or LLRW elements, a large number of planned shipments, variable disposal routes, or other complexities related to LLRW. Such projects should also include a project-specific Quality Assurance Project Plan (QAPP), which will outline project-specific quality assurance (QA) requirements. The project-specific Waste Management Plan should provide the protocols for the handling, storing, sampling, characterization, packaging, and transportation of LLRW and applicable QA requirements. The Waste Management Plan should also address specific waste treatment processes that will be implemented on the project site, if applicable. Specific waste treatment or processing procedures may be written into the Waste Management Plan or they can be separate documents.

4.2.3 Transportation of RAM and LLRW

Reference 2.10 provides the procedures, administrative requirements, and regulatory references to direct field personnel in the proper methods of preparing a shipment of RAM or LLRW. The document also specifically addresses the requirements for shipping waste to the Energy*Solutions* Containerized Waste Facility (CWF) or Bulk Waste Facility (BWF) in Clive, Utah. Checklists are provided for site personnel to use in verifying that a container, package, and/or conveyance of RAM or LLRW is ready for shipment. However, a Certified Broker or an Assistant Broker should be consulted as early as possible in the process of preparing shipments. This procedure does not provide a sufficient level of information to instruct project personnel in preparing radioactive material/waste shipments without the involvement of a Broker or Assistant Broker.

The DOT definition of radioactive material for the purposes of transportation is given in Part 173 of 49 CFR (Ref. 2.2). Any material containing radionuclides where either the activity concentration or the total activity in the transportation consignment is less than the values specified in the table in Section 173.436 is exempt from the DOT requirements for transportation of Class 7 (radioactive) materials. This often includes material such as laboratory samples or equipment with low levels of contamination.

An estimation of the activity concentration and the total activity planned for a consignment must be prepared and documented for each

consignment that meets the DOT exemption. Radioactivity concentration estimates and total activity estimates can be obtained by calculations based on contamination levels, gamma measurements and modeling of exposure rates versus activity (e.g., using Microshield), material process knowledge or existing characterization data. Materials that meet the DOT exemption for transportation should be shipped in a strong tight container and the inner package should be appropriately labeled.

Only Brokers or Assistant Brokers are authorized to ship material that meets the definition of Class 7 (radioactive) material, including Limited Quantities and Excepted Packages.

4.2.4 On-Site Storage and Transportation RAM Security

If the quantity of some licensed radioactive material in storage or in transportation exceeds certain activity limits, additional security controls needed to be established in accordance with NRC regulations. These quantities are referred to as radioactive material quantities of concern (RAMQC). The additional security and control measures and the RAMQC limits are provided in Reference 2.9 for material in storage and Reference 2.10 for material in transportation. The following isotopes have RAMQC limits:

Americium-241	Americium-241/Be	Californium-252
Curium-244	Cobalt-60	Cesium-137
Gadolinium-153	Iridium-192	Promethium-147
Plutonium-238	Plutonium-239/Be	Selenium-75
Strontium/Yttrium-90	Thulium-179	Ytterbium-169

DOT regulations require that security plans be prepared for shipments of RAM or LLRW that meet certain criteria, as provided in Reference 2.7. DOT also requires security awareness training as described in Reference 2.10, which provides instructions for transportation security.

4.3 Quality Assurance

4.3.1 The RAM Management Program is committed to compliance with the QA requirements set forth in Reference 2.11. Specific QA requirements are provided in the RAM management procedures that are under the umbrella of the RAM Management Program and in project-specific Waste Management Plans and procedures.

4.3.2 The RAM Management Program may be revised according to document control procedures. Additional procedures can be added to the RAM Management Program to address specific Commercial Services needs.

4.3.3 All elements of the RAM Management Program are subject to QA requirements. Quality assurance is the responsibility of all Commercial Services personnel, including Directors, Managers, Project Managers, and site operations personnel.

4.3.4 For projects requiring Waste Management Plans, specific QA requirements will be established to ensure the following criteria are met:

- Wastes are properly sampled (if needed), sufficiently characterized and inventoried.
- Packages do not contain wastes that are not in conformance with the disposal site WAC or other applicable requirements.
- Waste treatment is performed using approved methods and under appropriate QA requirements.
- Proper testing is done on treated wastes to ensure treatment was effective.
- Wastes are properly packaged and labeled for transport.
- Wastes are handled and stored properly.
- All waste handling and processing conform to RAM Management Program requirements.

4.3.5 The PM will assign specific individuals to have responsibilities for overseeing the implementation of QA requirements at each project. The Commercial Services QA Manager will oversee the Commercial Services QA Program, which includes the approval of project QAPPs and auditing elements of the program.

5. ATTACHMENTS AND FORMS

None