

OAK RIDGE NATIONAL LABORATORY

MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

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Subject: **IO-2003-04: Assessment of ORNL Waste Certification Program**

The Oak Ridge National Laboratory (ORNL) Independent Oversight (IO) organization facilitated a UT-Battelle Corporate assessment of the ORNL Waste Certification Program during the week of January 13, 2003. This corporate assessment utilized resources from the Brookhaven National Laboratory, the Battelle Columbus Laboratory Decommissioning Project, and the Pacific Northwest National Laboratory. The assessment independently evaluated the performance of the ORNL Waste Certification Program in meeting applicable requirements related to the effective and efficient removal, processing, and disposal of regulated waste.

This assessment identified program strengths, programmatic deficiencies, and recommendations for needed improvement. In general, waste management functions performed under the ORNL Waste Certification Program are being conducted in a regulatory compliant manner and meet waste acceptance criteria. Program personnel are knowledgeable of their job functions and execute program functions as currently defined. However, weaknesses were identified in the areas of waste certification process design and implementation, organizational structure, communications and teamwork, and feedback and improvement. The recommendations contained in this report should be entered into the ORNL Assessment Tracking System (ATS) and dispositioned in accordance with the Standards-Based Management System procedures *Responding to Assessment Results* and *Analyzing Performance Assessment Results*. The deficiencies identified in the report should also be considered for possible action and tracked, at your discretion, in your division-level ATS.

Should you need any clarification of this report, or if you would like to discuss the assessment approach or results further, feel free to contact my office.

Attachment

IO-2003-04: Assessment of ORNL Waste Certification Program

SUMMARY

During December 2002 and January 2003, a Battelle corporate assessment of the Oak Ridge National Laboratory (ORNL) Waste Certification Program was conducted. The assessment objective was to evaluate the performance of the ORNL Waste Certification Program in meeting applicable requirements to facilitate the effective and efficient removal, processing, and disposal of regulated waste. Program strengths, programmatic deficiencies, and recommendations were identified.

Based on the information evaluated, waste management functions performed under the ORNL Waste Certification Program are being conducted in a regulatory compliant manner and meet waste acceptance criteria. The critical driver for this success is the technical competence, work ethic, and dedication of Waste Certification Program personnel (Laboratory Waste Services, Waste Acceptance Coordinators, and Waste Certification Official). Program personnel are knowledgeable of their job functions and execute program functions as currently defined. Elements of the waste management program appear to be “best in class” – notably management of the Laboratory’s 90-Day Accumulation Areas and the hazardous material spill response process. Line management and working level personnel are committed to improving the Waste Certification Program as demonstrated by: (1) the request for this corporate assessment, (2) the degree of cooperation and candor on the part of all personnel interviewed, and (3) their willingness to explore potential program improvements.

Conversely, a number of weaknesses were identified in the areas of waste certification process design/implementation, organizational structure, communications and teamwork, and feedback and improvement. In the area of waste certification process design/implementation, process efficiency and effectiveness have been impacted by the uncontrolled addition of requirements and decision points that do not appear to be mandated by regulation. The sequential nature of the many certification reviews is not consistent with the principle of “building in” quality, and requirements of the Standards Based Management System (SBMS) for developing or modifying existing procedures and guidance are not consistently followed with respect to solicitation of stakeholder input. In the area of organizational structure, roles, responsibilities, authorities, and accountabilities (R2A2s) documentation – although detailed – is not always internally consistent and is not reflected in the latest revision of the Waste Certification Program Plan. The relocation of Waste Acceptance Coordinator personnel has impacted program effectiveness; this function is now performed as quasi-independent certification review – rather than the intended Subject Matter Expert or Technical Support function.

In the area of communications and teamwork, there is no clearly articulated set of standards of performance for the Waste Certification Program. Because of this, the relationship of overall program goals to individual goals is often unclear to program personnel. There has been a breakdown in teamwork and trust among program personnel; some personnel assigned key Environmental Protection and Waste Services Division roles do not demonstrate the leadership skills or spirit of teamwork necessary for successful program execution. In the area of feedback and improvement, there is not an effective performance measurement system to establish, track, and trend performance metrics. Assessment results do not appear to drive management decisions or identification of program improvements.

As a result of these deficiencies, the following recommendations have been identified for purposes of enhancing Waste Certification Program effectiveness.

- Re-engineer the certification process through a series of facilitated brainstorming sessions conducted with representative stakeholders.
- Establish and clearly articulate standards and expectations of performance.
- Re-establish a communication forum for the timely identification, discussion, and resolution of issues and evaluation of program performance.
- Restructure several organizational elements to be consistent with program needs.
- Develop a self-assessment/management system assessment program and performance measures, which “mirror” the revised certification process.
- Consider a brief stand-down of the Waste Certification Program to communicate and gain acceptance of the above recommendations.

BACKGROUND

This assessment was conducted at the request of the ORNL Environment, Safety, Health, and Quality (ESH&Q) Directorate. It was performed as a Battelle Corporate Integrated Assessment utilizing resources from the Brookhaven National Laboratory (BNL), the Battelle Columbus Laboratory Decommissioning Project (BCLDP), and the Pacific Northwest National Laboratory (PNNL). This management/organizational approach was selected to ensure an appropriate level of independence; to enable access to recognized, external subject matter experts; and to provide a mechanism to benefit from recent and unique experiences at the other Battelle-partnered laboratories. Collectively, the assessment team has significant experience in waste management and waste certification program development and implementation, quality assurance and feedback and improvement processes, and the management systems and Integrated Safety Management philosophy used at each of the Battelle-partnered laboratories.

OBJECTIVE AND APPROACH

The overall objective of the assessment was to evaluate the performance of the ORNL Waste Certification Program in meeting applicable requirements to facilitate the effective and efficient removal, processing, and disposal of regulated waste. The Department of Energy (DOE) may, as early as Fiscal Year 2004, begin to transition management of the entire program for newly generated waste to ORNL. For the purposes of this assessment, underlying requirements were defined to include, but not necessarily be limited to: (1) relevant Treatment, Storage, and Disposal (TSD) Facility Waste Acceptance Criteria, and (2) DOE Order 435.1, *Radioactive Waste Management*.

The scope of the assessment included examination of:

- The adequacy of the program in capturing relevant and applicable requirements;
- The rigor and effectiveness of the certification process, including documentation, control points, approval for disposal, and handling of errors;
- The level of independence of the certification process where required by Treatment, Storage, and Disposal Waste Acceptance Criteria and DOE Order 435.1;
- The rigor and adequacy of training provided to ESH&Q personnel who are responsible for the certification process (e.g., Customers/Generators, Generator Interface/Generator Interface Equivalents [GI/GIE], Laboratory Waste Services personnel, and Environmental Protection and Waste Services personnel);
- The clarity and consistency of roles and responsibilities of ESH&Q and Generator personnel who are responsible for the certification process;
- The adequacy of the process to facilitate effective and efficient waste removal, processing, and disposal;
- The thoroughness and effectiveness of line self-assessment and independent audit activities as mechanisms to identify program weaknesses and facilitate improvement;
- The effectiveness of non-conformance control, causal factor analysis, and corrective action processes;
- The effectiveness of communications; and
- The adequacy of management support for the waste certification process.

Accordingly, the assessment and the assessment team assignments were organized around the following elements:

- Program definition and identification/flowdown of requirements,
- Waste characterization process,
- Waste certification process,
- Definition of roles and responsibilities,
- Training,

- Assessments, audits, and corrective actions,
- Management oversight and support, and
- Work environment and communications.

The list of personnel interviewed by the assessment team is provided in Appendix A. Documents reviewed by the assessment team are provided in Appendix B. Biographical sketches of the assessment team members are provided in Appendix C.

DISCUSSION OF RESULTS

Strengths and deficiencies developed from the conduct of this corporate assessment are discussed below.

Strengths

1. The Laboratory's success in completing waste shipments is directly attributable to the technical competence and work ethic of Waste Certification Program personnel (Laboratory Waste Services, Waste Acceptance Coordinators, and Waste Certification Official). Based on the information evaluated, waste management functions (leading to the offsite shipment of waste) are being performed in a regulatory compliant manner and meet waste acceptance criteria. This level of performance is primarily being driven by the diligence and competence of Waste Certification Program personnel, who are dedicated staff with a high degree of personal ownership in and commitment to the success of the program. The level of individual commitment is functionally compensating for a certification process that is unnecessarily complex, contains sequential review activities, and is not always being conducted in an integrated manner.
2. Management of the Laboratory's 90-Day Accumulation Areas and the hazardous material spill response process by Laboratory Waste Services appear to be "best in class" activities. ORNL Waste Handling facilities are well maintained and well managed by the Laboratory Waste Services organization. Waste Handler personnel interviewed were judged to be efficient in meeting applicable requirements to facilitate the effective and efficient packaging, removal, and storage of regulated waste. The housekeeping of the 90-day storage area, chemical storage area, and hazardous materials spill response equipment was impeccable (Note: The assessment team visited Buildings 7013, 7075, 7085, and 3621).
3. Some of the procedures promulgated within the SBMS provide exceptional guidance for implementing elements of the Waste Certification Program. The Waste Certification Program contains a number of detailed Subject Areas, Procedures, and supporting documentation organized in hierarchical fashion. Collectively, these constructs provide a comprehensive set of guidance for personnel responsible for meeting program requirements. Among the specific elements that furnish excellent direction and detail include *Radiological*

Characterization of Solid Radioactive Waste, ORNL-WC-507, Revision 4; Guidance for Process Knowledge Evaluation, ORNL-WC-008; and Waste Stream Profile Sheets.

4. Program personnel appear knowledgeable of their job functions and execute the waste certification process as currently defined. Most personnel interviewed were able to effectively articulate their R2A2s with respect to the Waste Certification Program. They were able to accurately describe how the certification process is being executed – including recent modification(s) to elements of the certification process. Staff members also exhibited an understanding of key program interfaces and the chain-of-custody process for waste certification documentation.
5. Line management and working level personnel are committed to improving the Waste Certification Program. Almost all personnel interviewed identified the need and importance of modifying elements within the Waste Certification Program. Their collective commitment to this objective is demonstrated by: (1) line management's request for this corporate assessment, (2) the degree of cooperation and candor demonstrated by all personnel interviewed, and (3) their willingness to explore potential program improvements. Among the potential improvements identified by ORNL personnel interviewed during this assessment include the structure of the waste certification process, the organizational alignment of specific functions of the Waste Certification Program, the degree of involvement of line management, and the rigor and effectiveness of performance monitoring and measurement activities. As part of this assessment, the team interviewed personnel from Bechtel Jacobs – who receive waste from ORNL prior to its shipment offsite – to determine the level of recent performance regarding waste certification activities. The Bechtel Jacobs Waste Certification Official indicates that the quality of supporting documentation – especially with regards to waste characterization – has shown noticeable improvement (e.g., data quality objectives, sampling analysis plans, chain-of-custody logs, independent data validations, signed process knowledge statements, and signed Generator interviews).
6. The Laboratory has demonstrated the ability to work safely and effectively in addressing unique waste management-related challenges and in meeting aggressive milestones. All levels of staff working on this project demonstrated the ability to work creatively and as a team by successfully completing a pilot radioactive waste shipment to the Envirocare of Utah disposal facility. In August 2002, \$200K in funds was identified for waste disposal. The Environmental Management Program, by working effectively with stakeholders at the Laboratory and at Envirocare, was able to establish a profile for the waste through the Envirocare program and successfully transport five sea-land containers to the Utah site. Using this same stakeholder involvement concept and the *Guidance for Process Knowledge Evaluation (ORNL-WC-008)*, the Environmental Management Program is planning to complete a pilot, clean-out

campaign of off-the-shelf chemicals in 2003. This same “commitment to teamwork” will be essential as the Waste Certification Program addresses its current challenges and seeks to effect sustained program improvements (see Recommendation A.1).

Deficiencies

1. The Waste Certification Program Plan (WCPP) is outdated and does not reflect current practices. There are a number of practices and associated R2A2s in the WCPP, which are no longer being executed as described. (Note: The Laboratory is planning to update the WCPP.) The WCPP indicates that Generators are responsible for accurately characterizing and meeting requirements of the Waste Acceptance Criteria, and that the Laboratory Waste Services Group provides support functions, which includes verification of Generator waste certification activities. However, in practice, the Laboratory Waste Services Group (Generator Interface personnel) has a significant role in ensuring compliance with the receiving organization’s Waste Acceptance Criteria. The WCPP identifies the Request for Disposal form as the mechanism for initiating the certification process. Step 1 of the Procedure of Initiating Waste Certification for Solid Radioactive Waste (of the Solid Low Level Waste Subject Area) provides a link to the required Request for Disposal form and the set of instructions. However, all the forms included in the link are outdated, contain the Lockheed-Martin logo, and are not the version currently used. Section 5 of the WCPP (Organizational Responsibilities) does not accurately reflect the current organizational structure and/or associated responsibilities with respect to Generators, the Waste Certification Official, Quality Services Division, and the Office of Environmental Management Programs. Section 5.3 discusses a Waste Certification Operations Issues Forum, which is intended to meet at periodic intervals to discuss and resolve program issues and provide a mechanism for all stakeholders (including Generators) to provide program input; however, this forum has not met in over a year. Finally, although the revision number is identical, the WCPP issue date is not the same on the Waste Certification Home Page (November 21, 2001) as what appears in the Environmental Management Program Description (January 14, 2002).
2. The Waste Certification Program does not consistently follow requirements of the SBMS for either new development or modification of existing procedures and guidance. Stakeholder input is not being systematically or consistently sought or used in developing or modifying program procedures or guidance. Although the WCPP requires that the Director of ESH&Q, the Environmental Protection and Waste Services Division Director, and Quality Services Division Manager approve the WCPP, revisions/changes to requirements established in the WCPP are occurring without their approval. Revisions and changes to the WCPP are not being consistently implemented in accordance with the SBMS Subject Area: *SBMS Documents – New and Revised*. According to this Subject Area, the Management System Owner (Environmental Protection and Waste Services

Division Director) determines if revisions are to be made to the WCPP based on: (1) feedback from self-assessments, (2) changes in requirements or in the conduct of work, or (3) a recommendation from the SBMS leadership team. In addition, the Waste Acceptance/Waste Certification Official group maintains a web page with a number of useful guidance documents. To that extent some of these documents provide recommended formats or approaches that are of use to other functions in the Waste Certification Program (e.g., GI/GIE personnel) or are equivalent to program requirements/direction, such information – and any modifications to same – should be managed through the SBMS process. For example, within this web page (and under the “Current GI-GIE Tools” link), there is a guidance document pertaining to waste container log sheets (dated November 11, 2000); this information and underlying requirements are not captured on SBMS. In addition, links to elements such as “process knowledge” and “interim gamma spectroscopy guidance for waste” – if they contain the equivalent of requirements against which the adequacy of waste certification documentation is judged – should not be managed outside of SBMS.

3. Expectations for overall program goals/requirements are not communicated to staff and, accordingly, the relationship of overall program goals/objectives to individual staff goals is unclear to program personnel. Some program personnel indicated that – although they understood and followed the expectations and guidance of their immediate line manager – they did not necessarily understand the overall objectives and goals of the Waste Certification Program. Further, some program personnel do not know if individual expectations are consistent with either those of other groups within the Environmental Protection and Waste Services Division or with the Division Director’s goals. Program personnel are not always afforded the opportunity to provide input into the development of program decisions or in the establishment of new requirements. On a general level, maintenance of the web page (see Deficiency #2) outside the framework of SBMS is essentially managing a body of guidance and direction without a clear, formal mechanism for obtaining input. At a more specific level, a change to the Solid Radioactive Waste Subject Area requiring Environmental Protection Officers/Environmental Compliance Representatives sign the 2109 form for solid low-level waste was proposed as “minor” in nature, which effectively limited the number of individuals notified of it. Functional leads and managers are establishing requirements without sufficiently communicating this information to affected parties. Examples include: (1) requiring all paperwork/2109 corrections received from Waste Acceptance Coordinators to be reviewed by the Generator Interface Team Leader prior to Generator Interface staff seeing them, and (2) limiting access to Non-Conformance Report results. The lack of effective coordination and teamwork (among Waste Certification Program functional managers) results in the various groups conducting their activities, at times, in an “autonomous” and inconsistent fashion.

4. The efficiency and effectiveness of the Waste Certification Program have been impacted by the uncontrolled addition of requirements, steps, and verifications that are not mandated by regulation. A number of no- or limited-value added elements have been (or are expected to be) incorporated into the program apparently without a corresponding review of how such elements impact operations, thereby leading to increased program costs. For example, a requirement to review and certify ten percent of all analytical data received from outside laboratories is being contemplated. While Nevada Test Site acceptance criteria require that “a portion” of data be validated and the DOE Order for Quality Assurance requires that “service must meet established requirements and perform as specified,” there needs to be a risk-based evaluation conducted to determine the proper balance between risk, time, and financial impacts to effectively implement the elements of this requirement. Second, the practice of having UT-Battelle Generator Interface personnel review and certify contracted Generator Interface work is increasing the cost (and possibly the schedule) associated with processing waste (see also Deficiency #9). Third, it is not evident that the practice of requiring Waste Acceptance Coordinators to provide their review comments on certification documentation to the Generator Interface Team Leader (for examination and analysis) as opposed to working directly with the Generator Interface personnel is an efficient use of time and effort. From the perspective of the Generators (and the research and development organizations in general), the inefficient consumption of the research dollars allocated for waste operations increases the potential for the accumulation of additional legacy materials. Based on the experience of the assessment team, it appears that revisions to the Waste Certification Program are not based on a risk-informed, graded approach. Customers and program staff indicate that the program operates on a “*zero percent risk basis*” and without consideration of financial impacts. Certification activities at other Battelle operations are structured in a more streamlined and efficient fashion. The ORNL certification process, as currently structured, requires the execution of two independent “control points” including the conduct of a series of sequential reviews and verification activities – each of which must be completed successfully in order for initiation of subsequent reviews/verifications – a process that is not necessarily consistent with “building in” quality. Specifically, the steps include the GI/GIE declaring that the Waste Acceptance Criteria has been met, the Waste Acceptance Coordinator reviewing documentation and packaging to verify that the Waste Acceptance Criteria has been met, Waste Handlers performing a field check to verify packaging and labeling, the Waste Acceptance Coordinators reviewing documentation to assure that all programmatic requirements have been met, and the Waste Certification Official authorizing that the waste package and the associate documents meet the receiving organization’s acceptance requirements. It is not obvious that these sequential steps are providing additional assurance that the waste will meet Waste Acceptance Criteria. In general, a systematic or integrated approach is not being used for the planning, execution, and evaluation of revisions or changes incorporated into the Waste Certification Program.

5. The detailed R2A2 information (i.e., job descriptions and job analysis) is not consistent with the information provided in Revision 7 of the WCPP; internal discrepancies exist between the job descriptions and the job analysis documentation, and may specify unnecessary qualifications. There is no defined set of R2A2s for the Generator function, although the knowledge and accountability of these individuals is important to the success of the Waste Certification Program. Although Generator responsibilities are captured in the Subject Area documentation, these activities in reality are being conducted by the GI/GIE. Section 5.1 of the WCPP (Waste Generators) lists Generator responsibilities that are not documented in the detailed job analysis information provided to Generator personnel (and furnished to the assessment team) and which are – in practice – being conducted by the Laboratory Waste Services Group (Generator Interface personnel). Section 5.2 of the WCPP describes responsibilities for the Waste Certification Official and Waste Acceptance Coordinators under the discussion of the Generator Support – Waste Services Division. Since May 2002, the Waste Certification and Waste Acceptance Coordinators have been operating as part of the Environmental Protection Group. The detailed documentation (job description and job analysis) for the Waste Acceptance Coordinator/Waste Certification Official requires 5 to 10 years of waste operations experience under the description of “Education, Experience, and Skills Required” and 3 to 5 years under the “Job Analysis” element. Although Waste Acceptance Coordinators are required to have previous line, program, or project management experience, it is not evident that such experience is essential to the execution of their functions as currently being discharged. Within the documentation associated with the Generator Interface, the Generator Interface Team Leader, and the Field Operations Manager, there are also internal inconsistencies regarding required years of experience.

6. Undocumented authorities and accountabilities are being exercised. The Quality Assurance Specialist, who is providing matrix support to the Environmental Protection and Waste Services Division and is assigned to the Waste Certification Program, is responsible for managing the Non-Conformance Report process. This individual functionally reports to the Waste Certification Official, who in turn determines whether a non-conformance should be issued as well as the distribution for resulting reports. This functional arrangement may be inhibiting the assigned Quality Assurance Specialist from effectively performing assigned duties in an independent manner. There have been instances of the Waste Certification Official instituting new requirements or changes to the WCPP without soliciting input from all affected parties of interest (see Deficiency #3). Some changes to the certification process have been instituted via e-mail, which is inconsistent with established requirements for communication of such changes (per SBMS Subject Area: *SBMS Documents – New and Revised*). For example, it has been reported that the Waste Certification Official and Waste Acceptance Coordinators have instituted additional guidance on waste acceptance, process knowledge, and other certification activities. In addition, Section 5.2.2 of the WCPP states that the Waste Acceptance Coordinators will not (presumably

under any circumstances) establish certification policy or programmatic requirements.

7. The May 2002 organizational relocation of the Waste Acceptance Coordinators has had multiple impacts to program effectiveness and efficiency. The physical and organizational relocation of the Waste Acceptance Coordinator function has resulted in the introduction of additional administrative steps to compensate for the loss of the daily face-to-face interactions with GI/GIE personnel. These additional steps have increased the cost of certification activities and required line management to allocate additional time for the review and analysis of waste certification documentation. This organizational reassignment has also created unintended barriers to team building and has impacted the level of trust among key program participants (Generators, Laboratory Waste Services Group, Waste Acceptance Coordinators, and Waste Certification Official).
8. The organizational location of the Waste Certification Official function may not be consistent with the “demonstration of organizational independence” required by the Nevada Test Site (or Waste Isolation Pilot Plant) disposal programs. The Nevada Test Site Waste Acceptance Criteria, Section 5.1, states that: “The organization structure **must** ensure the independence of the Waste Certification Official, Alternates, and Package Certifiers from the waste generator and allow for direct access to a management level having sufficient authority and organizational freedom, if necessary, to ensure compliance with the Low Level Waste program.” In addition, the Waste Certification Official shall be independent of other responsibilities when performing waste certification responsibilities. As ORNL seeks to certify its program for disposal at the Nevada Test Site, it may be problematic for a single person to perform as Program Manager and Lead Certification Official, when it is likely – given the demands of these positions – that two individuals should be performing these functions. Further, the current assignment of Waste Certification Official within the Environmental Protection Group may not exhibit the necessary degree of organizational independence from the balance of the Waste Certification Program. Finally, the overall importance of this program to the Laboratory, the inherent institutional risk, and span of control required of the Waste Certification Program Manager is not reflected in this position reporting to a Group Leader within the Environmental Protection and Waste Services Division.
9. The practice of having UT-Battelle Generator Interface personnel verify/certify packages prepared by contractor Generator Interface personnel is inconsistent with the concept of accountability and unnecessarily costly if an adequate review is performed. Contractor Generator Interface personnel are not allowed to sign waste certification documentation they prepare. This requires that a UT-Battelle Generator Interface sign such documentation – indicating their acknowledgement that the information in the package is correct. It can be argued that such an assertion could only be made by having the UT-Battelle Generator Interface repeat the activities performed by the contractor (an unnecessary and costly

requirement). This practice also removes accountability from the contractor organization – where it presumably should be assigned – and places it on the UT-Battelle organization.

10. Training requirements are not consistently being applied based on actual discharge of responsibilities. The RCRA McCoy training should be evaluated for its applicability at ORNL and the needs of personnel having waste management responsibilities. This level of training is normally provided to entities that have RCRA permitted facilities; training is typically provided via a five-day class followed by annual, shorter duration refresher classes. UT-Battelle does not operate a RCRA permitted facility (it operates only 90-day accumulation and satellite accumulation areas); however, it is providing the full five-day course to selected program personnel on an annual basis. It is not evident that alternative approaches to providing such training were examined (e.g., using other training providers, developing specialized in-house training) to ensure that the Laboratory would meet the training requirements of 40 CFR 262.34. Although the McCoy training is excellent, it should not be relied upon to provide instructions on the specifics of designation. Using a graded approach to training might, for example, require all new hires attend McCoy training and – as budgets allow – others would attend this class for developmental/professional growth purposes. Conversely, there is not adequate training being provided for Generators to effectively execute their responsibilities, which are essential to program success. The lack of a documented set of R2A2s for Generators, combined with the absence of associated training, is requiring GI/GIE personnel to compensate by conducting a wide range of activities – some of which could be readily performed by Generators (e.g., obtaining all process knowledge information).
11. Some personnel assigned to key Environmental Protection and Waste Services Division roles do not demonstrate the leadership skills and/or do not embrace the culture of teamwork, which are essential for successful execution of the program. Many interviewees indicated that there has been a breakdown in “teamwork” and “trust” among elements of the Waste Certification Program. The key functional components of the program (i.e., the Environmental Protection Group and the Laboratory Waste Services Group) are not working collaboratively or effectively (e.g., additional administrative steps have been introduced to the certification process as opposed to addressing what appears to be the underlying issue of a breakdown of trust). It appears that on a number of occasions, operational modifications have been made to the certification process that, while appearing to solve a problem or challenge faced by one organizational element, may not have been in the best interest of the overall Waste Certification Program (and/or are resulting in the incurrence of additional unnecessary costs). On occasion, these changes have not been coordinated with all program elements prior to implementation. Such actions have resulted in the creation of additional institutional barriers and process inefficiencies, and have engendered a significant lack of trust in the motives of counterpart organizations. This circumstance is not consistent with the expectations normally associated with

personnel in positions of leadership and authority – especially with regard to a program having the visibility and importance of the Waste Certification Program. It is noted that recently the program principals (Waste Certification Official, Environmental Protection Group Leader, Laboratory Waste Services Group Leader, and Generator Interface Team Leader) were beginning to meet to discuss operational issues and solutions.

12. The Waste Certification Program does not have an effective performance measurement program to establish, track, and trend performance metrics. The existing suite of verification, assessment, and audit activities does not appear to be driven by or organized around a clear set of overarching performance standards and expectations and underlying performance metrics. Although verification, assessment, and audit activities are routinely conducted, the results of these activities are not being used to drive management decision-making or to identify needed improvements throughout the Waste Certification Program. For example, the Non-Conformance Report process is not fully or effectively used (e.g., root cause analysis of events is not conducted), and operating experience and lessons learned are not being shared. In general, adequate performance information is not communicated up the line management, chain-of-command.
13. Program personnel view the identification of process and performance issues as individual failures, rather than opportunities to establish an improvement agenda and achieve excellence through improvement. The lack of an “environment” of teamwork and trust among program personnel results in stakeholders not having an incentive to provide input that might improve program performance. For example, the Non-Conformance Report process is interpreted as a mechanism to selectively identify personnel performance issues as opposed to a process to improve minor weaknesses in program performance prior to such weaknesses becoming systemic issues. Performance information is neither systematically analyzed to identify and correct potential root causes nor communicated in the context of lessons learned for the benefit of program personnel.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations associated with this corporate assessment are provided in this section.

Conclusions

1. Currently, the Laboratory’s success in completing waste shipments is dependent on the technical competence and work ethic of Laboratory Waste Services, Waste Acceptance Coordinator, and Waste Certification personnel. It is the conclusion of this assessment – and based on the information evaluated – that waste management functions (leading to the offsite shipment of waste) are being performed in a regulatory compliant manner and shipments meet waste acceptance criteria. This level of performance is primarily being driven by the

diligence of Waste Certification Program personnel, who are dedicated staff with a high degree of personal ownership in the success of the program. The level of individual commitment is compensating for a certification process that is unnecessarily complex, contains sequential review activities, and is not being conducted in an integrated manner.

2. There is a need for significant modifications to the Waste Certification Program. Personnel interviewed clearly recognize the need and importance of modifying elements of the program. These modifications include the structure and design of the waste certification process, the organizational alignment of specific functions of the Waste Certification Program, the degree of involvement and oversight of line management, and the rigor and effectiveness of performance monitoring and measurement activities.
3. The philosophy and design of the waste certification process is not an efficient or “risk-based” mechanism for characterizing and certifying waste shipments. The existing waste certification process is based on the execution of two independent “control points” in addition to the conduct of a series of sequential reviews and verification activities – each of which must be completed successfully in order for subsequent reviews and verifications to be initiated. The current approach does not embody a philosophy of building in quality at the initial stage of the process. That is, it does not ensure that the initial development of waste package documentation and conduct of associated verification activities is being conducted in an integrated fashion, with the active participation of all requisite program resources acting as a coordinated team. Such an approach and philosophy could enable the certification review to be restructured from its current approach of essentially an entire re-review of documentation to one of a targeted and focused review activity.
4. Line management oversight of the Waste Certification Program needs additional emphasis. The conduct of this independent assessment activity clearly reflects line management’s recognition of the need for greater involvement and oversight of Waste Certification Program activities. This momentum needs to continue and to be implemented operationally. Critical to this increased involvement are: (1) re-establishing a culture of teamwork and integration among all program personnel, (2) developing overall standards of performance for the Waste Certification Program and using these as a basis for creating more detailed performance measures, and (3) ensuring accountability among all personnel for achievement of these expectations.
5. A performance monitoring system that “mirrors” the revised certification process is essential and needs to be established. The existing suite of verification, assessment, and audit activities does not appear to be driven by or organized around a clear set of overarching performance expectations and underlying performance metrics for the Waste Certification Program. Although verification, assessment, and audit activities are conducted, it is not apparent that results are

systematically used by program or line managers to drive improvements throughout the Waste Certification Program. Re-engineering of the waste certification process would provide the basis for restructuring the performance measurement and monitoring system and, in doing so, provide assurance to line management that the Waste Certification Program is meeting expectations.

Recommendations

Based on the assessment team's findings, recommendations have been developed and are presented in four areas – Waste Certification Process, Organization, Communication, and Feedback and Improvement.

A. Waste Certification Process

Restructuring the waste certification process – with the emphasis on “building in” quality – will provide the framework for implementing a series of changes that should enhance the overall performance of the Waste Certification Program.

1. ORNL should thoroughly examine and re-engineer the waste certification process. The vehicle for this re-engineering would be the conduct of a series of facilitated brainstorming sessions with representative stakeholders involved in generation, certification, characterization, packaging, transportation, and disposal. Another Battelle Laboratory with comparable Waste Certification Program challenges used a similar re-engineering process. Specific steps needed to execute this recommendation include the following:
 - a. Freeze all procedures, training requirements, SBMS documents, and R2A2 revisions with the exception of those that – if not addressed – would create legal/non-compliance impacts.
 - b. Determine waste acceptance requirements at the end-user facilities (Treatment, Storage, and Disposal).
 - c. Determine the methods to be used to collect the information needed to fulfill the end-user (Treatment, Storage, and Disposal) requirements.
 - d. Structure the revised process around the principles of (1) developing the documentation and information (for the first control point) in a collaborative and integrated fashion, and (2) conducting the certification activity as a targeted or focused sample of information – not as a 100 percent re-review.
 - e. Identify all procedures, training activities, SBMS documentation, and R2A2s needing modification as a result of process re-engineering.
 - f. Develop a plan to revise program documentation identified above.
 - g. Develop an implementation plan and an implementation date for rollout of the revised certification process.

B. Organization

The organizational alignment of functions within the Environmental Protection and Waste Services Divisions should be modified to effectively support the needs of the Waste Certification Program. With minor modifications, the organization could be re-aligned to, among other improvements, provide enhanced levels of support to the Generators and allow for a more independent final review of program documents. Below are the recommendations in the area of organizational alignment.

1. Organizationally realign the Waste Acceptance Coordinator and Generator Interface functions to re-establish the notion of “teamwork” and Subject Matter Expert support. Waste Acceptance Coordinator support is crucial to GI/GIE personnel; these resources should be collaborating in a teaming/consulting fashion to develop certification documentation. Increasing the access of these resources to each other (e.g., through physical or organizational relocation) would potentially contribute to improved interaction and collaboration.
2. Separate the Waste Certification Official function from the Waste Certification Program manager function. Consider establishing a Program Manager function reporting to the Environmental Protection and Waste Services Division Director. Cognizant group managers (Laboratory Waste Services and Environmental Protection) would have “dotted line” functional accountability to the Program Manager.
3. Increase the organizational independence of the Waste Certification Official function by having this function directly report to the Environmental Protection and Waste Services Division Director, the Quality Services Division Director, or to a function outside of the ESH&Q Directorate. This would elevate the position of Waste Certification Official from reporting to a Group Leader to an organizational level that is above that of the Program Manager.
4. Consider deploying/housing Generator Interface personnel by location rather than by division to improve efficiency. Generator Interface personnel indicate that the current deployment strategy requires significant time be allocated to travel among buildings.
5. Modify the R2A2s of Waste Acceptance Coordinator personnel to include performance of RCRA designations and Department of Transportation (DOT) classifications to alleviate some of the workload on the GI/GIE personnel and to improve the consistency of these designations. This recommendation would involve 4-5 knowledgeable staff performing designations instead of the current total of 16-20 personnel, who have varying degrees of technical expertise in these areas. Although Generators certify that the RCRA designation and DOT hazard category are correct, the complexity of the Form 2109 prevents the GI/GIE personnel from effectively performing the initial characterization.

6. Require qualified subcontractor Generator Interface personnel to sign/certify the program documentation they prepare. If the subcontractors perform the work and have the requisite training, they should be attesting to the accuracy and completeness of the work products they prepare. This assumes that the ORNL contract, with the subject subcontractors, enables this delegation of authority to occur.

C. Communication

There were several areas of the Waste Certification Program where ineffective communication has contributed to weaknesses in the program; addressing these communication shortcomings will lead to overall program improvements. Below are the recommendations in the area of communication.

1. Establish and clearly articulate line management standards and expectations of performance for the Waste Certification Program. This can be accomplished by defining metrics for: (1) performance of the program as a whole, (2) performance of organizational elements (i.e., groups) within the Environmental Protection and Waste Services Division that support the program, and (3) performance of individuals. Program and line management should track performance against these expectations.
2. Establish a forum for those organizational elements having key Waste Certification Program responsibilities, which enables timely identification, discussion and resolution of program issues, as well as, evaluation of performance information. This forum could meet on a routine basis (e.g., monthly) to solicit input from stakeholders on needed program changes, to determine if customer needs are being met, to provide information on verification performance, to schedule upcoming activities (e.g., laboratory clean-outs), and to “broadcast” program successes. Among the candidate organizations that could participate in such a forum include – Environmental Protection Group, Laboratory Waste Services Group, Quality Services Division, and Generator organizations.
3. Consider instituting a brief stand-down of the applicable elements of the Environmental Protection and Waste Services Division to communicate and gain acceptance of the recommendations provided in this report and/or additional actions that are proposed by management. During the stand-down, line management could communicate key assessment results and recommendations, and the series of actions that are to be implemented. It will be essential that division personnel understand that this is an opportunity to become “best in class” and that line management clearly establishes organizational and individual expectations of performance for executing the waste certification process.

D. Feedback and Improvement

Environmental Protection and Waste Services Division assessment activities need to be restructured to provide a comprehensive picture of the health of the organization with respect to the Waste Certification Program. Establishing clear performance measures and metrics, tracking performance, trending results, and initiating improvement actions are critical in the “work environment” at UT-Battelle where the efficiency and effectiveness of the waste disposal process directly impacts research operations. Below are the recommendations in the area of feedback and improvement:

1. Develop a self-assessment/management system performance assessment program and associated performance measures that “mirror” the revised certification process and provide assurance that development of program documentation (e.g., Form 2109 and associated documents) meets an agreed upon level of standard/performance. This would allow managers to assess the overall health of the Waste Certification Program and the effectiveness of each of the organizations within the Environmental Protection and Waste Services Division in supporting the program. Performance measures should be carefully established to ensure that they capture the information necessary for functional leaders, group managers, and the Division Director to evaluate the certification process and to identify needed changes enabling the Waste Certification Program to operate at a high level of effectiveness and efficiency.
2. Fully implement the Non-Conformance Report process, as prescribed in SBMS. Evaluate the current Non-Conformance Report process against the SBMS requirements and revise the process as needed. Tailor the process to meet the needs of the Environmental Protection and Waste Services Division so that the information can be collected, trended, and used to identify improvements.
3. Develop and implement a lessons learned program. SBMS describes the Laboratory’s Lessons Learned program and how to participate in it. The Environmental Protection and Waste Services Division should consider using an internal lessons learned system – following SBMS guidance – as a method to provide feedback to program staff and to support continual improvement.
4. Provide more resources to develop the details of a strategy and associated implementing plan for transuranic (TRU) waste certification and disposal. Using the lessons learned from this assessment and other sources (e.g., the Battelle Columbus TRU Certification Program), there is a need to place additional emphasis and priority on the development of a certification strategy for the ORNL contact-handled and remote-handled TRU waste. Such a program will require commitment of resources and personnel, as well as, effective long-term planning. ORNL should consider the variety of options that exist (shipment to the Waste Isolation Pilot Plant, shipment to the

Savannah River Site, and use of the Foster Wheeler TRU Project as a hub site) and any unique constraints or requirements associated with implementation of each option. For example, the Carlsbad Field Office can be expected to require review and approval of the Quality Assurance Project Plan and the TRU Certification Plan prior to their implementation.

APPENDIX A
List of Interviewees

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List of Interviewees

ESH&Q Line Management

Kelly Beierschmitt
John Burr
Karen Downer

Environmental Protection Personnel

Nancy Dailey
Dave Skipper
Jason Taylor

Laboratory Waste Services Personnel

David Drake
Sandy Fine
Jim Johnson
Greg Larson
Lance Mezga
Betty Shelton
Martin Tull

Generator Interface Personnel

Steve Childs
Pat Cleveland
Don Coffey
Mary Sue Condon
Jeff Davis
Judy Hardt
Sandra Kennedy (also a customer)
Rachel Murphy
Randy Pudelek
Mark Saunders
Sherry Williams

Waste Acceptance/Certification Personnel

Sandra Beeler
Jerry Bohannon
Charles Eblen
Laura Morgan

Quality Assurance Personnel

Kat W. Eldridge
Robert Orrin, BNFL

Waste Handling Personnel

Lynn Herrell
Mark Johnson

Customer Personnel

Jaime Bain – Metals and Ceramics Division
Paul Gubanc – Non-Reactor Nuclear Facilities Division
Ken Isham – Life Sciences Division
Sandra Kennedy – Physics Division (also a Generator Interface Equivalent)
John Norman – Nuclear Science and Technology Division
Mac Roddye – DOE
Monty Ross – Environmental Sciences Division
Fred Smith – Chemical Sciences Division
Dirk Van Hoesen – Environmental Management Program

Other Personnel

Angela Barnard – Environmental Protection and Waste Services Division
Kim Jeskie – Records, Training, and SBMS Services Division
Angie McGee – Logistical Services Division
Bob Orrin – Quality Services Division
Jeff Shelton – Logistical Services Division
Tim Tharpe – Bechtel Jacobs, Waste Certification Official

APPENDIX B
List of Documents Reviewed

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List of Documents Reviewed

1. DOE Order 435.1, Radioactive Waste Management
2. DOE M 435.1, Radioactive Waste Management Manual
3. Waste Certification Program Plan for UT-Battelle, LLC at the Oak Ridge National Laboratory, November 2001
4. Environmental Management System Description
5. UT-Battelle, LLC, Radioactive Waste Management Basis (RWMB), December 11, 2002
6. Solid Radioactive Waste Management Subject Area, December 20, 2001
7. Hazardous and Mixed Waste Management Subject Area, September 17, 2002
8. Solid and Industrial Waste Management Subject Area
9. Guidance for Characterization of Hazardous, Polychlorinated Biphenyl, and Low-level Mixed Waste, Oak Ridge National Laboratory, WC-406, Revision 2, February 2002
10. Radiological Characterization of Solid Radioactive Waste, ORNL-WC-507, Revision 4, November 2002
11. Guidance on No-Radioactivity-Added Characterization for Hazardous and PCB Contaminated Waste at Oak Ridge National Laboratory, WM-SWO-407, April 15, 1998
12. Calculation Documentation, Checking and Approval, ORNL-WC-001, Revision 0, October 2002
13. Waste Stream Profile Sheet Review and Approval Process, ORNL-WC-003, October 2002
14. NTS Waste Profile, Preparation and Review, ORNL-WC-004
15. Compliance with HAZ, PCB, and Mixed LLW Acceptance Criteria, ORNL-WC-005, Rev 5, August 26, 2002
16. Compliance with SLLW Acceptance Criteria, ORNL-WC-006, Rev 4, September 30, 2002

17. Compliance with TRU Waste Acceptance Criteria, ORNL-WC-007, Rev 3, October 2002
18. Guidance for Process Knowledge Evaluation, ORNL-WC-008
19. Guidance for Acceptable Process Knowledge (APK)
20. Nevada Test Site Waste Certification Program and Quality Assurance Plan for UT-Battelle LLC at the Oak Ridge National Laboratory, ORNL/TM-2002/209, Revision 0, November 2002
21. Nevada Test Site Certification Tools Homepage (part of the reference above); this homepage provides guidance in the following areas: (1) Calculations, (2) Checklist, (3) Revised Waste Stream Profile Sheet Instructions, (4) Waste Stream Profile Sheet – 11/2002, (5) Waste Stream Profile Sheet Review and Approval Process, and (6) WCO Approved Listing for Waste Characterization Providers
22. Laboratory Waste Services Waste Certification Program Self-Assessment Schedule, April 29, 2002, Rev 1
23. Quality Assurance Monitoring Report Number “PQA-SU-00-0186”
24. Quality Assurance Monitoring Report Number “PQA-SU-00-0185”
25. Forms -- Waste Pick Up Request, Waste Item Description, and Container Log Sheet
26. Waste Forecast versus Actual Chart
27. Waste Certification BJC/WESKEM Waste Rejection Rate Chart 2002
28. Occurrence Report Number ORO-ORNL-X10NUCLEAR-2002-0023
29. Position Descriptions and Job Analysis for Laboratory Waste Services Organization Manager, Labor Waste Services Organization Planning and Special Projects, Laboratory Waste Services Financial Reports and Data Assistant, Senior Reports and Data Assistant, Laboratory Waste Services Organization Generator Interface/Generator Interface Equivalent, Environmental Protection Organization Waste Acceptance Coordinator/Waste Certification Official, Laboratory Waste Services Organization Waste Handler, Laboratory Waste Services Shipping Coordinator, Environmental Protection Organization Lead Waste Certification Official, Laboratory Waste Services Organization Generator Interface Team Leader, and Laboratory Waste Services Organization Field Operations Manager
30. ESH&Q WBS 5.2.3 Review Waste Management Program

31. Overview of the UT-Battelle Waste Certification Program FY2002 Report Number
WCP-02-010

32. Generic Surveillance Checklist for Solid Low Level Waste Developed for Procedure
Number ORNL-WM-006

APPENDIX C
Evaluation Team

APPENDIX C Evaluation Team

Steven A. Coleman, CEM, PMP
Waste Management Division
Brookhaven National Laboratory

EDUCATION/CERTIFICATION: Master of Science, Energy Management, New York Institute of Technology, 1999. Bachelors of Science, Engineering Science/Liberal Arts, 1996. A.A.S. Computer Service Technology, Briarcliffe College, 2001. Certified Energy Manager (CEM). Project Management Professional (PMP). ISO 14001 Environmental Management System Lead Auditor course certification

EXPERIENCE

Brookhaven National Laboratory (BNL), Waste Management Division (WMD) Facilities Operations & Support Project Engineer/ Procedures & Training Coordinator, Nuclear Criticality & Safety Officer: 2000-Present

Responsible for water processing treatment, storage and disposal operations, training personnel and developing and maintaining hazardous, radioactive (includes DOE O 435.1, Radioactive Waste Management) and mixed waste plans, subject areas and Standard Operating Procedures (SOPs). He is designated as a BNL Occurrence Categorizer; this includes investigation of potential occurrences and Price Anderson Amendment Act (PAAA) violations, the documentation and tracking of facts, findings and corrective actions. He participated as a Environmental Management System (EMS) core team member for the WMD, and assisted WMD in achieving and maintaining EMS registration. He assures that proper criticality safeguards and administrative controls are maintained and conducts periodic reviews of the Waste Management Division's criticality safety program in concert with BNL's Criticality Safety Officer.

Senior Reactor Operator, BNL High Flux Beam Reactor (HFBR): 1991-2000

Performed specialized duties and HFBR plant operations. Specific activities include; controlling nuclear power operations, refueling activities, decontamination, removal and disposition of 14 tons of equipment and spent fuel in support of tritium remediation project upgrades; planning, control and execution of plant system modifications and changes to the HFBR technical specifications. He also participated in the preparation, implementation and review of the HFBR Integrated Safety Management System (ISMS) and HFBR ISO 14001 EMS Gap Analysis.

Nuclear Electrical Operator, United States Navy, USS Atlanta (SSN-712): 1984-1990

Qualified electrical operator, shutdown reactor operator and all subordinate stations. Maintained the ships electrical equipment including turbine generators, AC/DC motors, controllers, switchboards and instrumentation and control systems.

James Eide, CHMM
Program Manager, Transuranic Waste Management Program
Battelle Columbus Laboratory Decommissioning Program (BCLDP)

EDUCATION/CERTIFICATION: Master of Science, Environmental Management, Findlay University, Findlay, Ohio; Bachelors of Science, General Business, University of the State of New York, Albany, New York. ISO 14000, Quality Assurance Auditors Training; Carlsbad Field Office Lead Auditor Course. 40-Hour Hazardous Waste Worker for Resource Conservation Recovery Act, Treatment/Storage/Disposal Facilities.

EXPERIENCE

Project Manager, BCLDP Transuranic (TRU) Waste Certification Program: 1999-Present

Mr. Eide is responsible for preparing the BCLDP Transuranic Waste Certification Program for a DOE Carlsbad Field Office Waste Isolation Pilot Plant certification audit. He represents the BCLDP in activities required by the DOE National Transuranic Program, including attending the NTP steering committee meetings and updating site-specific waste inventory information associated with the DOE Baseline Inventory Report. Mr. Eide develops and writes the “statements of work” for waste management support contracts, volume reduction services, and waste disposal contracts. He reviews the bid proposals and work scope with Battelle’s purchasing group to qualify the vendors for the contract. He is designated as the Battelle subcontractor technical representative responsible for Wastren, Inc., Denver, Colorado; IT Corporation, Albuquerque, New Mexico; and Duratek, Columbia, South Carolina.

Project Manager, BCLDP Field Operations: 1995-1999

He was responsible for waste management activities associated with TRU/TRU hazardous waste accumulation, minimization, and disposal shipments. Activities included budgeting subcontract support contracts, purchasing equipment, developing waste profiles, and packaging and transporting waste.

Project Manager, BCLDP: February 1993 – March 1995

Mr. Eide supported a Battelle subcontract at the Westinghouse Savannah River Company (WSRC) in South Carolina. He worked in the WSRC Waste Generator Technical Support Group, assisting waste generators to develop and implement low-level waste certification programs for the WSRC solid waste disposal complex.

Westinghouse Hanford Company: 1986-1995

Mr. Eide’s job duties included supervision of eight transportation field inspectors who were responsible for verifying that hazardous materials met all applicable federal and state regulations prior to any movement on the 560-square mile, Hanford Site.

Shelly Grohs, CHMM
Project Manager
Pacific Northwest National Laboratory

EDUCATION/CERTIFICATION: Associate Degree, Applied Science, Shawnee State University, Portsmouth OH, 1982; Bachelor of Science Degree, General Studies, City University, Bellevue WA, (Core studies-Environmental Science) 2002. Certified Hazardous Materials Manager, Senior Level 12/2000

EXPERIENCE

Multiple positions within Environmental Management Services Department (EMSD), Pacific Northwest National Laboratory (PNNL), Richland, WA as listed below: 1995-Present

EMSD Operations Office, Project Manager

Responsible for department level activities in support of the mission and goals of the EMSD. This includes working with EMSD managers to establish performance metrics, and then tracking, trending and reporting results as well as the implementation of changes to support improved performance. In this position she is also responsible for self assessments of the waste disposal process across the EMSD organization, the collection of data and reporting for the Performance Management Plan agreement between EMSD and DOE and for PAAA NTS tracking for EMSD related activities.

EMSD Project Manager for Operations, Radiological Processing Laboratory (RPL)

Assigned to manage the EMSD processes that relate to the RPL (Category 2 Nuclear Facility). Set priorities, goals and performance metrics in conjunction with customer needs to allow for the most cost effective and timely service for EMSD processes. Operations managed include hazardous and/or radiological waste disposal, waste planning, field assistance to RPL generators, and environmental compliance.

Environmental Project Manager Matrixed to Facility Transition and Legacy Waste Project in Facility Operations

Managed assigned legacy waste projects, facility transitions and contaminated sites. Responsible for budget preparation, cost estimating and transition planning. Major projects included underground radioactive tank pumping/grouting/stabilization and the disposal of spent nuclear fuel with >1800 curies of radioactivity. She also established a risk assessment inspection schedule for unfunded legacy materials and PNNL's contaminated sites.

Lead and Technical Group Leader, Field Waste Management Services

Managed exempt that were paid for and matrixed to line organizations to manage waste disposal areas. This team was responsible for the field operations of waste management from the point of generation until the transfer to Waste Operations for disposal. This included the co- management of up to 500 satellite accumulation areas and the management of 20 ninety-day storage areas located within the PNNL complex.

The combined customer and EMSD budget managed for this role was \$1.65 million. She managed the field-operated programs associated with Field Services including elementary neutralization, treatment by generator activities, chemical redistribution, waste pending analysis, recycling, laboratory clean-outs, hazardous and radioactive waste generator training, and 90-day area documentation. In this role, she served as the Laboratory's POC for any regulatory interface with DOE, WDOE and EPA for regulatory inspections of generator areas. She was responsible for the development of the operating procedures, established a testing/qualification process and a quarterly assessment program for Field Service Representatives (FSRs). During her time in this position, the FSR program became fully institutionalized at the Laboratory.

Waste Management Technical Specialist

Responsible for packaging hazardous and radioactive wastes for offsite shipment, preparing RCRA TSDF permit modifications for the PNNL permitted facility and working with the Washington State Department of Ecology to resolve "notice of deficiencies" to finalize the RCRA permit for PNNL's Hazardous Waste Treatment Unit.

Radiological Control/Health Physics Technician: January 1990-December 1994

Martin Marietta Energy Systems Uranium Enrichment Plant, Piketon, OH; Bartlett Nuclear, Inc. Ft. Calhoun Nuclear Power Station, NE; Battelle PNNL; Richland, WA. Performed radiological control activities including radiological surveys and air sampling, radiological work permit preparation, whole body/chest counts, and multi pack dosimetry issuance and processing.

Robert F. McCallum
Principal
McCallum-Turner, Incorporated

EDUCATION/CERTIFICATION: Master of Science, Management, Purdue University, 1977. Bachelors of Science, Civil Engineering, University of Lowell, 1976. Engineer-in-Training Certificate, Massachusetts.

EXPERIENCE

President, McCallum-Turner, Inc.: 1991-Present

Provides management systems consulting services principally related to environmental and energy technology development. He has provided assistance to DOE and DOE contractors in the areas of internal independent oversight, self-assessment program development, waste management program development, and proposal preparation and review. He participated in the DOE investigation of historical and current environment, safety, and health practices at the nation's gaseous diffusion plants. He is involved in providing technical support to a variety of commercial nuclear power industry initiatives related to implementation of the Early Site Permit program (10 CFR Part 52).

He participated in the DOE Tiger Team program as member of Management Subteam at Los Alamos National Laboratory, at Ames Laboratory, and at the Naval Petroleum and Oil Shale Reserves. He served as the Report Technical Manager at the Naval Petroleum Reserves in California and at the National Institute for Petroleum and Energy Research. Mr. McCallum participated in two Corporate ES&H Oversight Reviews of the Pantex Plant and one of the Brookhaven National Laboratory. He conducted independent assessments of ISM mandated ES&H budget/risk prioritization, Waste and Environmental Management Division procedural compliance, ISM Phase I/II Verification readiness, an event evaluation for a debris pile fire incident, and management and independent assessment processes (10 CFR 830.120) at Brookhaven National Laboratory. He was part of the transition evaluation at Oak Ridge National Laboratory (examining the overall ISM program), supported development of criteria for evaluating the effectiveness of line self-assessment programs, and participated in a review of the evolution of the ISM program at Oak Ridge National Laboratory to a single, standards-based system.

Manager, Project Operations, Packer Engineering, Inc.: 1990-1991

Supported the DOE Tiger Team program as a member of the Management Subteam at the Pittsburgh Energy Technology Center – evaluating the Human Resource Management Program, Organizational Design, and the Strategic and Operational Planning functions. Served as the Technical Report Manager at the Energy Technology and Engineering Center, the Morgantown Energy Technology Center, and the Solar Energy Research Institute.

Section Manager, Battelle Office of Waste Technology Development: 1986-1990

Managed the institutional relations and licensing support activities associated with storage and disposal of spent fuel. Studies included developing strategies for

conducting site selection activities for locating interim and final disposal facilities for spent fuel, evaluating options for public involvement in site selection activities for such facilities, and identifying alternative approaches for licensing interim spent fuel storage facilities. Mr. McCallum supported the State of Illinois Low-Level Waste Program as part of a project team that designed, developed, and implemented a combined volunteer/traditional site selection strategy.

Environmental Liaison, Battelle Office of Crystalline Repository Development: 1984-1986

Interface between offsite Battelle and contractor staff and onsite DOE customer staff in preparing environmental studies related to developing a deep geological repository in crystalline rock for spent nuclear fuel. Involved in development and application of a multi-attribute screening methodology for evaluating the suitability of 17 eastern States as locations for a spent fuel disposal site, and the conduct of workshops with State and Tribal representatives to obtain input into the development of this methodology.

Senior Engineer, Battelle Pacific Northwest Laboratory: 1978-1984

Participated in and directed projects evaluating the radiological, non-radiological, and economic impacts of implementing various commercial and defense waste management alternatives for the disposal of high-level nuclear waste. Projects included examining disposal options for spent nuclear fuel, evaluating technologies for at-reactor disposal of low-level waste, and supporting the Nuclear Regulatory Commission in hearings on construction of Clinch River Breeder Reactor Plant.