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ENVIRONMENTAL MANAGEMENT (EM) CLEANUP PROJECTS

[This Guide describes suggested nonmandatory approaches for meeting requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual.]

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INITIATED BY:
Office of Environmental Management

FOREWORD

This Department of Energy (DOE) Guide is for use by Environmental Management Program Offices. This guide intends to provide approaches for implementing the project management process in accordance with DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets,* dated 7-28-06. DOE Guides, which are part of the DOE Directives System, provide supplemental information for fulfilling requirements contained in rules, regulatory standards, and DOE directives. Guides describe a suggested non-mandatory approach for meeting requirements. Guides are not requirements and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual. This guide does not establish or invoke new requirements nor is it a substitute for requirements.

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TABLE 1. ACRONYMS

ACWP	Actual Cost of Work Performed
AE	Acquisition Executive
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
CD	Critical Decision
CDR	Conceptual Design Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CMP	Corrective Measures Plan
CMS	Corrective Measures Study
CP	Contract Price
CX	Categorical Exclusion
D&D	Deactivation and Decommissioning
DOE	US Department of Energy
DQO	Data Quality Objective
DSA	Documented Safety Analysis
ECAS	Environmental Cost Analysis System
ECES	Environmental Cost Element Structure
EIA	Electronic Industries Association
EIR	External Independent Review
EIS	Environmental Impact Statement
EM	Environmental Management
EM-1	Office of Environmental Management
EM-30	EM Program, Planning and Budget
EPA	US Environmental Protection Agency
ER	Environmental Restoration
ESH	Environmental Safety and Health
EVMS	Earned Value Management System
FDE	Facility Decontamination Evaluation
FFA	Federal Facility Agreement
FPD	Federal Project Director
FS	Feasibility Study
FY	Fiscal Year
G	DOE Guide
GFSI	Government Furnished Services and Items
HASP	Health and Safety Plan
HQ	Headquarters
HSS	Office of Health, Safety and Security
ICE	Independent Cost Estimate
IGCE	Independent Government Cost Estimate
IPABS	Integrated Planning, Accountability and Budget System
IPR	Independent Project Review
IPT	Integrated Project Team
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
LCC	Life Cycle Cost
LCCE	Life Cycle Cost Estimate
LLW	Low Level Waste
LOE	Level of Effort
LTRA	Long Term Response Action
LTS	Long Term Stewardship
LUCIP	Land Use Control Implementation Plan
MARSSIM	Multi Agency Radiation Survey and Site Investigation Manual
MR	Management Reserve
MTHM	Metric Tons of Heavy Metal
KPP	Key Performance Parameter

NEPA	National Environmental Policy Act
NFA	No Further Action
NPL	National Priorities List
NRC	US Nuclear Regulatory Commission
NTB	Near Term Baseline
O	DOE Order
OECM	Office of Engineering and Construction Management
OMB	Office of Management and Budget
OPER	Out-year Planning Estimate Range
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PARS	Project Accountability and Reporting System
PBCE	Performance Baseline Cost Estimate
PBS	Project Baseline Summary
PCR	Post Construction Report
PDRI	Project Definition Rating Index
PDSA	Preliminary Documented Safety Analysis
PEP	Project Execution Plan
PMB	Performance Measurement Baseline
QA	Quality Assurance
QC	Quality Control
RACR	Remedial Action Completion Report
RAIP	Remedial Action Implementation Plan
RAO	Remedial Action Objectives
RAOR	Risk Analysis and Opportunity Report
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RFI/RI	Remedial Facility Investigation/Remedial Investigation
RI	Remedial Investigation
RMP	Risk Management Plan
ROD	Record of Decision
RSA/ORR	Readiness Self Assessment-Operational Readiness Review
S&D	Stabilization and Disposition
S&GW	Soil and Groundwater
S&M	Surveillance and Maintenance
SE	Site Evaluation
SI	Site Investigation
SSC	Structures, Systems and Components
SWMU	Solid Waste Management Unit
T&PRA	Technical and Programmatic Risk Assessment
TPC	Total Project Cost
TRU	Transuranic Waste
TS	Treatability Study
TSCA	Toxic Substances Control Act
TSR	Technical Safety Requirements
TYSP	Ten Year Site Plan
VE	Value Engineering
WAEP	Work Authorization/Execution Plan
WBS	Work Breakdown Structure
WIPP	Waste Isolation Pilot Plant

1.0 PURPOSE

The purpose of this guide is to define how DOE O 413.3A is applied to Environmental Management (EM) cleanup projects. It also delineates how the regulatory processes for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), Atomic Energy Act (AEA), and US Nuclear Regulatory Commission (NRC) Decommissioning Plans fall into the Critical Decision (CD) process. This guide lays out the framework for executing a cleanup project within the DOE O 413.3A requirements, and supplements DOE O 413.3A by providing consistent project management guidance for EM cleanup projects.

1.1 OBJECTIVES

The major objective of this guide is to provide guidance to the federal project director (FPD), integrated project teams (IPTs), and Headquarters (HQ) program managers on nine unique project types, which are described in Section 2.0, and associated regulatory processes that should be included in the overall EM project management process. Other objectives include the following:

- Recommend the integration methods essential to EM cleanup projects and the regulatory drivers that have an impact on implementation of DOE O 413.3A. Regulatory drivers, which are not explained in this guide, include RCRA, CERCLA, the National Environmental Policy Act (NEPA), and the site specific Federal Facility Agreement (FFA). [See references 6.7, (NEPA) and 6.6, (CERCLA, RCRA) for additional information.]
- Define the types of projects and the differences with regard to the Critical Decision (CD) process and provide perspective on the way in which specific project management deliverables and the CD process may vary.
- Differentiate between the application of DOE O 413.3A to EM cleanup projects for a portion of (subset or subproject) or an entire project baseline summary (PBS). A PBS or subproject may include operations and facility support activities such as surveillance and maintenance.
- Address attributes of EM projects that are unique compared with traditional capital construction projects for developing a project performance baseline. A key example of this is the management of waste generated by the project. This guidance is needed because the nature of similar functional activities varies considerably from traditional capital construction projects. The EM project management goals for CD baseline development, performance measurement, risk, contingency, reviews, Quality Assurance and Integrated Safety Management (ISM) are highlighted in section 3.0 of this guide.

See references 6.13 and 6.14 for additional information and expectations regarding contingency.

2.0 SCOPE

A PBS is an EM designated program scope that contains a logical grouping of work activities, which are "projectized" through establishing technical scope, cost and schedule baselines; defining performance metrics; and providing financial history, budget request justification and other information such as programmatic risk and compliance drivers.

In most cases, EM defines a cleanup project as the entire PBS; however, a project may be a portion of a single or multiple PBSs. EM is responsible for clearly defining the composition of each project. The nine types of EM cleanup projects can be grouped into three major categories of Deactivation and Decommissioning (D&D) (section 2.2), Soil and Groundwater Remediation (S&GW) (section 2.3), and Stabilization and Disposition (S&D) (section 2.4) as follows:

- D&D
  - nuclear deactivation and decommissioning
  - non-nuclear deactivation and decommissioning
- S&GW Remediation
- S&D
  - radioactive liquid waste tank stabilization and disposition
  - nuclear materials stabilization and disposition
  - spent nuclear fuel stabilization and disposition
  - solid waste stabilization and disposition
  - waste disposal facility operation
  - waste and material transportation

A graphic representation of the types of EM Cleanup projects is provided in Attachment 1, "Environmental Management Cleanup Projects by Major Category and by Type of Project."

There are two types of PBSs, which are not considered EM cleanup projects. They are Safeguards and Security and the Community Involvement PBSs. The guidance provided in this document may be useful in the management of these PBSs. Within a cleanup project PBS, there can be one or more subprojects which are typically defined as a non-major acquisition comprised of a series of tasks or activities within a PBS that are related and have a specific objective. These subprojects can be contained within the nine types of projects identified above. Sections 3.2 to section 3.4 apply to these nine types of projects at PBS and subproject level.

2.1 Environmental Management Project Baseline Summaries

During fiscal year 2001, EM "projectized" its portfolio organizing scope, schedule, and cost of all EM activities into descrete projects. EM projects that have common attributes, such as a common assumed end state, geographic location, or activity type, were typically grouped under the rubric of a PBS, which is directly linked to the more detailed project baselines developed by each site. More recently, EM mandated that all EM projects produce and execute against certified near-term baselines (NTB), as well as produce reasonable out-year estimates.

2.2 Deactivation and Decommissioning Projects[1]

D&D are the two major phases of a facility disposition project.

In general, deactivation includes stabilization, removing nuclear materials, shutting down non-essential systems, and other activities to convert a facility from operations to a mode characterized as low surveillance and maintenance. Regardless of this generality, the scope of deactivation is flexible and project specific; in some cases, deactivation can include total cleanout of a facility.

Decommissioning is used to indicate achieving an end state (e.g., demolition, entombment) for a facility or group of facilities. Decommissioning of nuclear facilities is performed under CERCLA non-time critical removal action regulatory umbrella unless the circumstances at the facility make it inappropriate or unnecessary. This approach effectively integrates Environmental Protection Agency (EPA) oversight responsibility; DOE lead agency responsibility, and state regulator and stakeholder participation.

D&D may be conducted as two discrete activities, separated in time by an interim period of surveillance and maintenance, or they may be conducted integrally in which case deactivation activities usually occur early in the project. Decisions regarding the scope of D&D, the project end state, or whether or not to conduct D&D as a single project are dependent on factors such as budget, safety, and site and national priorities.

This does not mean that deactivation is not a part of the S&D projects. For five of the six S&D projects, deactivation is a customary phase at the end of an operations cycle prior to post-deactivation surveillance and maintenance.

2.3 Soil Groundwater Remediation Projects[2]

The soil and groundwater at most sites across the DOE complex is contaminated with hazardous chemicals, metals, or radionuclides that are harmful to human health and the environment. Cleanup of contaminated soil, groundwater, surface water, and biota at DOE sites continues under EM's S&GW program. S&GW projects are not like typical design-build construction projects. For example S&GW projects may include:

- subsurface contaminant characterization necessary to define the scope of work, which may involve extensive drilling, sampling, and analysis;
- excavation and disposal of contaminated media along with sampling, testing, and monitoring;

[1] DOE O 413.3A defines D&D as “decontamination and decommissioning.” For the purposes of this guide, however, that definition will not be used for D&D.
[2] DOE O 413.3A defines S&GW as environmental restoration (ER). For purposes of this guide, ER projects are called S&GW projects.

- treatment of contaminated soil and groundwater using one or more remediation methods to extract contaminants;
- immobilization and containment of the contaminant plume by stabilization methods and remediation methods;
- construction of underground barriers to restrict contaminant movement; and
- construction of engineered caps over contaminated waste areas to control contaminant movement.

Certain waste materials are regulated under the RCRA, a comprehensive law requiring responsible management of hazardous waste. Areas where hazardous constituents may remain uncontrolled and potentially released to the environment are identified as a solid waste management unit (SWMU) under RCRA section 3004(U). RCRA section 3004(U) mandates investigations and corrective actions at these units.

Sites included on the National Priorities List (NPL) fall under the jurisdiction of CERCLA, which imposes requirements for the remediation of releases of hazardous substances and inactive hazardous waste disposal sites. The NPL inclusion created a need to integrate the established RCRA facility investigation (RFI) program with the CERCLA requirements to provide for a focused environmental program. At several sites, DOE negotiated a FFA with the EPA and state environmental regulatory agencies to coordinate remedial activities into one comprehensive strategy to fulfill these dual regulatory requirements. RCRA and CERCLA regulatory processes are further discussed under section 3.

2.4 Stabilization and Disposition Projects

S&D projects are not defined as traditional projects but per DOE O 413.3A, can be managed as projects. The following are classified as S&D:

- radioactive liquid waste tank stabilization and disposition
- nuclear materials stabilization and disposition
- spent nuclear fuel stabilization and disposition
- solid waste stabilization and disposition
- waste disposal facility operation
- waste and material transportation

S&D Projects can include traditional projects. Activities such as deactivation, research, maintenance, start-up, and operations may be common to all EM cleanup projects.

3.0 EM PROJECT REQUIREMENT OVERVIEW

3.1 EM Project Management Principles

The following sections describe the basic project management principles applicable to EM cleanup projects and sub-projects. Secitons 3.2, 3.3, and 3.4 discuss the uniqueness of EM cleanup project types.

3.1.1 Critical Decisions

CD-0 through CD-4 are decision points to evaluate project status and to determine if the project is ready to go to the next phase and commit resources. CDs for S&GW and some D&D projects are driven by the regulatory requirements in the CERCLA, RCRA, and regulatory agreements with EPA, state and/or tribal authorities. These projects go through the same phases of initiation, definition and execution; however, the sequence and grouping of specific activities and the timing of CDs and documentation requirements for decisions may differ somewhat from those of other projects. Refer to Figure 1, "Environmental Management Cleanup Projects Framework," for an illustration of a typical CD process.

The terminology used within this guide in the discussion of CERCLA and RCRA documentation may differ based on Federal, State, and local regions and should be verified with the particular EPA regional office and/or state regulatory agency governing the facility location. Appropriate documentation of agreed upon terminology should be completed.

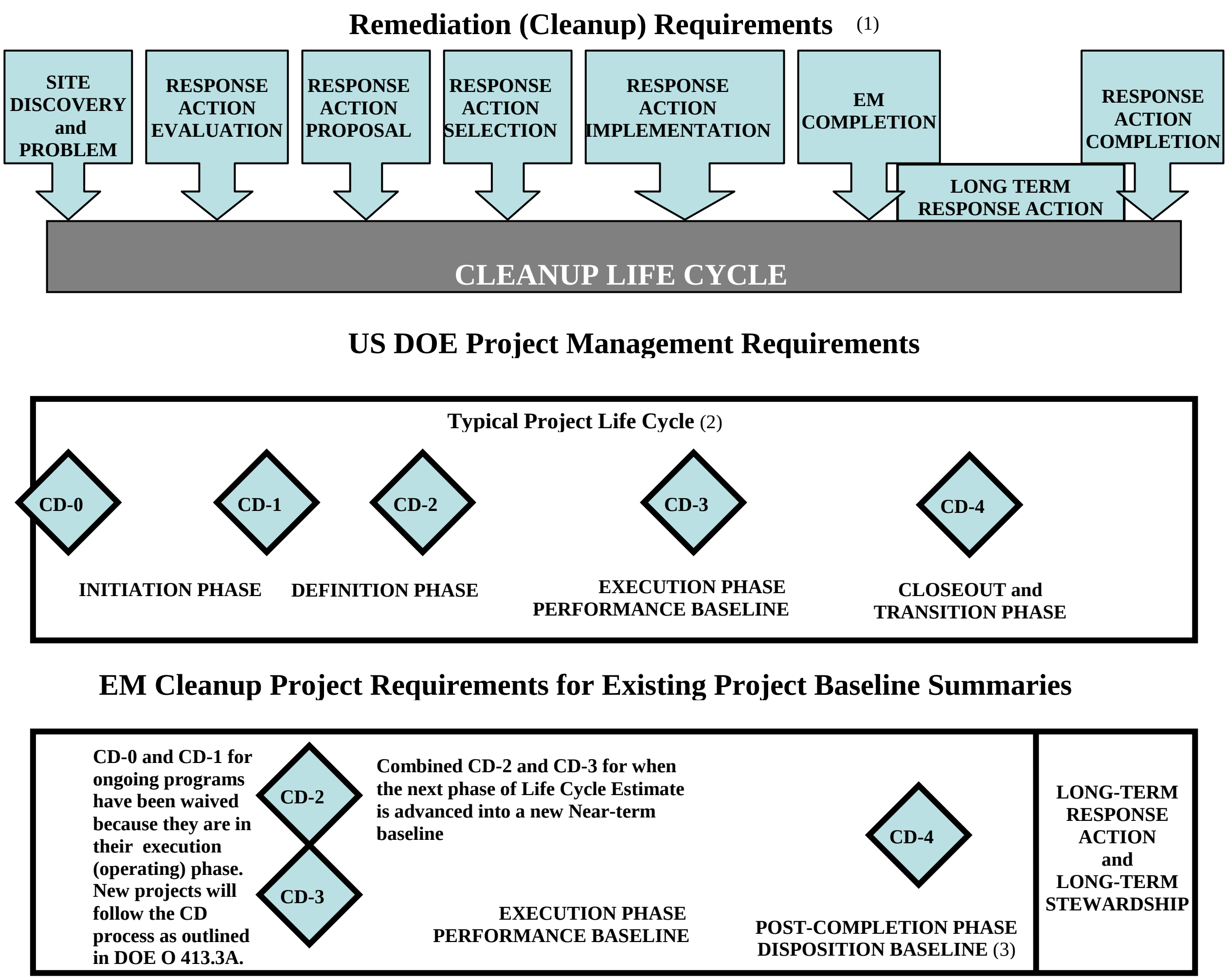
DOE Order 413.3A specifies "Project Closeout" (CD-4) in general terms for environmental management projects as the point at which a project may proceed to EM completion. More specifically, it is recommended in this guidance that project closeout and turnover address the following subjects:

- Identifying the receiving organization that will be responsible for managing the site after completion of a D&D and/or Soils and Groundwater project; for example a DOE Program Secretarial Office (PSO) such as Legacy Management, another Federal Department or Agency, State or Local community, and Indian Tribe, or others.
- Agreed-upon criteria for transfer such as an overall End State Definition and End Point Specifications; these can include, for example, physical conditions/configuration, allowable residual contamination, and specified records.
- Identification of project activities, such as operation of treatment systems and monitoring, to be terminated by EM or to be continued by the receiving party.
- The status of various agreements and commitments, for example based on regulatory requirements, legal settlements, contractual commitments, and others.

The record for CD-4 may take any of a number of forms that depend on who is assuming responsibility. A Memorandum of Understanding (MOU) would be typical instrument for transfer to another PSO.

For existing S&D projects, which were already in the execution phase, the EM protocol (reference 6.1) provides guidance on CDs. The CD-0, Approve Mission Need and CD-1, Approve Alternative Selection and Cost Range have been waived because S&D projects were already in their execution phase when EM decided to projectize them. Future projects and subprojects require implementation of the CD process as delineated in DOE O 413.3A with appropriate tailoring. For new S&D Projects or subprojects, CD-0 and CD-1 will not be waived.

Figure 1. Environmental Management Cleanup Projects Framework



Note: The above two CD processes show the typical example of capital projects compared to an existing EM Project Baseline Summary which has CD-0/1 waived and CD-2/3 combined. The CD processes are discussed further in Sections 3.2.1 and 3.3.1 of this guide.

1) The typical CERCLA cleanup process is shown. Other programs [e.g. RCRA, Toxic Substances Control Act (TSCA), US Nuclear Regulatory Commission (NRC), etc.] have a similar structure.
2) Department policy is to apply project management principles to cleanup.
3) Refer to DOE O 430.1B regarding requirements for preparing disposition baseline for real property assets.

3.1.2 Baseline Development

This section describes the general steps involved in developing a PBS baseline including how, when and by whom the NTB and out year planning estimate range (OPER), should be developed, and who should develop independent government cost estimate (IGCE) for future acquisitions and the role that the IGCE plays in the acquisition process and baselines updates. In March 1999, EM issued the Integrated Planning, Accountability, and Budgeting Systems (IPABS) Handbook. EM, through IPABS, directed HQ and field offices to projectize the entire EM Program work into PBSs. Refer to Figure 2 for the relationship between OPER, NTB and risk discussed in subsequent sections. Upon AE certification of the baselines, the NTB and OPER should be placed under configuration control as described in reference 6.15.

Further baseline requirements are listed throughout the EM protocol. EM cleanup PBS should be coordinated with baselines at the site and EM complex levels. Integration of complex-wide and site level baselines provides key information for the determination of:

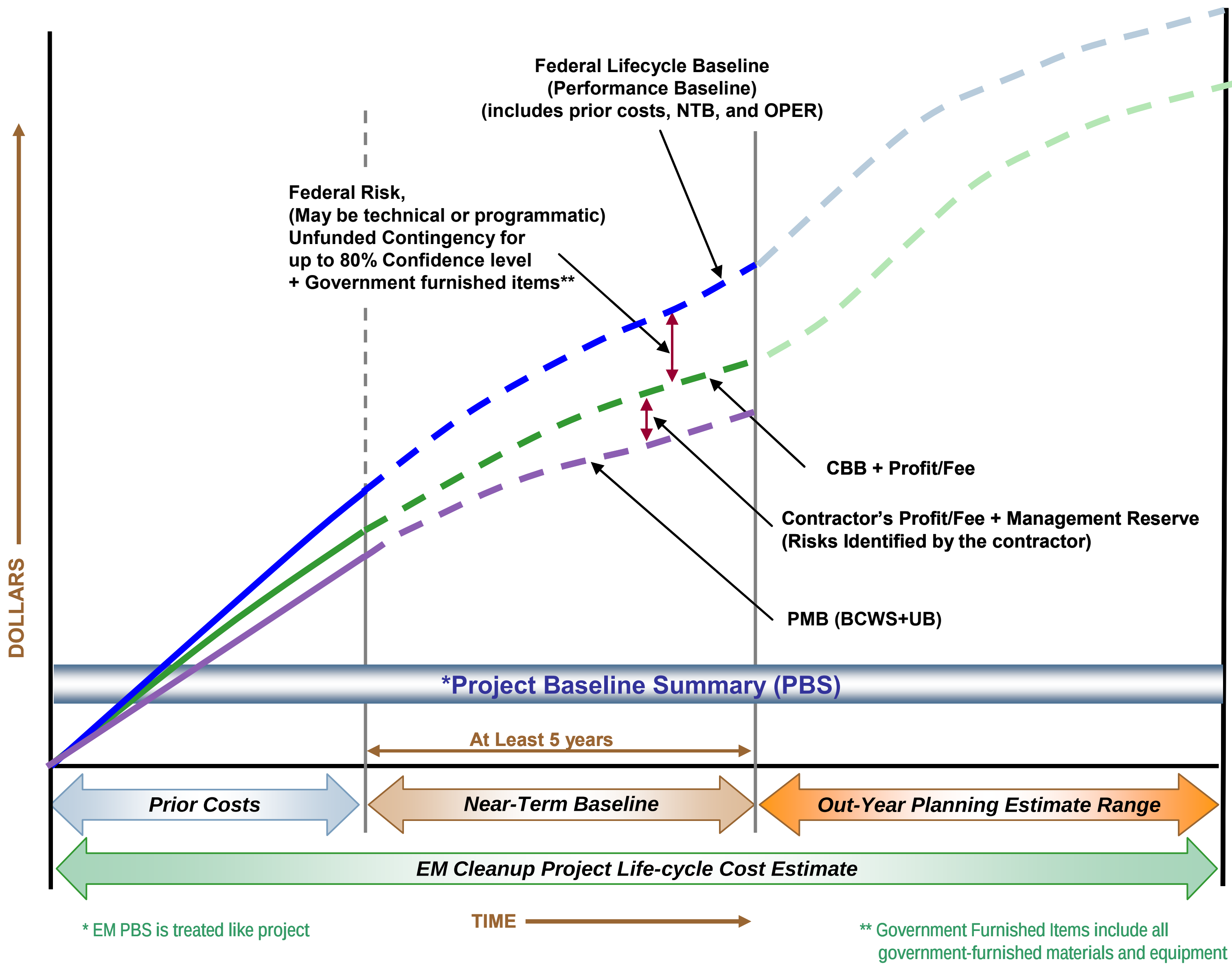
- construction of new facilities,
- operation of existing facilities, or
- expansion/modification of existing facilities.

Consolidation, disposition, storage, transportation, and solid waste functions should be considered during integration. Because the previous lists are not all inclusive, other activities should be considered. In addition, baseline integration supports the process of deactivation, decontamination, and decommissioning providing information that may lead to waste management or S&GW remediation activities.

The life cycle of an EM cleanup project is broken into three time frames (see Figure 2) as follows:

- Completed Work. This includes all actual costs from 1997 to the year before the Near-Term Baseline.
- NTB. This baseline will be a minimum of five years or for the period of performance of the current contract if it exceeds five years.
- OPER. This baseline has been defined as the first fiscal year following the last fiscal year of the current NTB through project completion.

Figure 2. Relationship of NTB and OPER in Project Life-cycle



3.1.2.1 Near-Term Performance Baseline (i.e., Near-Term Baseline)

The near-term performance baseline for EM cleanup projects will normally be a minimum of five years or for the period of performance for the current contract if it exceeds five years. For projects that are scheduled to be completed within a few years (up to 3 years) after the five-year period, the project certification may include the entire remaining out years. In the case where fewer than 5 years remain on the current contract, the NTB should include the current contract plus the expected period of performance for the next contract. For projects with durations of five years or less, the entire project may be included in the near-term baseline review. In all cases except possibly the tail end of the project lifecycle, the near-term baseline will start at the beginning of a fiscal year and be complete at the end of a fiscal year.

When the proposed near-term period is not completely covered by a contract, EM will be responsible for developing summary level planning packages for those years not covered by the contract. The entire near-term period may be included in the external independent review (EIR) or independent project review (IPR). Once the contract is awarded and a detailed near-term performance baseline is developed, a follow-up EIR or IPR will be performed to evaluate the completeness of the contactor's cost and schedule. The near-term performance baseline includes fee, management reserve (MR), and all costs associated with executing the project within the applicable window (e.g., 5 years). The fee and MR are reported outside the contractor's performance measurement baseline (PMB) but included in the contract price of the near-term performance baseline.

Because the number of years included in the near-term baseline can vary for each project, the final decision on the scope of the EIR including the length of the near-term baseline may be based on a negotiated agreement between the Office of Engineering and Construction Management (OECM) and EM. Near-term baselines will be aligned with target funding levels which are part of the current approved strategic funding plan (e.g., Five-Year Plan) issued by EM Program Planning and Budget. An EIR should be conducted on the near-term baseline if its cost is equal to or greater than $250M, otherwise an IPR should be conducted.

The AE will approve CD-2 and CD-3 for the near-term baseline within 6 months after OECM issues a memorandum certifying the near-term performance baseline or the certification may be considered void. The goal is to provide a draft EIR report within 30 days after the on-site visit is completed. Corrective Action Plans and closure of the actions is the joint responsibility of EM and OECM.

For EM cleanup projects an independent cost estimate (ICE) should be developed or an independent cost review should be performed as part of the OECM near-term performance baseline validation. An ICE should be performed where complexity, risk, cost, or other factors create a significant cost exposure for the Department.

3.1.2.2 Out-year Planning Estimate Range (OPER)

The OPER is defined as the first fiscal year following the last fiscal year of the current near-term baseline through project completion. The OPER is the baseline for uncompleted PBS scope not included in the near-term baseline. If the completion date remains constant, the timeframe of the

OPER will decrease each time a new near-term baseline is certified. Verifying the reasonableness of the OPER is part of the EIR or IPR review process.

The Office of Environmental Management, EM-1, approves the reasonableness of the OPER, and is responsible for managing, changing and controlling the cost and schedule ranges. The cost and schedule ranges may be adjusted annually based upon changing project or program conditions including directed changes.

EM may tailor the requirements of DOE O 413.3A to the OPER but at a minimum a summary scope of work, cost and schedule range, funding profile provided by Program Planning and Budget, EM-30, and a robust project and program risk management plan should be included. The amount of detail required will be less than the near-term baseline, and may vary from project to project based upon the complexity of the work, ability to define the remaining scope, regulatory drivers, disposition paths, existing or new technology requirements, etc. The scope of the OPER-EIR and required documents will be part of the OECM and EM negotiations. The OPER is reported in IPABS and in the planning section of PARS.

3.1.2.3 Work Breakdown Structure (WBS)

The WBS provides a product/activities-oriented structure that arranges, defines, and graphically displays all work elements in an organized and structured framework. The higher-level activities necessary to accomplish a defined scope of work should be identified during the planning phase of a project.

When possible, the Environmental Cost Element Structure (ECES) as described below should be used in development of the WBS and cost elements. The below structure may not be a good match for specific projects and the Federal Project Director should have some flexibility in choosing the the cost elements that make the most sense for managing and controllong the project in the most cost-effcient and appropriate matter.

The WBS is identifier information for D&D, S&GW, and S&D cleanup projects including waste management activities. It should incorporate or refer to standard EM cost categories per ASTM International (ASTM) Standard E2150, *Standard Classification for Life-Cycle Environmental Work Elements Environmental Cost Structure.* Use or reference to the Environmental Cost Element Structure (ECES) standard cost categories allows for the project historical costs to be captured in EM's historical cost database in the Environmental Cost Analysis System (ECAS). These historical costs can then be analyzed and used in the development of future baselines for NTBs and OPERs.

At the close of the contract period or as defined in the contract, contractors should provide to DOE completed project or project phase historical cost data for use in the ECAS at the level specified in the contract documents or by the DOE contracting officer. This cost categorization information is invaluable to the DOE for comparing the contract prices with the estimated cost in the IGCE and NTBs . The contractor can use a suitable WBS below that level to accommodate work activities in more detail for execution, performance measurement, and other purposes beyond supporting the historical cost collection efforts by EM through ECAS. The level of the WBS structure is determined contractually and through the reporting requirements.

A WBS dictionary that summarizes the scope of work included in any WBS element should be available so that the cost, schedule, and risk factors associated with that element can be analyzed.

3.1.2.4 Environmental Cost Element Structure (ECES)

The ECES is a lower level life-cycle work/cost breakdown structure that provides a framework for managing cost, schedules, and performance objectives of an environmental project developed by the Interagency Environmental Cost Engineering Committee to improve cost management of Federal environmental projects. The ECES enhances cost management by providing a comprehensive, consistent structure that allows cost collection and identification for all project phases and phase activities (e.g., program management, project management, or sampling and analysis, etc.). The ECES allows for the separation of project components into logical parts, which allows for task separation and the detailed monitoring of those components. These major tasks/activities can be followed by more detailed cost elements to facilitate bottoms-up cost estimating, cost reporting, and collection. In addition to its primary project management function, ECES can facilitate the solicitation process and compare project data between sites and agencies.

The ECES follows the major steps in the CERCLA and RCRA processes, including preliminary assessment, site inspection, remedial design, and construction.

The ASTM classifies the ECES as a national standard. The ECES standard is ASTM Standard E-2150-02, *Standard Classification for Life Cycle Environmental Work Elements - Environmental Cost Element Structure*. More information is available online at http://www.em.doe.gov/pages/Aceteam.aspx.

3.1.3 Performance Baseline

The contractor performance baseline (PB) is a subset of the NTB and is the baseline that the FPD, under EM configuration control, manages, controls, and monitors the progress during project execution. As such, a PBS is comprised of one or more PBs. It includes completed work (may include a completed NTB) and the current NTB. OPER work will be classified as PB once baselined as an NTB. The method of monitoring should be established during the development of the baseline and should include an earned value management system that is compliant with the American National Standards Institute/Electronic Industries Association ANSI/EIA 748-A-1998, Earned Value Management Systems (EVMS) (reference 6.2). EVMS data, major milestones, and key performance parameters (KPPs) including those listed in Table 2 are entered into PARS and IPABS.

Performance measurement only applies to the near-term baseline periods. Some unique performance metrics used for EM cleanup projects are described in sections 3.2.3, 3.3.3 and 3.4.3. EM Cleanup projects are unique in that they may have funded and unfunded contingency (see section 3.1.5).

Monitoring of the PBS at the HQ level is completed primarily using the Integrated Planning, Accounting and Budgets System (IPABS). Actual cost, schedule, and performance data are collected for each PBS and compared to the established baseline. All elements of the lifecycle baseline are under EM configuration control. Performance data include project performance measures and milestones. IPABS currently tracks performance through the corporate performance measures shown in Table 2, "Environmental Management Corporate Performance Measures." The EM Corporate Performance metrics are a range of activities that account for many of EM's cleanup activities across the complex. This includes D&D of nuclear, radiological, and industrial facilities (categorized in DOE-STD-1027-92) as well as S&GW remediation. These metrics are counted as complete upon acceptance by the local regulatory agency.

There are metrics associated with the stabilization and disposition of nuclear materials, nuclear materials storage areas, radioactive and mixed wastes, and tanks for storage of high-level liquid waste. The metrics listed in Table 2 are corporate performance metrics and with appropriate approval may be adjusted to better accommodate regulatory direction as well as changes to current practices. These performance measures are discussed fully at http://www.em.doe.gov/Pages/perfmeasdef.aspx.

Table 2. Environmental Management Corporate Key Performance Parameters

Category	Units
Plutonium, metal or oxide package for long term storage	Number of Canisters
Enriched Uranium packaged for long term storage	Number of Containers
Material Access Areas eliminated	Number of Areas
Plutonium or Uranium residues packaged for disposition	Kilograms of Bulk Materials
Transuranic Waste dispositioned	Cubic Meters
Depleted and other Uranium packaged for disposition	Metric tons
Spent Nuclear Fuel packaged for final disposition	Metric Tons of Heavy Metal (MTHM)
High-Level Waste packaged for final disposition	Number of Containers
Liquid Waste in Inventory eliminated	Kilo Gallons
Liquid Waste Tanks closed	Number of Tanks
Low-Level and Mixed Low-Level Waste disposed	Cubic Meters
Remediation completed	Number of Remediation Completions
Nuclear Facility completed	Number of Facilities
Radioactive Facility completed	Number of Facilities
Industrial Facility completed	Number of Facilities

3.1.4 Risk

This section provides additional fundamental requirements and information for the application of risk management to the EM programs and projects as required by DOE Order 413.3A, *Program and Project Management for the Acquisition of Capital Assets.* This information and fundamental requirements are not provided specifically in DOE G 413.3-7, Risk Management Guide.

The DOE G 413.3-7 Risk Management Guide's operable risk culture is captured in the EM risk management policy. The policy states that safety-related risks are to be avoided. In other risk areas, the handling strategy should first be analyzed for an avoidance strategy within the bounds of a cost/benefit analysis. If, however, the analysis does not justify an avoidance strategy, a step-wise risk handling strategy should be found that would eliminate or reduce the impact of forecasted risks.

EM's risk culture exists in a framework that is bounded by the extent to which an individual project can effectively absorb risks to the project within their scope. Risks to the project that cannot be effectively absorbed by the project should be clearly identified in the RMP. Other constraints exist within this framework and should also be recognized within the Risk Management Plans (RMPs) of both the federal and the contractor IPTs. These constraints, among others, include:

- Funding
- Schedule
- Human resources
- Equipment, material and other field office resources
- Technical knowledge

RMPs are to be developed and documented for all PBSs per the EM Protocol on both the NTB and OPER.

A fundamental component of the risk planning process is the federal RMP, which captures risks as well as risk handling strategies. The RMP is the roadmap that tells the government or contractor team how to proceed in risk management from where the project is conceptually to where the project is predicted to be in the future based upon initial risk management project planning documentation. During preparation for CD-1, the contractor will prepare a contractor RMP reflecting the risk handling strategy for the contract period.

These RMPs are strategic documents that state the processes that will be used to accomplish the overall risk process, the resources that will be applied, the schedule required for the initial completion of the first cycle of the process, and the first re-issue of the RMP with the Risk Register. The Risk Register is either included by reference or physically included in the RMP.

Depending upon the number of transferred threats or shared opportunities, a project may choose to have separate risk registers for threats and opportunities. It is recommended for large projects that a separate register be maintained for threats and opportunities.

Risk can be identified at the sub-project level, depending upon the size and complexity of the project. Individual subprojects, programs or projects within the PBS may require their own RMP, which may be contained expressly in the PEP or included by reference.

It is DOE policy that all contingency requests be supported by a quantitative risk analysis. Identified risks must be sufficiently characterized to support a quantitative analysis that all projects must undergo to support the contractor and EM cost and schedule contingencies. The quantitative analysis should be prepared in support of the CD-2 project phase, and the contingency management associated with the approved baseline should be fully implemented after the contract is awarded.

Qualitative analysis is also mandatory for projects within the EM program portfolio or field program office and is an integral part of the monthly project status reporting.

Unless otherwise specified in the PEP, the IPT for each project should prepare a formal risk report to the FPD, who should file a reviewed report with the Office of Project Management Oversight (EM-53) on a monthly basis. The report should be integrated with other metric reporting for the near-term. Although the project life-cycle risks are always important, the focus of the monthly status report should be near-term, often a 90-day rolling horizon, and changing life cycle risks should be addressed in more detail during the periodic quantitative updates (often performed on a quarterly basis).

The monthly risk report should contain the following:

- Status of the key project risks and explanations of any significant changes
- Review of risk handling strategies taken or postponed during the previous month and their effectiveness
- Review of risk handling strategies due during the next 90 days, including the responsible parties
- Review of any safety or security risk for which the avoidance strategy is viewed as presenting secondary risks

Discussion of the status of the risk should include more than whether the risk is open or closed. It could include items such as whether the trigger metric did not transpire and the risk time has elapsed; the risk has significantly changed and is being entered as a new risk; the risk handling strategy is being modified; or other information that might highlight such items as a lessons learned or a new risk item. These discussions are a necessary element of risk communication and feedback.

Any new risks which are identified during the risk reporting process should be entered into the risk register. If the project has had scope changes or other impacts that have resulted in changes to the project's risk profile, the risk identification process should be re-initiated and the risk register resubmitted either in hard copy or electronically during the reporting period when the changes are noted

All risks, including those risks which have been judged by the IPT to be qualitatively overall low in risk, should be reviewed. A report should be submitted by the contractor project manager to the FPD, and by the FPD to the appropriate designee in the Office of Project Management Oversight (EM-53) stating any changes in risk classifications and in the handling strategies for near-term risks.

On a quarterly basis, risks, including those risks which have been judged by the IPT to be qualitatively overall low in risk, should be reviewed. This review does not negate the need to maintain the review for trigger metrics for the risks.

The risks of the most concern for the next quarter should also be reported in the quarterly project review (QPR) or in a currently existing quarterly project report or review with the step-wise risk handling strategy with the date metric as it appears in the risk register for risk reporting.
Other quarterly reporting may be accomplished through the QPR through detailed supporting slides. In addition to the information contained in the monthly risk report, the quarterly report should contain the following:

- An updated project key risk table that reflects the current project level risks
- An updated Risk register including handling actions for risks ranked greater than an overall low classification with their associated due dates and responsible party for the risk handling strategy
- Identification, one level below the project level, of risks which have the largest potential to impact the project if their likelihood or their impacts were to increase over current projections

If changes in risk handling strategies and/or risk levels are indicative of a forecasted shortfall, an updated quantitative analysis assessing the adequacy of project cost and schedule contingencies is recommended.

3.1.5 Contingency

Contingency is an integral part of EM baseline budgetary and planning processes that acknowledges and makes provision for the possible impacts to project cost and schedule of latent project risks. Appropriate estimates, management, and funding of contingency are essential elements to project success.

Contingency is a tool used to help management respond to the uncertainty that is inherent in EM projects. Coupled with a well administered Baseline Management processes, EM cleanup projects set the stage for a project management culture that is Best-in-Class. EM contingency provides the flexibility to successfully deal with planned and unplanned project risks that would otherwise result in unanticipated work scope delays.

Cost and schedule contingency are project resources, which are expected to be used as risks and uncertainties are realized.

EM contingency policy creates several categories of contingency, each of which is discussed in this section. The various categories of contingency are used to provide EM and their contractors the ability to control project risks in support of the project success.

EM establishes the following categories of risk based contingencies:

- **Contractor Management Reserve (MR)** is for use by a contractor and is a portion of the negotiated contract cost estimate/target that the contractor sets aside for the management of risks within the contractor's contractual obligations. MR is maintained separate from the performance measurement baseline and is utilized by means of the contractor change control process. MR is determined by the contractor and it is not estimated at a specified DOE EM confidence levels.

  It is also important to recognize that the contract price is established by cost analysis and price analysis and once established is allocated to PMB, MR, and profit/fee; PMB, MR, and profit/fee are a function of contract price–contract price is not a function of PMB, MR, and profit/fee. As such, MR is determined as the resultant of the contact price less profit/fee, less PMB.

  (MR = CP – profit/fee – PMB)

- **Contractor schedule reserve** is for use by the contractor and is that portion of the overall project schedule duration that is estimated to allow for the time related impacts of risk.
- **EM project contingency** is for use by the FPD and is the portion of the project budget that is available for managing risk within the funded project baseline. EM policy establishes project contingency at a level that provides at least a 50 percent confidence level for completing the near-term baseline (NTB) for EM cleanup projects.
- **EM unfunded contingency** is applicable only to EM cleanup projects and is calculated as the additional funds that would be needed for managing project risk to bring the overall confidence level in completing the project up to at least an 80 percent confidence level.
- **EM schedule contingency** is for use by the FPD and is the portion of the overall project schedule duration that is estimated to allow for the time impacts of risk. EM policy establishes contingency to provide a project confidence level range from 50 to 80 percent for EM cleanup projects.

Newly certified NTBs are to identify any contingency needed to represent at least 50% confidence level regarding project risk (both contractor and DOE project risks). Any increment above the sum of the PMB, profit/fee, and other DOE direct costs, required to ensure this level of confidence will be identified as "DOE Contingnency (50% CL)." Requests for approval of new NTBs must reflect funding consistent with this level of contingency. EM policy related to "Unfunded Contingency" (i.e., the increment form 50% to 80% confidence level) remains the same. This guidance should be incorporated during the next rebaselining effort. This guidance by itself is not intended to trigger a rebaselining effort.

The intent of MR and contingency for both cost and schedule is to:

- Allow EM and contractor management the time and funding resources to respond to the changing risk circumstances of the project in a manner that will maximize the projects ability to hold project cost and schedules.
- Provide a risk-adjusted forecast of Estimate-to-Complete and completion date.
- Support the FPD and contractor project manager in aggressively managing the potential risks to the project.

The overarching goal of this section is to assist each EM cleanup project in the development of a consistent approach to contingency determination and management through:

- Contingency concepts such as MR, schedule reserve, project contingency, unfunded contingency, and EM schedule contingency.
- Development and management of cost contingency for EM related project risks.
- Development and management of schedule contingency for EM related project risks.

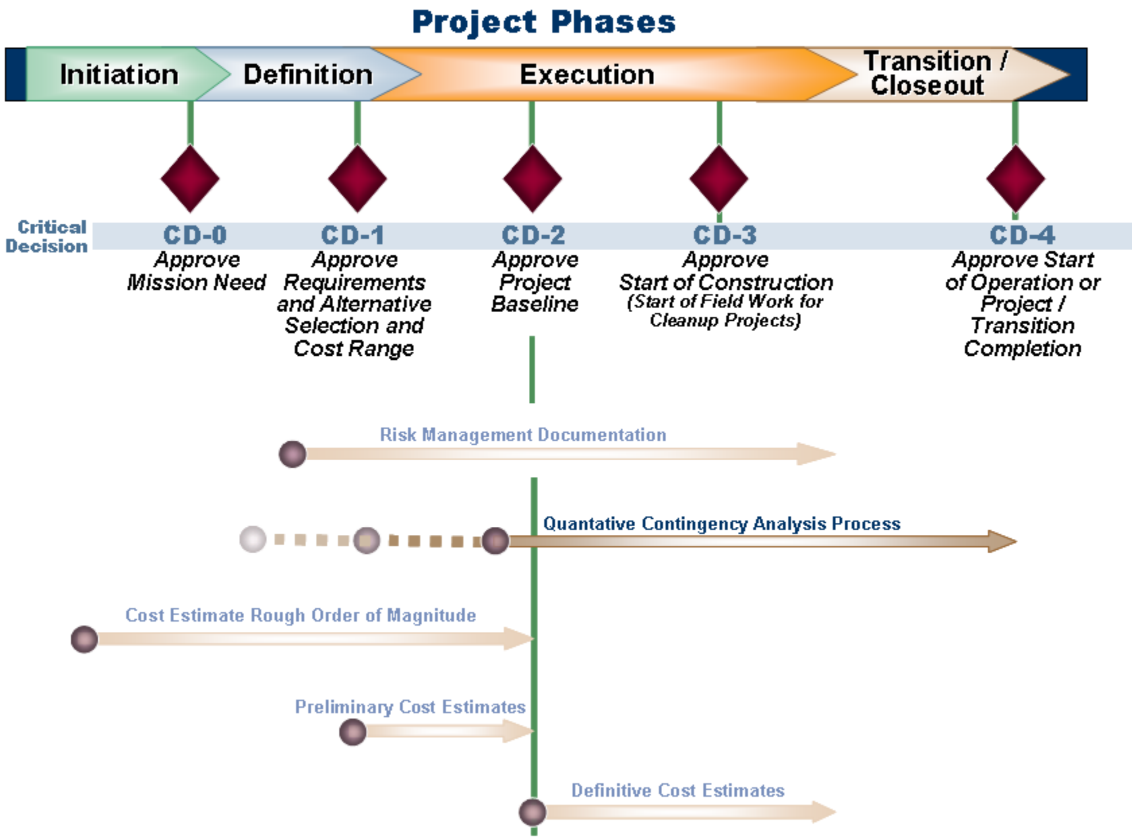
3.1.5.1 Cost and Schedule Contingency Development

Initial cost and schedule estimates are developed as rough-order-magnitude (ROM) estimate alternatives during the CD-0 project stage with contingency included as part of the ROM estimate uncertainty. As the project progresses toward the CD-1 planning stage a project approach is selected and the project scope refinement begins. After CD-1 approval an independent government cost estimate (IGCE) is developed providing a more definitive cost and schedule estimate of the project. During the CD-1 planning stage, a formal Federal Risk Management Plan should be developed identifying anticipated contractor and EM project risks as well as the cost and schedule impacts expected from these risks. At this stage of the project planning the project estimate is evaluated to provide at least at a 50 percent confidence level for budget planning (project funding) and at least an 80 percent confidence level for life-cycle planning. The project estimate to complete and project confidence levels will be periodically re-evaluated throughout the project's life-cycle.

To provide for the planning and development of the project OMB, Circular No. A-11, Part 7, *Planning, Budgeting, Acquisition and Management of Capital Assets,* states that life-cycle costs means the overall estimated cost for a particular program alternative over the time period corresponding to the life of the program, including direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance. The guidance also states new projects must be justified based on the need to fill a gap in the agency's ability to meet strategic goals and objectives with the least life-cycle costs of all the various possible solutions and provide risk adjusted cost, schedule goals, and measurable performance benefits.

The DOE G 413.3-7, Risk Management Guide recommends that risk management activities such as risk identification and risk assessment be initiated early in the project life-cycle. As a project matures, the detail and precision of the project baseline improves through the various critical decision (CD) phases (i.e., CD-0 to CD-4), as shown in Figure 3. Early project estimates are subject to large uncertainties and are based on conceptual scope definition. These early estimates use cost estimating relationships, parametric relationships, and historical data to provide ROM estimates of project cost. While it is possible to perform a Monte Carlo analysis on a ROM estimate, the results of the analysis do not add a great deal of value because the costs and risks are aggregated at such a high level. In addition, the project baseline and program uncertainty are quite high as a project progresses from CD-0 through to CD-2. Consequently, there is an elevated likelihood that many project risks will remain unrecognized or unidentified throughout the early project phases.

Figure 3: Project Scope Detail Improves as the Project Matures

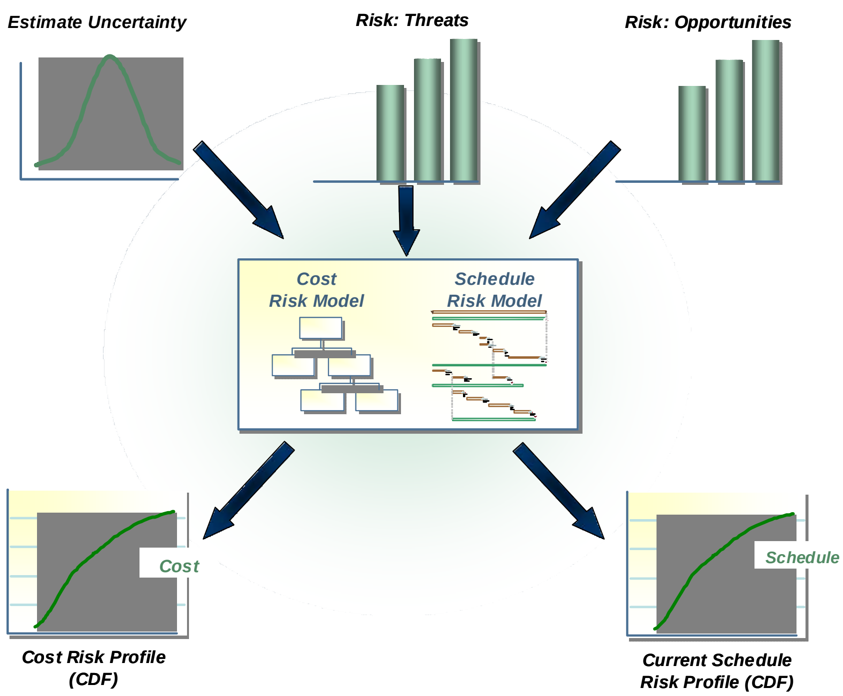


The DOE G 413.3-7, Risk Management Guide states that the preferred methodology for quantitative analysis is a Monte Carlo analysis. A Monte Carlo analysis requires a model that includes identified risks and uncertainties and defines their interrelationships. Normally, baseline cost estimates are the basis for cost risk models and critical path method (CPM) schedules are the basis for schedule risk models. Inputs to the analysis are the risks identified in the project risk register; the various risk likelihoods (probability of occurrence) and impacts (consequence) as well as the associated project cost and schedule uncertainties.

To complete the contingency analysis, a project may use an integrated cost and schedule model or individual cost and schedule risk models, as depicted in Figure 4. If separate cost and schedule models are used they must be developed using the same baseline information and assumptions. The interactions between the cost and schedule risk models must be integrated to account for hotel and other level-of-effort costs associated with project delays and extensions.

Because EM projects vary in complexity and scale, it is impossible to stipulate the exact design of the Monte Carlo models.

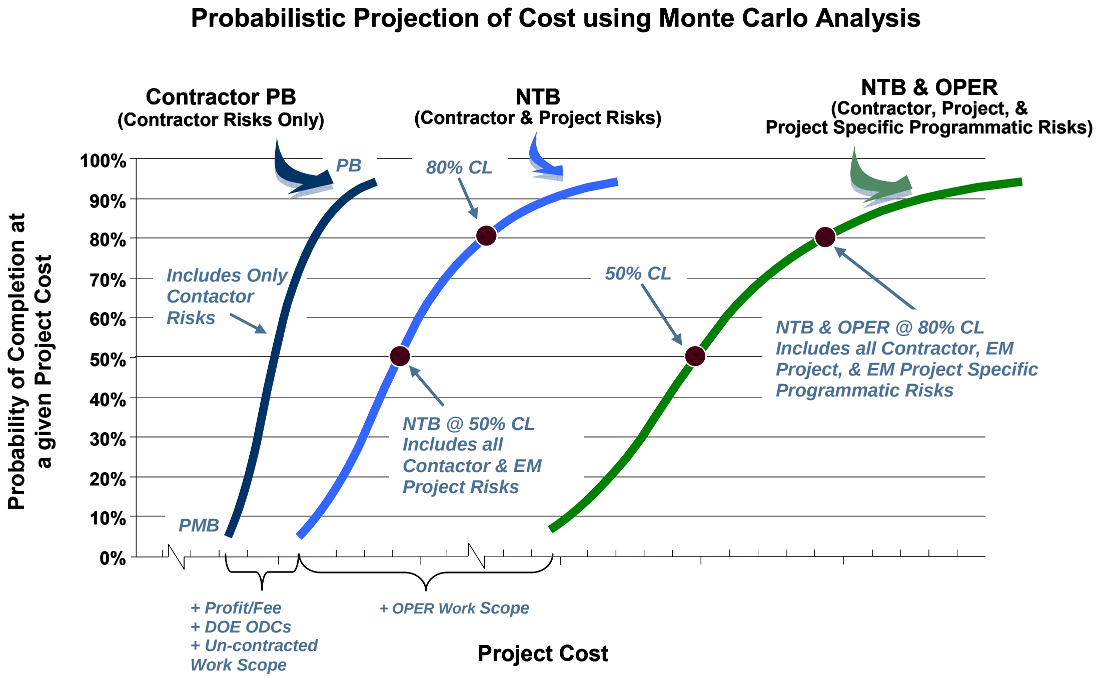
Figure 4: Conceptual Cost and Schedule Risk Analysis Process



The contractor's MR risk model is based on the project work breakdown structure (WBS) elements and their associated cost estimates. The risk model should only include the contractor risks that would normally be managed within the performance measurement baseline. The contractor's estimation of the contractor schedule reserve is typically based on the contractor CPM schedule using only the contractor risks that the contractor would normally be expected to manage within their contractual obligations.

Similarly, the calculation of EM cost contingency is based on the WBS and represents the incremental expected cost of the project related risks at a given confidence level. Due to the effects of risk interrelationship, competing risks, and compounding impacts, both EM project and contractor risks are included in the EM contingency calculation and contractor MR (representing contractor risks only) is subtracted from the total estimated contingency amount. Similar considerations apply to the calculation of the project's schedule contingency. Figure 5, is representative of the relationship between contractor MR, EM project contingency, EM unfunded contingency, and the EM project NTB and OPER baseline. The cumulative distribution function (CDF) curves (S-curves) shown in the Figure 5 represent the likelihood of successful project completion (y-axis) for a given project cost (x-axis).

Figure 5: S-curve Representation of MR, EM Project, and EM Unfunded Contingency



Each project may have a mix of current and future contract activities during the NTB period and may include multiple DOE contracts within the same project. The length of the NTB will be based on an agreement between the FPD and the AE. The NTB period for EM cleanup projects will be for a minimum of five years. Figure 6 provides a graphical representation of the NTB and OPER periods.

- For cleanup projects where less than five years remain on the current contract, the NTB should include the current contract plus the expected period of performance for the next contract.
- For cleanup projects which are scheduled to be completed within a few years (up to three years) after the five year period, the NTB includes the entire remaining out-years.
- For cleanup projects with durations five years or less, the NTB includes the entire project.
- For cleanup projects where the NTB equals the contract period which equals to the entire cleanup project baseline.

Figure 6: Near Term Baseline vs Contract and Future Contract Period

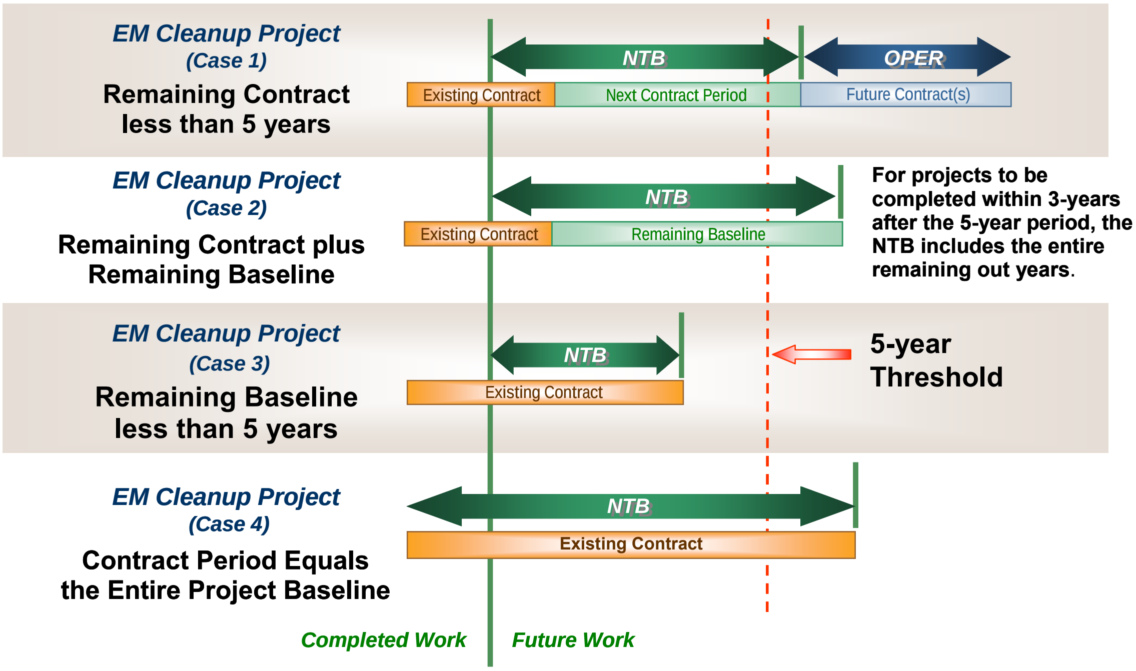
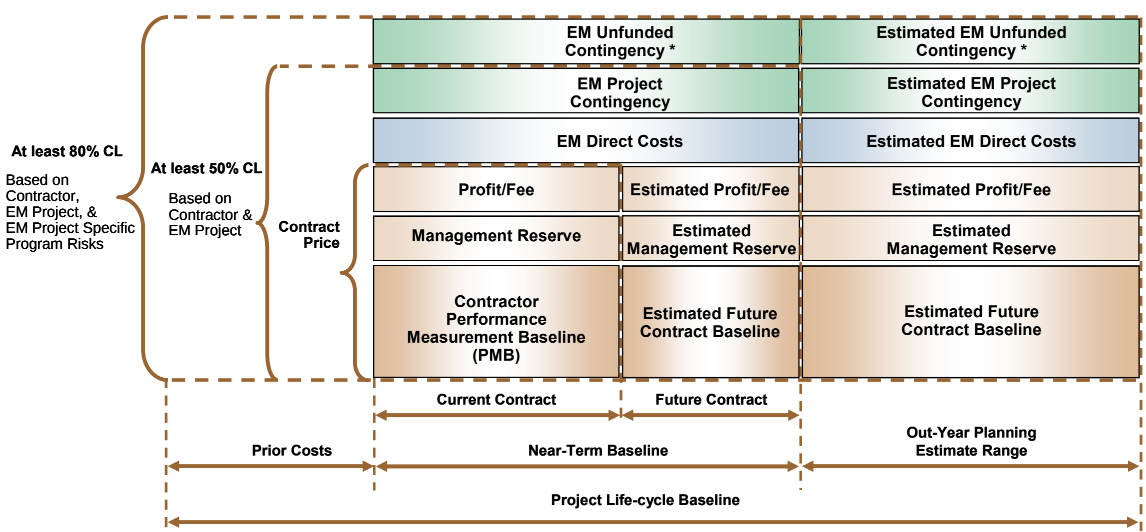


Figure 7 is applicable to EM cleanup projects and shows the components of both the current contract and the future contract period. Although the components in Figure 7 are similar for both current contract and the future contract periods, the methods used to estimate them may be very different with different degrees of uncertainty. Development of EM funded contingency for future contract scope within the NTB is required and it is recommended in the OPER to facilitate budget development, federal life-cycle baseline analysis, and strategic planning.

Figure 7: Project Lifecycle Components



* For EM Cleanup projects only

Figure 7 represents the fundamental building blocks used in the development of MR and contingency. This depiction is from a combination of EM documents including the Protocol for Environmental Management Cleanup Projects (reference 6.1), the Policies for EM Operating Project Performance Baselines (reference 6.14), and the Configuration Control Process for Project Baselines (reference 6.15). Policy reference 6.1 incorporates three project periods: the prior costs, the NTB, and the OPER. Policy reference 6.14 identifies the following attributes with respect to contractor MR and EM contingency, which are paraphrased below:

- Contractor MR and EM project contingency represent funds available for managing known project risks.
- To estimate EM unfunded contingency, EM performs a project life-cycle risk analysis of known project and project related programmatic risks. The estimated cost of risk impacts and risk handling strategies for managing those risks are an integral part of the contingency development.
- EM funding requests include PMB, contractor MR, Profit/Fee, EM other direct costs (ODC)/GFS&I, and any available EM funded contingency allocated to the funding year.
- Federal risk management plans identify both contractor and EM risks for the entire life-cycle of the project and are used to establish EM contingency amounts.
- EM programmatic risks generally involve activities like those associated with federal deliverables and can include: funding availability risks, technical complexities such as disposal paths, regulatory uncertainties, funding shortfalls, and schedule changes. In many cases, these federal deliverable risks can prevent or preclude a contractor from successfully completing the assigned contract work.

Once contingency estimates are developed, the FPD uses the cost and schedule contingency to manage and mitigate the potential consequences of project risks and uncertainties.

MR is held in a consolidated reserve account within the contract budget base to provide flexibility for the contractor to manage risks associated with the contract requirements. MR cannot be used to address risk issues arising beyond the scope of the contract requirements or used to resolve negative variances resulting from poor contract performance.

EM project contingency is maintained in an EM held consolidated reserve account within the project and can be used to recover from the impacts of realized project risks incurred either in executing the project baseline or by other EM work scope. Project contingency can also be used to fund opportunities, and newly identified risk handling strategies. EM project contingency includes funds for:

- Uncertainties in the estimate of EM costs within the PBS.
- The occurrence of identified EM risks.

EM project contingency can be used to reduce the likelihood or the impacts of identified EM risks. EM contingency, by design, may be used to fund contractor realized risks when available MR has been expended.

EM unfunded contingency applies only to EM cleanup projects. EM recognizes that additional project funds may be required above the 50 percent CL. The decision to request unfunded contingency is made by the site FPD. Currently, EM unfunded contingency is funded by:

- Managing funds within a project to address critical path and realized risk events.
- Requesting additional funds from the Configuration Control Board.
- Requesting additional funds in the next budget cycle or through re-programming for that project.
- Performing Value Engineering studies to determine alternative methods for meeting the requirements but at reduced costs.

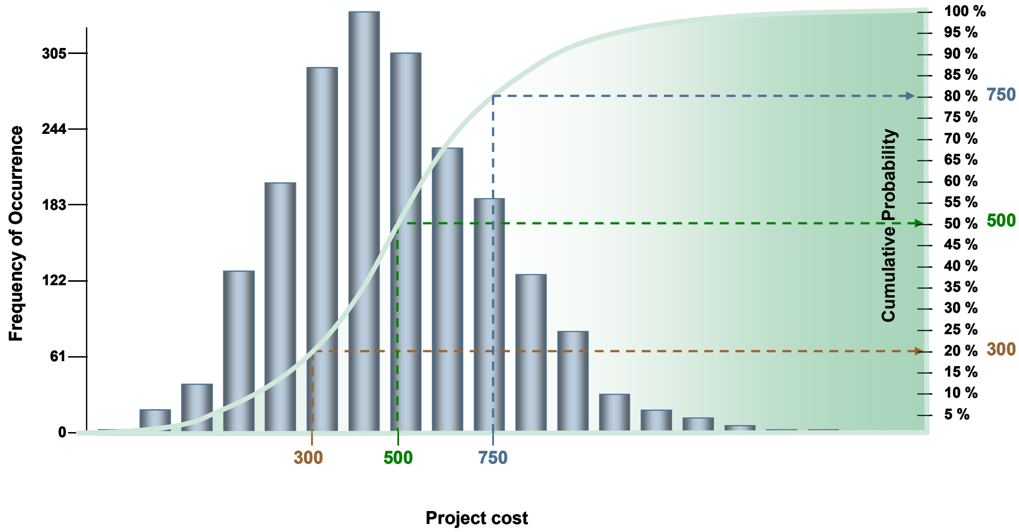
The EM project baseline schedule includes clearly identified EM schedule contingency that provides a confidence level range of 50 to 80 percent for meeting the selected key milestones, which includes the project completion date.

Since contractor reserves (cost and schedule) and EM contingency (cost and schedule) are finite resources for managing project risk, their use must be monitored and evaluated as part of the ongoing project control function. Evaluation of these resources involves the periodic assessment of the overall adequacy of the remaining contractor MR and schedule reserve as well as EM cost and schedule contingencies. The evaluation also identifies the areas of the project that are contributing the most to cost and schedule variances. The utilization of cost and schedule contingency should be planned, reported, and managed over the project duration to insure that sufficient contingency is available to support successful project completion. Drawdown curves are used to depict the planned and actual contingency utilized to assist the evaluation and management of contingency. Changes in the previously identified risk likelihoods and impacts, which may have significant impact on the analysis, should be identified and the risk should be updated in the risk register.

3.1.5.2 Calculating MR and Contingency

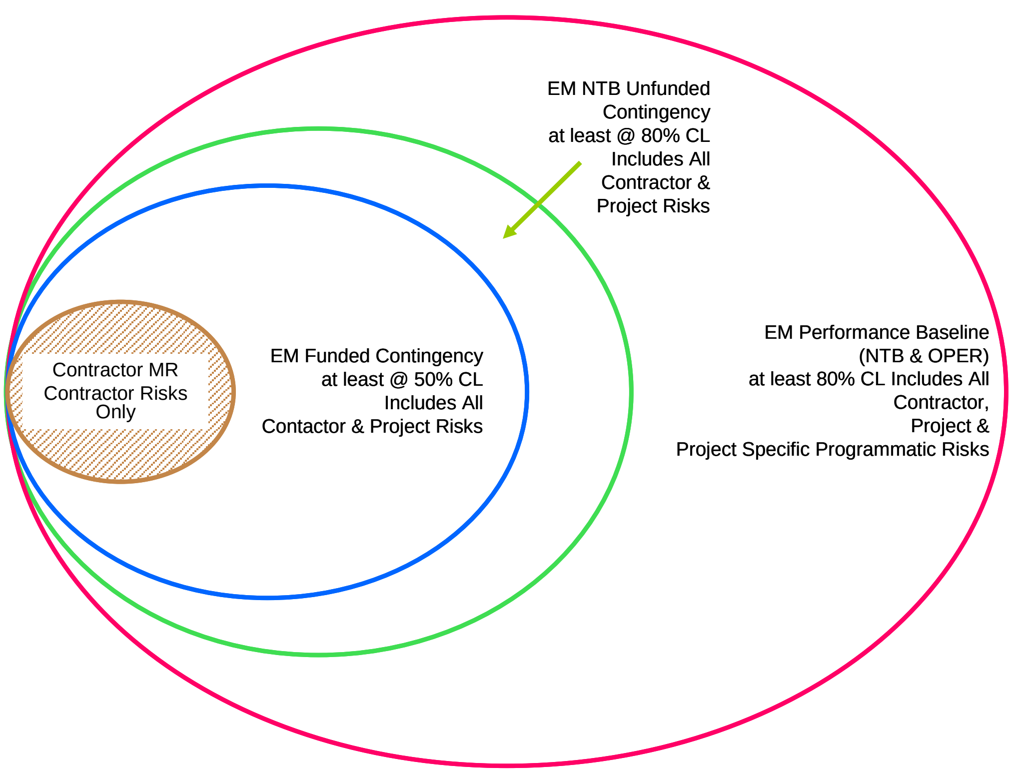
A common way to evaluate Monte Carlo models is to use a CDF. The CDF represents the entire range of values encountered in the Monte Carlo analysis of the cost estimate (depicted on the x-axis) and the cumulative probability of occurrence of a particular value (depicted on the y-axis). Figure 8 illustrates sample CDF curve for a hypothetical project. The CDF represented by the curve is based on project risks (contractor and DOE project risks).

Figure 8: Project Completion Confidence Levels at Specified Project Costs



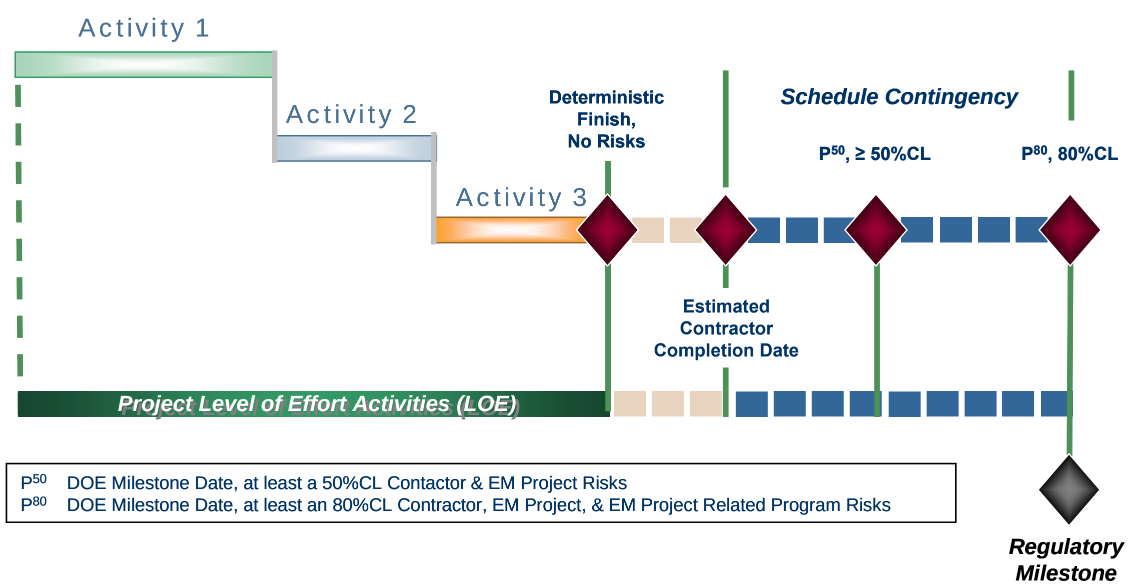
EM project contingency, is defined as the difference between the anticipated project cost, estimated to provide at least a 50 percent confidence level, and the project's contract award price. EM unfunded contingency includes all contractor and project risks above the 50 percent CL and all project related program risks to provide at least an 80 percent CL. Figure 9 illustrates the relationship of MR and EM contingency to the EM project baseline, which includes the NTB and OPER.

Figure 9: MR and EM contingency relationship to the project baseline



EM schedule contingency is developed based on all project risks (contractor and EM) for the certified project baseline. The schedule contingency is calculated using a Monte Carlo analysis based on logic-driven schedule. Schedule activities that are affected by an identified risk or estimated duration uncertainty are modeled in a Monte Carlo scheduling program with an appropriate probability distribution. When the Monte Carlo analysis is conducted, the EM schedule contingency is calculated to provide a 50 to 80 percent confidence level range that the project will be completed by the scheduled date. Schedule contingency should be applied to the project schedule to support the successful completion of the planned project end date and key project milestones, as illustrated in Figure 10.

Figure 10: Allocation of Schedule Contingency to Selected Schedule Milestones



3.1.6 Reviews [External Independent Reviews (EIR) and Independent Project Reviews (IPR)]

The process for review and validation of the NTB and verification of the reasonableness of the OPER is specified in the EM Protocol (reference 6.1).

An EIR is to be conducted on the NTB if its cost estimate is equal to or greater than $250M, otherwise an IPR may be conducted. Once a contract is awarded which encompasses the NTB, a detailed near-term performance baseline will be developed. If the previously certified federal NTB exceeds cost by more than 15 percent, increases schedule by a year or more, or modifies scope significantly, a follow-up limited EIR or IPR may be required. Each new NTB period will have a new baseline to report performance against. Once the NTB is certified, adjustments will not be allowed annually except the change control process.

The EIR scope for EM cleanup projects will focus on technical scope, schedule, cost, risk management and project management. The required documentation for the review is defined in the EM Protocol (reference 6.1).

The following documentation identified in the Protocol typically does not apply to EM cleanup projects:

- system functions and requirements document,
- preliminary design drawings and performance specifications,
- results of and responses to preliminary design reviews,
- final design drawings and specifications,
- results of and responses to site final design review, or
- construction planning document.

Table 3 provides information relative to project phase and the expected score derived from the Project Definition Rating Index (PDRI), a project management tool that provides a numerical assessment of how well a project is planned. The PDRI has five key areas that are utilized in the up-front planning stages of each phase. These are:

- cost,
- schedule,
- scope/technical,
- management and planning, and
- external factors.

Each area listed has a rating element defined by the type of project and is applicable to the particular project or project phase. The project team develops a maturity score for each element and the resultant score provides a basis for determining that a particular project or project phase is of sufficient maturity to proceed to the next step. The expected/actual score is not used as a go/no-go requirement for CD approval, but the score is an important factor in supporting a decision to proceed to the next phase. For each type of project area, various rating elements provide a sound indication of project planning maturity at each phase of the project. PDRI information is available at the following link http://www.em.doe.gov/pages/pdri.aspx.

Table 3. Critical Decision Targeted EM Cleanup Projects Definition Rating Index Scores for Each Projects Type

Soil and Groundwater Projects		
Critical Decision	Critical Decision Description	Expected Score
CD-0/CD-1	Mission Need/Proposed Plan	500
CD-2/CD-3	Performance Baseline/Start Work (Approved to Start ER Work)	1000
Deactivation and Decommissioning Projects		
CD-0	Mission Need Justification	400
CD-1/CD-2	Conceptual/Preliminary Design (Performance Baseline)	900
CD-3	Final Design (Approved to start D&D)	1000
Stabilization and Disposition Projects		
CD-0/CD-1	Mission Need/Alternative Selection	N/A—Waived *
CD-2/CD-3	Performance Baseline/Start Execution	Scoring TBD

* Note: Future projects and subprojects require implementation of the CD process as delineated in DOE O 413.3A with appropriate tailoring.

3.1.7 Quality Assurance (QA)

EM cleanup projects should follow the guidance in DOE G 413.3-2 “Quality Assurance” for overall QA guidance and for application of the graded approach. For many cleanup projects the QA requirements may be embodied in a combination of the implementing organization’s QA program and other plans and procedures. It is the responsibility of the project team, in concert with the FPD, to decide if a project-specific quality control (QC) plan is needed. It is suggested that such a decision be reached by conducting a review of the project activities to determine if the project’s QA/QC needs are already embodied in existing processes, procedures, and instructions (e.g., procedures for design, laboratory sample analyses requests, and waste management shipping and disposal requirements). If such a review indicates a need, then a project-specific QC plan should be created that identifies the affected activities and specify the procedures needed for those activities.

A project-specific QA program and/or QC plan[3] should be developed in the following circumstances.

- There exists unusual conditions or a one-of-a-kind situation that poses a significant project or safety risk; for example, demolishing a building connected to another building that will remain.

- It is required by specific environmental regulations or DOE Orders; for example, for work plans created to meet the requirements of the RCRA and CERCLA QA/QC project program/plan as defined in the Remedial Feasibility Investigation/Remedial Investigation (RFI/RI) Program Plan.

- It is considered necessary by organizations participating in the collection and evaluation of environmental data.

Whether or not a project-specific QC plan is created, there are activities that may require verification and/or inspection steps (for quality control). One such group of EM activities relates to safety. A few examples are as follows:

- isolating mechanical and electrical system for worker protection and for facility deactivation or demolition;

- structural analyses for demolition planning and specification;

- analyses to downgrade a facility’s nuclear or hazard category so as to reduce the authorization basis and eliminate unneeded technical safety requirements; and

- remediation of waste units, physical removal of wastes, capping inactive waste units, and inspecting closed waste units.

Additional activities that need verification and/or inspection regardless of a project-specific QC plan include, but are not limited to the following:

- characterization to show conformance with regulatory drivers and or needed for baseline planning;

- characterization activities of environmental processes to include the generation, collection, analysis, evaluation, and reporting of environmental data;

- survey results to record project completion [e.g., Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) method;];

[3] DOE O 413.3A states that the project’s application of Quality Assurance is documented in either the organizational or project-specific Quality Assurance Program; therefore the use of project specific QA plan is not used here.”

- design, construction and operation of engineered environmental systems such as collection equipment, systems and facilities for pollution control, waste treatment, and waste site remediation;
- cleaning, inspecting, testing, maintaining, repairing or modifying of systems or components;
- estimating waste quantities and types;
- procuring, handling, shipping, receiving and storing of material;
- waste characterization for processing and packaging to comply with transport and disposal regulations;
- documentation of contents, waste form and concentration for compliance with disposal site waste acceptance criteria;
- supporting decisions as to whether to decontaminate surfaces and/or mechanical systems to support dose reduction; or for decisions related to decontaminating to reduce hazardous materials concentrations below regulatory limits; amd
- removing special nuclear material.

3.1.8 Integrated Safety Management System (ISMS)

This section describes the implementation of Integrated Safety Management (ISM) principles into EM cleanup projects. Requirements on ISMS are described in DOE P 450.4, *Safety Management System Policy*, dated 10-15-96, and guidance for cleanup projects is described in DOE-STD-1120-2005, *Integration of Environment, Safety, and Health into Facility Disposition Activities*. DOE-STD-1120-2005 does not apply to new nuclear facility design activities or major facility modifications as defined in 10 CFR 830, Subpart B. These activities should be conducted in accordance with DOE O 420.1B, *Facility Safety*, dated 12-22-05, DOE-STD-1189, and 10 CFR 851.

The ISMS process is applied to all CDs and the Office of Health, Safety and Security (HSS) activities and documentation as defined in the following sections.

<u>Prior to CD-0 (Mission Need):</u>

- Develop inventory of available documents based on existing facilities/sites identified in the scope of the project to facilitate hazard analysis and project planning.
- Identify the potential hazards and their safety and risk implications in the mission need statement.

<u>CD-0 to CD-1 (Alternative Selection and Cost Range):</u>

- Develop a Safety Design Strategy (DOE-STD-1189, section 2.3) and integrate into project planning documentation.

- Develop/update initial hazard identification and nuclear facility hazard categorization. Supporting activities may include site walk-downs, employee interviews, characterization studies, etc. (DOE-STD-1120-2005, section 2.1).
- Determine the set of HSS directives applicable to the project (DOE-STD-1120-2005, section 2.2, Appendix A).
- Assess existing HSS documents against the proposed scope of cleanup activities (e.g., planned end states) (DOE-STD-1120-2005, Appendix C).
- Initiate the preliminary hazards analysis and establish/update an initial list of safety structures, systems, and components (SSCs) for public and worker protection.
- Determine whether facility scope involves any major modifications in accordance with 10 CFR 830 and DOE-STD-1189. If so, follow DOE-STD-1189 process for design and Preliminary Documented Safety Analysis (PDSA) development.
- Determine the qualified safety and health professionals on the Integrated Project Team necessary to support the FPD.

<u>CD-1 to CD-2 (Performance Baseline):</u>

- Complete a process hazard analysis and update list of safety Structures, Systems, and Components (SSCs) (see DOE-STD-1120-2005, sections 3 and 4).
- Draft documented safety analysis (DSA) or draft changes to existing DSA (see DOE-STD-1120-2005, sections 3 and 4).
- Update to cleanup plan (DOE-STD-1120-2005, section 2.2).

<u>CD-2 to CD-3 (Start of Construction):</u>

- Prepare final DSA and technical safety requirements (TSRs) (see DOE-STD-1120-2005, sections 3 and 4).
- Prepare/update health and safety plans (HASPs) or applicable hazard analysis documents (DOE O 413.3A, 10 CFR 851).
- Finalize cleanup plans (DOE-STD-1120-2005, section 2.2).

<u>CD-3 to CD-4 (Start of Operations or Project Completion):</u>

- Approve DSA/TSR.
- Conduct readiness review or operational readiness review (DOE O 425.1C).
- Commence with operations, where applicable.

3.2 Deactivation and Decommissioning Projects

D&D projects are defined as projects subject to DOE O 413.3A. New construction projects generally benefit from a large number of “known” attributes relevant to planning, design, engineering, physical construction (how big, how many floors, how many rooms, etc.), and the type, size and capacity of systems (process, utility, support systems). Conversely, D&D projects are frequently characterized by attributes that are unknown until a substantial part of the project is conducted. While the end-state (e.g., deactivation and long-term surveillance and maintenance, demolition, in-situ decommissioning) of a D&D project is generally understood at the onset of project planning, requisite knowledge of many other conditions, for which characterization activities are required may not be sufficiently well understood. Examples include types and extent of contamination, structural integrity and configurations of systems and modifications within areas that are difficult to access because of radiation or contamination.

Activities essential to a design-build project such as creating drawings, specifications, and other new construction design products to achieve conceptual, preliminary, and final design stages associated respectively to CDs 1, 2, and 3 are rarely significant in D&D projects. It is important that reviewers understand these differences. While there are often minor design-build aspects of D&D projects, in general, the following are noted:

- There is relatively little traditional design work (of a construction nature) for D&D. The amount of engineering leading to design drawings and specifications is usually limited relative to the overall project scope. Such design efforts would be a minor factor in the CD process.
- D&D involves a significant amount of engineering. The type of engineering activities, however, is for the most part very different from design-build engineering. Deactivation of equipment and systems, equipment removal, demolition, operational safety analysis, and material stabilization are a few examples of D&D engineering. In addition to the traditional structural, mechanical, chemical and electrical disciplines, skills required include nuclear safety (including the prevention of inadvertent criticality) and radiological engineering.
- Activities tend to be heavy in operations and services types of activities and light on fabrication or new construction, resulting in a labor mix that is unique to these types of activities. Also, with the exception of decommissioning equipment (e.g., excavators, cutting equipment), the need for new equipment is low. The need for materials can be heavily weighted toward consumable items that may be disposed of as they may become contaminated and/or processed as radioactive waste. These and other differences are significant to the basis-of-estimate for project baselines.
- Pre-existing conditions may be extremely variable from facility to facility because of differences in vintage of construction and the nature of operations that have been conducted.

Many of these differences are the subject of guides associated with DOE O 430.1B. This guide (DOE G 413.3A-8) is to be used as a supplement to those listed below:

- DOE G 430.1-2, *Implementation Guide for Surveillance and Maintenance during Facility Transition and Disposition*, dated 9-29-99.
- DOE G 430.1-3, *Deactivation Implementation Guide*, dated 9-29-99.
- DOE G 430.1-4, *Decommissioning Implementation Guide*, dated 9-2-99.
- DOE G 430.1-5, *Transition Implementation Guide*, dated 2-24-01.

3.2.1 Critical Decisions

Decommissioning projects may be driven by the regulatory requirements in CERCLA, RCRA and regulatory agreements with EPA and/or state authorities. Therefore, many of the specific actions and deliverables called for in DOE O 413.3A have equivalents because of the CERCLA/RCRA process. The CERCLA/RCRA approval and decision stages for a major D&D project may differ considerably from the CD milestones for a typical design build project. Example comparisons of the environmental regulatory decision milestones and deliverables compared with those in DOE O 413.3A can be seen in the following diagrams, where deliverables noted therein are tailored to each project:

- Attachment 2, Decommissioning Project Overview (CERCLA Non-Time Critical)
- Attachment 3, Decommissioning Project Overview (typical 413.3A deliverables)

In those cases where decommissioning is a remedial action in lieu of non-time critical, the workflow process is similar to that shown in Attachment 4 for S&GW. This might be the case where facility and surrounding soil are combined as one project. These examples do not specifically apply to a deactivation project because deactivation, as a focused project, is not a subject of a CERCLA action.

The project deliverables for S&GW projects are shown in Tables 5 and 6. Similar listings can be applied to decommissioning projects but are not applicable to deactivation projects or the deactivation phase of an integrated project.

As part of the project tailoring, CD milestones are sometimes combined. Many D&D projects combine CD-1 and CD-2 or CD-2 and CD-3 when there is relatively little technical development needed between the two decision points. In these cases, the level of detail described below for CD-1 and CD-2 is applicable for a combined CD-1/2; and CD-2 and CD-3 is applicable to a CD-2/3 combined approach. However, in all cases of large and/or complex projects these CDs should be addressed separately. The DOE O 413.3A requirements from CD-1 to CD-3 are based on the progression of design from conceptual, to preliminary, to final. As noted, D&D projects have very little classical design, but have a large content of other than design-build engineering. The following interpretations illustrate the characteristics of D&D projects:

- CD-0. Approval of Mission Need; a project is authorized either as an individual stand-alone project, as an inclusive part of a larger PBS, or as a result of a Record-of Decision, an Action Memorandum, or other agreement resulting from environmental authorities or a Federal Facility Agreement.
- CD-1. Approval marks the completion of the project definition phase and selection of an alternative and estimate of the cost range. For a D&D project, this can be a preferred alternative end state and/or project scope resulting from environmental decision-making and/or concept development within the DOE. The design requirements at CD-1 require a Conceptual Design Report (CDR). Most D&D projects do not involve much traditional design activities. To meet the intent of CD-1 D&D projects subject to DOE O 413.3A should determine the expectations and present the concepts of the project work to be conducted. For

some D&D projects, there may be a need to conduct some project activities to obtain information needed to support detailed planning, engineering and design before reaching the CD-1 milestone. Prime examples include characterization for condition assessment and for input to technology development. In these examples, adequate progress needs to be realized to support meeting the technical challenges of the project.

- CD-2. Sufficient information has been developed to support formulation of the Performance Baseline founded on a mature design, a well-defined and documented scope, a resource-loaded detailed schedule, a definitive cost estimate, and defined key performance parameters. D&D preliminary design should include decisions and descriptions of "how" the concepts are to be implemented.
- CD-3. Approval authorizes the project to commit all the resources necessary, within the funds provided, to execute the project. For D&D this will be authority to start field activities. Final "design" encompasses having work packages, instructions, and/or procedures ready for implementation.
- CD-4. Provides authorization for start of operations or project closeout. For D&D projects, this will generally verify that the specified project end-points have been established and the facility end state has been achieved.

At some sites, the critical decision process is exercised at the PBS level that encompasses several facilities versus the individual D&D Projects at the facility level. However, for a major facility project (per DOE O 413.3A total project cost criteria) within a PBS, planning, engineering and baseline development should be conducted to meet the intent of DOE O 413.3A for the CD process.

It is important to understand that many D&D projects vary with regard to conducting engineering/design well after CD-3 and initiating fieldwork well before CD-3. Many engineering and design deliverables for specific activities are provided well after project implementation has started but sufficiently in advance of their actual need. This is acceptable for activities that are well known and for which the ability to create a high confidence project baseline does not rely on their detail. In addition, many facilities have operational requirements (e.g., to maintain safety) that are to be conducted regardless of the timing of the CD process. Similarly, some D&D projects are funded for activities to be initiated in the field prior to completion of the CD process. These include activities that are necessary to define the project (e.g., characterization), conducted under operations budgets (e.g., removal of nuclear materials, flushing of systems containing hazardous chemicals, etc.), and those for which the scope, schedule, and cost are well understood (e.g., stand-alone equipment removal, permanent shutdown, road grading for heavy equipment access, isolation of a piping system).

It is a key responsibility of project management to meet the intent of the CD process while necessarily conducting design activities and fieldwork in the sequence not envisioned by DOE O 413.3A. This responsibility is most important with regard to the CD-2 objectives of creating a high confidence project baseline.

3.2.2 Deactiviation and Decommissioning Engineering Activities

EM has prepared guidance entitled "Tailoring and Decommissioning Engineering /Design Activities to the Requirements of DOE Order 413.3A." The guidance has been created to address in detail how the objectives of Conceptual, Preliminary, and Final Design as required by the Order can be met for D&D projects. The theme of this guidance, is to start early development of D&D projects' technical detail to create a comprehensive technical project concept at CD-1, to increase the level of detail sufficiently to provide a reliable scope, schedule, and cost performance baseline at CD-2, and to be ready for implementation at CD-2 or CD-2/3.

This tailoring document describes engineering/design output for 41 typical D&D activities. It then addresses project management regarding decisions for thelevel of detail needed for engneering at various phases of D&D projects, provides a process for identifying significant project activities that would require detailed engineering and design development to support a baseline, and includes sample ines-of-inquiry for reviewers of D&D projects.

3.2.3 Baseline Development

A complicating factor in developing the baseline for a D&D project is that because of difficulty of access or interfering structures, knowledge of important physical conditions can only be obtained when the project proceeds to the point necessary to collect requisite characterization data. Then modifying the project baseline can redirect project activities, change schedules, modify the sequence of work, necessitate resource allocation, etc. The potential for these variations should be recognized in the project risk and contingency planning efforts.

In addition, the following specific differences should be noted for baseline development.

- To the degree possible, baseline development should be based on activity-based schedules and estimates. However, some D&D project elements are estimated as level-of-effort because the labor is for operations and/or provided by support organizations that conduct a wide variety of tasks not associated with work breakdown structure elements at an activity level. Examples include plant operations, nuclear safety engineering, health and safety oversight, and project controls. Project reviewers should recognize that some level-of-effort elements are unavoidable for developing a D&D project baseline.

- The costs of packaging, shipping, and disposing of waste and scrap/salvage are very significant for almost every D&D project. Because of the importance of waste in a D&D project, further details of baseline development are included in section 3.2.4.

- Estimating D&D field activities is somewhat different from that for design-build projects. The latter are characterized by decades of developing unit cost factors for construction and installation of facilities and equipment. Estimated costs for D&D are more often developed by conducting walk downs and projecting the skills required, type of and number in a crew, and duration (e.g., number of days) to conduct each activity. In addition, parametric estimates are used (e.g., unit cost per building gross square feet) where site-specific experience has collected data for a class of buildings, typically based on facility nuclear safety category, type of construction, and nature of its contamination.

3.2.4 Performance Measurement

Performance metrics for D&D projects vary considerably from design-build projects. The following three types of performance measurements have proven useful. These are not intended to be exclusive of other methods that project management may choose.

- End-Points. The end-points method is a very important process for specifying the conditions to be achieved for a D&D project. The method was derived for DOE projects in the 1990's as a systematic way to specify facility deactivation because construction specifications for the most part do not apply. End-points can also be specifications for demolition and in-situ decommissioning projects. End-points for deactivation or in-situ decommissioning will generally be more elaborate than for demolition.
- Work Sets. The work sets approach for building cleanout can also be used for progress metrics. A work set is a definition of a bounded incremental scope of work; for example, removal of a set of equipment in a given area of a building.
- Quantitative Metrics. Quantitative characteristic of D&D projects; that is, units of measure relevant to specific activities, provide useful performance metrics. Examples include volume (cubic yards) of soil removed, area (square feet) of asbestos-containing siding removed; individual or numbers of equipment removed such as glove boxes and hoods, etc.

3.2.5 Waste Management for Deactivation and Decommissioning

The effective products of D&D projects are industrial, hazardous, and radioactive waste, and scrap/salvage materials. For all but the simplest projects, waste planning is essential. The costs of packaging, shipping, and disposing of waste and scrap/salvage can be as much as 40 percent of a D&D project. Planning should consider factors such as the variability in waste constituents, limited choice of disposal sites, landfill regulations that apply to other than radioactive waste, transport through local communities, the DOE metals moratorium, several of which are existing conditions that cannot be known until well into the project. A cost-benefit analysis for decontamination vs. direct product waste disposal will often influence technical approaches and options.

This guidance focuses on the relation of waste management planning to CD stages and considerations of waste during baseline development.

3.2.5.1 Waste Management Planning for Deactivation and Decommissioning Projects

For a D&D project, the approach to waste management relative to CD points should be as follows:

- At CD-0, the primary objective is to recognize the degree to which waste processing and disposal will be significant project activities. To understand the overall project cost, a gross estimate of the waste volume by type (addressed below) and a rough order of magnitude cost estimate should be included in the overall cost profile.
- At CD-1/CD-2, project waste planning results should be available to address the topics in Table 4. The results of waste planning provide the basis for activity-based schedules and cost estimating for waste management (See section 3.2.4.2).
- At CD-3, revise the project baseline from new information or revised assumptions.
- At CD-4, the project summary report is generated, including project waste statistics.

Table 4. Waste Planning

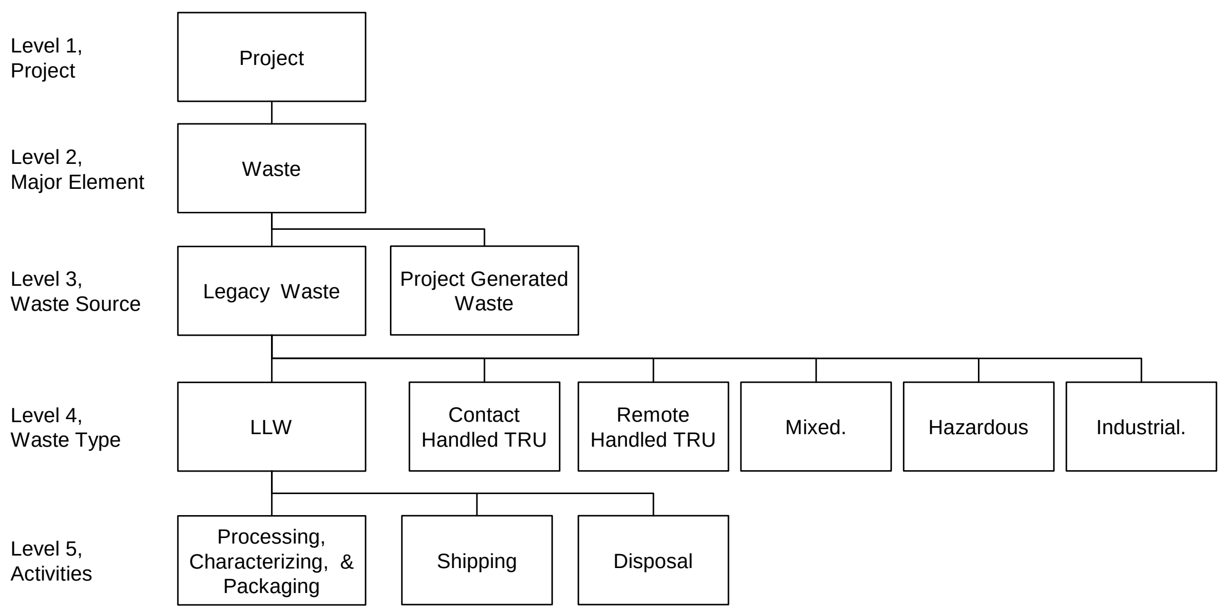
Subject	**Purpose**
Waste types and quantity estimates	Waste estimates by type and quantity are the key assumptions for input to the project scope. These assumptions/estimates are needed for all the following subjects in this Table.
Constraints	Address constraints and issues that affect cost and project schedule. Examples include waste acceptance criteria, available disposal sites, and the DOE Metals Recycle Suspension
Processing required for removal	Plans and assumptions are needed for input to the project schedule and basis of estimates.
Processing and characterization for packaging; packaging by waste type	Plans and assumptions are needed for input to the project schedule and basis of estimates.
Transportation mode by waste type	Plans and assumptions are needed for input to the project schedule and basis of estimates (e.g., rail, truck, or a combination).
Disposal destinations	Affects packaging and transportation plans. Provides input to the project schedule and basis of estimates.
Organization	The organization and individuals that will directly manage the project’s waste are input to the PEP.
Waste related trade studies	Results used for project decisions that affect the baseline.
Verifications required	Identify review requirements of waste characterization result to ensure that transportation and disposal criteria are met. In effect this is the QA part of waste management.
Uncertainties	Identify inability to obtain information that can potentially affect project schedule and cost if the related assumptions prove to be incorrect.
Project risks	Identify any significant project risks associated with waste management.

3.2.5.2 Project Baseline Development Related to Waste

Waste Management Baseline for projects that will generate a large quantity of waste, it may be necessary for a project to assign a dedicated staff to manage, coordinate, and schedule material package characteristics, on-site staging management, and status of shipments. Such staffing needs should be recognized in the baseline development.

The costs of waste retrieval, conditioning, packaging, shipping, and disposal are major elements of most D&D projects. For example, significant expenses can be incurred with procuring certified waste containers and characterization of the loaded waste to demonstrate compliance with disposal facility waste acceptance criteria. For all D&D projects, as well as other types of EM projects, a separate WBS element should be considered for these activities. Therefore, the WBS structure for a project should have project waste as a Level 2 WBS element. Figure 4 illustrates a five-level WBS that represents a project with a comprehensive assortment of waste types.

Figure 11. Example of a WBS Structure for Deactivation and Decommissioning Project Waste



The bases for elements beneath Level 2 in this figure are described below:

- At Level 3, legacy refers to wastes that were generated prior to start of the project. In general, such waste will have been quantified and characterized. Project-generated waste refers to wastes that will be generated during the course of the project as a result of processing, cleanup, material stabilization, dose reduction, equipment removal, radiological control, and other similar activities. The reason for the two separate WBS elements is that project-generated waste involves a larger number of activities, is likely to have more schedule elements, and its basis of estimates will be different than for legacy waste.

- Level 4 elements address each type of waste. Only the waste types that exist for the project should be included. The reason for separate planning activities is wide variations in costs for each waste type. Also, since overall project waste activities represent a large fraction of the project, progress, cost, and earned value are all likely to be reported at this level.

- Level 5 elements are the root-level activities conducted for each waste type. The basis for scheduling and estimating each activity will be different for each waste type. Characterization at this level is for packaging and handling the waste. Overall characterization within a facility should be addressed elsewhere.

Projects in which a significant scope of work includes cleanout and/or equipment removal that generates waste should manage these as separate WBS elements from the waste WBS. For example, the removal of substantial equipment (e.g., glove boxes) or material (e.g., massive shielding) can generate a substantial amount of waste. However, the removal activities are distinct from the waste handling activities. Therefore, these two unique tasks should be scheduled and estimated separately.

Processing of liquid or gaseous waste are operational activities and not similar in nature to those for waste destined for disposal locations. Both of these types of activities can be major project elements and should be addressed in establishing a baseline.

3.3 Soil and Groundwater Remediation Projects

DOE O 413.3A defines S&GW remediation projects as environmental restoration. The remedial action activities require a different approach to establish the information relative to CD development. Environmental restoration projects begin with site evaluation, historical data and information reviews, interviews with employees and former employees and research of previous activities at the location. Information is gathered during the CD-0/1 phase to enable the development of subsequent CD-2/3 project phases. The exact location, extent of contamination, contaminant behavior, accurate localized geological information, and many other attributes are not sufficiently understood at the onset of the project planning. These attributes generally evolve as the project planning matures and further develops as the remedial activities progress. Consideration of several alternatives and the application of a diligent, systematic process to identify, select and/or implement new technologies that could be deployed for the remediation of S&GW, and negotiating cleanup requirements with the regulators are a continuing part of the cleanup process.

3.3.1 Critical Decisions

The CD documents are formal determinations or decisions at specific points in a project that allow the project to proceed to the next phase and commit resources. S&GW remediation projects are driven by the regulatory requirements in the CERCLA and RCRA and in regulatory agreements such as the FFA established with EPA and/or state or tribal authorities. These projects require a decision process that supports regulatory requirements to meet mandated performance periods. The CDs should be combined (tailored) to match the project's developmental process that considers the regulatory and legal requirements.

As an example, combining CD-0 and CD-1 steps should be considered for these projects and the information submitted at the same time in support of the regulatory process. CD-2 and CD-3 steps should be combined to facilitate the regulatory requirement of remedial action start within 15 months of the signed Record of Decision (ROD). A time line showing the correlation between the CD points and regulatory documents is provided in Attachment 4.

For S&GW remediation projects, the CD process should proceed as follows:

<u>CD-0, Approve Mission Need, and CD-1, Approve Alternative Selection and Cost Range/Proposed Work Plan, are combined.</u>

- CD-0/1 (Combined) Mission Need/Proposed Work Plan. Complete restoration screening process (preliminary assessments/site investigation) and need assessments. Mission need for S&GW remediation is established through legally enforceable agreements such as the FFA and various regulatory permits, direction and remediation processes based on RCRA and/or CERCLA law that are subject to HQ concurrence. These documents are consistent with goals outlined in DOE strategic plans and thereby establish mission need and constitute CD-0 or CD-0/1 when combined.

  To integrate the requirements of the RCRA and CERCLA programs, the DOE, EPA and the affected states/tribes entered into a legally enforceable agreement (FFA). The FFA establishes the primary requirements for effecting remedial activities at contaminated waste units, thus achieving comprehensive clean up and closure. DOE submittal of the FFA Appendix E and/or DOE submittal of a RCRA Permit Application, both requiring the DOE site manager's certification, should constitute CD-0 "Mission Need" approval.

<u>CD-2, Approve Performance Baseline, and CD-3, Start fieldwork are combined.</u>

- CD-2/3 (Combined) Perform Baseline Start/Remedial Action. Start fieldwork. This activity generally equates to the construction phase of a conventional project. The updated cost and schedule baselines form the basis for the review and approval of the CD–2/3 packages. Refer to subsequent sections for key activities associated with CD 2/3 document development.

<u>CD-4, Approve Project Completion. Approve Start of Operations/Project Closeout (Project Transition/Closeout Phase).</u>

- CD-4 marks the end of the execution (construction) phase for a project and transition to operations and/or to post closure care. In the RCRA/CERCLA regulatory process, upon completion of construction activities (including startup, as appropriate), a waste unit walk down is performed with the regulators for approval of implemented actions. Successful completion of the walk down and any other checklist actions are documented in the Post-Construction Report (PCR) generated by DOE.

For environmental restoration projects that require continued operation of remedial systems or require post-closure care, the CD-4 document is prepared after turnover and documents the turnover to operations of the remedial facility or to the organization for post-closure care or long-term stewardship. Regulator-approval of the Operations and Maintenance Plan (O&M)once a remedy has been put in place and/or the regulator's determination that the remedy is operating properly and successfully (OPS) may be required. The PCR is submitted to the regulatory agencies for approval. After operation of the remedial system is complete, the remedial action completion report (RACR) is submitted to the regulatory agencies for approval. (Note: Completion could be many years after the system is constructed and placed into operation.)

For environmental restoration projects that do not require continued operation of remedial systems, the CD-4 process marks the end of all activities at the waste unit. The PCR and RACR are combined into a single document (PCR/RACR) and submitted to the regulatory agencies for approval. For sites where a remedial action must continue to operate, post-EM Completion the CD-4 can be submitted upon attainment of EM Completion (which may include an approved O&M Plan and an OPS determination from the regulators).

Each approved PCR/RACR for individual waste units constitutes a CD and supports the development and approval of the final CD-4 documentation. The documentation is submitted to the regulatory agencies in accordance with the regulatory approved implementation schedule. Through the incremental completion of waste units, and ultimately area completions, the desired end state is accomplished.

The documents listed in Tables 5 and 6 are provided as a guide to assist the FPD in identifying the regulatory documents under CERCLA and RCRA that may be utilized to meet the requirements of DOE O 413.3A. This list is not all-inclusive but illustrates the relationships among the major documents required in DOE O 413.3A. It should be noted that other regulatory document requirements not related to project management are not shown or discussed in this guide.

3.3.2 Supplemental Information

The following is provided as additional information relative to the correlation of regulatory required documentation and the requirements identified in DOE O 413.3A. This information is not all-inclusive and there are opportunities to combine various regulatory documents to expedite the regulatory approval process. The combining of documents can affect the normal review and submittal of CD packages. The project director and the IPT should consider the combining process when developing the CD documentation.

Regulatory documents required under RCRA/CERCLA contain the same or similar information as required under DOE O 413.3A. These documents may be utilized to fulfill those requirements. In certain instances only a portion of the DOE O 413.3A requirements are covered. In those cases, the FPD should supplement the regulatory document with the information to fulfill the DOE O 413.3A requirement.

<u>Overview of Core Team Scoping Process</u>

Project scoping is conducted at various points in the RCRA/CERCLA investigative process to build consensus on the path forward for the project. A project core team consists of representatives from the DOE, EPA and state environmental agency staff who are responsible for project scoping and response action decision-making. Scoping consists of communicating existing information (documented in project scoping summaries) throughout the project life-cycle to ensure that the project core team and supporting technical team share a common understanding of site conditions and cleanup strategies.

The intention of frequent scoping is to establish a systematic process for project communication and technical agreement by which the formal documentation is a result of collaboration. Throughout the scoping process, the project core team employs the Principles of Environmental Restoration as a guide for establishing a more effective approach to remedial decision making.

Additional information on the Principles of Environmental Restoration can be found at the following locations:

http://www.hss.energy.gov/nuclearsafety/nsea/oepa/training/restoration/

http://www.epa.gov/correctiveaction/curriculum/download/env-rest.ppt#13

The emphasis on each scoping meeting is a thorough presentation of the most current project information, a shared technical understanding of conditions and problems, and robust questioning of the technical information to ensure confident real-time decision-making. The outcome of scoping will be alignment of DOE, EPA, state agency, and contractor staff with respect to the following decisions:

- presence/absence of a problem that warrants remedial action,
- remedial action objectives (RAO)
- scope of the problem, and
- response actions.

These decisions are addressed for each Operable Unit (OU).

Data Quality Objectives

The data quality objective (DQO) process is an important tool for project management and planners to determine the type, quantity and quality of data needed for remediation project decision making. DQOs are qualitative and quantitative statements derived from the application of a systematic approach to data collection. The DQO process follows seven steps; the output of each step provides input to the subsequent step. Over the course of the effort, some steps may be iterative. A complete DQO process will provide added assurance that the type, quantity and quality of environmental data used in decision-making is appropriate for the intended application. Additional information on the DQO process is available in the EPA document, EPA QA/G-4, "Guidance for the Data Quality Objectives Process."

Table 5. Cleanup Project - Phases, Requirements and Equivalent Project Management Documentation

PLANNING PHASE

Baseline Management	Project Management (Critical Decisions may be combined as one decision)		Environmental Management Cleanup		
			CERCLA	**RCRA**	**Facility Disposition**
Planning Phase	**Initiation Phase CD-0 Approve Mission Need**	• Identify Program Performance gap • Identify need in terms of the mission, purpose, capability, schedule and cost goals, and operating constraints	• Preliminary Assessment/Site Inspection (PA/SI) • Federal Facility Agreement/ Interagency Agreement	• RCRA Facility Assessment Report (RFA) • Federal Facility Compliance Agreement	• Facility Assessment (Site Wide Infrastructure Long Range Plan)
		Establish Integrated Project Team	Establish Project and Core Team	Establish Project and Core Team	
	Definition Phase Critical Decision-1 Approve System (Project) requirements and alternatives, Conceptual Design Report	**<u>Pre-conceptual Design and Conceptual Design includes:</u>** • Project Risk Management Plan • Alternative Analysis • Environmental Compliance • Waste Management • Quality Assurance • Value Engineering • Safeguards and Security Plans **<u>Preliminary Baseline Range includes:</u>** Project Requirements Alternatives Analysis Process Technical Scope High-Level/Summary Schedule Cost Estimate Range	**<u>Remedial Investigation/Feasibility Study (RI/FS) includes:</u>** • Scoping the RI/FS • RI Site Characterization • RI: Baseline Risk Assessment (supplement with a project risk management plan) • RI Report • FS: Development and screening of alternatives • FS: Detailed Analysis of the alternatives • FS: Treatability Studies • FS Report **<u>Remedy Selection includes:</u>** • Identifying the preferred alternative • Statement of Basis • Corrective Action Plan • VE, QA	**<u>RCRA Facility Investigation (RFI) includes:</u>** • Scoping the RFI • RFI: Work Plan • RFI: Site Characterization • RFI Report (supplement with a project risk assessment plan) **<u>Corrective Measures Study (CMS) includes:</u>** • Scoping the CMS • CMS: Work Plan • CMS Report **<u>Remedy Selection includes:</u>** • Identifying the preferred alternative • Statement of Basis • Corrective Action Plan • VE, QA	**<u>Facilities Characterization Phase includes:</u>** Develop Mission Alternatives NEPA (CX, EA, EIS) Sampling and Analysis Plan Characterization Work Plan Characterization Report Develop Risk Assessments and Impacts (supplement with a project risk assessment plan) Develop Preferred Alternative **<u>Remedy Selection includes:</u>** Engineering Evaluation/Cost Analysis Draft Action Memorandum VE, QA
		Acquisition Strategy	Acquisition Strategy	Acquisition Strategy	Acquisition Strategy
		Preliminary Project Execution Plan	Proposed Plan and Draft Record of Decision Public participation		Define Decommissioning Work Plan
		Identify Project Endpoint	Define risk-based end state that is consistent with intended future use	Define risk-based end state that is consistent with intended future use	Define risk-base end state that is consistent with intended future use

Table 6. Cleanup Project - Phases, Requirements and Equivalent Project Management Documentation PERFORMANCE PHASE

Baseline Management	Project Management (Critical Decisions may be combined as one decision)		Environmental Management Cleanup		
			CERCLA	RCRA	Facility Disposition
Performance Phase (Performance Baseline)	Execution Phase CD-2 **Approved Acquisition Performance Baseline, Final Design Report**	**<u>Performance Baseline is the original baseline for the project that defines:</u>** • Performance parameters • Technical scope • Schedule • Cost **<u>Final Design Includes:</u>** External Independent Review (EIR) Independent Project Review (IPR)	**Final ROD** **<u>Remedial Design/Remedial Action Implementation Plan (RD/RAIP) includes:</u>** • Cost and Schedule • Waste Management • Contractor/Subcontractor strategies • Independent Field Office and HQ Assessments • Land Use Control Implementation Plan	**Final RCRA Permit Modification** **<u>Corrective Measure Implementation Plan includes:</u>** • Cost and Schedule • Environmental Compliance • Waste Management • Public Participation • Independent Field Office and HQ Assessment	**<u>Final Decommissioning Work Plan includes:</u>** • Environmental Compliance • Cost and Schedule • Waste Management • Environment, Safety and Health • Safety Analysis Report • Quality Assurance • Safeguards and Security • Public Participation • Independent Field Office and HQ Assessments
		Final Project Execution Plan	Final RD/RAIP	Final CMP	
	Execution Phase CD-3 **Approve Start of Construction (Remediation)**	Construction	• Execute RD/RAIP • Independent cleanup verification per Work Plan/ROD	• Execute CMIP • Independent cleanup verification per RCRA Permit/CMIP	• Execute D&D Work Plan • Independent cleanup verification per Work Plan
	Transition/Closeout Phase CD-4 **Approved Project Transition, Project Closeout**	• Final/Financial Closeout • Site/Facility/System/Transitio n • Transition/Acceptance Criteria • Begin beneficial occupancy • Begin initial or full operating capability • Transition to LTRA	• Field Demobilization • Final RA report • Notice of Deletion from NPL, if required • Operation and Maintenance plan • ROD Reviews	• Field Demobilization • Corrective Measures report • Operation and Maintenance plan • Post-Closure Inspection and Maintenance plan • Periodic Corrective Action reports • RCRA permit renewals	• Demobilization • D&D Final report • Post Closure Monitoring if necessary
	Post Completion Phase (N0 CD) **Transition and Start of Long Term Stewardship**	• CD-4 accomplishes transition of completed short-term cleanup to long-tern response action, institutional controls and other needed caretaker actions. • Site/project transferred from EM to the Lead Program Secretarial Office or other receiving entity.	• Post Construction Report • Site Completion Report		Execute the actions of the disposition baseline (DOE Operations 430-1B)
		Project/Site Transfer Plan	Site Completion Report	Closure Report	Field Decommissioning Report

3.3.3 Baseline Development

The S&GW remediation project baseline development process begins in the early stages of planning, leading to project performance baseline. Documents to be prepared include cost estimates, schedule, scope and historical baseline information. These documents should be maintained throughout the project life cycle and controlled through the change control process.

The S&GW project baseline is managed through the utilization of proven project management systems, including an EVMS. The system is the primary cost and schedule management tool utilized for external and internal project management objectives.

The WBS or similar grouping organizes and defines the total scope of the project. The primary objective of this structure is to define and arrange all authorized work at prescribed levels for project management, data collection, and reporting.

3.3.4 Performance Measurement

An essential component of project management is the measurement of project progress. Soils and groundwater remediation project performance is measured by the number of actual completed waste units against the number of planned completions and the regulatory milestones, as applicable. Soils and groundwater remediation provides reporting information and project status as necessary to meet the requirements of the EVMS for cost and schedule information. This system is the primary cost and schedule management tool used to meet external and internal project management objectives.

Progress toward these measures, milestones and any proposed changes to them are reported as follows:

- remediation of all waste units will be completed;
- waste unit and source unit "remediation complete" is defined as—
  - completion of the remedial action as documented in the submittal of a post-construction report or a final remediation report and
  - agreement from the regulatory agencies that no further action (NFA) is the appropriate remedial action for a waste unit (including site evaluation areas) as documented through the issuance of a Record of Decision (ROD) or concurrence from the regulatory agencies on NFA for site evaluation areas;
- remedial actions at all sources that contributed to the groundwater contamination have been completed; and
- groundwater unit "remediation complete" is defined as—
  - construction or remedial system is complete,
  - remedial action is implemented, and

- progress toward remedial goals can be demonstrated.

Milestones reflect waste unit completions by the end of the program cycle. The proposed baseline spreads the milestones over the life of the program, integrates decommissioning activities with S&GW activities to complete clean up in entire areas.

Record of Decision milestones for S&GW units are established in accordance with the regulatory schedule and the program end date. Milestones can change as the regulatory agreement or regulatory driven document schedule modifications occur.

Project milestones are established to align with the near term completion strategy established for each project and are included in the Project Execution module of IPABS.

3.4 Stabilization and Disposition

3.4.1 Critical Decisions

Most S&D projects are covered by and included in the CD for the EM PBS (life cycle) as discussed in section 3.1. However, stand-alone programs/projects or sub-projects may require their own CD process.

For example, when the path forward for the disposition of a material is significantly changed or modified, a CD process should be used for programs/projects with a NTB of $100M or more. This threshold of $100M or more should not be applied to surveillance and maintenance or maintaining the facilities, plants, and systems. The threshold may be applicable to the costs associated with modifying these facilities, plants, and systems to process the material (e.g., engineering [the flow sheet development, safety documentation, etc.], training and qualification of personnel, additional storage and/or security costs, material processing costs, and any costs associated with waste streams from these materials). If the disposition of the additional material is the only purpose for extending the life of these facilities, plants, and systems, then the surveillance and maintenance costs are to be considered in the $100M threshold for the CD process. For S&D projects, the CD process should proceed as follows:

New projects being created:

- CD-0, Approve Mission Need
- CD-1, Approve Alternative Selection and Cost Range
- CD-2/3, Approve Performance Baseline and Start fieldwork are combined
- CD-4, Approve Project Completion

For existing projects, when a new NTB is established:

- CD-0/1, Approve Mission need; and Approve Alternative Selection and Cost range have been waived, because these S&D projects were already in their execution phase when EM decided to “projectize” them.

- CD-2/3, Approve Performance Baseline and Start fieldwork are combined.

- CD-4, Approve Project Completion.

These new projects should be appropriately tailored as should all projects.

3.4.2 Baseline Development

S&D projects are driven by the requirements of the EM PBSs (life cycle) in section 3.1. S&D projects need to take in consideration the same components as traditional projects. Some additional considerations in developing a baseline for S&D projects are as follows.

- Staffing costs are often driven by minimum control room and watch station requirements for emergency response teams.

- Surveillance and maintenance costs associated with maintaining the facility, plant and systems.

- Campaign startup costs associated with the disposition of new materials.

- Material costs (chemicals, glass frit, consumables, etc) associated with running the process.

- Utility costs associated with steam, water, and electrical requirements.

- Transportation costs associated with shipping material, including special shipping containers, drums, casks, and special transportation vehicles.

- Costs associated with storage and security requirements for certain materials.

- Cost associated with critical spare parts and replacement vessels and tanks.

3.4.3 Performance Measurement

Many S&D projects are process driven and project performance measurements can be developed based on the metrics identified in Table 2, “Environmental Management Corporate Key Performance Parameters” in section 3.1.3. In addition to these metrics, other performance measurement elements are identified below for each type of S&D project.

3.4.3.1 Radioactive Liquid Waste Tank Stabilization and Disposition

- Number of canisters produced, where process costs for a particular waste material are divided by the number of canisters scheduled. Performance is earned by canisters produced.

- Planned outages are given a performance value as operations and facility support personnel efforts will be focused on the outage versus producing canisters.

- Surveillance and maintenance costs are normally level-of-effort activities. These are costs associated with maintaining the facility, which are independent of running the process. These are also known as hotel costs.
- Gallons of liquid waste dispositioned using metric similar to canisters above.
- Tanks cleaned based upon a predetermined value.
- Sludge batches prepared based a predetermined value.
- Safety documentation prepared for a particular waste stream.
- Projects and major modifications are a portion of these S&D projects, but are treated as traditional projects with respect to performance measurement

3.4.3.2 Nuclear Materials Stabilization and Disposition

- Material campaign preparations are given a performance value.
  - modifications,
  - training,
  - safety documentation,
  - shipping requirements, etc.
- Processing these different material campaigns using metric similar to canisters above.
- Surveillance and maintenance costs are normally level-of-effort activities.
- Safety documentation prepared for a particular waste stream.
- Projects and major modifications are a portion of these S&D projects.
- Materials shipped based upon a predetermined value.

3.4.3.3 Spent Nuclear Fuel Stabilization and Disposition

- Cask loading and shipping and cask receiving and unloading.
- Surveillance and maintenance costs are normally level-of-effort activities.
- Safety documentation prepared for a particular waste stream.
- Projects and major modifications are a portion of these S&D projects.

3.4.3.4 Solid Waste Stabilization and Disposition

- Drum remediation using a metric similar to canisters above.
- Drum shipping using a metric similar to canisters above.
- Safety documentation prepared for a particular waste stream.

3.4.3.5 Waste Disposal Facility Operation

On site waste disposal based upon either a metric or level-of-effort type of activities.

3.4.3.6 Waste and Material Transportation

Number of waste shipments using a metric similar to canisters above

In addition to the metrics above, a component breakdown by PBS type for S&D projects is provided. Most of these components are taken into consideration to measure true project performance as the metrics above only account for 20 percent to 50 percent of the costs of each PBS project.

4.0 ATTACHMENTS

Attachment 1. Environmental Management Cleanup Projects by Major Category and by Type of Project

Attachment 2. Decommissioning Project Overview (CERCLA Non-Time Critical)

Attachment 3. Decommissioning Project Overview typical (DOE O 413.3A products)

Attachment 4. Soil and Groundwater RCRA/CERLA Work Flow Process

Attachment 5. Stabilization and Disposition Project Overview

5.0 TERMS AND DEFINITIONS

Capital Assets

Capital Assets are land, structures, equipment, intellectual property (e.g., software), and information technology used by the Federal government and having a useful life of two or more years. Capital assets include environmental restoration (decontamination and decommissioning) of land to make useful leasehold improvements and land rights, and assets whose ownership is shared by the Federal government with other entities. Capital assets may be acquired through purchase, construction, or manufacture; a lease-purchase or other capital lease (regardless of whether title has passed to the Federal Government); or exchange. This Guide does not apply to land, structures, equipment, intellectual property (e.g., software), or information technology acquired by State and local governments or other entities through financial assistance (i.e., DOE grants and cooperative agreements), or to assets acquired under general plant projects for maintaining infrastructure at a site (DOE O 413.3A)

Cleanup Subproject

A subproject within a cleanup project PBS will be identified based upon an approved mission need statement, and is defined as a non-major acquisition comprised of a series of tasks or activities within a PBS that are related and have a specific objective. Creation of a subproject is intended to provide enhanced visibility to project elements (cost, scope and schedule) and performance/execution analysis and reporting (e.g., EV data), and to provide for future corporate "what if" planning analysis. Subprojects follow the DOE O 413.3 process, which includes using a tailored approach for EM cleanup projects. The subprojects may have a defined scope, cost, and schedule (including end-point); have certified FPDs; and upon establishment of a performance baseline should be able to report earned value data separately from other portions of the PBS. In general, the TPC for subprojects will be greater than $20 million and less than $1 billion. Subprojects will not be established for level-of-effort types of activities; where a PBS has subprojects, the balance of the PBS scope e.g., other level-of-effort, site infrastructure support, contract fee, management reserve, etc) could be captured as a separate element, e.g., "balance of PBS." Examples of subprojects include: the deactivation and decommissioning of a single or related group of facilities; construction of temporary facilities and structures to perform a specific cleanup; construction or modification of fixed facilities with an operational life of less than five years (such as treatment or storage facilities to support a specific cleanup action).

Contaminated Facilities

Contaminated facilities are those that have structural components and/or systems contaminated with hazardous chemical and/or radioactive substances. This definition excludes facilities that contain no residual hazardous substances other than those present in building materials and components, such as asbestos,-containing material, lead-based paint, or equipment containing PCBs. This definition excludes facilities in which bulk or containerized hazardous substances, including radionuclides, have been used or managed if no contaminants remain in or on the structural components and/or systems (DOE O 430.1B).

Deactivation

Deactivation places a facility in a stable and known condition including the removal of hazardous and radioactive materials to ensure adequate protection of workers, public health and safety, and the environment, thereby limiting the long-term cost of surveillance and maintenance. Actions include the removal of fuel, draining and/or de-energizing nonessential systems, removal of stored radioactive and hazardous materials, and related actions. Deactivation does not include all decontamination necessary for the dismantlement and demolition phase of decommissioning (e.g., removal of contamination remaining in the fixed structures and equipment after deactivation [DOE O 430.1B]). This term is commonly used to describe the activities associated with removal of equipment for the purpose of hazard mitigation or salvage and reuse and other preparatory operations such as utility isolation. The desired end state is a facility that can be categorized as “inactive” or “shutdown” pending final disposition.

Decommissioning

Decommissioning is the process of closing and securing a nuclear facility or nuclear materials storage facility to provide adequate protection from radiation exposure and to isolate radioactive contamination from the human environment. It takes place after deactivation and includes surveillance, maintenance, decontamination, and/or dismantlement. These actions are taken at the end to retire it from service with adequate regard for the health and safety of workers and the public and protection of the environment. The ultimate goal of decommissioning is unrestricted release or restricted use of the site (DOE O 430.1B)

Decontamination

The removal or reduction of residual chemical, biological, or radiological contaminant and hazardous materials by mechanical, chemical or other techniques to achieve a stated objective or end condition (DOE O 430.1B). This applies to all facilities that are being dispositioned.

Demolition

Demolition is described as the dismantling, razing, destroying, or wrecking of any building or structure or any part thereof (ANSI A10.6). This is a term widely used and understood in the public domain and applies to all facilities being dispositioned.

Disposition

Those activities that follow the completion of program missions, including but not limited to, preparation for reuse, surveillance, maintenance, deactivation, decommissioning, and long-term stewardship (DOE O 430.1B).

EM Completion

EM Completion occurs when: 1) all required short-term response activities at a specific site are complete (e.g., soil excavation, cap construction, building decommissioning); 2) all required long-term response measures (e.g., ground water treatment systems) are constructed and determined to be operational and functional; 3) all necessary documentation is in place (e.g., engineering certifications/and verifications, post-closure or operating permits, final site condition/configuration records); and 4) the site is administratively transferred from EM responsibility to another DOE, Federal, State or private entity.

Environmental Management Cleanup Project:

EM defines a cleanup project as the entire PBS; however, in some cases the project may be a portion of one PBS or portions of multiple PBSs. EM is responsible for clearly defining the composition of each project. The major categories of EM cleanup projects are as follows: D&D projects, S&GW Remediation, and S&D. These projects have TPCs greater than $20 million and some in excess of $1 billion. A new cleanup project would be established following an approved mission need statement requiring environmental cleanup.

Project Baseline Summary

The PBS is defined as the EM designated program scopes containing logical groupings of work scope, which are projectized through establishing technical scope, cost and schedule baselines, defining performance metrics, providing financial history, budget request justification and other information such as programmatic risk and compliance drivers.

6.0 REFERENCES

6.1 "Protocol for Environmental Management Cleanup Projects," dated April 24, 2007, Memorandum from James A. Rispoli to Paul Bosco.

6.2 American National Standards Institute/Electronic Industries Association ANSI/EIA 748-A-1998, Earned Value Management Systems

6.3 DOE-STD-1120-2005, April 2005 *Standard Integration of Environment, Safety, and Health into Facility Disposition Activities*, Volume 1 of 2,

6.4 "Risk Management Policy," dated February 23, 2007, Memorandum from James A. Rispoli to J.E. Surash

6.5 "Protocol for External Independent Review (EIR)," dated June 30, 2005, Memorandum between EM and OECM

6.6 DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets*, dated 7-28-06.

6.7 Code of Federal Regulations, Title 7, Agriculture, Part 650 *Compliance with NEPA.*

6.8 Code of Federal Regulations, Title 40, Protection of Environment, *CERCLA, RCRA.*

6.9 DOE G 430.1-2, *Implementation Guide for Surveillance and Maintenance during Facility Transition and Disposition*, dated September 29, 1999.

6.10 DOE G 430.1-3, *Deactivation Implementation Guide*, dated September 29, 1999.

6.11 DOE G 430.1-4, *Transition Implementation Guide*, dated September 29, 1999.

6.12 "Delegation of Acquisition Executive Authority for Office of Environmental Management Cleanup Projects," dated August 16, 2007, Memorandum from James A. Rispoli for Clay Sell.

6.13 "Environmental Management Contingency Policy," dated February 3, 2005, Memorandum from Paul Golan.

6.14 "Policies for EM Operating Project Performance Baselines Contingency and Federal Risk Management Plans, and Configuration Control," dated July 10, 2006, Memorandum from C.E. Anderson.

6.15 "Environmental management Configuration Control Process for Project baselines," dated February 13, 2008, Memorandum from Mark Frei.

6.16 DOE-STD-1189-2008, *Integration of Safety into the Design Process,* dated March 2008.

Table 7. Team Membership

Name	Organization
Autar Rampertaap Team Lead	Office of Project Management Oversight EM-53
Ken Kawasaki	Project Time & Cost, Inc.
C.J. Plummer-Wooley	Savannah River Nuclear Solutions
Andrew Szilagyi	D&D and Facility Engineering EM-23
Bill Harker	Idaho Operations Office
Steve Balone	Richland Operations Office
Pramod Mallick	Office of Project Management Oversight EM-53
Tom Longo	NA-56
Larry Romine	Federal Project Director, Richland Operations Office
Amiya Das	Office of Groundwater and Soil Remediation EM-22
Joe Knick EFCOG Lead	SRS, WSRC, Washington Group International
Chuck Negin	PEC-EFCOG
Tony Eng	Nuclear safety HS-20
Todd Lapointe	Nuclear safety HS-20
Pete Zionkowski	SRS, WSRC, Bechtel
Casey Knapp	SRS, WSRC, Bechtel
Greg McCallum	SRS, WSRC, Bechtel

EM Cleanup Projects by Major Category and by Type of Project

Example-EM Cleanup Projects by Major Category and by Type of Project

EM Lifecycle Scope (PBS)

Deactivation and Decommissioning

D&D PBSs

- ***PBS-0040 Nuclear D&D***
- ***PBS-0050 Non-Nuclear D&D***

Soil and Water Remediation

S&WR PBSs

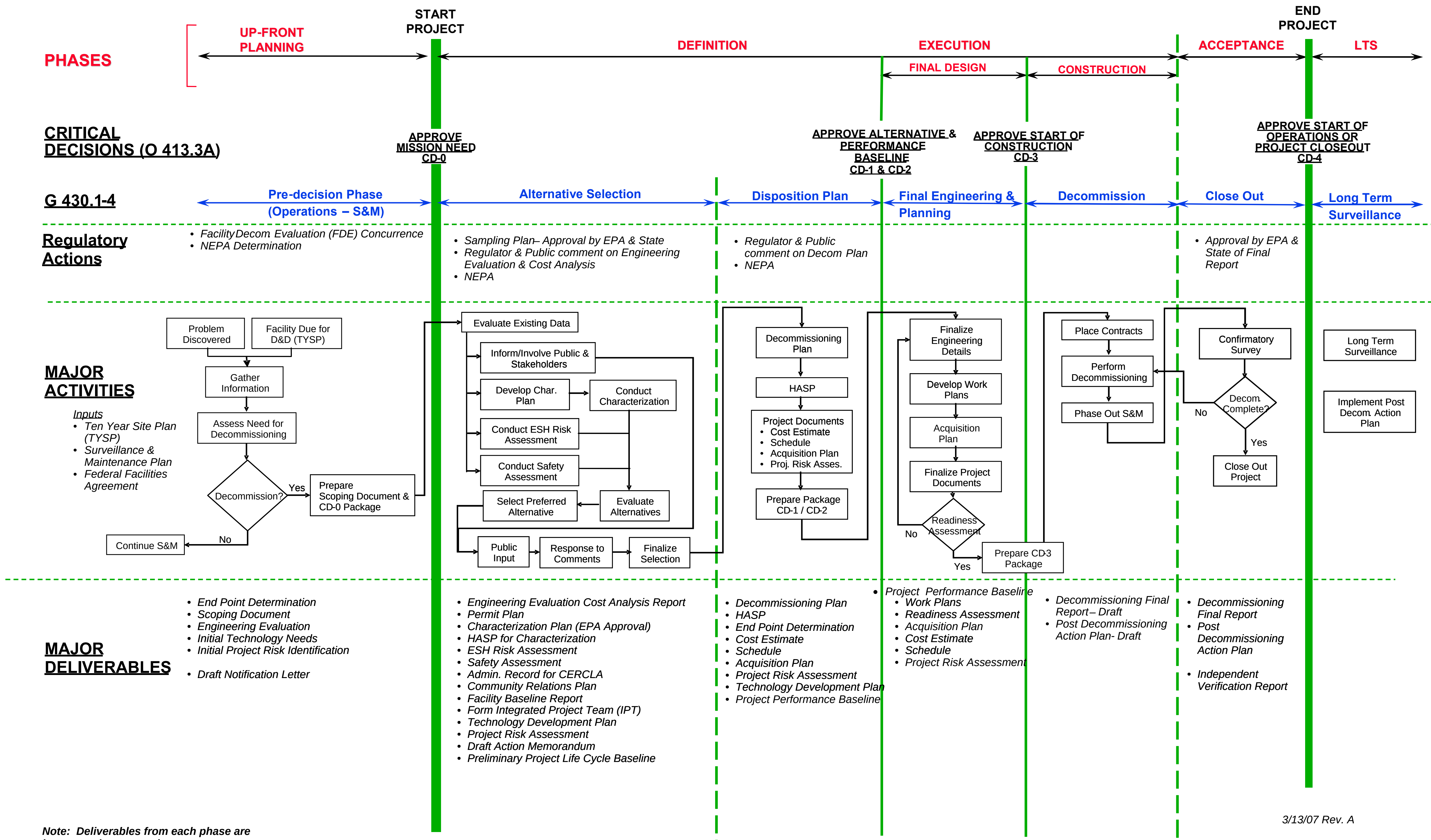
- ***PBS-0030 Soil and Water Remediation***

Stabilization and Disposition

S&D PBSs

- ***PBS-0011 Nuclear Materials S&D***
- ***PBS-0012 Spent Nuclear Fuel S&D***
- ***PBS-0013 Solid Waste S&D***
- ***PBS-0014c Radioactive Liquid Waste Tank S&D***
- ***PBS-0080 Operate Waste Disposal Facility***
- ***PBS-0090 Waste & Material Transportation***

Decommissioning Project Overview (CERCLA Non-time Critical)



Note: Deliverables from each phase are input to subsequent phases

Decommissioning Project Overview

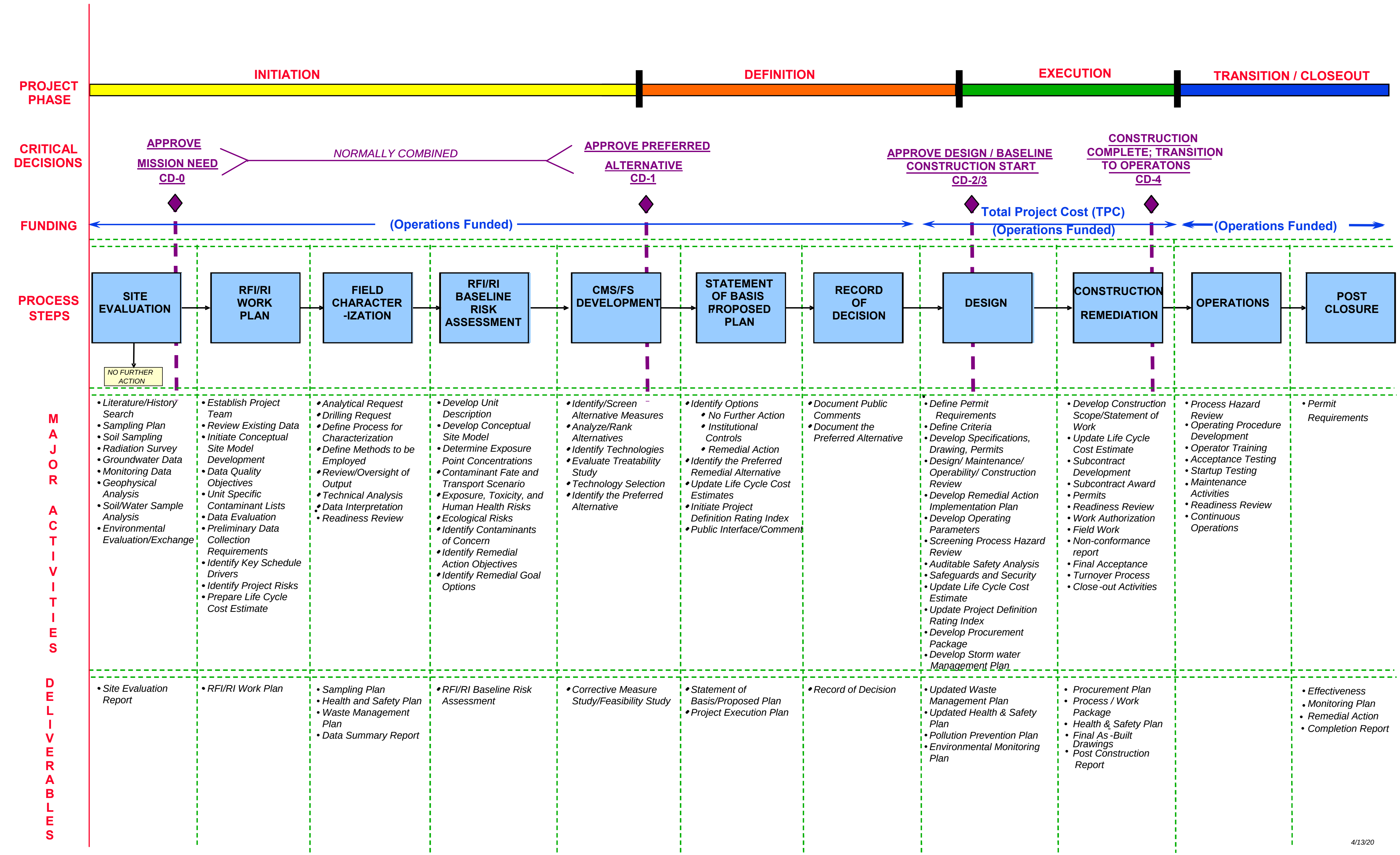
(Typical products)

PHASES	UP-FRONT PLANNING	START PROJECT — DEFINITION	DEFINITION	EXECUTION	EXECUTION	ACCEPTANCE	LTS
			PRELIMINARY DESIGN	FINAL DESIGN	D&D		END PROJECT
CRITICAL DECISIONS (O 413.3A)	APPROVE MISSION NEED CD-0		APPROVE ALTERNATIVE & PERFORMANCE BASELINE CD-1 & CD-2	APPROVE START OF Deactivation & Decommissioning CD-3		APPROVE PROJECT CLOSEOUT CD-4	
FUNDING	Pre-decision Phase (Operations – S&M)	Alternative Selection	Disposition Plan	Final Engineering & Planning	Deactivate or Decommission	Close Out	Long Term Surveillance
MAJOR INPUT ITEMS	• Problem / Need Definition • Document Proposed Modification • Conceptual Design Business Decision Estimate & Budgets	• Permit Requirements • Facilities Scope • Preliminary Technology Dev Input • RSA / ORR Applicability	• Approval of Preliminary Base line Range • Facility Scope Package • TPC BDER & Schedule Range • Special Requirements	• Approved Baselines • Source Documents • Technology Development output	• Material and Equipment • Project Authorization • Permits	•Completed Systems	
MAJOR ACTIVITIES	• Establish Project Team • Establish Program/Project Planning Budget • Develop Project Scope • Initiate Planning & Technical Approach • Assess Technology Needs • Submit CD0 Package • Identify Project Risks • Environmental Strategy has been decided • Identify Customer Expectations • Identify Key Schedule Drivers • Identify Funding Constraints • Identify Project Level Interfaces • Establish Placeholder in Out Year Budget • Identify Current & Next 2 FY Funding Requirements • Establish Next Phase Budget & Schedule • Develop TPC BDER & Sched Range	• Perform Project & Detail Design Phase T&PRA • Set Project Execution Strategy • Review Alternatives • Identify Project Codes, Standards and Procedures • Perform Safety & Operability Review • Update Acquisition Strategy • Develop Next Phase Budget & Schedule • Update TPC BDER & Schedule Range • Identify Current & 2 FYs Funding Requirements	• Define Special Procurement • Finalize Permit Requirements • Commit Critical Equipment • Perform Hazards Review • Finalize PEP • Update ROAR • Develop Baselines • Develop CD1 / CD2 Package • Define Project End-points • Update Annual/Outyear BA	• Finalize Field Support Plan • Engineering & Design deliverables needed to initiate fieldwork • Develop CD 3 Package	• Conduct Site Work • Final Waste and Material Disposition • Initiate Closeout Process	• Specified End State and End-points Verification	• Financial Closeout or transfer to Long Term Stewardship
MAJOR DELIVERABLES	• Statement of Mission Need • Technology Dev Issues List • TPC BDER & Schedule Range • Acquisition Strategy • Next Phase Budget & Schedule • Risk & Opportunity Mgmt Plan/Prelim. Risk Assessment • Program Plan • Systems Eng. Mgmt. Plan • Project Definition Rating Index • CD-0 Package	• Project End State Vision • Project Expectations Summary • Statement of Work • Preliminary NEPA Documentation • Preliminary Project Execution Plan • Preliminary Hazard Analysis Report • Risk Anal. & Opport. Report (RAOR) • Verification of Mission Need • Updated TPC BDER & Schedule Range	• Project End-points Specification • Detailed Schedules • Responsibility Assign. Matrix • Finalize NEPA documentation • Performance Metrics • Staffing Plans • Project/Tech. Risk Analysis Report • Technology Dev Output • Documented Safety Analysis • Final PEP • Project Definition Rating Index (PDRI) • TPC Estimate • CD-1 / CD-2 Package	• Equipment and Material Requisitions • 100% Definitive Estimate • Detail Schedules • Updated PEP & Performance Baseline • Verif. of Mission Need • Request for Project Auth. (D&D) • Approved Safety Docs • Execution Readiness Independent Review • PDRI • Updated ROAR • CD-3 Package	• Deactivation or Decommissioning Completion • Turnover & Closeout	• Project Completion Report	

3/13/07 Rev A

Note: Deliverables from each phase are input to subsequent phases

Soil and Groundwater RCRA/CERCLA Flow Process



Stabilization and Disposition Project Overview