Facility: DOE complex

Best Practice Title: Facility Cold & Dark/Deactivation Process Step Considerations

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Brief Description of Best Practice: This Best Practice (BP) tool can help Deactivation and Decommissioning (D&D) teams prepare a thorough Cold & Dark/Deactivation (C&D/D) plan to prepare a facility for demolition. A well-planned and executed C&D/D plan can reduce risks to cleanup workers and the public, and increase the confidence in delivering C&D/D projects on time and within budget. C&D/D can easily represent the greatest effort in a D&D project. The C&D/D plan workers implement can determine how successful both C&D/D work and post-C&D/D work will be. This BP and its implementation have multiple purposes.

- Outline an industry-proven process and key strategy considerations for conducting C&D/D on U.S. Department of Energy (DOE) facilities to prepare them for successful demolition and minimize the possibility of contaminating workers, the public, or the environment during or after C&D/D (e.g., during demolition and waste removal);
- Provide a "dictionary" of typical C&D/D activities for planners engaged in preparing C&D/D project scope, schedule, and cost baselines;
- Reemphasize the importance of surveillance and maintenance (S&M) rigor to maintain facility National Fire Protection Association 101[1®], *Life Safety Code*®, compliance until C&D/D is complete;
- Serve as a reference/training aid for engineers and technical work planners new to the C&D/D process;
- Leverage C&D/D lessons learned to reduce risks to C&D/D and demolition workers;
- Eliminate or significantly reduce S&M costs (fire protection [FP] inspections, etc.).

Why the Best Practice was used: This BP was used to reduce risk and help prevent adverse cost and schedule events during C&D/D and demolition.

What are the benefits of the Best Practice: Primary benefits include reduction in C&D/D project risks and reduction in adverse cost and schedule performance metrics during C&D/D and demolition.

What problems/issues were associated with the Best Practice: The C&D/D process steps must be tailored to each facility—a time consuming, highly skill-based task. More and more facilities are increasingly dilapidated and increasingly dangerous, posing

[1]Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

numerous threats to workers, the environment, and project success. Surprises tend to be the rule, not the exception.

How the success of the Best Practice was measured: Success is measured by the reduction in adverse, preventable demolition problems, and waste disposal events (e.g., electrical events, loss of contamination control events) due to shortcomings in C&D/D planning and execution. Success can also be measured by evaluating associated cost and schedule performance metrics (e.g., Cost Performance Index, Schedule Performance Index). Metrics could be tracked at the program or site level to track the effectiveness of this guidance.

Description of process experience using the Best Practice: These practices have been used successfully for years at multiple sites to plan and execute C&D/D activities leading to successful C&D/D and demolition and waste disposal projects.

CONTENTS

ACRONYMS

ACM	asbestos-containing material
ARAR	applicable or relevant and appropriate requirements
BP	best practice
C&D/D	Cold & Dark/Deactivation
CA	corrective action
CAAS	criticality accident alarm system
CAP	capital asset project
CA	corrective action
CD	critical decision
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
CX	categorical exclusion
D&D	deactivation and decommissioning
DOE	U.S. Department of Energy
DQO	data quality objective
EA	environmental assessment
EC	environmental compliance
EIS	environmental impact statement
EM	environmental management
EPA	U.S. Environmental Protection Agency
ES&H	environment, safety and health
FIMS	Facility Information Management System
FM	facility manager
FP	fire protection
GSA	General Services Administration
HSWA	Hazardous and Solid Waste Amendments of 1984
HUD	U.S. Department of Housing and Urban Development
IH	industrial hygiene
IS	industrial safety
ISM	integrated safety management
MOA	memorandum of agreement
NCS	nuclear criticality safety
NDA	nondestructive assay
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NF	nuclear facility
NHPA	National Historic Preservation Act
NMC&A	Nuclear Material Control and Accountability
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPTD	no path to disposal
OPS	Operations
PM	project manager
PPE	personal protective equipment
QA	quality assurance
RAD	Radiological
RA	remedial action
RCRA	Resource Conservation and Recovery Act of 1976
RP	radiological protection
S&M	surveillance and maintenance
S&S	safeguards and security

SAP	sampling and analysis
SB	safety basis
SCWE	safety conscious work environment
SME	subject matter expert
SWPPP	Stormwater Pollution Prevention Plan
TFHA	transitional fire hazard analysis
TRM	training requirements matrix
VPD&I	vent, purge, drain and inspect
WAC	waste acceptance criteria
WBS	work breakdown structure
WCP	waste characterization plan
WHP	waste handling plan
WM	waste management
WMin	waste minimization

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1. INTRODUCTION

1.1 Purpose

This Best Practice (BP) tool can help Deactivation and Decommissioning (D&D) teams prepare a thorough Cold & Dark/Deactivation (C&D/D) plan to safely prepare a facility for demolition. A well-planned and executed C&D/D plan can reduce risks to cleanup workers and the public, and increase the confidence in delivering C&D/D projects on time and within budget. C&D/D can easily represent the greatest effort in a D&D project. The C&D/D plan that workers implement can determine how successful both C&D/D work and post-C&D/D work will be. This BP and its implementation have multiple purposes.

- Outline an industry-proven process and key strategy considerations for conducting C&D/D on U.S. Department of Energy (DOE) facilities to prepare them for successful demolition and minimize the possibility of contaminating workers, the public, or the environment during or after C&D/D (e.g., during demolition and waste removal);
- Provide a "dictionary" of typical C&D/D activities for planners engaged in preparing C&D/D project scope, schedule, and cost baselines;
- Reemphasize the importance of surveillance and maintenance (S&M) rigor to maintain facility National Fire Protection Association 101®, *Life Safety Code*®, compliance until C&D/D is complete;
- Serve as a reference/training aid for engineers and technical work planners new to the C&D/D process;
- Leverage C&D/D lessons learned to reduce risks to C&D/D and demolition workers; and
- Eliminate or significantly reduce S&M costs (fire protection [FP] inspections, etc.).

DOE's inventory of facilities requiring application of the C&D/D process is large and diverse. Therefore, it is impractical to provide a planning and execution tool that addresses every conceivable situation and corresponding solution. Instead, this BP describes the general C&D/D process steps that typically should be followed. The success of any C&D/D effort depends on the quality of the C&D/D Project Team; the quality of their C&D/D planning; and their ability to execute the plan, quickly identify changed conditions, and then adjust to those changes promptly in a technically competent manner.

A key point is that a faulty C&D/D plan or faulty execution of a C&D/D plan is likely to manifest itself during demolition. Serious problems during demolition, such as loss of contamination control or waste disposal complications, can often be traced to poor C&D/D assumptions or shortcomings in C&D/D planning (e.g., wrong end points) and/or execution.

1.2 Applicability and Scope

a. This BP is applicable to C&D/D work on DOE nuclear and non-nuclear facilities.

b. This BP describes C&D/D activities often needed to prepare a DOE facility for a demolition end state.

c. Throughout this BP, the word “should” is often used to describe process steps; the C&D/D Project Team will need to clearly identify hard requirements (e.g., “must” versus “should”).

1.3 Overview

As shown in Figure 1, once planned, designed, and constructed, facilities are operated. When no longer needed, facilities may enter a transition phase where they are shut down and stabilized. Stabilization consists of implementing those actions necessary to maintain a facility in a stable condition while it awaits final D&D. Establishing and maintaining stable, passive conditions in the facility helps ensure protection of S&M and D&D workers, the nearby public, and the environment from hazards posed by radiological (RAD) conditions, chemical contaminants, and degraded physical structures. Further, stabilization eliminates the need to retain, or attempt to rehire/replace uniquely trained and qualified personnel for special process operations (such as system cleanouts and isolation) later during C&D/D. After stabilization, facilities can be prepared for demolition using this BP’s C&D/D guidelines, then be demolished and disposed. After their disposal, environmental remedial actions (RAs), removal actions, or corrective measures may be required on affected media (e.g., soils).

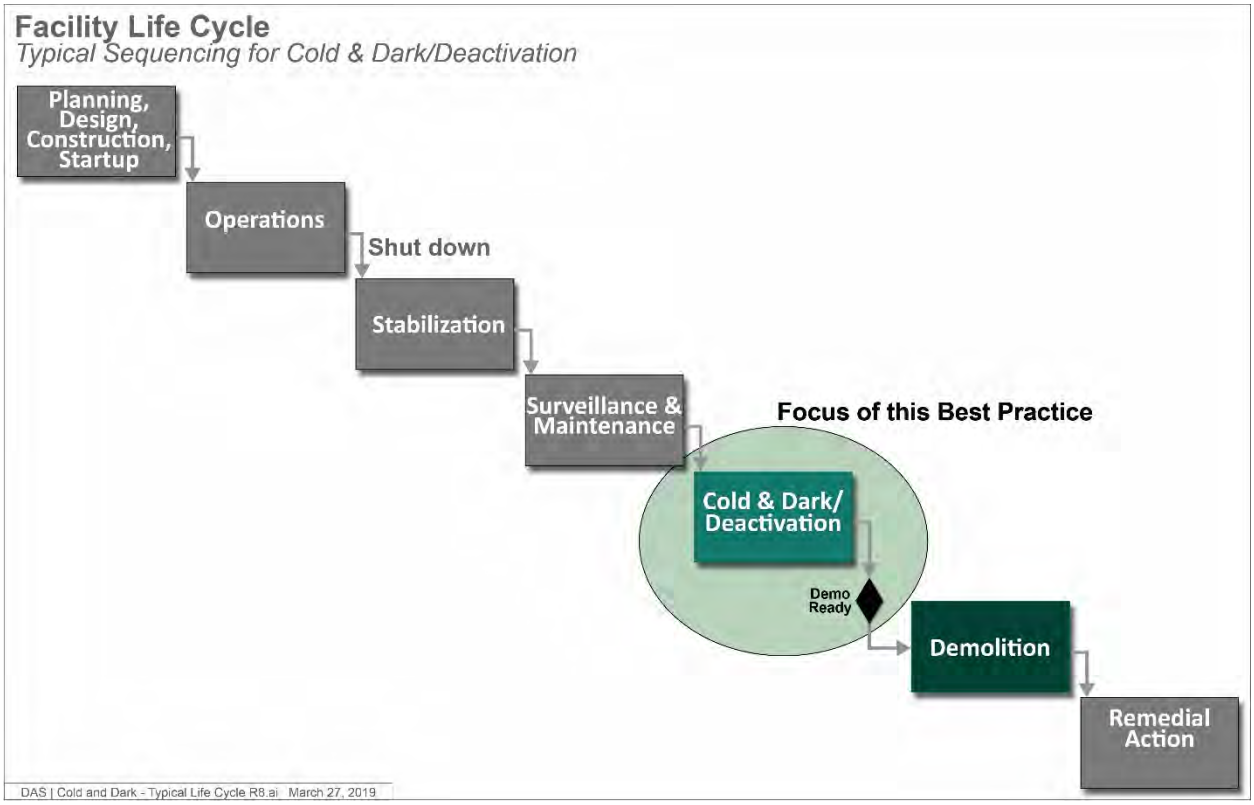

Figure 1. Cold & Dark / Deactivation in Facility Life Cycle.

The C&D/D process typically involves the following eight (8) steps (see Figure 2):

Step 1: Project Team Formation (e.g.,staffing the team with the right experience, diversity, and skill mix).

Step 2: Planning (e.g., understanding the regulatory framework and defining the scope, required C&D/D end state, end points, safety basis [SB] updates, and regulatory document updates).

Step 3: Safety/Hazard Evaluation & Improvements (identifying and addressing hazards to workers).

Step 4: Utilities Isolation (e.g., electrical, mechanical, energy).

Step 5: Characterization (e.g., nonintrusive and intrusive sampling for planning/scoping).

Step 6: Removals/Other Preparation Work (e.g., abatement, removals, and purging systems).

Step 7: Waste Disposal (e.g., package, load, and ship waste).

Step 8: Demolition-Ready Tasks (e.g., final tasks needed to prepare for demolition).

The work required for each step depends on the specifics of the facility undergoing C&D/D. Each C&D/D Project Team must identify the C&D/D activities required for each facility.

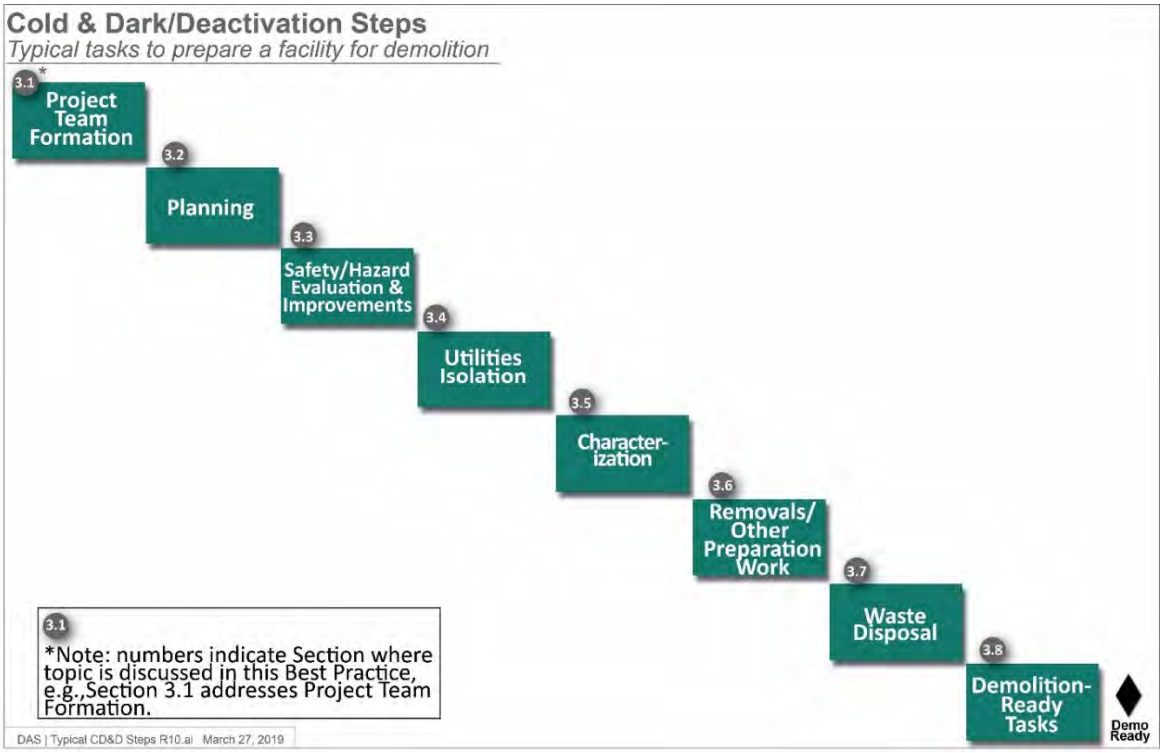

Figure 2. C&D/D Steps.

1.4 Use of BP

A multidiscipline team approach is needed for C&D/D. Candidates for C&D/D Project Team membership are discussed in Section 3.1, “Project Team Formation.”

1.5 Definitions

This section explains important terms used in this BP. To the extent practicable, standard definitions have been used. In some cases, the general definitions have been supplemented in order to explain more fully how the term is used in this BP. Brackets ([ ]) at the end of some definitions indicate the original source.

Abatement. Abatement refers to a controlled process to remove and dispose various hazardous materials from a building to allow demolition to proceed. Common materials that are abated during C&D/D include asbestos, lead, light bulbs, mercury switches, etc.

Applicable or Relevant and Appropriate Requirements (ARARs). Applicable requirements are defined as "cleanup standards, standards of control, and other substantive environmental protection requirements criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) site." Relevant and appropriate requirements are defined as "substantive environmental protection requirements…promulgated under Federal or State law that, while not 'applicable,' … address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site."

Cold & Dark (C&D). Often synonymous with Deactivation (although some sites may equate C&D with utilities isolation by itself).

Deactivation. 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 S&M. 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. [DOE Order (O) 413.3B, Chg. 5, *Program and Project Management for the Acquisition of Capital Assets*, Attachment 2, April 12, 2018]

Deactivation and Decommissioning (D&D). The dual phases of preparing a facility for demolition and then demolishing it and disposing the waste.

Decommissioning. Takes place after deactivation and includes S&M, decontamination and/or dismantlement. These actions are taken at the end of the life of a facility to retire it from service with adequate regard for the health and safety of workers and the public and for the protection of the environment. The ultimate goal of decommissioning is unrestricted release or restricted use of the site. [DOE Order (O) 413.3B, Chg. 5, *Program and Project Management for the Acquisition of Capital Assets*, Attachment 2, April 12, 2018]

Decontamination. The removal or reduction of residual chemical, biological, or radiological contaminants and hazardous materials by mechanical, chemical or other techniques to achieve a stated objective or end condition. [DOE Order (O) 413.3B, Chg. 5, *Program and Project Management for the Acquisition of Capital Assets*, Attachment 2, April 12, 2018]

Demolition. Destruction and removal of physical facilities or systems. [DOE Order (O) 413.3B, Chg. 5, *Program and Project Management for the Acquisition of Capital Assets*, Attachment 2, April 12, 2018]

Dismantlement. The disassembly or demolition and removal of any structures, systems, and components during decommissioning and satisfactory interim or long-term disposal of the residue from all or portions of a facility. [DOE O 413.3B, Chg. 5, Attachment 2, April 12, 2018]

Data Quality Objectives (DQOs). Criteria for determining the type, quantity, and quality of data needed to reach defensible decisions or make credible estimates. [U.S. Environmental Protection Agency (EPA) QA/G-4, *Guidance on Systematic Planning Using the Data Quality Objectives Process*, February 2006]

End Points. For a C&D/D Project, end points answer the question "How do you know when the project is complete?" End points refer to the detailed specifications for, at C&D/D completion, the condition of spaces, systems, and equipment within a facility, and related documentation. A thorough description and application of a deactivation end-point process is described in "UO_3 Deactivation End Point Criteria," L.D. Stefanski, Westinghouse Hanford Co., Richland Washington (WHC-SD-WM-TPP-052, September 7, 1994).

End State. Refers to the overall status and disposition of a facility after all C&D/D end points have been achieved (e.g., Engineering has condemned the facility and it is physically ready to be demolished).

Exception. A system or piece of equipment that still contains hazardous energy after C&D status is declared. Examples include temporary power systems and site utilities that pass through or near the subject facility and devices that contain stored energy. These exceptions should be approved by management and prominently documented in a C&D/D report.

Intrusive Electrical Work. Work that enters the Limited Approach Boundary or Flash Protection Boundary of any electrical enclosure, removes the dead front from any panel, or involves accessing electrical enclosures in a manner that has a potential for contact with energized conductors and/or exposed energized parts. This would include voltage measurements with contact probes.

Intrusive Mechanical Work. Work that changes valve alignments or makes any opening into a sealed system.

Lessons Learned. The project management-related input and output device that represent the knowledge, information, or instructional knowledge that have been garnered through the process of actually completing the ultimate performance of the respective project. Lessons learned are valuable, because they will benefit future endeavors and ideally prevent any negative happenings from taking place in the future. [DOE O 413.3B, Chg. 5, Attachment 2, April 12, 2018]

Mitigation. Technique to eliminate or lessen the likelihood and/or consequence of a risk. [DOE O 413.3B, Chg. 5, Attachment 2, April 12, 2018]

Physical Air Gap (Electrical). The cutting of a conductor, cable, or conduit so that it can be visually verified and cannot be easily reconnected. This requires the removal of enough of the conductor, cable, or conduit to require rewiring to reconnect. Lifting and taping of leads, removing fuses, and opening disconnects do not qualify as physical air gaps.

Physical Air Gap (Mechanical). The cutting of piping or tubing so that it can be visually verified as empty and unpressurized. This requires the removal of enough of the piping or

tubing to require major rework to reconnect. For large-diameter piping, typically it is acceptable to cut or drill multiple holes (two [2] minimum) into the pipe and not remove a complete section of the pipe. The closing of a valve or installation of a pancake typically does not qualify as a physical air gap.

Project. A unique effort having defined start and end points undertaken to create a product, facility, or system. Built on interdependent activities planned to meet a common objective, a project focuses on attaining or completing a deliverable within a predetermined cost, schedule, and technical scope baseline. Projects include planning and execution of construction, assembly, renovation, modification, environmental restoration, decontamination and decommissioning, large capital equipment, and technology development activities. A project is not constrained to any specific element of the budget structure (e.g., operating expense). [DOE O 413.3B, Chg. 5, Attachment 2, April 12, 2018]

Primary Isolation (Electrical). De-energizing and isolating/air gapping the main electrical power feeding of a facility. For example, assume a 13.8 kV feeder feeds a facility that is slated for D&D. The feeder is fed from a powerhouse facility through a duct bank system to a switchgear vault in the facility that is slated for D&D. For primary electrical isolation, the 13.8 kV feeder will need to be de-energized and isolated/air gapped in the powerhouse and at the switchgear interrupter switch in the vault of the facility that is slated for D&D.

Primary Isolation (Mechanical). Air-gapping utilities that are the main supply headers from outside a facility (e.g., main fire risers, sanitary water risers, chilled water lines, steam, plant air, nitrogen [N] lines).

Risk. A factor, element, constraint, or course of action that introduces an uncertainty of outcome, either positively or negatively, that could impact project objectives. [DOE O 413.3B, Chg. 5, Attachment 2, April 12, 2018]

Secondary Isolation (Electrical). De-energizing and isolating/air-gapping conduits/cables that penetrate the floors and exterior walls of the structure that are fed from adjacent facilities or branch circuits/conduits within the facility required to be physically air gapped.

Secondary Isolation (Mechanical). Air-gapping utilities (fire water risers, sanitary water risers, chilled water lines, steam, plant air, nitrogen lines) that enter either through the slab floors or exterior walls of the facility.

Stabilization. An interim process where the facility is placed in a stable, known condition, including removal of hazardous and radioactive material to ensure adequate protection of workers, public, and environment, thereby limiting the long-term surveillance, stabilization, and maintenance costs, while awaiting ultimate decommissioning. [DOE O 430.1C, *Real Property Asset Management*, Attachment 1, August 19, 2016.] Consult the forthcoming Standing Operating Policy and Procedure on Stabilization for an enhanced definition and guidance on stabilization.

Surveillance and Maintenance (S&M). Activities conducted during a period of asset dormancy when the facility is inactive. These activities maintain the facility safety envelope and may include periodic inspection and maintenance of structures, systems, and equipment to ensure that, at a minimum, any contamination is adequately contained and that the potential hazards to workers, the public, and the environment are eliminated or mitigated and controlled. [DOE O 430.1C, Attachment 1, August 19, 2016]

1.6 Graded Approach

Using a C&D/D Project Team and sound project management practices, this BP can be applied to help ensure key steps are followed and applied to a given facility commensurate with its size, complexity, and risk. For example, C&D/D of an isolated, one-story, small administration building typically will involve fewer activities and much less rigor than that of a Manhattan Project-era uranium- or plutonium-processing facility or reactor.

2. C&D/D MANAGEMENT

Important aspects of C&D management include recognizing the status of a C&D/D facility in its life cycle and the challenges it will pose to C&D workers and their required work activities. Also important for management is early recognition of whether the future demolition work will be Operations (OPS) or a Capital Asset Project (CAP) so that needed reviews and approvals can be scheduled and budgeted. Last, given the potential complexities of C&D work, another key aspect of C&D management is evaluation of applicable lessons learned. DOE has invested significant resources in archiving and making lessons learned available to improve all aspects of management, including C&D/D. The emphasis of this BP is to explain the "what" that C&D/D management likely will entail; the specific steps, or "how" the work must be done will depend on the specific C&D/D facility and team.

2.1 Facility Phases and C&D/D Considerations

2.1.1 Overview

When no longer needed, facilities enter a transition phase where they are shut down and stabilized. Environmental Management (EM) has Stabilization Criteria (see *Transition Implementation Guide*, DOE Guide (G) 430.1-5, April 24, 2001) for each Program Secretarial Officer to use to prepare a facility for transfer to EM. Following stabilization, facilities can be prepared for demolition using this BP's C&D/D guidelines.

Given the diverseness of DOE facilities, required C&D/D activities will almost certainly vary by facility. Currently, many DOE facilities are in extremely poor condition[2]. C&D/D work inside and around these facilities most likely will be hazardous. C&D/D workers often face structural hazards (floor collapse, roof collapse), contamination and radiation hazards, stored energy hazards, shock-sensitive material hazards, and even biological hazards. This C&D/D BP outlines a process to address hazards common to D&D work.

2.1.2 C&D/D Work and Cost

C&D/D includes the steps necessary to prepare a facility for demolition, and unless there are extenuating circumstances, C&D/D should result in a facility being "Demolition-Ready." Completion of C&D/D can yield important safety and cost benefits. Once a facility is Demolition-Ready, S&M requirements typically can be eliminated or greatly reduced. As a result, workers may no longer need to enter the facility as frequently and risk exposure to hazards. The need for reentry typically depends on what is left in the facility and the duration of delay between Demolition-Ready and demolition.

Delaying C&D/D can have significant adverse work and cost implications. Postponed C&D/D work may result in a cost increase due to escalation. It may also result in a cost increase due to additional facility deterioration that complicates C&D/D efforts. For example, over time, the working surfaces/floors/cranes needed for C&D/D may become structurally unsound and require enhancement or expensive workarounds. Water may enter piping and equipment or other process systems and raise nuclear criticality safety (NCS) concerns. Facility equipment that could be useful for C&D/D activities, such as original cranes and elevators, may no longer be certified safe for use or may require repair parts that are no

[2]GAO Report to the Committee on Armed Services, U.S. Senate, *DOE Facilities, Better Prioritization and Life Cycle Cost Analysis Would Improve Disposition Planning*, GAO-15-272, March 2015.

longer available. Once a roof, doors, windows, or other facility protective features fail, thus allowing water entry, costs for C&D/D can begin a path for one or more large step function increases.

2.1.3 Demolition (Decommissioning)

Demolition removes a facility (see Figure 3). As explained above, the plan for demolition will drive and define the C&D/D approach, end state, and required end points.

2.1.4 Environmental Policy

In May 1995, DOE issued a policy in collaboration with the EPA for decommissioning surplus DOE facilities consistent with the requirements of CERCLA. This policy ensures protection of the environment, worker health, and public health; provides opportunities for stakeholder involvement; and achieves risk reduction without unnecessary delay. Consistent with the jointly issued *Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities* (EPA 1994), this decommissioning policy encourages streamlined decision-making (see Appendix A) and C&D/D tasks.

2.1.5 DOE 413.3B, Capital Asset Projects

DOE O 413.3B, Chg. 5, *Program and Project Management for the Acquisition of Capital Assets*, specifies thresholds for designating whether a D&D project is a DOE O 413.3B, Chg. 5, CAP. This should not be confused with the accounting treatment of “capital” items. Sufficiently large dollar D&D projects will be CAPs and will require Critical Decision (CD) (typically CD-2/3) approval from the Chief Executive for Project Management or Project Management Executive prior to starting demolition (see Figure 3). For all D&D projects, C&D/D work leading up to demolition is OPS work and does not require CD approval. For D&D projects below the DOE O 413.3B, Chg. 5, CAP threshold, both the C&D/D work and the demolition work will be managed as OPS work with no CD approvals being required. Whether the D&D work is a CAP or not, all work should be thoroughly planned with adequate scope definition, critical path schedule, cost estimate, and supporting documents. If a demolition project is a CAP, then CD work leading up to approval of CD-2/3 (e.g., Independent Project Review, Independent Cost Estimate, External Independent Review) is OPS work (pre-CAP).

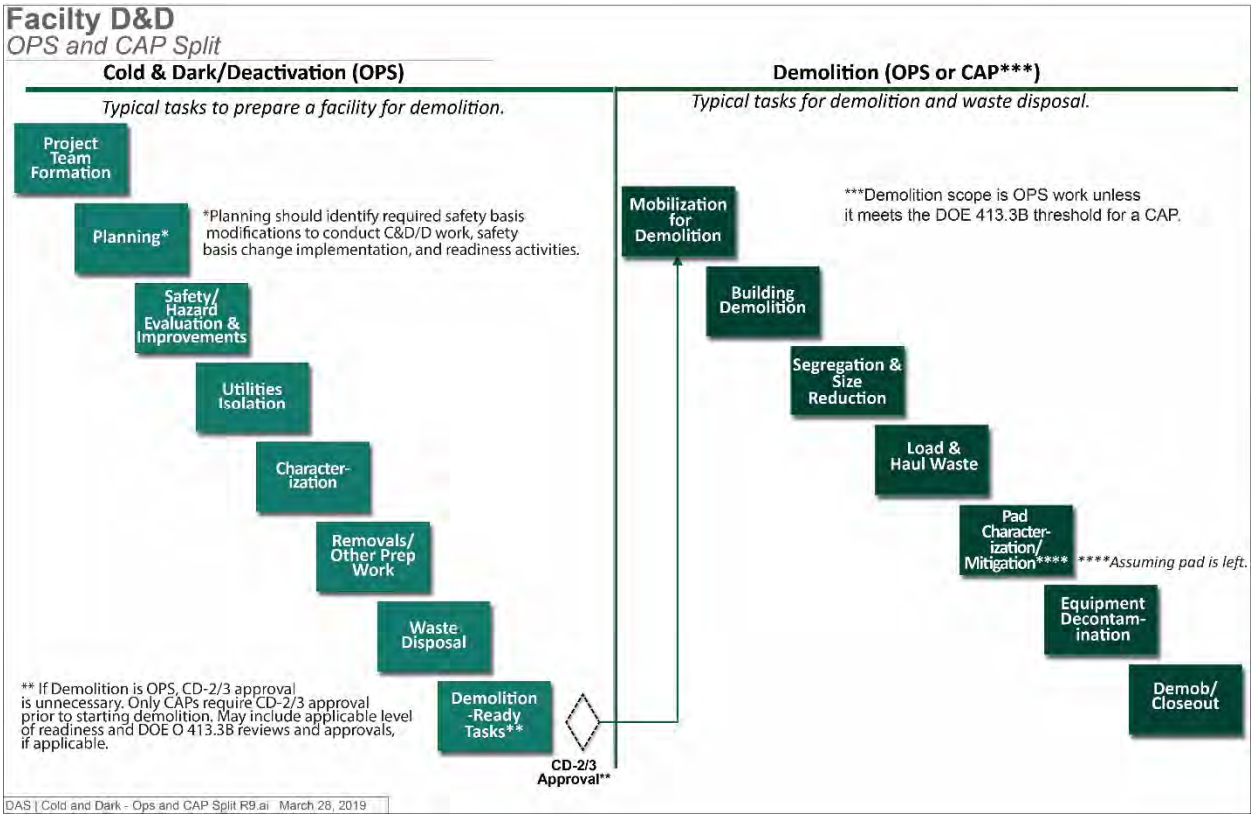

Figure 3. C&D/D (OPS) and Demolition (OPS or CAP) split.

2.2 Lessons Learned

Documenting potential problems with C&D/D can be challenging. However, proper planning and execution can protect the C&D/D Project Team, the Demolition Team, and/or the public from serious hazards.

During planning, C&D/D Project Team members should review lessons learned and factor analogous situations into the C&D/D plan. This includes reviewing internal lessons learned resources as well as OPEXSHARE (**https://opexshare.doe.gov/**) to ensure that C&D/D project planning takes advantage of the available extensive experience base. Doing so can help lessen the likelihood of C&D/D Project cost and schedule growth and, more importantly, an injury or environmental insult. Important lessons learned exist on C&D/D and demolition topics such as:

- As-built drawings
- Inaccurate facility drawings/documentation
- Lack of worker involvement in planning
- Mishaps involving C&D/D interpretations
- SB violations
- Fixative/fogging hazards
- Foam hazards

- Asbestos hazards
- Air-gapped electrical lines that are still active
- Cutting wire bundles instead of wires individually
- Unexpected liquids or gases or odors
- Change Management
- Discovery conditions
- Training
- Conduct of Operations
- Hoisting and Rigging
- Deviating from manufacturers'/suppliers' intended use
- Improper use of equipment/materials
- Valve failures
- Spare Parts and Critical Spare Parts
- Suspect/Counterfeit (S/CI) or Defective Items

3. TYPICAL C&D/D TASKS

3.1 Project Team Formation

C&D/D Project Team formation is a critical early step. It is essential to have engaged participation from the right functional subject matter experts (SMEs) early in the process to prevent avoidable problems. The quality of the C&D/D approach depends upon having the right SMEs from the right functional disciplines and involving workers early in planning. A key point in forming the team is to ensure team member diversity. Project managers (PMs) should drive a participative team culture that encourages creative thinking, constructive criticism, and constructive challenges to plans, assumptions, risks, and scenarios. Team members should be self-critical, testing their ideas and understanding weakness so that problems can be prevented before they occur rather than being corrected afterwards. A key goal is to prevent a situation where C&D/D planning begins down the wrong path, builds momentum when no one raises challenges to flaws in the plan, which materialize and results in failed fieldwork, unsafe field conditions, and significant costs or schedule overruns.

Depending on the facility (e.g., nuclear or non-nuclear, highly contaminated or relatively clean), C&D/D Project Team membership may need to include SMEs from the following functions/disciplines/resources:

- Labor/Craft Workers
- Project Management
- Facility Management
- Project Controls (e.g., Scheduling, Estimating, Reporting)
- Engineering
- Electrical
- Configuration Management
- Nuclear Safety
- NCS
- Environmental/Regulatory
- Industrial Hygiene (IH)/Industrial Safety (IS)
- FP
- Nondestructive Assay (NDA)
- Radiation Protection (RP)
- Emergency Management
- Safeguards and Security (S&S) (Classification/Information Control, Nuclear Material Control and Accountability [NMC&A], Physical Security)
- Training
- Real Property
- Field Services
- Waste Management (WM)
- Quality Assurance (QA)

- Subcontractors

Context will help streamline C&D/D Project Team membership (e.g., for many facilities, there may be no need for NMC&A or NCS representation).

Other C&D/D Project Team considerations include labor composition and logistics: Davis-Bacon reviews, union determination, office space location (which may require transportation arrangements for workers), fencing, shower facilities, cool rooms, storage for personal protective equipment (PPE) and C&D/D equipment, and access controls.

Once the C&D/D Project Team membership is established, the PM should ensure that each member's roles, responsibilities, authorities, and accountabilities are understood and communicated. During execution, changes in Project Team membership may occur. As mentioned above, the PM should maintain team diversity when replacing personnel and avoid situations where changes to key skills/staff mix result in a threat to planning or execution.

3.2 Planning

C&D/D should be managed as a project with a PM, Project Team, Work Breakdown Structure (WBS), WBS Dictionary, cost estimate, critical path resource-loaded schedule, project risk register, and supporting documents. The project planning documents should reflect the work required to deliver the required C&D/D end state. Thorough upfront project planning is absolutely essential.[3] When deriving the C&D/D approach, the team members should avoid "group-think." The C&D/D plan should be thoroughly challenged to identify potential weaknesses upfront so that the best alternatives and lowest-risk workarounds are identified early. This is particularly important in terms of evaluating how the C&D/D approach and C&D/D decisions will impact the likelihood of successful demolition and waste disposal (e.g., prevent contamination or cross-contamination events). Demolition Team members should be included in C&D/D planning. If Demolition Team members have not been identified or cannot participate, then the project's risk register should be updated. That update should include one or more risks that the future Demolition Team decides that the assumed C&D/D end points are unacceptable for demolition and additional C&D/D work is required. An additional risk may be that the C&D/D demolition approach assumed by the C&D/D Project Team requires significant change.

If the C&D/D scope is particularly complex, the multidisciplined C&D/D Project Team should consider the value added of preparing a separate C&D/D plan (see Appendix C for a sample outline). A separate C&D/D plan can help ensure all team members are unified on the C&D/D scope and required end state and end points; a plan can also clarify important interfaces, roles, and responsibilities. Thoroughly documenting the scope and key assumptions has an added benefit in that it can help team members quickly identify and prevent scope and assumptions creep (i.e., subtle, informal, incremental changes from original scope).

For example, consider D&D of a Hazard Category 2 NF. If the plan were to conduct demolition as a Less than Category 3 NF or as a RAD facility, then C&D/D must be planned and executed to enable that downgrade prior to starting demolition. FP, NCS, and SB SMEs would need to identify specific requirements and end points that must be delivered by the C&D/D process (e.g., the C&D/D Project Team may be required to perform and confirm

[3] *Improving Project Management*, Report of the Contract and Project Management Working Group, November 2014, Secretary of Energy, Washington, D.C.

specific removals [e.g., mechanical removal of specific equipment and piping or chemical removal of deposits] of fissile materials).

In addition to the assumed demolition approach, the C&D/D Project Team should discuss and resolve:

- The organization that will assume management and funding responsibility for the facility when C&D/D is complete;
- Whether the facility will be demolished and disposed immediately after C&D/D or require extended S&M; and
- Whether the facility is physically connected to other facilities or structures (e.g., walls, tunnels, pipelines, utilities) that are excluded from the C&D/D scope.

Examples of plans/documentation that the C&D/D Project Team may need to prepare to achieve the required end state and end points include:

- C&D/D Plan;
- Safety Plans;
- Communication/Notification Plan;
- Security Plans (if the facility is a sensitive facility, a security plan should be in place prior to accessing the facility);
- Stormwater Pollution Prevention Plan (SWPPP);
- Transitional Fire Hazard Analysis (TFHA) (especially if facility is > 5000 ft^2);
- Training Requirements Matrix (TRM);
- Waste Characterization Plan (WCP);
- Waste Handling Plan (WHP);
- Work Packages;
- Readiness documentation; and
- Waste Readiness-To-Ship Checklist.

The full list of plans required will depend on the C&D/D scope and the applicable requirements.

3.2.1 Integrated Safety Management (ISM)

C&D/D should be planned, conducted, and documented in a manner consistent with the guiding principles and core functions of DOE's ISM policies. To ensure this, project planning activities should be conducted in accordance with the principles of ISM identified in DOE O 450.2, *Integrated Safety Management*. The objective of ISM is to systematically integrate environment, safety and health (ES&H), waste minimization (WMin), pollution prevention (P2), and QA into management and work practices at all levels so that workers, the public, and the environment are protected while mission work is accomplished. DOE fosters a strong safety culture and a safety conscious work environment (SCWE) through leadership, employee/worker engagement, and organizational learning. Application of ISM, starting with C&D/D planning and continuing through execution, can help prevent accidents and also sustain high productivity levels.

C&D/D work planning should reflect the five core functions of ISMS: define the scope of work; analyze the hazards; develop/implement hazard controls; perform work safely; and provide feedback and improvement. Planning should also reflect the eight guiding principles: line management responsibility for safety; clear roles and responsibilities; competence commensurate with responsibility; balanced priorities; identification of safety standards and requirements; hazard controls tailored to work being performed; operations authorization; and worker involvement.

C&D/D work planning should reflect implementation of the hierarchy of controls preference shown in Figure 4 (use of PPE to protect workers as the least effective control).

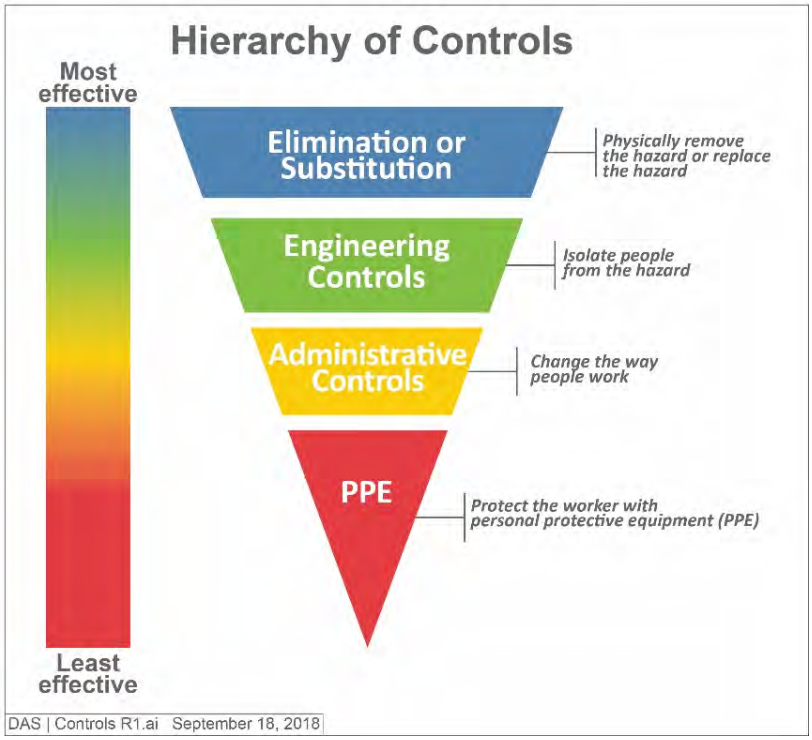

Figure 4. Hierarchy of Controls.

3.2.2 C&D/D Scope Definition, End State, and End Points

The C&D/D end state represents the agreed-upon facility condition that is to be achieved after completion of the C&D/D effort. This condition is the ultimate goal of C&D/D and is typically characterized by a safe facility configuration that can be maintained until demolition is feasible. ES&H considerations for both C&D/D and demolition are a major concern and drive the end-state and end-point definitions. The end points are the detailed specifications for the condition of spaces, systems, and equipment within a facility, and related documents, for declaring C&D/D complete.

Therefore, the C&D/D Project Team should methodically list facility spaces, systems, and equipment along with the structure and decide what end points must be reached for each of these for C&D/D to be complete. End points may be needed for:

- Process piping

- Non-process piping
- Process equipment
- Non-process equipment
- Fire protection system
- Criticality accident alarm system (CAAS)
- Security System
- Structural elements

Each of these may require additional detail. For example, separate end points may be required for process piping based on diameters and/or contamination levels and/or specific rooms or areas.

The C&D/D Project Team should use Demolition Team input to set the end points. Experienced Demolition Team members will be better able to predict what will happen during demolition. For example, the C&D/D Project Team may assume that encapsulating highly contaminated surfaces is an acceptable end point. But the Demolition Team may conclude that given the type of contaminant, simply encapsulating the contamination is likely to create a contamination event during demolition when the surfaces are pulverized and crushed by demolition shears. The Demolition Team may conclude that additional contamination removals (e.g., hydrolasing, scabbling) must be performed prior to heavy equipment demolition. Or—to minimize the risk of contamination events—demolition must be performed under a full enclosure instead of in open air. Since both events could have significant cost and schedule impacts, adequate risks should be included in the project's risk register to address the potential need for additional work to reach an alternate C&D/D end state better suited for demolition.

In general, for a Demolition-Ready end state, no additional facility work should be required. If the facility is Demolition-Ready at the completion of C&D/D, Engineering will issue a memorandum documenting that the building has been condemned and any reentry requires special evaluation and authorization. Condemnation placards, warning tape, and/or other obvious visual indicators would be placed on facility doors and entryways. It is possible that one or more factors may prevent the facility from being Demolition-Ready. For example, it is possible that the C&D/D Project Team discovers waste in the facility that has no path to disposal (NPTD) (e.g., liquid-phase mixed waste with dioxin and furans) and must be left in the facility until a disposition plan is formulated.

Additional analysis of the C&D/D scope, end state, and end points may be warranted for large and/or complex facilities. For example, there may be a desire to start demolition in one area of a large building that has been made Demolition-Ready while C&D/D is ongoing in other parts of the building. In such cases, thorough engineering analysis would be required to ensure C&D/D personnel working in other parts of the facility are protected and safe during demolition.

A complication can arise when the facility undergoing C&D/D is physically connected to other facilities that are still in use or excluded from the C&D/D scope. Depending on how complications like this are resolved, the facility C&D/D end state could end up being something less than Demolition-Ready.

3.2.3 Regulatory Framework for C&D/D

When scoping and planning a C&D/D project, it is essential to identify the regulatory authority; it guides the overall environmental review process. If the C&D/D work is not covered by CERCLA, the environmental regulatory framework would be the Atomic Energy Act with environmental review occurring under the National Environmental Policy Act (NEPA) and following the NEPA process (10 *Code of Federal Regulations [CFR]* Part 1021, *National Environmental Policy Act Implementing Procedures*). NEPA scoping of the action is essential in determining the level of NEPA for the project, i.e., a categorical exclusion (CX), an Environmental Assessment (EA), or an Environmental Impact Statement (EIS). Actions that have been reviewed and determined to have no impacts are CXs and are listed in Appendices A and B to Subpart D of 10 *CFR* Part 1021. EAs for types of actions that have been reviewed and determined to have impacts, but where the impacts are not significant, are listed in Appendix C to Subpart D of 10 *CFR* Part 1021. EISs for types of actions that have been reviewed and determined to have significant impacts, or the potential for significant impacts, are listed in 10 *CFR* Part 1021 Appendix D to Subpart D. For actions that are not listed in any of the appendices and have the potential for impacts, an EA should be prepared to determine if there is a need for an EIS, or if a Finding of No Significant Impact can be obtained. It is important to note that close integration of NEPA with the regulatory authority governing the C&D/D Project is essential to ensure that the decisions are aligned. Additionally, sensitive resource reviews, in particular those of the National Historic Preservation Act (NHPA) (36 *CFR* Part 800, *Protection of Historic Properties*), may affect how the C&D/D Project is executed, its schedule, and, as an example, if elements (or contents) of the building slated for D&D may need to be preserved in some manner.

For actions that are CERCLA, NEPA values are incorporated into/performed as a part of the CERCLA process (see the 1994 Secretarial Policy on NEPA). NEPA values address those actions not covered by CERCLA, which do not have their own regulations, e.g., socioeconomic, transportation, and environmental justice impacts. No separate NEPA document is prepared. All of the sensitive resources assessed as a part of the NEPA process (i.e., wetlands, cultural resources) are performed as CERCLA ARARs, where the substance of the regulation is followed but not the administrative aspects (see the CERCLA Compliance with Other Laws, Volume II for an explanation of ARARs). For example, no permits are sought or obtained, and in the case of effects to historic properties, no Memoranda of Agreement (MOAs) are sought or obtained. Performing the administrative aspects of the various laws governing sensitive resources removes the protections offered by the CERCLA 113(h) jurisdictional bar against lawsuits before all RAs have been taken.

3.2.4 National Historic Preservation Act (NHPA)

To avoid an adverse schedule impact or noncompliance situation, C&D/D planning should always evaluate the applicability of NHPA requirements. Some DOE structures and facilities targeted for C&D/D may be covered by NHPA requirements. Early during C&D/D planning, the C&D/D Project Team should consult the CERCLA (if work is covered by CERCLA) and NHPA SMEs to identify and understand if there are applicable NHPA requirements and, if so, formulate a compliance approach.

If the work is CERCLA, NHPA actions should be addressed as a CERCLA ARAR—not Section 106 of the NHPA (see Figure 5, NHPA Compliance Approach). Note that the ARARs approach applies to structures and slabs, and may also, depending on the site, be in part applicable to the soil and subsurface CERCLA actions. Coordination with the site's NHPA SME and CERCLA regulatory SME should occur to ensure the appropriate compliance approach for all project media.

Failure to properly address NHPA requirements when they apply to C&D/D work could result in the C&D/D Project Team inadvertently making prohibited facility changes (internal or external) to protected NHPA assets. It could also result in a significant schedule delay while awaiting required approvals to allow C&D/D tasks to commence or restart.

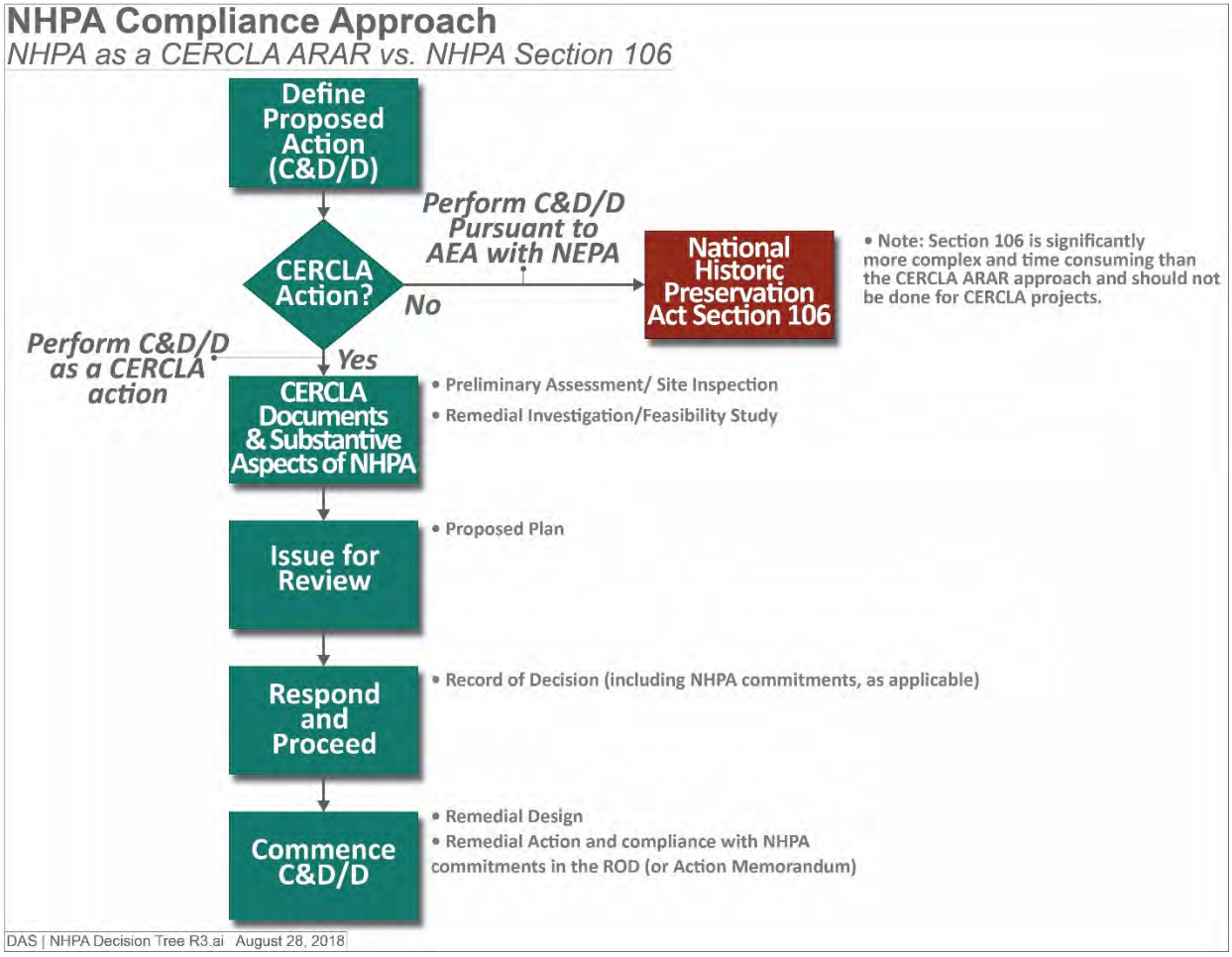

Figure 5. NHPA Compliance Approach.

3.2.5 Safeguards and Security (S&S)

Many buildings within the DOE complex performed processes related to weapons-related material and/or dealt with sensitive government information. During C&D/D planning, the C&D/D Project Team should consult with the germane S&S organizations to assure that: (1) sensitive equipment, material, and information (including historic information) have been properly identified and protection requirements are understood; and (2) development of strategies for handling protection requirements have been included in the planning. In general, S&S requirements can influence most other parts of the C&D/D process.

The involvement of S&S organizations is important for the following reasons:

(1) By evaluating the work and applicable S&S requirements early, C&D/D plans can be formulated to minimize the impact of S&S requirements on project productivity (e.g., lessen

the need for cleared workers or formulate acceptable plans for handling and disposing of certain waste streams);

(2) Sound S&S plans/procedures (e.g., physical security plans/procedures and classification review procedures) and ensuring participating personnel are aware of these plans/procedures (and the associated sensitivities) will help prevent a major incident of security concern (e.g., accidental distribution of sensitive information).

3.2.6 Stewart B. McKinney-Vento Homeless Assistance Act

The establishment of program ownership of real property assets (buildings and related infrastructure assets and appurtenances) is a critical step in the early planning process for C&D/D and demolition projects. Coordination with the site and program's Real Property Officer is important to project success; the Real Property Officer will be able to determine if the property has been identified in the Facility Information Management System (FIMS) as excess to the program's needs. Excess screening throughout DOE follows screening within the program office. The program proposing the C&D/D or demolition must have ownership and control of the property in FIMS prior to C&D/D or demolition.

Additionally, screening of the property pursuant to the Stewart B. McKinney-Vento Homeless Assistance Act (McKinney Act; Public Law 100-77, 42 USC 11411 and 11412) applies to all demolition projects except for property assets owned by the EM program.[4] The McKinney Act is a public law that authorizes use of unutilized and underutilized public buildings and real property to assist the homeless and to make surplus personal property available to nonprofit agencies.

Properties owned by programs other than EM go through the full McKinney-Vento screening process prior to obtaining the requisite program's Real Property Officer approval for demolition. This process takes approximately six (6) months to complete and engages the local Real Property Officer, the program Real Property Officer, the General Services Administration (GSA), and the U.S. Department of Housing and Urban Development (HUD). A Federal Register notification period also occurs as a part of the process to determine if there is interest by GSA or HUD, or others engaged in homeless assistance, prior to completing the review and receiving approval for demolition by the program Real Property Officer.

If the C&D/D or demolition project is to be performed by EM but the asset is owned by another program, transfer of the asset from the other program to EM is possible through a Transfer MOA. This transfer occurs within FIMS and requires the assistance of the site program's Real Property Officer who will coordinate the transfer process with the EM program's Real Property Officer. This process may take approximately 2 months to complete and involves site and program personnel, including signature by EM-1 and the transferring program's leadership as well, e.g., SC-1, NE-1. Following transfer to the EM program, the McKinney-Vento screening process review would not be performed.

In summary, up-front planning and coordination with real property professionals is an important part of C&D/D and demolition project success. Prior to D&D, a facility needs to be (1) excess, and (2) through the McKinney-Vento screening process with approval to demolish from the program's Real Property Officer (unless it is an EM-owned asset in FIMS). Note that these steps are separate and distinct from evaluation pursuant to the NHPA,

[4]EM assets are considered unsuitable for homeless accommodation purposes and do not go through the McKinney-Vento screening.

either through the NHPA Section 106 process or as an ARAR under CERCLA, which may have requirements to be performed prior to facility C&D/D or demolition.

3.2.7 Interfaces

The C&D/D Project Team should list key stakeholders and interfaces. At some locations, facility C&D/D may have complicated interfaces. Regulators, Citizen Advisory Boards, private companies operating in the area, and other groups, can affect planning. In addition, consideration should be given to engaging other contractors and DOE offices (e.g., DOE Office of Science [DOE-SC], National Nuclear Security Administration [NNSA]). As an example, an active communications line used by NNSA or DOE-SC may run through, or around, or under an abandoned building undergoing C&D/D and warrant special attention and protection to prevent accidental isolation. These interface discussions can help identify errors/problems in advance that are common with as-built drawings that are often incorrect.[5]

3.2.8 Assumptions and Requirements identification

As part of managing C&D/D as a project, key assumptions and requirements (e.g., the appropriate electrical standards) should be documented in project documentation (e.g., WBS Dictionary, Basis of Estimate).

Assumptions made while planning the C&D/D work activities should be confirmed or plans prepared and available to address worst-case scenarios, if possible. This is essential for critical assumptions—those that if incorrect, could lead to significant, adverse consequences. Significant potential assumption failures should be added to a project risk register and statused regularly. Readily verifiable assumptions should be resolved. For example, consider the following assumption: “The existing SB document will allow planned C&D/D tasks to proceed without a SB update.” Rather than simply making this assumption, the C&D/D Project Team should check with the SB SME and confirm whether this is true or not; if false, then the C&D/D Project Team should add scope for an update and modify the schedule and estimate accordingly.

As another example, consider C&D/D of a highly dilapidated facility. Rather than simply assuming that electrical equipment (e.g., power distribution panels, power carts) to be used for C&D/D can be National Electrical Manufacturers Association (NEMA) one (1) or two (2) rated (indoors), the electrical SME should be engaged. The electrical SME may recognize that the poor condition of the roof and water infiltration has created a situation where required C&D/D tasks inside the building require NEMA three (3) or four (4) rated (outdoor) equipment. In addition to many other benefits, having the electrical SME engaged in defining assumptions and identifying requirements can help prevent creating a C&D/D plan founded on faulty assumptions and the wrong requirements.

This principle applies to other functional disciplines. For example, mechanical, civil-structural, and chemical engineering SMEs are needed for selecting the correct assumptions, requirements, and methodology for draining and depressurizing fluid systems, stabilizing bulk or liquid chemicals, deciding if roofs need repairs, etc.

[5]Lesson Learned: WRPS-IB-13-001, *When Field Conditions Differ From As-Built Drawings*, January 24, 2013

If modeling/simulation is used to define C&D/D key assumptions, sensitivity analysis can help assess how model output is affected by variation in inputs. Faulty inputs substantially increase the likelihood that the resultant assumptions produced by modeling are wrong.

3.2.9 Documentation Updates

Based on the proposed C&D/D and demolition approach, numerous supporting documents should be reviewed and updated, as required. The C&D/D Project Team should identify the list of documents and revisions required.

Regulatory documents (e.g., sampling plans, removal action work plans [RmAWPs], waste handling), security plans, and safety documents are just a few of many potentially required plans. The SB must support the C&D/D work activities and numerous other plans. In some cases, this may be simple. In other cases, careful consideration, analysis, and follow-on actions may be required. For example, the pre-C&D/D SB for a facility may require that safety alarms remain active and audible until the facility is completely Demolition-Ready. But based on the proposed C&D/D plan and equipment, activities (e.g., reciprocating saw cutting metal) may be so loud that workers in PPE might not hear an alarm if it sounded. It is important to recognize changed conditions like this and perform thorough planning.

3.2.10 Readiness Reviews/Implementation Verification Reviews

For Category 1, 2, and 3 nuclear facilities, careful evaluation (early during C&D/D planning) of the governing SB documentation is extremely important. If the SB documentation for facilities to undergo C&D/D does not already authorize C&D/D work, then SB modifications will be required. Some level of readiness (see DOE O 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*; and DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*) may be required to initiate all or some portions of C&D/D work. SMEs will need to engage to determine the applicability of readiness to C&D/D tasks. In some cases, activities and time (which can take months or even longer) may need to be included in the project schedule and cost estimate to account for readiness; time-consuming readiness activities (e.g., assessments, reviews, corrective action [CA] plans, CAs, verifications, notifications) can quickly become critical path predecessors to allowing key C&D/D activities to start. For simple facilities, readiness may be as simple as a concise Management Assessment/checklist. Early engagement with SB and readiness SMEs is highly recommended for C&D/D projects involving nuclear or hazardous facilities.

3.2.11 Recycle

The C&D/D Project Team should evaluate the potential for recycle of facility materials and the appropriateness of including recycling in the C&D/D approach (see Appendix D). For many facilities there may be no feasible opportunity for recycle; however, the C&D/D Project Team should investigate the potential.

3.2.12 Project Schedule

A high-quality project schedule for C&D/D is extremely important. The C&D/D Project Team should help prepare the schedule, identifying the required activities, durations[6], predecessor/successor logic, critical path, and responsibilities. For complex C&D/D work, the schedule should identify how long certain systems are needed (e.g., heat, CAAS coverage) and the end points/events that enable their shutdown. The entire C&D/D Project Team

[6]Durations should reflect reasonable, executable productivity assumptions.

should regularly review the schedule and logic, and confirm that it continues to reflect the required activities.

Often key regulatory or high-visiblity contract milestone dates are determined based on the C&D/D schedule. In no circumstance should ES&H or quality be compromised to meet dates: extreme work schedules and pressure to cut corners/boost productivity can lead to serious adverse consequences in C&D/D and future demolition (e.g., less than adequate decontamination by the C&D/D Project Team).

For particularly complex or hazardous work, a good practice is to include one or more pause activities in the schedule for worker involvement and review of lessons learned. Feedback from workers during these pauses may identify emerging opportunities or risks that warrant changes to the C&D/D approach (see Section 3.2.1, "Integrated Safety Management [ISM]").

3.2.13 Risk Management

As mentioned briefly in Section 3.2, "Planning," C&D/D Project Teams should maintain a risk register (containing risks and opportunities). The team should quantify the cost and schedule risks using Monte Carlo techniques and regularly review and status the C&D/D risks. Where possible, the team should identify mitigation strategies to reduce the likelihood of the risk happening and/or the consequence if a risk does happen. The risk register should be statused regularly.

Risk management can be used to help with overall C&D/D planning. The C&D/D Project Team can brainstorm scenarios of serious problems that occur on the project (e.g., major safety event, major contamination event, major waste shipping event) and then use that data to establish an improved plan, populate the risk register, and implement needed mitigation actions.

3.3 Safety / Hazard Evaluation & Improvements

3.3.1 Change Management

The C&D/D Project Team should ensure that the PM and Facility Manager (FM) are engaged at all times and that C&D/D work activities comply with the approved SB and work control documents. Surprises and discoveries should be expected with C&D/D work. Project Team members should have a questioning attitude, be alert, and quickly identify and communicate changed conditions. Workers should be trained in the specifics of how to recognize a changed condition or problem, how to report it (e.g., voice-to-voice, e-mail), when to report it, and whom to report it to. In many cases, time is of the essence. Delays in distributing information throughout the right channels should not happen. For complex/potentially dangerous work, rehearsals and exercises may be extremely helpful to work out important details of communication logistics. This can help ensure that all workers and managers know their roles and responsibilities. This is especially important in terms of emergency response.

Management systems should be in place and workers trained, empowered, and encouraged to STOP WORK when they identify[7] or suspect conditions adverse to safety. Regardless of

[7]This could be an unexpected odor, spark, flash, sound, etc.

the work shift schedule (e.g., 4-10s, 5-8s, 5-10s), the C&D/D Project Team should discuss and plan for off-shift support and notification process in case the need arises.

Changed conditions can lead to new risks and new hazards that require investigation and response. Prior to resuming C&D/D work after a stoppage, the risks and consequences associated with the changed conditions should be addressed by safety SMEs, Engineering, and others (if needed), to ensure workers remain protected and the plan going forward is technically sound. Major changes in assumptions or plans should require presentation to management for review and approval.

One situation to avoid is to normalize or desensitize team members to changes/anomalous conditions and accept them. Anomalous situations, such as detecting contamination in an unexpected area, should be investigated with a sense of urgency. While a single situation may not be revealing, a trend analysis of these events may reveal a serious situation that warrants immediate and aggressive response. The C&D/D Project Team should employ event trend analyses, metrics, and related performance monitoring tools to help identify problems.

3.3.2 General Industry vs. Construction Standards

A common challenge that may arise for C&D/D work is deciding which Occupational Safety and Health Administration-related standards apply: those for general industry work (29 *CFR* Part 1910, *Occupational Safety and Health Standards*), or those for construction work (29 *CFR* Part 1926, *Safety and Health Regulations for Construction*). These standards differ in what is required to protect workers in areas such as:

- Fall protection
- Confined space
- PPE
- Stairways and ladders
- Fire extinguishers
- Accident-prevention signs and tags
- Others

Pursuant to §1910.12(b) and §1926.32(g), “construction work” is defined as “work for construction, alteration, and/or repair, including painting and decorating.” General industry standards apply to maintenance work. Although there is no regulatory definition of maintenance, the following work characteristics can help SMEs identify the correct standards:

- Large-scale, high-complexity tasks indicate construction.
- Tasks that improve (rather than preserve) the original condition indicate construction.
- Tasks that are scheduled at regular intervals indicate maintenance.

Selecting the correct standard may be complex; therefore, engaging the safety SMEs as early as possible is important.

3.3.3 Engineering/structural evaluation

Engineering staff should evaluate the facility's structural condition and assess what enhancements are needed to protect C&D/D workers and facilitate C&D/D work. There should be sufficient C&D/D planning complete to enable Engineering to evaluate the facility's structural compatibility with planned C&D/D work crews, equipment, and the intended method of accomplishment. The advanced deteriorated condition of some facilities may reveal that work areas will not support the weight of the crews, equipment, and their loads and an alternate plan is required. Facilities may have equipment such as cranes and elevators that, although potentially useful for C&D/D removal tasks, may require recertification, repairs, and updates before they can be reactivated. In some cases, abandonment and replacement of these assets may be more cost and time effective for C&D/D.

3.3.4 Industrial Hygiene (IH)/Industrial Safety (IS), Radiological (RAD) surveys

IH, IS, and Radiological Protection Technicians should conduct a survey and identify and document hazards posed to C&D/D workers performing C&D/D work (not just S&M work) such as asbestos hazards, chemical hazards, and physical hazards. This effort should be documented in a Health and Safety Plan or equivalent.

DOE policy is to conduct RAD operations in a manner that promotes the health and safety of all employees, subcontractors, and the general public. In achieving this objective, C&D/D Project Teams should minimize the radiation exposure to employees, subcontractors, the public, and the environment. Deliberate efforts should be taken to further reduce exposures and releases in accordance with a process to make any such exposures or releases as low as reasonably achievable.

All C&D/D work should be performed in a radiologically safe manner that meets or exceeds the applicable requirements of 10 *CFR* Part 835, *Occupational Radiation Protection*.

3.3.5 Life Safety (exit signs, ropes, barriers, etc.)

Safety SMEs should review the facility and identify needed enhancements to ensure life safety is maintained. Items such as exit signs, ropes, barriers, etc., may need to be repaired, installed, and/or maintained to enable C&D/D workers to safely perform their work activities.

3.3.6 PPE Requirements

To protect workers, C&D/D work planning should apply a hierarchy of controls: elimination (physically removing a hazard), substitution (replacing a hazard with a lesser hazard), engineering controls (isolating people from the hazard), administrative controls (changing work processes, training, signs, and postings), and finally PPE.

Consideration should be given to temperature and humidity extremes faced by C&D/D workers and needed enhancements to protect them (e.g., rest areas, hydration, real-time monitoring, cool rooms). A team approach with RP personnel to ensure PPE is adjusted during high temperature and high humidity months has been used with success in previous C&D/D work.

3.4 Utilities Isolation

A key initial step of C&D/D facility work is to isolate electrical and mechanical utilities and address stored energy. This work is often replete with serious hazards. Failure to fully and correctly isolate utilities and stored energy could expose C&D/D and demolition workers to lethal hazards such as energized lines. Facilities can have many forms of energy that can pose a hazard: pneumatic, hydraulic, mechanical, potential energy (springs, compressed gas, suspended objects, etc.) and many others. Isolation workers should be trained and work to an appropriate utilities isolation procedure. Items should be painted or otherwise coded to make it obvious to workers what items may have energy and what has been safely deactivated.

3.5 Characterization

3.5.1 Data Quality Objectives (DQO)

As a part of C&D/D, facilities and their contents must be characterized sufficiently to determine where the C&D/D and demolition waste may be disposed. Disposal facilities typically have various Waste Acceptance Criteria (WAC), (e.g., allowable contamination types and concentrations, waste size restrictions). Characterization data may also be required for other reasons, e.g., stepping out of CAAS coverage.

The DQO[8] process is a planning tool used to establish performance or acceptance criteria, which serves as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of characterization. The DQO process may be applied to waste characterization and other environmental problems that require decision-making or estimation. The DQO process consists of seven (7) iterative steps, as described below.

Step 1: State the Problem. Define the problem that necessitates the study, identify the planning team, examine the budget, and create a schedule.

Step 2: Identify the Goals of the Study. State how environmental data will be used in meeting objectives and solving the problem, identify study questions, and define alternative outcomes.

Step 3: Identify Information Inputs. Identify data and information needed to answer study questions.

Step 4: Define the Boundaries of the Study. Specify the target population and characteristics of interest, and define spatial and temporal limits, and scale of inference.

Step 5: Develop the Analytic Approach. Define the parameter of interest, specify the type of inference, and develop the logic for drawing conclusions from findings.

Step 6: Specify Performance or Acceptance Criteria.

[8]See U.S. EPA QA/G-4, *Guidance on Systematic Planning Using the Data Quality Objectives Process;* EPA/240/B-06/001, U.S. Environmental Protection Agency; Washington, D.C., February 2006; and U.S. EPA QA/G-9R, *Data Quality Assessment: A Reviewer's Guide*; EPA/240/B-06/002, U.S. Environmental Protection Agency; Washington, D.C., February 2006.

Step 6A: Specify Probability Limits for False Rejection and False Acceptance Decision Errors.

Step 6B: Specify Performance Metrics and Acceptable Levels of Uncertainty.

Step 7: Develop the Plan for Obtaining Data. Select the resource-effective sampling and analysis plan (SAP) that meets the performance criteria.

3.5.2 Sampling and Analysis Plan (SAP)

Using the results of the DQO process, prepare a SAP to follow for acquiring the quantity and type of needed characterization data. There may be specific requirements for the format and content and approval process for these, depending on the regulatory bodies and agreements in place. The Environmental SME should have a lead role in this.

3.5.3 Intrusive Sampling

In many cases, collection of samples pursuant to the SAP will require intrusive sampling (e.g., samples taken from the facility structure, piping, and equipment). Intrusive samples should be collected under a formal work control program and in compliance with applicable SB requirements.

3.5.4 Nonintrusive Sampling

In some nuclear cases, nonintrusive NDA samples may be required. Collection of this data should be done using an approved NDA program so that the data are usable and acceptable to internal users, DOE, regulators, and disposal sites (e.g., Nevada National Security Site [NNSS]).

3.5.5 Waste Handling Plans (WHPs)/Waste Profiles

The WHP discusses the types of waste to be disposed, the quantity of waste to be disposed, the planned disposal facilities (e.g., NNSS, Waste Isolation Pilot Plant), the waste profiles to be developed or used, transportation issues, waste storage and staging, and the waste anomaly program and includes the SAP required to determine which waste disposal facility is appropriate and how WAC for the disposal facility is met.

3.6 Removals/Other Preparation Work

In 1984, Congress authorized the land disposal restrictions program as part of the Hazardous and Solid Waste Amendments of 1984 (HSWA) to the Resource Conservation and Recovery Act of 1976 (RCRA). HSWA prohibits the land disposal of untreated hazardous wastes and requires EPA to specify either concentration levels or methods of treatment for hazardous constituents (i.e., treatment standards) to meet before land disposal.

Numerous items typically found in shutdown facilities are prohibited from direct land disposal. Examples of common land ban items include mercury-containing devices, transformer oils, refrigerants, lead items, fluorescent lights, and batteries. It is impractical to list all items in this BP. The C&D/D Project Team should ensure the Environmental Compliance (EC) and WM SMEs are engaged to identify required item end points.

Other materials and stored inventory should be evaluated for removal during C&D/D. It is possible that some or all must or should be removed as a part of C&D/D. The Environmental

and WM SMEs should designate the required C&D/D EC-related removals that must be complete for C&D/D. These removals should be quantified, provided to cost estimators and schedulers, and added to the Demolition-Ready Checklist. Although it is impractical to provide a complete list of removals that will be required, common items that may require removal include:

- Asbestos
- Chemical traps
- Vacuum tubes
- Mercury switches
- Motor oils
- Transformer oils
- Incandescent lights
- Fluorescent lights
- Ethyl chloride bulbs
- Stringer light bulbs/wobble light bulbs
- Lead and lead-lined cabling/piping
- Stored legacy waste
- Fissile materials
- Explosives/shock-sensitive items
- Refrigerants
- Polychlorinated biphenyl items
- Classified items
- Tensioned cables

In addition to item removal, various preparation actions may need to be taken on the structure, piping, and equipment. Project SMEs (e.g., Engineering, Nuclear Facility Safety, Demolition, Environmental, WM) should identify those preparation actions to achieve required C&D/D end points. Although a complete list of actions is impractical, various preparation actions to be taken during C&D/D that may be required include:

- Applying fixative/fogging and/or foaming to certain items
- Marking items with paint (to facilitate segregation during demo)
- Unbolting equipment (to lessen tugging/pulling/ripping during demolition)
- Plugging slab penetrations (eliminate conduits for waste migration during demolition)
- Backfilling trenches
- Surveying for endangered species

While it is impossible for this BP to provide C&D/D end points for every conceivable situation, the following considerations may help. For facility areas that are High Contamination Areas, the C&D/D Project Team should evaluate whether it is practical to

scabble or encapsulate the areas to reduce them to just Contamination Areas. In terms of removal decisions, the C&D/D Project Team, in consultation with the Demolition Team (if possible), should evaluate whether certain items need to remain for demolition due to the hazards posed to C&D/D workers if removal is attempted during C&D/D. Other factors that should be considered in C&D/D removal/preparation end-point decision planning include:

- The contaminant involved and its toxicity and mobility.
- Radiation exposure potential.
- Cross-contamination exposure (e.g., demolition/size reduction activities inadvertently increasing the quantity of difficult to dispose waste by spreading it).
- Weather impacts (e.g., wind, rain).
- Demolition approach (e.g., explosives, traditional excavators with shears, open-air, enclosed).
- Impact of demolition on fixative/fogging effectiveness (if used).
- Level of confidence in being able to locate and remove a needed waste item during demolition.
- Security (e.g., visibility, theft).
- Other factors.
- Some facilities may have nesting species that have taken up residence. The C&D/D Project Team should consult with their Environmental SME to correctly identify the species and confirm how best to address their nests during C&D/D, and any special notifications that should be made to a future Demolition Team. Care must be taken to understand and follow applicable laws and regulations.

3.6.1 Structural Issues

To ensure worker safety for C&D/D, Engineering should conduct a facility structural evaluation. The results of this should be factored into C&D/D planning. As a simple example, the floor in an aged, deteriorated facility may have reduced loading capacity. This could jeopardize the ability to safely remove items or implement preparatory actions during C&D/D. One or more floors might not support forklifts, skid steers, other needed C&D/D equipment, and even labor crews. An alternative C&D/D approach may be required.

Deteriorated roofs can pose numerous problems. Spalling concrete, water infiltration (especially in nuclear facilities), and corrosion are just a small listing of additional hazards that must be recognized and accounted for in C&D/D planning. The longer a facility awaits C&D/D, the greater the potential for structural issues to affect C&D/D planning and execution. Rainwater can be acidic. It can interact with construction materials, C&D/D PPE and related equipment, and chemicals to create subtle, easily overlooked, but serious complications to C&D/D work.

3.6.2 Abatement

Facilities being transitioned to D&D are typically old and may have been poorly maintained prior to transition. The presence of water and lack of ventilation can lead to growth of mold. Due to their age, these facilities often have asbestos-containing materials (ACMs) of construction. Materials hazardous to worker health, such as beryllium, may also be present

as a result of facility mission. These hazards must be abated, usually early during in the C&D/D process.

Asbestos is often the most prolific hazardous material encountered in excess facilities. It exists as flooring and/or ceiling tiles, transite siding, roofing materials, wallboard joint compound, window glazing, electrical wire insulation, and pipe lagging. The current practice is to completely remove all ACM from a facility prior to full-scale demolition. Some cases for which open air demolition of asbestos-containing roofing have been allowed because the hazard to workers on an old roof was judged as unsafe. When present, exterior transite siding typically should be carefully removed, double-bagged, and disposed as an initial task during demolition prior to heavy machine demolition.

EPA and state regulatory agencies have extensive requirements for the management of asbestos.

3.6.3 Vent, Purge, Drain and Inspect (VPD&I)

Some facilities may have piping and equipment containing hold-up liquids or gases. Those materials may pose nuclear criticality, waste transportation and disposal, or other concerns. As a part of C&D/D, SMEs may require that this piping and equipment be opened, purged of liquids/gases, drained/vented, and inspected via borescope or other methods to confirm removal success. An assumption that by opening valves and tapping piping low points, all the fluids will drain out may be a flawed assumption. Valve failures, chemical reactions over the years, and other factors may create situations that prevent fluids from draining to low points.

Intentionally leaving liquids or gases in piping or equipment is typically an unacceptable end point for C&D/D and should be avoided. Unexpected liquids or gases found during demolition waste transportation or disposal can create significant, severe, and widespread problems. Any instance of intentionally leaving liquids or gases during C&D/D should be clearly highlighted in a C&D/D report (see Section 3.8.8, “Completion Report and Declaration of Demolition-Ready”) and explicitly communicated to the future Demolition Team, if known.

During demolition, waste segregation, size reduction, loading, hauling, and disposal, the presence of residual liquids and gases could result in extremely serious, adverse consequences to workers, the public, and the environment (e.g., release of hydrogen fluoride, in-commerce spill of mercury [Hg]).

3.6.4 Targeted Removals

SMEs may define required end points for items (e.g., specific equipment, piping) that require their removal from the facility to achieve the required C&D/D end state and set demolition up for success. There are numerous potential reasons for such removals, among others:

- NCS concerns (e.g., fissile deposits that could go critical during demolition, size reduction, or loading)
- Contamination and cross-contamination control concerns (e.g., highly mobile technetium-99 [Tc-99], plutonium [Pu])
- Regulatory agreements (e.g., regulators may insist certain items of concern to them be removed prior to demolition)

- NHPA requirements (e.g., items to save for NHPA purposes, documentation required to allow C&D/D work and/or demolition work to begin)
- Security requirements (e.g., visual concerns; man-portable concerns)
- Waste disposal requirements (e.g., commingling risk during demolition complicates segregation required for multiple disposal sites)

For unusually complex or high-risk removals (e.g., chemical traps containing a large fissile deposit), the C&D/D Project Team should consider whether employing mock-ups would be of value to help team members practice and prepare for complex/high-risk removals or processing (e.g., size reduction of items that require placement in a specialty shipping cask during C&D/D).

The key point is for the C&D/D Project Team to plan out the demolition and waste disposal approach and complete needed C&D/D removal tasks to make the demolition and waste disposal approach executable and efficient.

3.6.5 Equipment and Piping Preparation

SMEs may define as an end point that specialized preparatory actions be taken on piping and equipment that will remain in the building after C&D/D. For example, for contamination control or security or disposal facility subsidence prevention reasons, there may be value in applying engineered, expandable foam to piping and equipment internals. For certain equipment, demolition might be safer and more controlled if certain pieces of equipment/piping is unbolted or precut/tabbed (e.g., a pull tab on a soft drink can) during C&D/D to ensure it fails quickly in the right place during demolition to lessen tugging/pulling/ripping by demolition equipment.

For some high-risk piping and equipment that can't be safely removed during C&D/D, it may be important to easily segregate them into separate demolition debris piles for waste disposal reasons (e.g., characterization may conclude that some piping must go to disposal facility A, and other piping must go to disposal facility B); application of a highly durable, visible engineered paint during C&D/D may facilitate this. However, this approach should be minimized since it may not be as effective as envisioned; items can easily be lost or covered with demolition debris and dust and accidently overrun by heavy equipment.

There are too many possible preparation scenarios to list. The key point is for the C&D/D Project Team to think through the demolition and waste disposal approach and complete needed C&D/D tasks to make that approach executable and efficient. Potentially endangering workers by sending them back into a structure after demolition starts in order to address a problem that could have prevented with better upfront planning should be avoided.

3.7 Waste Disposal

The WM SME's early involvement in C&D/D planning is crucial. Factors such as identifying acceptable disposal sites, waste transportation methods, required container types (e.g., B-25 box, fissile qualified) and waste dimensions (e.g., maximum allowable dimensions, weights, allowable quantities of fissile materials), can drive what C&D/D activities must take place, including end points of specific items.

In some cases, a highly specialized cask or other waste container is needed. Due to limited availability and high demand, early planning and coordination with the cask or container

supplier must take place. Due to demand, these suppliers may commit to a fairly narrow window of availability. The project team's performance to schedule becomes increasingly important in such situations to ensure that they are ready to use and release the cask or container prior to the window closing.

C&D/D waste should not be generated until after the path for its disposal is known, containers are available, and the receiver site has confirmed they will accept the waste.[9]

3.8 C&D / D Complete / Demolition-Ready Tasks

3.8.1 Checklist

A C&D/D Complete/Demolition-Ready Checklist should be prepared (see Appendix B as an abbreviated example). This comprehensive checklist should list all pre-demolition activities to be completed and confirmed as complete prior to the start of demolition. Acceptance of completion of each activity should be indicated via a signature for each line item by both the person responsible for completing the activity and a verifier (i.e., from the perspectives of EC, IH, the Waste Coordinator, the PM, and Engineering), as required.

The checklist is unique to each facility and should be prepared with full engagement from the C&D/D Project Team.

3.8.2 Engineering Declaration of Condemnation

Upon completion of C&D/D, a professional civil/structural engineer should collaborate with the FM and formally condemn the facility. Placards, other signage, and/or barriers to prohibit personnel entry should be placed at any facility that has been condemned. However, in the condemnation declaration, an allowance may need to be made for an emergency or other situation to allow reentry into the condemned structure if it can be shown safe to do so.

It is possible that extenuating circumstances (e.g., the facility contains NPTD waste) prohibit the C&D/D Project Team from condemning the facility at the end of C&D/D. There may be an ongoing need to periodically reenter the facility and conduct some level of S&M.

3.8.3 Final Deactivation of Utilities

Depending on the facility and requirements, final C&D/D of special supporting utilities/services may be required. This might include isolating and/or removing nuclear CAASs, security systems, FP systems, operating sump pumps, and other items once the FM and owners confirm the requirement for them has been eliminated by completed C&D/D activities, or exceptions have been approved.

3.8.4 Final Removals

Because of demolition waste disposal requirements or other issues, it is possible that C&D/D tools, equipment, and materials must be removed as part of the C&D/D scope. Therefore, one of the last C&D/D steps is to remove these items from the facility and demolition exclusion zone. Example items are power distribution panels, power carts, and temporary

[9]There can be circumstances where a facility's structural condition has deteriorated enough to preclude pre-demolition characterization due to the significant hazards posed to characterization workers.

lighting. Depending on the facility involved, a complication can arise; these items may now be contaminated and require decontamination and/or disposal.

3.8.5 Safety Basis update

Depending on the facility and demolition strategy, at the conclusion of C&D/D or at other key step-down points, the SB may need updating. As an example, if the overall strategy is to conduct demolition of a NF with no nuclear criticality controls, then nuclear criticality concerns would need to be resolved in the C&D/D (e.g., removal and/or neutralization of criticality concerns) phase. After C&D/D, the approved Documented Safety Analysis/Technical Safety Requirements controls should be revised via a downgrade/replacement, if needed. A key point to remember is that C&D/D will change a facility, often dramatically; the SB should be kept current with these changes.

3.8.6 Fire Protection

Similar to SB updates, FP documents may require updating, e.g., Fire Hazard Analysis to a TFHA.

3.8.7 Demobilization

Demobilization typically will include removing C&D/D support facilities, equipment, and other tasks to shut down the C&D/D project. If demolition is scheduled to commence soon after C&D/D, the C&D/D Project Team should coordinate with the Demolition Team to identify items of benefit to the Demolition Team (e.g., truck stands, fencing) that should remain.

3.8.8 Completion Report and Declaration of Demolition-Ready

Depending on the facility and the expected time gap between Demolition-Ready and Demolition, there may be value in preparing a completion report to document the finished C&D/D condition. A clear, complete report can help eliminate potential misunderstandings and/or miscommunications with the future Demolition Team regarding exactly what was removed from the facility, what was left in the facility, and nuances regarding specific preparation steps taken.

For example, if a fixative were used, the specific fixative name, why it was used/its purpose, where and how it was applied (e.g., number of coats, drying time between coats) and any deviations from manufacturer's recommendations (e.g., dilution); or if foam were used, where and how it was applied, foam type and density, any deviations from manufacturer's recommendations, etc. The ambient temperature and humidity when fixative is applied can influence its effectiveness. If demolition is not expected to commence soon, systems and access may need to remain to monitor and or replace these systems if they degrade. This is particularly important if there is waste stored in the facility.

As another example, structural or other conditions may have prevented the manual removal of required items (e.g., mercury pumps, stored transite panels items on a collapsing floor). The Demolition Team will need to know the location of these remaining items so that they know to exercise special care and perhaps engage an alternate method of accomplishment to safely and compliantly remove these items during demolition.

4. POST-C&D/D S&M

Ideally, following C&D/D, there will be no need to continue S&M: the building would be ready for demolition. In other cases, due to funding constraints or changes in execution priorities, a facility may require some level of post-C&D/D S&M. For example, it may be important to sustain the roof integrity of a contaminated facility to prevent an uncontrolled release of contamination along with other complications commonly caused by water infiltration. The receiving post-C&D/D S&M program should be apprised of key facility aspects that need to be addressed by S&M as well as details regarding the physical end state that the C&D/D Project Team delivered. There may be particularly challenging areas that require in-depth communication and planning as a part of turnover to S&M (e.g., facility-related tunnels or other aspects that are difficult to access and inspect).

The post-C&D/D S&M program should have procedures and schedules for inspections and required CAs.

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5. REFERENCES

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10 *CFR* Part 1021, *National Environmental Policy Act Implementing Procedures,* Washington, D.C.

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WRPS-IB-13-001, *When Field Conditions Differ from As-Built Drawings*, Lessons Learned, January 24, 2013, Washington River Protection Solutions (Hanford Site), Richland Operations Office, Office of River Protection, Richland, Washington.

APPENDIX A. Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities

9285.4-03/S

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 22 1994

MEMORANDUM

SUBJECT: Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities

FROM: Steven A. Herman
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Elliott P. Laws
Assistant Administrator
Office of Solid Waste and Emergency Response

TO: Waste Management Division Directors, Regions I-X
Federal Facilities Leadership Council, Regions I-X
Superfund Branch Chiefs, Regions I-X
Regional Counsels, Regions I-X

This memorandum transmits to you the Agency's "Guidance on Accelerating Environmental Restoration at Federal Facilities." The guidance is the result of a cooperative effort between EPA, the Department of Energy (DOE) and the Department of Defense (DoD) to institutionalize accelerated cleanup approaches already in place at federal facilities and to further encourage and support efforts by federal agencies to develop streamlined approaches to the cleanup of hazardous waste.

The guidance was developed by the Federal Facilities Enforcement Office along with the Federal Facilities Leadership Council,[1] Headquarters and regional offices. DOE, DoD and members of the Civilian Federal Agency Task Force also reviewed and contributed to the formulation of this guidance. There have been several drafts of this guidance and at each stage of the review, we have incorporated comments that we believe will foster a more efficient and effective environmental restoration process. We thank you for your assistance.

Attachment

[1] The Federal Facilities Leadership Council is comprised of Branch Chief level staff from regional program offices as well as representatives of the Office of Regional Counsel from all ten regions.

cc: Mike Stahl
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Bob Van Heuvelen
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AUG 22 1994

MEMORANDUM

SUBJECT: Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities

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PURPOSE

The purpose of this guidance is to encourage and support efforts at federal facilities to accelerate and develop streamlined approaches to the cleanup of hazardous waste.

BACKGROUND

On July 7, 1992, U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response (OSWER) issued OSWER Directive No. 9203.1-03, "Guidance on Implementation of the Superfund Accelerated Cleanup Model (SACM) under CERCLA and the NCP" to address accelerating cleanup of private Superfund sites. The OSWER directive stated that separate guidance would be issued for accelerating cleanup of federal facility sites. This guidance is being issued as a supplement to the OSWER guidance.

Washington, D.C.

In order to encourage and facilitate the acceleration of hazardous waste cleanup at federal facilities, the EPA Federal Facilities Enforcement Office (FFEO), the U.S. Department of Defense (DoD), and the Department of Energy (DOE) met to consider ways in which this goal could be achieved consistent with the requirements of §120 of the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP) and Executive Order (E.O.) Number 12580, 3 C.F.R. 193 (1987).

CERCLA §120 and E.O. 12580 establish certain unique requirements with respect to federal facilities. In addition, the potential for cooperative decision making between the lead federal agencies, EPA and the states, in consultation with community groups, offers opportunities for flexibility at federal facility sites. To improve and accelerate cleanups at federal facility sites, it will be necessary to identify available opportunities, take creative approaches to managing uncertainty, empower field managers to make decisions, be prepared to review past conclusions when necessary and develop decisions that appropriately address the reduction of risk to human health and the environment as expeditiously as the law allows.

EPA also seeks to encourage accelerated cleanup at federal facilities through the use of innovative technologies, as appropriate. (See OSWER Directive 9380.0-17). Although the time constraints imposed by CERCLA §120(e) to initiate the Remedial Action (RA) within 15 months of remedy selection may discourage the use of federal facilities for research and development of new technologies, EPA is willing to explore, in appropriate circumstances, a "decision-sharing" approach in order to provide incentives to develop innovative technologies for environmental restoration. Where states are a party to the Interagency Agreement/Federal Facilities Agreement (IAG/FFA), they need to be a party to the decision making process. Where innovative technology may offer accelerated cleanup at federal facilities, EPA may allow for changes in scheduled activities, and provide technical support to the federal agency. Such an approach should be based on decisions acceptable to EPA, state environmental regulatory agencies, the lead federal agency and the public.

EPA is fully committed to improving the overall performance of environmental restoration activities at all federal facilities and to put into practice, in collaboration with federal agencies, the states and the public, strategies that accelerate the cleanup process. Potential areas for streamlining and accelerating the cleanup process are: standardize technical and field methodologies, use of removal actions to address imminent and substantial endangerment, use of non-time-critical removals and interim response actions, use of sampling data for both the Site Investigation (SI) and the Remedial Investigation (RI), use of focused Feasibility Studies (FS), use of presumptive remedies,

concurrent document review, early Remedial Design (RD) starts, plan, scope and use site assessment data for removal or remedial determinations, develop common measures of performance (e.g., risk reduction), delineate regulatory responsibilities (e.g., Resource Conservation and Recovery Act (RCRA), CERCLA) and improve team work at sites amongst regulators and the facility.

EPA has recently begun working with DOE on a joint pilot project to evaluate the effectiveness of a streamlining approach developed by DOE. The Streamlined Approach for Environmental Restoration (SAFER) is being implemented at four DOE facilities and is being closely monitored and evaluated by EPA and DOE. SAFER was developed by DOE to manage the uncertainty associated with environmental restoration activities and to address stakeholder concerns early in the process. DOE expects that this approach will result in more efficient and effective waste cleanups.

With respect to CERCLA, this memorandum focuses on accelerating cleanup of those facilities which either are "National Priorities List (NPL) caliber" (i.e., likely to be listed on the NPL), proposed for or listed on the NPL, because the scope of EPA involvement at federal facility Superfund sites is defined in CERCLA §120 and E.O. 12580 as focused at NPL sites. It is intended, however, that approaches to accelerated cleanup will also be applicable to cleanups under RCRA and cleanups undertaken in the context of military base closure. EPA's RCRA program is currently developing guidance on the use of a streamlined approach for the corrective action process.

EPA also is in the process of issuing guidance on future land use and innovative technology. These documents may be useful for implementing acceleration measures.

Site Assessment

Efforts should be made to simplify or consolidate site assessments by planning and performing required studies and collecting data in such a way that the studies and data collected can be used to satisfy multiple purposes. Under current practices, hazardous waste sites may receive numerous sequential assessments prior to the inception of cleanup. Rather than sequentially conducting a Removal Preliminary Assessment (PA), Removal SI, Remedial PA and Remedial SI, where possible, the studies should be consolidated in one site assessment and one site report, provided the report includes findings required by the NCP for moving from one phase of site assessment to another.

A more flexible approach to site assessment will generally require the agencies that either own or operate the facility to improve the quality of the information collected in order for it to be useful beyond the PA/SI stage. Improved levels of Quality

Assessment/Quality Control (QA/QC), identification of background levels and adequate sampling and analysis methods may facilitate multiple use of the data. To facilitate the regulatory process under CERCLA or RCRA, early consultation with EPA and states and early involvement of the public will be essential. This approach will also help in the determination of clean parcels based on Community Environmental Response Facilitation Act (CERFA) requirements.

Lead agencies are encouraged to adopt innovative approaches to field sampling with the understanding that they will sample to a level that will produce a defensible level of data that will allow sound cleanup decisions to be made. (EPA and the Air Force are currently piloting a field method of site characterization.) In order to balance the uncertainty that may arise from less detailed initial site assessment, it may be necessary to develop contingent Records of Decision (RODs) that will provide for alternative remedies should additional data be uncovered that makes the preferred remedy impracticable.

"Early Actions" v. "Long-Term Actions"

Although federal facilities are encouraged to take early actions at any facility where risk reduction can be accomplished promptly, the response action chosen must be one that will satisfy CERCLA and its implementing regulations. Early interaction with EPA, the state and the public will help ensure that removal actions are consistent with long-term actions and that cleanup levels will be based on risk assessment and Applicable or Relevant and Appropriate Requirements (ARARs) that will be sufficient to be the final action, whenever possible.

The need to promptly address sources of contamination, without compromising environmental requirements, at all federal facility sites should be addressed by means of a removal, operable unit RODs, and/or interim remedial actions, once a federal facility has been listed on the NPL.[1] Strong consideration should be given to non-time-critical removals (NTCRs) (i.e., where an estimated 6 month planning period is required), that will achieve results comparable to a remedial action, but which may be completed in less time. The NCP provides that in selecting a NTCR action, the alternatives must be evaluated in an engineering evaluation/cost assessment (EE/CA) which must be provided to the public for no less than a thirty

[1] When using removal authorities delegated by Executive Order 12580, other federal agencies should consult with EPA, states and the public to ensure that the action is consistent with overall facility restoration goals and will result in cleanups consistent with the operable unit ROD and/or the final installation-wide ROD to delete the site from the NPL.

(30) day comment period prior to the selection of the action. (See 40 CFR 300.415(b)(4) and (m)(4)).

Opportunities for accelerated cleanup may be the greatest for actions that fall between time critical removals and remedial actions; i.e., for NTCR at which rapid risk reduction is possible. All parties will benefit if the lead federal agency provides EPA and the state with an adequate regulatory role in the removal planning and decision process, including consultation on the removal action decision and monitoring progress of the action. Such an approach gains the regulatory assurances that the removal actions will be consistent with the final remedy. Without this early participation, the federal agency, EPA and the state may later be required to expend additional resources if there is an inconsistency.

Careful consultation with EPA and the states will be essential in the identification of ARARs in the removal or remedial decision process. ARARs analysis remains a part of the removal decision process since the NCP requires that in removals, ARARS be met to the extent practicable. As noted in the OSWER directive (OSWER Directive No.9203.1-03, July 7, 1992, at 7), it should generally be practicable to meet ARARS in NTCR actions. However, to the extent that the scope of those actions is limited, the issue of attaining ARARs may be deferred to later remedial actions.

Presumptive Remedies

Historically, a substantial amount of time and money has been expended in the remediation process to address similar or recurring contamination problems. EPA and federal agencies have received substantial criticism for studying sites too long and not moving ahead with response actions. Federal agencies, with the cooperation and concurrence of EPA and the states, should focus on developing standardized solutions consistent with the requirements of the NCP (i.e., 40 CFR 300.420(b)(iv)). Standardized approaches offer the opportunity to streamline the investigation and cleanup process, provide consistency in dealing with recurring problems and should result in significant saving of resources at all agencies. EPA has developed presumptive remedies for CERCLA municipal landfill sites (OSWER Directive Number 9355.0-49FS) and CERCLA sites with Volatile Organic Compounds (VOCs) in soils (OSWER Directive Number 9355.0-48FS). EPA in consultation with other federal agencies will begin the development of presumptive remedies more specifically relevant to federal facilities such as remedies for jet fuel spills (e.g., Jet Propulsion 4 (JP4)).

Presumptive remedies are expected to improve the focus of data collection efforts during the site assessment, site inspection and remedial investigation activities. Employing a

presumptive remedy approach, data collection efforts should focus on seeking information adequate to confirm the site type. If the site type is one for which a presumptive remedy has been developed, data collection should next be focused on characterization needs for that particular type of site. Following site characterization, a focused Feasibility Study (FS) or Engineering Evaluation/Cost Analysis (EE/CA) may be sufficient when employing the presumptive remedy approach.

These focused analyses may be streamlined using presumptive remedies by limiting, as appropriate, the discussion of the identification and screening of technologies and response action alternatives. Similarly, the Proposed Plan and ROD or Action Memorandum may be streamlined by focusing primarily on the presumptive remedies being considered. Finally, the remedial design may be streamlined by using the data collected earlier in the process and drawing on the existing programmatic knowledge of the design of the particular presumptive remedy.

The following are some initial steps which could lead to the development of presumptive remedies at federal facilities:

- Identifying types of contamination for which such an approach is feasible;
- Establishing a structure for getting state/federal/local regulators and facility staff together early in the process to decide on cleanup methods, and Data Quality Objectives required; and
- Identifying pilot sites at which to test the feasibility of the approach.

If studies at pilot sites validate the use of a presumptive remedy, information on that remedy will be made available to similar sites. Proposed presumptive remedies will be evaluated and addressed consistent with OSWER Publication 9203.1-021, Superfund Accelerated Cleanup Bulletin\Presumptive Remedies.

Sites that have common contamination problems that lend themselves to presumptive, standardized approaches may also be good candidates for innovative technology development. Innovative technologies that are developed for a cluster of similar sites could result in significant cost and time savings.

Public Participation

Accelerating cleanups may require employing new and innovative strategies and processes that may be of concern to affected stakeholders. Choosing removal and interim remedial responses may raise policy and legal questions related to ARAR compliance and the merits of early action. Affected public

stakeholders should be given an early and meaningful opportunity to participate in a comment and response process that results in decision-making. Federal facilities should consider establishing Site-Specific Advisory Boards (SSABs) or their equivalent, early in the decision-making process for the purpose of sharing technical and regulatory concerns and providing a forum for dialogue on cleanup decision related issues.[2]

Effect on Existing Federal Facility Interagency Agreements

Federal facilities listed on the NPL are subject to IAGs under CERCLA §120(e)(2) which provide for enforceable schedules for the conduct of RI/FS work and for the implementation of selected remedies, including interim remedial actions. The implementation of the IAGs is also subject to the public participation requirements of CERCLA §117. Most IAGs do not provide enforceable schedules for removal actions.

IAGs provide for the opportunity to change or modify milestones. To the extent that acceleration efforts affect milestones, the parties to the IAG should review the schedules and modify as appropriate. The statutory mandate for IAGs must be considered in the evaluation of the restoration strategy at federal facilities. CERCLA §120(e)(2) provides that IAGs be entered into at or about the time of remedy selection. No explicit role is defined for EPA in CERCLA §120 relative to removal actions. However, in consideration of the Congressional mandate for EPA involvement in the remedy selection process, the federal facility must exercise its removal authority with prudence. That is to say that not all response actions should be categorized as removals, thereby obviating regulatory involvement.

Decision Teams

Under the SACM model, OSWER views Regional Decision Teams (RDTs) as the key to the successful implementation of accelerated

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[2] The role of Site Specific Advisory Boards is discussed more fully in the Interim Report of the Federal Facilities Environmental Restoration Dialogue Committee, February 1993. The Report recommends that SSABs include individual residents of communities where the site is located, representatives of citizen, environmental and public interest groups in communities where the site is located, workers or representatives of workers involved in site cleanup and representatives of Indian Nations and other indigenous people with rights affected by cleanup activities at the site. A Technical Review Committee (TRC) or Restoration Advisory Board (RAB) with sufficiently broad membership and involvement at a site may provide the mechanism for this purpose.

cleanup at private sites. While it is suggested that the make-up of the RDTs may vary from region to region, the general assumption is that a team would include an EPA Branch Chief, On-scene Coordinator (OSC), Remedial Project Manager (RPM), Office of Regional Counsel and site assessment representative. The purpose of the RDTs is to provide continuity throughout a project and to centralize and expedite decision making.

Under Executive Order No. 12580 and CERCLA §120, federal agencies, other than EPA, have jurisdiction for carrying out most response actions at federal facility sites. As EPA is not the lead agency at such sites, its role is different from that at other Superfund sites.

To achieve the purpose intended for RDTs at a federal facility, the lead agency could create an empowered site-specific team to perform a number of the RDT functions, such as establishing a site-wide sampling strategy, deciding whether to use early or long term actions, making recommendations for approval of the Action Memorandum and screening proposed remedial actions. A team including representatives of EPA, the state, the community and the federal agency could accomplish the overall goal of accelerating cleanup by improved coordination and simplification. This cooperative model is currently being employed in the base closure program.

Improved planning and cooperative decision making between lead agencies, EPA and the states will be necessary because of fixed and often limited resources. A decision to proceed with a removal may result in delaying other activities at the site. A site-specific team should consider the implications of available alternatives and seek buy-in from affected stakeholders early in the decision-making process.

CONCLUSION

As described above, there are significant opportunities for the acceleration of environmental restoration at federal facility sites on the NPL. EPA is supportive of coordinated efforts between agencies on the development and initiation of projects that accelerate the cleanup process. EPA views the focus on accelerated cleanup of hazardous waste sites as an opportunity to work cooperatively with other federal agencies in order to more effectively achieve our joint goal: protecting human health and the environment.

PURPOSE AND USE OF THIS GUIDANCE

This policy and any internal procedures adopted for its implementation are intended exclusively as guidance for employees of the U.S. Environmental Protection Agency. This guidance does not constitute rulemaking by the Agency and may not be relied

upon to create a right or benefit, substantive or procedural, enforceable at law or in equity, by any person. The Agency may take action at variance with this guidance or its internal implementing procedures.

Addressees:

United States Environmental protection Agency
- Waste Management Division Directors, Regions I-X
- Federal Facility Leadership Council, Regions I-X
- Office of Regional Counsel, Regions I-X

United States Department of Energy
- Environmental Restoration Office Directors
- Assistant Managers for Environmental Management, DOE Operations Offices

United States Department of Defense
- Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health
- Deputy Assistant Secretary of the Navy for Environment and Safety
- Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health
- Director, Defense Logistics Agency (DLA-CAAE)

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APPENDIX B. Demolition-Ready Checklist (Example excerpt)

Note: This table should list specific, verifiable tasks that must be completed to reach the desired end state. In this excerpt, the desired end state is a condemned building and the Demolition Team and equipment being ready for demolition and demolition waste shipment. Task types are grouped according to three categories: Building Condemnation, Demolition-Ready, and Demolition Waste Shipment-Ready.

Category No.	Category	Main tasks	Items	Responsible person	Verifier
1.1	Building Condemnation	Verify equipment large fastening bolts and hardware removed	"A" Motors		
1.2	Building Condemnation	Verify equipment large fastening bolts and hardware removed	"B" Process Equipment		
1.3	Building Condemnation	Verify asbestos removed	Process Area		
1.4	Building Condemnation	Verify asbestos removed	Ductwork		
1.5	Building Condemnation	Removal of RCRA-related items	Mercury switches in operations room		
2.1	Demolition-Ready	Confirm the following are in place	Demolition equipment onsite and available for use		
2.2	Demolition-Ready	Confirm the following are in place	Demolition equipment operators trained and qualified		
2.3	Demolition-Ready	Confirm the following plans are in place	Verify Endangered Species Act surveys complete		

Category No.	Category	Main tasks	Items	Responsible person	Verifier
3.1	Demolition Waste Shipment-Ready	Confirm the following are in place	Approved waste profile		
3.2	Demolition Waste Shipment-Ready	Confirm the following are in place	Implemented Disposal Site Hazard Assessment document revision		
3.3	Demolition Waste Shipment-Ready	Confirm the following are in place	Approved Readiness-To-Ship Checklist		

APPENDIX C. Example Cold & Dark/Deactivation (C&D/D) Plan Outline

(Source: *Deactivation Implementation Guide*, U.S. Department of Energy [DOE] Guide [G] 430.1-3, Section 4.2, page 16; expired September 29, 2003)

Introduction. Describes the purpose and overview of the plan and summary strategy.

Project Objectives. Describes the purpose of the deactivation project and explains its driving objectives.

Project Scope. Describes the affected facilities and the major actions that comprise the project.

Project Organization. Describes the project organization and all functional relationships and discusses the roles and responsibilities with respect to accomplishing the project objectives.

Project Management and Control. Describes the systems and processes to manage and control the project (e.g., cost, schedule, scope). This section of the project plan document also includes a process for issue resolution and technical decision-making.

Project Baseline. Contains a roll-up summary of the work breakdown structure, schedule, proposed milestones, and cost estimate.

End Points. Describes the process used to develop the end points.

Quality Assurance (QA). Describes the policies and procedures to be used to meet QA objectives.

Regulatory. Provides an overview of the deactivation project regulatory drivers and the proposed approaches to ensuring compliance.

Safety and Health. Provides the safety basis (SB) and the strategy and methods to be used for evaluating the hazards associated with the project activities. The strategy includes integration of worker safety and health issues, as well as protection of the public and dislocated site workers.

Communications. Outlines a plan for public and stakeholder outreach and involvement and provides the proposed communications objectives and methods.

Project Risk. Provides an outline of the method to be used in performing a project risk assessment.

The supporting appendices to the deactivation project plan can provide more detailed documentation, additional cost and schedule data, and guidance to project staff for day-to-day management of the project, and are developed, maintained, and approved by the C&D/D contractor.

The following topics and their descriptions are offered for consideration as supporting appendices to be included as part of the C&D/D project plan.

- **Work Management.** Describes the work management system and procedures to be used in the performance of project objectives.
- **C&D/D Project Baseline.** A quantitative definition of cost, schedule and technical performance that serves as a base or standard for measurement and control during the performance of an effort; the established plan against which the status of resources and the effort of the overall program, field program(s), project(s), task(s), or subtask(s) are measured, assessed and controlled. Once established, baselines are subject to change control.
- **Schedule.** The C&D/D project schedule should identify the required activities, durations, predecessor/successor logic, critical path, and responsibilities (see U.S. Government Accountability Office [GAO] *Schedule Assessment Guide, Best Practices for Project Schedules*, GAO-16-98G, December 2015).
- **WBS Dictionary and Basis of Estimate.** Describes the key assumptions and work scope for each C&D/D activity included in the baseline schedule.
- **Cost Estimate.** Provides the project cost estimate.
- **Schedule Preparation and Change Control.** Describes the schedule preparation methodology and best management practices. This appendix also identifies the procedures for schedule maintenance, change control, and status reporting.
- **Configuration Control.** Describes the configuration control practices to be used for the project. It also identifies the compliance approach with the site configuration control procedures and how waivers or exemptions will be approved and documented (see DOE-STD-1073-2016, *Configuration Management*).
- **Technical Baseline Development and Control.** Describes the relationship of systems engineering to preparation of the technical baseline. The best management approaches for development of technical baseline documentation should be described here.
- **Project Metrics.** Identifies the performance measures to be used to communicate project performance.
- **End-Point Document.** Contains the facility-specific material stabilization and facility deactivation end-point criteria and the agreed-upon end points. These end points define the work that will be performed during the C&D/D project, which is integrated and presented in the current fiscal year execution plan.
- **End point Closure Methods and Practices.** Provides the acceptable methods and procedures for end-point closeout to ensure that a consistent and defensible end-point closure is achieved.
- **Surveillance and Maintenance (S&M) Plan.** Outlines the facility-specific S&M activities to be performed in conjunction with the C&D/D project activities to ensure the facility's safety envelope is maintained in a safe, efficient, compliant,

and cost-effective manner. This plan includes the key interfaces with project activities, the phase-out of pre-C&D/D S&M, and the phase-in of post-C&D/D S&M as required. Post-C&D/D S&M is performed until demolition activities begin.

- **Health and Safety Documentation.** Provides detailed implementation procedures for the S&H plan identified in the first part of the deactivation project plan.
- **Project Risk Assessment.** An assessment of C&D/D risks that is a combined effort between the contractor and the customer. It typically will include identification and analysis of project and program risks to ensure an understanding of each risk in terms of probability and consequences and mitigation strategies.
- **Radiological (RAD) Controls.** Describes the as low as reasonably achievable implementation and RAD exposure/dose reduction practices. This appendix includes projected RAD dose estimates and the actual measured doses. It also defines the key RAD control management indicators.
- **Waste Management (WM).** Identifies the projected wastes by type and volume and captures the waste generation actuals. WM, pollution prevention (P2), and waste minimization (WMin) practices and methods are also identified. Other regulatory aspects may be included as appropriate.
- **Closure Plan**. Provides detailed actions to be completed during C&D/D to accomplish the closure of specific systems in compliance with regulatory or other requirement

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APPENDIX D. Memorandum on Recycling

The Secretary of Energy
Washington, DC 20585
July 13, 2000

MEMORANDUM FOR HEADS OF DEPARTMENTAL ELEMENTS

FROM: BILL RICHARDSON

SUBJECT: Release of Surplus and Scrap Materials

The Department of Energy's (DOE) management of surplus and scrap materials has evolved over many years. Effective management of these materials has become more complicated over the past decade because the Department has begun generating them in larger quantities as it closes many facilities and expands its environmental management activities. Moreover, since much of this material was once used in nuclear operations, our management of it must continue to take into account safety and security issues, but we also want to address recently voiced public concerns that are not faced by most other Federal Agencies or by private industry.

For several months, we have been actively reviewing ways to improve our management of materials which might be released from departmental control. My goal has been to identify ways to better ensure protection of public health and the environment, openness and public trust, and fiscal responsibility.

I thank the Reuse and Recycling Task Force I established last winter for their contribution to the Department's review. While the work of the task force is now complete, many of its members will be involved over the coming months further developing and implementing changes to our policies and procedures.

On January 12, 2000, I placed a moratorium on the Department's release of volumetrically contaminated metals pending a decision by the Nuclear Regulatory Commission (NRC) whether to establish national standards. The NRC continues to review the issue, and the moratorium remains in effect.

Today, I am hereby directing further action in four areas: improvement of the Department's release criteria and monitoring practices; expansion of efforts to promote reuse and recycling within the complex of DOE facilities; improvement of the Department's management of information about material inventories and releases; and the accelerated recovery of sealed sources. Also, I am suspending the unrestricted release for recycling of scrap metals from radiation areas within DOE facilities. This suspension will remain in effect until improvements in our release criteria and information management have been developed and implemented as described below.

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Our existing release criteria, described in DOE Order 5400.5, limit the potential for radiation exposure to the public to levels well below applicable requirements. Our experience using these criteria, however, demonstrates that even this very low potential exposure is not fully acceptable to the public. Our experience with existing criteria also shows that most scrap metal released is either not contaminated at all or has residual levels of surface contamination well below the current DOE standard.

Henceforth, the Department will not allow the release of scrap metals for recycling if contamination from DOE operations is detected using appropriate, commercially available monitoring equipment and approved procedures. To implement this decision, I am directing the Assistant Secretary for Environment, Safety and Health, with appropriate resource support, to revise DOE directives and associated guidance documents applicable to scrap metal releases through a public process, as described below, by December 31, 2000.

The Department will publish proposed changes to DOE directives and guidance for at least sixty days of public review and comment. The changes will describe conditions whereby the Department uses appropriate, commercially available technology and the most appropriate monitoring and decontamination procedures to ensure that no detectable contamination from DOE operations remains on any scrap metal released into commerce for recycling from any portion of our facilities. The revised DOE directive will establish a review cycle to develop future updates to guidance consistent with lessons learned, advances in monitoring or decontamination technology and procedures, and new information such as any future rulemaking activity by the NRC.

Changes will also be made to DOE's requirements and guidance to improve the collection, maintenance, and reporting of information associated with releases of surplus equipment, scrap metals, and other excess personal property. We need better records on inventories of these materials; contamination, security, and other concerns associated with them; and the basis for decisions authorizing their release. This information needs to be maintained in a way that makes it easily accessible to the public (consistent with classification and other security requirements) and readily available to meet the needs of project and program managers.

Once the revised directives and guidance are in place, the Department will require each DOE site to have local public participation before the site may resume the unrestricted release for recycling of scrap metals from radiation areas. These public participation requirements must address each of the above mentioned elements associated with release criteria and information management. In addition, the Department will require individual sites to certify, through the responsible Program Secretarial Officer (PSO), that they have met all requirements of the revised order before the release of scrap metal from radiation areas for recycling can resume. In addition, each affected PSO will implement an

independent verification program to ensure that site activities continue to comply with the new requirements.

While updated release criteria and record keeping procedures are being developed and implemented, the Department will undertake several activities to promote internal reuse and recycling. All DOE programs and sites should expand their efforts to reuse and recycle materials within the Department. I direct the Assistant Secretary for Energy Efficiency and Renewable Energy to lead completion of a feasibility study on the potential use of a dedicated mill to recycle steel for reuse within the DOE complex. The study is to be completed within ninety days, after which I will receive the study's recommendations and determine if the Department will pursue the project further. Also, I direct the Chief Financial Officer to develop a set of proposed actions that will institutionalize incentives for internal reuse and recycling when such activities are cost-effective and protective of workers, the public, and the environment. The Chief Financial Officer will forward these recommended actions to me within 120 days for approval.

Finally, I direct the Assistant Secretary for Environmental Management to accelerate the Department's program to recover radioactive sources. The goal should be to recover over the next four years the backlog of commercial sources for which the Department has authority.