

VERIFICATION OF WASTE CERTIFICATION THROUGH PROGRAM ASSESSMENT

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ABSTRACT

Certification of waste by a generator has become increasingly important recently for treatment, storage, or disposal (TSD) facilities to accept waste and the potential liability associated with managing that waste. Providing such certification can be a difficult process for generators of certain wastes, especially those for which there is little or no analytical or process knowledge. Also, certification can be difficult for wastes with hazardous or radioactive contaminants that are present in forms that cannot be adequately measured. Waste characterization is a fundamental step in the waste certification process and verification of that characterization is necessary to ensure the certification process operates properly. One method of verification is conducting waste certification assessments, evaluations of one or more waste certification activities. The techniques developed for assessing the waste certification process for a mixed waste stream generated at a Department of Energy site can be adapted for use at various sites that use either onsite or offsite TSD facilities to manage waste.

INTRODUCTION

The Martin Marietta Energy Systems, Inc. (Energy Systems) *Solid Waste Certification Program Plan* establishes a waste certification program to provide assurance that waste being sent to a TSD facility meets the Waste Acceptance Criteria (WAC) for that particular facility. The waste certification process includes a means of evaluating waste certification activities at all levels in Energy Systems to verify that the process is being implemented properly. A pilot program was implemented to test methods of validating process knowledge, an essential element of the proposed Energy Systems waste certification program. The pilot program was designed to examine various aspects of using process knowledge for characterizing waste and ultimately certifying that a waste meets certain criteria.

As part of the pilot program, a manual on conducting assessments to accomplish the certification program verification was prepared. This paper summarizes key points of the manual, which was to be tested during the pilot program using a mixed waste stream from the K-25 Site in Oak Ridge, Tennessee. Unfortunately, funding for the program ran out before a complete assessment could be performed. Nevertheless, preliminary results of the pilot program indicate that the assessment methodology described in the manual is a viable approach for ensuring that waste characterization and certification are appropriate and effective.

In the context of this paper, "waste certification assessment" (or "assessment") is the term used to describe several functions typically associated with self-assessment and audit activities that are conducted by organizations both internal and external to Energy Systems site-level waste management operations. It includes document reviews, evaluations of equipment and operations, data validation, and other activities required to verify that waste being sent to TSD facilities meet the respective WAC of those facilities. An actual waste certification assessment may address any one activity or a combination of activities. The scope of its application to each assessment undertaken should be scaled to the activity being evaluated. For instance, a full-scale assessment involving all waste certification activities at a site will require the participation of several individuals working as a team, whereas

assessment of a small portion of the waste certification program most likely will be conducted by a single individual.

The goal of waste certification assessments is to improve or validate the waste characterization process to verify that waste sent to a TSD facility is appropriate for that particular facility. Such validation must consider whether the waste characterization data are collected appropriately and if those data are of sufficient quality and detail to satisfy the WAC of receiving TSD facilities. While compliance with regulatory requirements and procedures should be addressed and reported, any corrective actions derived from waste certification assessment results must be directed toward improving the quality and reliability of the characterization data, including information developed solely through process knowledge. For example, compliance with procedures does not necessarily provide the needed level of data quality, if the procedures have not adequately addressed the data collection methods and techniques necessary to demonstrate compliance with a given set of WAC.

Important factors for successfully conducting a waste certification assessment are development of an assessment plan prior to each assessment and early establishment of the roles and responsibilities of the various organizations involved.

WASTE CERTIFICATION ASSESSMENT METHODOLOGY

Waste certification assessment consists of four discrete activity areas: 1) planning and preparation, 2) performance, 3) reporting, and 4) follow-up. Planning and preparation activities include scheduling and notification, information gathering, assessment plan development, and team selection and preparation. Performance activities include document reviews, interviews with personnel, observation of the conduct of operations, and completion of checklists customized for each assessment. Reporting activities include development of a written report of the assessment results, including recommendations to correct deficiencies. Follow-up activities include response to the assessment results, development of corrective actions and schedules for action implementation, and tracking and reviewing progress in closing out action items.

The areas of the certification process that must be verified on a regular basis to ensure the validity of the process include written procedures, implementation of the procedures, laboratory analyses or other assay methods (including the hardware used for the analyses), and documentation of the certification process. The scope and extent of assessments for these areas, as well as the assessment frequency, will be dependent on the specific waste stream involved. In general, the assessment scope for each of the areas is as follows:

Planning and Preparation

- Determine the assessment scope and schedule
- Select assessment team members
- Determine applicable assessment standards
- Organize the assessment process and develop assessment plan (including customized checklists)
- Prepare team members for the assessment
- Research documentation to be reviewed
- Arrange for independent analysis of characterization data, if applicable
- Determine the system for reporting assessment results
- Notify the organization responsible for the activity being assessed

Performance

- Conduct a meeting with the affected organization at the beginning of field activities (initial briefing)
- Perform document reviews, including procedures and analytical results
- Conduct interviews with personnel from the organization being assessed
- Observe conduct of operations and evaluate effectiveness of the implementation of procedures
- Evaluate waste samples and containers, instrumentation, and other program hardware
- Conduct independent analysis of characterization data and techniques
- Complete customized checklist(s) to record observations
- Identify program deficiencies and problems as well as successes
- Interpret results of data gathering
- Formulate preliminary assessment results and recommendations
- Conduct a meeting with the affected organization at the end of field activities (final briefing)

Reporting

- Confirm information gathered during performance of assessment
- Resolve outstanding issues resulting from the final briefing
- Prepare a written report of the assessment activities, results, and recommendations

- Evaluate whether assessment findings would invalidate any waste characterization data already collected

Follow-up

- Prepare response to assessment results
- Develop action plans to address deficiencies and implement recommendations, including corrections to existing data
- Determine schedule for implementing corrective actions
- Track and review progress in closing out action items

These assessment activities include evaluations by the individuals responsible for the waste certification program at both the site and waste generator level, by the waste management organizations, and by independent reviewers of the program. Each organization conducting an assessment will have its own goals and objectives for each assessment, with the primary purpose being assurance that waste being sent to TSD facilities meets the WAC of those facilities, both in terms of satisfying requirements for waste characteristics and meeting data quality objectives. Nevertheless, certain types of assessments will repeatedly examine the same items as the assessments are conducted on a routine basis.

Assessments of TSD facilities will consist, at a minimum, of the following activities:

- Review of WAC to determine whether pertinent limits have been established for critical parameters. Descriptions of critical parameters for TSD facilities operated by Energy Systems are found in that organization's *Guidance Manual for Developing Waste Acceptance Criteria Documents (K/CWM-10)*,
- Review of WAC to determine if data quality and the required level of detail for data have been specified,
- Review of procedures for accepting waste, data validation and verification, documentation of acceptance process and validation and verification results, tracking of waste and characterization data, etc., and
- Review of analytical laboratories and other support organizations contributing to waste certification activities.

Assessments of the site waste management organizations' waste certification program functions will involve the following activities:

- Review of program documentation, including site-specific waste certification program plans such as that described in *Energy Systems Standard Content Guide for Site-Specific Solid Waste Certification Program Plans (K/CWM-7)*,
- Review of procedures for data validation and verification, internal reviews, data and report tracking, program documentation, etc., and
- Review of analytical laboratories and other support organizations contributing to waste certification activities.

Assessment of waste generators will complete, at a minimum, the following activities:

- Review of waste characterization procedures,

- Review of process knowledge documentation and measurement quality assurance,
- Review of procedures for data and record tracking, training, data validation and verification, waste packaging and handling, etc., and
- Review of analytical laboratories and other support organizations contributing to the waste certification activities of waste generators.

ORGANIZATIONAL RESPONSIBILITIES

Verification of the waste certification program requires the participation and cooperation of numerous personnel representing a wide variety of functional groups within the Energy Systems organization as well as independent organizations. The relationship among the organizations involved in performing Energy Systems waste certification assessments is shown in Fig. 1. This figure identifies which organizations will conduct assessments of the organizations responsible for waste certification, including both internal and external assessments. As the term is used in this document, "external" represents those assessments conducted by organizations external to the Energy Systems site waste management organizations, TSD facilities, and waste generators, and "internal" means assessments conducted among those groups.

The Energy Systems Waste Management Organization (ESWMO) is tasked with the responsibility for coordinating implementation of the waste certification program throughout Energy Systems. Therefore, the primary responsibility of this organization in waste certification assessment is to ensure that the program elements at the site level are being adequately implemented. In addition, the ESWMO provides verification that the waste certification program requirements for TSD facilities are being adequately implemented.

The Energy Systems organizations charged with environmental regulatory oversight of operations are responsible for verifying that the waste certification program is conducted in accordance with the applicable regulations, DOE Orders, agreements, or other defined requirements. The quality assur-

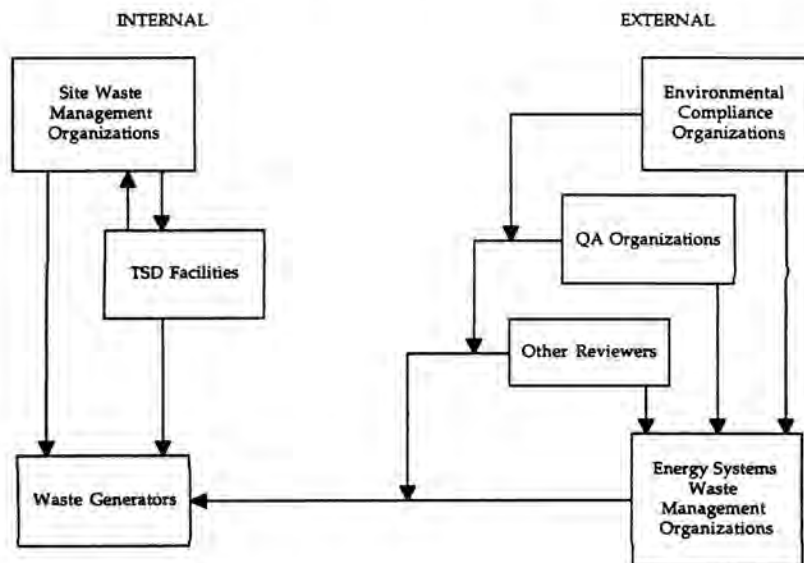
ance organizations within Energy Systems are responsible for conducting independent oversight activities of operations and programs in accordance with their own approved quality assurance program.

Independent assessments by other reviewers should be used to verify the adequacy of the waste certification program at all levels to the extent applicable. The available pool of personnel to conduct independent assessments includes personnel from other organizations within each site (e.g., the Waste Certification Official (WCO) at a site may arrange for a group of waste generators to conduct an assessment of other waste generators at the site), personnel from other Energy Systems sites (e.g., the WCO from one site may conduct an independent assessment for another site), waste certification personnel from other DOE facilities, TSD facility operators, site or Energy Systems quality assurance personnel, consultants, or other personnel as appropriate to the type of assessment being conducted.

Since the principal goal of the Energy Systems waste certification program is to ensure that wastes being managed at a particular TSD facility meet the WAC of that facility, the primary responsibility of each TSD facility in verifying program implementation is to ensure that waste characterization and certification for the waste streams that it manages are being conducted properly. Thus, a TSD facility operator will assess both the waste generators using the facility and the programmatic functions.

The waste management organizations at each site include the groups or individuals responsible both for waste management operations and for waste certification. The assessment responsibilities are shared by these two functional groups. In general, the WCO at each site has the overall responsibility for ensuring that assessment activities are conducted and that all the functions associated with waste certification are verified as applicable. The WCO also has the responsibility for ensuring that corrective actions resulting from internal assessments are completed in a timely manner.

Each organization within the Energy Systems sites that generates waste covered by the waste certification program is



Note: Arrows indicate who assesses whom.

Fig. 1. Organizational responsibilities for waste certification assessments.

responsible for ensuring that the waste characterization and certification functions assigned to the waste generator organization are being adequately implemented. Waste certification at the waste generator level primarily consists of internal assessments of the program elements being conducted within that organization.

To achieve the goal of verification effectively, assessments must be conducted on a routine basis and whenever substantial changes are made to waste acceptance criteria. Because of the number of waste generators using Energy Systems TSD facilities, the individuals involved in establishing the verification assessment program could not agree on an assessment frequency that would cover all elements adequately without putting too much of a burden on resources. This is an issue that remains unresolved, but the currently proposed approach is to incorporate the requirements of the certification assessment with those of other periodic inspections or audits (e.g., quality assurance audits) to eliminate redundancy and loss of productivity while the assessments are being conducted.

PILOT PROGRAM TEST ASSESSMENT

Planning for the pilot program included identifying a candidate waste stream that could be used to test the waste certification assessment approach. An opportunity arose to evaluate a completed waste characterization process because a shipment for offsite disposal of a waste that met the pilot program criteria was scheduled for later in the year. The selected waste stream consists of stabilized pond sludges designated for disposal at Envirocare of Utah, Inc. (Envirocare), a permitted mixed waste disposal facility. The sludges were generated by the Pond Waste Management Project at the K-25 Site during closure of surface impoundments once used for treatment of gaseous diffusion process waste. This waste was ideal for testing the overall approach to waste characterization and verification for several reasons. First, data were available on both the pretreated (raw) and treated (stabilized) waste material, allowing comparison of expectations of waste treatment results with actual treatment results. Second, a computer model had been developed to predict treatment results using knowledge of the process whereby the waste was generated, thus providing additional comparison capability. And third, the waste was also being evaluated by a commercial facility with established waste acceptance criteria that would have to be satisfied prior to shipment.

The first step in the process of testing the waste characterization approach was to finalize the Energy Systems *Waste Certification Assessment Manual*, which was to be used as guidance for conducting the assessment. An Assessment Plan was then developed specifically for assessment of the Pond Waste Management Project waste certification activities. To meet Energy Systems varied needs, it was decided that the assessment would be conducted in two parts, where the first part would examine the characterization of the stabilized sludge from the Pond Waste Management Project to ensure its acceptance by Envirocare and the second part would evaluate the waste certification program and procedures.

The most crucial part of an assessment is having criteria against which an evaluation can be made and that address all necessary items. These criteria should be described in the Assessment Plan and, in this case, include the waste acceptance criteria of the designated disposal facility as well as procedures defining the waste certification process and waste characterization data. In accordance with the assessment

guidance outlined previously, procedures and data would be reviewed, documentation and quality assurance requirements would be established, and interviews with personnel involved with disposal of the sludges would be conducted to confirm assumptions and determine what areas important to the waste certification might have been missed.

The standards and requirements that must be met for the stabilized sludges to be disposed at the Envirocare facility are delineated in the radioactive material license and the mixed (hazardous/radioactive) waste permit issued by the State of Utah. The license and permit define the acceptable constituents, chemical and/or physical form, and, for some constituents, the maximum concentrations allowed in waste for disposal. In addition, Envirocare has developed a series of waste profile records that must be completed prior to shipment of wastes to the site. These records require detailed descriptions of wastes and submittal of actual waste samples as well as waste analysis data. Each of these documents should be referred to during the course of the assessment to ensure all requirements are satisfied prior to shipment of the waste. Additional materials to be reviewed for the assessment are the currently available guidance documents relating to waste certification programs within Energy Systems, including the following:

- *Martin Marietta Energy Systems, Inc. Solid Waste Certification Program Plan*, K/WM-14, January 1991.
- *Standard Content Guide for Site-Specific Solid Waste Certification Program Plans*, K/CWM-7, August 1992.
- *Guidance Manual for Developing Waste Acceptance Criteria Documents*, K/CWM-10, October 1992.
- *Martin Marietta Energy Systems, Inc. Waste Certification Program Audit Manual, Draft*, May 1992.
- *Martin Marietta Energy Systems, Inc. Waste Certification Assessment Manual, Draft*, May 1993.

The preliminary results of the pilot program assessment supported the conclusion that the waste would meet the Envirocare WAC. However, the pilot program was discontinued before the assessment could be completed.

SUMMARY

Though the waste certification assessment was not completed as planned because additional funding for the pilot program was unavailable, activities that were accomplished included briefing the personnel responsible for disposing of the stabilized sludges, development of the assessment plan and checklists, establishment of evaluation criteria, selection of the assessment team, and characterization data review. Results of these planning and preparation activities indicate that assessment is a viable approach for ensuring that waste characterization and certification processes and procedures are appropriate and effective. *Preliminary conclusions* apparent from the curtailed pilot program are that assessments must focus on the quality, completeness, and validity of characterization data to ensure that TSD facility performance is not compromised. Of utmost importance is defining criteria for evaluation such that TSD facility performance is upheld.

The framework for waste certification program verification presented in this paper is essentially an independent review and validation of the methods used for waste characterization and of the characterization data as well. If incorporated into routine operations and conducted on a regular basis, waste certification assessment should enable generators

to consistently determine the strengths and weaknesses of their certification program. As currently designed, the proposed approach can be modified to accommodate process

changes or discovery of previously uncharacterized waste. Further testing of the approach is planned whenever additional funding can be secured.