

STABILIZATION AND DISPOSITION OF EXCESS FACILITIES AND DOE'S LIFE CYCLE ASSET MANAGEMENT ORDER

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ABSTRACT

A major revision to DOE Order 430.1A, LIFE CYCLE ASSET MANAGEMENT (LCAM) (1) was approved on October 14, 1998, and now more specifically addresses the requirements for the disposition of radiologically and/or hazardous chemically contaminated facilities that have been declared excess to DOE programs. The overall purpose of the Order revision was to establish a more appropriate set of requirements for facility disposition activities. The disposition activities include stabilization, deactivation, and decommissioning, as well as the surveillance and maintenance (S&M) necessary to maintain the excess facility in a stable condition as disposition proceeds. Also included is a process for transferring facilities from operating programs to the Office of Environmental Management. These requirements, along with others previously included in LCAM, help to ensure that the activities conducted during the phases of a facility's life-cycle are conducted as an integrated and seamless process through its final decontamination and decommissioning.

The requirements for stabilization and disposition were partially derived from DOE Order 5820.2A, RADIOACTIVE WASTE MANAGEMENT, Chapter V, DECOMMISSIONING OF RADIOACTIVE CONTAMINATED FACILITIES (2) and DOE Order 4330.5, SURPLUS FACILITY TRANSFER (3) as well as experience gained and practices established during stabilization/deactivation conducted since 1993. This effort was part of a continuing effort to consolidate and update old Order requirements. In addition, experience gained to date from projects that have been successful in meeting the stabilization and deactivation requirements has been beneficial in the development of guidance and examples of methods, practices, and procedures that can be used to implement these requirements now contained in LCAM. Strategic approaches have been developed in an effort to unify the implementation of these requirements through the efforts of the National Decommissioning Committee and the National Facilities Deactivation Initiative (NFDI), both managed by the Office of Environmental Management.

INTRODUCTION

DOE Order 430.1, LIFE CYCLE ASSET MANAGEMENT, (LCAM) (1) was originally issued August 24, 1995 in response to the Department's Directives Streamlining Initiative. Its purpose was to move the DOE towards a performance-based approach to managing its physical assets, while eliminating unnecessary and expensive compliance requirements. The LCAM Order replaced 13 DOE Orders on management of projects and fixed assets through their life-cycle, addressing project management, facilities maintenance, real property management, utilities management, and other aspects of fixed asset acquisition, operations and disposition. Less than four pages of requirements were included in the original LCAM Order, including the requirement

that performance measures based on best industry practices were to be used, graded to the value and importance of the project or facility. These high-level, performance-based requirements replaced several inches of detailed requirements. The 13 orders would remain in effect during a transition period, but would be phased-out and canceled as DOE sites implemented the LCAM Order and adopted performance objectives and measures tied to the requirements.

The Defense Nuclear Facilities Safety Board (DNFSB) expressed its concern that in DOE's streamlining of its orders important nuclear safety requirements should be captured in new orders or regulations. DOE committed to the DNFSB that the LCAM Order would be revised to address their concern. Also, as DOE gained experience in planning and conducting work involving the disposition of DOE contaminated excess facilities, it became apparent that the original requirements in LCAM needed to be revisited. Although the methods for construction and operation of facilities across the complex were generally well understood, the Department's experience with disposing of contaminated facilities was more limited, albeit increasing. Clearly, more specific requirements and guidance for the stabilization of materials and the transfer, deactivation, decommissioning and continuing surveillance and maintenance of facilities needed to be included. Requirements for the stabilization, deactivation and decommissioning of facilities were among the most significant changes to the Requirements Section of LCAM during this revision. These requirements were derived from DOE Order 5820.2A, RADIOACTIVE WASTE MANAGEMENT, Chapter V, DECOMMISSIONING OF RADIOACTIVE CONTAMINATED FACILITIES (2) and DOE Order 4330.5, SURPLUS FACILITY TRANSFER (3).

The Office of Field Management, which initiated the original LCAM Order, served as facilitator during the LCAM revision, while the Office of Environmental Management provided technical expertise on stabilization, deactivation and decommissioning issues. A team approach was used to revise the LCAM Order and develop appropriate implementation guidance, including representatives from Defense Programs, Science (formerly Energy Research), Nuclear Energy, Environment, Safety and Health, various field offices and contractors. Early recognition was given to concerns expressed by the DNFSB regarding the integration of safety management practices and the need for a seamless process for proceeding from operations to disposition of contaminated excess facilities. The DOE Directives System was used to solicit and resolve comments from across the complex on the draft requirements and guidance.

As the review process progressed, considerable effort was made to ensure that the revision to LCAM incorporated all appropriate requirements for the disposition of excess facilities. For example, a requirement for the application, as appropriate, of guidelines contained in DOE Technical Standard DOE-STD-1120-98, INTEGRATION OF ENVIRONMENT, SAFETY, AND HEALTH INTO FACILITY DISPOSITION ACTIVITIES (4) was included so that LCAM did not lose sight of important safety requirements. This requirement, along with others, helped to ensure that the disposition of excess facilities was conducted as an integrated and seamless process from operations through its final decontamination and decommissioning.

LCAM IMPLEMENTATION GUIDES

As the requirements for facility disposition became clear, it was determined that it was necessary to also develop a series of LCAM implementation guides for the transfer of an excess facility and the various stages of disposing of contaminated excess facilities. Since many of these activities were new and outside the scope of routine operations and maintenance, focused methodologies and safety precautions would help in the execution of the work tasks.

Four LCAM Implementation Guides have been developed in accordance with the requirements of the DOE Directives system. DOE G 430.1-2, SURVEILLANCE AND MAINTENANCE DURING FACILITY DISPOSITION (5); DOE G 430.1-3, DEACTIVATION IMPLEMENTATION GUIDE (6); and DOE G 430.1-4, DECOMMISSIONING IMPLEMENTATION GUIDE (7) were developed to address the LCAM requirements for disposition of contaminated facilities. DOE G 430.1-5, TRANSITION IMPLEMENTATION GUIDE (8) provides implementing guidance for those activities performed prior to the end of facility operations and/or during transition to disposition in order to ensure facility safety and to expedite future disposition.

As part of the Departmental directives system, all Guides are consistent with the principles and core functions of DOE Policy 450.4, SAFETY MANAGEMENT SYSTEM POLICY (9) and present acceptable methods for implementing the requirements specified in LCAM. All four of these guides will be approved and distributed in the near term.

The requirements contained in LCAM applicable during all phases of stabilization, transfer and disposition of contaminated excess facilities are depicted in Table I.

Table I B Requirements Applicable to All Phases

Use a value-added, quality driven, graded approach to life-cycle asset management.
Ensure application of guidelines contained in DOE-STD-1120-98, INTEGRATION OF ENVIRONMENT, SAFETY AND HEALTH IN TO FACILITY DISPOSITION ACTIVITIES.
Maintain complete, current inventories of the DOE physical assets.
Ensure that all applicable Federal, state, and local laws, regulations, and negotiated agreements; safeguards and security and ISM requirements and policies are followed.

STABILIZATION and TRANSFER

In preparation for the disposition phase of a facility's life-cycle, it's important that material and system/infrastructure stabilization activities, aimed at a continuum of risk reduction, be initiated prior to the end of facility operations or as soon as a facility has been declared excess. To establish safer conditions, a *stabilization campaign* at the end of operations is prudent in many cases for facilities containing radiological and/or hazardous chemical materials, either in inventory or as holdup in areas such as equipment, pipelines and filters. For example, a process/equipment clean-out run may be appropriate in order to either process quantities of radioactive or chemically reactive liquids, to clear process systems, or remove nuclear fuel for the purpose of clearing a storage area.

The LCAM requirements specific to the transfer of the contaminated excess facility and stabilization activities are depicted in Table II. DOE G 430.1-5, TRANSITION IMPLEMENTATION GUIDE (8) was specifically developed to provide implementation guidance for these requirements and others specific to the "transition" of contaminated excess facilities. Completion of these activities at this time in the facility's life-cycle can take advantage of facility operational capabilities before they are lost, reducing risks in a more efficient, cost-effective manner. Lessons learned from a joint DOE Program Office team review of actions necessary to facilitate a smooth transfer of contaminated excess facilities to EM aided in the development of the Transition Implementation Guide. Additional lessons learned from the

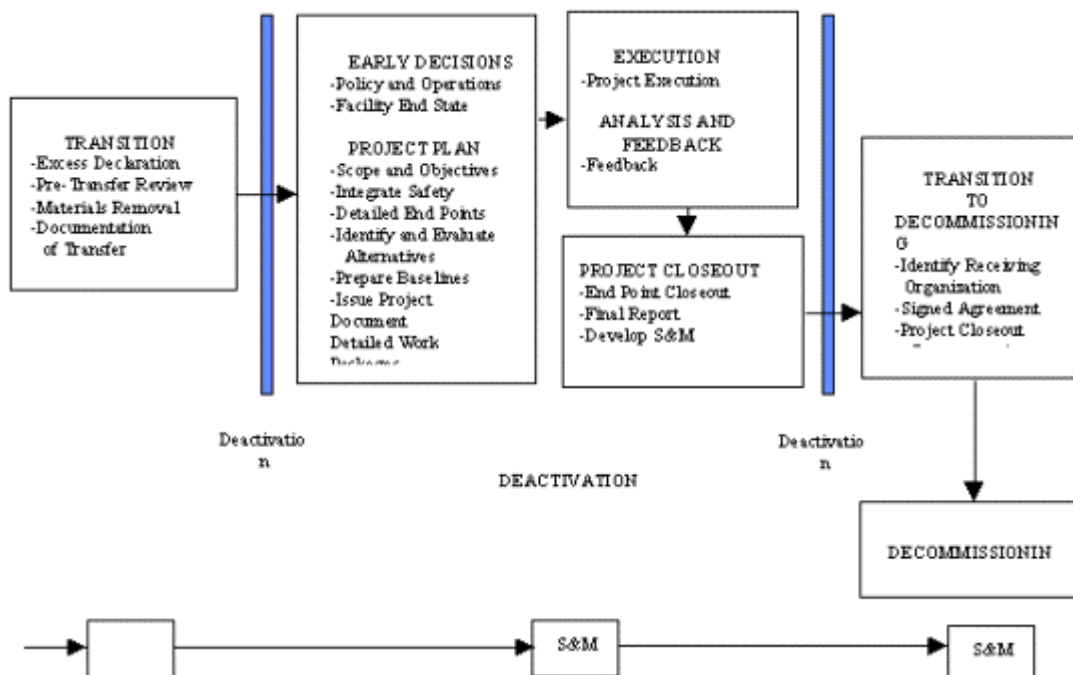
transition and disposition of numerous DOE facilities such as Fernald, Hanford and Rocky Flats Environmental Technology Site have shown that many aspects of disposition can be positively influenced by the condition in which final operations leave the facility.

Table IIB Stabilization and Transfer Requirements

Identify, inventory, and periodically assess the condition of physical assets.
Place the facility, systems, and materials in stable and known conditions based on an assessment of the remaining hazards at the time when mission activities are completed.
Identify and characterize hazardous and radioactive materials and wastes remaining in systems/facilities and provide for their stabilization, adequate storage and removal.
Assess and adjust (if necessary) the facility authorization basis to ensure it continues to reflect conditions in the facility pending disposition.
Conduct S&M activities required to maintain the facility and remaining hazardous/radioactive materials, wastes and contamination in a stable and known condition pending facility disposition.
Identify and allocate resources needed to maintain stable and known conditions pending disposition.
Identify a method whereby land and facilities are transferred to other Program Offices, or are determined excess, available for disposal, and disposal procedures initiated.
Transfer the appropriate funding and budget target to the receiving program on the first October 1, after the two year anniversary of the date the receiving organization is notified.
Complete a Pre-Transfer Review, with participation by EM and EH, for transfer of facilities for disposition whose scope shall be commensurate with the existing hazards.
Develop a signed agreement to document scope, conditions, state of readiness, and associated funding, when transferring facilities between Program Offices.

DISPOSITION

The Department of Energy (DOE) faces an enormous task in the disposition of the nation's contaminated excess facilities. Many of these facilities are large and complex and contain many and varied radiological and/or hazardous chemical substances. In addition, many excess facilities are generally old (40 plus years), have outlived their general design criteria and require significant expenditure of resources in order to maintain the safety envelope and to prevent undesired contamination and health and safety occurrences. The disposition phase of a facility's life-cycle, which occurs once it has been declared excess to any current or future DOE mission, usually includes deactivation (including any remaining stabilization), decommissioning, and continuing surveillance and maintenance (S&M) activities. The flowchart in Figure 1 depicts the elements of the disposition phase.



Disposition Phase - Figure 1

The flowchart identifies the steps necessary to minimize existing risk and to safely complete the disposition of a contaminated excess facility. It indicates the system boundaries during the transition of a facility that distinguish the deactivation activities from those required prior to, and after, deactivation. It, also, includes activities that will be completed after the closeout of all deactivation activities to prepare the facility for decommissioning or a continued S&M status awaiting eventual decommissioning.

Decommissioning is typically the final facility disposition activity. At this time the facility is taken to its ultimate end state, through decontamination and/or dismantlement to demolition or entombment. After decommissioning is complete, the facility or surrounding area may require DOE control for protection of the public and the environment or for environmental remediation.

Throughout stabilization and the facility disposition phase, S&M activities are performed to monitor the status or condition of structures, systems and components; and document the presence and adequately contain hazards associated with the facility. S&M is adjusted as transition, deactivation or decommissioning activities are completed. S&M programs incorporate safety management at all levels so that these activities are accomplished while protecting the worker, the public and the environment. S&M activities are based upon the parameters established in the facility authorization basis and support the facility's safety envelope.

DEACTIVATION OF FACILITIES, SYSTEMS AND EQUIPMENT

Following operational shutdown and stabilization, the first disposition activity, usually, is to deactivate the facility. Deactivation is defined by LCAM as the process of placing a facility in a stable and known condition including the removal of hazardous and radioactive materials to ensure adequate protection of the worker, public health and safety, and the environment, thereby limiting the long-term cost of surveillance and maintenance. Actions include the removal of fuel, draining and/or de-energizing nonessential systems, removal of stored radioactive and hazardous

materials, and related actions. Deactivation does not include all decontamination necessary for the dismantlement and demolition phase of decommissioning, e.g., removal of contamination remaining in the fixed structures and equipment after deactivation.

The deactivation mission is to place a facility in a safe shutdown condition that is economical to monitor and maintain for an extended period until the eventual decommissioning of the facility. Deactivation serves as the bridge between operations and decommissioning. Deactivation can accomplish various activities, placing the facility in a low-risk state with minimum S&M requirements.

The requirements in LCAM intended to address deactivation activities are depicted in Table III. DOE G 430.1-3, DEACTIVATION IMPLEMENTATION GUIDE (6) is intended to provide guidance to address these requirements. Other directive system documents that should be consulted to support the planning and conduct of deactivation activities and ensure the incorporation of an integrated safety management approach include: DOE-STD-1120-98, INTEGRATION OF ENVIRONMENT, SAFETY, AND HEALTH INTO FACILITY DISPOSITION ACTIVITIES (4), and the good practice guides associated with the LCAM Order. These documents and this Guide provide acceptable methods for fulfilling requirements of disposition in a facility's life-cycle, and assists project and facility managers in developing and implementing effective deactivation activities at DOE excess facilities.

Table III B Deactivation/Decommissioning Requirements

Ensure that deactivation and decommissioning activities are appropriately planned, conducted, and documented in a manner consistent with the guiding principles and core functions of the Department's integrated safety management and facility disposition policies.
Update the baseline data to support a physical, chemical, and radiological characterization, as necessary, to reflect changes in facility conditions during the disposition process.
Identify, assess and evaluate alternatives for deactivating and/or decommissioning and for selecting and documenting a preferred alternative.
Provide for an end-point process in deactivation and decommissioning planning that identifies specific facility end-points and activities needed to achieve those end-points.
Provide for detailed engineering planning and for plan documentation to execute the preferred deactivation and/or decommissioning alternative.
Develop a final report, or equivalent document, for each deactivation and/or decommissioning project unless deactivation and decommissioning are conducted as a single, uninterrupted activity then only one final report is required.

DECOMMISSIONING

DOE has developed a decommissioning framework that implements the requirements of the Decommissioning Policy and the requirements that the LCAM Order places on decommissioning activities. This model for decommissioning DOE facilities has been designed explicitly to accommodate all types of regulatory scenarios under which decommissioning can be initiated.

The decommissioning framework, which is the focus of and DOE G 430.1-4, DECOMMISSIONING IMPLEMENTATION GUIDE (7), is modeled after the process for conducting CERCLA non-time-critical removal actions, as specified in the National Contingency Plan. However, the basic framework is flexible enough to accommodate all DOE decommissioning projects, regardless of the statute, authority, or management decision that initiates the project.

A decommissioning project may be initiated by a variety of circumstances, including:

- Determination that a release or substantial threat of release to the environment is present, and a removal action under CERCLA is appropriate;
- Implementation of a decommissioning plan approved by the Nuclear Regulatory Commission (NRC), with the objective of termination of an NRC license;
- Decommissioning in accordance with a Resource Conservation and Recovery Act (RCRA) permit or order; and
- DOE programmatic management decision to proceed with the disposition of a surplus facility.

The decommissioning framework satisfies the requirements of these potential drivers, as well as the asset management specifications of LCAM and integrated safety management requirements.

LCAM requires that decommissioning use a Non-Time-Critical Removal Action as the approach

for decommissioning, using the tailored process negotiated with the Environmental Protection Agency, with continued Defense Nuclear Facilities Safety Board oversight to the extent authorized by law. The remainder of the LCAM requirements intended to address decommissioning activities is shown in Table III.

CONCLUSION

An important objective throughout transition and disposition is to continue to maintain an integrated and seamless process linking deactivation, decommissioning and S&M with the previous life-cycle phases. Application of the graded approach to stabilization, deactivation and other disposition requirements of the LCAM Order provides flexibility. One size does not fit all, and the analysis, work scope and performance targets to disposition contaminated excess facilities will vary with the site conditions as well as the value and importance of the task. The graded approach and focus on performance helps ensure that appropriate, site-specific actions are taken for a particular facility. The DOE LCAM Guides and DOE Technical Standard illustrate and provide more detail on acceptable approaches for implementing the LCAM requirements, and aim to ensure that all DOE facility disposition activities consider the health and safety of workers, the public and the environment as an integral and visible element.

REFERENCES

- 1) DOE O 430.1A, LIFE CYCLE ASSET MANAGEMENT, Revised October 14, 1998
- 2) DOE Order 5820.2A, RADIOACTIVE WASTE MANAGEMENT, Chapter V, DECOMMISSIONING OF RADIOACTIVE CONTAMINATED FACILITIES
- 3) DOE Order 4330.5, SURPLUS FACILITY TRANSFER
- 4) DOE-STD-1120-98, INTEGRATION OF ENVIRONMENT, SAFETY, AND HEALTH INTO FACILITY DISPOSITION ACTIVITIES, May 1998
- 5) DOE G 430.1-2, SURVEILLANCE AND MAINTENANCE DURING FACILITY DISPOSITION
- 6) DOE G 430.1-3, DEACTIVATION IMPLEMENTATION GUIDE
- 7) DOE G 430.1-4, DECOMMISSIONING IMPLEMENTATION GUIDE
- 8) DOE G 430.1-5, TRANSITION IMPLEMENTATION GUIDE
- 9) DOE Policy 450.4, SAFETY MANAGEMENT SYSTEM POLICY