

Environmental Restoration Competency 4.4

Competency 4.4 Environmental restoration personnel shall demonstrate a working level knowledge of financial management necessary to integrate program resources and apply those resources to meet quality, safety, cost, and schedule commitments; as described in Department of Energy (DOE) Notice 4700.5, Project Control System Guidelines.

1. Supporting Knowledge and Skills

- a. Define and compare the terms “cost estimate” and “budget.”
- b. Describe the process for preparing cost estimates and budgets.
- c. Describe and compare labor and non-labor costs.
- d. Describe and compare direct and indirect costs.
- e. Discuss methods of reducing indirect costs.
- f. Discuss the importance of determining the measure for work performed before work starts.
- g. Describe methods for measuring work performed.
- h. Define and explain the relationship between following terms:
 - Budgeted cost of work scheduled (BCWS)
 - Budgeted cost of work performed (BCWP)
 - Actual cost of work performed (ACWP)
- i. Discuss schedule and cost variance.
- j. Given actual project management documentation and data, identify Budgeted cost of work scheduled, Budgeted cost of work performed, Actual cost of work performed, and determine the schedule variance and cost variance.
- k. Describe the types of Earned Value and how they are measured.
- l. Explain what is meant by the term “baseline” as it relates to project management.
- m. Describe the four baselines used in project management.
- n. Describe the types of data required to forecast cost and schedule performance.

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- o. Define the term “Estimate at Completion.”
- p. Given sample data, calculate Estimate at Completion.
- q. Discuss the importance of formal change control with regard to project management.
- r. Discuss the use of strategic planning, and how such planning relates to ongoing operations and safety of operations.

2. Self-Study Activities (Corresponding to the Intent of the Above Competency)

Below are two web sites containing many of the references you may need.

Web Sites		
Organization	Site Location	Notes
Department of Energy	http://wastenot.inel.gov/cted/stdguido.html	DOE Standards, Guides, and Orders
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Review DOE Order 4700.1, *Project Management System*, Attachment III, Definitions.

Review DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*.

Review DOE N 4700.5, *Project Control System Guidelines*.

Review DOE O 130.2, *Budget Formulation*.

EXERCISE 4.4-A Referring to DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*, define cost estimating.

EXERCISE 4.4-B DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*, provides several different methods for preparing cost estimates. Referring to the Order, describe them.

EXERCISE 4.4-C What are the “four distinct phases” of formulation of the Department’s budget?

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EXERCISE 4.4-D Describe and compare labor and nonlabor costs.

EXERCISE 4.4-E Describe and contrast direct and indirect costs.

EXERCISE 4.4-F List ways to reduce indirect costs.

Scan DOE N 4700.5, *Project Control System Guidelines*.

Read DOE Order 4700.1, 1. Introduction; 2. Objectives; 3. Requirements, Attachment III, Part B, Work Breakdown Structure; and Part F.10.b, Performance Measurement Data Systems.

EXERCISE 4.4-G Discuss the importance of determining the measure for work performed before work starts.

EXERCISE 4.4-H Describe methods for measuring work performed.

Read DOE N 4700.5, *Project Control System Guidelines*, Attachment 2, Project Control System Guidelines; and DOE Order 4700.1, *Project Management System*, pages III-25 through III-39, Project Control; and pages III-85 through III-89, Attachment III-7, Cost and Schedule Control Systems Criteria.

NOTE: This Order will be phased out upon the incorporation of its contents into contracts or other agreements. It is presented here because its general content remains applicable.

Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

EXERCISE 4.4-I Define budgeted cost of work scheduled (BCWS).

EXERCISE 4.4-J Define budgeted cost of work performed (BCWP).

EXERCISE 4.4-K Define actual cost of work performed (ACWP).

EXERCISE 4.4-L How are BCWS, BCWP, and ACWP used in performance measurement?

Review DOE N 4700.5, *Project Control System Guidelines*.

EXERCISE 4.4-M Given actual project management documentation and data, identify budgeted cost of work scheduled, budgeted cost of work performed, actual cost of work performed, and determine the schedule variance and cost variance.

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EXERCISE 4.4-N Discuss schedule and cost variance.

Read DOE N 4700.5, *Project Control System Guidelines*, Attachment 2, Project Control System Guidelines; and DOE Order 4700.1, *Project Management System*, pages III-25 through III-39, Project Control; and pages III-85 through III-89, Attachment III-7, Cost and Schedule Control Systems Criteria.

NOTE: This Order will be phased out upon the incorporation of its contents into contracts or other agreements. It is presented here because its general content remains applicable.

Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

EXERCISE 4.4-O Define earned value (EV).

EXERCISE 4.4-P Describe the types of EV data elements.

EXERCISE 4.4-Q How are the types of EV measured?

Read DOE N 4700.5, *Project Control System Guidelines*, Attachment 1, Definitions, and Attachment 2, Project Control System Guidelines.

Read DOE Order 4700.1, *Project Management System*, Attachment 3, Definitions, pages II-49 through II-57, Guidance for Preparing a Project Plan; and pages III-1 through III-15, Project Control.

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Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

EXERCISE 4.4-R Describe the term “baseline” in the context of project management.

EXERCISE 4.4-S Describe the controlled baselines used in project management.

EXERCISE 4.4-T Describe the four types of technical baselines used in project management.

EXERCISE 4.4-U Explain how the project baseline is controlled.

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Review DOE N 4700.5, *Project Control System Guidelines*.

EXERCISE 4.4-V Describe the types of data required to forecast cost and schedule performance.

Read DOE N 4700.5, *Project Control System Guidelines*, Attachment 2, Project Control System Guidelines; and DOE Order 4700.1, *Project Management System*, pages III-25 through III-39, Project Control; and pages III-85 through III-89, Attachment III-7, Cost and Schedule Control Systems Criteria. (Note that this Order will be phased out upon the incorporation of its contents into contracts or other agreements. It is presented here because its general content remains applicable.)

Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

EXERCISE 4.4-W Define estimate at completion (EAC).

EXERCISE 4.4-X How is the EAC computed?

EXERCISE 4.4-Y What is the purpose of EAC?

EXERCISE 4.4-Z How is EAC used in contractor performance analysis?

Read DOE N 4700.5, *Project Control System Guidelines*, Attachment 2, Project Control System Guidelines; and DOE Order 4700.1, *Project Management System*, pages II-49 through II-81, Guidance for Preparing a Project Plan; and pages III-1 through III-15, Project Control. This Order will be phased out upon the incorporation of its contents into contracts or other agreements. It is presented here because its general content remains applicable.

Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

EXERCISE 4.4-AA Referring to DOE N 4700.5, what are the primary objectives of formal project control?

EXERCISE 4.4-BB Why is formal project control important?

Read pages II-1 through II-29, Parts A through E, Strategic Planning, Project Planning, and Budgeting of DOE Order 4700.1, *Project Management System*. This Order will be phased out upon the incorporation of its contents into contracts or other agreements. It is presented here because its general content remains applicable.

Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

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Scan DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, pages 1 through 4.

EXERCISE 4.4-CC Referring to DOE Order 4700.1, *Project Management System*, Chapter II, Part A, Project Initiation and Planning Documentation; and DOE O 430.1, *Life-Cycle Asset Management*, Attachment 1, what is the purpose of strategic planning and what assurances does it provide?

EXERCISE 4.4-DD What is the relationship between strategic planning and project planning?

EXERCISE 4.4-EE Referring to DOE Order 4700.1, *Project Management System*, Parts A through H of Chapter II, Strategic Planning, Project Planning, and Budgeting; and to DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, how does strategic planning ensure (or support) continued safe operation of DOE facilities?

3. Summary

DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*, defines cost estimate as:

“ . . . a statement of costs estimated to be incurred in the conduct of an activity such as a program, or the acquisition of a project or system.” Budget is usually defined as a financial plan used to estimate the results of future operations.

Projects are broken into categories by the total cost of the projects. Major System Acquisitions (MSAs) are above \$100 million, Major Projects (MPs) are \$50-100 million, and “other” projects are under \$50 million. Funding for projects are generally the responsibility of the Program Secretarial Office.

The contractor decides the nature of the cost, either direct or indirect, and the decision is reviewed by the Contracting Officer and Chief Financial Officer for the contract, using government-prescribed guidelines. There is no absolute list of costs that belong in one group or another.

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The milestones and deliverables (services, products, or data) called for in the WBS become the measuring devices by which progress in a project can be measured. By setting these, both the contractor and the Department will know what is to be expected. DOE N 4700.5, *Project Control System Guidelines*, directs a cost-effective, graded approach to the application of project controls, providing flexibility in application to all projects and contracts on the basis of the scale and type and unique needs of each project.

The methods of measuring work performed are through assessments, audits, surveillances, etc. These will vary according to who or what is being measured (the contractor or project), who is doing the measuring (the assessor), and the type of assessment, audit, surveillance, etc. Currently, all assessments, audits, surveillances, etc., are being conducted using performance-based measurements.

Performance measurement data analysis is a dual responsibility of the contractor and DOE. The contractor performs this function for internal management needs and for preparation of the external reports to DOE. Cost, schedule, and at-completion variances that exceed established thresholds require review and analysis to determine the cause, to evaluate options to resolve the situation, and to report actions to higher management. These variances are calculated using the project management tools: earned value (EV), budgeted cost of work scheduled (BCWS), budgeted cost of work performed (BCWP), actual cost of work performed (ACWP), and estimate at completion (EAC). The use of these reports and control tools assist DOE and the contractor in:

- Determining the current contract cost and schedule performance status
- Highlighting areas requiring more detailed focus and attention
- Identifying deviations and trends
- Forecasting, verifying, or questioning future work status

Schedule and cost variance is the measurement of project costs and its schedule of performance against the Cost Baseline and the Schedule Baseline to compare where a project is to where it should be. The baselines may be formally changed to reflect actual changes that have occurred in a project.

The three major categories in the Project Control System are:

- Baseline Development
- Project Performance
- Change Management

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The Baseline Development category includes management actions necessary to define the project scope and responsibilities, establish baselines, and plan the project. The Project Performance category includes management actions after work commences that are necessary to monitor project status against the baseline, report and analyze performance, and manage risk. The Change Management category includes management actions necessary to ensure adequate control of project baselines, including the performance measurement baseline.

The three objectives of project planning and scheduling are to ensure that all known requirements affecting a project are identified and considered in the development of project baselines; ensure visibility of critical path activities and DOE milestones; and ensure that all project work is scheduled using a disciplined approach, and properly integrated with other guideline elements.

The major elements of the Project Baseline Development process are:

- Technical Baseline and Work Scope Definition
- Roles and Responsibilities
- Cost Estimating
- Planning and Scheduling
- Cost Baseline

Forecasting cost and schedule performance are integral parts of completing the project management plan for any project of any size. Accurate estimates of performance will give the oversight person better standards with which to measure performance.

Project management is a management approach in which authority and responsibility for execution are vested in a single individual. This approach provides focus on the planning, organization, direction, and control of all activities within the project. The project management plan is the document that sets forth the plans, organization, and systems that those responsible for managing the project shall utilize.

A cornerstone of DOE's project management policy is the concept of accountability at appropriate levels for project control and management. An essential element of accountability is overall project control of technical scope, cost, and schedule baselines. The three major categories in the Project Control System are Baseline Development, Project Performance, and Change Management.

Strategic planning integrates energy, health, safety, environment, technology, and economic considerations across the entire range of DOE programs in order to bring the plans and projects in line with near-term, midterm, and long-term objectives of the Department.

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4. Exercise Solutions

EXERCISE 4.4-A Referring to DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*, define cost estimating.

ANSWER 4.4-A DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*, defines cost estimate as “. . . a statement of costs estimated to be incurred in the conduct of an activity such as a program, or the acquisition of a project or system.”

EXERCISE 4.4-B DOE Order 5700.2D, *Cost Estimating, Analysis, and Standardization*, provides several different methods for preparing cost estimates. Referring to the Order, describe them.

ANSWER 4.4-B

Cost Estimate Technique	Description
Bottoms-Up	“Generally, work statement and set of drawings or specifications are used to ‘takeoff’ material quantities required . . . in accomplishing a given operation or producing an equipment component. From these quantities, direct labor, equipment, and overhead costs are derived and added thereto.” (DOE Order 5700.2D, Attachment 1, 1)
Specific Analogy	These use the known cost of an item used in a prior system to estimate the cost of a similar item in the new system. Adjustments are then made to account for recognized differences in the two systems (i.e., design, complexity of performance, etc.).
Parametric	This requires historical databases on similar systems and uses statistical analysis to find correlations between the cost drivers and other system parameters.

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Cost Estimate Technique	Description
Cost Review and Update	Previous estimates of the same project are examined for internal logic, completeness of scope, etc.
Trend Analysis	Actual costs of work performed are compared to the original projected costs and a contractor efficiency index is derived. The index is then used to predict the cost of work not yet completed.
Expert Opinion	Specialists are consulted reiteratively until a consensus cost estimate is established. This is used in the absence of other data or techniques.

EXERCISE 4.4-C What are the “four distinct phases” of formulation of the Department’s budget?

- ANSWER 4.4-C
- (1) Field Budget Process: The field budget process is the first phase of the Department’s annual budget formulation process. It is the process through which Field Offices prepare and submit field budget data to Headquarters Elements for use in the corporate review budget process.
 - (2) Corporate Review Budget (CRB) Process: The corporate review budget process is the second phase of the Department’s annual budget formulation process. It is the process whereby Headquarters organizations use, among other budget-related information, field budget data and spring planning decisions to develop initial budget requests that are jointly and considered in the Department's internal budget review, resulting in CRB budget allowances.
 - (3) Office of Management and Budget (OMB) Budget Review Process: The OMB budget review process is the third phase of the Department's annual budget formulation process. It is the principal mechanism for preparing the Department's annual budget submission to the OMB. The Department’s OMB request is based on the Secretary’s final budget allowances resulting from the CRB process.

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- (4) Congressional Budget Review Process: The congressional budget review process is the final of the Department's annual budget formulation process. It is based on final Presidential funding and policy determinations resulting from the OMB budget review process.

EXERCISE 4.4-D Describe and compare labor and nonlabor costs.

ANSWER 4.4-D Labor and nonlabor costs are those direct costs assigned to a specific project. Labor costs are those associated with the labor needed to complete the project: salaries, benefits, and associated costs. Nonlabor costs are those for supplies and materials for the project.

EXERCISE 4.4-E Describe and contrast direct and indirect costs.

ANSWER 4.4-E Direct costs are costs that can be specifically identified with a particular project or activity, including salaries, travel, equipment, and supplies directly benefiting the project or activity.

Indirect costs are costs incurred by an organization for common or joint objectives and cannot be identified with a particular project or activity. Examples are utilities, computer processing, security, and administrative expenses. Indirect costs are often referred to as overhead or burdened expense.

EXERCISE 4.4-F List ways to reduce indirect costs.

ANSWER 4.4-F There are several ways to reduce indirect costs including:

- Understanding the basis for allocation of cost pools
- Question rate changes
- Question cost changes
- Look for inefficient/costly practices
- Provide input to budget validations of indirect costs
- Work with the CFO for more effective process

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EXERCISE 4.4-G Discuss the importance of determining the measure for work performed before work starts.

ANSWER 4.4-G By determining the measure for work performed BEFORE work starts, you are able to establish the milestones and deliverables for the project and begin the creation of the Work Breakdown Structure (WBS). The WBS then becomes the measuring device for the work performed on the project and a part of the established baseline for the project.

EXERCISE 4.4-H Describe methods for measuring work performed.

ANSWER 4.4-H The WBS, with its milestones and deliverables, becomes the measuring device for the work performed on the project. The WBS technique accomplishes the objective of work definition and provides the basis for performance measurement at levels that meet specific management needs.

EXERCISE 4.4-I Define budgeted cost of work scheduled (BCWS).

ANSWER 4.4-I The sum of budgets for all control accounts for work scheduled to be accomplished within a given time period. Also, the time-phased budget plan (baseline), which represents the contract work plan.

EXERCISE 4.4-J Define budgeted cost of work performed (BCWP).

ANSWER 4.4-J The planned value of work accomplished or the value of the work completed. Also known as earned value.

EXERCISE 4.4-K Define actual cost of work performed (ACWP).

ANSWER 4.4-K The cost incurred and recorded in the accounting system for accomplishing the work performed within a specified time period. Also, the direct and indirect costs applicable to the work which has been performed.

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EXERCISE 4.4-L How are BCWS, BCWP, and ACWP used in performance measurement?

ANSWER 4.4-L A comparison of BCWS and BCWP indicates whether more or less work was done than was scheduled to be done. The difference represents the schedule variance in monetary terms. Comparing BCWP with ACWP results in a cost variance that indicates whether the work that was actually performed cost more or less than it was planned to cost. Analyses of cost and schedule variances enable the contractor (and DOE) to identify problems, to determine reasons for deviations from plans, to take corrective actions, and to report the results.

EXERCISE 4.4-N Referring to DOE N 4700.5, discuss schedule and cost variance.

ANSWER 4.4-N “Variance is the difference between planned and actual performance. Variances that exceed established thresholds normally require further review, analysis, or action. Established thresholds should be revised during the life of a project to ensure meaningful analysis.

Schedule baseline is the time-phased plan with a logical sequence of interdependent activities, milestones, and events necessary to complete the project. The schedule baseline shall be formally changed during the execution of the project when required.

Cost Baseline is a time-phased budget that has been developed from the cost estimate made at approval of the technical baseline, and the majority of the budget has been time-phased in accordance with the project schedule. It contains direct and indirect budget; management reserve budget; undistributed budget and higher level budgets; contingency amount; and amount for fee, as appropriate.”

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EXERCISE 4.4-M Given actual project management documentation and data, identify budgeted cost of work scheduled, budgeted cost of work performed, actual cost of work performed, and determine the schedule variance and cost variance.

- ANSWER 4.4-M
1. For the assumed time period, identify the work that has been planned and identify the amount or milestone for the work actually performed.
 2. Determine the apportioned budget for this work performed. This is the earned value.
 3. Compare the work that has been planned with the amount of work actually performed. This difference is the schedule variance.
 4. Compare the earned value of the work performed with the actual cost of the work performed during this period of time. This difference is the cost variance.
 5. Depending on whether these variances are positive or negative, the DOE cognizant individual will require the contractor project manager to take specific actions to rectify any cost overrun or schedule slippage, and to reconcile cost underrun or a schedule forecast. In either case, the DOE cognizant individual will likely increase oversight activities of the contractor.

EXERCISE 4.4-O Define earned value (EV).

ANSWER 4.4-O EV is the value of completed work expressed in terms of the budget assigned to that work. With regard to cost and schedule control systems criteria, earned value is the budgeted cost of work performed.

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EXERCISE 4.4-P Describe the types of EV data elements.

ANSWER 4.4-P

EARNED VALUE		
Earned Value (EV) Data Elements	Acronym	EV Data Element Description
Budgeted Cost of Work Scheduled	BCWS	Work Planned
Budgeted Cost of Work Performed	BCWP	Work Accomplished (Earned Value)
Actual Cost of Work Performed	ACWP	Cost of Work Accomplished
Budgeted Cost at Completion	BAC	Work Authorized
Estimated Cost at Completion	EAC	Estimate of Final Contract Cost
Cost Variance (BCWP minus ACWP)	CV	Cost Difference
Schedule Variance (BCWP minus BCWS)	SV	Schedule Difference
At Completion Variance (BAC minus EAC)	ACV	Cost at Completion Difference

EXERCISE 4.4-Q How are the types of EV measured?

ANSWER 4.4-Q They are compared to the budgeted cost for work scheduled to obtain an indication of schedule performance and are compared to the actual cost of work performed to obtain cost performance.

EXERCISE 4.4-R Describe the term, baseline, in the context of project management.

ANSWER 4.4-R A quantitative expression of projected costs, schedule, and technical requirements. Baseline establishment should serve as a base or standard for measurement during the performance of an effort. It is the data plan against which the status of resources and the progress of a project can be measured.

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EXERCISE 4.4-S Describe the controlled baselines used in project management.

ANSWER 4.4-S

CONTROLLED BASELINES	
Type	Description
Scope (technical)	A configuration identification document or set of documents formally designated and approved by DOE. The initial technical baseline, plus DOE-approved changes to that baseline, constitute the current technical baseline.
Cost	A budget spending plan that has been developed from the cost estimate made at approval of the technical baseline, and the majority of the budget, has been time-phased in accordance with the project schedule. The cost baseline normally contains direct and indirect budget, management reserve budget, undistributed budget, contingencies, and fee.
Schedule	The time-phased plan with a logical sequence of interdependent activities, milestones, and events necessary to complete the project. The schedule baseline can only be changed formally during the execution of the project.

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EXERCISE 4.4-T Describe the four types of technical baselines used in project management.

ANSWER 4.4-T

TECHNICAL BASELINES	
Types	Description
Functional Requirements Baseline	The initial technical baseline, and is based on the functional requirements of the end products that are derived from the mission needs.
Technical Requirements Baseline	The basis for preliminary design, and is established at the completion of the conceptual design. It consists of the documentation that describes the selected design approach and specifies its design and performance requirements.
Design Requirements Baseline	The collection of documentation that defines the preliminary design. It is established at the completion of the preliminary design and is the basis for the definitive design.
Final Baseline	Established when the definitive design is completed, it describes all the details of the design necessary for fabrication, assembly, construction, installation, and checkout of the facilities and equipment. It is composed of the specifications and drawings, quality assurance provisions, test procedures, and operations and maintenance manuals.

EXERCISE 4.4-U Explain how the project baseline is controlled.

ANSWER 4.4-U By the use of the project management tool, configuration management, and control. Configuration control is exercised on the basis appropriate to the management level concerned and to the stage in the project life cycle. All affected project activities, such as engineering, logistic support, quality assurance, maintenance, and procurement need to be involved in evaluating proposed changes in the configuration of an aspect of the project throughout its life cycle. This is normally accomplished by a configuration control board.

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EXERCISE 4.4-V Describe the types of data required to forecast cost and schedule performance.

ANSWER 4.4-V Cost estimates are prepared using appropriate estimating methodologies that are integrated with the WBS, and the DOE cost structure as specified by DOE, for all contract work. All estimates are to be consistent with DOE 5700.2D and in accordance with FAR 15.804, "Cost and Price Data Analysis," as appropriate.

Cost estimates are prepared using appropriate estimating methodologies that are integrated with the Work Breakdown Structure (WBS), and the DOE cost structure as specified by DOE, for all contract work. All estimates are to be consistent with DOE 5700.2D and in accordance with FAR 15.804, "Cost and Price Data Analysis," as appropriate.

FORECAST COST PERFORMANCE		
	Type of Cost	Description
Cost Estimates	Total Estimated Costs	Costs including the land and land rights; engineering, design, and inspection costs; direct and indirect construction costs; and initial equipment necessary to put the plant or installation into operation.
	Total Project Costs	All generic research and development, operating, and plant and capital equipment costs specifically associated with a project. (Total Project Cost is the sum of the total estimated cost plus all other costs identifiable to the project.)

Planning and scheduling is a process that is established and is in operation through the life of the project to identify programmatic, operational, legislative, institutional, and other requirements or constraints that may affect technical, cost, or schedule baselines and ensure that such baselines reflect such potential impacts. Schedules are developed integrating the WBS and cost estimate, and represent all work scope regardless of funding source. Activity logic is used to depict all work scope, constraints, and decision points and estimated and assigned durations to activities that represent work accomplishments. The detail scheduled activities form the master- and intermediate-level schedules as required.

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EXERCISE 4.4-W Define estimate at completion (EAC).

ANSWER 4.4-W The actual cost incurred to date plus the estimated costs (direct and indirect) of all remaining work, including authorized work that has not been definitized.

EXERCISE 4.4-X How is the EAC computed?

ANSWER 4.4-X Determine the actual project costs to date and add the estimated costs of all remaining work. These estimated costs will be the same or similar in magnitude to the apportioned budget for the remaining work.

EXERCISE 4.4-Y What is the purpose of EAC?

ANSWER 4.4-Y To determine overall project status and performance against the authorized budget.

EXERCISE 4.4-Z How is EAC used in contractor performance analysis?

ANSWER 4.4-Z Based on the contractor's performance to date and estimates of future conditions, an EAC is computed and compared to the total budgeted cost for work scheduled or the projected budget at completion. At the contract level, total budget is usually equal to the contract value; therefore, the difference between the budget at completion and the EAC forecasts a contract overrun or underrun.

EXERCISE 4.4-AA Referring to DOE N 4700.5, what are the primary objectives of formal project control?

ANSWER 4.4-AA (Any reasonable paraphrase of the following.)

- To assure cost, schedule, and scope baselines are clearly defined, documented, and approved in accordance with DOE policies and directives.
- To assure baseline changes are defined, documented, and approved, and authority and responsibilities for such approval are delineated.
- To provide assurance that decisions are made at the appropriate management level.

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- To enhance accountability and traceability in the DOE decision-making process.

EXERCISE 4.4-BB Why is formal project control important?

ANSWER 4.4-BB (Any reasonable paraphrase of the following.)

Establishment and maintenance of project baselines are essential to project control for statutory adherence, funds control, Congressional scope limitations, and timely completion. As such, changes to baselines must be carefully controlled to avoid loss of control and distortions in performance reporting.

EXERCISE 4.4-CC Referring to DOE Order 4700.1, *Project Management System*, Chapter II, Part A, Project Initiation and Planning Documentation; and DOE O 430.1, *Life-Cycle Asset Management*, Attachment 1, what is the purpose of strategic planning and what assurances does it provide?

ANSWER 4.4-CC Purpose: To provide the capability for integrating across the entire range of DOE programs to bring the plans and projects in line with near-term, midterm, and long-term objectives of the Department.

Assurances: That all of DOE's energy, health, safety, environment, technology, and economic considerations are molded into a mutually supportive framework.

EXERCISE 4.4-DD What is the relationship between strategic planning and project planning?

ANSWER 4.4-DD Strategic planning is a broader type of planning that attempts to ensure that the Department's short-term and long-term mission and goals are integrated with internal and external programs and are reflected in current programs and projects. Project planning, on the other hand, is a more specific type of planning that attempts to ensure that all aspects of a particular or anticipated project are identified so that the project can be initiated, controlled, and managed to ensure its success.

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EXERCISE 4.4-EE Referring to DOE Order 4700.1, *Project Management System*, Parts A through H of Chapter II, Strategic Planning, Project Planning, and Budgeting, and to DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, how does strategic planning ensure (or support) continued safe operation of DOE facilities?

ANSWER 4.4-EE Generally, all aspects of DOE operations (energy, health, safety, environment, technology, and economics) are considered in strategic planning for its near-term, midterm, and long-term mission and goals. For example, the “Assistant Secretary for Nuclear Energy must develop, promulgate, and maintain policies necessary to implement and sustain effective DOE-wide conduct of operations of facilities . . .” These policies should originate from the Department’s strategic mission, goals, and planning.

Specifically, safe operation of DOE facilities can only be assured and ensured if DOE and contractor management explicitly implement these Department policies; that is, “the conduct of operations at DOE facilities be managed with a consistent and auditable set of requirements, standards, and responsibilities . . .”