

18 RECORDS

Completing a project successfully requires that all project participants be continuously provided with timely, thorough, and accurate project information, including participants, activities, decisions, progress baselines, changes, decisions, and end product(s). As a project proceeds through its life cycle, the number of participants and activities grow significantly and the volume of information grows exponentially. The task of satisfactorily managing this information is a major challenge and is essential to project success. This section identifies methods of managing and controlling this information.

In the early stages of a project's life cycle, functions and requirements contained in mission need and conceptual design documentation define end product(s). At this time the number of project participants is small and the task of managing project information is relatively easy. The primary focus is on controlling changes to the functions and requirements, thoroughly evaluating and documenting all changes, and ensuring the rapid and complete dissemination of approved changes to all project participants. This process is usually accomplished by controlling the revision and distribution of the document by its identifying requirement.

18.1 BACKGROUND AND INFORMATION

As a project progresses through its life cycle, functions and requirements are expanded to develop design requirements for the functional and physical configuration of the end product(s). These design requirements, in turn, are expanded to the detail required to design, procure, construct, checkout, and turnover the end product(s). The number of participants also expands to include designers, vendors, suppliers, constructors, operators, and stakeholders, all often representing different organizations and interests. As a result, the task of managing information becomes very complex. The increased volume of information, number of documents, number of participants, and number of requests for changes all contribute to project complexity.

The key processes to managing this information include receipt, identification, document control, change control, and data management, defined as follows:

- ▶ Identification—selection of components of the end product(s) to control and selection of the documents that define the product and these components.
- ▶ Document Control—receives, identifies, stores, controls, reproduces, tracks, retrieves, and distributes documents.
- ▶ Change Control—provides a systematic method for managing changes to a project and its physical and functional configuration to ensure that all changes are properly identified, assessed, reviewed, approved, implemented, tested, and documented.
- ▶ Data Management—ensures that necessary project information and project end product(s) are systematically recorded and disseminated for decision making and other uses. Data management is synonymous with “configuration status accounting” as used in contemporary configuration management literature.

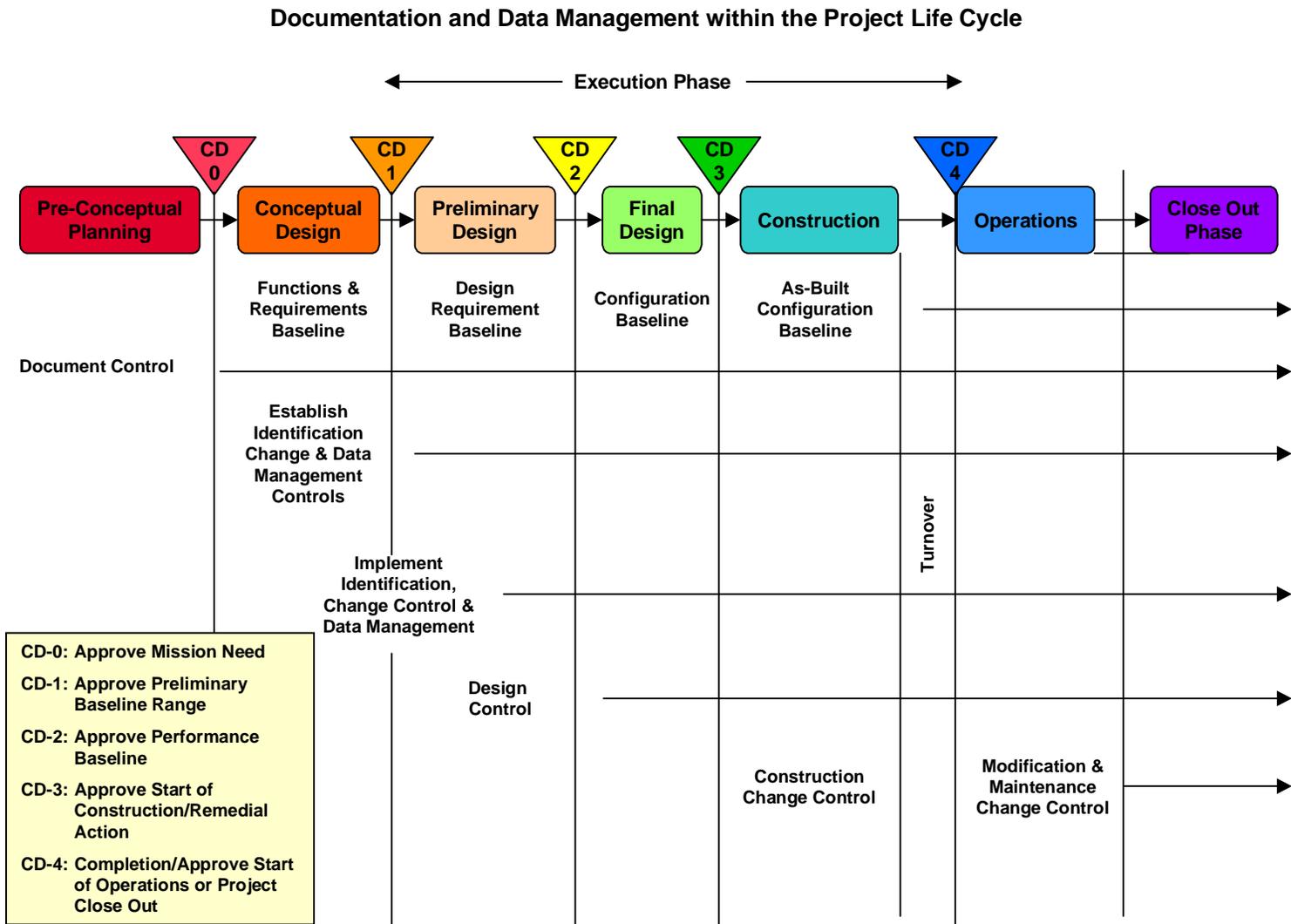
Collectively, the integration of these elements among all project participants is referred to as configuration management. Figure 18-1, Documentation and Data Management in the Project Life Cycle, illustrates the relationship of these elements to the Project Life Cycle.

As illustrated in Figure 18-1, elements of documentation and data management are applicable through all phases of the Project Life Cycle. This requires that Headquarters, field managers, the Federal project manager, and the contractor project manager implement applicable elements of documentation and data management in program and project-related activities using a tailored approach, based on the importance and complexity of the project. These applicable configuration management elements interface with and are further integrated with the activities of contractors and other project participants. Collectively, these activities represent a configuration management program applicable throughout the project life cycle.

18.2 CONFIGURATION MANAGEMENT AND BASELINE MANAGEMENT

At any point in its life cycle, from preconceptual to completion of the execution phase, a project has a configuration. Initially, its configuration is a conceptual arrangement of the parts or elements of the desired end product(s). As the project proceeds through its life cycle, the configuration is defined in greater detail through the design process and documented in specifications and drawings. At

Figure 18-1. Documentation and Data Management in the Project Life Cycle



the end of the life cycle, the configuration becomes an actual physical and functional configuration of the end product(s) and is associated as-built documentation.

Configuration management is used to identify and document the configuration of the end product(s) and control changes to that configuration throughout the project's life cycle.

At selected points in a project's life cycle, the current configuration is established as a reference point or technical baseline. The technical baseline is combined with other project activities (e.g., activities to construct or activities to conduct remedial action) to form a scope baseline. The scope baseline is then used as a basis to develop project schedule and cost baselines. The scope, schedule, and cost baselines serve as a basis for project authorization and management, and as a standard for measurement during project execution. As such, the scope, schedule, and cost baselines are the established plan against which the status of resources and the progress of a project are measured.

Baseline management is used to measure progress and control changes to the scope, schedule, and cost baselines. Configuration management and baseline management are integrated in that the baselines are derived from the configuration and they share a common change control process.

18.3 PROCESS OVERVIEW

Figure 18-2, Configuration Management Process Flow Diagram, depicts the overall configuration management process and process elements. In addition to the four key elements of Identification, Document Control, Change Control and Data Management, Figure 18-2 includes the Change Implementation and Review process elements. Specific applicability of these processes to DOE programs and projects is addressed in Practice 7, Baseline Development and Validation, and Practice 14, Critical Design Packages, respectively. A general description of these process elements is provided in the following paragraphs:

18.3.1 Identification

The processes and methods of identifying components of the end product(s) (also referred to as configuration items), as well as the supporting documentation which defines the project and components, are subject to control. The supporting documentation includes the numbers and other identifiers (e.g., document numbers,

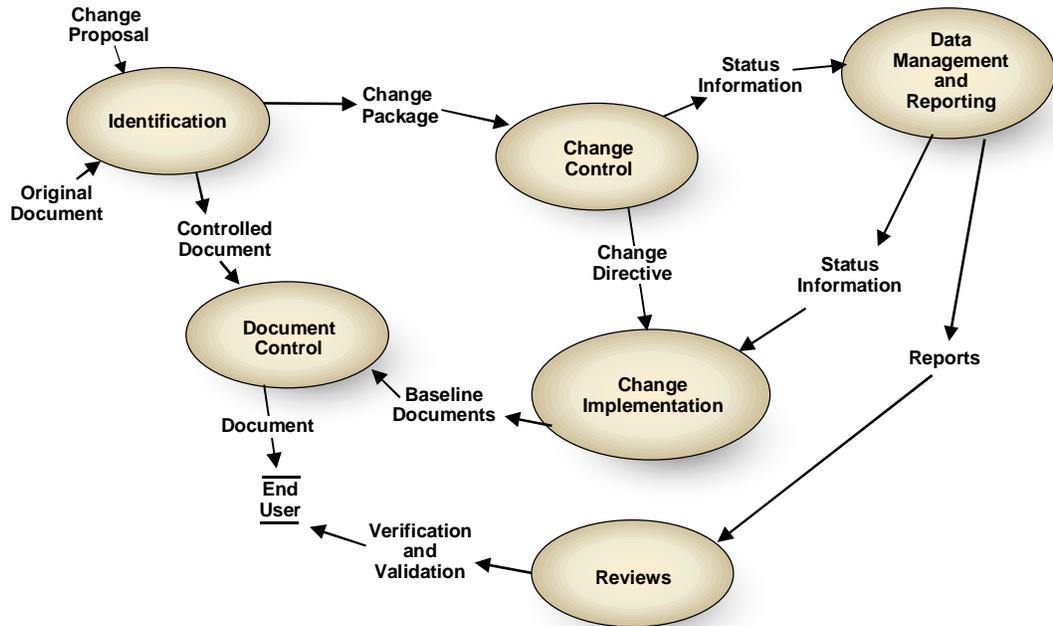


Figure 18-2. Configuration Management Process Flow Diagram

drawing numbers, equipment numbers) assigned to configuration items and documents, and the approved technical documents that identify and define configuration items' functional and physical characteristics, such as specifications, drawings, associated lists, and interface control documents.

18.3.2 Document Control

Document control provides for controlling the distribution of documents and approved changes and retains the master copy in storage for safekeeping. Document control also maintains distribution lists and a master controlled document index. The index includes information such as document title, document number, revision number or date of issue, and the document distribution list. Controlled distribution ensures that recipients of controlled documents are notified of approved changes and that superseded documents are not used for performing work. Document control also provides for record receipt, organization, reproduction, and eventual disposition.

18.3.3 Change Control

The process of managing proposed changes to the configuration items and technical documentation to ensure proposed changes are accurately described, systematically reviewed and evaluated for impact, implemented upon approval, and closed out. The change control process provides for technical scope, schedule, and cost reviews of proposed changes (see Practice 7, Baseline Development and Validation).

18.3.4 Data Management and Reporting

Data management and reporting is the process of recording and reporting the current status of configuration items, technical documentation, and all proposed and approved changes throughout the life cycle of the item. Data management satisfies two needs. The first is to track the implementation of approved change proposals to ensure that all affected documents are updated and that all change directive instructions are followed. This also permits the generation of reports providing the current approved configuration of configured items and their documentation, and pending changes. The second is to create and maintain an audit trail of change proposals through the configuration change control process so that chronological records of changes and reports can be prepared for any configuration item or baseline document.

18.3.5 Reviews

Reviews are the process of verifying that (1) the technical baseline satisfies design requirements, (2) the physical and functional characteristics of configuration items conform to the technical baselines, (3) approved changes have been properly incorporated into the technical baseline, (4) as-built configurations conform to the approved technical baseline, and (5) the entire configuration management program performs in accordance with approved plans and procedures. Reviews are performed periodically to validate that project documentation is properly updated and verify that only current controlled documents are being used to perform work.

18.4 PLANS AND PROCEDURES

The documentation and data management processes should be controlled by a project configuration management plan. Preparation and use of a configuration management plan should be based on a tailored approach. Each non-DOE organi-

zation (e.g., construction) participating in a project shall similarly be required to prepare and maintain a configuration management plan for their portion of the work. Each plan must integrate with the project-level plan. The project-level configuration management plan may be an integrated cohesive assembly of the plans of other participants. The plan should include discussion of how configuration management will be achieved on the project and what items will be so managed. Wherever practical, configuration management activities should be included as steps in procedures for related activities, rather than in standalone configuration management procedures, the steps are integral to the process.

18.5 SCOPE (TECHNICAL) BASELINE IDENTIFICATION

The project technical baseline is combined with other project activities to form the scope baseline. The scope baseline is the basis for schedule and cost baselines. The technical baseline defines the physical and functional configuration of the project's end product(s). Baseline management controls the scope, schedule, and cost baselines, and integrates with configuration management that controls the technical baseline. Data management controls information on the project and the configuration of its end product(s).

The technical baseline consists of a top-down set of requirements in which all subsidiary requirements flow down from the requirements above them. Typical DOE technical baselines are defined below.

The titles may vary for a particular program and project and there may be fewer or more baselines. For example, the Tank Waste Remediation System, an EM Strategic System, has two program technical baselines (functional requirements and technical requirements) and five program element/project baselines: design requirements, design configuration, as-built configuration, operational, and decontamination. A minimum set of technical baselines would be those required to support scope, schedule, and cost baseline critical decision submittals.

The relationship of these baselines to the Project Life Cycle is shown in Figure 18-1. A recommended set of documents that should be included in each baseline is shown in Table 18-1, Typical Technical Baseline Documents.

18.5.1 Functions and Requirements Baseline

The initial baseline for projects is developed during the conceptual phase and supports the Approval of Preliminary Baseline Range Critical Decision. It establishes the functions and technical requirements of DOE programs and projects. At this stage of a project, the configuration represented by the baseline is conceptual with nothing designed or built. The functions and requirements baseline is generally developed as follows:

- ▶ The DOE mission and objectives are defined.
- ▶ Functions of the DOE programs are defined.

Table 18-1. Typical Scope (Technical) Baseline Documents

<i>FUNCTIONS AND REQUIREMENTS BASELINE</i>
<ul style="list-style-type: none"> ▶ Strategic Plans ▶ Program Plans ▶ Justification of Mission Need ▶ Conceptual Design Reports ▶ Project Execution Plans ▶ Interface Control Documents
<i>DESIGN REQUIREMENTS BASELINE</i>
<ul style="list-style-type: none"> ▶ Design Criteria ▶ Preliminary Safety Analysis Reports ▶ System Requirements ▶ Conceptual Design ▶ Preliminary Design ▶ Interface Control Documents
<i>CONFIGURATION BASELINE</i>
<ul style="list-style-type: none"> ▶ Final Safety Analysis Report ▶ Final Design ▶ Operational Safety Requirements ▶ Specifications ▶ Drawings

- ▶ Quality Assurance Procedures
- ▶ Test Procedures
- ▶ Operating and Maintenance Procedures
- ▶ Procurement Documents
- ▶ Work Control Packages
- ▶ Operating and Maintenance Manuals
- ▶ Construction Procedures

18.5.2 Design Requirements Baseline

For complex projects, the design portion of the execution phase is often split into preliminary design and final design. Through the preparation of preliminary planning and engineering studies, preliminary design translates the functions and requirements from the conceptual phase into preliminary drawings and outline specifications, life cycle cost analysis, preliminary cost estimates and scheduling for project completion. Preliminary design identifies long-lead procurement items and provides analysis of risks associated with continued project development. At this stage of a project, the configuration defined by the preliminary drawings and outline specifications is represented by the design requirements baseline with the following content:

1. The physical systems for each project or facility are identified.
2. The boundaries and interfaces for each physical system are identified.
3. The major components for the physical systems are identified and defined.
4. The functions and requirements, and performance criteria and constraints established in the conceptual phase are allocated to the respective physical systems and major components.

18.5.3 Configuration Baseline

The configuration baseline represents the output of the detailed design portion of the execution phase and supports the Approve Start Construction Critical Decision. The functions and requirements from the conceptual phase and the design requirements from preliminary design, as applicable, are expanded to include the detail required to construct the systems and components of the end product(s).

The configuration of the project is defined by the design output documents that include procurement and construction specifications, drawings, test procedures, and operating and maintenance information.

18.5.4 As-Built Configuration Baseline

At completion of the construction portion of the execution phase, the detailed design documents established in the configuration baseline are used to establish the as-built configuration baseline as follows:

1. All changes to the configuration baseline during construction are approved and reflected in the as-built configuration baseline.
2. All changes to the configuration baseline during the operations phase after system turnover are approved and reflected in the as-built configuration baseline.
3. Configuration baseline documents with the approved updates are incorporated to reflect the physical configuration.
4. Interfaces of the DOE activities, programs, and projects with other facilities, programs, and projects are identified.

18.5.5 Establishment of Baselines

Development of baselines for DOE programs, projects, and operating facilities should adhere to the following management concepts set forth by DOE O 413.1:

- ▶ Identification, documentation, and approval of basic requirements.
- ▶ Specification of a systematic process for development of baselines.
- ▶ Formal identification and approval of baselines.
- ▶ Specification of allowed variances from the approved baselines.
- ▶ Regular reporting and assessment of status against the approved baselines.
- ▶ Corrective management action (that may include baseline revision) in the event a variance exceeds a prescribed threshold.

18.5.6 Records Identification

Each project record shall be identified with a unique identifier (e.g., drawing, component, or equipment number). The unique identifier is needed to ensure consistency, retrievability, and traceability of technical and baseline documentation for configuration items. In addition, each project shall develop and maintain current lists of project products (e.g., drawings, specifications, equipment, instrumentation, lines, valves, etc.) Documentation associated with each physical product (pumps, valves) shall be traceable to that item through the unique item identification number. For DOE, the configuration identification guidelines apply specifically to

- ▶ physical items (e.g., facilities, structures, systems, and components).
- ▶ software.
- ▶ site characteristic data and samples.
- ▶ waste packaging.
- ▶ documentation (including supporting analysis and data).

The level of identification required varies with the importance of the configuration item and the indentured level from which documentation needs to be retrieved. Structures, systems, and components important to safety require a more detailed identification than other nonsafety items. This ensures traceability of requirements throughout the life of the project, program, or operating facility.

18.5.7 Traceability

Configuration management shall require traceability of technical baseline requirements and data through all phases of DOE programs and projects. Technical baseline documents should establish traceability of requirements through all levels of documentation and to the configured items. Regulatory and other design basis requirements depicted in documents that describe configured items should be readily traceable to their origin through design requirements documents, etc.

The baselining process allocates technical requirements to subsequent levels of detail. Throughout the design, construction, and turnover phases, materials and components should be traceable to their application and physical location. Traceability of technical requirements should be established by uniquely identifying

configured items and in the associated documentation. Data management systems should be used to cross-reference the appropriate documents to configured items.

18.5.8 Software Configuration Management

The configuration management program must require that essential computer software and associated documentation be identified and controlled. Software designated to be controlled should be uniquely identified and established as part of the technical baseline. Software that should be included in the configuration management program includes

- ▶ operations and process control.
- ▶ protection systems.
- ▶ engineering development, design analyses, evaluation, and assessment.
- ▶ mathematical models.
- ▶ database or document indexes when used as a controlled source of information.
- ▶ computer-aided design/manufacturing/engineering (CAD/CAM/CAE).

18.5.9 Interface Control

The functions, requirements, and physical characteristics of the end product(s) at common boundaries among project participants must be identified, documented, and controlled. For complex projects, interface control working groups should be established to identify, document, and monitor interfaces. Interface control documents shall be used to define interfaces, interface responsibilities, and interface requirements in terms of functions, requirements, and physical characteristics, as appropriate, and interface constraints and assumptions. For changes in functions, requirements, and physical characteristics between two configuration items controlled by different organizations, the interface control documents should include interface control drawings and should be baselined, approved, and controlled.

18.5.10 Data Management

Computerized information applications shall be used to collect, store, and maintain configuration management technical baseline information and changes thereto. When used, the design, development, implementation, and use of these applications should be subject to the guidelines of the configuration management program.

New facilities should develop a Master Equipment List (MEL) database during design and construction. This list should contain structures, systems, and components selected by the project manager and the contractor based upon safety grades assigned to these systems. As a minimum, the list should have the following features:

1. All structures, systems, and components should be classified (where applicable) by engineering system, start-up system, operating system, safety class, hazard category, instrument loop number, piping line number, circuit number, plant location, applicable Work Breakdown Structure (WBS) element, or any other category of interest to the users of the MEL.
2. Lists should be extractable by category. For example, a list of all Safety Class 1 items.
3. Each component should reference its unique identification number, engineering drawing, or specification number and other related documents. For example, applicable Safety Analysis Reports (SARs), interface control document, spare parts list, and test procedure.
4. Operating and maintenance procedures should be cross-referenced to their associated structures, systems, components, and operating systems as applicable.
5. Each existing facility classified as a Hazards Category Class 3 or higher should develop a Safety Equipment List (SEL) for Safety Class 1 equipment only. The SEL should contain the data specified above and should be a subset of the MEL.

18.5.11 Reviews/Assessments

Review and assessments should be performed to measure the effectiveness of the configuration management process and consistency between the project physical system and the documentation that represents that system. Contractor reviews,

assessments, surveillance, results and corrective actions must be documented and tracked to closure.

- ▶ *Programmatic Assessment.* Programmatic assessments should determine the acceptability of the configuration management process and implementation of the requirements contained in project execution and planning documentation. Initially, assessments should identify procedural weaknesses and necessary corrective actions. Subsequent assessments should determine the effectiveness of corrective actions and continue to monitor and improve the configuration management process.
- ▶ *Physical Configuration Assessments.* Periodic physical configuration assessments should determine the consistency between the documented technical baseline and the actual physical configuration. Discrepancies should be analyzed and appropriate corrective action taken to resolve them. An annual schedule for physical configuration assessments should be prepared by the contractor and submitted as an integral part of work planning documentation.

18.6 DOCUMENT CONTROL FOR CONFIGURATION MANAGEMENT

Documents must be controlled and distributed to ensure that only the applicable approved version is available for use, and to ensure prompt communication of changes. The effective control of documents is essential to the success of the configuration management program because the documents are the vehicles used to communicate information to affected organizations. The configuration management program should ensure processes (based on a tailored approach) are in place to assure that

- ▶ controlled documents are uniquely identified and identification systems are proceduralized.
- ▶ controlled documents are reviewed, approved, changed, and released through the change control processes.
- ▶ controlled documents are kept current by controlled distribution, including a receipt acknowledgment process.
- ▶ users needing controlled copies have ready access to current revisions of controlled copies.
- ▶ databases providing revision-level information are controlled and maintained current.

- ▶ record retrieval systems are in-place that allow timely retrieval of historic documents and the cross-referenced material in those documents.
- ▶ effective dates are established for controlled documents that allow for changes to impacted documents and related training.

All technical baseline documents should be issued as controlled documents. On approval, these documents should be entered in the appropriate controlled document list.

18.6.1 Roles

Each project organization has specific roles and responsibilities related to documentation and data management:

- ▶ Project Manager
 - Approve the standard distribution list for the controlled documents within their areas of responsibility.
 - Generate and distribute a controlled document list.
 - Ensure only current revisions of controlled documents are used in performing quality-related work activities.
- ▶ Document Originating Organization
 - Ensure controlled documents released for distribution have been appropriately reviewed for technical adequacy and approved.
 - Ensure effective dates for controlled documents are established prior to release for distribution.
- ▶ Document Distributing Organization
 - Ensure controlled documents are distributed in accordance with approved procedures.

18.6.2 Guidelines

Organizations that generate project documents shall define the process for the preparation, format, review, approval, revision, and verification of the technical adequacy of those documents:

- ▶ *Document Numbering.*
 - Each controlled document must be identified by a unique number that appears on all pages of the document. The original identification number must be retained throughout all changes to and revisions of the document. Should a document be canceled, that unique number shall not be reused.
 - The current revision number of each controlled document must appear on all changed pages issued since the initial issuance or last complete revision.
 - Pages within a controlled document must be numbered in a manner that allows page accountability.
- ▶ *Control Identification.* Controlled documents must be cleanly identified as controlled by use of colored paper or a color-identified stamp indicating a “controlled” status. Black must not be an acceptable color identification for the control stamp. Without this control identification, documents shall be considered uncontrolled.
- ▶ *Controlled Documents List.* A controlled documents list must be prepared and maintained that identifies controlled documents originated by their organizations and lists the individual document title and number, the current revision number and date, effective date, and originating and distributing organizations.
- ▶ *Document Revisions.*
 - Revisions to controlled documents must be reviewed and approved by the same organizations that reviewed and approved the original issue, unless delegated to another qualified organization.
 - Inclusion of revision/change information must be made part of the document by one of the following methods:
 - Inclusion of a revision/change record as part of the transmittal package.
 - Inclusion of a revision/change log as part of the document
 - The revision/change information must include the reason for the revision and identify the page(s) revised.
- ▶ *Document Review.* Organizations originating controlled documents shall procedurally define the required review and approval cycles. Resolution of review comments, for which resolution is considered mandatory by the responsible organization prior to approval, shall be documented.

► *Document Release.*

- Organizations originating controlled documents must be responsible for ensuring controlled documents are legible, reproducible, adequately reviewed and appropriately approved prior to release for distribution. An effective date for the controlled document shall be indicated on the first page of the controlled document, allowing sufficient time for the development/revision of implementing procedures and training as appropriate.
- When the revised document is maintained in a manual, an updated table of contents or an index should be prepared which accompanies the revision that is forwarded to the distributing organization.

► *Document Distribution.*

- A unique controlled copy number should be assigned to each controlled document listed on the standard distribution list.
- A systematic transmittal and receipt acknowledgment process shall be used to control distribution and track receipt of controlled documents. Individually addressed transmittals shall be used to transmit controlled copies of documents to each person on the standard distribution list. The transmittal record shall also contain any necessary instructions, including the deadline for return of the signed transmittal receipt and disposition instructions for superseded documents/pages.
- The recipient of each controlled copy must sign and return the transmittal form to the distributing organization by the due date specified and maintain their controlled copy current.

► *Standard Distribution List.* Standard distribution lists must be developed for controlled documents and maintained by the organization distributing controlled documents. Additions to or deletions from the standard distribution lists should be authorized by the organization originating the documents. Controlled distribution shall be limited to avoid the creation of an unduly cumbersome or unmanageable document control system that may ultimately prove self-defeating.

► *Document Use.* The document user is responsible to ensure that only the current revision of controlled documents are used in the conduct of activities. Currency shall be readily verifiable by contacting the distributing organization or referencing the controlled document list.

- ▶ *Document Assessment.* At least annually, each distributing organization shall require each controlled copyholder to inventory and verify currency of all controlled copies assigned to that particular copyholder. Random assessments of controlled copies should be made on an as-needed-basis by the distributing organizations to confirm the adequacy of the controlled distribution process.
- ▶ *Maintenance of Controlled Copies.* As appropriate, controlled copies of project documents shall be maintained by the responsible project organization.
 - *Master Copy.* A master copy is the copy used by distributing organizations for reproduction, distribution, and reference of the current revision. The master copy must not be checked out of the distributing organization's files and access control must be maintained. Only the current revision shall be considered a master copy. Historical, superseded, or obsolete revisions should be retained in the appropriate records systems.
 - *Controlled Copies.* Recipients of each controlled copy must maintain the controlled copy current, promptly inform the distributing organization of any changes in physical relocation, position responsibilities, or titles, and, at least annually, assess the accuracy of their controlled copy(ies).

18.7 PROJECT COMMUNICATIONS MANAGEMENT

18.7.1 Information Distribution

Information distribution involves making needed information available to project stakeholders in a timely manner and includes implementing the communications management plan as well as responding to unexpected requests for information.

18.7.1.1 Inputs to Information distribution:

- ▶ Work Results
 - Communications Management Plan
 - Project Plan
 - Tools and Techniques for Information Distribution
 - *Communication Skills.* Communications skills are used to exchange information. The sender is responsible for making the information clear,

unambiguous, and complete so that the receiver can receive it correctly and confirming that it is properly understood. The receiver is responsible for making sure that the information is received in its entirety and understood correctly. Communicating has many dimensions:

- A) Written and oral, listening and speaking
 - B) Internal (within the project) and external (to the customer, the media, the public, etc.)
 - C) Formal (reports, briefings, etc.) and informal (memos, ad hoc conversations, etc.)
 - D) Vertical (up and down the organization) and horizontal (with peers).
- *Information Retrieval Systems.* Information can be shared by team members through a variety of methods including manual filing systems, electronic text databases, project management software, and systems that allow access to technical documentation such as engineering drawings.
 - *Information Distribution Systems.* Project information may be distributed using a variety of methods including project meetings, hard copy document distribution, shared access to networked electronic databases, fax, electronic mail, voice mail, and video conferencing.

► Outputs from Information Distribution

- *Project Records.* Project records may include correspondence, memos, reports, and documents describing the project. This information should, to the extent possible and appropriate, be maintained in an organized fashion. Project Team members may often maintain personal records in a project notebook.

18.7.2 Performance Reporting

Performance reporting involves collecting and disseminating performance information in order to provide stakeholders with information about how resources are being used to achieve project objectives. This process includes

- status reporting—describing present project status

- ▶ progress reporting—describing what the project team has accomplished
- ▶ forecasting—predicting future project status and progress.

Performance reporting should generally provide information on scope, schedule, cost, and quality. Many projects also require information on risk and procurement. Reports may be prepared comprehensively or on an exception basis.

18.7.2.1 Inputs to Performance Reporting

- *Project Execution Plan.* The Project Execution Plan contains the various baselines that will be used to assess project performance.
- *Work Result.* Work results—which deliverables have been fully or partially completed, what costs have been incurred or committed, etc.—are an output of project execution. Work results should be reported within the framework provided by the communications management plan. Accurate, uniform information on work results is essential to useful performance reporting.
- *Other Project Records.* In addition to the Project Execution Plan and the project's work results, other project documents often contain information pertaining to the project context that should be considered when assessing project performance.

18.7.2.2 Tools and Techniques for Performance Reporting

- *Performance Reviews.* Performance reviews are meetings held to assess project status or progress. Performance reviews are typically used in conjunction with one or more of the performance reporting techniques described below:
- *Variance Analysis.* Variance analysis involves comparing actual project results to planned or expected results. Schedule and cost variances are the most frequently analyzed, but variances from the plan in the areas of scope, quality and risk are often of equal or greater importance.
- *Trend Analysis.* Trend analysis involves examining project results over time to determine if performance is improving or deteriorating.
- *Earned Value Analysis.* Earned value analysis in its various forms is the most commonly used method of performance measurement. It integrates

scope, cost, and schedule measures to help the project management team assess project performance.

18.7.2.3 Outputs from Performance Reporting

— *Performance Reports.* Performance reports organize and summarize the information gathered and present the results of any analysis. Reports should provide the kinds of information and the level of detail required by various stakeholders as documented in the communications management plan.

Common formats for performance reports include bar charts (also called Gantt charts), histograms, S-curves, and tables.

— *Change Requests.* Analysis of project performance often generates a request for a change to some aspect of the project. Change requests are handled as described in the various change control processes (e.g., scope change management, schedule control, etc.).

18.7.3 Administrative Closure

The project or phase, after either achieving its objectives or being terminated for other reasons, requires closure. Administrative closure consists of verifying and documenting project results to formalize acceptance of the product or the project by the sponsor, client, or customer. It includes collection of project records, ensuring that they reflect final specifications, analysis of project success, and effectiveness and archiving such information for future use.

Administrative closure activities should not be delayed until project completion. Each phase of the project should be properly closed to ensure important and useful information is not lost.

18.7.3.1 Inputs to Administrative Closure

— *Performance Measurement Documentation.* All documentation produced to record and analyze project performance, including the planning documents that established the framework for performance measurement, must be available for review during administrative closure.

— *Documentation of the Product or the Project.* Documents produced to describe the product of the project (plans, specifications, technical

documentation, drawings, electronic files etc.—the terminology varies by application area) must also be available for review during administrative closure.

- *Other Project Records.* All other appropriate project records that aid understanding project initiation, performance, scope, schedule, and cost.

18.7.3.2 Tools and Techniques for Administrative Closure:

- *Project Archives.* A complete set of indexed project records should be prepared for archiving by the appropriate parties. Any project-specific or program-wide historical databases pertinent to the project should be updated. When projects are done under contract or when they involve significant procurement, particular attention must be paid to archiving financial records.
- *Formal Acceptance.* Documentation that the client or sponsor has accepted the product of the project (or phase) should be prepared and distributed.
- *Lessons Learned.* A lessons learned document shall be prepared and issued at the completion of a project. The most effective and efficient approach to this requirement is the preparation and issuance of a routine (weekly) Lessons Learned report throughout the life of a project.