

**LIFE
CYCLE
ASSET
MANAGEMENT**

Good Practice Guide
GPG-FM-008

Work Scope Planning

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Office of Project and Fixed Asset Management

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1. INTRODUCTION

Projects within the Department of Energy (DOE) range widely—from standard facility construction to specialized production facilities and from environmental and waste management facilities to unique research efforts. For each project, technical objectives should be established early. As the project progresses and becomes more completely planned, technical objectives are translated into tasks and task sequences. This process is the development and definition of the work scope.

Technical objectives define what the project will accomplish, and work scope describes how the technical objectives will be accomplished. Because the project cost and schedule are driven by the work scope, and changes in work scope result in changes in the project schedule and the time-phased budget, proper definition of the work scope is critical to the project's success. During early project phases, such as conceptual design, the work scope is necessarily less well defined than it is later; however, work scope must be defined in as much detail as possible during each phase.

This Guide provides information about defining work scope, developing structures for managing and controlling work scope, and documenting work scope. The DOE project manager should use this information to choose and use a method for developing the work scope to ensure cost-effective and efficient management of the project. The project manager should also use this Guide to specify higher levels of work scope and ensure that the work scope proposed by the contractor accomplishes the technical objectives.

This Guide should be used both for complex projects requiring a quantifiable work scope and for those requiring a less stringent work scope, which can rely more heavily on monitoring the accomplishment of technical objectives.

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2. PRINCIPLES AND PROCESSES

2.1 Construction Projects

Standard "brick and mortar" projects (construction projects with little or no new technology) allow the most direct translation of technical objectives to work scope. On this type of project, every element of the work scope is usually traceable to a technical objective or objectives. This type of project could employ the "rolling wave" concept of planning—that is, the development of a well-defined, quantified work scope for near-term work based on available information and a less well defined, less quantified definition for work scope that is beyond the current planning window.

2.2 Special Facilities Projects

Special facilities projects, such as nuclear material processing or waste treatment, may apply existing technology in a new way that requires a unique or more specialized design. For these projects, many of the technical objectives will clearly translate to work scope, but those associated with new uses of existing technology will have to rely on management by technical objective since the work scope cannot be defined in advance.

2.3 Technology Development Projects

Because technology development projects, which develop or advance state-of-the-art engineered systems, can be unprecedented, a work scope cannot always be defined in advance of the work. In these cases, technical objectives and their specifications become the primary vehicle by which the project is defined, tracked, reported, and managed, especially in the early stages. In such projects, in which management by technical objectives is necessary, an artificial work scope should not be created in an attempt to define tasks before technical planning has been accomplished.

2.4 Environmental Restoration Projects

In most environmental restoration projects, the project-specific technical objective related to the desired remediation technology cannot be finalized until the regulatory Record of Decision is obtained; however, the work scope for the assessment is often clearly defined early in the project. For instance, the volume of waste to be cleaned up (work scope) may be determined early in the project and may remain the same despite required changes in the remediation level or the selected remediation technology (technical objective). In other instances, the desired cleanup level (technical objective) may not change but, to achieve the required cleanup level, the volume of waste to be cleaned up (work scope)

may change. For these projects and others with a significant level of regulator and stakeholder involvement, explicit and quantified work scope definition is critical because changes in the work scope will significantly affect the project budget and schedule.

2.5 Technical Objectives and Work Breakdown Structure

Technical objectives encompass project mission, functions, design or characterization requirements, and specifications, and are used to define, execute, and control the project scope. Technical objectives are the basis for development of the project's Work Breakdown Structure (WBS), which integrates all aspects of accomplishing the project, including cost estimate, schedule, and performance reports. Technical objectives are typically documented in a WBS element work scope definition sheet or equivalent document that describes the hierarchy of tasks comprising the project work scope. Table 1 contains examples of technical objective descriptions for projects of various sizes. The key to developing technical objectives is that they be monitorable and measurable; that is, they are quantitative parameters that correlate to the project's mission.

Because it integrates work scope, schedule, and cost into one structure, the WBS is an essential part of project management. The WBS facilitates the planning and controlling of work scope and should reflect the way the work will be performed and managed. Figure 1 depicts a WBS that reflects the way a project has been defined, scheduled, and cost estimated, and the way it will be managed.

The formalized structuring of work scope into a WBS provides a number of project benefits in addition to the integration of cost estimates and schedules. First, structuring the work scope helps ensure that all scope is captured, and facilitates assignment to a responsible organization (i.e., contractor, DOE organization, other government organization). If there are multiple project participants or contractors, use of a WBS permits organization of tasks so that responsibilities can be assigned appropriately. With proper structuring of the WBS, interrelated activities and decision points can be identified. Although technical objectives are not necessarily structured to the WBS, proper structuring of the work scope consistent with the technical objectives can assist in ensuring that technical objectives can be achieved cost effectively.

By organizing and graphically displaying the elements of the work scope in logical relationships, the WBS divides the work scope into units of manageable size. For small, low-risk projects, a single element WBS may be sufficient to plan and manage the work. For more complex and higher risk projects, a multi-level, multi-element WBS may be necessary. The addition of levels and elements to the WBS divides the work scope into progressively smaller units, which may be required on more complex and higher-risk

projects. **A word of caution: adding elements to the WBS beyond those needed for effective management will add project management cost to the project. The project WBS should, however, represent the management values of DOE and the contractor(s) and should be developed the way the work will be planned and performed.**

2.6 Changes to the WBS

Changes to the WBS are not typically made once work has started. Changes, such as splitting the work scope into multiple WBS elements, may cause disruptions if some of the work has been performed and actual costs accumulated. Changes to the WBS normally occur when the project moves from one major phase to another or when re-scoping occurs. An expected WBS change is the expansion of a WBS element as the project proceeds and the work scope can be more accurately defined.

2.7 Code of Accounts

To support further categorization of the work scope, a code of accounts may be used. The code of accounts is a hierarchical or other categorization breakdown of like or similar work elements that usually cross-cuts WBS elements. It is a framework that provides a common basis for estimating, consolidating, or summarizing costs for DOE project work. For instance, piping might be a higher level code-of-accounts element, which could be categorized by type, size, etc. The code of accounts permits estimating databases to be developed based on contractor, site, or project experience. Actual costs are collected to the same code-of-accounts structure. As a result, actual performance data can be entered into the database for developing future estimates and measuring performance in categories that cannot be collected in a WBS summary.

2.8 Other Data Accumulation Structures

Because other structures may be used for data accumulation, it is not necessary to organize the WBS to capture all data desired for the project. Most software packages allow a number of sort keys or code fields for subsidiary breakouts or cross-cuts of data. Therefore, the WBS structure selected should be one that allows for routine reporting. Reporting requirements may include the need to accumulate and report status information in a particular manner, to accommodate a contracting strategy, or to address the project phases. Some of the many WBS structures that are available are listed below:

- functions or skills,
- physical products or end items,

- systems,
- project phase,
- geographical location or area,
- resource type, or
- funding source.

All aspects of project work scope definition should be WBS-based and address the total project life cycle (Total Project Cost). The primary users of any information relating to work scope are the DOE project manager and the contractor.

2.9 Work Scope Definition

2.9.1 Work Scope Definition Formats

Scope definition may be accomplished using two formats, narrative and numerical. The narrative should describe and quantify specific tasks, processes, and steps and should capture all attributes of the scope that affect cost and/or schedule. Numerical information captures specific quantifiable attributes of the work scope that can easily be aggregated to higher levels and used for objective scope performance measurement. Such quantifiable information should always reconcile with the cost estimate.

2.9.2 Work Scope Definition Document

Work scope definition documents describe and quantify tasks and focus on items that will affect cost and schedule. This document is composed of WBS element work scope definition sheets, which are typically developed at the level of detail to which work tasks may be assigned to contractors. Work scope definition at higher levels may not be needed since the higher levels simply summarize details contained in the WBS element work scope definition sheets. The narrative definition is meaningful to the project only at the work task assignment level; summarized levels may add little or no value to monitoring and directing project work.

WBS work scope definition sheets should address the following.

- Statement of the tasks to be accomplished.
- Identification of the input requirements from other tasks in other work assignment elements. (This might include information about tasks to be completed by other project participants, component/subsystem interfaces, hold or decision points, etc.)

- References to applicable specifications, standards, procedures, etc.
- Description of specific results to be achieved. (This might include deliverables, such as software, design data, reports, completed components, or installation, etc.)
- Milestone listing with strategically selected milestones designed to measure work scope accomplishment and performance.

2.9.3 Work Scope Quantity Definition

The work scope quantity definition may provide a summary of work scope information useful in measuring performance. It includes selected specific, measurable quantities from the work scope definition document. These quantities can be tracked to objectively represent significant progress toward project completion and are useful for reporting project work scope performance. These quantities would be extracted from the work scope narrative. Quantities can be aggregated to higher levels in the WBS. The primary users of this information are the DOE project manager and the contractor. The information is also useful in its complete or abstracted form for higher levels of management, including those at the program and secretarial levels.

Those quantities of most interest to be aggregated will vary among projects and with time. The creation of this information will generate the basic data source from which desired reports can be generated. Examples of potential quantities are:

- square feet constructed;
- cubic feet of waste generated, treated, and disposed;
- number of wells/feet of well drilled;
- gallons of water treated;
- feet of pipe installed;
- number of design drawings;
- labor hours to generate technical documentation and reports;
- laboratory samples taken, analyzed, and validated;
- pilot tests and startup runs completed;
- procedures developed and approved, and
- training hours completed and personnel trained and certified.

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3. MEASURING FOR RESULTS

See Attachment 1, which provides sample formats for work scope definition, including both narrative and quantity performance reporting. Included with the sample documents are a report specification that describes the information contents, implementation guidance and grading options, and the intended audience. These formats are not required and can be tailored to individual projects or sites.

- Work Scope Definition Sheet
- Work Scope Definition Sheet (Alternate format)
- Work Scope Quantity Definition (and Performance Report)
- Time-Phased Work Scope Quantities (and Performance Report)
- Work Scope Performance Report

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4. SUGGESTED READING

- *Project Management Overview*, GPG-FM-001.
- *Project Execution and Engineering Management Planning*, GPG-FM-010.

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5. DEFINITIONS

For a complete listing of the definitions for major terms used in this Guide, see the Consolidated Glossary.

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6. ASSISTANCE

Questions concerning this Guide may be referred to the Office of Field Management in Washington, D.C. at (202) 586-4041.

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7. RELATED TRAINING

Skills training in work scope planning is offered in "Project Planning for DOE Project Managers (PMMS1)" as part of the Department of Energy Project Management Skills Training curriculum.

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8. EXAMPLES

See Attachment 1.

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Table 1. Technical Objective Descriptions and Examples

General: Performance objectives, functional requirements, and characteristics derived from mission needs that provide the basis for project direction and execution.					
Levels	Technical Objective Descriptions	Example Projects			
		Experimental Facility - Strategic Systems	Environmental Projects - Strategic Systems	Fuel Processing Facility - Line Item Projects or Large Expense Funded	Small Expense Funded Projects and GPPs ¹
Level 1	Summary statement(s) of the project's objective encompassing the total project mission.	Provide a facility capable of performing particle collision energies XX greater than currently available.	Cleanup specified contaminated areas to allow unrestricted land use.		
Level 2	Performance parameters expressed quantitatively encompassing the project's primary goals.	Produce interactions of XX million electron volts; peak luminosity of XX cm per second; 80 percent availability.	Obtain XX parts per million contaminate concentration level at specified contaminated area.	Provide processing capability to enrich specified material.	
Level 3	Functional requirements, expressed quantitatively, to accomplish performance parameters.	Achieve energy injection of XX million electron volts.	Determine total waste volume/type in cubic feet to within +/- XX% for contaminated areas.	Provide fuel (type) throughput of XX kilograms per day with facility availability of 85 percent.	Provide parking for XX spaces at site XYZ.
Level 4	Specifications expressed quantitatively as to the size, quality, or components of a building, area, or subsystem.	Provide accelerator system with X.X kilometer circumference.	Cleanup of XX thousand cubic feet of waste at contamination area Y.	Process solutions of XXX grams/liter at flow rate of 6 liters/hour through de-nitrate process.	Pave parking lot with X ft by Y ft dimensions using asphalt.

¹General Plant Projects

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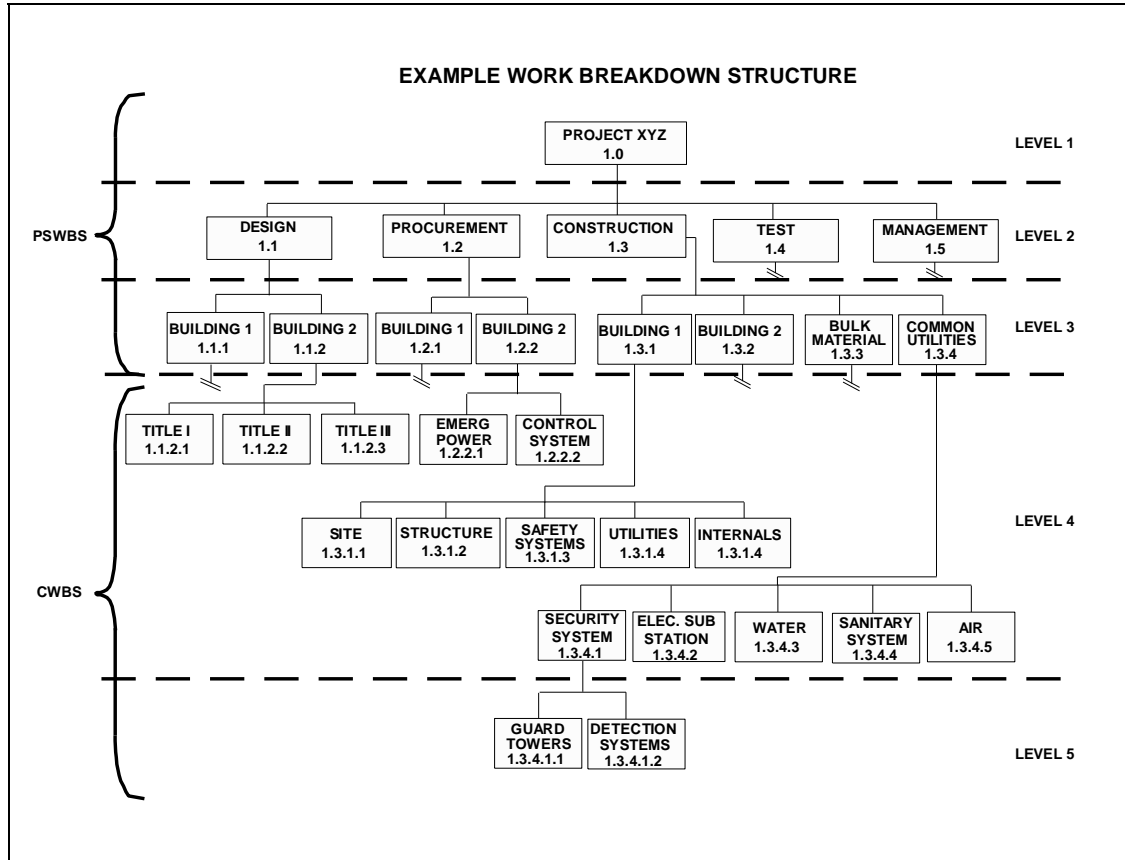


Figure 1. Graphic representation of the WBS reflecting how a project was planned, how the cost was estimated, and how the project will be managed.

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REPORT SPECIFICATION SHEET

Major Report Category: Work Scope

Report Name: Work Scope Definition Sheet (and Alternate Format)

Report Data/Information Contents

The work scope definition sheet is a WBS-based, narrative description of work scope at the lowest level—the contractor work assignment level. The narrative should quantify specific tasks of work scope, especially attributes that affect project schedule or cost. For example, if one work scope task in a WBS element were to drill wells, the quantification would be to specify the number and depth of wells, the type of well, and the installation method. All level of effort work scope must also be defined on the work scope definition sheet.

If the all work scope has not been defined to the work assignment level, a work scope definition sheet should be prepared for the lowest WBS element that has been defined.

Included on the work scope definition sheet are the following data elements.

- WBS Element - number and title of the element.
- Budget - the WBS element budget.
- Work Scope - complete narrative of the WBS element work scope that quantifies the specific tasks to be completed.
- Milestones - milestone description and completion date for each milestone in the WBS element.

The collection of all work scope definition sheets becomes the work scope baseline for the project. Once approved by DOE, the work scope definition document represents the current work scope definition for the project and is subject to formal change control. Thresholds should be established in project planning documentation that trigger changes to the work scope definition document.

Implementation Guidance and Grading Options

The narrative description of the work scope has value only at the lowest level or terminally defined WBS level. This fundamental work scope definition drives the project schedule and cost.

Once the work scope is defined, it should be the basis for establishing the detailed schedules and the cost estimate. If summary work scope definition is developed for any reason, it should not be a formalized (change controlled) document.

An alternate form of the work scope definition sheet permits placing quantitative information for each work scope definition sheet on an attached spreadsheet. This format may have advantages in certain applications since only the spread sheet would be updated in the event of approved work scope change control action.

The work scope definition document is not a routine report. In some cases, depending on the size of the project and the WBS selected for management, the work scope definition document may be a large document, or it may contain only one definition sheet.

Intended Users

The primary user of the work scope definition document is the DOE project manager. The work scope definition document is used as the baseline of the project work scope and as the controlling document to determine the basis of change to the project.

INSTRUCTIONS FOR COMPLETING THE WORK SCOPE DEFINITION SHEET

1. **Project** Include the project number and project name. If the project is subproject to a line item, include the line item number.
2. **WBS** Include the full WBS number to the work assignment level and include the element title.
3. **WBS Element Budget** Specify the currently authorized WBS element budget. If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level and authorized, include the appropriate budget amount for the WBS element.
4. **Responsible Person** Specify the name of the responsible person. If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include the name of the appropriate responsible individual or the project manager.
5. **Work Scope** Include a complete narrative of the work assignment level work scope that quantifies specific tasks to be completed in the element. (For example, if the task is "drill wells," the quantification would be to specify the number and depth of wells, the type of well, and the installation method). Include all attributes of the work scope that affect the schedule and cost. Include all level of effort work scope.

If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include narrative that quantifies the specific tasks to be completed in the WBS element. Include all attributes of the work scope that affect the schedule and cost, and all level of effort work scope.
6. **Milestones** List a milestone-unique identifier (milestone number), milestone description, and baseline completion date for each milestone in the WBS element.

If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, list any baseline milestones that have been approved.

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**WORK SCOPE DEFINITION SHEET
(SAMPLE)**

Project: S-4051 Separations Area Training Facility (91-D-1687)

WBS: 1.4.2.3 Railroad Relocation WBS Element Budget: \$841,000

Responsible Person: John Smith

Work Scope

Remove/relocate 1903 feet of service railroad for delivery of coal to D-Area. Existing railroad crosses 4 Road 82 feet from the centerline intersection off E Road and 4 Road. The relocation section begins 73 feet from the centerline of 4 Road, 53 degrees 0 minutes east (89 degrees 23 seconds east true north).

Relocation will require removal of 2375 yard³ of naturally compacted earthen berm consisting of mostly sand and coarse aggregate from new site. Spoil will be trucked 2.9 miles to F Area and used as drainage base for construction of new sanitary landfill entrance road. An additional 795 yard³ of compacted fill material will be removed (for removal of existing parking lot, see WBS 1.3.2.1) prior to construction of railroad bed.

Removal of existing railroad will require removal and disposal of 5806 feet of rail and 634 cross-ties. Cross-ties will be transferred to the Solid Waste Department for disposal according to Federal Facilities Act. Due to age, rails will be transferred to Salvage Department and sold as scrap. (Note: Project will receive a credit of ~\$13K for scrap steel sale.) Removal of existing railway bed will require spoiling 3986 yard³. Material will be trucked 7.6 miles to C Area for construction of new employee parking area.

New railroad section will be 2403 feet long. 4133 yard³ of fill material will be needed to construct bed. Fill material will be trucked 9.6 miles from M Area. Fill will be compacted to 95% Standard Proctor; QC tests will be conducted every 500 yards compacted. 4906 feet of railroad steel will be supported by 801 cross-ties (steel and cross-ties procured by Design Engineering).

Existing site construction forces will execute all work. There will be no labor subcontracts.

Milestones:	DC14231 - Complete site prep or of location railway bed	8-19-95
	DC14232 - Complete removal of existing railway and bed	12-14-95
	DC14233 - Complete construction of new railroad	10-21-95
	DC14234 - Receive new rails	8-21-95
	CC14231 - Transfer scrap steel to Salvage Department	11-19-95
	CC14232 - Transfer cross-ties to Solid Waste Department	11-29-95
	CC14233 - Receive new cross-ties	8-7-95

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**INSTRUCTIONS FOR COMPLETING THE
WORK SCOPE DEFINITION SHEET - ALTERNATE FORMAT**

1. **Project** Include the project number and project name. If the project is subproject to a line item, include the line item number.

2. **WBS** Include the full WBS number to the work assignment level and include the element title. If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include the appropriate WBS element number and the element title.

3. **WBS Element Budget** Specify the currently authorized WBS element budget. If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include the appropriate budget amount for the WBS element.

4. **Responsible Person** Specify the name of the responsible person. If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include the name of the appropriate responsible individual or the project manager.

5. **Work Scope** Include a complete narrative of the currently approved work assignment level work scope that describes the specific tasks to be completed in the element. Include all attributes of the work scope that affect the schedule and cost. Include all level of effort work scope as well.

 If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include the appropriate narrative that describes the specific tasks to be completed in the WBS element. Include all attributes of the work scope that affect the schedule and cost, and all level of effort work scope as well.

6. **Milestones** List a milestone-unique identifier (milestone number), milestone description, and approved baseline completion date for each milestone in the work assignment element.

 If the Work Scope Definition Sheet is for a WBS element that has not been defined of the work assignment level, list any baseline milestones that have been approved.

7. **Quantity
Spreadsheet**

List the work assignment level work scope commodities, commodity units of measure, original baseline quantities, approved changes, and currently approved baseline.

If the Work Scope Definition Sheet is for a WBS element that has not been defined to the work assignment level, include the work scope commodities, units of measure, original baseline quantities, approved changes, and currently approved baseline.

**WORK SCOPE DEFINITION SHEET
(SAMPLE)**

Project: S-4051 Separations Area Training Facility (91-D-1687)

WBS: 1.4.2.3 Railroad Relocation WBS Element Budget: \$841,000

Responsible Person: John Smith

Work Scope

Remove/relocate service railroad for coal delivery to D-Area. Existing railroad crosses 4 Road 82 feet from centerline intersection of E Road and 4 Road. The relocation section begins 73 feet from centerline of 4 Road, 53 degrees 0 minutes east (89 degrees 23 seconds east true north).

Relocation will require removal of naturally compacted eastern berm consisting of mostly sand and coarse aggregate from new site. Spoil will be trucked 2.9 miles to F Area and used to provide drainage base for construction of new sanitary landfill entrance road. Additional compacted fill material will be removed (for removal of existing parking lot, see WBS 1.3.2.1) prior to construction of railroad bed.

Removal of existing railroad will require removal and disposal of rail and cross-ties. Cross-ties will be transferred to the Solid Waste Department for disposal according to Federal Facilities Act. Due to age, rails will be transferred to Salvage Department and sold as scrap. (Note: Project will receive a credit of ~\$13K for scrap steel sale.) Removal of existing railway bed will require spoiling existing material. Material will be trucked 7.6 miles to C Area for construction of new employee parking area.

Fill material will be required to construct bed. Fill material will be trucked 9.6 miles from M Area. Fill will be compacted to 95% Standard Proctor and QC tests will be conducted every 500 yards compacted. Railroad steel will be supported by new cross-ties (steel and cross-ties procured by Design Engineering).

Existing site construction forces will execute all work--there will be no labor subcontracts.

Milestones:	DC14231 - Complete site prep of relocation railway bed	8-19-95
	DC14232 - Complete removal of existing railway and bed	12-14-95
	DC14233 - Complete construction of new railroad	10-21-95
	DC14234 - Receive new rails	8-21-95
	CC14231 - Transfer scrap steel to Salvage Department	11-19-95
	CC14232 - Transfer cross-ties to Solid Waste Department	11-29-95
	CC14233 - Receive new cross-ties	8-7-95

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QUANTITY SPREADSHEET

Commodity	Units	Original Baseline	Approved Changes	Current Baseline
Excavation	CY	6256		6256
Rail removal	LF	5806		5806
Cross-tie removal	Each	634		634
Backfill	CY	4133		4133
Rail steel	LF	4906		4906
Cross-ties	Each	801		801

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REPORT SPECIFICATION SHEET

Major Report Category: Work Scope

Report Name: Work Scope Quantity Definition (and Performance Report) Time
Phased Work Scope Quantities (and Performance Report)
Project Work Scope Quantity Spreadsheet and Work Scope
Quantities Performance Spreadsheet

Report Data/Information Contents:

The work scope quantity spreadsheet provides a useful summary of work scope. It includes selected specific, measurable quantities from the work scope definition document. These quantities can be tracked to objectively represent significant progress toward project completion and are useful for reporting project work scope performance. These quantities would be extracted as a "takeoff" from the work scope narrative (included in the work scope definition document). Quantities can also be aggregated to higher levels in the WBS for reporting summary performance.

The quantity information is subject to formal change control. The information would be used to reflect the current status of the work scope definition in specific quantities.

Included for work scope quantities are the following data elements.

- Commodity - specific quantifiable attributes of the work scope.
- Units - unit(s) of measure for the commodity. (Examples might include linear feet, cubic yards, number of hours, etc.)
- Original Baseline - the original, approved baseline quantity. (This should be the quantity included/reflected in the project cost estimate and the quantity included/aggregated from the work scope definition document.)
- Approved Changes - the quantity of the approved change (by the highest change control authority).
- Current Baseline - the sum of the "original baseline" quantity and the "approved changes."

If the following performance information is included with the above baseline information, a work scope quantity performance spreadsheet can be produced.

- Completed this Period - the quantity installed or completed in current work period. (Current work period could be day, week, month, quarter, etc., depending of the reporting period established for the project.)
- Completed to Date - the total/cumulative quantity installed or completed to date (generally, since project inception).
- Remaining - The "completed to date" quantity subtracted from the "current baseline" quantity.
- % Complete - the percent of the completed work.

Implementation Guidance and Grading Options

The information in the work scope quantity report may or may not be time-phased depending on the risk, needs, and/or size of the project. Time phasing of selected work scope quantity elements will provide simple graphic(s) useful for portraying project accomplishment and performance. Since this information does not include the narrative requirements applicable to the objective quantities, it is an incomplete definition of the work scope. Its primary value is as a tool in aggregating the quantities and objectively measuring high levels of work scope performance.

Those quantities of most interest to be aggregated will vary between projects and with time. The creation of this scope quantity information will create the basic data source from which other desired information reports can be generated. A few examples of potential quantities are the following.

- Square feet constructed
- Cubic feet of waste generated/treated/disposed
- Number of wells/feet of well drilled
- Gallons of water treated
- Feet of pipe installed
- Number of design drawings
- Labor hours to generate technical documentation/reports
- Laboratory samples taken/analyzed/validated
- Pilot test/startup runs completed
- Procedures developed/approved
- Training hours completed, personnel trained/certified

Strategic selection of commodities can result in meaningful indicators of progress towards project completion. For instance, if the project includes construction of a building, selection of the following commodities will assist during the indicated percentage of the overall building construction effort.

- Excavation/earth work 0% - 10%
- Concrete 5% - 15%
- Structural steel 10% - 45%
- Piping 35% - 95%
- Electrical cable 25% - 95%
- Cable Terminations 40% - 100%

Time-phased graphs showing all commodities planned for installation and performance will convey a picture of the plan and the performance results.

Job hours can be used as indicators of performance in place of commodities

Intended Users

The primary users of the work scope quantity information are the DOE project manager and the contractor. The information is used to document planning and indicate performance.

The work scope quantity information is also expected to be useful in its complete or abstracted form for higher levels of management, including program and secretarial levels.

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**INSTRUCTIONS FOR COMPLETING THE
PROJECT WORK SCOPE QUANTITY SPREADSHEET**

1. **Project** Include the project number and project name. If the project is subproject to a line item, include the line item number.

2. **Project Manager** Specify the name of the contractor project manager. If the report is being prepared for use by the Program Office in DOE Headquarters, specify the DOE project manager's name.

3. **Commodity** Specify quantifiable attributes of the work scope. These items should be meaningful and easily aggregated and will assist in measuring work scope performance. (Examples might include number of items to be installed, linear distance/volume of material, etc.)

4. **Units** Specify the unit(s) of measure for the commodity. (Examples might include linear feet, cubic yards, number of hours, etc.).

5. **Original Baseline** Specify the original, approved baseline quantity. This should be the quantity that is included/reflected in the project cost estimate and the quantity included/aggregated from the Work Scope Definition Document.

6. **Approved Changes** Specify the quantity of the approved change (by the highest authority).

7. **Current Baseline** Add the "original baseline" quantity and the "approved changes."

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PROJECT WORK SCOPE QUANTITY SPREADSHEET

Commodity	Units	Original Baseline	Approved Changes	Current Baseline
Excavation	CY	11463		11463
Fill	CY	17950	990	18940
Concrete	CY	9467		9467
Structural Steel	LB	46000		46000
Piping (< 2.5 in)	LF	17000	-400	16600
Piping (>2.5 in)	LF	3482		3482
Electrical Cable	LF	31800		31800
Electrical Conduit	LF	18940		18940
Electrical Raceway	LF	3540		3540
Design Drawings	Each	445		445
Wells	Number	49	15	64
Well Drilling	LF	1890		1890
Laboratory Samples	Each	16480	-500	15980
Operating Procedures	Each	67	7	74
Maintenance Procedures	Each	221		221
Startup Tests	Each	47	3	50
Labor	Hours	141230	10360	151590

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**INSTRUCTION FOR COMPLETING THE
PROJECT WORK SCOPE QUANTITY PERFORMANCE SPREADSHEET**

1. **Project** Include the project number and project name. If the project is subproject to a line item, include the line item number.
2. **Project Manager** Specify the name of the contractor project manager. If the report is being prepared for use by the Program Office in DOE Headquarters, specify the DOE Project Manager's.
3. **Commodity** Specify quantifiable attributes of the work scope. These items should be meaningful and easily aggregated, and will assist in measuring work scope performance. (Examples might include number of items to be installed, linear distance/area/volume of material, etc.).
4. **Units** Specify the unit(s) of measure for the commodity. (Examples might include linear feet, cubic yards, number of hours, etc.).
5. **Original Baseline** Specify the original, approved baseline quantity. This should be the quantity that is included/reflected in the project cost estimate and the quantity included/aggregated from the Work Scope Definition Document.
6. **Approved Changes** Specify quantity of the approved change (by the highest authority).
7. **Current Baseline** Add the "original baseline" quantity and the "approved changes" to obtain this number.
8. **Completed This Period** Specify the quantity installed or completed in current work period. Current work period could be day, week, month, quarter, etc., depending on the reporting period established for the project.
9. **Completed to Date** Place the total/cumulative quantity installed or completed to date (generally, since project inception) in the space.
10. **Remaining** Subtract the "completed to date" quantity from the "current baseline" quantity to obtain this number.
11. **% Complete** Calculate and enter the percent of the completed work.

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PROJECT WORK SCOPE QUANTITY PERFORMANCE SPREADSHEET

Commodity	Units	Original Baseline	Approved Changes	Current Baseline	Completed This Period	Completed To Date	Remaining	% Complete
Excavation	CY	11463		11463	670	980	10483	8.5%
Fill	CY	17950	990	18940	200	350	18590	1.8%
Concrete	CY	9467		9467	90	120	9347	1.3%
Structural Steel	LB	46000		46000			46000	0.0%
Piping (< 2.5 in)	LF	17000	-400	16600			16600	0.0%
Piping (> 2.5 in)	LF	3482		3482			3482	0.0%
Electrical Cable	LF	31800		31800			31800	0.0%
Electrical Conduit	LF	18940		18940			18940	0.0%
Electrical Raceway	LF	3540		3540			3540	0.0%
Design Drawings	Each	445		445			445	0.0%
Wells	Number	49	15	64	3	8	56	12.5%
Well Drilling	LF	1890		1890			1890	0.0%
Laboratory Samples	Each	16480	-500	15980	60	580	15400	3.6%

PROJECT WORK SCOPE QUANTITY PERFORMANCE SPREADSHEET (continued)

Commodity	Units	Original Baseline	Approved Changes	Current Baseline	Completed This Period	Completed To Date	Remaining	% Complete
Laboratory Samples	Each	16480	-500	15980	60	580	15400	3.6%
Operating Procedures	Each	67	7	74			74	0.0%
Maintenance Procedures	Each	221		221			221	0.0%
Startup Tests	Each	47	3	50			50	0.0%
Labor	Hours	141230	10360	151590	11270	38570	113020	25.4%

REPORT SPECIFICATION SHEET

Major Report Category Work Scope

Report Name Work Scope Performance Report

Report Data/Information Contents

The Work Scope Performance Report is a WBS-based, narrative report designed to provide the DOE project manager with integrated work scope, schedule, and cost information. The report focuses on problems and issues that affect completion of the project within schedule and cost parameters. The summary narrative provides work scope accomplishment information to the appropriate level of the WBS structure matching the level of management requiring the information.

Typically, this report will be provided to the DOE field project manager at the designated reporting level of the WBS. Included in the report will be following data elements:

- WBS Elements budget - the sum of the control account budgets that summarize to the WBS element.
- WBS Element actual cost - the sum of the control account actual costs to date that summarize to the WBS element.
- Work Scope Accomplishment - a short, concise list of the current reporting period's work scope accomplishments, excluding excessive self-congratulatory filler.
- Problems/Issues - any problems or issues that affect the ability to complete the WBS element work scope within the baseline schedule or cost; focusing on a description of the problem(s); the root cause; technical objectives, schedule or cost impact(s); and actions taken or planned to mitigate the problem/issue, particularly where actions are required by DOE.
- Milestones - baseline completion date, and forecast completion date for each milestone included in the WBS element.

This report should be produced by the contractor on a routine basis. It should be an introduction and reference to other, more detailed reports that provide focused schedule, cost, funding, and resource exception information.

The report should be reviewed by the project manager with a critical eye to ensure that work scope accomplishment is meeting the project technical objectives, and that unplanned incremental scope increases is being avoided.

Implementation Guidance and Grading Options

The frequency of this report should be established as a result of the Project Risk Analysis and documented in the Project Execution Plan. The exact format provided here may not be effective for all DOE projects; however, except on very low risk projects, some form of routine work scope performance report should be produced. For some lower risk projects, this report might be produced as a comprehensive project report rather than as a separate sheet for each reporting level WBS element.

This report should not replace routine verbal communication between the DOE project manager and the contractor regarding project work scope accomplishment and progress. It should be an introduction to other exception reports requested by the DOE project manager in the Project Control Specification referenced in the Project Execution Plan. Information provided by the contractor in the report should serve as documentation of the previous reporting period's work scope performance.

For each reporting level WBS element, there may not always be issues or problems that require DOE action. If this is the case, it is appropriate to leave that section blank, but the remainder of the report, especially the work scope accomplishment section, should be completed. Contractors should be encouraged to use this report to document problems or issues that are impacting or have the potential to impact project outcome, even if action is not required by DOE.

Intended Users

The primary users of this report are the DOE and contractor project managers. Higher levels of DOE and contractor management and DOE Program management may require summary information built from the work scope information provided on this report; however, this report would not typically be provided to higher levels of DOE or contractor management on a routine basis.

A summary of this information for higher levels of management will generally be a manual exercise and therefore should be limited to minimum information necessary.

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**SCOPE PERFORMANCE REPORT
PERFORMANCE AS OF 9-30-95
(SAMPLE)**

Project: S-4051 Separations Area Training Facility (91-D-1687)

WBS: 1.4.2.3 Railroad Relocation Control Account Budget: \$841,000 (actual \$117,348)

Control Account Manager: John Smith

Supported Technical Milestone(s)

Performance

Excavation continued on removal of the earthen berm. Approximately 980 yard³ have been removed to date. During excavation 9-19-95, waste drums and B-25 boxes were encountered. See "Problems/Issues" below for further detail.

Problems/Issues

Site historical documents indicated that the earthen berm in the area of the relocated railroad was naturally compacted material. (Soil samples indicate that composition is as anticipated.) The Solid Waste Department was contacted and an investigation initiated. The investigation results indicate that during a site emergency in 1962, drums and boxes were "dumped on the ground" and covered pending receipt of funding to relocate the waste to the Burial Ground. Funding was not appropriated and after 7 years, the effort was abandoned. An investigation of the waste indicates that radioactive and mixed waste are present. Removal of the waste will significantly impact the scope, schedule, and cost baseline. Preparation of a Baseline Change Proposal is underway and is forecast to be submitted 10-3-96.

Due to the new site procedures on Waste Certification, cross-ties cannot be transferred from the project to the Solid Waste Department until 1-17-96. This will require the project to store the cross-ties adjacent to the relocation area rather than being shipped immediately. A special laydown area will be constructed and special interim handling procedures will be required. This issue is being reviewed for possible impact to the cost and schedule baseline. A Baseline Change Proposal may result. Further status of this issue will be reported at the weekly project managers meeting until resolved.

Milestones	Baseline	Actual Forecast
DC14231 - Complete site prep of relocation railway bed	8-19-95	10-17-95 (F)
DC14232 - Complete removal of existing railway and bed	12-14-95	1-16-96 (F)
DC14233 - Complete construction of new railroad	10-25-95	12-20-95 (F)
DC14234 - Receive new rails	8-21-95	8-21-95 (A)
CC14231 - Transfer scrap steel to Salvage Department	11-19-95	11-12-95 (F)
CC14232 - Transfer cross-ties to Solid Waste Dept.	11-29-95	1-17-95 (F)
CC14233 - Receive new cross-ties	8-7-95	8-9-95 (A)

TRAINING: COURSE SYNOPSIS AND SCHEDULE OFFERINGS

- TO BE COMPLETED -