# WASTE MANAGEMENT, ENVIRONMENTAL COMPLIANCE AND POLLUTION PREVENTION

By:
James J. Balkey and Ronald E. Wieneke, Nuclear Materials Technology Division
Los Alamos National Laboratory
Los Alamos, New Mexico

## ABSTRACT

The Waste Management and Environmental Compliance Group within the Nuclear Materials Technology (NMT) Division at Los Alamos National Laboratory (LANL) is responsible for managing all waste generated in NMT facilities from operations with, or that support, actinide processing. These operations result in the generation of a variety of waste forms, from sanitary and salvage to radioactive, hazardous, and mixed waste.

A number of prescriptive DOE Orders, federal and state regulations, waste acceptance criteria, Laboratory requirement documents, and standard operating procedures control waste management activities. For instance, waste operations that involve the use of materials that contain regulated levels of hazardous constituents must observe the requirements of the Resource Conservation and Recovery Act (RCRA), and materials that contain Special Nuclear Materials (SNM) must be controlled in accordance with the Atomic Energy Act of 1954 and its amendments. The waste management program is designed to implement these requirements, and personnel are trained and certified to perform their job functions in accordance with the regulations. An integral quality assurance program ensures that program documents implement regulations and that operations are conducted in accordance with program documents.

Waste management operations must control the radiological, chemical, and physical hazards associated with waste handling. Personnel are trained to identify and mitigate these hazards in their daily activities. A successful waste management program depends upon a knowledgeable and cooperative generator population. This relationship forms the basis for proper characterization of waste materials and establishes effective waste avoidance and waste minimization.

The proper management of waste requires a robust, yet flexible program in order to effectively adapt to rapidly changing missions and regulations. A number of challenges to NMT waste operations have been addressed and overcome successfully; however, many challenges remain to be resolved in the future. The NMT-7 Waste Management and Environmental Compliance Group strives to maintain their philosophy of providing an expedient, compliant, and cost-effective waste management program to NMT operations.

## INTRODUCTION

LANL, one of the U.S.'s national laboratories, is owned by the U.S. Department of Energy (DOE) and operated by the University of California (UC). LANL is one of the original Nuclear Weapons Complex Laboratories, dating back to the Manhattan Project in World War II. Consequently, LANL has conducted radioactive materials research for over half a century and it remains one of LANL's primary responsibilities. The Nuclear Materials Technology (NMT)

Division of LANL is responsible for the operation of two nonreactor nuclear facilities at Technical Area (TA)-3, the Chemistry and Metallurgy Research (CMR) Building, and at TA-55, the Plutonium Facility. These two facilities are essential to accomplish one of LANL's core missions of Stockpile Stewardship of America's nuclear arsenal.

Activities at these two sites generate a variety of waste types from sanitary and salvage to radioactive, hazardous, and mixed wastes. All materials must be handled safely and in accordance with a variety of rules and regulations that govern the treatment, packaging, identification, storage, transportation, and disposal of each specific waste type.

The Waste Management and Environmental Compliance Group (NMT-7) within the NMT Division is responsible for conducting waste operations in a compliant, expedient, and cost-effective manner. This requires the close coordination of waste management activities with personnel from the processing groups and from the Laboratory waste management and regulatory support organizations.

Several key factors contribute to the success of the waste management program. Essential is the cooperation of a knowledgeable generator population with the specialists of the waste management group. This allows the use of acceptable knowledge (AK), where applicable, to minimize the costs associated with characterization, and assures the proper handling, segregation, and storage of waste items. Collaboration in the planning phases of projects also allows the successful implementation of opportunities for waste avoidance and waste minimization with minimal impact and cost.

The waste management and environmental compliance programs are subject to intense scrutiny and frequent audits by regulators and disposal sites. The accuracy of data and the ability to track waste packages to the operations that produced the waste are fundamental to program certification and integrity. The waste management program has a strong, integral quality assurance function that provides an internal check of program integrity, as well as compliance with 10 *Code of Federal Regulations* (CFR) §830.120, "Quality Assurance Requirements," and disposal site quality assurance plans.

## REGULATIONS

A plethora of regulations controls all aspects of waste management at LANL. Various federal and state statutes, acts, regulations, orders, and criteria are interpreted by internal Laboratory documents before being implemented at the operations level by standard operating procedures. Waste management personnel are trained and certified to the operating procedures, and various forms and databases are used to prompt the collection of documentation needed to characterize waste types and ensure compliance with these regulations. An integral quality assurance program is used to verify program integrity, as well as identify and correct deficiencies.

The New Mexico Environment Department (NMED) regulates hazardous and mixed wastes under the *New Mexico Administrative Code* (NMAC) as adopted from 40 CFR, implementing the Resource Conservation and Recovery Act (RCRA). The NMED regulates asbestos waste under the NMAC, also in accordance with 40 CFR implementing the requirements of the Toxic Substances Control Act (TSCA). However, polychlorinated biphenyls (PCBs) are regulated in

accordance with TSCA by the U.S. Environmental Protection Agency (EPA) Region 6. The transportation of hazardous materials, including waste, is regulated by the U.S. Department of Transportation (DOT) in 49 CFR. The NMED and EPA Region 6 jointly enforce liquid effluent discharges in accordance with the Clean Water Act and the National Pollution Discharge Elimination System (NPDES). The NMED and EPA Region 6 also regulate air emissions in accordance with the Clean Air Act, with EPA taking responsibility for radioactive airborne emissions.

DOE orders also regulate the management of waste, as specified in the UC and DOE Operating contract for LANL (W-7405-ENG-36). DOE Order 5820.2A, *Radioactive Waste Management,* sets forth requirements for radioactive waste disposal and reinforces the applicability of RCRA to hazardous constituents of mixed wastes. Mixed waste without a disposition path is also subject to the Site Treatment Plan (STP) under the Federal Facilities Compliance Agreement (FFCA), which was established between the DOE and EPA.

Waste Acceptance Criteria (WAC) is defined by disposal facilities such as the Waste Isolation Pilot Plant (WIPP) (in DOE/WIPP-069 for transuranic [TRU] waste) to meet safe handling, transportation, RCRA operating, and repository performance requirements for deep geologic disposal. Low-level waste is disposed of on-site by shallow land burial, also in accordance with siting criteria, and emplaced waste must meet the LANL WAC.

The Special Nuclear Materials (SNM) content of the waste must be controlled in accordance with Nuclear Material Control and Accountability (NMC&A) procedures in compliance with the Atomic Energy Act (AEA) of 1954 and its amendments. Waste contents must be assayed and the radioisotope content identified to satisfy WAC and DOT requirements, as well as facilitate material accountability requirements.

Radioactive and hazardous wastes must be handled in a safe, responsible manner. An effective radiological protection program, in accordance with 10 CFR 835, *Occupational Radiological Protection,* must be implemented and waste management personnel certified as radiological workers. Waste management personnel must have RCRA training, as specified in 40 CFR §265.16 and Hazardous Waste Operations and Emergency Response (HAZWOPER), in accordance with 29 CFR §1910.120, "Occupational Safety and Health Act" (OSHA). Chemicals must be handled safely and segregated so that no adverse reactions can occur should there be spills or breaches of the containers. Many recent incidents at DOE sites have been the result of mixing incompatible wastes in the same container.

All of these regulations and requirements are interpreted as they apply to waste operations within LANL in Laboratory Implementing Requirements (LIRs) and additional waste-specific requirements documents:

- LIR404-00-02.2, "General Waste Management Requirements"
- LIR404-00-03.0, "Hazardous and Mixed Waste Requirements for Generators"
- LIR404-00-04.1, "Managing Solid Waste"
- LIR404-00-05.1, "Managing Radioactive Waste"
- LIR404-00-06.0, "Managing Polychlorinated Biphenyls"

- LIR404-10-01.1, "Air Quality Reviews"
- LIR405-10-01.0, "Packaging and Transportation"
- PLAN-WASTEMGMT-002-0.20, "Los Alamos National Laboratory Waste Acceptance Criteria"

Site-specific documents for conduct of waste operations are the responsibility of NMT-7 and include program documents (e.g., CMR-PLAN-001, "CMR Waste Management and Environmental Compliance Plan," which provides an overall view of the requirements and the manner in which the waste management program is organized and implemented). CMR-PLAN-001 was intended to provide someone who is unfamiliar with the waste management program (an auditor, for instance) with a basic understanding of the entire operation from regulatory drivers to where records are stored, so that he or she could conduct their business more effectively. Safe operating procedures take requirements from LIRs and WACs and effectively apply them at the working level. For instance, CMR-SOP-007, "Facility Waste Management Requirements," was developed as a reference document to provide waste generators with the information that they need to know to prepare their waste for acceptance by waste management personnel. CMR-SOP-007 is organized by waste type and contains flowcharts that walk the user through the entire process (i.e., what information is needed for characterization, forms required, packaging needed, marking and labeling, etc.). Group safe operating procedures (such as NMT-SOP-CMR-010, "Low-level Radioactive Waste" and its Work Instructions [WIs]) are documents with which the technicians are trained and certified to perform their work safely. Hazards inherent in waste operations are identified, and actions are taken to eliminate or minimize them in the procedures. These procedures also implement the requirements of the LIRs and WACs at the working level to ensure an acceptable product (fully certified waste package).

This discussion of regulations, although lengthy, is by no means all encompassing. It is intended to give the reader a feeling for the complexity of the current regulatory environment under which waste operations must be conducted at LANL.

## WASTE MANAGEMENT AND ENVIRONMENTAL COMPLIANCE

A wide variety of waste from actinide research, processing, and analytical activities must be handled in an expedient, cost-effective, and compliant manner. This requires a basic understanding of regulations and the waste management process by the personnel who conduct the waste-generating activities. To accomplish this, both Laboratory and site-specific waste generator training courses are conducted. Waste generators interact with NMT-7 personnel on a daily basis; whether it is with the technicians who certify and handle waste packages; the knowledgeable waste management coordinators who provide guidance to the generators or help them with paperwork; specialists in regulatory matters who recommend modifications to project designs to avoid regulatory pitfalls; or shippers who verify DOT compliance of waste packages prior to shipping. Waste operations areas and permitted areas (Satellite Accumulation Areas [SAA], Less-than-90-Day Storage Areas [<90] or Interim Permitted Storage Areas [TSD]) in the case of RCRA hazardous or mixed wastes, are clearly defined and situated to facilitate use by operations personnel, as well as waste management technicians. Operations with hazardous materials are conducted in accordance with LANL's RCRA Part A Interim Operating Permit.

A resident quality assurance specialist ensures that the integral quality assurance program is working as intended. This includes conducting a self-assessment program and spot field audits per a surveillance matrix, as well as performing desktop audits of program documents. Quality assurance performance indicators are tracked to identify any fundamental deviations in the waste management program as early as possible so that they can be corrected with negligible impact to program certification. Nonconformance Reports (NCRs) and Corrective Action Reports (CARs) are also tracked carefully. This level of support has proven invaluable in resolving quality issues that arise regularly with purchased products when vendors or suppliers are changed and physical specifications of waste packages vary from acceptable tolerance.

The heart of the waste management program is the records and waste documentation. All information must be kept in an orderly and retrievable manner as the program is subject to regular inspection by regulators or disposal facility auditors. Many of these records that were condensed onto microfiche are now being transferred to compact disk.

Site environmental compliance officers interface with facilities personnel and the following Laboratory environmental organizations: ESH-17 Air Quality, ESH-18 Water Quality and Hydrology, and ESH-20 Ecology personnel. The officers retain files of data collected from sampling stations on-site and copies of periodic reports; follow changing permit requirements; recommend changes to maintain compliance; perform periodic inspections; keep plans up to date; assist in writing permits or revisions to existing permits; assist personnel with screening forms; and submit information for National Environmental Protection Act (NEPA) review, when required.

Waste minimization and pollution prevention activities are essential to controlling waste disposal costs, especially with an expanding mission and production role. Operations personnel are actively involved in preventing the generation of waste that is expensive or impossible to dispose of. Personnel know, for instance, not to take packaging materials into a radiological control area with new equipment or supplies so that they may disposed of as sanitary waste instead of low-level radioactive waste (LLW). One successful project that has resulted in a significant reduction in low-level waste is "Green-is-Clean," which involves the segregation of paper from radiological control area and assay by sensitive phoswitch detectors to verify that contamination is not present. (1) This effectively diverts a portion of the LLW stream to sanitary disposal and saves disposal costs. Waste management coordinators work with process personnel to substitute nonhazardous chemicals for hazardous chemicals in their operations. One example is the substitution of nonhazardous scintillation cocktail for those formulations containing toluene in radioassay processes or the substitution of nonhazardous solvents for trichloroethylene (TCE) in certain degreasing operations.

Waste minimization and pollution prevention goals are central in the UC/DOE Contract, Appendix F, Performance Measures. These performance measures are very prescriptive in defining the level of waste reduction expected. For instance, the Laboratory has recently joined other sites in the practice of segregating sanitary waste to remove recyclable materials even though the practice is not cost-effective to meet sanitary waste reduction goals. Many of the waste minimization goals were derived from Secretarial Directives in Executive Order 12088, "Federal Compliance with Pollution Control Standards," Executive Order 12856, "Federal

Compliance with Right-to-Know Laws and Pollution Prevention Requirements," and Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition." These orders are in keeping with the spirit of the Pollution Prevention Act (PPA) of 1990 and the Hazardous and Solid Waste Amendment (HSWA) of 1984 to RCRA, which established policy for minimizing waste generation and reducing reliance on waste disposal. (2)

## NMT PHILOSOPHY

NMT is committed to maintaining operations in accordance with legal requirements, second only to the safety of workers and the public. Waste management and regulatory compliance cannot be accomplished without considering the processes that generate the waste, nor can they be magically applied by an external entity without impact or expenditure of effort. NMT realized that to attain an effective program, waste management must be integral to the Division to properly consider legal obligations from an operations standpoint, yet must remain independent to resist compromising the program due to programmatic pressures and deadlines. As prescriptive as the RCRA regulations are, there are issues that must be interpreted. In many cases, knowledge of both the regulation and the process allows modification of the process in the design phase. The modification achieves regulatory compliance and waste minimization with minimal impact upon either the schedule or the budget, and does not compromise the quality or integrity of research and development activities.

To maximize program efficiency and effectiveness, waste generators must be willing participants in proper management of waste and environmental compliance. Waste management must be involved from the start in planning projects to identify any activities that may require permits, modifications to permits, or that may generate an undesirable waste form or unacceptable quantity of waste. The new activity approval process was modified to require a review by the waste management organization to avoid surprises late in the approval process when modification would be difficult and expensive.

It is important to utilize acceptable knowledge to characterize waste with a minimum of sampling and analysis, which is particularly expensive for radioactive waste forms. The vast majority of operations are contained within glove box lines and stringently controlled so that no incidental substances may be introduced. Constituents are carefully identified and documented, and processes–even experimental ones–are strictly controlled and documented, making them ideal processes for applying acceptable knowledge.

Process personnel are the logical choice to provide characterization information on the waste with their intimate knowledge of the processes. Buy using standard forms, waste management procedures, and consulting with waste management coordinators when required, process personnel can quickly and efficiently document, package, mark, and label waste for collection by waste management personnel. Waste management personnel can then complete the documentation; collect and consolidate the waste into shipping packages; mark and label the packages per DOT, RCRA, (when applicable) and radiological requirements; and coordinate off-site shipment.

NMT-7 feels that this cooperation of generator and waste management has established an optimal waste management program in NMT operations.

## ORGANIZATIONAL STRUCTURE

LANL is organized into approximately 36 major projects, offices, and divisions based upon function under three associate directors and three deputy directors. Waste management and environmental compliance activities are divided between the Facilities and Waste Operations Division (FWO Division), with responsibility for Solid Waste Operations (FWO-SWO Group) and Radioactive Liquid Waste Operations (FWO-RLW Group). The Environmental Science and Waste Technology Division (E Division) is responsible for developing waste characterization and analysis standards in the Environmental Technology Group (E-ET Group). Environmental compliance groups reside in the Environment, Safety and Health Division (ESH Division) in the Hazardous and Solid Waste Group (ESH-19 Group), the Water Quality and Hydrology Group (ESH-18 Group), and the Air Quality Group (ESH-17 Group). Possible environmental impacts from proposed Laboratory operations or modifications of existing operations are evaluated in accordance with NEPA by the Ecology Group (ESH-20 Group). Supporting organizations include Quality Assurance in ESH-14 and the AA-1 Audits and Assessments Group. The NMT Division made the decision to form an independent group to handle waste management and environmental compliance issues in NMT-7.

NMT-7 consists of approximately 70 personnel, who are split between two sites and share some common resources. About 20 waste management technicians are organized into three operational entities (TRU Solid, TRU Liquid, and LLW and Hazardous) at one site and one operational entity at the other due to the different quantities and types of wastes generated there. NMT-7 has three group managers, one group leader and two deputies (one with responsibility for each site), and five administrative personnel with responsibility for document and records management, as well as scheduling and reporting functions. The other personnel are team leaders, supervisors, and specialists in the various aspects of waste management and environmental compliance, quality assurance, and shipping. The group is clearly organized along functional lines, with the waste operations at the two sites being distinct organizations.

The technicians possess skills that are unique to waste operations and equivalent in expertise to those in chemical processing, instrumentation, computers, electrical, or mechanical operations. The technicians must have a practical knowledge of environmental regulations, including certification in hazardous material packaging and transportation, in addition to radiological worker training to safely perform their work. Their job responsibilities are clearly defined at each level, and they may advance as their experience, knowledge, and responsibilities develop.

## PROGRAM DEVELOPMENT

In the 1980s, NMT Division waste management functions were originally included in the Facilities Group. As requirements became more stringent with the enactment of environmental regulations and with agreements by the DOE to abide by those regulations (in accordance with the Federal Facilities Compliance Act [FFCA]), both the number of environmental personnel and the level of specialization grew to the point that it was recognized that the waste management function alone constituted a viable organization. LANL worked to define new job families which, up until that time, had only been part-time assignments, and came to define and classify environmental workers, including waste management coordinators and waste management technicians.

The group interfaced closely with the Laboratory waste disposal organization and environmental groups and eventually recognized the need to place regulatory compliance and quality assurance staff on-site to interface with operations personnel on a daily basis. This had the added advantage of providing a balanced picture of the requirements of the regulatory world with the needs of operations that required practical solutions to environmental regulations.

Waste operations at the plutonium facility are essentially mature, having been a separate entity and group since the late 1980s, whereas NMT established CMR waste operations only 2 years ago. With the addition of a second nuclear facility (CMR Building) at a physically separate site, it became necessary to recruit a core of experienced personnel from TA-55 to join waste management personnel who were already at the CMR Building and familiar with the facility, process personnel, and waste-producing operations. This temporarily weakened the organization until budget issues could be resolved and vacancies filled. It is estimated to take from 6 to 9 months to train and certify new waste management personnel to an entry level.

Operations at the CMR Building became a matter of prioritization on three fronts: dealing with legacy issues, program organization to deal with current waste generation, and program building to meet future requirements. All three issues had to be addressed and implemented as soon as practical, with limited budget and personnel resources. A project management system was implemented to define, prioritize, assign responsibility, and track the progress of activities.

## PROGRAM EFFECTIVENESS

The measure of success of the waste management program is, ultimately, to produce a waste form with documentation acceptable to the treatment, storage, or disposal site. The certification of the TRU waste management program and the shipment of TRU waste originating in NMT's Plutonium Facility to the WIPP last year was a major accomplishment. Both sites have routinely met the low-level waste criteria and sent waste to TA-54 for burial. Chemical and sanitary waste is routinely shipped off-site for treatment and disposal, and NMT supports a strong salvage and recycling program.

Radioactive waste shipments from TA-55 last year totaled 278, 55-gallon drums of solid TRU waste; 23, 55-gallon drums of solidified TRU liquids; 2,880, 2-$ft^3$ laboratory trash boxes, and 65, 90-$ft^3$ boxes of low-level, noncompactable waste. Waste shipments from the CMR Building last year totaled 42, 55-gallon drums of solid TRU waste, 1,798, 2-$ft^3$ laboratory trash boxes, and 52, 90-$ft^3$ boxes of low-level, noncompactable waste.

The processes in the CMR Building are fundamentally different from those in the plutonium facility in that the majority are analytical processes and typically handle much smaller quantities of radioactive material at much lower concentrations. Therefore, the fraction of TRU waste is much smaller than that produced at the plutonium facility. In the case of both TRU and low-level, noncompactable waste at the CMR Building, the figure given represents a two- to three-year backlog of waste for the facility. Chemical disposal was of a much larger magnitude, representing decades of backlogged chemicals. A concerted effort by waste management over the past 2 years to do a comprehensive walk-down of all laboratory areas with the owners resulted in the disposal of approximately 12,000 to 13,000 items. This Herculean task, required close coordination with analytical, nondestructive assay, health physics, facilities, and

Laboratory waste management personnel and the contractor who conducted the direct off-site shipment. In addition, waste management supported a major campaign to reduce the building combustible loading to meet the facility safety basis, removing tons of records, packaging, boxes, furniture, shelving, books, and periodicals from the building.

Another successful waste management campaign involved the use of a high-efficiency particulate air (HEPA)-filtered, negative-pressure, confinement tent with an air lock to sort undocumented boxes of legacy low-level noncompactable waste. This was accomplished by waste management personnel wearing protective clothing and full-face respirators without physical injury (although many of the items were awkward and heavy) and without spreading radiological contamination. Fifteen boxes were opened and the contents documented. In some cases, inappropriate waste items were removed from the boxes for proper disposal. The work was accomplished on schedule in about four weeks around routine waste management activities.

The waste management program must be continually modified to support the needs of the facility with changing projects and processes internally, and from external regulatory changes. This requires effective two-way communications with sponsors, operators, and regulators; awareness on the part of waste management personnel; and involvement in the planning phase of activities. Waste management is tied in, intimately, with the Division Integrated Program Plan for long- and short-range planning and the estimation of future waste generation. Procedures must be reviewed on a regular basis and evaluated with respect to current regulations and needs.

An increase in self-identified regulatory violations was also realized in 1999, due to a significant increase in activities with hazardous and mixed waste, primarily associated with the acquisition of CMR operations. The legacy campaign itself led to a proliferation of SAAs that contained hundreds of items, which presented increased opportunities for errors and discrepancies. The drain on resources from TA-55 operations also led to a temporary increase in self-identified regulatory violations at that site. Waste management is working with the generator to expedite removal of the remaining items and to close SAAs. In an attempt to minimize the number of active SAAs, a prompt pickup program is being initiated that will take hazardous or mixed waste items directly from processes to a central <90 day storage area.

Generator training at the CMR Building also led, initially, to the identification of improperly characterized waste, which was reported and corrected immediately. This action started with the identification of processes where hazardous materials were used, which resulted in the generation of waste that was also classified as hazardous. Personnel then used waste records to track hazardous waste items to the drums in storage areas in which they were packaged. In some cases, the hazardous waste items could be removed and consolidated, thereby minimizing the number of hazardous waste drums. Operations personnel then worked with waste management personnel to properly characterize and segregate newly generated hazardous waste items from their processes.

One waste treatment study conducted in the CMR Building, which spanned the CMR Resumption Project and CST to NMT transition, was in jeopardy of exceeding time constraints and was prematurely terminated. Challenges encountered in the study include an insufficient understanding of regulatory requirements for waste treatment studies, and a failure to fully

consider all constraints at the inception of the project. Many issues must be factored into the cost of research with regulated materials, including the effort necessary to properly characterize residues; costs incurred in setting up and maintaining permitted storage areas for hazardous waste; and regulatory requirements for the ultimate disposal of all wastes and residues resulting from the study. It also may be a challenge to meet product specifications for recovered material or meet waste acceptance criteria. The facility new activity approval process has since been modified to require NMT-7 review and concurrence.

## FUTURE CHALLENGES

Significant gains in NMT waste operations have been made over the past five years by upgrading from paper records to an electronic document system that utilizes file servers, notebook computers, and handheld scanners. The computerized waste management system, which was developed in the early 1990s, has significantly improved the efficiency of the data entry and filing process for TRU waste. There are no longer transcription or calculation errors, and the consistency of data has improved. Reports on TRU waste are readily available, and the status of waste data packages can be checked on-line. Transmittal of information for review and approval of waste packages has also been expedited. The Waste Information and Tracking System (WITS) is being prepared for implementation and will improve the integrity of low-level and chemical waste management programs in NMT facilities.

Over the past 2 years, much progress has been made in establishing stable waste operations in the CMR Building and addressing legacy issues. The next items requiring evaluation are equipment and instruments throughout the facility that are no longer in use, even though they may still be operational. During the 47 years of the CMR Building's operation, a number of divisions and programs have come and gone. These entities, for the most part, did not consider or budget for the disposal of obsolete equipment and instruments from their operations and were not held accountable by the facility manager for this responsibility. There exist today throughout the CMR Building a number of unused glove box liners, fumehoods, equipment, instruments, parts, records, boxes, and drums. These items pose possible safety hazards, as well as potential regulatory liability for the NMT Division. Whereas the NMT Division took unconditional ownership of the CMR Building in March 1998, these issues are now NMT's responsibility to address and resolve.

The first order of business will be to survey, identify, and document unused equipment, instruments, glove boxes, fumehoods, boxes, drums, etc. in the CMR Building. A searchable database will be developed to capture all required information on these items. A bar code inventory system (compatible with current NMT-7 operations) will be employed, and items will be bar coded to correspond with database entries. A field survey of all areas of the CMR Building will be made to identify items that meet the definition of legacy and evaluate them with respect to radiological condition, industrial hazard/physical condition, regulatory concern, location, process knowledge, description, size, weight, etc. The survey team will work with CMR personnel in radiological protection, waste management, industrial hygiene, and facilities operations to document the condition of legacy equipment, and will work with operations personnel to gather process knowledge. In this manner, items can be prioritized, and those items that present the greatest risk can be stabilized and prepared for disposal, as funding becomes

available. Some items may not be removed from the building until it is decommissioned in 10 years.

Prior to 1998, waste disposal was funded in its entirety by the DOE Office of Environmental Management (EM). This situation, although practical, resulted in a disconnect between the organization funding projects that generate waste and the organization paying for waste disposal in most cases. Shrinking budgets were also forcing EM to spend a larger portion of their funding allocation on the disposal of newly generated waste when their priority was decontamination and decommissioning, environmental restoration, and site remediation. Switching the cost of newly generated waste disposal to the organization that sponsored the project effectively provided an incentive for waste minimization. The majority of programs in the NMT Division are funded by the Department of Defense Programs (DP), and Laboratory waste management organization and disposal facilities are funded by EM. This requires that waste from a process be traceable to the program that utilizes the process in order to recover disposal charges. This is a complicated problem that cannot be solved by instituting a rudimentary accounting system. Many different projects utilize the services of a single process and materials move between processes making the source of the waste difficult to track. In addition, waste types that do not have a disposal path (non-defense TRU, contaminated explosives or pyrophoric liquids, low-level biohazard, etc.) can be generated and could possibly incur infinite storage costs. In response to this challenge, NMT-7 must devise and institute a system to track waste disposal costs back to the projects that generate them.

Regulatory requirements are in constant flux. Changes in high-level documents must be tracked through the requirements of the UC/DOE contract and internal Laboratory requirements documents to the procedures that implement them, and the changes must be enacted in an expeditious manner. The most recent regulatory change with a significant impact to NMT waste operations is the WIPP RCRA Part B Operating Permit, which was issued by the NMED and requires substantial changes in TRU waste characterization. NMT-7 is currently participating in a gap analysis of current program documents to determine what changes must be made to comply with the new requirements and what impact those changes will have on NMT waste operations.

## SYNOPSIS

The NMT Division believes that the responsible management of waste from actinide processing operations and analytical activities and protection of the environment is second only to worker and public safety. To this end, an integral waste management and environmental compliance organization was formed within the NMT Division to ensure that these issues are addressed in a compliant, expedient, and cost-effective manner. Experienced waste management personnel and environmental specialists interface with operations personnel and Laboratory support waste management and regulatory compliance organizations on a daily basis to ensure that NMT activities remain in compliance with all state and federal statues, legal obligations, regulations, DOE orders, waste acceptance criteria, contractual requirements, Laboratory requirements documents, and standard operating procedures. NMT-7 can operate effectively in this prescriptive regulatory environment and has achieved some major accomplishments, including being the first to ship TRU waste to the WIPP and effectively address serious waste management issues in the CMR Building. This paper lays the basis for understanding the significance of the

activities presented in the following papers of this session to the NMT Waste Management and Environmental Compliance program.

## REFERENCES

1. G. J. Arnone, "Status of the WAND (Waste Assay for Non-radioactive Disposal", LA-13432-SR, Los Alamos National Laboratory (March 1998)

2. C. L. Foxx, "TA-55 Waste Minimization and Pollution Prevention Plan," LA-UR-95-1403, Los Alamos National Laboratory (1995).