Office of Independent Oversight and Performance Assurance
Office of Security and Safety Performance Assurance
U. S. Department of Energy

Independent Oversight Lessons Learned Report

Management of Legacy Hazards

December 2004

OVERSIGHT

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Abbreviations Used in This Report

CFR	Code of Federal Regulations
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
EM	DOE Office of Environmental Management
ES&H	Environment, Safety, and Health
FY	Fiscal Year
ISM	Integrated Safety Management
KCP	Kansas City Plant
LLNL	Lawrence Livermore National Laboratory
NE	DOE Office of Nuclear Energy, Science and Technology
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
ORNL	Oak Ridge National Laboratory
P2	Pollution Prevention
PCB	Polychlorinated Biphenyl
SAA	Satellite Accumulation Area
SC	DOE Office of Science
SRS	Savannah River Site
STP	Site Treatment Plan

FOREWORD

Since 1984, the Office of Independent Oversight and Performance Assurance (OA), within the Office of Security and Safety Performance Assurance, and its predecessor offices within the U.S. Department of Energy (DOE) have been responsible for evaluating programs of national significance and reporting on their status to the Secretary of Energy, senior Department management, and Congress. This independent internal oversight function is unique in the executive branch of the government and, over the years, has led to notable improvements in safeguards and security; cyber security; environment, safety, and health (ES&H); and emergency management programs. The OA Office of Environment, Safety and Health Evaluations is responsible for evaluating and reporting on ES&H performance throughout the DOE complex.

A number of DOE sites house legacy hazards that have not been addressed in a timely manner; these include unneeded hazardous materials in long-term storage and abandoned, deteriorating buildings for which there are no plans for disposition. Therefore, OA identified management of legacy hazards as a focus area—one that warrants increased attention across DOE—during four fiscal year 2004 inspections: Lawrence Livermore National Laboratory, Oak Ridge National Laboratory, the Kansas City Plant, and the Savannah River Site.

At all four sites, OA found that recent initiatives developed by the site contractors that were reviewed are having a positive effect on addressing legacy hazards. Two of the four sites have generally been effective in the past in controlling operations to prevent the creation of legacy hazards; these sites had appropriate programs in place to manage the remaining legacy hazards. However, until recently, the other two sites had not effectively managed operations to prevent the creation of legacy hazards; these sites face significant challenges but have recently implemented aggressive programs to address legacy hazards. Although these sites have appropriate programs, improvements are needed at the DOE Headquarters level to ensure that legacy hazards are addressed in a timely manner and to resolve responsibility for functional ownership.

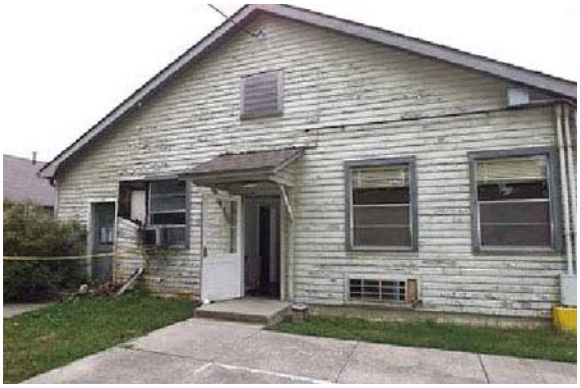
OA will continue to evaluate safety management programs and select focus areas based on a review of operating events and inspection results where weaknesses continue to be identified. OA also will continue to periodically review its evaluation results to identify lessons learned that will facilitate improvements. By these means, OA will continue to fulfill its mission of promoting improvement in DOE ES&H programs.

1.0 Introduction

This report summarizes the observations, insights, and lessons learned from evaluating the management of legacy hazards during Office of Independent Oversight and Performance Assurance (OA) environment, safety, and health (ES&H) management inspections conducted in 2004. OA, within the Office of Security and Safety Performance Assurance, identified management of legacy hazards as a focus area across the U.S. Department of Energy (DOE) complex based on an analysis of past inspections and other performance data, which determined that a number of sites have not addressed legacy hazards in a timely manner. In 2004, this focus area was evaluated as part of ES&H inspections at the four sites listed in Table 1. The table also identifies the DOE program office that has primary management responsibility for each site: the National Nuclear Security Administration (NNSA), the Office of Environmental Management (EM), or the Office of Science (SC).

The four sites OA examined represent three program offices and include waste management, laboratory, and production activities. Therefore, the four sites provide a good sample for gleaning insights on overall DOE performance of major DOE sites that have clear missions and fully functioning ES&H support organizations.

Legacy hazards typically result from past use of hazardous materials, such as beryllium, volatile organic compounds, fuel oils, and polychlorinated biphenyls (PCBs), and past disposal practices involving radioactive and/or hazardous waste. In addition, there are a number of aging facilities that are not currently being used or that have been deactivated and are undergoing or awaiting environmental remediation.



Deteriorating Facility

OA evaluated site contractor management of legacy hazards against the applicable requirements: Federal, state, and local environmental regulations; Occupational Safety and Health Administration and DOE/site requirements; integrated safety management (ISM) expectations; and DOE Order 430.1B, *Real Property Asset Management*, requirements in the areas of facility condition assessment, deactivation, and disposition. OA also examined DOE line management direction to and oversight of site contractor programs for managing

Table 1. Sites Inspected by OA During 2004

Safety Management Inspection Site	Headquarters Program Office(s)
Savannah River Site (SRS)	EM/NNSA
Kansas City Plant (KCP)	NNSA
Oak Ridge National Laboratory (ORNL)	SC
Lawrence Livermore National Laboratory (LLNL)	NNSA

legacy hazards. Performance in this area was evaluated by reviewing policies, requirements, procedures, guidance documents, plans, and hazard control documents; observing work within facilities; interviewing key DOE and contractor personnel; observing work associated with waste storage and treatment processes and legacy hazards cleanup; and conducting walkthroughs of operating facilities with potential hazardous legacy concerns and abandoned or unused buildings.

Section 2 of this report discusses OA's observations in four topical areas: 1) legacy waste management, 2) legacy hazards within facilities, 3) legacy facility disposition, and 4) environmental legacy hazards. Conclusions derived across the four sites are presented in Section 3, focusing on effectiveness in addressing legacy hazards and areas where additional management attention will be necessary to control and/or eliminate these hazards.

2.0 Results

For each of the four topical areas, OA discusses overall observations and insights, positive attributes, and opportunities for improvement. Because site-specific deficiencies and opportunities for improvement have already been communicated to the sites as part of OA's inspection reports, the improvement items in this report focus on potential enhancements of DOE performance across the complex. However, where appropriate, OA refers to positive attributes at specific sites so that interested parties can obtain additional information about innovative approaches and noteworthy practices (e.g., by referring to the applicable ES&H inspection report or by contacting the site).

2.1 Legacy Waste Management

The review of legacy hazards associated with waste management examined two questions: 1) Are current operations and waste handling performed in a manner that does not create a future legacy concern? and 2) Is waste from past activities being properly managed to minimize the risk it presents, pending ultimate disposal? The inspection results show that all four sites are managing waste effectively. With only a few exceptions, newly generated waste is being treated or disposed of in a timely manner that will not create a legacy disposal concern or pose undue ES&H risks. The inspection results also indicate that waste management facilities are well maintained and effectively operated. Specific actions that sites have taken to improve waste disposal or reduce the amount of waste generated include streamlining the disposal process, constructing new waste management facilities, becoming certified to dispose of low-level waste directly to the Nevada Test Site, and implementing strong pollution prevention (P2) programs. Because the P2 programs generally have senior management support and are effectively integrated with mission work, DOE sites have received several awards for these programs.

Low Level Interim Waste Storage Bins

In a few cases, sites have allowed their longer-term storage facilities to accumulate waste in volumes allowing more economical disposal. Methods used for this longer-term storage appropriately minimize ES&H risk and have DOE field element approval. In addition, by effectively managing current waste streams and pursuing pollution prevention actions, sites are preventing the creation of future legacy hazards.

All four sites are managing legacy waste properly, with one small but notable exception (discussed under Opportunities for Improvement, below) involving storage of hazardous waste in satellite accumulation areas (SAAs). Sites with large amounts of legacy waste have programs, currently in various stages of execution, to significantly reduce and/or dispose of the waste. For example, a site that previously had deficiencies in management of legacy waste took significant actions to address these issues and is now on schedule to dispose of almost all legacy waste by the end of fiscal year (FY) 2005. Specific actions involving legacy waste that are being performed by one or more sites include:

- Performing walkdowns of waste storage areas in facilities awaiting deactivation and disposition as part of a management strategy to ensure that miscellaneous waste containers are moved into storage that complies with regulations

- Relocating drums containing uranium chips from outside near the site boundary to inside a storage bay in a recently opened waste management facility and beginning a process

to deactivate the chips as part of a series of management actions to protect workers, the public, and the environment and to provide an effective disposition path for these materials

- Instituting processes and programs within facilities as part of a management commitment to locate and properly dispose of legacy waste containers; this action is often performed in conjunction with space management and cleanout programs, which are discussed in Section 2.2.

As a result of these actions and programs, the four sites inspected have already significantly reduced the quantity of legacy waste, or are in the process of doing so.

Positive Attributes

Sites have implemented effective programs for disposing of legacy waste. For example, one site effectively addressed storage issues affecting over 10,000 drum equivalents of transuranic waste, low level waste, and mixed waste (radioactive and hazardous wastes); previously, these drums were stored outdoors in less than optimal conditions, and there was no firm schedule for disposal. In addition, transuranic waste drums are now being sent to the Waste Isolation Pilot Plant, following certification of the drums by the National Transuranic Program's mobile vendor. Other sites have been identifying, characterizing, and sending waste to disposal as part of their programs to reduce legacy hazards.

Site Treatment Plans (STPs) are being effectively used as a management tool by sites for legacy mixed waste that cannot go to disposal within regulatory time limits. The STP establishes a regulatory framework for exceeding the time that waste can be stored. Sites are working effectively with regulators as part of the Federal Facility Compliance Act agreement with their States to establish the STPs. For example, at one site, legacy mixed waste (totaling 600 cubic meters) has been added to the STP. This site has committed to dispose of 95 percent of the mixed waste under the STP by FY 2006, after the mixed-waste streams are fully characterized and a path for disposal is determined. Other sites are using the STP process for complying with regulatory requirements as disposal options are identified and characterization activities are completed for mixed waste with difficult disposal paths.

Opportunities for Improvement

Site management needs to ensure that processes are in place and effectively implemented to ensure the timely disposition of legacy waste containers held in SAAs. An environmental compliance vulnerability was identified at one site—namely, that hazardous waste remained in long-term storage in SAAs after the generating activity ended, resulting in the unnecessary potential for exposure of workers and the environment to these wastes. This site has several legacy SAAs and has not taken adequate corrective actions. Because of the number of legacy waste containers, resolution of this vulnerability is expected to take several years. SAAs are intended to accumulate hazardous waste only from an ongoing process; when the process ends, the hazardous waste from that process must be moved to a compliant storage area. Although this weakness was noted only at one site during this review period, other DOE sites may have similar vulnerabilities that need to be addressed. Sites need to ensure that waste services, environmental compliance, and/or internal organizational resources work with line organizations to guide proper management of SAAs. Also, sites need to ensure that

Legacy Waste in a Satellite Accumulation Area

legacy wastes are removed from inactive SAAs. Where funding constraints and/or the volume of waste make immediate disposal unrealistic, sites should consider moving legacy wastes from SAAs into 90-day storage areas and/or facilities under a Treatment, Storage, and Disposal permit. If regulatory time limits will be exceeded, sites need to add the waste to the STP.

DOE needs to ensure that effective management planning processes are in place and used to provide the necessary facilities and infrastructure for disposition of legacy wastes. Because of insufficient management planning, no viable disposition path is available for transuranic waste stored in large boxes because the items in these boxes must first be reduced in size, and there is no facility for opening them safely. This situation could be a concern at sites where special facilities may be required to allow large containers to be opened so that the waste can be safely characterized and certified. DOE needs to identify alternative processes for size reduction and decontamination of equipment in oversized transuranic boxes and ensure that facilities are available for the disposition of oversized transuranic boxes across the DOE complex.

2.2 Legacy Hazards Within Facilities

DOE line management – NNSA and other DOE program offices and site offices – have focused attention on site conditions and resources needed to address legacy hazards within facilities. For example, one site office played an active role in responding to a Defense Nuclear Facilities Safety Board (DNFSB) 60-day letter about hazardous material safety limit exceedences. In some instances, DOE line management regularly performs oversight of initiatives to remove and disposition legacy hazardous materials. However, not all site offices include identification and removal of legacy hazards as a regular part of operational awareness activities.

At all four inspected sites, legacy hazards posing significant risk to the public, workers, and the environment are being addressed by programs that focus on legacy hazards. For example, at one site, senior management focused attention on the removal of legacy equipment, facilities, and materials through its Ten Year Comprehensive Site Plan, which identified the removal of legacy equipment, facilities, and materials as a major institutional initiative. At most sites, innovative approaches are used to fund the removal of legacy hazards, including the use of specially-designated funds from DOE Headquarters, direct program funds, overhead, and internal "legacy taxes." Contractors at some sites have initiated an institutional tax to fund removal of legacy hazards and reuse of space, and have effectively used institutional risk-ranking processes to prioritize legacy hazard removal actions and adequately consider ES&H aspects.

Contractor management has established specific organizations and programs to assist the institution and line organizations in addressing legacy hazards. For example, at one site a Legacy Materials Disposition Initiative program was established to identify, characterize, and remove legacy items; as a result of this program, significant quantities of hazardous legacy materials have been removed from the site over the past three years. Another site has established an Institutional Facilities Management organization for the disposition of legacy materials from all site organizations.

Ongoing, sitewide projects and special teams are being used to remove hazardous materials from facilities. For example, at one site, a Legacy Remediation project was successfully applied at a nuclear materials vault, resulting in downgrading the vault from a Category 3 nuclear facility to a radiological facility. A project was initiated in 2001 at that site to identify and remove legacy materials within a large radioisotopes facility. Because of these and other similar efforts, approximately 5900 square feet of laboratory space that formerly housed legacy materials and equipment have been restored to productive use within the past few years. Institutional Space Action Teams have been effectively used for removal of hazardous legacy materials and deactivation of facilities. These teams have been involved in the removal and disposition of various hazardous legacy materials, including 80 gas lecture bottles of rhenium hexafluoride from one facility and approximately 5 pounds of perchlorate salt from the ductwork of another facility.

At another site, a Legacy Materials Disposition initiative resulted in the removal of significant quantities of hazardous legacy materials, including approximately 32,400 cubic feet of low-level waste, 56 cubic yards of asbestos, 4,327 excess chemicals, over 1,100 gas cylinders, 8.25 tons of lead, and 1,915 pumps and motors that were potentially contaminated. Although significant progress is being made at this site, legacy materials from past site operations still exist, in part because the responsible owners have not been adequately identified and because disposition pathways are not available.

Before **After**

Hot Cell Cleanout

At sites dealing with legacy materials that were identified as part of DNFSB Recommendations 94-1 and 97-1, processes have been developed and used to stabilize and package excess plutonium and uranium in welded 3013 containers for long-term storage. The sites have processed and dispositioned these materials in accordance with the DOE implementation plan. For example, significant progress has been made toward removing americium/curium materials from a canyon facility by placing them in high-level waste tanks for processing in another facility. Excess plutonium and uranium materials have been processed and are ready to be shipped to another DOE site for additional processing; they cannot yet be shipped because the ultimate disposition path from that site has yet to be developed.

Most sites have implemented programs to identify and characterize legacy beryllium areas and usage as required by 10 CFR 850, *Chronic Beryllium Disease Prevention Program*. However, the rigor applied to the characterization of beryllium plant areas has varied considerably among DOE contractors. As a result, the evaluation of beryllium programs, including legacy beryllium contamination, has been identified as a focus area for OA evaluations scheduled in calendar year 2005.

Although management has systems in place to control the accumulation of hazardous chemicals, many of these systems have not been fully developed to ensure their effectiveness. Institutional chemical inventory systems are in place to control the accumulation of chemicals within facilities and laboratories. However, management attention is still needed to ensure that these processes are fully developed in a timely manner so that chemicals are effectively controlled and owners of chemicals are held accountable for managing their inventories. At the facility level, processes have been implemented (e.g., laboratory space management, landlord-tenant agreements, and use of checklists) to ensure that employees properly dispose of any excess hazardous materials before transferring to another position or terminating employment and when ownership of laboratory space is transferred. Although implementation of a laboratory space management program at one site was observed to be a positive step for controlling the accumulation of excess legacy materials, some aspects of the program have not been implemented effectively because roles, responsibilities, authorities, and accountabilities for laboratory space managers are not clearly defined, contributing to instances where legacy hazards within facilities were not addressed. For example, some floor panels were left open in a vacated area of a facility that formerly housed computers and was being cleaned out, exposing a carbon dioxide (CO_2) fire suppression system; an inadvertent release of CO_2 from the system could lead

Exposed CO_2 Fire Suppression System

to injuries or fatalities due to asphyxiation. This situation demonstrates the need for having clearly defined roles and responsibilities for addressing workplace hazards for individuals who oversee work performed in areas with legacy materials.

Positive Attributes

Active involvement of DOE and contractor management has resulted in the implementation of programs and processes that are effective in addressing a number of legacy hazards and environmental vulnerabilities. At ORNL, a Legacy Materials Disposition Initiative program was identified as a noteworthy practice for identifying, characterizing, and removing legacy items while using rigorous controls to ensure safety. At LLNL, senior management has made a strong commitment to reducing legacy hazards through institutional initiatives and the Ten Year Comprehensive Site Plan. As part of that commitment, LLNL senior management has established an Institutional Facilities Management organization that is used effectively to manage the removal of legacy materials from the site. At LLNL, a laboratory space tax, restrictions on creating new space, and ES&H considerations have been effective in reducing legacy hazards and promoting reuse of space.


Legacy Materials Properly Labeled

Opportunities for Improvement

DOE site offices need to strengthen oversight of site contractor management of legacy hazards. Legacy hazards are not always included in regular reviews and operational awareness documents. Further, the site's implementation plans and associated procedures do not provide for adequate oversight of the site contactor's management of legacy hazards.

Institutional processes aimed at managing chemical hazards need to be improved. Systems to track site chemical inventories—ultimately intended to prevent the accumulation of hazardous legacy chemicals in facilities and laboratories—have not been fully implemented and were being upgraded at the time of the OA inspection. Increased management attention is needed to ensure complete and timely implementation so that these systems can be effectively used to perform their intended function. One important needed enhancement is to establish mechanisms to strengthen program owner accountability for management of chemicals. In addition, some aspects of institutional space management and landlord-tenant agreements need to be strengthened by extending annual space management training to tenants and facility managers and including a discussion of the roles, responsibilities, authorities, and accountabilities of space managers, tenants, and facility managers for preventing the accumulation of hazardous materials in facilities and laboratories.

2.3 Legacy Facility Disposition

DOE Line Management Organizations. DOE line management organizations have made progress and have been effective in identifying site issues related to deactivation and disposition of legacy facilities, and providing effective oversight of facility disposition processes with respect to deactivation and disposition of facilities. Site offices have provided appropriate direction to contractors, based on program office guidance, and tracked progress through monthly progress reports and project walkdowns.

However, disposition of legacy facilities at some sites has presented management challenges because of: 1) unclear responsibilities among DOE program offices for implementing disposition and transfer processes for excess facilities, 2) the lack of agreement on funding responsibilities for addressing legacy hazards, and 3) poorly documented processes within some program elements. As a result, not all environmental and safety hazards have been adequately addressed. Program offices have not reached consensus on funding activities to address legacy hazards within some buildings. Without this consensus, environmental and safety hazards remain to be addressed because of undefined responsibilities for funding.

EM and SC have not established a process for the transition of several waste treatment facilities and waste management programs. For example, EM proposed transferring liquid and gaseous low-level waste treatment facilities at SC sites to SC, along with the program for newly generated waste. Although this situation does not pose any immediate environmental impacts and the site office continues to actively pursue resolution of this issue, EM and SC have not agreed upon a firm transfer date. At the same site, EM has not accepted a number of legacy-contaminated buildings that SC submitted before an EM-imposed deadline, including a Quonset Hut Complex consisting of World War II-era buildings with peeling paint chips that contain

Deteriorated Quonset Hut

PCBs. SC has restricted the use of the Science Laboratories Infrastructure program funds to non-contaminated buildings, leaving responsibility for these contaminated buildings unresolved. Although some actions have been taken to control these paint chips, sediment samples from the storm drains that serve these buildings exceeded the Federal Facilities Compliance Agreement action levels for PCBs in 1999 and 2002. The Environmental Protection Agency has been informed that the buildings are scheduled to be demolished, but funding for this work is uncertain.

Sites with multiple program facility owners have hazardous legacy facilities with no disposition path identified for their removal. This is attributed to insufficient clarity in ownership of these facilities and acceptance of funding responsibilities for their disposition. Questions about program office ownership of legacy facilities have left legacy hazardous facilities with no disposition path for their deactivation and removal. In one instance, SC funds were used for cleanout of several large buildings used by the DOE contractor to facilitate transfer to NNSA. NNSA has since decided not to accept liability for these contaminated buildings, but because part of the contamination in these buildings predated SC-funded activities, responsibility for demolition remains unresolved. Another facility that was originally used for a Defense Programs function is currently assigned to the Office of Nuclear Energy, Science and Technology (NE), which previously used some of the equipment. Although EM has responsibility for funding surveillance and maintenance of a portion of the equipment and infrastructure in the building, EM's role in eventual deactivation and disposition of the building has not been defined. In yet another instance, ownership and responsibility for the removal of certain legacy materials, such as chemicals and welding gases abandoned in place without the necessary hazard controls, remain in dispute between SC and NNSA.

DOE Contractors. The framework for addressing disposition of legacy facilities is in place. DOE contractors have established effective institutional processes and programs for the deactivation and disposition of these facilities.

A Facilities Disposition program at one site has been used effectively to identify, prioritize, and disposition excess facilities using available funding provided by SC, the DOE Headquarters Health and Safety Initiative, and laboratory overhead. Disposition activities for excess facilities have been prioritized using a process that considered risk reduction, results of condition assessment surveys, potential cost savings, and mission impact. A relatively recent initiative, an "AREA Closure" unit concept, has been developed to help prioritize legacy hazard management and cleanup priorities as part of EM's reengineering of management priorities. All "AREAs" are identified on an integrated schedule for sequencing closure activities. Sitewide priorities reflect the future need for facilities and consider the fact that many "AREAs" identified for eventual closure still house ongoing or planned operational activities to support cleanup. Approximately 250 buildings identified for deactivation and disposition have been surveyed to determine legacy hazard issues and to further establish needed priorities.

An institutional facility deactivation and disposition process is being used effectively to reduce legacy hazards at another site. That process involves an annual identification and risk ranking of projects for removing legacy facilities or materials from within those facilities. The program owner of the facility has been assigned responsibility for removing legacy materials and implementing related requirements, and the requirements must be met before the institutional organization accepts responsibility for final facility disposition. Once accepted, the institution holds the

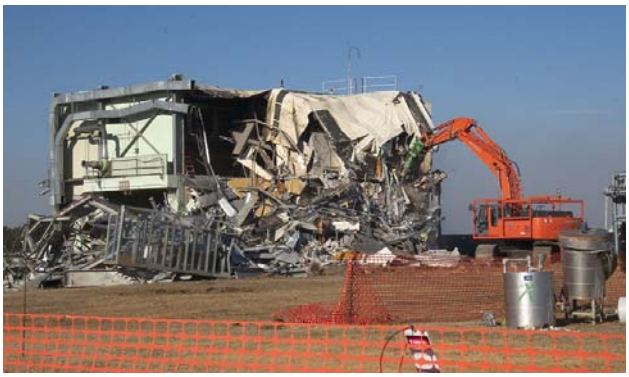
facilities for reuse or ultimate demolition. This process has been effective and has resulted in disposition of 150 excess facilities, representing 400,000 square feet of space, over the past ten years.

OA reviewed certain requirements of DOE Order 430.1B, including the Facility Condition Assessment program, to determine whether they have been adequately implemented. Facility condition assessment surveys have been performed at frequencies that meet DOE Order 430.1B requirements. The results of these surveys were used as one factor in determining whether a facility was accepted into the site's disposition process, and have been effective in preventing the creation of future hazardous legacy facilities. These surveys also identified some ES&H-related hazards, such as PCBs, lead paint, and asbestos.

Although much progress has been made in establishing the necessary framework for disposition of legacy facilities, some challenges remain. Some aspects of facility disposition programs, such as program plans and procedures, have not been formalized. The core functions of ISM have not been incorporated within facility deactivation planning or surveillance and maintenance activities. Furthermore, surveillance and maintenance plans have not been developed and implemented for facilities awaiting deactivation and disposition. As a result, ES&H hazards remain without sufficient controls in place. In addition, facility condition assessment surveys did not identify some legacy hazards associated with hazardous chemicals and radiological materials.

Positive Attributes

DOE contractors have established effective institutional processes and programs for the deactivation and disposition of facilities. Processes are in place at ORNL and LLNL and are being used effectively to identify, prioritize, and disposition excess facilities. Risk ranking processes that consider risk reduction, results of condition assessment surveys, potential cost savings, and mission impact are effectively applied to prioritize disposition of excess facilities.



Deactivation and Dispositioning Activities

As part of EM's reengineering of management priorities, SRS implemented the "AREA Closure" concept as a useful means of prioritizing legacy hazard cleanup projects.

Facility condition assessment surveys have been performed as required by DOE Order 430.1B and are being used to prevent the creation of future hazardous legacy facilities. Facility condition assessment surveys have been performed at frequencies that meet DOE Order 430.1B requirements at the sites that OA reviewed. The results of these surveys have been used effectively for disposition planning at ORNL and LLNL.

Opportunities for Improvement

Program offices need to coordinate efforts and develop a comprehensive strategy for reaching consensus on the disposition and transfer of excess facilities and the funding of activities to address legacy hazards at sites where multiple program offices have facility responsibilities. At two sites, various program offices (e.g., SC, EM, NE, and NNSA) have responsibilities for dispositioning and transferring facilities that are no longer needed, for addressing legacy contamination and demolition, and for funding. However, these organizations have not reached agreement on assignment of these responsibilities and how they are to be carried out. As a result, buildings with multiple owners contain environmental and safety hazards that are not being addressed.

Site contractors need to review and strengthen processes for conducting surveillance and maintenance activities for deactivated facilities to ensure that they do not pose undue ES&H risks. Surveillance and maintenance plans are not always formalized and effectively implemented. As a result, several excess facilities have deteriorated and pose environmental vulnerabilities. In one instance, the roles, responsibilities, authorities, and accountabilities for developing and implementing surveillance and maintenance activities have not been established. ES&H subject matter experts do not always conduct regular walkthroughs of deactivated facilities to ensure that the existing hazard controls and surveillance and maintenance plans are adequate.

Site contractors need to ensure that plans and processes for addressing legacy hazards and the disposition of facilities no longer having mission requirements are formalized and include ISM. Facility disposition program plans, procedures, and performance expectations have not been formalized as required by DOE Order 430.1B. In addition, procedures for conducting surveillance and maintenance activities at excess facilities have not been prepared, nor has ISM been considered as part of these activities. Plans describing how the contractor is to identify, manage, and integrate all initiatives involving legacy hazards have not always been prepared.

Site contractors need to continue efforts to identify and remove longstanding legacy hazards in and around facilities. Although sites have processes in place to address legacy hazards, hazards still remain in or around some facilities, or the facilities themselves represent hazards that have not been addressed. In some instances, these deficiencies are attributable to an ineffective surveillance and maintenance program or insufficient management walkthroughs.

2.4 Environmental Legacy Hazards

OA evaluated restoration/remediation actions at two sites. Past activities have resulted in groundwater contamination from industrial solvents, fuels, and PCBs. Although the site office and the site contractor have addressed these environmental hazards using systematic approaches, PCBs continue to pose a compliance problem. NNSA and EM have not determined funding responsibility for further mitigating PCB releases in a timely manner to address the current exceedences of environmental requirements.

At another site, final negotiations are in progress with State regulators for approval of the proposed closure concept. However, the concept for long-term restoration and stewardship presented in the *Risk-Based End States Vision* document is being revised concurrently to address feedback from EM Headquarters to more clearly depict the methodology and endpoints for site closure, including the basis for the cleanup endpoints. Therefore, this document has not been introduced into the negotiation, so the State's acceptance of and/or concerns about the concept could not be evaluated. A key aspect of the long-term plan is a decision that the Federal government will be the owner and operator of the site for the long term (greater than 300 years). If this decision is made, the cleanup endpoints will be determined on the assumption that the land will not be open to the public, but controlled by the government, and that cleanup would therefore not be as extensive.

Positive Attributes

Legacy environmental concerns about groundwater contamination are well characterized and are being addressed to prevent offsite regulatory limit exceedences. Past operations at several DOE sites used PCBs, fuels, and solvents under conditions that were not effective in preventing their release to the ground in and around facilities. As a result, several locations have been identified where the groundwater is contaminated, and a pump and treat system is used to control this slowly moving contamination. Sampling data and analyses generally indicate that contaminated groundwater has not moved beyond the site's boundaries at concentrations above regulatory limits.

Opportunities for Improvement

DOE Headquarters organizations need to resolve conflicting positions for ensuring continued environmental compliance at sites where restoration/remediation funded work may not have fully eliminated environmental impacts. This situation occurred at a site where several lateral pipes for the roof drains go under the buildings and transfer collected rain water to permitted storm water surface discharge points. Because the aging pipes are no longer watertight, PCB-contaminated groundwater can enter the pipes, mix with rain water, and reach the

PCB Sampling in Storm Water Outfall

discharge point at PCB concentrations above the discharge limit. EM has funded several restoration projects (e.g., lining some underground pipes) that reduced contamination in the discharge. However, since these actions were completed, a more restrictive standard has been imposed, thus changing the permitted limit and sampling method. The more restrictive standard, along with a reduction in the amount of potable water entering the storm water, resulted in several more recent instances where the new limits were exceeded. At the time of the OA inspection, legal actions by the State's department of natural resources had resulted in two Notices of Violations and discussions between the State, the Department of Justice, and DOE legal staffs on additional enforcement actions, including a proposed Consent Judgment under the State's clean water act. EM stated that additional funds for mitigating the PCB exceedances are outside the scope of restoration and would not be funded. The Headquarters organization for this site does not concur with EM's position that mitigating the PCB exceedances is a stewardship responsibility. While this situation occurred at one site, similar problems could occur at other sites. A Headquarters strategy for transitioning long-term stewardship for legacy environmental concerns is needed to ensure that sites can meet environmental discharge and/or release requirements as EM-funded activities transition to line organizations at the sites.

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3.0 Conclusions

The four sites that were reviewed have processes in place to treat and/or dispose of currently generated waste effectively and in a timely manner. As a result of well-managed current waste streams and pursuit of pollution prevention actions, the four sites are preventing the creation of future legacy hazards. The sites with significant amounts of legacy waste have implemented programs to significantly reduce and/or dispose of their waste. However, OA identified a potential complex-wide vulnerability in environmental compliance involving the need for processes to ensure the timely disposition of hazardous waste held in SAAs after the generating activity has terminated, which will require additional management attention. Due to the lack of effective planning processes, facilities and infrastructure necessary for the disposition of some legacy wastes are not in place at some sites.

DOE and contractor management have made good progress in implementing institutional initiatives and processes aimed at reducing legacy hazards within facilities and addressing environmental vulnerabilities. Several initiatives have been effective in managing legacy hazards within available funding. However, several actions have been identified that would improve management of legacy hazards; these include completion of planned enhancements to existing chemical inventory systems and strengthening of space management programs/landlord-tenant agreements as mechanisms for preventing the accumulation of hazardous legacy materials in the future. Although most sites have implemented programs to identify and characterize legacy beryllium areas, the rigor of these programs varies considerably among DOE contractors, and thus, legacy beryllium contamination has been identified as part of a beryllium program focus area for OA inspections in calendar year 2005. The aforementioned initiatives could be further strengthened by incorporating legacy hazards management within site office operational awareness activities, consistent management attention to legacy hazards at the facility level in support of institutional initiatives, and improved documentation.

DOE and contractor managers have established effective institutional processes and programs for the deactivation and disposition of facilities. A Facilities Disposition program at ORNL has been used effectively to identify, prioritize, and disposition excess facilities. LLNL has implemented an institutional facility deactivation and disposition process and uses it to reduce legacy hazards and free up facility space for reuse. Facility condition assessment surveys have been performed in accordance with DOE Order 430.1B requirements. Although significant progress has been made in addressing disposition of facilities, several challenges remain. Sites with multiple DOE program office facility owners have hazardous legacy facilities with no disposition path identified for their transfer or removal, in part because of the need for program offices to better coordinate efforts and develop a comprehensive strategy for reaching consensus on the disposition and funding of activities to address these legacy hazards. Other areas for improvement include the need for site contractors to review and strengthen surveillance and maintenance processes for deactivated facilities, ensure that facility disposition plans and processes are formalized and incorporate ISM principles, and ensure that hazards in or around facilities are identified and removed through effective management walkarounds.

Restoration/remediation programs have been effective at the two sites where OA reviewed those programs. However, uncertainty in responsibility for managing legacy contamination needs to be resolved at one site to address current exceedences of discharge limits. At another site, negotiations with State regulators are in progress, but because the negotiations do not include the concept of using long-term DOE ownership requiring less remediation, the State's acceptance and the resulting path forward cannot be evaluated. The implementation of long-term stewardship represents a possible area for evaluation by OA in the future.

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