U.S. Department of Energy
Washington, D.C.

ORDER

DOE 4700.1

3-6-87
Change 1: 6-2-92

SUBJECT: PROJECT MANAGEMENT SYSTEM

1. PURPOSE. To establish the Department of Energy (DOE) project management system and provide implementing instructions, formats, and procedures, and to set forth the principles and requirements which govern the development, approval, and execution of DOE's outlay program acquisitions as embodied in the Project Management System (PMS).

2. APPLICATION TO CONTRACTS. The provisions of this Order are to be applied to covered contractors and they will apply to the extent implemented under a contract or other agreement. A covered contractor is a seller of supplies or services involved with Major System Acquisitions, Major Projects, and Other Projects, as defined at Figure I-1 on page I-3, and awarded a procurement contract or subcontract. The term "procurement contract" does not include small purchases. Covered contractors shall be required to comply with all paragraphs of this Order except paragraph 10 on page 5.

3. REFERENCES. See Attachment 1.

4. POLICY.

   a. It is Department policy to manage all projects in accordance with this Order. The chapters of this Order provide instructions, formats, and procedures to implement the project management system.

      Where programs/projects of a classified nature are conducted, procedures will be tailored accordingly.

   b. This Order does not apply to facilities and activities covered under Executive Order 12344.

   c. Pursuant to the Bonneville Project Act, the Federal Columbia River Transmission System Act, the Pacific Northwest Electric Power Planning and Conservation Act, and other statutory authorities, the Administrator of the Bonneville Power Administration (BPA) is authorized and directed to provide, construct, operate, maintain, and improve electric transmission lines and facilities as necessary, desirable, or appropriate for the purpose of transmitting electric energy for sale to existing and potential markets. These authorities are coupled with the Administrator's responsibility to ensure the safety, security, and reliability of electric power

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marketing and transmission as well as to meet its legal and contractual obligations. In light of these unique authorities, this Order shall not apply to BPA.

d. This Order does not alter the procedure outlined in the May 7, 1986 memorandum entitled "Modified Project Management System for the Western Area Power Administration, Western Area Power Administration."

e. Formality and documentation requirements will be significantly greater for Major System Acquisitions (MSAs) and major projects, but this fact does not lessen the responsibility for proper planning and execution of any project. Acquisition Executives, Program Secretarial Officers and Heads of Field Elements shall ensure that the project management system is implemented at a proper level in all projects.

5. BACKGROUND.

a. The project management system has evolved as one of the principal management processes for the Department. The principles, policies, and procedures for the system were first promulgated in 1978. This implemented and institutionalized OMB Circular A-109, Major System Acquisitions, of 4/5/76.

b. The next step in the evolutionary process of PMS was issuance of a requirement for decentralization in 1979. This policy brought the field offices clearly into the process as a full partner in project management.

c. In 1980, the Acquisition Executive decision process for Major Projects was delegated to the Program Secretarial Officers.

d. In 1989 and 1990 the Department emphasized the strengthening of the project management system.

e. The project management system, since inception, has been substantially improved to: (1) simplify the procedures; (2) streamline the system; and (3) allow for management by exception.

f. This revision incorporates the following to the extent noted:

(1) SEN-6D-91, Departmental Organizational and Management Arrangements, added titles to definitions.

(2) SEN-9-89, Federal Manager's Financial Integrity Act and Audit Resolution and Followup, of 7-26-89. Added in its entirety to Chapter IV, Part A.

(3) SEN-1OE-91, Authorities and Responsibilities of the Deputy Secretary and Under Secretary, of 6-17-91. Updated titles throughout document.

(4) SEN-25-90, Strategic Planning Initiative, of 7-24-90. Added to Chapter II.

(5) SEN-27-90, Strengthening the Department of Energy Project Management System, of 8-15-90. Incorporated in its entirety into Chapters I and II.

(6) DOE N 4700.4A, Baseline Change Control Process at the Executive Level, of 10-31-91. Incorporated in its entirety into Chapter III.

6. OBJECTIVES.

a. The primary objective of this Order is to assure the application of sound management principles to provide a disciplined, systematic, and coordinated approach to project management resulting in efficient planning, organization, coordination, budgeting, management, review, and control of DOE projects.

b. The overall objectives of the project management system and this Order are to facilitate meeting mission needs, aid in achieving and sustaining excellence in project management, minimize procedural requirements, and foster the concepts of baseline management, accountability, and performance assessment.

c. The specific objectives of the project management system are summarized as follows:

(1) Ensure all projects are based on clearly defined missions and mission analyses and are developed with clear time-phased goals and objectives that support program requirements.

(2) Ensure proper coordination by all appropriate line and staff elements beginning with program or project inception.

(3) Provide a basis for determining priorities among programs and projects, and, in turn, relate these to various levels of resource availability.

(4) Promote project execution which achieves tecnnical, schedule and cost objectives. Technical objectives include safeguards and security, environment, health, safety, quality assurance and all programmatic aspects.

(5) Avoid commitment of major resources prior to adequate project definition.

(6) Provide an overall plan for project execution including evaluation of project progress in relation to specific milestones. This plan should also identify the required Government staffing as well as the responsibility and authority of project and matrix staff.

(7) Provide visibility on all key decisions and timely feedback for all levels of management, and maintain accountability and traceability of management decisions through and across all levels of the organization with the minimal amount of procedures and paperwork.

(8) Centralize authority for project approval and for allocation of resources, and assure line management authority for project execution and the utilization of resources in that execution.

(9) To assure preparation of well planned budgets.

7. DISCUSSION.

a. The magnitude of the Department's project management task is formidable. The diverse array of project responsibilities and activities requires wide familiarity with, and understanding and working knowledge of scientific, engineering and managerial skills. These attributes are necessary to assure that projects meet mission needs, achieve planned technical and management objectives and are accomplished on schedule, within cost and scope, and that the projects serve the purposes intended.

b. This Order is the Department of Energy's primary written reference for project managers and program managers responsible for project management.

c. The cost, complexity, and longevity of a multimillion-dollar effort demands a formal management system, prescribed authorities and responsibilities, and finite planning and control. These, in turn, bring to mind project justifications, plans and charters, reporting, and project review. However, every project effort--regardless of size and complexity-has certain inherent characteristics.

Every project effort needs several specific ingredients:

(1) Someone in charge and accountable.

(2) An understanding of that person's responsibility and authority.

(3) A clear definition of the work scope.

(4) An integrated schedule, including milestones (network schedule).

(5) Supportive budget planning and execution that considers overall funding availability within the Department as well as program and project management.

(6) An overall plan for performance.

(7) Project execution against the plan.

(8) Sufficient reporting to stay aware of progress.

(9) Periodic management review to ascertain project status.

(10) Organizational commitment to successful project completion.

d. The management differences between MSAs, major projects, and other projects have to do with substance, not intent. In other words, all projects must be managed; the extent and formality of that management is the only issue. Attachment 2 summarizes PMS application.

e. The attached Chapters I through V comprise the Project Management System.

8. DEFINITIONS. See Attachment 3.

9. RESPONSIBILITIES.

a. Acquisition Executive and the Director of Procurement, Assistance and Program Management, jointly determine and approve changes or additions to the policies and procedures in the project management system.

b. The Associate Director for Program/Project Management and Control through the Director of Program/Project Management, is responsible for initiating and updating the guidance for the project management system, for monitoring its implementation, and for review and concurrence of all reporting requirements.

c. Heads of Headquarters Elements assure that the provisions of this Order, which apply to project management functions over which they have program direction, both in the field and at Headquarters, are carried out.

d. Heads of Field Elements carry out all project management functions delegated or assigned by Program Secretarial Officers as required by applicable directives.

e. Heads of Headquarters Elements and Heads of Field Elements (the senior ranking DOE official at a DOE office location) shall include in a procurement request package, for each procurement requiring the application of this directive, the following: (1) identification of the directive, (2) identification of the specific requirements with which a contractor or other awardee is to comply, or, if this is not practicable, identification of the specific paragraphs or other portions of this directive with which a contractor or other awardee is to comply, and (3) requirements for the flowdown of provisions of this directive to any subcontract or subaward. For application to awarded management and operating contracts, Heads of Headquarters Elements and Heads of Field Elements may set forth this information in a written communication to the contracting officer rather than in a procurement request package.

BY ORDER OF THE SECRETARY OF ENERGY:

DONALD W. PEARMAN, JR.
Acting Director
Administration and Human
Resource Management

REFERENCES

1. DOE 1300.2A, DEPARTMENT OF ENERGY STANDARDS PROGRAM, of 5-19-92, which establishes general policy guidelines, authorities and responsibilities for DOE standards programs, use of voluntary consensus standards, and guidelines for participation in private sector standards organizations.

2. DOE 1324.2A, RECORDS DISPOSITION, of 9-13-88, which assigns responsibilities and authorities, and prescribes policies, procedures, standards, and guidelines for the orderly disposition of Departmental records.

3. DOE 1332.1A, UNIFORM REPORTING SYSTEM, of 10-15-85, which establishes and provides implementing instructions for a uniform system of reporting the accomplishments under contracts.

4. DOE 1332.2, UNIFORM REPORTING SYSTEM FOR FEDERAL ASSISTANCE (GRANTS AND COOPERATIVE AGREEMENTS), of 10-31-83, which establishes and provides implementing instructions for a uniform system of reporting the accomplishments under grants and cooperative agreements.

5. DOE 1360.1A, ACQUISITION AND MANAGEMENT OF COMPUTING RESOURCES, of 5-30-86, which establishes Departmental policies and procedures for the acquisition and management of automatic data processing equipment and resources.

6. DOE 2200.4, ACCOUNTING OVERVIEW, of 3-31-88, which establishes the policy, principles, objectives, and responsibilities for Departmental accounting and reporting in accordance with Government regulations and generally accepted commercial and industrial accounting principles.

7. DOE 2200.9A, MISCELLANEOUS ACCOUNTING, of 3-30-89, which provides Department of Energy (DOE) policy and general procedures for payroll accounting (does not include payroll processing procedures), travel and transportation accounting, financial closeout of contract procedures, grant accounting, and accounting procedures unique to the power marketing administrations.

8. DOE 2250.1D, COST AND SCHEDULE CONTROL SYSTEMS CRITERIA, of 6-12-92, which delineates the requirements, procedures, authorities, and responsibilities for establishing and documenting uniform standards for assessing contractor cost and schedule control systems criteria (CSCSC).

9. DOE 3220.4, CONTRACTOR PERSONNEL AND INDUSTRIAL RELATIONS REPORTS, of 6-4-85, which prescribes policy and procedures, and assigns responsibilities and authorities for the preparation and submission of the subject reports.

10. DOE 4200.1C, COMPETITION IN CONTRACTING, of 1-9-87, which establishes policies and procedures to assure that competitive procedures are utilized to the maximum extent practical in the acquisition of personal property and nonpersonal services.

11. DOE 4240.1K, DESIGNATION OF MAJOR SYSTEM ACQUISITIONS AND MAJOR PROJECTS, of 6-23-92, which lists the specific Department of Energy (DOE) projects which have been designated as major system acquisitions and major projects in accordance with the references.

12. DOE 4300.16, REAL PROPERTY MANAGEMENT, of 7-1-87, which establishes DOE policies and procedures for the acquisition, use, and disposal of real estate or interest therein.

13. DOE 4320.16, SITE DEVELOPMENT PLANNING, of 1-7-91, which provides the policy and procedures for site development, facility utilization, and related planning.

14. DOE 4330.4A, MAINTENANCE MANAGEMENT PROGRAM, of 10-17-90, which provides policy and procedures for the establishment of programs for the maintenance and repair of Departmental property.

15. DOE 5000.3A, OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION, of 5-30-90, that sets forth policy, assigns responsibility, and provides criteria and instructions for a system of reporting occurrences that have programmatic significance to DOE operations, analyzing the information reported and disseminating the analysis results.

16. DOE 5100.3, FIELD BUDGET PROCESS, of 8-23-84, which provides requirements and procedures for the preparation and submission of field budget material for preparation of the Departmental budget.

17. DOE 5160.1A, REPROGRAMMING, RESTRUCTURING, AND APPROPRIATION TRANSFER PROCEDURES, of 12-1-86, which establishes the major policies, criteria, and procedures for initiating reprogramming, restructuring, and appropriation transfer actions relating to the appropriation accounts of the Department of Energy.

18. DOE 5440.1D, NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE PROGRAM, of 2-22-91, which establishes procedures to implement regulation 10 Code of Federal Regulations (CFR) 1021 for use in complying with the National Environmental Policy Act of 1969 (NEPA), as amended; Executive Order 11514, as amended; as supplemented by the regulations of the Council on Environmental Quality and DOE guidelines for compliance with NEPA; including DOE's "Environmental Compliance Guide," Volumes I and II.

19. DOE 5480.1B, ENVIRONMENT, SAFETY, AND HEALTH PROGRAM FOR DOE OPERATIONS, of 9-23-86, which establishes the environmental protection, safety, and health programs for the Department of Energy operations.

20. DOE 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 2-24-81, which establishes the requirements and procedures for the reporting of information having environmental protection, safety, or health protection significant for DOE operations.

21. DOE 5500.2B, EMERGENCY CATEGORIES, CLASSES, AND NOTIFICATION AND REPORTING REQUIREMENTS, of 4-30-91, which provides for the coordination and direction of Departmental planning, preparedness, and response to operational emergencies involving DOE or requiring DOE assistance, in which there is a potential for personal injury, destruction of property, theft or release of toxic, radioactive, or other hazardous material which represent a potential threat, including terrorist threats of acts, to health, safety, or the environment.

22. DOE 5500.3A, PLANNING AND PREPAREDNESS FOR OPERATIONAL EMERGENCIES, of 4-30-91, which establishes requirements for the development of DOE site specific emergency plans and procedures for radiological emergencies occurring in existing or planned DOE reactors and nonreactor nuclear facilities.

23. DOE 5600.1, MANAGEMENT OF THE DEPARTMENT OF ENERGY WEAPONS PROGRAM AND WEAPON COMPLEX, of 6-27-79, which establishes the policy and procedures for the management of the Department’s weapons program and weapon complex and utilization of the weapon complex facilities for nonweapon DOE activities.

24. DOE 5700.2C, COST ESTIMATING, ANALYSIS, AND STANDARDIZATION, of 11-2-84, which establishes the policy and responsibilities for developing and reviewing project cost estimates; preparing independent cost estimates and analyses; standardizing cost estimating procedures; and improving overall cost estimating and analytical techniques, cost data bases, cost and economic models escalation, and cost estimating systems.

25. DOE 5700.6C, QUALITY ASSURANCE, of 8-21-91, which provides Departmental policy, sets forth principles, and assigns responsibilities for establishing, implementing, and maintaining programs of plans and actions to assure quality of achievement in DOE programs.

26. DOE 5700.7B, WORK AUTHORIZATION SYSTEM, of 9-24-86, which establishes a formal process for budget development, authorization, and monitoring of Departmentally funded work performed at specified contractor facilities.

27. DOE 6430.1A, GENERAL DESIGN CRITERIA, of 4-6-89, to be implemented in coordination with the Director of the Office of Administration and Human Resource Management memorandum of 6-10-81, which establishes policies and objectives, responsibilities and authorities, procedures, and requirements for development and maintenance of general design criteria and their application in the planning and design, or acquisition, of the Department’s facilities.

28. DOE/S-00141, “National Energy Policy Plan of October 1983,” which describes the policies, plans and goals for the Department of Energy.

29. DOE/MA-0040, “Cost and Schedule Control Systems Criteria for Contract Performance Measurement, Work Breakdown Structure Guide,” of October 1981.

30. DOE/MA-0046, “Cost Estimating Manual,” of January 1982, which is a compilation of DOE cost estimating procedures.

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31. DOE/MA-0063, Volume 1, “Cost Guide (Economic Analysis),” of January 1982, which discusses economic analysis in cost estimating.

32. DOE/MA-0063, Volume 2, “Cost Guide (Standard Procedures for Determining Revenue Requirements),” of June 1982, which concerns itself with establishing standards for conducting economic evaluations using revenue requirements or product cost methodology.

33. DOE/MA-0063, Volume 3, “Cost Guide (Cost Factors),” of April 1982, which provides cost, labor, and material information concerning facilities or systems.

34. DOE/MA-0063, Volume 4, “Cost Guide (Cost Data and Cost Estimating Relationships--CER)," of May 1982, which details the methodology for establishing CER’s on equipment, material, facilities, and modules.

35. DOE/MA-0063, Volume 5, “Cost Guide (Construction of Economic Escalation Indices), Of May 1982, which covers the construction and use of price change indices to be used in estimating and forecasting.

36. DOE/MA-0154, “Acquisition Regulators Handbook - Source Evaluation,” of 2-86 which provides guidance for carrying out procurement in excess of $5 million.

37. DOE/PR-0045, “DOE Acquisition/Assistance Guide for Technical Personnel.”

38. OMB CIRCULAR A-34, “Instructions on Budget Execution,” which applies to the management of all appropriations, funds, and other authorizations, except deposit funds.

39. OMB CIRCULAR A-76, “Performance of Commercial Activities,” of 8-4-83, which sets forth procedures for determining whether commercial activities should be performed under contract with commercial sources or using government facilities and personnel.

40. OMB CIRCULAR A-109, “Major System Acquisitions,” of 4-5-76, which establishes policies to be followed by executive branch agencies in the acquisition of major systems.

41. OMB CIRCULAR A-119, “Use of Voluntary Standards,” of 1-17-80, which establishes policies to be followed by executive branch agencies in working with organizations that plan, develop, produce, and coordinate voluntary standards.

42. Federal Acquisition Regulations (FAR) of 4-1-84, which establishes uniform acquisition regulations for use by Federal Agencies.

43. Department of Energy Acquisition Relations (DEAR) of 4-1-84, which implements the provisions of the FAR.

44. P.L. 95-224, “Federal Grant and Cooperative Agreement Act of 1977,” which describes the appropriate circumstances for using government contracts grants or cooperative agreements.

45. P.L. 95-507, “Small Business Investment Act of 1977,” which provides guidelines for the utilization of small and disadvantaged businesses in government contracting.

APPLICATION OF THE PROJECT MANAGEMENT SYSTEM
ELEMENT TO DOE PROJECTS

ELEMENT	APPLICATION			CHAPTER AND PART OF ORDER
	MAJOR SYSTEM ACQUISITION (MSA)	MAJOR PROJECTS (MP)	OTHER PROJECTS (OTHER)	
Acquisition Executive	X	X		I-C
Acquisition Strategy	X	X	O	II-E/Attachment II-6
Advanced Acquisition or Assistance Plan Projects	X	X	O	II-E/Attachment II-7
Annual Report for General Plant Projects			X	IV-B/Attachment IV-7
Architect/Engineer (A/E) Services	X	X	X	V-A
Baseline Management	X	X	X	III-A
Business Strategy Group	X	X	O	II-E/Attachment II-6
Conceptual Design Report	X	X	X	V-B/Attachments V-9 & V-10
Configuration Management	X	X	X	III-C/Attachments III-5 & III-6
Construction Completion Report	X	X	X	V-C/Attachment V-C-12
Construction Manager	X	X	X	V-A
Contingency Management	X	X	X	II-D
Cost Estimating	X	X	X	II-D
Cost and Schedule Control Systems Criteria (CSCSC)	X	X	O	III-F/Attachment III-F-7

O = Optional
X = Required

ELEMENT	APPLICATION			CHAPTER AND PART OF ORDER
	MSA	MP	OTHER	
Design Criteria Package	X	X	X	V-A/Attachment V-3
Energy System Acquisition Advisory Board (ESAAB)	X	O		I-C/Attachments I-I & I-2
Environmental Assessment (EA)	X	X	X	II-F
Environmental Compliance Plan	X	X	X	II-F
Environmental Impact Statement (EIS)	X	X	X	II-F
Finding of No Significant Impact (FONSI)	X	X	X	II-F
Independent Cost Estimate (ICE)	X	X		II-D
Internal Review Budget	X	X	X	II-C
Justification of Mission Need	X	X		II-A/Attachment II-1
Mission Analysis	X	X	X	I-B
Mission Requirements	X	X	X	I-B
Network Scheduling (Logic Diagram)	X	X	X	II-A/Attachment H4
OMB Budget	X	X	X	II-C
Organizational Financial Plan	X	X	X	II-C

ELEMENT	APPLICATION			CHAPTER AND PART OF ORDER
	MSA	MP	OTHER	
Performance Measurement	X	X	O	III-F
Program Manager's Quarterly Report to the Acquisition Executive	X	X		IV-B/Attachment IV-8
Project Authorization System	X	X	X	V-A
Project Data Sheet	X	X	X	II-A/Attachment II-5
Project Management Plan (PMP)	X	X	X[1]	II-A/Attachment II-4
Project Manager's Progress Report	X	X		IV-B/Attachment IV-1
Project Manager's Quarterly Supplemental Report, Cost and Cost-Plus Commitment Chart	O	O		IV-B/Attachment IV-4
Project Manager's Quarterly Summary Report, Management and Construction Manpower	O	O		IV-B/Attachment IV-5
Project Manager's Quarterly Summary Report, Progress Photographs	O	O		IV-B/Attachment IV-6
Project Manager's Quarterly Summary Report, Project Activity	X	X	X	IV-B/Attachment IV-3
Project Plan (PP)	X	X	O	II-A/Attachment II-2
Project Plan Changes (Baseline Changes)	X	X	X	II-A/Attachment II-3

1/ Generic

ELEMENT	APPLICATION			CHAPTER AND PART OF ORDER
	MSA	MP	OTHER	
Project Reporting	X	X	X	IV-B
Project Status Review	X	X	X	IV-A
Project Transition Plan	X	X		II-H
Project Validation	X	X	X	II-C
Quality Assurance	X	X	X	III-D
Responsibility Matrix	X	X	X	II-A/Attachment II-4
Safety Analysis Review (Report-SAR)	X	X	X	II-F
Semiannual Status Report			X	IV-B/Attachment IV-2
Status of DOE Energy Management Projects	X	X	X	IV-B/Attachment IV-2
Summary Project Performance Report to Senior Management	X	X		IV-B/Attachment IV-9
Systems Engineering	X	X	X	III-6/Attachments III-1 & III-2
Test and Evaluation (T&E)	X	X	X	III-B/Attachments III-3 & III-4
Uniform Reporting System (URS)	X	X	X	III-F
Work Breakdown Structure (WBS)	X	X	X	II-B
Work Package Authorization System (WPAS)	X	X	X	II-C

DEFINITIONS

1. ACCEPTANCE TESTING. The performance of all necessary testing to demonstrate that installed equipment will operate satisfactorily and safely in accordance with the plans and specifications. It includes required hydrostatic, pneumatic, electrical, ventilation, mechanical functioning and run-in tests of portions of systems, and finally of completed systems.

2. ACQUISITION EXECUTIVE. The individual designated by the Secretary to integrate and unify the project management system and to monitor implementation of prescribed policies and practices. Approves the initiation of a major system acquisition (or a selected major project) and its transition through phases of the acquisition process and other sub-phases involving major commitments; selects, from among competing systems, those that are to be advanced to development, demonstration and production/operations; and authorizes development of a noncompetitive (single concept) system.

3. ACQUISITION PROPONENT. The DOE component having the primary responsibility for research, development, demonstration, production or operation of a major system acquisition project (to include, when applicable, the system for its logistic support) which meets Departmental objectives in carrying out DOE missions.

4. ACQUISITION STRATEGY. A description contained in the "Justification of Mission Need" and subsequent Project Plan of the proposed overall DOE business approach which will be utilized to ensure that the system being acquired or supported satisfies the approved mission need. Specific details of individual procurement actions should be made part of the Advance Acquisition/Assistance Plan in the Project Management Plan.

5. ADVANCED DEVELOPMENT. The effort guided by the principle that the work should lead ultimately to a particular application or product. Advanced development can cut across several scientific disciplines and is intended to explore focused innovation in a particular area of one or more energy technologies.

6. AGENCY COMPETITION ADVOCATE. The individual appointed pursuant to the Competition in Contracting Act of 1984 to promote full and open competition in the Department's acquisitions and to challenge barriers to competition. In DOE, this is the Competition Advocate located in the Office of Procurement, Assistance and Program Management.

7. APPLIED RESEARCH. Systematic study directed towards fuller scientific knowledge or understanding for direct use in fulfilling specific energy requirements.

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8. APPORTIONMENT. A distribution by the Office of Management and Budget of amounts available for obligation in appropriation of fund accounts of the executive branch. The distribution makes amounts available on the basis of time periods (usually quarterly), programs, activities, projects, objects, or combinations thereof. The apportionment system is intended to achieve an effective and orderly allocation of funds.

9. APPROVED FUNDING PROGRAM (AFP). The AFP is an internal DOE document issued by the Office of Budget to program managers and operating activities, setting forth the funds available for the program release activity in each appropriation and fund account. The AFP specifies pertinent legal limitations and funding ceilings applicable to programs, sub-programs, activities, and elements of expense. The AFP delegates the authority to program managers to initiate program release documents for their respective programs. Each allottee will use the AFP in conjunction with the associated allotment to establish funding ceilings on the obligational authority available to program managers and organization elements (formerly referred to as Financial Plans).

10. ASSESSMENT. A determination of project or system acquisition conditions based on a review of project cost, schedule, technical status, and performance in relation to program objectives, approved requirements, and baseline project plans. Assessments are made by the responsible managing or advocate program organization or independently by the Office of Program/Project Management. In all cases, assessments must be based on knowledge of the actual project status, performance, problems, and significant development in both the actual execution activities as well as required institutional approval, licensing, review, and environmental processes. They may take the form of:

a. Monthly report status ratings of project performance and outlook prescribed rating categories; or

b. The Acquisition Executive; the Director of the Office of Procurement Assistance and Program Management; or acquisition proponent review ratings of project performance and outlook in similar rating categories; or

c. Detailed evaluations of all project and system parameters prior to phase change or key resource commitment decisions.

11. BASELINE. A quantitative expression of projected costs, schedule, and technical requirements. Baseline establishment should include criteria to 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.

12. BASELINE CHANGE CONTROL BOARD. A multi-discipline functional body of representatives designated and chartered by the appropriate management level to ensure the proper definition, coordination, evaluation, and disposition of all changes to project baselines within their chartered jurisdiction.

Vertical line denotes change

13. BASELINE CHANGE PROPOSAL (BCP). The instrument/document prepared to provide a complete description of a proposed change and its resulting impacts on project baselines.

14. BASIC RESEARCH. Systematic, fundamental study directed toward a more comprehensive scientific knowledge or understanding of subjects bearing on national energy needs.

15. BENEFICIAL USE OR OCCUPANCY DATE. The date on which a facility, portions thereof, or the last piece of principal equipment, is released for use by others, prior to final acceptance. Nonintegral or subsidiary items and correction of design inadequacies subsequently brought to light may be completed after this date. On multiple-facility projects, beneficial use of the overall project will be the beneficial use date of the last major building or facility.

16. CHANGE IN SCOPE. A change in objectives, work plan, or schedule that results in a material difference from the terms of an approval to proceed previously granted by higher authority. Under certain conditions, stated in the approval instrument, change in resources application may constitute a change in scope. Under contractual agreement, contracting officers are the only Government personnel authorized to issue a change order of contract modification to a contractor/performer, in order to implement a change of scope. A change in scope may also affect the availability of current year funds until the proper congressional notification procedures have been executed. (See Federal Acquisition Regulation (FAR) 43.101 for additional information.)

17. COMPONENT. A major organizational subdivision of DOE, usually at the program or sub-program level.

18. CONCEPTUAL DESIGN. Conceptual design encompasses those efforts to:

a. Develop a project scope that will satisfy program needs;

b. Assure project feasibility and attainable performance levels;

c. Develop reliable cost estimates and realistic schedules in order to provide a complete description of the project for congressional consideration; and

d. Develop project criteria and design parameters for all engineering disciplines, identification of applicable codes and standards, quality assurance requirements, environmental studies, materials of construction, space allowances, energy conservation features, health safety, safeguards, and security requirements and any other features or requirements necessary to describe the project.

19. CONDITIONAL OR PROVISIONAL ACCEPTANCE. The acceptance of a unit or facility with a documented listing of the specific testing to be accomplished or work remaining including the furnishing of any outstanding submittal of technical and record data, to be completed by the construction contractor, and on or by what date the actions are scheduled to be complete.

20. CONFIGURATION. The functional and/or physical characteristics of hardware and/or software, as set forth in technical documentation and achieved in a product.

21. CONFIGURATION MANAGEMENT. The systematic evaluation, coordination, approval (or disapproval), documentation, implementation, and audit of all approved changes in the configuration of a product after formal establishment of its configuration identification.

22. CONSTRUCTION. Any combination of engineering, procurement, erection, installation, assembly, or fabrication activities involved in creating a new facility or altering, adding to, or rehabilitating an existing facility. It also includes the alteration and repair (including dredging, excavating and painting) of buildings, structures, or other real property. This does not involve the manufacture, production, finishing, construction, alteration, repair, processing or assembling of items categorized as personal property. (See FAR 36.102 for additional information.)

23. CONSTRUCTION COMPLETION DATE. The date on which work normally performed by construction forces (including installation of equipment by operating contractors or others) is accepted by the Government. This includes the completion of all building items, the erection and/or installation of mechanical units and/or processing equipment and the installation of all furnishings as required to make a full functioning building, facility, or process. Correction of minor deficiencies and exceptions may be accomplished after the recorded date.

24. CONSTRUCTION MANAGEMENT. Services that encompass a-wide range of professional services relating to the management of a project during the pre-design, design, and/or construction phases. (These services are deemed to be “professional” in accordance with FAR 15.204, Personal or Professional Services.) The types of services include development of project strategy, design review relating to cost and time consequences, value engineering, budgeting, cost estimating, scheduling, monitoring of cost and schedule trends, procurement, observation to assure that workmanship and materials comply with plans and specifications, contract administration, labor relations, construction methodology and coordination, and other management efforts related to the acquisition of construction.

25. CONTINGENCY. An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, and construction and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected cost.

26. CONTRACT. A binding legal relationship basically obligating the seller to furnish personal property or nonpersonal services (including construction) for which the buyer compensates. It includes all types of commitments which obligate the Government to an expenditure of funds and which, except as otherwise authorized, are in writing. In addition to a two-signature document, it includes all transactions resulting from acceptance of offers by awards or notices of awards; agreements and job orders or task orders issued thereunder; letter contracts; letters of intent; and orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance. It also includes contract modifications.

27. CONTRACT ADVANCE FUNDING. Obligations to a contract or project, to cover future work or materials not yet ordered. The value of advanced funding is the difference between uncosted obligation and unfilled orders outstanding.

28. CONTRACTING OFFICER. A person designated to enter into and/or review, modify, or terminate any contracts, financial assistance awards, and sales contracts and make related determinations and findings.

29. CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE. The individual in DOE who is assigned responsibility for overall technical monitoring of a contract and identified as such in the contract. The contracting officer's technical representative monitors the technical work performed under the contract, evaluates the contractor's performance, provides the contractor and the contracting officer with technical guidance, reports on contract status to DOE program and project management, and recommends corrective action when necessary.

30. CONTRACTOR. The term "contractor" is intended to mean and include all persons, organizations, departments, divisions, and companies having contracts, agreements, or a memorandum of understanding with DOE.

31. COST ESTIMATE. A documented statement of costs estimated to be incurred to complete the project. Cost estimates provide baselines against which cost comparisons are made during the life of a project.

32. COST-SHARING CONTRACT. A cost-reimbursable type contract under which the contractor receives no fee but is reimbursed only for an agreed portion of its allowable costs. This type of contract is suitable for those procurements that cover production or research projects which are jointly sponsored by the Government and the contractor with benefit to the contractor in lieu of full monetary reimbursement of costs. In consideration of this benefit, the contractor agrees to absorb a portion

of the costs of performance. The following illustrate situations in which this type of contract is generally desirable:

a. Jointly sponsored research and development work with nonprofit educational institutions or other nonprofit organizations; or

b. Other research and development work where the results of the contract may have commercial benefit to the contractor.

33. COSTS TO DATE. Costs incurred to date by the contractor and reported to DOE. These are recorded as accrued costs. They represent all charges incurred for goods and services received and other assets required, regardless of whether payment for the charges has been made. This includes all completed work and work in process, chargeable to the contract. Accrued costs include invoices for: (1) completed work to which the prime contractor has acquired title; (2) materials delivered to which the prime contractor has acquired title; (3) services rendered; (4) costs billed under cost reimbursement or time and material subcontracts for work to which the prime contractor has acquired title; (5) progress payments to subcontractors that have been paid or approved for current payment in the ordinary course of business (as specified in the prime contract); and (6) fee profit allocable to the contract.

34. DEFINITIVE WORK. The effort on which a contractual agreement for the dollar value of the effort has been reached.

35. DELIVERABLE. A report or product of one or more tasks which satisfies one or more objectives and must be delivered to satisfy contractual requirements.

36. DEMONSTRATE. To verify the soundness of the chosen design concept(s) in an environmentally acceptable manner, the technical and economic feasibility of new or advanced equipment, and facilities or processes by designing, constructing, testing, operating and evaluating near-full scale modules.

37. DEMONSTRATION. The verification of scale-up, economic and environmental viability for commercial application, through design, construction, test, and evaluation of large-scale energy systems in operational circumstances.

38. DEVELOPMENT. The development and test of systems and pilot plants judged to be technically and economically desirable as a means of achieving principal Departmental goals. Engineering development concerns itself with processes, preproduction components, equipment, subsystems, and systems. Initiation of work in this category is dependent upon successful demonstration of technical feasibility and economic, potential during the technology phase.

39. DEVIATION. A specific, before-the-fact, written authorization to depart from a particular performance or design requirement of a contract, specification, or referenced document. A deviation differs from an engineering change, in that, an approved engineering change requires corresponding revision of the documentation defining the affected product, whereas a deviation does not contemplate revision of the applicable specification or drawing.

40. DIRECT COST. Any cost that can be specifically identified with a particular project or activity, including salaries, travel, equipment, and supplies directly benefiting the project or activity.

41. DIRECTED CHANGE. A change imposed on a project(s), with direction to implement, which affects one or more of the project's (projects') baselines. Examples of directed changes include, but are not limited to:

a. Changes to approved budgets, or funding; and

b. Changes resulting from DOE policy directives and regulatory or statutory requirements.

42. ENGINEERING CHANGE. An approved change to controlled identification documentation. An Engineering Change Proposal (ECP) is a recommended Engineering Change (EC). There are typically two classes of EC's:

a. Class 1. Changes of configuration which affect the Departmental interest and require approval from the appropriate approval authority or designated representative. Class 1 engineering changes are those which affect: (1) technical baseline requirements and/or (2) nontechnical contractual provisions such as fee, incentives, cost, schedule, guarantees, or deliveries.

b. Class 2. Changes to a product which do not affect any of the Class 1 engineering change requirements. The Department's approval prior to implementation is not required, although such changes are subject to post-facto classification review by the project office. Other distinctions may be made at the discretion of the project manager.

43. ENGINEERING DEVELOPMENT. Systematic use of the knowledge and understanding gained from research and technology development to achieve the detailed design, construction and test for performance, producibility and reliability of energy system prototypes, pilot plants, and research facilities.

44. ENVIRONMENT(AL). Air and water quality, land disturbances, ecology, climate, public and occupational health and safety, and socioeconomic (including nonavailability of critical resources and institutional, cultural, and aesthetic) considerations. For conciseness, these are normally referred to as environment, safety and health considerations.

45. FACILITIES. Buildings and other structures; their functional systems and equipment, including site development features such as landscaping, roads, walks, and parking areas; outside lighting and communications systems; central utility plants; utilities supply and distribution systems; and other physical plant features.

46. FIELD OFFICE (FO). The new designation for the nine major Departmental offices responsible for day-to-day management of designated functional activities.

47. FINAL ACCEPTANCE. A written statement by the contracting officer or designee that the work performed by the construction contractor has been accepted as being in accordance with approved plans and specifications. The operating contractor should also be included in the final acceptance, if applicable, indicating acceptance of the facilities as constructed and the date the facilities are to be occupied or available for the use of operating contractor.

48. FIXED PRICE CONTRACTS. Fixed price contracts provide for a firm price or, under appropriate circumstances, may provide for an adjustable price for the supplies or services that are being procured. In providing for an adjustable price, the contract may fix a ceiling price, target price (including target cost), or minimum price. Unless otherwise provided in the contract, any such ceiling, target, or minimum price is subject to adjustment only if required by the operation of any contract clause which provides for equitable adjustment, escalation, or other revision of the contract price upon the occurrence of an event or a contingency.

49. FORECAST. The DOE project management office's most current performance projection for cost, schedule, and scope.

50. GENERAL PLANT PROJECTS (GPP). Congress has recognized DOE's need to provide for miscellaneous construction items which are required during the fiscal year and which cannot be specifically identified beforehand. Congress provides, annually, an amount for these purposes under the title of General Plant Projects.

51. GENERAL PURPOSE FACILITIES PROJECTS. Line item construction projects estimated to cost greater than $1.2 million and which are required to support the long-term administrative and technical needs of DOE-operated laboratories and facilities. Examples of general purpose facilities projects are light or heavy laboratories, administrative offices, machine shops, steam plants, electrical utilities, roads, railroads, and warehouses. Multiprogram general purpose facilities are restricted to general purpose facilities projects at the multiprogram laboratories/site where no one program will use more than approximately 60 percent of the planned facility.

52. GOVERNMENT ESTIMATES. Estimates are used to determine the reasonableness of competitive bids received in connection with formally advertised construction contracts, and serve as a control in evaluating cost and pricing data in negotiated contracts. Normally, the Title II design estimate, after being reviewed and approved by the Government, is the basis for the Government estimate. However, the services of an operating contractor, architect-engineer, cost-plus-fixed-fee construction contractor (with respect to subcontracts), or construction manager may be used appropriately to prepare, review, or revise the Government estimate prior to Government approval (refer to FAR 36.203). Cost-type contractors shall be required to follow cost estimate procedures when subcontracting for construction services. Government review and approval of the Government estimate is not required when the estimate is within the limits established by the Government's approval of the cost-type contractors procurement system. The specifics of a Government estimate vary with the size and type of contract.

53. INCURRED COSTS. Costs are applied to the performance of the project. All costs incurred for a project are reported whether they arise from payments, cost accruals, or transfers of costs from other DOE locations or Federal agencies. Any time costs are incurred by cost-type contractors, the amount will be included in that period. Incurred costs also comprise payments made or due to date, including any retained percent-ages, and lump-sum and unit price contracts based on payment estimates approved by the contracting officer and designated representative for the purpose of making the progress or final payments on work performed to date. Costs shall not be accrued on the basis of a percentage of physical completion, unless the amounts of such costs are approved by the contracting officer or his or her designated representative as progress or partial payments.

54. INDEPENDENT ASSESSMENT. An assessment, made outside the normal advocacy chain, of a project's status or condition. In the project management system, it is made by the Office of Program/Project Management in its role of independent monitoring. It will consist of independent evaluation of all pertinent factors in order to provide a condition rating or detailed analysis of the project or system situation. Independent assessments will typically be provided in conjunction with Headquarters reporting to senior DOE management; advisory board decision reviews; or other purposes associated with the program planning and budgeting system, acquisition or other DOE management control and direction processes. These independent evaluations must be based on knowledge of the actual project and related institutional matters. The Office of Program/Project Management will obtain this knowledge through reports from the project management and program organizations; conduct of field and Headquarters reviews with the program organization, the Departmental managing office and principal contractors; and direct communication and discussion of project matters with the DOE managing and program offices.

55. INDEPENDENT COST ESTIMATE. A documented cost estimate that has the express purpose of serving as an analytical tool to validate, cross-check, or analyze estimates developed by proponents for a project. An independent cost estimate also serves as a basis for verifying risk assessments. It is usually performed by an independent contractor.

56. INDIRECT COST. A cost incurred by an organization for common or joint objectives and which cannot be identified specifically with a particular project or activity. See 10 CFR 600.

57. INSPECTION. The survey of a unit, facility or area to determine overall compliance with contract drawings and specifications. It may vary from inspection of detailed items to extensive testing of operating equipment (which must be provided for in the contract). It may also serve in making a determination of the adequacy of the design effort. It includes a preliminary inspection to fix the number of work items remaining to be completed (list of exceptions or "punch list"), and a final inspection to accept the completed construction. (See Title III Services)

58. LEAD PROGRAM SECRETARIAL OFFICER (LPSO). The individual assigned line management responsibility and accountability for Headquarters and field operations and to which one or more multiprogram field offices report directly.

59. LIFE CYCLE COST (LCC). The sum total of the direct, indirect, recurring, nonrecurring and other related costs incurred or estimated to be incurred in the design, development, production, operation, maintenance, support and final disposition of a major system over its anticipated useful life span. Where system or project planning anticipates use of existing sites or facilities, restoration, and refurbishment costs should be included.

60. LINE ITEM PROJECTS. Projects which are specifically reviewed and approved by Congress. Projects with a total project cost greater than $1.2 million are categorized as line item projects.

61. LONG LEADTIME PROCUREMENT ITEMS. Those items of equipment and/or construction materials that require an order date prior to the estimated physical construction start to assure availability at the time needed so as not to delay the construction performance.

62. MILESTONE. An important or critical event and/or activity that must occur in the project cycle in order to achieve the project objective(s).

63. MISSIONS.

a. Responsibilities assigned to the Department of Energy for meeting national needs. Agency missions are defined by the Comptroller General of the United States in Budgeting Definitions, November 1975, as:

> "Those responsibilities for meeting national needs assigned to a specific agency. Agency missions are expressed In terms of the purpose to be served by the programs authorized to carry out functions or subfunctions which, by law, are the responsibility of that agency and its component organizations. (See Section 201 of the Budget and Accounting Act, 1921, as amended.)"

b. Additionally, Section 601(i) of the Congressional Budget Act of 1974 (Public Law 93-344) requires that:

> "The Budget. .." shall contain a presentation of budget authority, proposed outlays, and descriptive information in terms of:
>
> (1) a detailed structure of national needs which shall be used to reference all agency missions and programs;
>
> (2) agency missions; and
>
> (3) basic programs.
>
> "To the extent practicable, each agency shall furnish information in support of its budget requests in accordance with its assigned missions in terms of Federal functions and subfunctions, including mission responsibilities of component organizations, and shall relate its programs to agency missions."

64. MISSION ANALYSIS. Continuing analysis of assigned mission areas, reconciled with overall program capabilities technological opportunities, priorities, and resources that are involved.

65. MISSION AREA ASSIGNMENT. Assignment to a Program Secretarial Officer, by the Secretary, of the responsibility for the formulation and conduct of programs to carry out functions or subfunctions which by law and Administration policy are within the mission responsibilities of the Department.

66. MISSION NEED. A required capability within DOE's overall purpose, including cost and schedule considerations. When the mission analyses, or studies directed by appropriate executive or legislative authority, identify a deficiency in existing capabilities or an opportunity, this will be set forth as justification for purposes of system acquisition approvals, planning, programming, and budget formulation.

67. OPERATIONAL DATE.

a. Production Plant. The date when operations personnel introduce feed materials into the process equipment with the intent to produce the design plant product (excludes functional testing). For gaseous diffusion plants, term "on-stream date" is synonymous with operation date.

(1) Initial Operational Date. If the facility is a multiple unit type, the date on which feed materials are introduced into the first of a number of process or production units.

(2) Complete Operational Date. If the facility is a multiple unit type, the date on which feed materials are introduced into the last of the process of production units.

b. Reactor.

(1) Initial Operational Date. The date on which initial criticality is achieved.

(2) Complete Operational Date. The date on which tests have been completed and permission granted by the designated authority to go to full power for purposes of normal operation.

c. Accelerators. The date on which operations personnel inject a subatomic particle into the accelerator and achieve an initial accelerated beam.

d. Other. Normally, the date on which a building or facility is first occupied and functions in accordance with its intended purpose. However, on development projects it refers to completion of the first major milestone in output.

68. ORIGINAL ESTIMATE. The first total estimated and total project cost that are shown: (1) in a project data sheet submitted to the Congress for line item projects; or (2) in a project data sheet submitted to OMB for contingency type projects; or (3) in the initial authorization for general plant, operating funded, equipment funded, or other contingency-type projects.

69. ORIGINAL SCHEDULE DATES. The start and finish dates of design, construction, procurement, and operation submitted in conjunction with the original estimate or in the first approved schedule.

70. PHYSICAL CONSTRUCTION START. For purposes of reporting construction progress, the date on which work at the site physically starts, including work on site preparation, temporary construction and any earth moving. The start date of construction of permanent facilities should also be indicated.

71. PLANNING ESTIMATES. Developed for each project at the time of project identification. Since these are developed prior to conceptual design, they are order of magnitude only and have the least amount of accuracy and lowest confidence level. Care should be exercised in these estimates to assure that the order of magnitude is correct, since a tendency exists to avoid changing this estimate, particularly upward, once established.

72. PLANT ENGINEERING AND DESIGN FUNDS. Appropriated by Congress at the request of the Department for the performance of Title I and Title II design prior to authorization and appropriation of construction funds for a project. Plant engineering and design funds are limited to requests for projects which will receive high priority in future year budget submittal. Completed conceptual design is a prerequisite for allocation of plant engineering and design funds.

73. PRELIMINARY DESIGN (TITLE I). Continues the design effort utilizing the conceptual design and the project design criteria as a basis for project development. Title I design develops topographical and subsurface data and determines the requirements and criteria which will govern the definitive design. Tasks include preparation of preliminary planning and engineering studies, preliminary drawings and outline specifications, life-cycle cost analysis, preliminary cost estimates, and scheduling for project completion. Preliminary design provides identification of long lead procurement items and analysis of risks associated with continued project development. For a detailed description of the services provided during preliminary design, see Department of Energy Acquisition Regulation (DEAR) 936.605c and 952.236.70.

74. PRODUCT DATA REQUIREMENT. A contract requirement which directs contractors to collect, organize, prepare, maintain, transmit, deliver, or retain information incident to the design, development, production, operation, preservation, maintenance, or repair of contract end items. Product data includes engineering drawings, product specifications and standards, part breakdown lists, catalog item physical qualities and characteristics, preprocurement data, test plans and reports, and other such data.

75. PROGRAM. An organized set of activities directed toward a common purpose, or goal undertaken or proposed in support of an assigned mission area. It is characterized by a strategy for accomplishing a definite objective(s), which identifies the means of accomplishment, particularly in quantitative terms, with respect to manpower, materials and facilities requirements. Programs are typically made up of technology base activities, projects, and supporting operations.

76. PROGRAM ASSESSMENT. A determination of program condition based on a review of cost, schedule, technical status and performance in relation to mission area assignments, program objectives, approved strategy and milestones. Assessments are made by the responsible line program organization and outside the advocacy chain by the Office of Program/ Project Management. In all cases, program assessments must be based on knowledge of the actual program status, performance, problems, and significant development in approval; review; and environment, safety, health, and quality assurance processes.

77. PROGRAM MANAGEMENT. Management responsibility and authority for specific programs will normally be delegated by the cognizant Program Secretarial Officer. The Headquarters functions of program management includes planning and developing the overall program; establishing broad priorities; providing policy and broad program direction; preparing and defending the budget; establishing the technical performance, scope, cost, and schedule requirements for projects; controlling DOE Headquarters-level milestones; integrating all components of the program, providing public and private sector policy liaison; expediting Headquarters interface activities and followup actions; and retaining overall accountability for program success. The field function includes implementing these program activities, controlling field-level milestones, and providing major support to the Headquarters programming budgeting and processes.

78. PROGRAM MANAGER. An individual in an organization or activity who is responsible for the management of a specific function or functions, who is responsible for budget formulation, and for execution of the approved budget. The Program Manager receives an approved funding program from the Chief Financial Officer identifying program dollars available to accomplish the assigned function.

79. PROGRAM OBJECTIVES. A statement or set of statements defining the purposes and goals to be achieved during performance of a program to fulfill a DOE mission including the technical capabilities, cost, and schedule goals.

80. PROGRAM OFFICE. The Headquarters organizational element responsible for managing a program.

81. PROGRAM SECRETARIAL OFFICER (PSO). A senior outlay program official which includes the Assistant Secretaries for Conservation and Renewable Energy (CE), Defense Programs (DP), Fossil Energy (FE), Nuclear Energy (NE), Environmental Restoration and Waste Management (EM) and the Directors of Energy Research (ER), Civilian Radioactive Waste Management (RW), and New Production Reactors (NP).

82. PROJECT. A project is a unique major effort within a program which has firmly scheduled beginning, intermediate, and ending date milestones; prescribed performance requirements, prescribed costs; and close management, planning, and control. A project is a basic building block in relation to a program which is individually planned, approved and managed. A project is not constrained to any specific element of the budget structure (e.g., operating expense or plant and capital equipment). Construction, if required, is part of the total project. Authorized, and at least partially appropriated, projects will be divided into three categories: major system acquisitions, major projects, and other projects.

83. PROJECT DATA SHEET. A generic term defining the document containing summary project data and justification required to include the entire project effort as a part of the Departmental budget. Specific instructions on the format and content of the project data sheet are contained in the annual budget call, and DOE 5100.3.

84. PROJECT DESIGN CRITERIA. Those technical data and other project information developed during the project identification, conceptual design, and/or preliminary design phases. They define the project scope, construction features and requirements, and design parameters; applicable design codes, standards, and regulations; applicable health, safety, fire protection, safeguards, security, energy conservation, and quality assurance requirements; and other requirements. The project design criteria are normally consolidated into a document which provides the technical base for any further design performed after the criteria are developed.

85. PROJECT MANAGEMENT. A management approach in which authority and responsibility for execution are vested in a single individual, at a level below the general manager, to provide focus on the planning, organizing, directing, and controlling of all activities within the project. In general terms, project management functions include assisting the program manager in preparing Headquarters documents and establishing key milestones and overall schedules. Other activities include developing and maintaining the project management plan; managing project resources; establishing and implementing management systems, including performance measurement systems; and approving and implementing changes to project baselines.

86. PROJECT MANAGER. An official who has been assigned responsibility for accomplishing a specifically designated unit of work effort or group of closely related efforts established to achieve stated or designated objectives, defined tasks, or other units of related effort on a schedule for performing the stated work funded as part of the project. The project manager is responsible for the planning, controlling, and reporting of the project.

87. PROJECT OFFICE. The organization responsible for administration of the project management system, maintenance of project files and documents, and staff support for officials throughout the project life cycle.

88. PROJECT SUMMARY WORK BREAKDOWN STRUCTURE. A summary work breakdown structure tailored by project management to the specific project with the addition of the elements unique to the project. Generally, the project summary work breakdown structure will identify project elements through the third level.

89. PROJECTIONS. Estimates of budget authority, outlays, receipts, or other budget amounts that extend a minimum of 5 years beyond the current year. Projections generally are intended to indicate the budget implications of continuing current or currently proposed programs and legislation for an indefinite period of time. These include alternative program and policy strategies and ranges of possible budget amounts. Projects should be regarded neither as firm estimates of what actually will occur in future years nor as recommendations regarding future budget decisions.

90. QUALITY ASSURANCE. All of the planned and systematic actions necessary to provide adequate confidence that a facility, structure, system or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises all those actions necessary to control and verify the features and characteristics of a material, process, product, or service to specified requirements.

91. REAL PROPERTY. Land and/or improvements including interests therein, except public domain land.

92. SCOPE. In baseline management terminology, the term "scope" refers to those performance and design requirements, criteria, and characteristics derived from mission needs that provide the basis for project direction and execution. In budget terminology, the term "scope" refers to the congressionally approved project parameter/tasks as defined in the Congressional Project Data Sheet.

93. SITE. A geographic entity comprising land, buildings, and other facilities required to perform program objectives. Generally a site has, organizationally, all of the required facilities management functions. That is, it is not a satellite of some other site.

94. SITE DEVELOPMENT AND FACILITY UTILIZATION PLAN (SITE DEVELOPMENT PLAN). A formal written document summarizing all of the various data necessary to plan for the most effective utilization, orderly future development; and disposal of facilities at an individual site. Such planning shall be in accordance with site related program objectives and requirements and shall represent the consolidated views of site management, the field organization and the resource sponsor.

95. SITE OFFICE. Term used to describe small organizations established near work sites for the accomplishment of specific projects or work assignments receiving administrative support from another field organization.

96. STATE-OF-THE-ART TECHNOLOGY ASSESSMENTS. An integral part of the technology base element of a program. The objective of these assessments is to ensure that technology base and project activities can benefit from relevant state-of-the-art technology where appropriate. Furthermore, these assessments can assist in the identification of mission needs and ensure that DOE officials have a clear understanding of where a specific energy-related technology stands before making significant program or project decisions.

97. SUBCONTRACT. Any agreement or arrangement between a contractor and any person (in which the parties do not stand in the relationship of an employer and an employee):

a. For the furnishing of supplies or services or for the use of real or personal property, including lease arrangements, which, in total or in part, is necessary to the performance of any one or more contracts; or

b. Under which any portion of the contractor's obligation under any one or more contracts is performed, undertaken, or assumed.

98. SUBSYSTEM. An aggregation of component items (hardware and software) performing some distinguishable portion of the function of the total system of which it is a part. Normally, a subsystem could be considered a system in itself, if it were not an integral part of the larger system.

99. SUPPORTING OPERATIONS. All work in an outlay program that is not in the science and technology base activity and not in projects. It includes program overhead, personnel, and standing studies, and is generally characterized by level of effort.

100. SYSTEM. A collection of interdependent equipment and procedures assembled and integrated to perform a well-defined purpose. It is an assembly of procedures, processes, methods, routines, or techniques united by some form of regulated interaction to form an organized whole.

101. TECHNICAL BASELINE. A configuration identification document or a set of such documents formally designated and approved at a specific time. (The time need not be the same for each document in the set.) Technical baselines, plus approved changes to those baselines, constitute the current configuration identification.

102. TECHNICAL DIRECTION. The monitoring or surveillance of the scientific, engineering, and other technical aspects of a work program, as distinguished from the administrative and business management aspects.

103. TECHNOLOGY. A demonstration by experiment of the technical feasibility of alternative inventive concepts. This category may concern itself with processes, components, equipment, subsystems, or initial system prototype, and may encompass: experimental exploitation and refinement of a known phenomenon; demonstration of the acceptability of the technical and operational characteristics of one or more specific concepts; and preliminary system studies responsive to a particular problem including system analysis, tradeoff, preliminary cost/benefit studies, and planning and programming studies.

104. TECHNOLOGY BASE. The equipment and facilities produced for, and the accumulated results and skills produced by, the conduct of basic research, applied research and technology development.

105. TECHNOLOGY OR EXPLORATORY DEVELOPMENT. The systematic application of knowledge from research toward proof of technology, including development of nonspecific application prototypes and processes.

106. TITLE I DESIGN ESTIMATES. Estimates prepared upon completion of Title I design. Through use of plant engineering and design funds, Title I may be completed prior to inclusion of the project in the budget. If this should occur, the Title I design estimate becomes synonymous with the budget estimate.

107. TITLE I DESIGN SUMMARY. An overview and record document of preliminary engineering and project management planning, reflecting completed Title I design and usually prepared under architect-engineer services or by the operating contractor. Title II design estimates are developed for each project by the designer as part of the Title I design summary. The estimates, since they are based on the definitive design, are the most accurate and have the highest confidence level of any estimate.

108. TITLE II DESIGN. This continues the development of the project based on approved preliminary design (Title I). Definitive design includes any revisions required of the Title I effort; preparation of final working drawings, specifications, bidding documents, cost estimates, and coordination with all parties which might affect the project; development of firm construction and procurement schedules; and assistance in analyzing proposals or bids. For a detailed description of the services provided during definitive design, see DEAR 936.605(c)(3) and (4) and DEAR 952.236.70.

109. TITLE III SERVICES. Those activities required to assure that the project is constructed in accordance with the plans and specifications (e.g., construction inspection), and that the quality of materials and workmanship is consistent with the requirements of the project (e.g., materials testing). (See DEAR 936.605(c)(3) and (4) and DEAR 952.236.70 for additional details.)

110. TOTAL ESTIMATED COSTS (TEC) AND TOTAL PROJECT COSTS (TPC). Definitions for TEC and TPC are provided in DOE 5100.3, FIELD BUDGET PROCESS, and 5700.2C, COST ESTIMATING, ANALYSIS, AND STANDARDIZATION. The below listed definitions, extracted from these documents form the basis for development of standardized cost estimates.

On occasion, there may be projects which cannot comply with these definitions and guidance. For these projects, variances must be requested by the project and approved by the Office of Program/Project Management prior to Key Decision No. 1 when establishing project baselines and requesting line item funding.

a. TEC. TEC includes the following estimated costs:

- Land, land rights, depletable resources, and improvements to land.
- Engineering, design, and inspection (Titles I, II, and III).
- Construction Management of main plant, balance of plant, other facilities, other structures and significant alterations, additions, and improvements to structures (excluding normal maintenance).
- Utilities - including water and sewage systems, heating ventilation and air conditioning, power systems, communication systems, and fire prevention systems.
- Quality Assurance.
- Pre-operational construction changes shown to be required during integrated systems testing and hot start testing.
- Safeguards and security systems.
- project and construction management.
- Direct and indirect construction costs.
- Standard and special facilities.
- All equipment, furniture, and systems contained in main, balance of plant facilities and administrative areas to render the facility useable.
- Computer systems, if dedicated to the project.
- Contingency and economic escalation.
- Decontamination and/or disposal cost of equipment and construction rubble when the purpose of the project is to replace existing facilities.

b. TPC. TPC includes all research and development (R&D), operating, plant and capital equipment costs, specifically associated with project construction up to the point of routine operations, which will include but not be limited to:

- Total Estimated Costs.
- Pre-Title I activities, such as:
  - Conceptual Design Reports (CDR).
  - Preliminary Safety Analysis Report, if initiated prior to KD-1.
  - Preparation of Project Data Sheets, design criteria, National Environmental Policy Act (NEPA) documentation, and formulations of Quality Assurance Criteria.
- R&D necessary for fabrication, testing, and rework of prototype equipment.
- R&D (scale-up or demonstration plants of high-risk technology) required prior to start of construction.
- One-time costs related to testing, startup, operator training, and commissioning.
- Initial inventories and spare parts.
- Site suitability testing and evaluation.
- Quality Assurance related to site suitability and testing.
- Regulation compliance.
- Grant to state and local governments.
- Payments equal to taxes.
- Systems studies and selected systems engineering services.
- Institutional activities related to facility siting and external interactions.
- Decontamination and decommissioning costs.
- Economic escalation.
- Contingency (applicable to TPC).

Vertical line denotes change

111. USER. The entity which ultimately will operate or otherwise use the system being developed. When the project objective is to demonstrate to the private sector the utility or feasibility of a given system for commercial application, the identity of the ultimate user may not be known. In such case, only the most likely type of user (utility, constructor, energy supplier) may be identifiable.

112. VALIDATION. The process of evaluating project planning, development, baselines and funding prior to inclusion of funds for a project or system acquisition in the DOE budget. It requires a review of project planning and conceptual development documentation, as well as discussion with the program or field element and principle contributing contractors to determine the source basis, procedures, and validity of proposed requirements, scope, cost, schedule, funding, and so forth. Findings and recommendations resulting from the validation process will be provided for use in the annual budget formultion.

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CHAPTER I

DOE PROJECT MANAGEMENT SYSTEM

PART A - OVERVIEW OF THE PROJECT MANAGEMENT SYSTEM

1. INTRODUCTION. The Department's project management system is an approach to management in which authority, responsibility, and accountability are vested in a single individual to provide the detailed planning, organizing, directing, and controlling of all activities leading to the successful execution of the project.

   a. The project manager's planning activities include developing a plan for management and control of the project. He/she is responsible for ensuring that the baselines established in that plan are followed. The project manager's basic tools for controlling baseline activities are monitoring and contractor reporting.

   b. The contractor's planning efforts must support those of the Department. Part of the contractual agreement requires inclusion of how the contractor will measure project performance so that the DOE project management plan will reflect that data. These agreed-to plans then become the project manager's mechanisms for directing and controlling the project.

   c. Baseline establishment, baseline change control, and current, complete, and accurate contractor reporting are the keys to proper project management. The project manager is responsible for ensuring that the project baselines are realistic, for understanding the need for and value of adequate reporting to measure baseline performance, and for establishing the proper control mechanism (Uniform Reporting System and Cost and Schedule Control Systems Criteria) to measure project performance. These requirements demand that the project manager be fully cognizant of the concepts and procedural details of the tools which are available for use.

   d. DOE project management policy requires decentralization of projects unless an exception is granted by the Acquisition Executive. Decentralization in this context simply means assignment of project management responsibility to field elements. Normally, for large decentralized projects such as Major System Acquisitions (MSAs), Major Projects (MPs) or major line items; scope, cost, and schedule baselines are provided and controlled by Headquarters.

Vertical line denotes change

e. The Department categorizes projects into three separate groups: MSAs, MPs, and other projects. The definition of these categories are detailed in Figure I-1. For project reporting purposes, other projects are further subdivided into those costing $15-$50 million, those $5-$15 million, those $1.2-$5 million, and those under $1.2 million (general plant projects). Chapter IV explains reporting requirements for all project categories.

2. CATEGORIES OF WORK EFFORT. The projects covered by the project management system include not only construction efforts, but also activities which may be defined in terms of operational/statutorial categories of work effort and the various phases of research and development. Figure I-2 shows the relationship of the activities; further details are provided below:

a. Operational Categories. The full spectrum of outlay program efforts can be divided into three categories which together constitute an individual program.

(1) Science and Technology Base. This normally accounts for 8 to 12 percent of the outlay program's total estimated cost. This work effort is referred to as tasks or work units, and is managed or performed by personnel designated as principal investigators, as opposed to the more formal procedures in projects and project management. The work is generally characterized as level of effort, and the documentation and management techniques are not as formalized or rigorous as those required for project management. An exception to this is the construction of large experimental facilities, in such programs as high energy physics and fusion, to be used in support of technology base activities.

(2) Projects. Concept and demonstration development projects and full scale development projects normally account for 20 to 40 percent of the outlay program's total estimated cost. Projects proceed through several discrete phases, each phase being separated by a key decision point as shown in Figure I-2. Key decisions are defined and explained in Chapter I, Part B, paragraph 2. These project phases can be contained within only a single statutorial phase of research and development, or they may pertain to the project as it moves through the various phases of research and development. It should be recognized that few projects come from science and technology base and proceed neatly through the research and development phases.

(3) Operations and Support. Normally in excess of 50 percent of the outlay program's total estimated cost can be attributed to operations and support work effort, which encompasses all work in an outlay program that is not in the science and technology base or projects. It includes production, fabrication, and testing, as well as program overhead, personnel, and studies, much of which is generally characterized by level of effort. Historically, some of this work moves into projects over time.

- Major System Acquisitions

  A. National urgency, importance, size or complexity.

  B. Dollar value-normally those systems or projects which have a total project cost in excess of $100 million.

- Major Projects

  A. Total project cost of the project from $50 to $100 million.

  B. Importance of project to program objectives.

  C. Size and complexity of the project.

  D. Degree of DOE control required.

  E. Visibility of the project.

  F. Potential severity of environmental impact.

  G. Recommendations by Program Secretarial Officers.

- Other Projects

  A. Total project cost of the project below $50 million, including line items, and GPP items.

  B. Line items.

  C. GPP items.

Figure I-1. Categories of DOE Projects

Vertical line denotes change

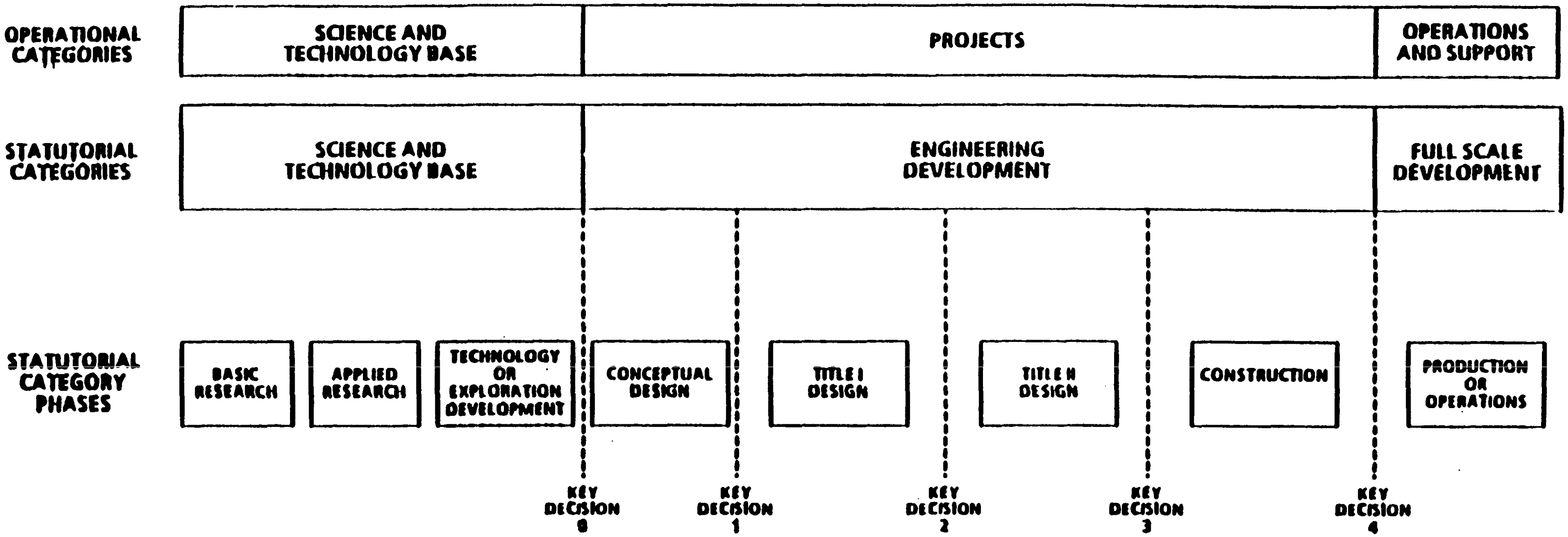


FIGURE 1-2

CATEGORIES OF WORK EFFORT AND RESEARCH AND DEVELOPMENT OR ACQUISITION PHASES

b. Statutory Categories. Within the Department, research, development, and demonstration efforts consist of three statutory general categories:

(1) Science and Technology Base includes basic research, applied research, and technology or exploratory effort. Normally for budgetary reporting purposes, research and development facilities and devices completed and capitalized are included in this base. The goal of this effort is to conceive, scope, and explore technology options to provide the foundation for the development of specific projects.

(2) Concept and Demonstration Development includes advanced development and engineering development. Its goal is the systematic application of knowledge towards the identification of solutions to meet specific energy requirements, including specific application prototypes and processes. Normally, there is an intended commitment to large scale projects.

(3) Full Scale Development includes demonstration and production or operation and is the systematic application of knowledge towards production of useful materials, devices, systems or methods; this includes design, development and improvement of equipment and processes to meet specific energy requirements. There is a major commitment of significant resources at this point.

c. Research and Development Phases. The statutory categories above are further subdivided into research and development phases. The first three are level-of-effort type phases; the last four are called the acquisition phases.

(1) Basic Research. Systematic, fundamental study directed toward fuller scientific knowledge or understanding of subjects bearing on national energy needs.

(2) Applied Research. Systematic study directed toward fuller scientific knowledge for direct use in fulfilling specific energy requirements.

(3) Technology or Exploratory Development. Systematic application of knowledge from research towards proof of technology including development of nonspecific application prototypes and processes.

(4) Advanced Development. Effort that leads ultimately to a particular application or product. Advanced development can cut across several scientific disciplines and is intended to explore innovation in a particular area of one or more energy technologies.

(5) Engineering Development. Systematic use of the knowledge and understanding gained from research and technoloy development to achieve the detailed design, construction, and test for performance, producibility, and reliability of energy system prototypes, pilot plants, and research facilities. This category also includes the preparation of appropriate National Environmental Policy Act documentation.

(6) Demonstration. Verification of economic and environmental viability through design and construction, test and evaluation of large energy systems in operational circumstances. Demonstration projects are intended to:

(a) Overcome "scale-up" problems;

(b) Contribute to the understanding of the economics of fabrication and operation; and

(c) Resolve other questions such as public assistance and institutional and environmental issues. Preparation of appropriate National Environmental Policy Act documentation is included in this phase.

(7) Production or Operations.

(a) Production. Producing the item in quantity, bulk, or other parameters which meet specifically stated requirements.

(b) Operations. Bringing the system or project from prototype or pilot plan operational testing status to full-scale operational condition to meet stated objectives.

PART B - PROGRAM/PROJECT RELATIONSHIPS

1. INTRODUCTION.

a. Program Requirements flow from Departmental missions and mission area assignments made by the Secretary. The goals established by the program requirements necessitate pursuit of state-of-the-art technology development, various project executions, and operation of pilot and fully integrated facilities.

b. Responsibilities. The program manager is responsible for attaining program goals within a mission area assignment and concentrates on assimilation of all aspects of the program into a single entity. The project manager is responsible for a single project within the program and concentrates on meeting project objectives within established baselines.

2. PROGRAM POLICY. Program policy establishes the base for project policy and execution.

a. Each program Secretarial Officer is responsible for the planning, programing, budgeting, and execution of programs under his or her cognizance.

b. Headquarters and field responsibilities and authorities are set forth for each program.

c. There is a clear hierarchical relationship between missions, programs, and projects. This hierarchical relationship is graphically depicted in Figure I-3.

d. Only programs and their constituent elements that fulfill a mission need, and are in consonance with assigned mission areas, will be conducted.

e. Continuing mission analysis and independent monitoring are conducted to ensure that programs are planned, developed and, upon approval, executed in accordance with assigned mission areas.

f. Significant program issues and near-term milestones of interest to senior management are identified and their status periodically reviewed.

3. PROJECT EVOLUTION.

a. The Secretary requests proposed changes to current mission area assignments from the program Secretarial Officers. These changes are based on the results of continuing mission analysis.

Planning Flow for Programs

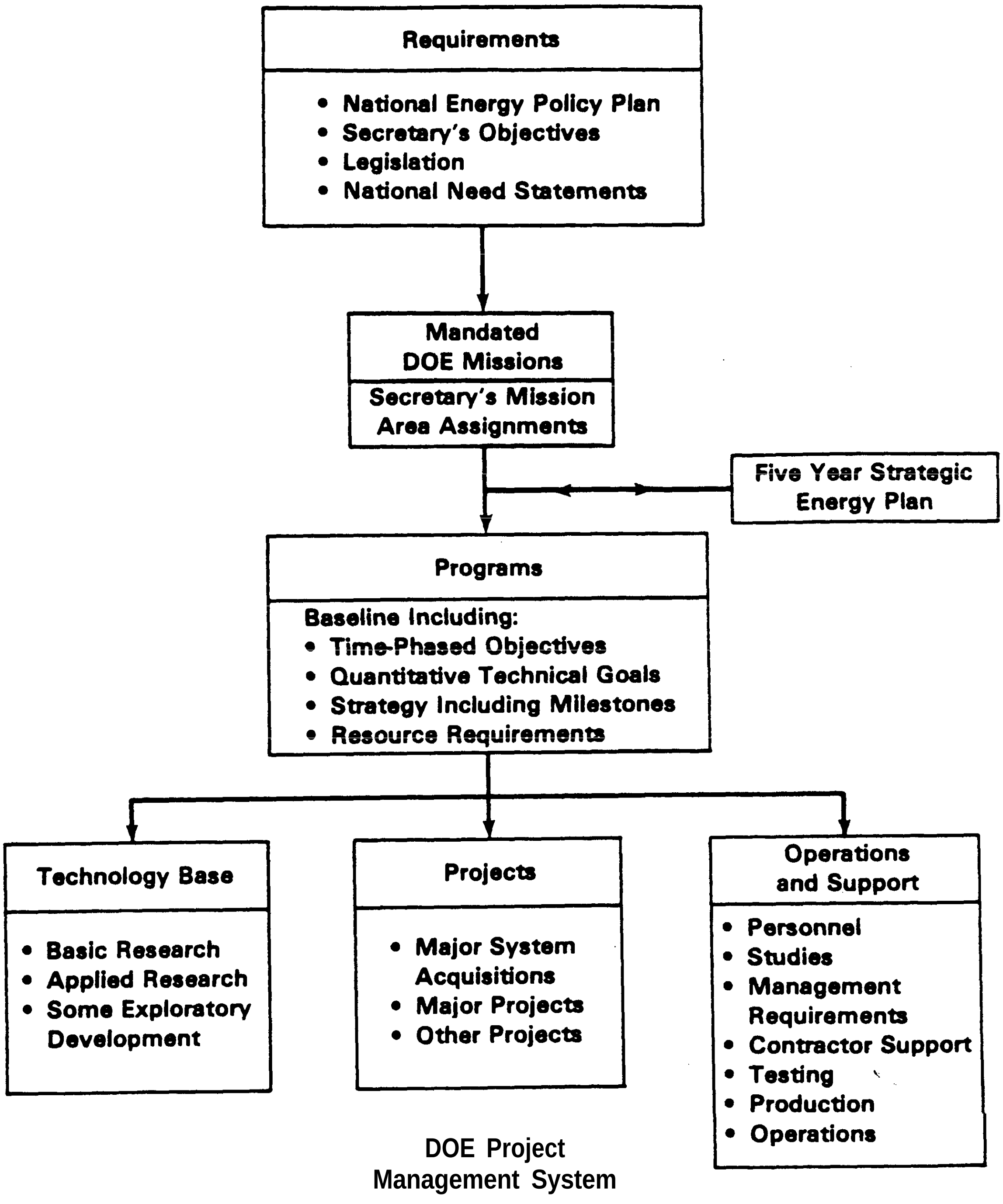


Figure I-3
Program Hierarchy

b. A program summary is developed for each program which includes the mission area assignment supported by the following data: (1) program objectives and related issues; (2) the program strategy; (3) summary of program logic; (4) near- and long-term milestones; (5) significant projects; and (6) the program project structure. The Secretary approves the program strategy and near-term milestones, and selects milestones and issues for periodic review.

c. The approved projects and/or project elements of the program then become specific budget items in the annual planning, programing, budgeting phase of program management. The planning and programming activities entail the translation of strategic Departmental policy objectives at a specific point in time within constrained resources.

4. STATE-OF-THE-ART ASSESSMENTS.

a. The project management system assumes the technical risks associated with research and technology development are investigated prior to the establishment of a project, especially MSA's or MP's. This risk can virtually be eliminated by requiring proven technology to be available prior to project initiation. The impact of this requirement, however, may be severe in terms of cost and schedule penalties as well as unrealistic for meeting a mission need. In other words, there must often be a tradeoff between project schedule and state-of-the-art technology. An assessment has to be made of the impact of one or the other situations.

b. This state-of-the-art assessment is primarily the responsibility of the program manager, who has better visibility into the technology related to his program. The assessment should then become an integral part of the risk assessment aspect of the justification for new start and be summarized in the alternatives and capability section.

c. Although the program manager has primary responsibility, the project manager must also be alert to technology change. State-of-the-art assessments may relate to any phase of the project, since various components in a system may be in different stages of development throughout the project's life. In updating the project plan, the project manager should describe the status of technology as it relates to the project. Then, as the project matures, early warning of potential deficiencies in technology readiness should be highlighted in the project manager's status reports.

PART C. MANAGEMENT ROLES, RESPONSIBILITIES, AND AUTHORITY

1. INTRODUCTION. It is the intent of the Department to place authority and responsibility at the appropriate management level commensurate with the project effort. This approach allows decisions to be made and actions to be taken at the appropriate levels within DOE line management. Below are the detailed roles played by various management levels within the Department as they relate to the project management system.

2. ORGANIZATION.

   a. Headquarters program organizational elements will be responsible for overall program policy, planning, program development (including establishment of Broad priorities), budget preparation and defense (with major support from field organizations), and broad program direction. Field organizations will be responsible for implementing these program activities and for providing major support to the Headquarters programming and budgeting process.

   b. Implementation of the Project Management System (PFK) involves both a “line” chain of authority and necessary participation of various “staff” elements. The line organization chain begins with the Secretary and progresses through the Program Secretarial Officers, Headquarters program organizations, and finally, to the project manager, the single individual who has full responsibility for detailed planning and execution of all project activities. Staff participation and coordination begin very early in a project’s life cycle and carry through to project completion. (A chart showing project management system relationships follows as Figure I-4).

   c. Project Line Management. The project line management for MSAs, MPs, and other projects, as depicted in Figure I-4, is the Office of the Secretary/Acquisition Executive, the Program Secretarial Officer, the Program Office, the Head of the Field Element, and the Project Manager.

3. ROLE OF THE ACQUISITION EXECUTIVE

   a. The Secretary has delegated the principal responsibility for project management activities to the Acquisition Executive. This includes establishing Department project management policies, approving the PMS, serving as the chairman of the Energy System Acquisition Advisory Board (ESAAB) and Level Baseline Change Control Board (BCCB) for the Department’s MSAs and selected MPs and approving establishment of special project offices.

   b. Key decisions on MSAs and certain decisions on selected MPs are normally reserved for the Acquisition Executive. In some cases, the Secretary may elect to act as the Acquisition Executive on critical projects. These include decisions to enter the acquisition phase or to make transitions between phases (key decisions) and any decisions

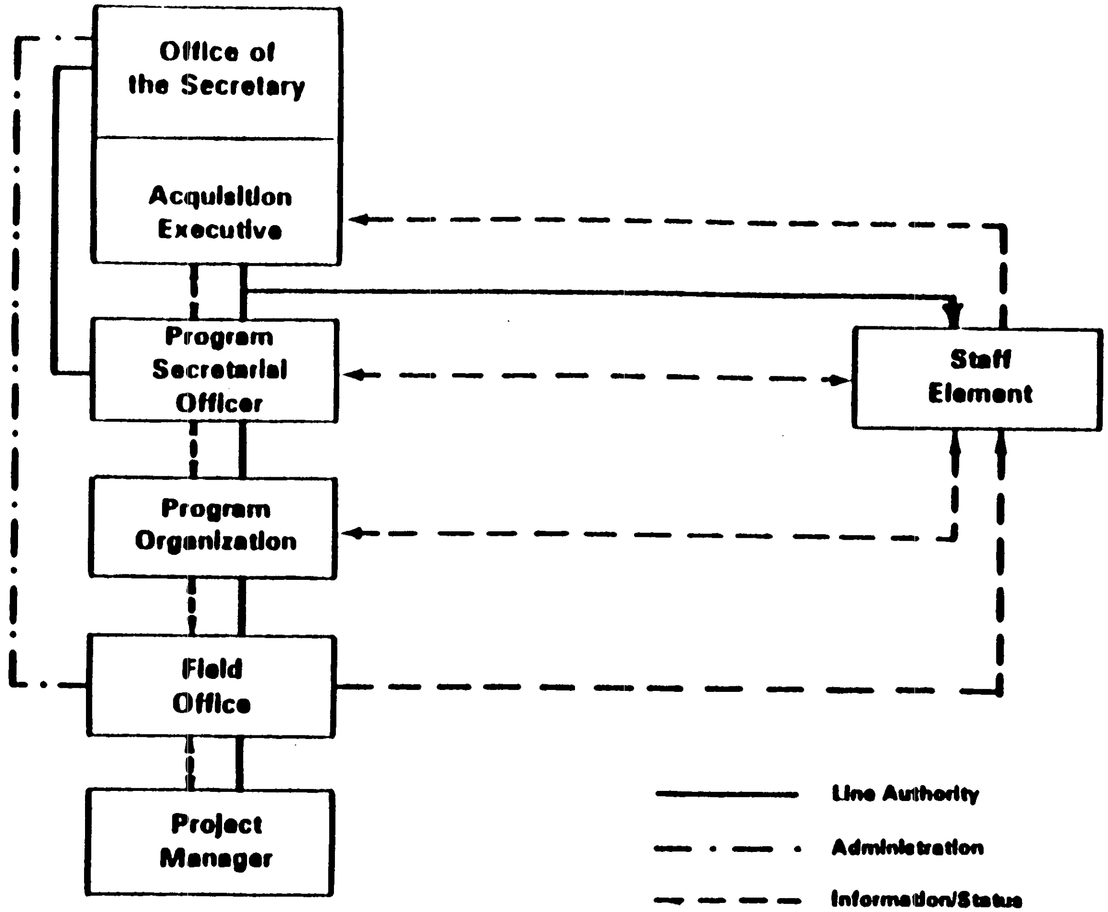


Figure I-4
Project Management System Relationships

which will directly result in commitment of major portions (e.g.,procurement of large long-lead items) of-the- project funds. Additionally, the Acquisition Executive may reserve other decisions on a case-by-case basis.

c. Other decisions on MSAs and similar key and significant decisions on MPs are typically made by the cognizant Program Secretarial Officers.

4. ENERGY SYSTEM ACQISITION ADVISORY BOARD.

a. The ESAAB supports the Acquisition Executive by providing advice, assistance, and recommendations at key decision points for each MSA and designated MPs. Attachment I-1 provides complete ESAAB membership and procedures. The ESAAB provides a single forum for the discussion of issues and alternatives and is designed to assure coordinated, objective senior level management advice to the Acquisition Executive. Attachment I-2 details ESAAB review meeting highlights.

b. The Acquisition Executive is responsible for convening formal meetings, as required to facilitate the decision process. Board members and appropriate advisors will attend all meetings. Other advisors are not required to attend unless asked to participate by the Acquisition Executive. In addition to prescribed meetings, any board member may request a meeting to consider significant issues at any point in the acquisition process for any MSA.

5. PROGRAM SECRETARIAL OFFICERS.

a. Each Program Secretarial Officer has full responsibility for the management planning and execution of his/her program activities including projects, subject to the national energy plan; approved Departmental policies and program strategies; mission area assignments; enacted budget legislation; approved resource allocations; and the Departmental PMS. For MPs, the Program Secretarial Officer is responsible for each approval or key decision not specifically reserved for the Acquisition Executive. Additionally, he/she is responsible for providing current information on program management decisions, the progress of work, status or resource utilization, major problems encountered, and planned corrective actions, to the Acquisition Executive and other Departmental elements having responsibility for activities which must interface with project activities.

b. Normally, the type and level of detail for the information provided will be the minimum required for the recipient office to fulfill its responsibilities in those areas which interface with project activities. In general, the information concerning projects that is provided to the Acquisition Executive will be that associated with MSAs and MPs although special reviews and reports may be requested for other projects on a case-by-case basis.

c. The responsibility and authority for decision-making shall be delegated to the appropriate organizational level. To accomplish this, only those approvals and key decisions on MPs, associated with entering or making the transition between acquisition phases, those directly resulting in large commitment of funds (e.g., procurement of large long lead items) or those of unusual national or programmatic importance or sensitivity are required at the Program Secretarial Officer level.

d. Assistant Secretary for Defense Programs (DP-1) has special responsibilities for non-weapon work assigned to the weapon complex. In coordination with appropriate DOE sponsors, he/she reviews the nature, scope, and future requirements of non-defense-related work. Additionally, he/she concurs or nonconcurs in the assignment of non-weapon work or lead missions to the weapon complex facilities.

e. Program Organizations.

(1) Management responsibility for specific programs is delegated by the cognizant Program Secretarial Officer to one of his/her DOE Headquarters program offices. This includes overall responsibility for any projects included in the program activities. The program organizations are responsible for assuring that overall requirements are fulfilled in the areas of environment, technical performance, scope, safety, quality assurance, cost, schedule, and operational environmental safety and health. They also continually evaluate and balance project needs against other programmatic needs and constraints.

(2) In general, the heads of the program offices are responsible for all the Headquarters approvals and key decisions which are not specifically reserved for the Program Secretarial Officer or the Acquisition Executive.

f. Program Organization Staff. The program organization staff will assist the director of the Headquarters program organization in the execution of assigned responsibilities. Precise delineation between the line management and the staff role is difficult since the staff functions are highly dependent upon overall organizational arrangements.

6. HEADS OF FIELD ORGANIZATIONS.

a. Certain planning and all executing responsibility for MSAs, MPs, and other projects shall be assigned to field offices unless an exception is obtained from the Acquisition Executive by the Program Secretarial Officer. The field element shall be involved in the planning of all assigned projects and shall develop much of the project documentation, which includes the "Justification of Mission Need" and the Project Plan, including the project charter. The Head of the Field Element shall establish an appropriate project management organization and will delegate appropriate authority to the project manager for management and direction of the project(s).

b. Specific Responsibilities. Heads of Field Elements will:

(1) Participate and concur in the determination regarding assignment of project(s) to the field organizations;

(2) Develop project plans, including charters, and other project documentation for the cognizant program element;

(3) Establish a project management organization and delegate appropriate authority to the project manager for the management and direction of the project(s) within the delegated authority;

(4) Assure the project manager is provided the necessary support to accomplish the project within the project charter guidelines, particularly in the area of personnel, in both administrative and technical areas;

(5) Review and approve project management plans;

(6) On MSAs, select the project manager with the concurrence of the cognizant Program Secretarial Officer or designated representative; on MPs, select the project manager or designate management responsibility, after consultation with the cognizant Program Secretarial Officer or designated representative; and on all other projects designate management responsibility;

(7) Assure satisfactory management of the project in accordance with the project plan, including the project charter and project management plan;

(8) Provide independent assessment on regular reports on project status, progress, problems, and variances provided to Headquarters management by the project manager;

(9) Coordinate and integrate all necessary in-house and outside administrative and technical support to meet project objectives and requirements;

(10) Develop project managers and project management capability;

(11) Within the authority delegated, conduct such contractor selections and subcontractor approvals as are required.

(12) Within authority delegated, execute and administer contracts;

(13) Assure that the minimum technical reporting requirements of the Department are met and that all scientific, technical, and engineering publications are deposited in a timely fashion with the Office of Technical and Scientific Information;

(14) Assist, when needed, the contractors or industrial partners in efforts to formalize experimental research and development programs to support the assigned project(s);

(15) Assure that adequate policy and procedures consistent with Departmental policy are established to assist the project manager in accomplishing the planning and execution of the construction portion of the project;

(16) Prepare National Environmental Policy Act documentation and assure the environmental protection, safety, and health protection aspects of facility operations;

(17) Accept the completed contractor efforts; and

(18) Assure effective implementation of required quality assurance activities.

7. PROJECT MANAGER.

a. Specific Responsibilities. The project manager will be the point of contact for the information flow to Headquarters. Day-to-day activities within the scope and charter thresholds and milestones will normally flow between the project manager and the program manager. The project manager shall be dedicated full time to the MSAs; however, on other projects the same project manager may have authority and responsibility for more than one project. For all projects, the OMB Circular A-109 requirement to minimize layering above the project manager must be satisfied.

b. Project Execution. The project manager has direct primary responsibility and accountability for execution of the project in accordance with the approved project plan, including the project charter and the project management plan. The project manager is responsible for actions indicated below:

(1) Technical Support. The support may be provided, as appropriate, by technology centers, laboratories, or contractors. Technical support services generally will be procured directly by the project manager, but may alternately be provided by contract from the program manager.

(2) Environment, Safety, and Health. The project manager is responsible for assuring that all project activities are carried out in compliance with Federal, State, and local regulations, laws, and standards for protection of the environment and the safety and health of employees and the public. The project manager may procure support services as necessary to achieve such compliance. In preparing National Environmental Policy Act documentation, the project manager shall obtain guidance from the appropriate field organization unit responsible for environment, safety, and health, and from the Assistant Secretary for Environment, Safety, and Health.

(3) Reporting. The reporting will be carried out in accordance with the project management plan and this Order.

(4) Quality Assurance. Procedures in the management of the project shall be established.

(5) Administrative Matters. The Head of the Field Element will provide necessary support to the project manager to fulfill administrative responsibilities associated with the project.

(6) Procurement. The project manager shall initiate all procurement actions necessary for execution of the project. The Head of the Field Element will provide necessary support to the project manager to fulfill these procurement responsibilities.

(7) Construction. The project manager shall oversee design review, construction review, and construction management activities related to the project.

(8) Financial. Management of project finances including contingency. Financial management support will be provided by the Head of the Field Element.

(9) Test Plan and Program. Preparation and execution of a complete test plan to assure full technical performance capabilities of the project. The Head of the Field Element will provide necessary support to the project manager to fulfill these test plan and program responsibilities.

(10) Configuration Management. Configuration management should be included for each project that establishes and documents the configuration baseline; institutes a configuration control system to ensure the review, approval, and documentation of changes; and institutes a program of configuration audits to assure compliance with the form and intent of the configuration control system.

8. DEPARTMENTAL SUPPORT ORGANIZATIONS.

a. Director of Procurement, Assistance and Program Management (PR-1) is responsible for procurement, cost estimates, and the development of management and business related policy. Specifically, responsibilities with respect to the project management system are carried out by the following:

(1) The Associate Director for Program/Project Management and Control (PR-20), through the Office of Program/Project Management has the primary responsibility for Department-wide overview of project activities for the Acquisition Executive. In this role, the Office of Program/Project Management and Control shall develop, implement, and maintain Department-wide program/project management policies and systems. Specific responsibilities of PR-20 include:

(a) Project Management System (PMS).

1 Develops and maintains the PMS

2 Establishes policies and procedures for DOE-wide program and project management and provides oversight, guidance and evaluation of this area of responsibility.

3 Establishes requirements for and overview of configuration management including the Baseline Change Control Process at the Executive level.

4 Develops, implements, and maintains the Uniform Reporting System and Cost and Schedule Control Systems Criteria.

5 Establishes requirements for, and overviews, mission analysis as it relates to the acquisition process.

6 Provides support to and serves as the Energy System Acquisition Advisory Board and the Level O Baseline Change Control Board (BCCB) Secretariat.

(b) Project Documentation.

1 Reviews and concurs on project documentation for MSAs and selected MPs.

2 Provides input for preparation of project plans as requested, and reviews final versions and provides recommendations.

3 Reviews and recommends approval of project baselines to the Acquisition Executive.

4 Provides support to both the ESAAB and Program BCCBs, including training and consultation for the Program and Project BCCBs as required.

5 Ensures programs keep project documentation, reporting and information current.

(c) Project Execution

1 Performs independent project assessment at each decision point and presents findings/recommendations to the Acquisition Executive.

2 Completes staff work and coordination to bring the decision to the Acquisition Executive for approval.

3 Provides evaluation and recommendations on baseline changes to the Executive Level Change Control Boards.

4 Acts as focal point for development and dissemination of cost estimating data bases and methodologies for the Department.

5 Conducts independent cost estimates prior to Key Decision 1, at the completion of Title I and II designs and at critical phases of the project, as deemed necessary.

6 Conducts independent cost estimates, as appropriate, of change control actions for review and approval by the Acquisition Executive (Level O BCCB).

(d) Analysis and Evaluation

1 Tracks execution against project baselines and provides independent assessment of project performance against approved baselines. Provides coordinated recommendations to the Acquisition Executive.

2 Provides coordinated quarterly summary project performance reports covering project execution and issues to senior management.

3 Provides recommendations to Program Secretarial Officers and Acquisition Executive for periodic project reviews.

4 Conducts program/project validations, in conjunction with the program organizations, and in coordination with the Chief Financial Officer and the Office of Policy, Planning and Analysis in support of the annual Internal Review Budget.

(2) Director of Procurement, Assistance and Program Management (PR-1) performs the following duties:

(a) Policy Development. Provides expertise in procurement, financial assistance, and business management to support development of Departmental project management policies.

(b) Project Development. Assists program offices in development and subsequent implementation of procurement matters on projects. These procurement and assistance services are required for MSAs and designated MPs. Assists program and project offices in development of the procurement strategy through provision of direct advice and counsel, as well as through business strategy groups, and concurs in the project plan and related documents to assure satisfactory business arrangements.

(c) Project Execution. Responsible for supporting procurement aspects of project execution. Field and Headquarters procurement organizations provide assistance to project organization in the planning of individual procurement actions, and carrying out necessary actions to solicit, award, and administer procurements.

(d) Other Responsibilities. The Director has specific responsibilities in two other areas that impact project management:

1 Personal property management; and

2 Materials allocation program.

(3) The Chief Financial Officer is responsible for budget formulation and execution activities including:

(a) Assurance that financial controls are established and maintained in accordance with legislative authority;

(b) Development and publication of budgeting, accounting, and other policies necessary for implementation of this Order;

(c) Preparation of financial reports as may be requested or required by Congress, the Office of Management and Budget, or the General Accounting Office;

(d) Coordination on financial aspects of reports *or* other documents required by this Order; and

(e) Determination in conjunction with the component program support offices whether congressional notification is needed prior to commitment of funds to any action which will result in, or as a result of, a change in scope, Total Estimated Cost (TEC), major thrust, or other significant departure from the previous congressional budget presentation.

(4) General Counsel (GC-1) provides legal counsel to assure that activities are planned and conducted in accordance with statutory and regulatory requirements. Counsel organizations in field organizations perform the specific legal functions necessary for project execution.

(5) Assistant Secretary for Environment, Safety, and Health (EH-1) has three basic roles in the PMS.

(a) Coordination of Energy Policy. Has primary staff responsibility. Draft policy, however, is coordinated with Program Secretarial Officers before issuance: This role focuses on the front end of the acquisition process, most specifically, on the Department-wide budget and program planning process.

(b) Identification, Coordination, and Integration of Major Issues Analyses and Decisions. These studies are performed on selected policy and program issues which require the Secretary's priority attention for the formulation of budget and legislative programs.

(c) Independent Review. Independent review of the conformance to laws, regulations, and DOE Orders related to environment, safety, and health.

These responsibilities are accomplished through the following procedures:

1 The review and approval of environmental documentation, by assuring compliance with the National Environmental Policy Act;

2 The independent overview of operational environment, safety, and health (occupational and public), and quality assurance requirements/activities including the safety analysis and review systems; and

3 Independent management appraisals of DOE programs and projects subject to this project management system in the areas of environmental safety and health protection and quality assurance per DOE 5700.6C and DOE 5480.1B.

(6) Director of Organization, Resources and Facilities Management (AD-10) is responsible for overall facilities management, cost of ownership issues, specifically in the areas of general design criteria, In-House Energy Management, maintenance management, real estate, site development planning, utilities management, and value engineering.

9. SUPPORT TO THE PROJECT MANAGER. The project manager and/or the Head of the Field Element will develop a proposed project organization. The project organization will be summarized in the project plan and detailed in the project management plan.

a. Organizational Options. Because of the diversity of projects and field organizations, there is not a standard project organization. The project organization can range from a relatively large dedicated project office for large, complex projects to a single project manager (having responsibility and authority for more than one project) receiving matrix support for all activities. The typical project organization consists of a small, dedicated project office (or designated individual) with general matrix support provided by the field organization. This project office reports to the Head of the Field Organization, generally through an assistant manager.

b. Other Than Departmental Support. In addition to DOE personnel, support from other Federal agencies and/or contractors may be utilized to extend and strengthen the capabilities of the Departmental managing organization. Support from other Government agencies (such as the U.S. Army Corps of Engineers) is obtained through use of interagency agreements. Contractor support may come from operating contractors or specialty-type contractors.

c. Key Government Functions. Provisions must be made for Government performance of those responsibilities that cannot be delegated to contractors. These responsibilities include:

(1) Determination of project and contract scope;

(2) Establishment of the project management and contracting approach;

(3) Selection of prime contractors as well as the award and administration of prime contracts for work;

(4) Determination of satisfactory contractor performance and acceptance of completed work;

(5) Assurance of project execution within agreed upon objectives;

(6) Direction and supervision of Government employees;

(7) Distribution and accountability of Government funds;

(8) Assurance of project cost, schedule, and technical performance;

(9) Development, justification, and approval of input into the President's budget; and

(10) Management of project contingency funds.

10. MANAGEMENT ASSIGNMENTS.

a. Project Management Assigmment. Responsibility for project management will generally be assigned to the field element with the greatest expertise in the program area under which the project falls. If no single field organization has major exclusive expertise in the program or project subject area, the program manager will identify an appropriate field organization for project management on the basis of staff experience and availability. The cognizant program manager and the Head of the Field Element will jointly decide the project management assignment and will issue a charter to the cognizant Program Secretarial Officer as part of the project plan.

b. Establishment of Special Project Office. Under extraordinary conditions, a special project office may be established separate from the existing field structure. A recommendation for this office shall originate with the cognizant program manager, program director, or Program Secretarial Officer. The recommendation will be coordinated with the Office of Procurement Assistance and Program Management and the Office of Organization, Resources and Facilities Management, and will be submitted to the Acquisition Executive for approval.

(1) A special project office imposes the heaviest burden on the Department in terms of Government personnel, and exceptional justification is required to support a recommendation to establish one. The specific level of support by a field organization and its reporting relationship will be established

on a case-by-case basis in consultation with the field organization involved.

(2) The office shall report to the program office of the cognizant Program Secretarial Officer or as directed by the Secretary.

PART D - MAJOR SYSTEM ACQUISITIONS AND MAJOR PROJECTS

1. INTRODUCTION.

a. OMB has issued an Executive Department policy statement entitled "Major System Acquisitions" (OMB Circular A-109). This circular establishes policy to be followed by executive branch agencies in the acquisition of major systems and provides basic policy guidance for the PMS. DOE MSAs and MPs shall conform to these requirements.

b. OMB and DOE policy requirements include:

(1) Top level management attention to the determination of agency mission needs and goals;

(2) An integrated systematic approach for establishing mission needs, budgeting, contracting, and managing programs;

(3) Early direction of research and development efforts to satisfy mission needs and goals;

(4) Improved opportunities for innovative private sector contributions to national needs;

(5) Avoidance of premature commitments to full-scale development and production/operations; and

(6) Early communication with Congress in the acquisition process by relating MSAs to agency mission needs and goals.

(7) Early identification of projects requiring major siting decisions.

c. The nature of DOE projects requires that consistent policy be established for their management and that all participants understand the objectives of the project. It is important that all Departmental participants coordinate their efforts in order to:

(1) Assure proper coordination by all appropriate line and staff elements beginning with program or project inception;

(2) Relate program or project objectives to national planning documents, mission area assignments, strategy papers, and legislation, as appropriate;

(3) Assist in determining priorities among programs and projects and, in turn, relate these to various levels of resource availability;

(4) Avoid commitment of major resources prior to adequate project definition; and

(5) Provide program and project managers with a clear view of related program and project objectives and plans.

2. KEY DECISIONS.

a. OMB Circular A-109 also specifies certain key decisions and outlines the logical sequence of activities in the MSA process. The key decisions and sequencing provide DOE with flexibility in determining how to meet the requirements of the policy and staff key decisions. Figure I-5 outlines the key decisions.

b. Key decisions are approved by the Acquisition Executive on all MSAs and selected MPs. Program Secretarial Officers make the key decisions on major MPs not reserved for the Acquisition Executive. Key decisions on other projects, when required, shall be made by the Program Secretarial Officer or formally delegated.

c. Project baselines are related to the key decisions. Key Decision O, Approval of Mission Need, allows the Conceptual Design Report (CDR) to be developed which provides the data required to develop initial technical, cost, and schedule baselines. Initial technical, cost, and schedule baselines are established at Key Decision 1 based on the CDR and other support documentation. The initial baselines will be refined and updated as the project proceeds through preliminary design (Title I), final/detailed design (Title II), construction/full scale development, testing, and successful start of operations. For projects funded from operating funds, appropriate equivalent decisions points reflecting significant expenditure of funds will be identified by Secretarial Officers and recommended to the Acquisition Executive. The baselines will be managed using the change control system at the executive level as defined in Chapter III and project change control systems for those changes not requiring Headquarters approval. Updated baselines reflecting incorporation of approved Baseline Change Requests will be presented at each key decision to the ESAAB or Program Secretarial Officer, as appropriate.

d. An Independent Cost Estimate (ICE) will be conducted prior to Key Decision 1 based on the proposed project baselines established from the CDR and supporting CDR data. The original baselines ICE will be refined at the completion of preliminary design (Title I) and final/detailed design (Title II) to provide independent project cost assessments prior to Key Decision 2 and Key Decision 3, respectively. The project manager will notify the Office of Program/Project Management well in advance of the need to update an ICE.

e. Key decisions may be expanded to include additional Acquisition Executive milestones or decision points, as appropriate, between the standard key decisions. These expanded decision points will ensure the proper Headquarters visibility and ESAAB action prior to all major commitments of resources for a project. Key decisions and expanded decision points shall be integrated into the project summary schedule.

KEY DECISION 0 - Approval of Mission Need

- Prerequisite for requesting conceptual design funding in the internal review budget cycle.

- Approval must occur prior to the planning stages of the annual internal review budget cycle and submission of initial funding requests to the Office of Management and Budget and Congress.

- Documentation Requirement: Approving Mission Need.

- Prerequisite for release of appropriated funding by the CFO.

KEY DECISION 1 - Approval of New Start

- Prerequisite for requesting project line item finding in the internal review budget cycle.

- Approve Project Plan including initial project baselines. Initial technical, cost and schedule baselines for the project will be based on the CDR and its support documentation.

- Implement a change control system delineating specific responsibilities, authority and accountability at the appropriate management levels for changes affecting the project baselines.

- Other input to the decision process includes completion of the budget validation, and independent cost estimate, and the project data sheet.

- Prerequisite for release of appropriated funding by the CFO.

KEY DECISION 2 - Approval to Commence Title II, or Final/ Detailed Design

- Scheduled prior to start of Title II, or Final/Detailed Design.

- Input to decision process includes update to the project baselines reflecting completion of preliminary design (Title I), and an independent cost estimate.

Figure I-5
Major System Acquisition and Major Project Key Decisions

Vertical line denotes change

- Current project plan reflecting approved baseline changes, as appropriate.
- Approval to begin long-lead procurement, if applicable.
- Prerequisite for release of appropriated funding by the CFO.

KEY DECISION 3 - Approval to Commence Construction or Enter Full-Scale Development.

- Scheduled prior to start of construction or full-scale development.
- Input to the decision process includes the update of project baselines reflecting completion of final/detailed design (Title II) and an independent cost estimate.
- Current project plan reflecting approved baseline changes, as appropriate.
- Other input to the decision process includes evidence of readiness to process, appropriateness of timing and a firm baseline.
- Prerequisite for release of appropriated funding by the CFO.

KEY DECISION 4 - Approval to Commence Operation/Production

- Scheduled prior to the transition from acquisition to operation/production; transition is not formally made until demonstrated capability to meet technical performance goals specified in the baseline.
- Prerequisite for released of appropriated funding by the CFO.

Figure I-5 (continued)
Major System Acquisition and Major Project Key Decisions

f. Each key decision point (including expanded decision points) will require ESAAB approval prior to the releases of appropriated funds by the Chief Financial Officer to proceed with the next phase of the project.

g. In the event that there are no key decisions or expanded decision points in a given year for the project, an Energy System Acquisition Review (ESAR) will be scheduled to advise the Acquisition Executive on current project status. Attendance at the ESAR will be the same as an ESAAB meeting with the Acquisition Executive serving as the chairman. The ESAR will be conducted similar to an ESAAB meeting in that the Acquisition Executive will review project performance (cost, schedule, and technical) against current baselines. The Acquisition Executive may delegate the responsibility for the ESAR to the cognizant Program Secretarial Officer.

3. DESIGNATION OF MAJOR SYSTEM ACQUISITIONS AND MAJOR PROJECTS. Projects that fulfill the prescribed MSA or MP criteria will be so designated by the Acquisition Executive using the following procedures:

a. The Office of Program/Project Management and Control, which maintains DOE 4240.1, will develop a list of MSAs and MPs. The list is submitted to the program organizations for review and comment.

b. Comments and unresolved designations which cannot be resolved at the program management levels will be forwarded to the Acquisition Executive for resolution. Appropriate notification of changes or additional designations is made to OMB and its Office of Federal Procurement Policy. Subsequently, a change to DOE 4240.1K, DESIGNATION OF MAJOR SYSTEM ACQUISITION AND MAJOR PROJECTS (or its successor) is issued.

c. If the approval of any change by a Level O, 1, or 2 Baseline Change Control Board (BCCB) action caused the Total Project Cost for a project to change from either the threshold for a MSA ($100 million), or for a MP ($50 million), the chairperson of the Level 1 BCCB approving the change shall be required to immediately notify the Director, Office of Procurement, Assistance and Program Management (PR-1) of the situation. Specifically, the Level 1 BCCB chairperson is required to provide such notification in writing within 5 working days of the approval of the project action which caused the change. The notification letter shall provide complete explanation of the new technical, cost, and schedule baselines and status of the project relative to key decision points to enable PR-1 to make determination whether an Energy System Acquisition Advisory Board/Energy System Acquisition Review should be convened, and whether DOE 4240.1 should be revised to include the subject project.

4. DOE ACQUISITION PROCESS.

a. Each MSA or MP is directed through the acquisition process by the project manager who has a charter which provides sufficient authority and resources to accomplish the stated project objectives and goals. Layers of authority between the project manager and the responsible Program Secretarial Officers are kept to a minimum. Figures I-5 and I-6 denote the process and phasing of MSAs. Figure I-7 provides the key events in the acquisition process. See Attachment I-3 for MSA procedures.

b. In order to effectively carry out DOE's missions, the acquisition process requires that DOE management:

(1) Express needs and program objectives in DOE mission terms to encourage innovation and competition in creating, exploring, and developing alternative energy system options and design concepts.

(2) Conduct initial activities in the system acquisition process to allow competitive exploration. of alternative energy system options in response to mission needs.

(3) Establish clear lines of authority, responsibility, and accountability for management of MSAs.

(4) Maintain a capability to:

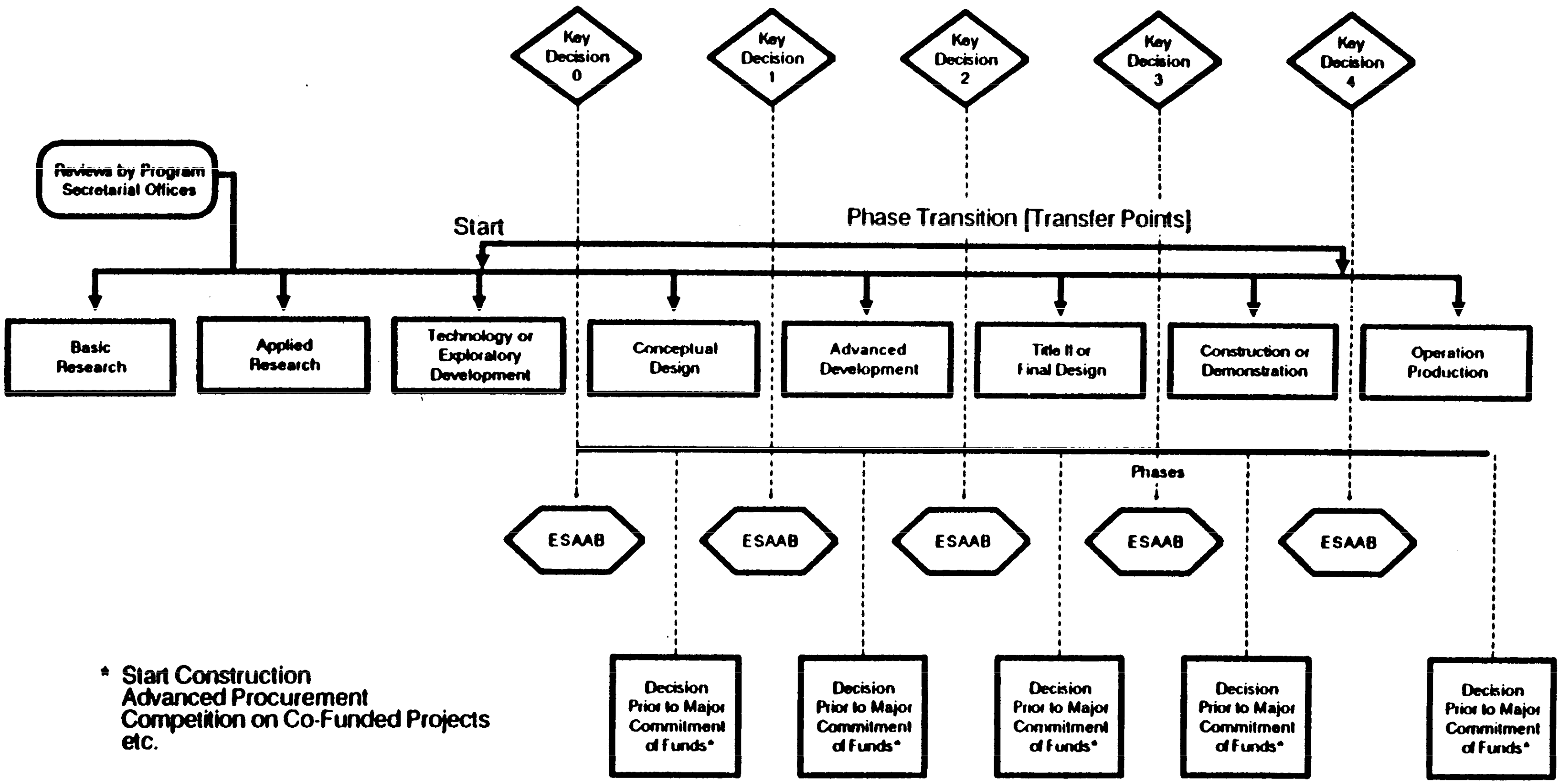
(a) Review, monitor and evaluate total project costs, schedule, and performance during the acquisition process and provide assessments for consideration at key decision points or when significant baseline variances occur.

(b) Estimate life cycle costs during system design, concept evaluation and selection, full-scale development, facility conversion, and production to ensure appropriate tradeoffs among investment costs, operating costs, schedules, and performance.

(c) Use independent cost estimates of the cost of the project for the applicable phase of the acquisition process, total project cost, life cycle cost for comparison purposes.

(5) Report on the accomplishment and status of the acquisition process. Of particular importance is reporting potential cost, schedule, or performance threshold breaches before corrective actions are foreclosed.

Vertical line denotes change



Major System Acquisition--Phase Transition Decision Points

Figure I-6

5. PROJECT PLANNING FOR MAJOR SYSTEM ACQUISITIONS OR MAJOR PROJECTS. Three documents are required during the project approval and execution processes: the Justification of Mission Need, the Project Plan, and the project management plan. During the development of these documents, particular attention must be paid to the following, not necessarily exclusive, concepts:

a. Management Information. Management information should be limited in all areas of activity to information essential for effective control. Normally, the information required by management for decision-making is obtained from the same data bases used by the contractor. A realistic work breakdown structure is developed for each project as a framework for planning and assignment of responsibilities, contracting and reporting progress.

b. Use of Government or Non-Profit Organizations. Government laboratories, federally funded research and development centers, educational institutions, and other non-profit organizations that submit alternative major system design concepts for consideration shall not participate in the evaluation process on those systems. Care must be taken not to place DOE management and operating contractors, Government laboratories, and federally funded research and development centers in competition with private industry, and further, to assure that inappropriate assignments of work are not made to such DOE management and operating contractors, Government laboratories, and federally funded research and development centers when such work is more appropriate and better suited for performance by the private sector. If further exploration of an alternative system design concept is deemed appropriate, that concept may be made available to industry to propose on the continued development stages.

(1) Departmental operations offices, energy technology centers, and laboratories may be assigned development tasks to complement a major system development.

(2) DOE energy technology centers and laboratories may be used as technical arms of the project management office, especially in matrix management organizations. Typical assignments may include actions such as studies, analyses, technology developments, risk and cost reduction efforts, and development test and evaluation.

c. Affordability. The Program Secretarial Officer will initially describe the magnitude of resource commitment required to acquire a system in the Justification of Mission Need and, subsequently, in the Project Plan. At Key Decisions 1 and 2, affordability considerations will be used as a factor in determining the selection of alternative concepts. At Key Decisions 3 and 4, favorable decisions may not be made unless the system's project acquisition and operating costs are available.

d. Timeliness. Potential savings in acquisition time should be balanced against cost and technical risks or national urgency. When technical and cost risks are low, or when the urgency to develop an alternative energy system exceeds high technical and costs risks, the cognizant

Program Secretarial Officer should recommend, with caution, minimizing acquisition cycle time. This may be accomplished by omitting a phase of the acquisition process or by overlapping or combining activities within a phase.

e. Competitive Concept Development. Alternative solutions to the mission need shall be obtained competitively unless the Acquisition Executive has approved pursuing a single concept. Even when pursuing a single concept, competition shall be employed in development of the concept. The widest range of acquisition alternatives to satisfy the mission need shall be considered. At a minimum, solicitations shall outline the need in mission terms; identify schedule objectives and constraints; and present project system cost objectives.

f. Cost Estimates. The validity of conclusions reached at each decision point depends upon the quality and consistency of cost, schedule and technical estimates presented in proposed changes to the updated project plan. Broad intervals of uncertainty and of risk must be expected early in the acquisition process, with smaller intervals developed as the project matures and uncertainty and risk decrease. (See Chapter IV.)

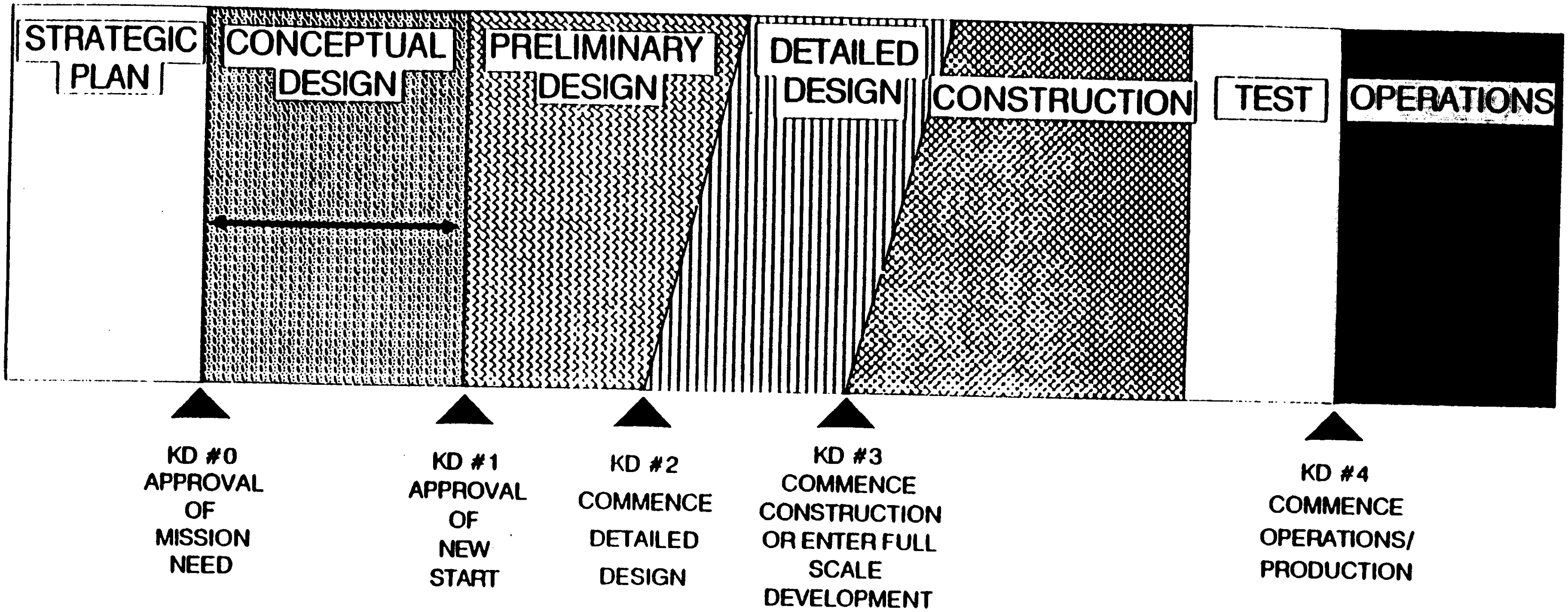
g. Cost Participation. Cost participation is a generic term denoting any situation in which the Government does not fully reimburse the performer for all allowable costs necessary to accomplish the project. The term encompasses cost sharing, cost matching, cost limitation, participation in kind, and similar concepts.

(1) In research, development, and demonstration projects for which there is a reasonable expectation that the performer will receive present or future economic benefit as a result of performance, it is Departmental policy to obtain cost participation.

(2) Cost participation should begin at the inception of a project with the Government and the performer each bearing a percentage of each dollar of allowable costs, including any overrun costs, as they are incurred. Net income, if any, should be shared in proportion to the accumulated investment of the parties at the time of accrual. Failure to reach agreement on cost participation from project inception may be sufficient reason for project cancellation.

(3) Specific cost participation arrangements must be determined on a project-by-project basis. The concept of sharing risks and benefits equally over the life of the project should be the basis for such a determination. The actual share may be adjusted for relevant business, technical, and risk factors, particularly as the project proceeds through its life cycle. Effective competition will be the ultimate evaluation tool in determining whether proposals accurately reflect the risks and benefits anticipated by the offerors. Management responsibilities and authorities generally should reflect the relative proportion of funding from each party during the phase being executed.

(4) Since most cost participation projects span several years, funding of the Government's share of construction costs should be sought to demonstrate the Government's intent to complete the project. Budgets and program plans should be based on equal share concept adjusted for relevant business, technical, and risk factors.



Key Decisions in the Acquisition Process for Construction or Development Projects

Figure I-7

PART E - OTHER PROJECTS

1. INTRODUCTION. Other projects are not subject to the policy of OMB Circular A-109. However, other projects of significant value should adhere to the same management conditions and practices as larger projects to the extent practicable. The program Secretarial Officer, program manager, or the Head of the Field Element is responsible for proper application of PMS, choosing management practices commensurate with the size, scope and complexity of the project.

2. OTHER PROJECT DECISIONS.

   a. Decisions on other projects should be made by the program Secretarial Officer, the program manager, the Head of the Field Element, or the project manager. The authority should be delineated, typically in a responsibility matrix.

   b. In a manner similar to key decisions, there should be an affirmative determination to:

      (1) Begin a project;

      (2) Commence Title II, or Final/Detailed Design;

      (3) Start construction, or enter full scale development; and

      (4) Operate or produce (as necessary.)

   c. In addition, major resource commitments also should be made only following an affirmative decision.

3. OTHER PROJECT MANAGEMENT PROCESS.

   a. The process for managing other projects is similar to that used in managing large projects:

      (1) There must be proper coordination of line, staff, and contractor organizations;

      (2) The project must be related to a mission area assignment, to a mission need, and to Departmental goals; and

      (3) Making major resource commitments without adequate project definition must be avoided.

b. Similarly, the progression of projects is the responsibility of a single person having clear lines of authority and communications with respect to the project. This individual will be responsible for planning, acquisition, environmental impact, execution, and transition as these areas relate to the project.

ENERGY SYSTEM ACQUISITION ADVISORY BOARD PROCEDURES

1. PURPOSE. The purpose of the Energy System Acquisition Advisory Board (ESAAB) is to assist the Acquisition Executive in the decision-making process for MSAs and selected MPs. The ESAAB process is also utilized for site selection determinations. In such circumstances, the ESAAB membership and procedures are as described in paragraph 4, below.

2. MEMBERSHIP AND RESPONSIBILITIES.

a. Members of the ESAAB.

(1) The Deputy Secretary/Under Secretary serve as the Acquisition Executive for their respective program areas by direction from the Secretary of Energy. The Acquisition Executive chairs the ESAAB and has approval authority for MSAs and selected MPs.

(2) The Assistant Secretary for Environment, Safety, and Health advises the Acquisition Executive on:

(a) Environmental acceptability and readiness of the project to proceed; and

(b) Environmental needs for ensuring phases.

(3) The General Counsel advises the Acquisition Executive on:

(a) Acquisition and construction issues;

(b) Licensing plan assessment;

(c) Legislative or executive action impact assessment;

(d) Patent issues; and

(e) Environmental requirements.

(4) The Chief Financial Officer advises the Acquisition Executive on:

(a) Budget formulation and execution status;

(b) OMB and congressional concerns and positions; and

(c) Other financial management issues.

(5) The Director of Administration and Human Resource Management advises the Acquisition Executive on:

(a) Real estate management policy and procedures;

(b) Facilities and maintenance management;

(c) Site development planning;

(d) Utilities management;

(e) Value engineering; and

(f) Personnel issues.

(6) The Director of Procurement, Assistance and Program Management advises the Acquisition Executive on:

(a) Adequacy of the acquisition strategy, including the related portions of the project plan;

(b) Procurement and contractual policy assessment;

(c) Conformance to and implementation of project management system policies and procedures; and

(d) Results of independent cost estimates in support of key decisions or the Executive Change Control Process.

b. Members to the ESAAB, for selected projects, include the Director of Energy Research, Assistant Secretary for Nuclear Energy, and the Director of Nuclear Safety. These members will provide an independent assessment to the Acquisition Executive of potential concerns/issues at its current phase and ensuing phases.

c. The Acquisition Proponent. The acquisition proponent will normally be the Program Secretarial Officer whose MSA or selected MP is being presented for decision. The acquisition proponent is responsible for:

(1) Conducting the pre-ESAAB review;

(2) Providing to the ESAAB Secretariat a draft of proposed changes to the project plan and related documentation for executing the project; and

(3) Providing the final updated project plan to the board Secretariat after decisions have been made for review and approval by the Acquisition Executive.

d. ESAAB Secretariat. The Associate Director for Program/Project Management & Control serves as the ESAAB Secretariat, providing:

(1) Staff support to the Acquisition Executive and board members for ESAAB and ESAR presentations (e.g., schedules, agenda, pre-briefings and presentation requirements);

(2) Independent cost, schedule and technical assessments and analyses of project planning, baseline changes, key decisions, expanded decision points, other significant decisions, and budgetary commitments; and

(3) Project management policy implementation activity and assessments.

e. Other Assistant Secretaries and Heads of Headquarters Elements may be asked to participate as advisors when appropriate. Other officials such as the cognizant DOE Field Office manager may be invited to serve as advisors to the acquisition proponent.

f. The project manager will normally present the issues, except for Key Decision O, and recommended decision for consideration to the board. The program manager might present a portion of the briefing focusing on the broader program considerations and issues, while the project manager stresses the status of the project and problems/issues at the project level. Other special reports may be presented by either, as appropriate, such as the results of an independent cost estimate or technical review.

3. ESAAB PROCEDURES. The Acquisition Executive may choose to make a decision and issue a board memorandum without a formal board meeting. Dispensing with the formal meeting shall be considered when the preliminary review to a scheduled meeting indicates that there are not substantial issues which would require a meeting. In this case, an action memorandum will be prepared and submitted by the acquisition proponent stating the factors in support of the decision requested. This action memorandum will be coordinated with board members, advisors and others indicated by the Chairman before it is forwarded for decision. Following approval by the Acquisition Executive, the Secretariat will document the decision and the actions and/or agreements that may have resulted from the process.

a. Scheduling of Energy System Acquisition Advisory Board Meetings.

(1) A decision/review schedule will be developed and maintained current by the ESAAB Secretariat for those projects which require a board review because of an acquisition phase decision, siting decision, problems, or other project developments that merit management attention. The decision/review schedules will be distributed to program offices monthly.

(2) Upon approval by the Acquisition Executive, formal scheduling of reviews will be accomplished by the ESAAB Secretariat.

(3) Unscheduled board meetings may also be called at the request of the Acquisition Executive or a Program Secretarial Officer. These requests will be made through the ESAAB Secretariat.

(4) Board Schedule. The steps outlined below provide normal working times and responsibilities for the activities prior to and immediately following an ESAAB:

		Responsible Office	Calendar Days Relative to Meeting
a.	Draft submission to ESAAB members of Justification of Mission Need, Project Plan or other appropriate baseline documentation	Program	60 days
b.	Pre-ESAAB meeting (Dry-run) Program	Program	20 days
c.	Dry-run presentation comments provided to Program Office	OP/PM	15 days
d.	Final draft of Justification of Mission Need, Project Plan or other appropriate baseline documentation	Program	10 days
e.	Presentation charts submitted to OP/PM and ESAAB membership	Program	10 days
f.	Board briefing books/materials prepared	OP/PM	7 days
g.	Acquisition Executive pre-brief	OP/PM	5 days
h.	ESAAB presentation	Program	O days
i.	Board decision memorandum for Acquisition Executive's approval	OP/PM	+15 days
	Project documentation reflecting board decisions provided for Acquisition Executive's approval and issuance.	OP/PM	+30 days

b. ESAAB Preparation. It is essential that the presenters address the significant issues and problems that are associated with the project; that these issues and problems be fully coordinated well in advance with cognizant staff and program officials; and that the Acquisition Executive and the sponsoring Secretarial Officer receive concise prebriefings to assure that an informed decision or review will occur.

(1) Project Presentation Review. A draft of the project presentation shall be provided to the Office of Program/Project Management and representatives for the board members by the cognizant Program

Vertical line denotes change

Secretarial Officer. The draft presentation will be reviewed for conformance to DOE orders and policies and to identify any remaining issues for discussion at the Pre-ESAAB meeting. The draft presentation shall address, as minimum, the following administrative actions:

(a) Peer Group Review. The program shall receive a current written statement of project endorsement for the Acquisition Executive from their respective peer groups. This action shall be completed prior to the Pre-ESAAB meeting.

(b) Inspector General/General Accounting Office Check. The program shall make the necessary contacts to determine the current audit activity on the project and provide a written statement on the status to the Acquisition Executive. This action shall be completed and reviewed at the Pre-ESAAB meeting.

(c) Congressional Briefings. The program shall notify the appropriate congressional committee staffs on project status and determine interest or support. A written statement on the congressional committee(s) response/position must be completed following the Pre-ESAAB meeting and provided to the Acquisition Executive prior to the ESAAB. This action applies to Key Decisions 2 and 3.

(2) Pre-ESAAB Meeting (Dry-Run). The program and project managers will schedule and conduct a “dry-run” of the developed presentation for the sponsoring Secretarial Officer for review and resolution of issues prior to the ESAAB meeting. The Office of Program/Project Management and board member representatives should also be invited to participate in a final exchange of ideas, assure compliance with Department policy/procedures, discuss and resolve outstanding issues, determine the status of any independent cost estimating requirements (where applicable), cover the status of administrative actions, and set a schedule for remaining actions. At the conclusion of the “dry-run,” a recommendation shall be made to the Acquisition Executive by the Office of Program/Project Management on the readiness of the project to proceed with the scheduled ESAAB meeting based on the completeness of material and administrative actions presented at the “dry-run.”

(3) Acquisition Executive Prebrief. A prebriefing is conducted by the Office of Program/Project Management for the Acquisition Executive to assist in his preparation for the board meeting. The objectives of this prebriefing are to acquaint the Acquisition Executive with a brief background and description of the project, provide an independent assessment of remaining issues/problems to be presented, clarify any technical and management items and provide a final status on administrative actions so as not to consume too much time during the formal meeting. In addition, an independent assessment of the project and issues will be presented with recommended solutions. Any

feedback from the prebrief shall be provided immediately by the Office of Program/Project Management to the cognizant Program Secretarial Officer.

3. ESAAB Memorandum. The board Secretariat shall prepare a memorandum summarizing the results of the meeting.

   a. The memorandum will specify decision(s) reached, actions assigned, results of special studies and assessments, limitations associated with approvals, resource levels which may be used for budgetary and organizational planning, constraints on systems development and definition, schedules for accomplishing action items, and the time frame for the next meeting. A summary of the approved cost, schedule and technical baselines will be attached to the memorandum.

   b. The Secretariat will coordinate the proposed memorandum with the members and advisors prior to forwarding it to the Acquisition Executive. Dissenting views will be included in the package. Signatures of each board member will be obtained on the final document.

4. SPECIAL ESAAB FOR SECRETARIAL SITE SELECTION DECISIONS.

   a. Responsibilities.

      (1) The ESAAB will be responsible for approving project site selection decisions.

      (2) Program outlay offices will notify the Office of Program/Project Management when initiating conceptual design on any project which involves a site selection determination option.

      (3) The Office of Program/Project Management will maintain a list of such projects and will advise the Acquisition Executive of the schedule for the upcoming decisions.

      (4) The Office of Program/Project Management will include an evaluation of siting considerations in the checklist used in the project validation process.

      (5) Site selection criteria will be established and approved, and site characterization studies and evaluations will take place during the early design phase of the acquisition process.

      (6) A site selection decision will occur at the earliest appropriate time during advanced development or preliminary design, although, in some cases, site selection may not be feasible until Key Decision 2, Start of Engineering Development or Detailed Design.

      (7) The Office of Program/Project Management will assist program organizations in preparing for ESAAB site selection meetings. Paperwork and administrative burdens associated with these presentations will be minimized. Presentations will focus on issues and ensure adequate coverage of all viable options.

b. Procedures. The site selection decision process is as follows:

(1) The ESAAB will be convened to enable the Acquisition Proponent to present background information related to the project and the siting considerations.

(2) Detailed discussion of the various siting options, including the pros and cons of each, will be conducted.

(3) The Acquisition Proponent will present specific recommendations for a siting decision. Supporting and/or opposing views of ESAAB members will then be considered, after which the ESAAB Chairman will make the siting decision(s).

5. ESAAB INVOLVEMENT FOLLOWING SPECIAL INDEPENDENT SCIENTIFIC OR TECHNICAL REVIEWS OF PROJECTS AND PROGRAMS.

a. Purpose. When directed by the Acquisition Executive, a special independent scientific or technical review will be performed if circumstances are presented that could potentially influence a project or program from continuing in an effective manner. If the findings of such a review will result in significant program or project redirection, the ESAAB will be included in the decision-making process.

b. Responsibilities.

(1) The Program Secretarial Officers have the responsibility for technical reviews of their programs or projects and will advise the Acquisition Executive of events which could "trigger" an independent scientific or technical review of any of their programs or projects.

(2) The scientific advisor, when requested by the Acquisition Executive, will organize independent panels to conduct scientific or technical reviews of the project and will work with the Office of Program/Project Management and Control to fully integrate the cost, schedule and technical aspects into the review and subsequent recommendations. Technical reviews will be conducted in a manner which minimizes disruption and delays in the accomplishment of ongoing projects.

(3) The Office of Program/Project Management and Control will:

(a) Review each new or proposed MSA and MP in order to assure that high risk technical issues are identified and ensure that a meaningful technical baseline is included in the project plan.

(b) Apprise the scientific advisor whenever a potential requirement for a review appears to be indicated.

(c) Independently track programs and projects and advise the Acquisition Executive, of events that could “trigger” an independent technical review.

(d) Arrange for a presentation to the ESAAB after appropriate coordination with the Program Secretarial Officers concerning review of the cost, schedule and technical status. The cognizant Program Secretarial Officers will be provided the opportunity to discuss the independent review at the ESAAB meeting.

c. Events Which Will “Trigger" Independent Reviews. In addition to the normal review of the project at the key decision points, certain events could “trigger” an independent review. Examples of such events are:

(1) Significant program redirection.

(2) Technical problems such as original technical goals or criteria not achievable.

(3) Basic assumptions on which the project was based have changed.

(4) Advent of a better technology significantly impacting the project’s mission.

(5) Changed external conditions, markets, economics, etc.

(6) Significant funding constraints.

(7) Lessons learned from other similar projects.

(8) Recommendations from scientific advisor.

(9) Requested by the Acquisition Executive.

(10) Regulatory redirection when obtaining permits.

GUIDELINES FOR PREPARATION FOR ESAAB MEETINGS

1. GENERAL. These guidelines have been prepared to aid program and project managers in their preparation of presentation materials for ESAAB meetings. Attached is a set of sample charts. They may be augmented by such additional charts that the managers feel are needed to illustrate project systems, problems, issues, or other pertinent factors. Presentation materials should be minimized to the extent practical.

2. COMPOSITION. Each presentation will be organized as followings:

   a. Introduction and purpose of meeting;

   b. Description of project;

   c. Background;

   d. Objectives and baseline;

   e. Organization;

   f. Readiness to proceed;

   g. Problems/issues/items of concern; and

   h. Summary of key points and next steps.

3. CHARTS. The discussion that follows describes the information to be included on the viewgraph charts. All charts shall use standard DOE notation, as applicable.

   a. Chart 1, Title Page. Indicate the official name of the project, the name of the acquisition proponent, and the name of the presenters. State the ESAAB decision that will be requested at the meeting.

   b. Chart 2, Project Technical Process. Show a recent photograph or artist's conception of the project. Use a technical process flow chart or similar graphic to summarize how the facility or machine is expected to function. A history of project related events and a detailed technical description should be avoided due to time constraints. The ESAAB members and advisors should be briefed by their respective staffs or may request a briefing by the Office of Program/Project Management and Control.

   c. Chart 3, Program/Project Objectives and Technical Baseline. State the key program and project objectives. The relationship between the program and project objectives should be clear. Show the basic technical baseline requirements for the project.

d. Chart 4, Baseline Project Summary Schedule - All Years. To provide an overview of project activity, display the baseline schedule for the life of the project. Include all Acquisition Executive decision points, other critical decisions and events, major milestones including ES&H milestones that may impact the project's critical path, and critical path for project implementation.

e. Chart 5, Baseline Resource Plan.

(1) This chart shall show the funding authority available and anticipated. Show both cumulative obligations and costs planned by fiscal year over the life of the project. Actual costs and obligations shall be shown against these plans. All costs and obligations shall be denoted in current-year dollars for the year of expenditure.

(2) This chart shall address the total project cost and identify the industry share, if appropriate. It shall also target the total estimated cost for design and construction.

f. Chart 6, Project Organization. Show the participating organizations and their responsibilities in the form of an organization chart. This is the opportunity to depict the manner in which the project is being managed. Laboratory/contractor/partner responsibilities should be included. Also show, in a separate box, a summary of the DOE staffing, both on-board and planned.

g. Chart 7, Readiness to Proceed. In a very brief, bullet style manner, summarize progress, accomplishments and performance to date. Include the most significant rationale for readiness to proceed and separately list the subjects of any substantive problems, issues, and/or items of concern that will be shown on the subsequent charts.

h. Chart 8, Problems/Issues/Items of Concern. Succinctly state the problem, issue, or item of concern, list the corrective actions taken to date, the additional corrective actions required (with dates), and an assessment of the impact on the project. Prepare a separate chart for each topic to be discussed in this section. Supplement each of these charts, as necessary, with whatever illustrative material is apprormiate to present the problem, issue, or item of concern in a fully informative manner.

i. Chart 9, Summary of Key Points and Next Steps. This chart highlights the key points from the presentation, restates the decision requested, and identifies the next actions planned following the requested decision by the Acquisition Executive.

Chart 1

U.S. Department of Energy
Energy System Acquisition Advisory Board

Project ABC

Acquisition Proponent: John D. Smith, Assistant Secretary, for Nuclear Energy

ESAAB Decision Requested:

- Authority to Initiate Construction

Presented by:

Donald D. Doe
Project Manager
Richland Operations Office

May 12, 1984

Chart 2

U.S. Department of Energy
Energy System Acquisition Advisory Board

Fuels and Materials Examination Facility

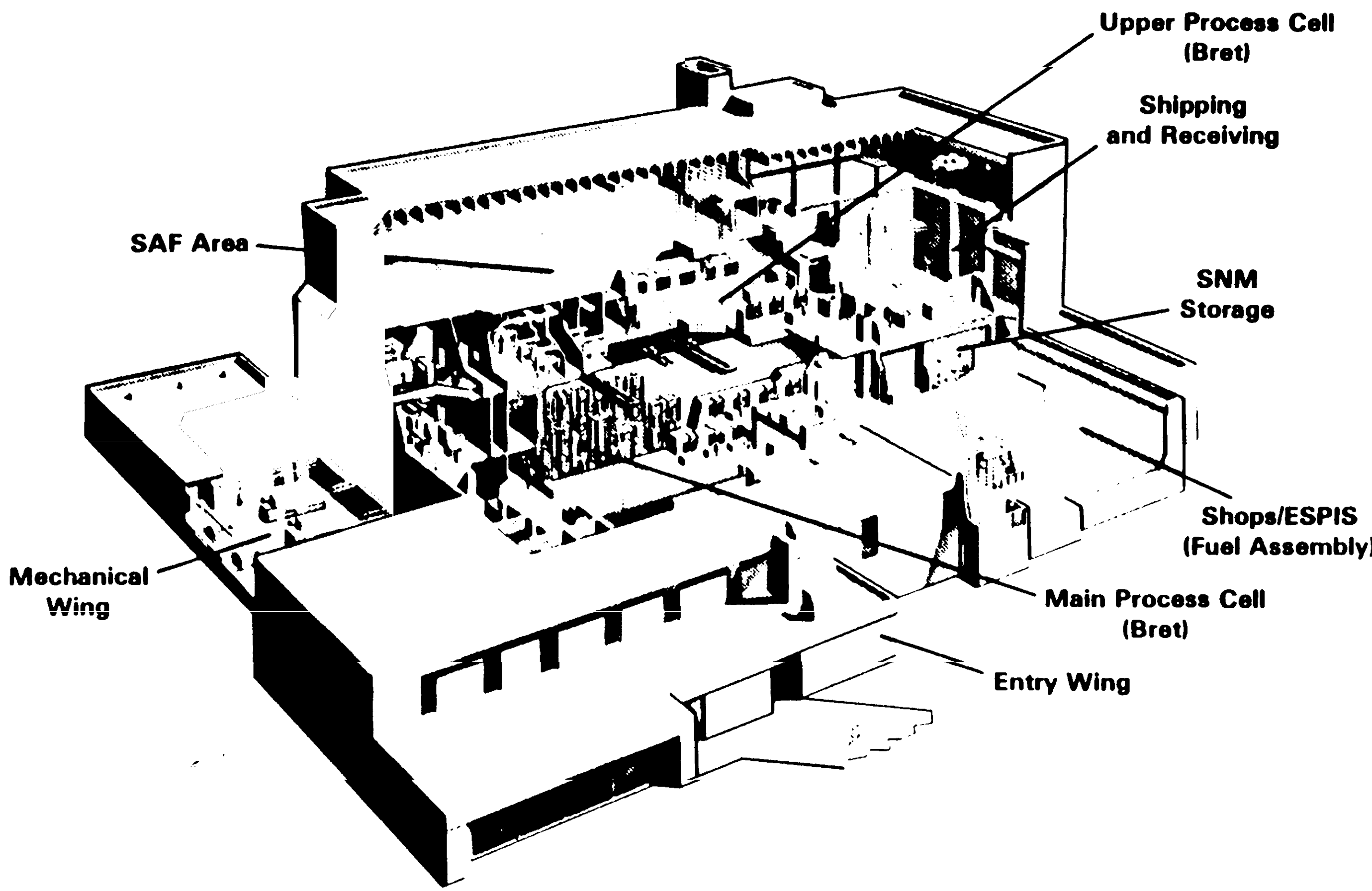


Chart 3

U.S. Department of Energy
Energy System Acquisition Advisory Board

Program/Project Objectives and Technical Baseline

EXAMPLE

Program objective:

- To develop and demonstrate inertial fusion technology for:
  - National Se...
  - National E...

Project objective:

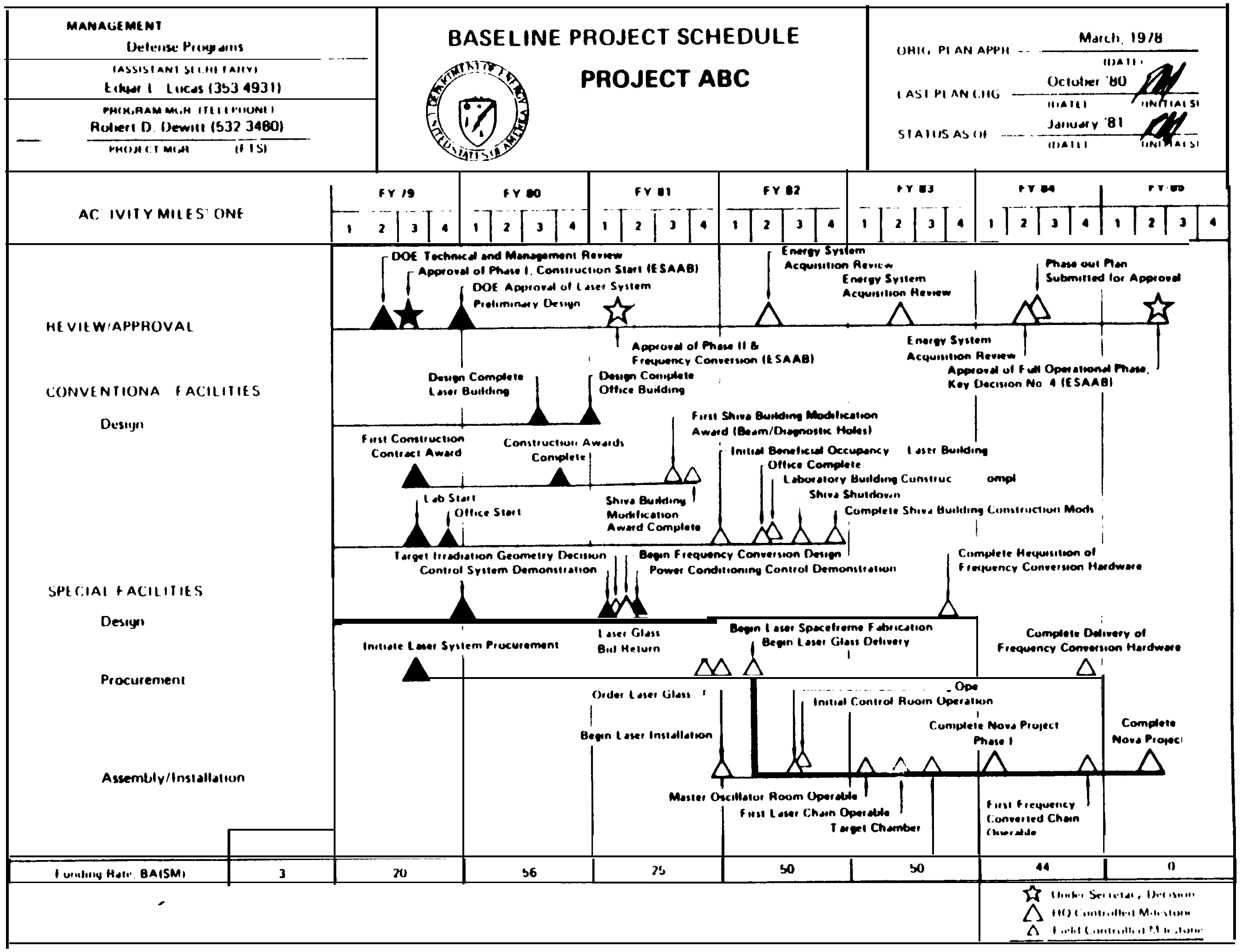
- To provide:
  - A major nuclear weapon phys... ...y
  - Fuel ignition as the next step toward ... the scientific feasibility of inertial fusion as an inexhaustible e... ...e

    Data on target performance vs wavelength to supp... ...nced Lasers Program

Technical baseline requirements/design criteria:

Major NOVA parameters	Phase I	Full NOVA
Energy on target, KJ at 3 ns and 1 μm	80-120 (initial)	200-300
Wavelength, μm	1.052	1.052, 0.525, 0.35
No. of beams	10	20
Lab bldg. sq ft	115,000	115,000
Office bldg. sq ft	56,000	59,000

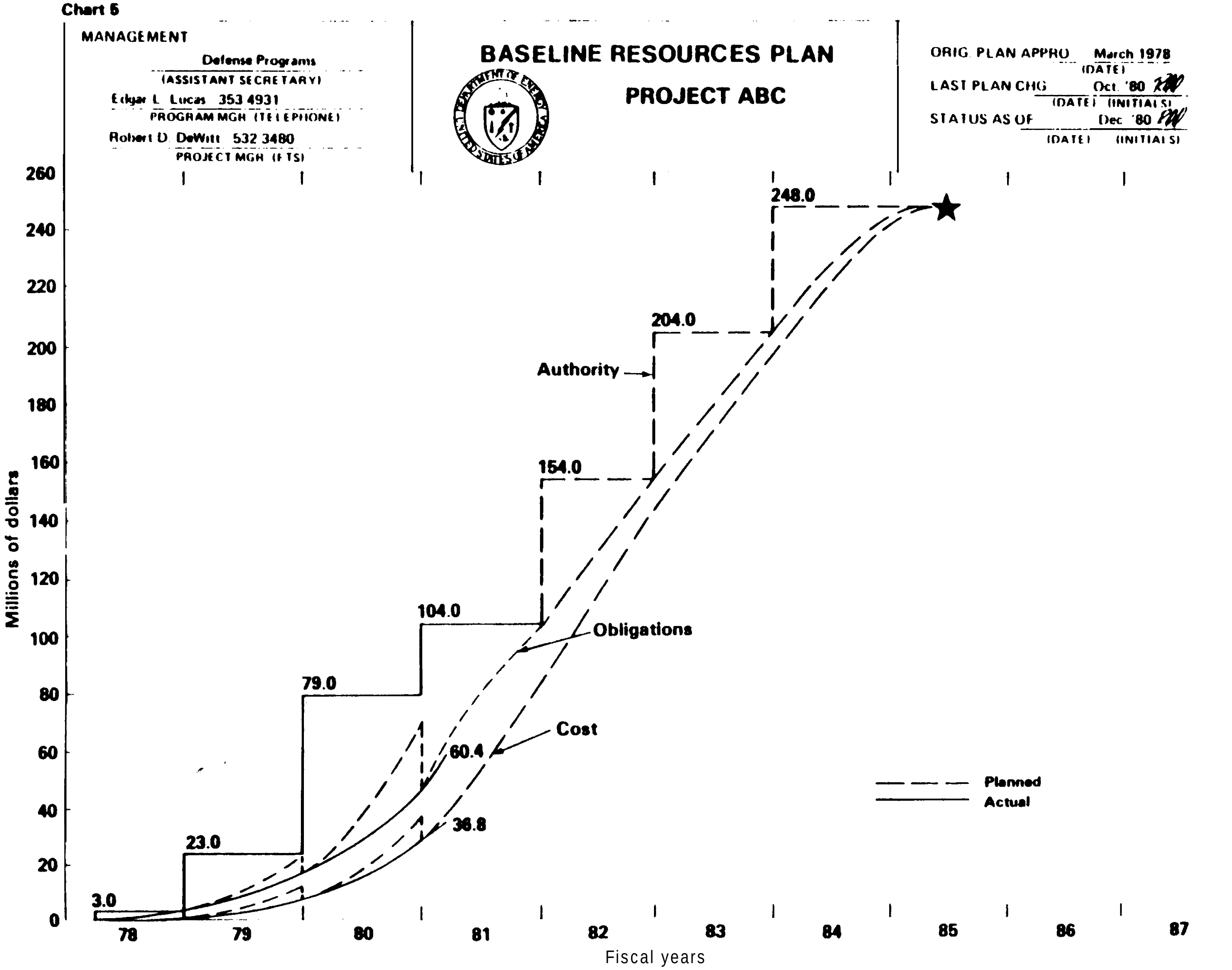
Chart 4



EXAMPLE

EXAMPLE

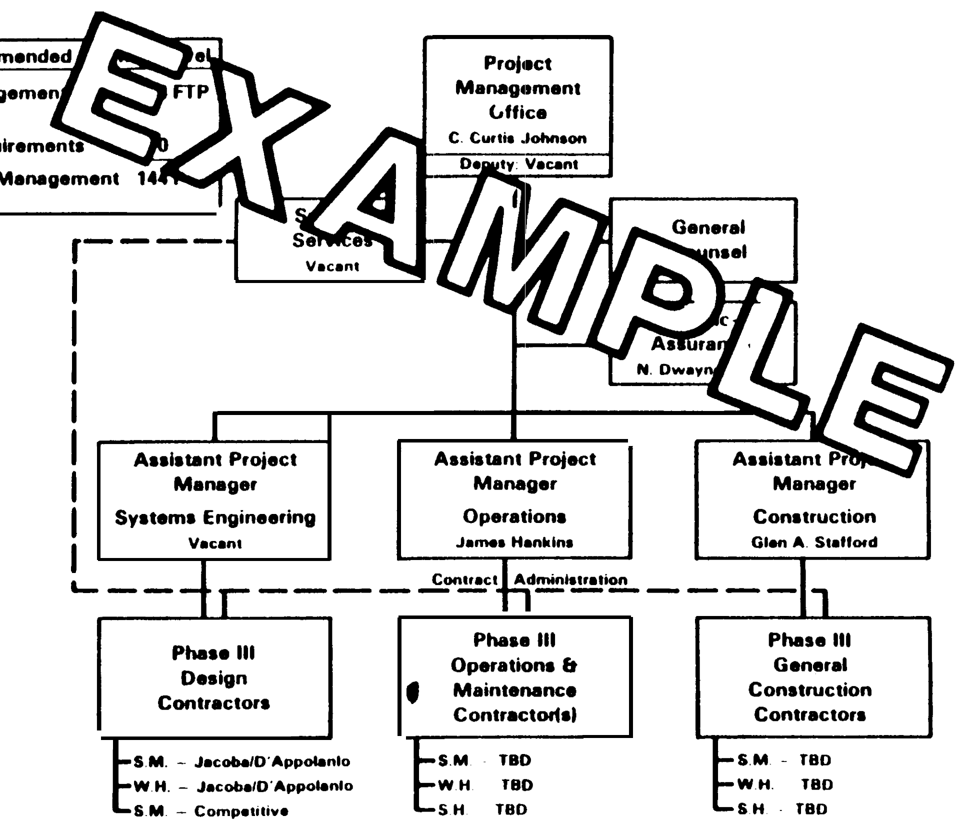
Chart 6



EXAMPLE

ment of Energy
tem Acquisition Advisory Board

Project Management Office Organizatior
Major Relationships



Project ABC

chart 7

- Project Status:

- **Readiness to Proceed:**

- **Problems/Issues/Items of Concern:**

Chart 8

Project ABC

Problem: Schedule Delay – Weather

Description:

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Corrective Actions to Date:

•

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Corrective Actions Required:

•

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Impact/Prognosis:

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•

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Chart 9

Project ABC

- **Summary of Key Points:**

- **ESAAB Decision Requested:**

- **Next Steps Following Decision Requested:**

MAJOR SYSTEM ACQUISITION PROCEDURES .

1. PURPOSE. To describe how the Department carries out a major system acquisition. The acquisition process is accomplished by the following steps (see Figure I-8, page I-61).

   a. Evaluation of Mission Needs.

      (1) Program Secretarial Officers conduct mission analysis to identify mission needs and any alternative energy system options and design concepts which are based on national planning documents, strategy papers, or other energy policy and program-related data. A mission need may result from a deficiency in existing capabilities or the decision to establish new capabilities in response to a feasible technological opportunity. Mission needs are independent of any particular system or technological solution.

      (2) Where more than one Departmental Element is involved, roles and responsibilities of each component will be assigned by the Acquisition Executive. Two or more organizational elements may be permitted to sponsor alternative energy system options and design concepts in order to foster innovation and competition.

      (3) When required to satisfy mission responsibilities, contributions will be made to the technology base by the conduct, support, or sponsorship of research; system design concept studies; proof of concept work; exploratory subsystem development; and tests and evaluations.

   b. Exploration of Alternative Systems.

      (1) Intended benefits to be derived from major system acquisitions shall be optimized by competitive exploration of alternative system design concepts and tradeoffs of capability, schedule, and cost. Care should be exercised during the initial steps of the acquisition process not to conform mission needs or project goals to any known systems or products that might foreclose consideration of alternatives.

      (2) Alternative system design concepts will be solicited from a broad base of qualified firms through the competitive procurement process. In order to achieve the most preferred system solution, emphasis will be placed on innovation and competition. To this end, participation of smaller and newer businesses should be encouraged. Concepts will be solicited primarily from private industry, and, when beneficial to the Government, foreign technology and equipment may be considered.

(3) Requests for alternative system design concept proposals will explain the mission need, schedule, cost, capability goals, and operating constraints. Each offeror will be free to propose his or her own technical approach, cost and capability goals. In the conceptual and early development stages, contractors shall not be restricted specifically by detailed Government specifications and standards.

(4) Federal laboratories, federally funded research and development centers, educational institutions, and other not-for-profit organizations shall also be considered as potential sources for competitive system design concepts. Ideas, concepts, or technology developed by Government laboratories or at Government expense may be made available to private industry through the procurement process or through other established procedures. Industry proposals may be submitted on the basis of these ideas, concepts, and technology, or on the basis of feasible alternatives which the proposer considers superior.

(5) Research and development efforts shall emphasize early competitive exploration of alternatives as relatively inexpensive insurance against the premature or preordained choice of a system that may prove to be either more costly or less effective.

(6) During the period of identifying and exploring alternative system design concepts, contracts covering relatively short time periods at planned dollar levels will be used. Parallel short-term contracts are awarded for those concepts selected for further exploration to expand on the concepts and reduce technical uncertainties in each system. Timely technical reviews of alternative system design concepts will be made to effect the orderly elimination of the least attractive concepts.

(7) When the system is being developed for Departmental use, contractors shall be provided with operational test conditions, mission performance criteria, and life cycle cost factors that will be used in the evaluation and selection of the system(s) for full-scale development and production. In addition, relevant operational and support experience will be provided to assist participating contractors in developing performance and other requirements for each alternative system design concept as test and tradeoffs are made.

(8) Development of subsystems that are intended to be included in a major system acquisition shall be restricted to less than fully designed hardware (full-scale development) until the subsystem is identified as part of a system candidate for full-scale development. Exceptions may be authorized by the Acquisition Executive if the subsystems are long lead time items that fill a recognized generic need, or if they have a high potential for common use among several existing or future systems.

(9) Selections from competing system design concept proposal shall be based on a review by a team of experts, preferably from both inside and outside the responsible development organization.

c. Title II or Detailed Design.

(1) Advancement to a competitive test/demonstration phase may be approved by the Acquisition Executive when DOE's mission needs, program objectives, and project goals are reaffirmed, and when alternative system design concepts are selected.

(2) Development of a single system design concept that has not been competitively selected should be considered only if justified by urgency of need or by the physical and financial impracticability of demonstrating alternatives. Proceeding with the development of a noncompetitive (single concept) system may be authorized by the Acquisition Executive. Strong DOE project management and technical direction should be used for these systems.

(3) Major system acquisitions will be structured and resources planned to demonstrate and evaluate competing alternative system design concepts that have been selected. Exceptions may be authorized by the Acquisition Executive if demonstration is not feasible.

d. Full-Scale Demonstration, Development or Construction.

(1) Full-scale demonstration or development, including limited production, may be approved by the Acquisition Executive when DOE's mission need, program objectives, and project goals are reaffirmed, and competitive demonstration results verify that the chosen system design concept(s) is sound.

(2) Selection of a system(s) and contractor(s) for full-scale demonstration/development and production/operation shall be made on the basis of:

(a) System performance measured against current DOE mission need, program objectives, and project goals;

(b) An evaluation of estimated acquisition and ownership costs; and

(c) The factors as contractors is demonstrated management, financial, and technical capabilities to meet project objectives.

(3) The project manager will monitor system tests and contractor progress in fulfilling system performance, cost, and schedule commitments. Significant actual or forecast variances shall be brought to the attention of the contractor for corrective action.

e. Production or Operation. Full production/operation may be approved when the Department's mission need, program objective, and project goals are reaffirmed, and when system performance has been satisfactorily tested, independent of user organizations, and evaluated in an environment that assures achievement of objectives under expected operational conditions.

CHAPTER II

STRATEGIC PLANNING, PROJECT PLANNING AND BUDGETING

PART A - PROJECT INITIATION AND PLANNING DOCUMENTATION

1. INTRODUCTION. This chapter discusses both strategic planning and project planning and budgeting. The terms "strategic planning" and "project planning" may be most easily differentiated by discussing who has responsibility and accountability for each and at what point in time a departure is made from one to the other for a specific program or project.

2. STRATEGIC PLANNING. The Department is committed to the preparation of strategic plans and annual updating of these plans to maintain them current. This strategic planning will assure that energy, health, safety, environment, technology, and economics are molded into a mutually supportive framework. The plans will provide the capability for integrating horizontally across the entire range of DOE programs to bring plans and programs into line with near (1 to 5 years), mid (5 to 10 years), and long-term (15 to 20 years or longer) objectives of the Department.

    a. Responsibilities. Program Secretarial Officers shall be responsible and accountable to the Secretary for the preparation and annual updating of Department strategic plans, Multi-Year Program Plans, and Crosscut Plans for which they have been assigned responsibility.

    b. Annual Cycle. Each annual strategic planning cycle is focused on the fiscal year, 3 years beyond the start of the planning cycle (the budget cycle is 1 year forward from issuance of OMB guidance). The strategic planning annual cycle is depicted in Figure II-1.

    c. Guidance. Guidance on strategic planning is available from the Office of Domestic and International Energy Policy.

3. PROJECT PLANNING DOCUMENTATION. Project planning documentation is necessary to establish approved project scope and technical performance requirements, schedules, resource plans, levels of responsibility and authority, organizational interfaces, implementation plans, and accountability. The documentation is needed to assure the execution of the project within the approved technical, cost, and schedule baselines. The key documents required by the Project Management System (PMS) are shown below and in Figure II-2. Detailed outlines and approvals for project planning documentation for Major System Acquisitions (MSA) and major projects are included in Attachments II-1 through II-6. Planning documentation of other projects should be similar in coverage and quality, although reduced in quantity to reflect the magnitude of the project and field organization Procedures.

	ACTIVITY	TIMING
1.	Secretarial Policies and Strategies	On Going
2.	Secretarial Planning Guidance Issued	Annually in August
3.	Strategic Plans by Program Secretarial Officers	Completed Annually by mid-September
4.	Review and Approval of Strategic Plans by the Secretary	Annually in September/October
5.	Multi-Year Program Plans	Completed Annually by mid-December
6.	Program Guidance to Field	Annually in late December
7.	Identification of Planning Issues	Annually in January/February
8.	Secretarial Decisions and IRB Guidance	Annually in March/April
9.	Crosscut Plans	Completed Annually by mid-July

Figure II-1
Chronology of Events in the Annual Strategic Planning Cycle

Vertical line denotes change

	JUSTIFICATION OF MISSION NEED	PROJECT PLAN (INCLUDING CHARTER)	PROJECT MANAGEMENT PLAN
MAJOR SYSTEM ACQUISITION	REWIRED PER ATTACHMENT II-1	REWIRED PER ATTACHMENT II-2	REQUIRED PER ATTACHMENT II-4
MAJOR PROJECT	REQUIRED PER ATTACHMENT II-1	REQUIRED PER ATTACHMENT II-2	REQUIRED PER ATTACHMENT II-4
OTHER PROJECTS $15-50 MILLION TOTAL PROJECT COST (TPC)	APPROVED DATA SHEET OR WPAS1/	RECOMMENDED PER ATTACHMENT II-2	REQUIRED PER ATTACHMENT II-5
OTHER PROJECTS $5-15 MILLION TPC	APPROVED DATA SHEET OR WPAS	RECOMMENDED PER ATTACHMENT II-2	REQUIRED PER ATTACHMENT II-5
OTHER PROJECTS UNDER $5 MILLION	APPROVED DATA SHEET OR WPAS	APPROVED DATA SHEET OR WPAS	REQUIRED PER ATTACHMENT II-5
GENERAL PLANT PROJECTS	GROUPED ON SINGLE DATA SHEET	GROUPED ON SINGLE DATA SHEET	OPTIONAL GENERIC ONLY

1/ FIELD WORK PACKAGE PROPOSAL AND AUTHORIZATION SYSTEM

1-000-7460/1

Figure II-2
Project Management System Documentation

a. Justification of Mission Need. A Justification of Mission Need must be submitted for Acquisition Executive approval at Key Decision O, for projects anticipated to be designated as MSAs, and to the cognizant Program Secretarial officer for approval on major projects. The Justification of Mission Need and the Short Form Project-Data Sheet must be approved prior to starting conceptual design. Other projects are justified and approved on the basis of a project data sheet. The cognizant Program Secretarial Officer may require a Justification of Mission Need for significant other projects (e.g., $15-$50 million). For projects currently well beyond Key Decision O, a Justification of Mission Need is not required.

Attachment II-1 details the contents and procedures for developing the Justification of Mission Need. A copy of the approved Justification of Mission Need shall be attached to the Key Decision O Decision Memorandum of Record and shall be reviewed at each ESAAB meeting.

b. Project Plan. The project plan, which includes the project charter, is a summary of the dimensions of the project to be executed, including objective, schedule, resources, priority, controlled milestones, and environmental requirements. For MSAs, the project plan is a contract between Headquarters and the project office for execution. For major projects, the project plan is an agreement between the program office and project office for execution with the project office reporting directly to the cognizant program office. The project plan documents the initial cost, schedule and technical project baselines defined in the CDR, and is updated, as required, throughout the life of the project to ensure current project baselines. It is prepared as required documentation to obtain approval to include the project in the congressional. budget and for Key Decision 1, Approval of New Start. The project plan is an evolving document which covers the project from its initiation through its completion. Guidelines for preparing project plans are contained in Attachment II-2.

(1) Major System Acquisitions and Major Project Approval. Project plans require approval by the Acquisition Executive for MSAs and major projects. (The cognizant Program Secretarial Officer serves as the Acquisition Executive for major projects.) The plan identifies Acquisition Executive and Program Level decision points and other milestones, as appropriate. Changes to this document are permitted only in accordance with formal change control procedures.

(2) Other Project Approval. There is no requirement for a Headquarters approved project plan for other projects. However, the Program Secretarial Officer may require such a plan where significant resources are involved. Where there is not a requirement, the circumstances do not obviate the need for such a plan. For other projects, the project data sheet has many of the

ingredients of a project plan and may serve that purpose with minor additional information. Field organizations should establish their own procedures for project plan content and approval.

(3) Standard Baselines Formats. Attachment II-2 provides requirements and guidance for preparation of technical, schedule and cost baselines in project plans.

(4) Changes to the Project Plan. Because the project plan reflects Acquisition Executive approval, it is essential that the plan be maintained current. Attachment II-3 provides project plan change control requirements and guidelines.

c. Project Management Plan. The Project Management Plan (PMP) is the document which sets forth the plans, organization, and systems that shall be utilized by those responsible for managing the project. The PMP is developed by the project manager and concurred with by the Program Secretarial Officer and approved by the Head of the Field Element. Guidance for preparation of a PMP is provided in Attachment II-4.

PART B - WORK BREAKDOWN STRUCTURE

1. INTRODUCTION.

a. Much of the planning, execution, and control of DOE projects revolves around the work breakdown structure (WBS). DOE/MA-0040, of October 1981, provides detailed guidance on WBS implementation. The WBS is a graphic representation that completely defines the project by relating elements of work to each other and to the end product. It is the prime tool which DOE uses in performance of its project responsibilities. A complete guide to the development and use of the WBS is contained in DOE/MA-0040. Figure II-3 illustrates a typical WBS. The individual products specified in the WBS are termed "elements." Each element is a discrete portion of the WBS, comprising either an item of hardware, service, or data. Descending levels provide increasingly detailed definition of the end objective. The number of levels depends on the scope and complexity of the individual project and the degree of control it warrants. The top three levels of the WBS for a project are typically subdivided as below. These three levels are frequently called a summary WBS, or a Project Summary WBS (PSMBs).

(1) Level one contains only the project end objective. The product at this level shall be identifiable directly to elements of the DOE Budget and Reporting Classification Structure.

(2) Level two contains the major product segments or subsections of the end objective. Major segments are often defined by location or by purpose served.

(3) Level three contains definable components, or subsets, of the level-two major segments.

b. WBS Dictionary. The WBS Dictionary lists and defines the WBS elements. It is prepared initially by the DOE project manager and then expanded by supporting contractors. It consists of two parts: Part I is an index which lists WBS elements extended in accordance with the guidance contained herein, and Part II contains individual entries to describe each WBS element and the effort associated with it. The WBS Dictionary shall be revised to reflect changes and shall be maintained in a current status throughout the life of the project.

2. PREPARATION OF A WORK BREAKDOWN STRUCTURE. The project manager is responsible for preparation of the project WBS. This WBS in summary form is then included in the solicitation documents for contractor information. Contractors, in turn develop a contract WBS to conform to their support of the project. This flow of activity is illustrated in Figure II-4.

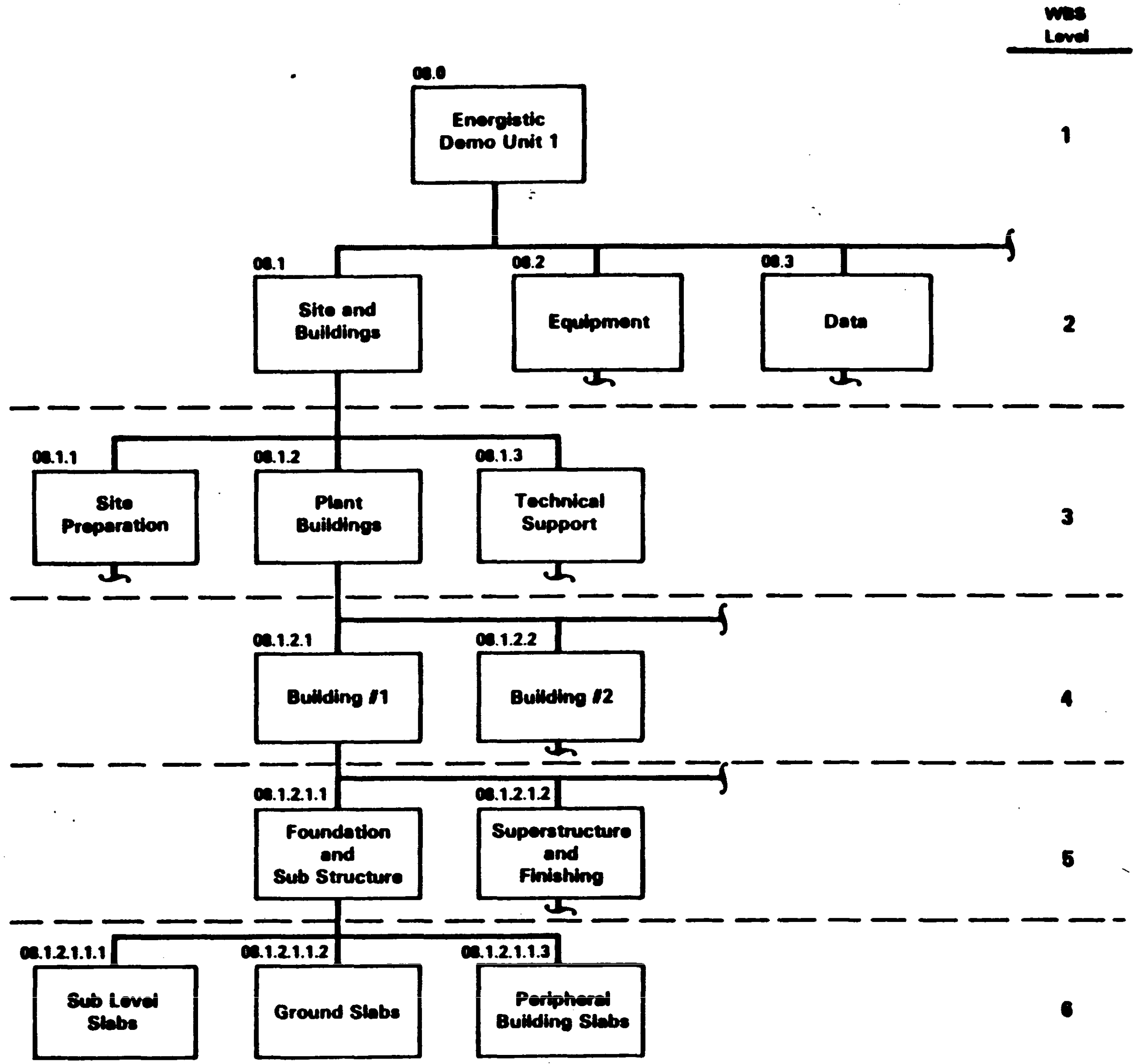


Figure II-3
Typical Work Breakdown Structure

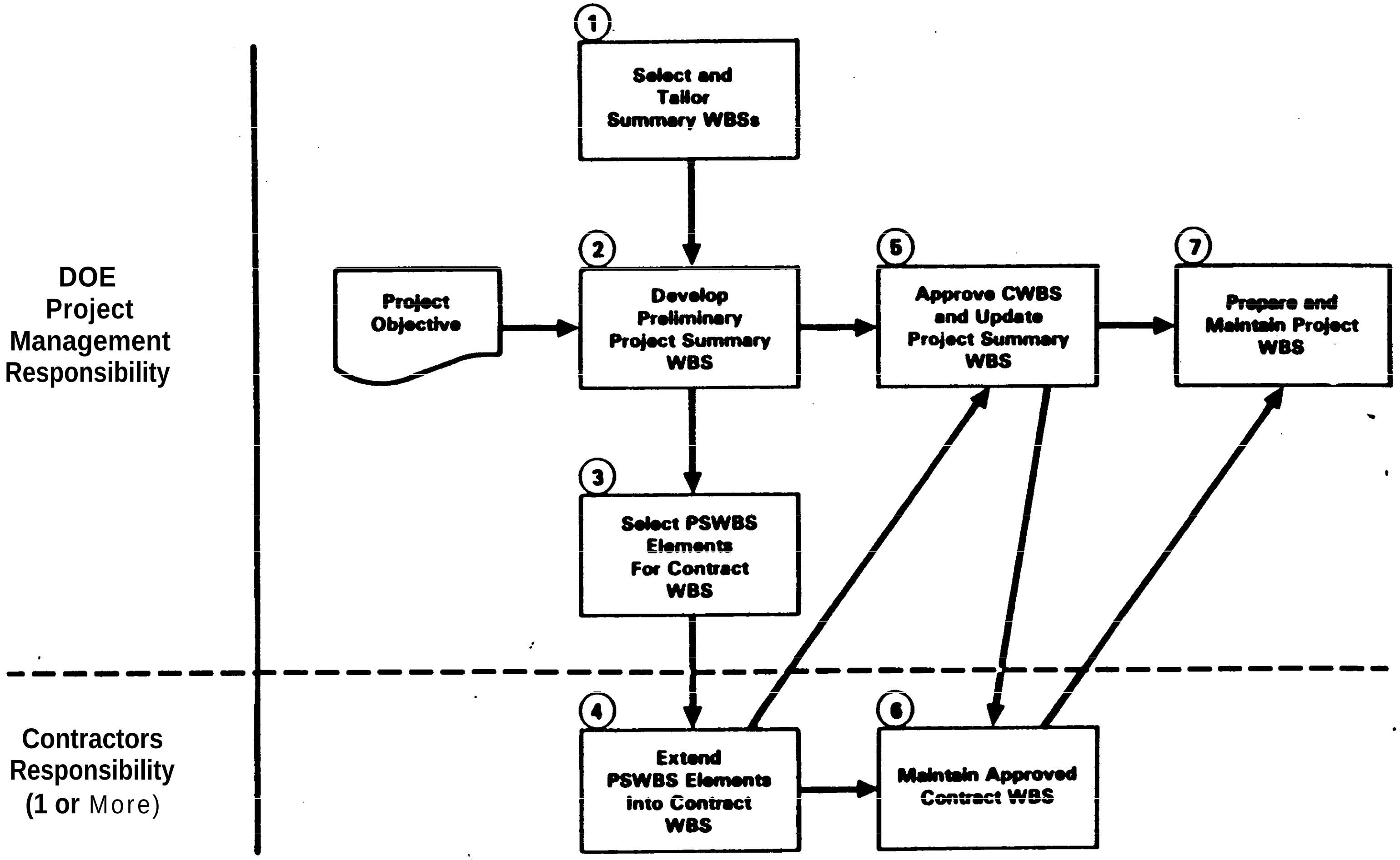


Figure II-4
Evolution of the Project Work Breakdown Structure

3. USES OF THE WORK BREAKDOWN STRUCTURE. A WBS shows the relationship of all elements supporting the project and provides a sound basis for technical cost and schedule control. Each level of the structure is closely related to a management sphere within the project, providing the framework for relating time and cost summaries to appropriate levels of contractor and DOE managers. A WBS provides both a basis and an integrating mechanism, for managing key functions of the project. Use of the WBS to support management control is described below:

   a. Planning and Budgeting. The WBS technique provides a formal structure which identifies all the products and relates all the work effort required to meet the project objective. By breaking the total product and effort into successively smaller entities, DOE can ensure that all required products are identified to the WBS (and hence, charged to the effort) and actually contribute to the work objective. Figure II-5 illustrates the relationships among work, schedule, and budget integration.

   b. Funding. The information derived from WBS performance reporting and projections can assist in establishing, justifying, and allocating project funds for the next and future fiscal years. Since the work and cost content, management priority, and status of each WBS element are defined, a baseline exists for planning, controlling, and accounting for project funds.

   c. Cost Estimating. The WBS technique provides a systematic approach to cost estimating that ensures relevant costs are not omitted. An estimate derived by WBS elements helps the Departmental project manager to monitor, coordinate, and control the various project activities that DOE and the contractors are conducting.

   d. Scheduling. The WBS provides a framework for collecting schedule information by WBS elements to establish overall and detailed schedules. The impact of schedule changes may be readily assessed when a WBS is used because each element's start and completion date is integrated with the other elements' schedules. This allows expedited review and approval by the Department of contractor proposed schedule changes.

   e. Performance Measurement. The WBS technique accomplishes the objective of work definition and provides the basis for performance measurement with a product orientation. It also facilitates work measurement at levels which meet specific management needs.

   f. Configuration Management. Configuration management is the task of managing, controlling, and reporting the planned and actual design of the physical characteristics of items throughout their intended life. The WBS may be extended sufficiently to identify elements selected for this purpose. It is not necessary that the WBS level identified for project control purposes (e.g., contract reporting) be the same as that used for configuration management.

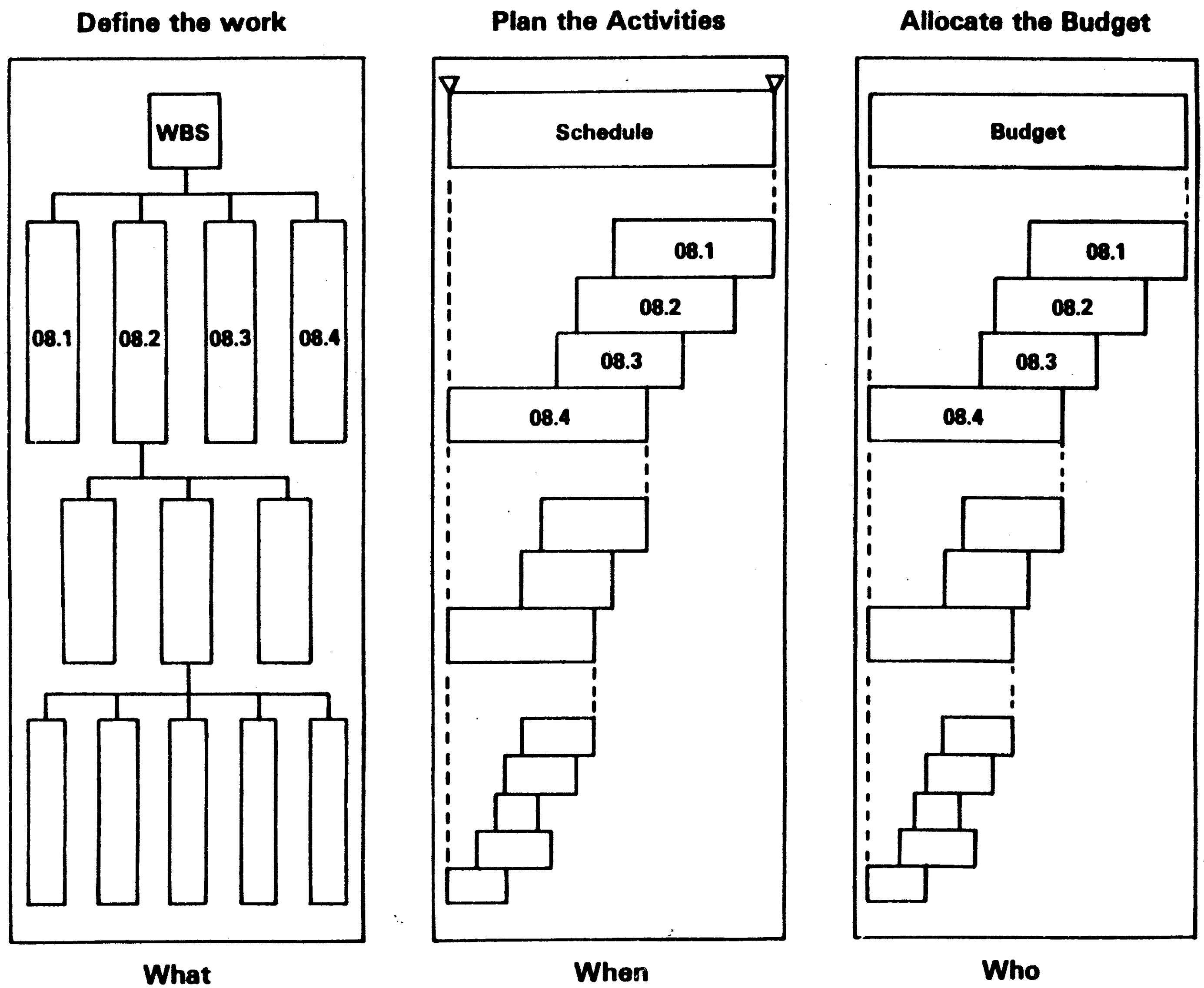


Figure II-5
Work—Schedule—Budget Integration

g. Integrated Logistic Support. Integrated logistic support is a composite of all support elements necessary to assure the effective and economical support of a system for its life cycle. These elements include logistical support activities such as the maintenance plan, facilities, support and test equipment, spares and repair parts, transportation and handling, technical data, and training. The WBS logistic elements should provide the capabilities to support the prime system and its components. The elements shall reflect the lead time planning needs of the site or test facility.

h. Test and Evaluation. A WBS may provide specifically for testing systems, subsystems, and components. A test and evaluation element shall be used to obtain or validate test performance data. This element shall cover the detailed planning, conduct, support, data reduction, and reports from the testing. Since testing requires the participation of organizational elements responsible for accomplishing development, reliability, and qualification tests, appropriate supporting elements need to be included.

i. Systems Engineering. The WBS may be used initially to lay out system functions in the systems engineering discipline. Following design and the development of a specification tree, the WBS shall be revised to reflect the end product. Throughout systems engineering, the WBS shall be updated to reflect current status of the end product.

PART C - PROJECT BUDGET PROCESS

1. INTRODUCTION. Providing adequate resources to develop, acquire, and operate a project is first a design constraint and secondly a determination of the Department's planning and budgeting process. The budget decisions shall be consistent with project baselines decisions derived requirements contained in the project management system. Figure II-6 displays the chronology of events leading to appropriation of funds.

2. PROCEDURES. Integration of decisions concerning project resource availability in the planning and budgeting process involves the following procedures:

   a. Field Budget Call. A field budget call shall be issued by the Chief Financial Officer in mid-to-late January incorporating any budget planning decisions that have been made by the Secretariat. Prior to including a project in the budget, a conceptual design shall be completed in accordance with Attachment V-8. Also, any planned conceptual designs which are expected to exceed $1 million shall be completed and submitted to Headquarters in accordance with Attachments V-9 and V-10. Project Data Sheets shall be developed and submitted for new project efforts and ongoing project efforts which require additional funding. This documentation, and the conceptual design report shall be used to validate the project and to defend the project in the internal review budget.

   b. Project Validation. Shortly after the field call is issued, the Office of Program/Project Management shall issue procedures and a checklist to be used with the information received in the field budget submission to conduct project validations. In April and May, the Office of Program/Project Management, in coordination with the program offices, shall assess new projects over $5 million and ongoing projects requesting additional funding. The validation process evaluates the projects for readiness to proceed into the Department's budget process and examines the planning, development, and baseline of a project to ensure that the funds requested are commensurate with the project's anticipated scope and schedule. Normally, the project must be validated prior to inclusion in the internal review budget.

   c. Internal Review, Office of Management and Budget, and Congressional Budgets. These reviews and budgets are described in detail in DOE 5100.3. Project documentation shall be updated according to decisions made in each review. The Conceptual Design Report, Justification for Mission Need, and Project Data Sheet are the mainline documents used to defend the project within the Department. Outside DOE (i.e., OMB and Congress) only the Project Data Sheet is used. Therefore, it is vital that the document be accurate and up-to-date for each review. Detailed instructions for preparing the data sheets are contained in DOE 5100.3.

3. FIELD WORK PACKAGE PROPOSAL AND AUTHORIZATION SYSTEM.

a. Specific DOE contractors, primarily management and operations contractors, process their budget submissions through the use of the Field Work Package Proposal and Authorization System (WPAS). This system establishes a formal procedure for budget development, authorization, and monitoring for those contractor so specified.

b. The major emphasis of WPAS is to group associated R&D tasks and activities into work packages for the purpose of DOE approval and control. A work package might include several project related efforts grouped by objectives and technical discipline. Each work package shall be measurable in terms of performance and include sufficient specifications of verifiable events or deliverables to mark project achievement. Complete coverage of WPAS will be found in DOE 5700.7A.

TARGET DATE	EVENT
October	1. DOE closes out PY 2. Congress appropriates funds for CY
November-December	1. OMB approves President's Budget for BY and provides guidance for BY +1, 2, 3, 4.
January	1. President's Budget for BY is sent to Congress 2. Chief Financial Officer issues field budget call for BY +1
February - May	1. Congress conducts hearings on BY
February - April	1. Field offices complete call and return to program offices, Chief Financial Officer, and Office of Program/Project Management
April - May	1. Chief Financial Officer issues internal review budget call for BY +1 2. Program offices and the Office of Program/Project Management conduct project validations for BY +1
July - August	1. Secretary conducts-internal review for BY +1
August - September	1. Department prepares OMB Budget for BY +1

LEGEND

PY	=	Prior Year
CY	=	Current Year
BY	=	Budget Year
BY=1,2,3,4	=	Outyears
BY+l	=	Planning

Figure II-6
Chronology of Events to Appropriation of Funds

Vertical line denotes change

PART D - COST ESTIMATING AND CONTINGENCY ESTIMATING

1. INTRODUCTION.

a. Cost estimating is the process of projecting financial requirements to accomplish a specified objective. Although the primary tasks involved can best be described and understood if they are discussed separately and sequentially, in actual practice they are closely related and often carried out concurrently. The primary cost estimating tasks are:

(1) Defining and planning the estimating task.

(2) Selecting the estimating structure for preparing cost data.

(3) Collecting, evaluating, and applying the necessary cost and cost related data.

(4) Applying the proper estimating methods.

(5) Documenting the estimate in enough detail, so that it can be reviewed, evaluated, and used in the decision making process.

b. When the estimate is completed, uncertainties, limiting assumptions, and constraints identified by the estimator must be understandable. Changes in ground rules, schedules, quantities, system description, and operational concepts can significantly affect cost. Using an estimate without regard to such system changes would be a misapplication of the estimate.

2. METHODS OF ESTIMATING. There are various methods of preparing cost estimates. The six most frequently used methods are listed below:

a. Bottom-Up Technique. Generally, a work statement and set of drawings or specifications are used to “take off” material quantities required to perform each discrete task performed in accomplishing a given operation of producing an equipment component. From these quantities, direct labor, equipment, and overhead costs are derived and added thereto.

b. Specific Analogy Technique. Specific analogies depend upon the known cost of an item used in prior systems as the basis for the cost of a similar item in a new system. Adjustments are made to known costs to account for differences in relative complexities of performance, design, and operational characteristics.

c. Parametric Technique. Parametric estimating requires historical data bases on similar systems or subsystems. Statistical analysis is performed on the data to find correlations between cost drivers and other system parameters, such as design or performance parameters. The analysis produces cost equations or cost estimating relationships which can be used individually or grouped into more complex models.

d. Cost Review and Update Technique. An estimate is constructed by examining previous estimates of the same project for internal logic, completeness of scope assumptions and estimating methodology. The estimates are then updated to reflect the cost impact of new conditions or estimating approaches.

e. Trend Analysis Technique. A contractor efficiency index is derived by comparing originally projected contract costs against actual costs on work performed to date. The index is used to adjust the cost estimate of work not yet completed.

f. Expert Opinion Technique. May be used when other techniques or data are not available. Several specialists can be consulted reiteratively until a consensus cost estimate is established.

3. TYPES OF COST ESTIMATES.

a. There are seven types of cost estimates recognized by DOE in the project management system. They include:

(1) Planning/feasibility study cost estimate;

(2) Budget/conceptual cost estimate;

(3) Title I design cost estimate;

(4) Title II design cost estimate;

(5) Government cost estimate;

(6) Current working cost estimate; and

(7) Independent cost estimate.

b. Identification of a cost estimate by type connotes a certain level of accuracy and confidence in it. Further information can be found in DOE Cost Guide DOE/MA-0063 Vol. 6.

c. Estimates for Small Project Efforts. The preparation of Government estimates in connection with work estimated to cost less than $10,000 is optional with the field office manager. Where the field office manager elects to use a contractor's estimate, bid, or proposal instead of a Government estimate, the contractor's estimate shall be carefully evaluated to verify that it is fair and reasonable.

4. BASIS FOR THE COST ESTIMATES.

a. When a cost estimate is prepared for a project, a description of the basis for the cost estimate shall be made and included in the estimate documentation. The general requirements for each type of cost estimate are as follows:

(1) Planning/Feasibility Study Estimate. The basis for the cost estimate shall comprise a description of the project's purpose, general design criteria, significant features and components, proposed methods of accomplishment, proposed construction schedule, research and development requirements, and any other pertinent cost experiences.

(2) Budget or Conceptual Design Estimate. These cost estimates shall be based on all the detailed requirements in the conceptual design report (CDR) such as the design parameters, applicable codes, specifications and standards. Quality assurance requirements, space requirements, research and development requirements, methods of performance, operations interfaces, safety requirements, and so forth, should be considered.

(3) Title I Design Estimates. The basis for these cost estimates shall include the CDR estimate basis, plus all the refinements developed during the course of producing the Title I engineering package. This includes all drawings, outline specifications, data sheets, bills of material, schedule refinements, definitions of scope, methods of performance, and changes in codes, standards, and specifications.

(4) Title II Design Estimates. The basis for these cost estimates shall include all the approved engineering data, methods of performance, final project definition and parameters, project schedule, and final exact detailed requirements. The statement of "basis" shall include a complete list of all engineering data used; (i.e., drawing data sheets, specifications, bills of material, job instructions, proposed schedules, and so forth).

(5) Government or Engineer's Estimate. Since this estimate is simply a refinement of a Title II design estimate, the basis used to make adjustments or refinements shall be listed and made a part of the file.

(6) Current Working Estimates. The basis for these cost estimates shall carefully define the purpose and scope of the estimate along with a complete list of all the considerations used to develop the estimate for actual costs to date and for data used to complete the projections.

5. CONTINGENCY.

a. Contingency is defined as the sum of funds included within an estimate to cover materials, labor, conditions and risk situations which are an intrinsic part of the presently intended scope of work, but are not specifically allowed for elsewhere in the estimate, due to uncertainty either as to their existence, nature, likelihood of occurrence, or magnitude of effect. Such items and situations are likely to occur in the course of every project, but in uncertain combinations and magnitudes. Guidance on contingency is issued by the Headquarters Independent Cost Estimating staff.

b. Several important concepts inherent in this definition should be emphasized:

(1) Contingency funds are included within the project's total estimated cost and shall be considered part of that cost and not "extra."

(2) There is a statistical probability that such funds will be spent to complete the work, and methods of determining the magnitude of contingency shall consider such probability.

(3) Contingency is meant to cover only the scope of work as it is presently conceived and is not intended to provide for additions to scope or to require reduction of scope.

c. Contingency is derived from a risk analysis of various aspects of the project. This analysis concerns cost, schedule, and technical risks as they apply to the project effort, underscoring the uncertainties that exist in each of the project elements. The amount of contingency is then reflected both as a total and on an individual element basis at whatever level is essential to produce an understandable cost estimate.

d. A contingency analysis shall be performed on all project cost estimates. In most cases, a short, documented statement accompanying the estimate is appropriate. The statement should simply indicate what rationale or thought process the estimator used to reach the conclusions. On simple or preconceptual design projects, an overall bottom line percentage will suffice. For more complex, better detailed, or more expensive projects, individual cost elements or work breakdown structure elements should be evaluated and documented individually.

e. The estimate types below are an indication of how well the estimator will be able to understand the scope of equipment, materials, and labor that make up the project being estimated.

(1) Planning Estimate. Planning estimates are developed soon after potential projects are identified and described, and they record and describe quantitatively the scope of the project and the-assumptions made for the estimate. These assumptions often force improvements in the project scope definition and provide a basis for assessing the magnitude of contingency.

(2) Budget or Conceptual Estimates. These estimates are based on conceptual designs which define major physical characteristics and focus on elements of the project that have significant impacts on cost. Such an estimate shall include all items of the project that the conceptual design implies, whether detailed in the conceptual design report or not, and shall be reviewed in detail by the designer for scope of work included.

(3) Title I Design Estimate. Title I design is performed in order to fix or freeze the project scope, to investigate alternative design directions within the overall project scope, and to establish project design criteria for final construction design. The resulting design information defines the project structures and equipment, and outlines their basic specifications.

(4) Title II Design Estimate. Title II design produces the detailed drawings and specifications by which procurement and construction are accomplished. As such, it provides the basis for a detailed estimate of the cost of the project.

f. To ensure that contingency is properly managed during execution of the project, the project manager shall develop a contingency plan, which shall be an integral part of the project management plan.

PART E - PROJECT ACQUISITION FOR MAJOR SYSTEM ACQUISITIONS AND MAJOR PROJECTS

1. INTRODUCTION.

a. The acquisition process is of such importance to the project evolution of a major system acquisition or major project that it is necessary to generate a basic acquisition strategy, then continuously plan to ensure that the strategy is properly implemented. Similar planning shall be done for other projects, except at a less formal level.

b. Although most of the acquisition process is the responsibility of the cognizant contracting officer and the contract specialist, the project manager is responsible for two aspects of the acquisition process. The first is acquisition strategy, which shall be developed in harmony with the program office and the local acquisition and assistance office. The second is acquisition planning, which is conversion of the acquisition strategy to a viable, detailed plan for implementation. In both cases, the project manager can receive advice, assistance, and recommendations from a business strategy group.

2. ACQUISITION STRATEGY.

a. Acquisition strategy is a brief description of the contractual basis of the project contained in the project plan. It reflects the management concepts that shall be used in directing and controlling the project to ensure that the system being acquired satisfies the approved mission need. Although the acquisition strategy encompasses the entire acquisition process, the strategy can be less detailed at the time of issuing the solicitation to explore competitively, alternative system design concepts. However, sufficient planning shall be accomplished for succeeding project phases for those considerations which may have a direct influence on competition and design efforts by contractors. The acquisition strategy shall evolve through an iterative process and become increasingly definitive in describing the interrelationship of the management, technical, business, resource, and other aspects of the project.

b. Development of the initial project acquisition strategy shall be completed as soon as feasible after key decision 1. The project acquisition strategy is unique for each project and shall be tailored by the project manager to the circumstances surrounding the project.

c. Advice and assistance should be sought from business and technical advisors and experienced managers of other major system acquisitions. The business strategy group is the formal mechanism for obtaining this advice and shall be used to develop the acquisition strategy for a project.

d. The project manager is required to keep all management levels informed of the strategy and is required to summarize certain aspects of it at the key decision points. At the earliest feasible date and no later than key decision 3, the project manager is required to have a comprehensive strategy for full-scale demonstration.

3. ACQUISITION PLANNING.

a. The purpose of an advance acquisition or assistance plan (AAAP) is to provide a description of the contractual means by which the project's acquisition strategy shall be carried out. Use of a plan reduces acquisition lead time and ensures consistency in the preparation of project contractual execution documents by providing contracting officers and others involved in project management with specific information about project business objectives. In addition, the plan and the documentation which normally accompanies it provide these personnel with an understanding of overall project goals.

b. The project plan provides a summary description of a project's acquisition strategy, emphasizing overall goals and objectives. The advance acquisition or assistance plan is that component of the project management plan which describes how that strategy is to be contractually carried out. Thus, it serves as a transition and link between the general acquisition strategy statement included in the project plan and the detailed, transactional level business planning which is performed for each project contractual action in the project life cycle.

c. The elements commonly included in an advance acquisition or assistance plan provide a useful checklist of factors which shall be considered and addressed in the contractual planning of any large project. These factors include those which OMB Circular A-109, "Major System Acquisitions," states shall be considered when tailoring an acquisition strategy to fit the circumstances of any large project. The details of an AAAP are included in Attachment II-7. One of the most important of these items in project planning is consideration of the acquisition process, including employment of proper lead times for contract actions.

d. Figure II-7 illustrates the chronological sequence of contractual planning activities in relation to the preparation of project documents (project plan and project management plan) containing advance acquisition or assistance planning information is contained. A description of these contractual planning activities follows:

(1) Advance acquisition planning is the activity in which program offices develop an aggregate, summary level plan of the contractual actions that they expect to initiate during a specified time in the future in relation to their budget authority.

(2) The acquisition or assistance planning accomplished by program offices in the preparation of the acquisition or financial assistance request package provides the contracting officer with the essential items of information, statement of work and delivery schedule needed for inclusion in the solicitation and resulting award documents.

(3) The acquisition planning and scheduling called for in DOE/MA-0154, "Acquisition Regulations Handbook - Source Evaluation Board," is a master blueprint of the source evaluation board's understanding of the requirement, how the source evaluation board intends to conduct proposal solicitation and evaluation, and when each major event in the source evaluation board process is scheduled to take place.

e. An advance acquisition or assistance plan is appended to the project management plan for each major system acquisition and major project. The use of an AAAP is encouraged for other projects.

f. Acquisition or financial assistance planning shall be initiated at the earliest practicable time in the project life cycle. This is normally at the time the initial project plan is written.

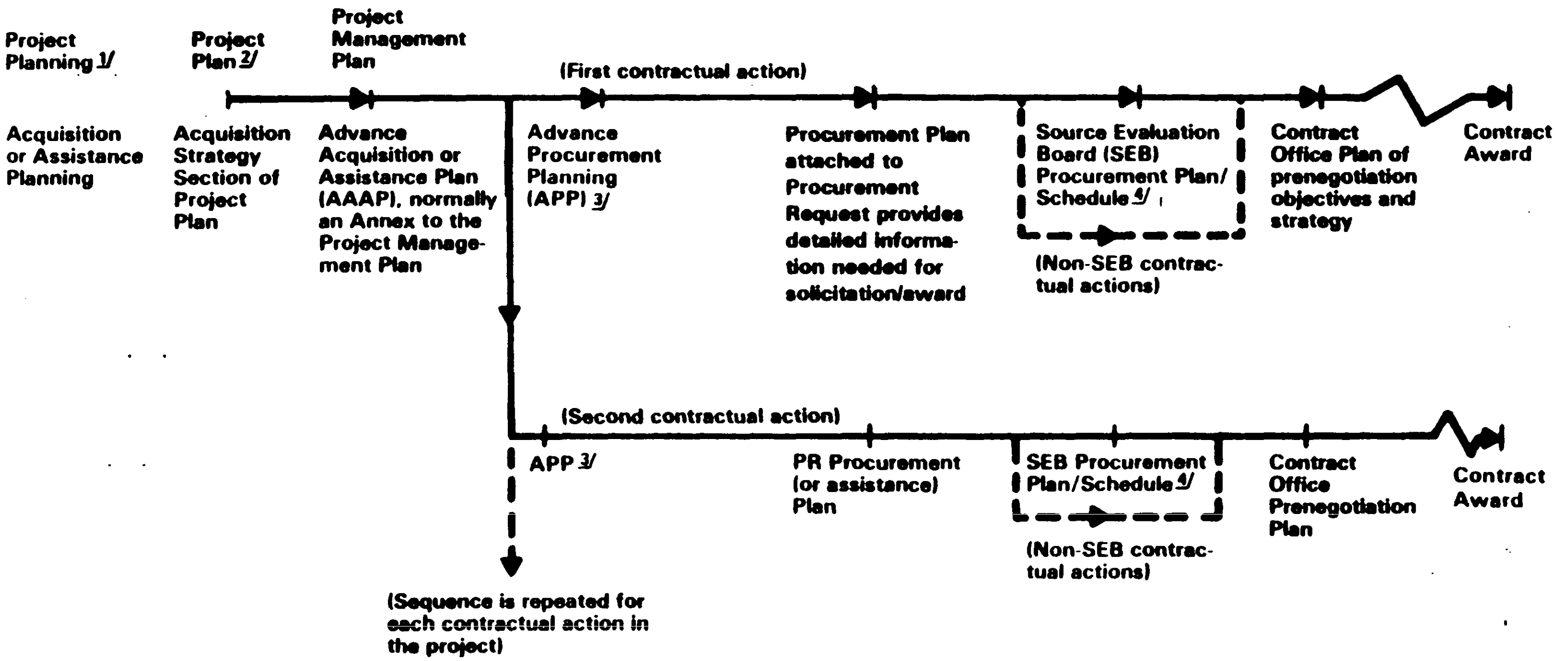
g. The contractual execution planning for a project which results in an AAAP is a shared responsibility of the project manager and the contracting officer. Although the project manager has the overall responsibility for project implementation, the contracting officer is responsible for determining the appropriate contractual means for accomplishing project objectives.

h. The AAAP is normally completed and forwarded in time for it to be received by the cognizant contracting office and other organizations involved in project execution at least 6 months prior to the time that the first acquisition request form for a contractual action is scheduled for release.

i. Changes in the AAAP. Changes my occur in a project which have a significant effect on the previously developed AAAP. For Instance, a large budget adjustment can require revisions; additional information just developed may need to be included; or problems may be encountered in implementing the plan. In such cases, any changes which need to be made to the AAAP are developed, approved, and distributed in the manner described in Attachment II-7.

4. BUSINESS STRATEGY GROUP.

a. The business strategy group (BSG) is intended to assist the project manager by providing advice and recommendations relating to sound contractual and business practices. The BSG is convened by the field manager of



1/ The project planning documents included on this line are those which are directly involved in the hierarchy of acquisition and assistance planning. Thus, not all general project planning documents are included.

2/ Initial advance acquisition and assistance planning, which is a product of the development of a project business strategy, is summarized in the Acquisition Strategy Section of the Project Plan. The AAAP constitutes an amplification and elaboration of this initial planning which forms the basis for the procurement (acquisition) or assistance planning for each of the project's contractual actions.

3/ Advance procurement planning provides a summary description of the planned contractual actions in a project for Departmental contracting offices.

4/ This document states how an SEB intends to solicit and evaluate proposals for major (over $5 million) negotiated competitive prime contractual actions over $5 million.

Figure II-7
Typical Chronological Sequence of Project Acquisition or Assistance Planning

the acquisition and assistance office at the request of the program or project manager. Each BSG shall be staffed by different personnel, depending upon the nature, complexity, and cost of the project.

b. In preparing its advice and recommendations, the BSG considers the project management plan, various business approaches, special contractual aspects of the project, the state of technology development, and similar questions. BSG advisory positions are presented to the program or project manager for consideration in acquisition strategy and plan development. BSG responsibilities are detailed in Attachment II-7.

PART F - ENVIRONMENTAL PLANNING AND REVIEW

1. INTRODUCTION. Environmental planning and review form an integral part of the project management system. The Environmental and Safety Plan and the Environmental Research Plan are used by the project manager in preparing the overall environmental and safety component of project plans and project management plans. Assistance in compliance with environmental and safety requirements is provided by the Assistant Secretary for Environment, Safety, and Health and the General Counsel.

2. ENVIRONMENTAL STRATEGY.

   a. The Assistant Secretary for Environment, Safety, and Health, in consultation with the General Counsel provides assistance and judgments concerning environmental factors that should be considered in program planning and in the acquisition of projects.

   b. General environmental compliance planning principles are discussed in the Department of Energy Environmental Compliance Guide. These principles address the problem of complying with a large number of different environmental review requirements through a comprehensive, integrated environmental compliance planning strategy, termed “phased compliance.” This strategy is characterized by:

      (1) A comprehensive review of all applicable Federal , State, and local policies, programs, and regulations and identification of all requirements;

      (2) Integration of requirements into an efficient time schedule, including identification of critical path(s);

      (3) Coordination of various environmental reviews including, in particular, early reviews under the National Environmental Policy Act, with the appropriate phases of project development;

      (4) Utilization of common environmental data bases; and

      (5) Analysis of any environmental constraints and development of suitable mitigation measures to alleviate these constraints.

   c. Within the acquisition process phases, the scope of environmental concerns broadens to include not only research and status reports but also environmental, health, and safety including socioeconomic assessments of specific projects and operations which are proposed.

3. ENVIRONMENTAL ASSESSMENT, ENVIRONMENTAL IMPACT STATEMENTS, AND SAFETY, ANALYSIS REVIEW.

a. Environmental Planning. Environmental planning and review mechanisms are of two types: those that are generic to an energy technology, and those that are specific to each project. Program Environmental Impact Statements (EIS's), or Environmental Assessments (EA's), are of the first type. The second type consists of the Site or Process Specific EIS's or EA's, and the Safety Analysis Review System (SARS). These represent vertical cuts throughout each acquisition phase in the process (see Figure II-8).

b. Environmental Documents. The principle environmental documents and their general interaction with the project management system for technology development are illustrated in Figure II-8. The figure provides a representation of how environmental activities and their documentation work to support the removal of barriers and the identification of uncertainties that must be considered within the technology before proceeding to production or operation. The EA and EIS, if required, are generally prepared first for a technology development program, and then on a site- or process-specific basis, early enough to allow major procurements and construction activities to begin with reduced uncertainties and minimum time delay. In a similar fashion, the safety analysis examines the health and occupational hazards of proposed major operations under the cognizance of DOE to assure that barriers and impacts are resolved without undue time delays. Subsequent updates assure continued reviews of operational safety.

(1) Environmental Assessment and Environmental Impact Statement, both of which are discussed in DOE 5440.1C, IMPLEMENTATION OF THE NATIONAL ENVIRONMENTAL POLICY ACT, of 4-9-85, and Department of Energy Compliance with the National Environmental Policy Act (NEPA) (45 FR 20694), of 3-28-80, and as amended by 47 FR 7976, of 2-23-82.

(a) The National Environmental Policy Act of 1969 requires that agencies prepare environmental impact statements "on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment." For proposals where it is unclear whether an EIS is required, an EA is to be prepared. An EA is a statement which provides the information upon which to base a determination of the necessity for an EIS or a finding of no significant impact.

(b) Assessments and impact statements are prepared by program offices according to Departmental procedures and are reviewed and approved by the Assistant Secretary for Environment, Safety, and Health, after consultation with General Counsel. Generally EIS's and EA's should be completed prior to initiation of detailed design work. EIS's required for DOE policy and legislative initiatives should be prepared as required.

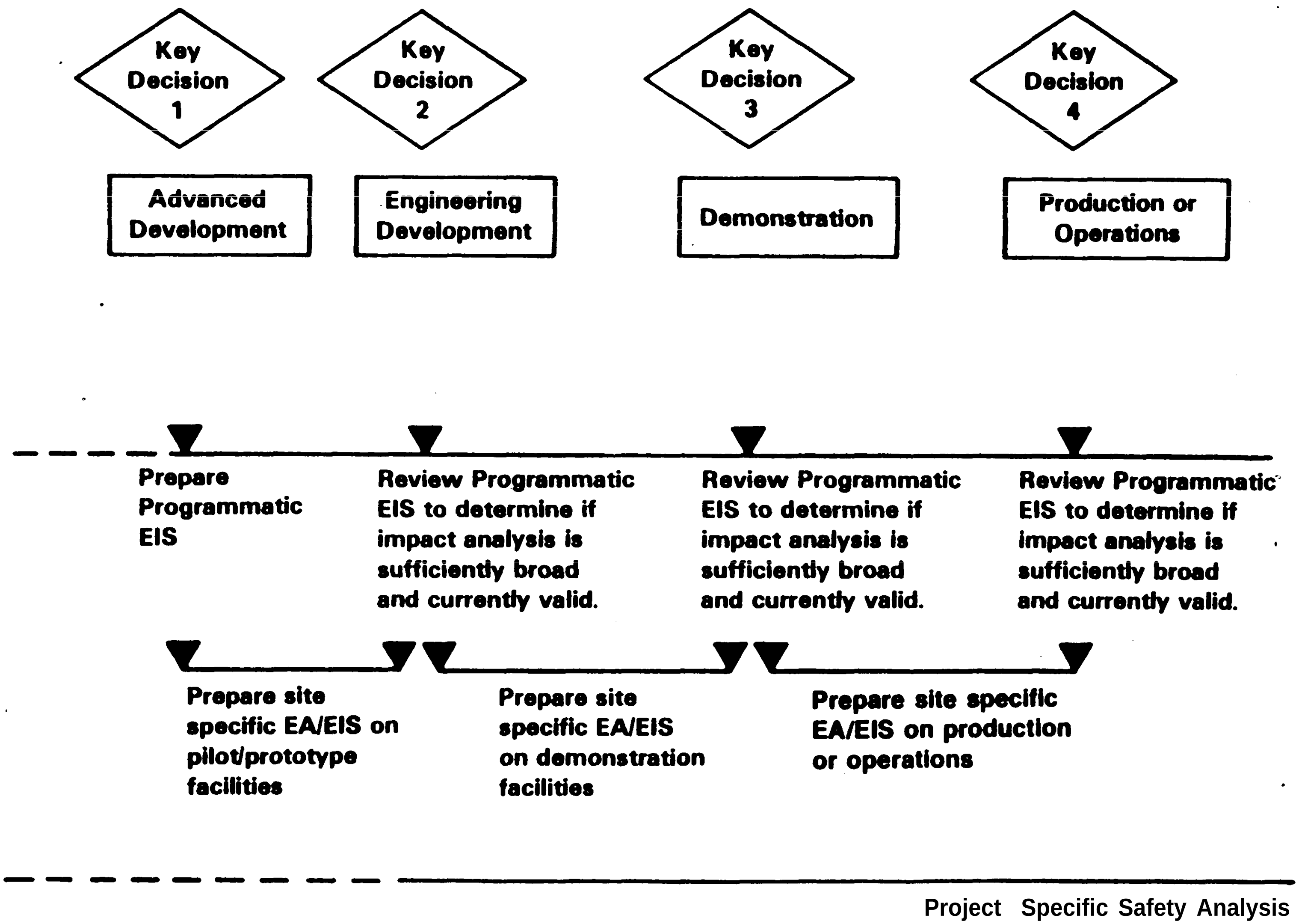


Figure II-8
Principal Environmental Requirements in the Project Management System

(2) Safety Analysis. This document is prepared by project managers according to DOE 5481.1A, SAFETY ANALYSIS AND REVIEW SYSTEM, of 8-13-81, for operations early in the design phase of a proposed facility that DOE intends to use for production activities or to place in operation for other purposes.

(a) DOE 5481.1A defines operations as "those activities funded by DOE for which the Department has assumed responsibility for environmental protection, safety, and health protection (ES&H). It is a general term intended to encompass individual operations or effort in the aggregate rather than separately." Safety analyses identify hazards, assess risks and means for their elimination or control, and document the approval for various stages of facility design, construction, and operation. DOE 5481.1A applies to all DOE operations except nuclear weapons production and activities having only hazards of a type and magnitude routinely encountered and accepted by the public. The safety analysis should facilitate early identification of hazards and their control or elimination. For complex or expensive operations a preliminary safety analysis shall be prepared and approved before construction begins. A final safety analysis shall be prepared and approved before facility or process operations commence.

(b) The line program organization is responsible for preparing safety analyses, obtaining an independent review of each safety analysis, and authorizing the construction operation and subsequent significant modification, including decommissioning, of each DOE operation. This includes developing safety analysis and review system implementation plans unique to their specific needs. The independent review includes a document evaluation of the adequacy of the preventive or mitigative design features and the administrative controls provided to limit the probability of an adverse occurrence or the severity of a hazard.

(c) The Assistant Secretary for Environment, Safety, and Health is responsible for providing independent assurance that line program organization responsibilities are fulfilled and as a part of this responsibility, conducts independent appraisals of line program safety analysis and review system activities.

4. ENVIRONMENTAL PLANNING.

a. Proper environmental planning is critical to project management. For a given project effort, a number of environmental requirements may be applicable, and compliance planning may involve complex tradeoffs of time, risk, costs, and quality. Failure to properly comply with environmental regulations and statutes invites lawsuits, delays, and loss of resources. Environmental issues can create severe breaches of baselines.

b. The environmental, safety, and health plan defined as Annex III to the project management plan contains the information on critical environmental and safety statutory, regulatory, and directive requirements necessary to develop the environmental and safety milestones and schedules required in project plans and project management plans. This information can be derived by applying the phasing principles outlined in Part I of the DOE Environmental Compliance Guide (DOE/EV-0132) and using appropriate information from ES&H implementation plans prepared in accordance with DOE 5480.1A, EIS implementation plans prepared in accordance with DOE 5440.1C, safety analysis reports prepared in accordance with DOE 5481.1A, plus other ES&H planning efforts as necessary. Requirements for environmental planning and review pertain primarily to the preparation, review, and decisions on program plans and project management plans.

c. The following general principles are involved in developing efficient environmental compliance planning that does not sacrifice the quality of review of major issues.

(1) Integrate the requirements of National Environmental Policy Act and other environmental review procedures with the appropriate phase of project development. The development of environmental analyses, whether as part of an EIS or part of a permit application, depends on the availability of an appropriate level of engineering detail. Therefore, the timing of such analyses is primarily dictated by the project development schedule. EIS reviews can generally be commenced with preliminary design information and performed in coordination with that phase. Permit applications generally require a greater level of detailed design information; therefore, “permitting” reviews are generally performed later, in coordination with the detailed design phase.

(2) An EIS serves as a vehicle for presentation and review of the environmental issues associated with the project. Compliance with the NEPA process identifies major issues, allows public participation, and requires consideration of alternatives and mitigating measures. Initiation of substantial detailed design work prior to completion of the EIS process incurs a program risk in: (a) prejudicing the NEPA review with attendant litigation risk and criticism; and (b) prematurely committing financial and other resources to the project.

(3) Generally, construction cannot commence before successful completion of preconstruction permitting environmental reviews.

(4) In light of the opportunities for phasing environmental reviews in coordination with project schedules discussed above, the proposal that limits overall environmental review time should be carefully scrutinized since: (a) it may not actually accelerate the project schedule; and (b) it may force scheduling that incurs substantial project risk. On the other hand, initiatives to consolidate or coordinate environmental reviews may be quite useful and productive.

d. These planning principles lead to the development of a proposed environmental plan termed “Phased Compliance” (see Figure II-9). Phased Compliance generally is characterized by:

(1) Coordination of the EIS and consultative environmental reviews with the preliminary design phase;

(2) Completion of the EIS process prior to commencement of detailed design;

(3) Submission of permit applications following publication of the EIS and Record of Decision; and

(4) Submission of permit applications and coordination of permitting reviews with the detailed design phase.

e. Delayed compliance will normally result when inadequate attention is given to environmental requirements early in the planning process. A ripple effect is generated when preparation of the EIS is delayed. In many instances the permitting authority will not commence review of permit applications until a draft EIS, as a minimum, has been circulated. As a result, the permitting process is no longer controlled by the availability of design information, but instead by the availability of the draft EIS. This delays the start of construction and makes the EIS and other environmental review processes critical path items. Any delays in these processes will further delay the project.

f. The phased environmental compliance plan has a number of major benefits; in view of these benefits the phased compliance plan is strongly recommended as the approach for planning environmental compliance.

(1) It avoids or minimizes environmentally related delays to the start of construction;

(2) It avoids or minimizes premature commitment of project resources and allows for progressive decisionmaking;

(3) It avoids prejudicing the NEPA review thereby reducing litigation risk and criticism; and

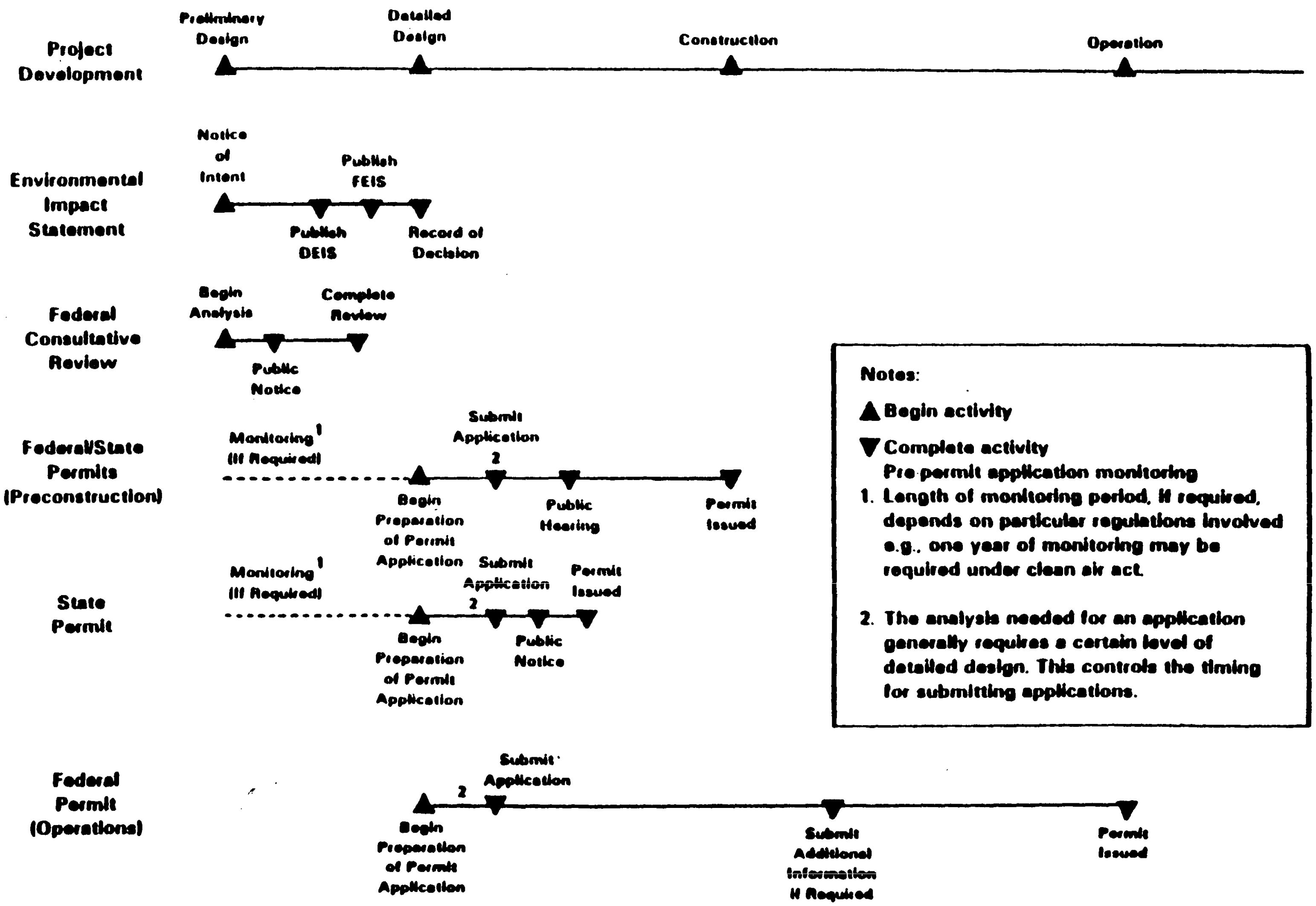


Figure II-9
Project Environmental Phased Compliance

(4) It facilitates subsequent permitting processes through its early EIS preparation effort.

g. Cost and Schedule Baselines Considerations for Environmental Planning. Chapter III, Part A, Baseline Management and Control, provides requirements and guidance for the establishment of project baselines and change control of the baselines. During the planning process, the project cost and schedule baselines should ensure the provision of the necessary analysis and preparation of documentation required for Federal, state, and local environmental compliance.

The following National Environmental Policy Act (NEPA) control milestones shall be included, as a minimum, as Level 1 Control Milestones in the project schedule baseline unless specifically excluded at KD No. l:

Issue Categorical Exclusion (CX);

Submit Environmental Assessment (EA);

Issue Finding of No Significant Impact (FONSI);

Submit Draft Environmental Impact Statement (EIS);

Submit Final EIS; and,

Issue Record of Decision (ROD).

The nature and scope of the proposed program or project will determine the appropriate level of NEPA review.

An alternative to prescribing these milestones is to state the criteria for assignment of milestones in the project plan for a given project.

Vertical line denotes change

PART G - CONSTRUCTION PLANNING

1. INTRODUCTION.

   a. Construction planning is important to the critical decisions that affect the design and cost of a project. It is during this phase that the size, function, technical performance requirements, and location of the proposed facility are determined and the budget is set. Once the preliminary decisions are made on these matters, the nature and cost of the facility are virtually predetermined. (Figure II-10 reflects construction planning).

   b. The planning phase commences at the initial identification of a construction project and continues until receipt of the detailed design and/or construction funds at the level responsible for project management. Planning for construction effort within DOE occurs concurrently with the budget process. Since the budget process is relatively rigid with regard to time, the planning phase must be structured to provide the necessary project information for budgeting purposes at the required time.

   c. Chapter V prescribes the minimum planning elements and procedures that field organizations must accomplish to assure construction objectives are met. The field office manager is responsible for establishing, where necessary, internal procedures to implement the minimum requirements contained here.

2. CATEGORIES OF CONSTRUCTION EFFORTS. The following summarizes information on the determination and selection of construction effort categories which require certain management control and reporting procedures:

   a. Plant and Capital Equipment Budgeted Projects. These are construction efforts that consist of the acquisition, modification, or retirement of land, land rights, buildings, structures, major process equipment, utilities, roads, and other facilities, or any combination thereof, when a scope of work is involved which may be capitalized. Plant and capital equipment projects may be line item or contingency projects.

      (1) Line Item Projects are projects which are specifically reviewed and approved by Congress. They may either be plant and capital equipment or operating expenses budgeted. Generally, projects with a total project cost greater than $1.2 million are categorized as line item projects.

      (2) Contingency Projects are plant and capital equipment-budgeted line item projects for which different procedures are applied during the planning and budgeting process. Management of the design and construction phases is the same as for line item projects; however, the consequence of planning actions varies from line item projects.

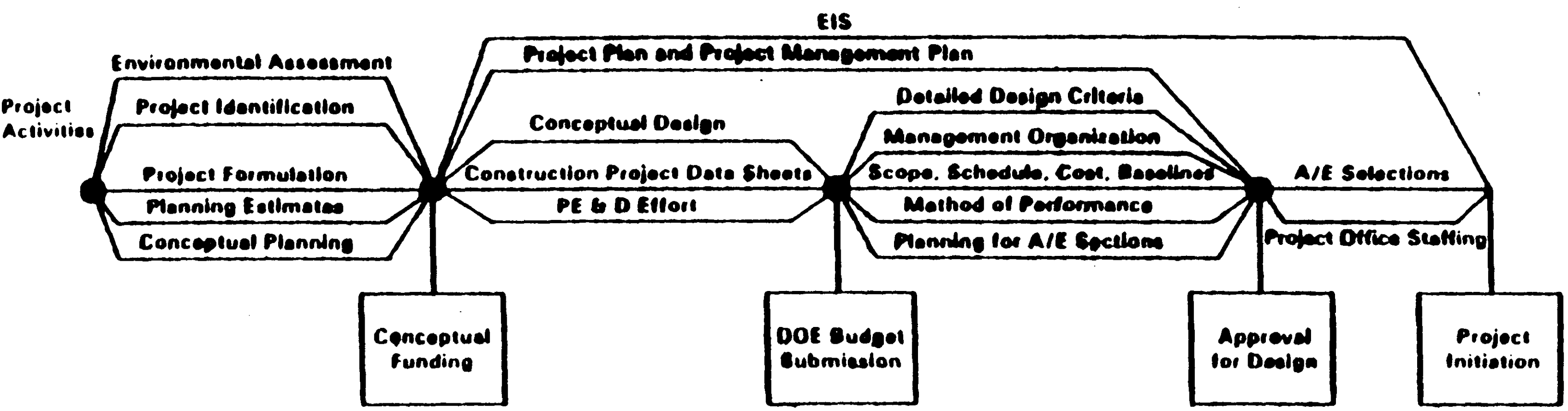


Figure II-10
Construction Planning

(a) A collection of sub-projects in support of a certain program at various locations is a contingency project. This type differs from line item projects in that, as submitted to Congress, it is a collection of projects, each of which could be a line item. It is formulated in this manner because the work required cannot be deferred or sufficiently defined and estimated at the time the budget request is submitted. Estimates for the work are generally based on past experience rather than on specific requirements for the fiscal year involved.

(b) A project providing for a variety of additions, modifications, improvements, and auxiliary experimental facilities at specific major programmatic facilities is a contingency project. The construction project data sheets submitted in the budget to Congress for such projects set forth the tentative plans for construction work to be performed during the fiscal year, although it is recognized that details of plans are not firm and that circumstances may necessitate revisions to the plans. Prior to accomplishment of the work, detailed scope and costs must be prepared.

(c) General plant projects are miscellaneous projects that cost $1.2 million or less each. A general plant project line item is submitted to Congress for each outlay program or specific element of a program requiring one or more of the job requirements. The individual jobs are not specifically approved by Congress; however, the jobs anticipated to be accomplished during the fiscal year are required to be listed in the construction project data street for the general plant project line item. Managing field offices may approve additions and deletions for general plant projects. Field office manager shall inform program offices of changes made.

b. Operating Expense Budgeted Project are projects funded by an operating expense appropriation, and meet the requirements set forth in DOE 2200.4, ACCOUNTING OVERVIEW.

c. Capital Equipment Budgeted Projects consist of the acquisition and installation of capital equipment funded from the plant and capital equipment not related to construction position of the budget, when the installation costs exceed $250,000.

PART H - PROJECT TRANSITION

1. INTRODUCTION. Projects are planned and executed with an eye to their being completed. Part of the planning process is to develop cost, schedule, and technical parameters which define project completion. This phase of the work must be as carefully planned and executed as any other. The project manager is responsible for a clear and viable plan to accomplish project transition.

2. SCOPE OF PROJECT TRANSITION.

   a. Transitioning a facility from project status to operating status requires that technical and procedural matters involved be considered during the planning state. The project plan and project management plan both must reflect the point at which the project is complete. The project charter shall indicate at what point the project manager's responsibility ceases and an operating contractor takes over. Specifications must clearly delineate the end product involved, not only for purposes of project execution, but to indicate the specific parameters of project completion.

   b. Besides the dimensions of the project as defined by the project plans, charter, and specifications, to be a transition plan must be formulated during project execution. This plan should be developed in conjunction with the contractor who will operate the facility, in order that there be complete understanding by both DOE and the contractor as to specific details of the transition and individual responsibilities. The plan should contain specifics on the following areas:

      (1) DOE and contractor transition responsibilities;

      (2) The measurements by which transition is considered appropriate;

      (3) A schedule of the activities involved in transition;

      (4) DOE procedures for turning over operation of the facility to the contractor;

      (5) Operating contractor procedures for accepting the facility for operation;

      (6) An indication of any permit or licensing obligations involved in operation which must be satisfied;

      (7) Operational testing and certification of technical performance capability; and

      (8) Any other details essential to the transition process.

3. PROJECT OFFICE TRANSITION.

a. The end of the project means the end of the freed for the staff. The project manager needs to be sensitive to this situation and deal with it before the staff turns its attention fully to post-project speculation.

b. The project manager should develop a project office transition plan whereby project staff members are relieved of the concern for future assignments. There should be a concerted effort made to assuage these concerns through discussions with the individuals about their desires; getting the field organization management involved in the problem; and assigning new job assignments as early as possible.

c. Another important element of project office transition is that of completing all the necessary steps for closeout. This procedure includes completing all contractual relationships, closing contracts for file, closing out financial records and documents, obtaining necessary approvals, licenses, and permits, completing the safety analysis report, establishing operating procedures, plus any other activities peculiar to the project. A project closeout checklist might be prepared by the project manager to ensure that all closeout activities are completed.

GUIDANCE FOR PREPARING A JUSTIFICATION OF MISSION NEED

1. The Justification of Mission Need is the document required to obtain Department approval for expenditure of Department funds for projects anticipated for designation as major system acquisitions or major projects, which reflect the determination and identification of DOE mission need(s), based on the reconciliation of continuing analyses of current and forecasted capabilities, technological opportunities, overall priorities, and initial resource expenditure involved with achieving DOE's mission. The Program Manager is responsible for Preparation of the Justification of Mission Need. The Justification of Mission Need should be a brief (three to six page) document expressing the project need in terms of the following elements:

   a. Program mission/goal;

   b. Project objectives;

   c. Organization; and

   d. Approvals.

2. Since the mission need is independent of any particular system or technological solution, the Justification for Mission Need shall not express the need in terms of equipment or specifications, although feasibility at this time via availability is relevant.

3. The Justification of Mission Need shall emphasize the reasons why project conceptual design funding should be approved by addressing the mission needs, the purpose and priority of the project in supporting the needs, the significance of meeting the needs, and shall include the following information:

   a. Program Mission/Goal.

      (1) Provide the mission of the program, a description of program goals to be accomplished and relationship to the Secretary's mission area assignments.

      (2) State how the project will support program goals and explicitly state why it is needed.

      (3) How is the project related to program strategy; how does it relate to other program elements and projects?

      (4) Why is it the appropriate action and what would be the programmatic impact of not doing it at all?

      (5) What are the most appropriate alternatives, if any?

(6) Why are these options being considered?

(7) Why is this the best option?

(8) Describe the appropriateness of the project at this time in view of the state of current technology.

b. Project Objectives.

(1) Technical Objectives:

(a) As specifically as possible, describe the technical objectives.

(b) Cite the basis for the feasibility of achieving the technical objectives (e.g., studies, research and development, state of related technologies).

(c) Discuss technical objectives in relation to similar ongoing or planned activities, both international and domestic.

(d) Describe the impact on the program of not meeting the technical objectives.

(2) Cost Objectives:

(a) Provide estimate of costs related to developing the Conceptual Design Report (CDR) and related documentation required for Key Decision 1.

(b) Provide discussion and justification of how the conceptual design funds will be distributed (profile) along with the major cost items.

(c) State when cost estimates resulting from conceptual design will be available.

(3) Schedule Objectives:

(a) Provide a statement of preliminary project schedule to include at least: (1) start conceptual design; (2) complete CDR; and (3) Key Decision 1, Approval of New Start.

(b) Describe the impact, if any, on the program of not meeting the schedule dates.

c. Organization. Provide a preliminary plan for organizational involvement and relationships, including, as appropriate, field organizations, laboratories, universities, industrial concerns, DOE Headquarters, or other agencies, foreign or domestic for the period between Key Decision O to Key Decision 1.

d. Risk Assessment.

(1) What is the probability of success?

(2) Describe the basis for risk assessment.

e. Approvals. The Justification of Mission Need shall be approved by the Acquisition Executive for MSA's and the cognizant Program Secretarial Officer for major projects. Concurrences of other program and staff officials, as appropriate, are required prior to these signatures. Include a specific statement of what the Acquisition Executive or the Program Secretarial Officer are supposed to approve (e.g., "This project as described in this Justification for Mission Need is recommended for inclusion in the FY94 budget submission to OMB").

4. As mentioned, the Justification of Mission Need is required only for major system acquisitions and major projects. For projects other than MSA's and major projects, the project data sheet should be sufficient to serve as a justification if it contains the basic information required above, tailored by project size and complexity. There may be instances, particularly for projects approaching $50 million, when the Assistant Secretary may require a justification as part of the project documentation.

5. APPROVAL. The signature page for a Justification of Mission Need shall include only the following:

a. SUBMITTED BY: Program Manager

b. A paragraph that approves initiation of the major system acquisition project and directs development of a project plan for signature approval of the Program Secretarial Officer and the Acquisition Executive (Deputy or Under Secretary); and

c. For major projects, the Program Secretarial Officer shall be the final approving official, except in cases where the Deputy or Under Secretary reserves approval authority.

6. REVIEW AND CONCURRENCE OF JUSTIFICATION OF MISSION NEED.

a. Major System Acquisition. The Justification of Mission Need as approved by the acquisition proponent shall be transmitted to the Acquisition Executive via Action Memorandum. The concurrence chain on the Action Memorandum shall include concurrences of:

(1) Assistant Secretary for Domestic and International Energy Policy;

(2) Director of Program/Project Management and Control; and

(3) Director of Procurement, Assistance and Program Management.

b. Major Projects. DOE major project Justification of Mission Need are to be approved by the Program Secretarial Officer and transmitted to the Deputy or Under Secretary, as appropriate via Information Memorandum, with a copy to the Director of Program/Project Management and Control. The acquisition proponent shall assure that the Assistant Secretary for Environment, Safety, and Health and the Associate Director of Program/Project Management and Control and Director of Procurement, Assistance and Program Management have concurred.

GUIDANCE FOR PREPARING A PROJECT PLAN

1. The project plan describes the project and establishes project baselines against which overall progress of the project and the effectiveness of its management shall be measured. The plan guides project execution and clearly sets forth the essential elements of the project. At key decision points for MSA's and major projects, current project plans become a key part of the Acquisition Executive decision-making, the project's mission need is reexamined, and alternatives for executing the next phase are presented to the Acquisition Executive. The project plan shall be maintained current to incorporate the Acquisition Executive and other management decisions to accurately serve as the project baseline document. The preparation of the project plan shall be the responsibility of the Program Manager working in cooperation with the Project Manager.

2. The project plan will be a definitive document, no more than 25 pages in length (excluding attachments). Specific subject allocations of these pages cannot be made since the project plan is a document that becomes more definitive as the project moves through advanced and engineering development. In the early state of a project, the project plan is focused more on objectives, technical plan, management approach, acquisition strategy, and documenting initial costs schedule, and scope baselines. Once the project is well underway, adjustments are made, as appropriate, to the technical plan, management approach, and acquisition strategy; normally these will not change during the remainder of the project. The project manager shall define the cost and schedule and shall focus on technical objectives, performance, and the test planning for the project. The project plan shall be tailored to the needs of the particular project considering the phase of its acquisition strategy, size, complexity, sensitivity, and particular project characteristics. Redundant specification or expression of data shall be avoided or minimized to the extent practical. The project plan format and the information it shall contain are described below:

a. Mission Need and Objectives. This section provides a summary of the approved mission need with regard to the required capability to be achieved and outlines technical, resource, and schedule objectives and projections.

The data and information included must provide reaffirmation of the Justification of Mission Need that was initially approved at Key Decision O.

b. Technical Plan. This section should describe what is going to be done and how it shall be accomplished.

(1) Document the technical objectives in quantitative terms, briefly describing what is to be developed or constructed. This description shall refer to the location (when construction is involved) and the major systems or elements of the project or facility.

(2) Describe the status of technology or the "technology readiness" for implementing the project. Include in this discussion a description of any ongoing or planned supporting development work on which the project is dependent and which, therefore, is part of the project.

(3) Either integrate or follow the above discussion with a description of the specific scientific, technological, or engineering approaches or processes to be used in meeting the performance objectives. For projects early in design and development, emphasis shall be placed on alternative concepts, design, or technical approaches being considered or pursued. For more mature projects, the development paths, critical subsystems, and test and verification procedures shall be described.

(4) For projects pursuing alternative design or technical approaches, briefly describe each alternative and the basis for selection of an alternative.

(5) Describe each phase of the project including the work to be accomplished and projects developed. In this discussion, indicate the major project events, technical activities, and decision points and authority that occur during each phase of the acquisition process. This is considered a key element of the technical plan.

(6) A project work breakdown structure chart is mandatory and shall be summarized in this section and included as an attachment. The work breakdown structure shall be product oriented and present the products or work elements of the project down to level three. This breakdown of the project shall conform to the manner in which the work shall be performed (including environmental work) and in which project cost and schedule are controlled and reported.

(7) For complex projects comprised of several major elements, include a flow of logic diagram that illustrates project element sequencing and interdependencies. The intent is to show significant interrelationships among major elements of the project.

c. Risk Assessment. This section is an assessment of project risks that identifies critical systems, subsystems, and other factors which require focused work and resolution. Types of risks that shall be addressed are technical, schedule, cost, others such as safeguards and security at all phases, loan guarantee, environmental, health, safety, regulator, utility, and institutional impediments that are not covered in other sections. In addressing each risk, the following information is required:

(1) The assessed level of risk (high, moderate, low);

(2) The basis for this assessment (reliability, availability, and maintainability analyses; study results; proven or unproven technology; well established or unproven construction procedures);

(3) The critical project elements contributing to the risk;

(4) Implications of the risk;

(5) Activities or alternatives planned to minimize the risk; and

(6) The stage of the project in which the risk exists (design, procurement and construction, or operations). For projects early in the advanced development phase of the acquisition process, a full assessment of these risks may not as yet exist. In this case, the discussion shall identify any risks that are evident and indicate when (e.g., during Title I design) the risk assessment for the project shall be developed.

d. Management Approach. This section addresses the organization responsibilities, decision delegations, other management arrangements, and management control systems under which the project shall be carried out. Emphasis shall be placed on the extent of the project manager's responsibility for total project funds and work effort. Accordingly, when field office matrix support is used by the project manager to review or monitor some aspects of project funded work, that management relationship shall be explained.

(1) Identify the Headquarters program office and division to which the project is assigned and the field organization responsible for project management.

(2) Identify the project manager by name in the text.

(3) Depict all participating organizations, (DOE, major contractors, and others) and their responsibilities on a project organization chart which shall be included as an attachment. Include names of the Headquarters program manager and the designated project manager on the chart.

(4) Where there are industry or utility partners, identify the partners and describe the management relationships with them and their role in management and implementation of the project. Also refer to existing agreements (cost sharing and other) with them or the status of agreements still to be negotiated.

(5) In discussing the items above, clearly identify decision delegations and the responsibility of each of the key individuals and support organizations.

(6) Identity and discuss project transition responsibilities and areas.

(7) For demonstration projects, indicate how disposition of the plant shall be determined at the conclusion of the demonstration phase of the acquisition process or termination at the convenience of the Government.

(8) If there will be site cleanup problems after conclusion of project operations, indicate how these needs shall be met.

(9) Describe the integrated program management control system that will be used to control this project including references to specific program management documents and systems. Describe the processes by which the project manager will control costs, schedules, and technical performance including a Responsibility Assignment Matrix (RAM) that illustrates responsibilities (organization breakdown structure).

e. <u>Acquisition Strategy.</u> The acquisition strategy is the underlying conceptual basis for management of a project and reflects the interrelationship of its mission, technical, business, and management objectives. A business strategy group should be used as an advisor to develop the acquisition strategy. This section shall include a description of the means by which the management objectives, prescribed for major system acquisitions and major projects, and the planning considerations shall be implemented while assuring consistency with program and project objectives. Key elements involved in an acquisition strategy are: the use of multi-phase contracts; sustaining competition; degree of delegation by the Government of coordination, integration, and management responsibility to a contractor; and reliance on private industry. These elements and the others discussed in this paragraph shall be fully understood and appropriately utilized in the development of an acquisition strategy. This section shall briefly summarize the acquisition strategy developed for the project and describe the approach that shall be used for acquiring the major items of hardware, software, and management support described in the technical plan section.

(1) Begin with a brief summary of the acquisition strategy thus far developed for the project. This summary shall describe the management concepts that shall be used in directing and controlling the project to assure that the systems being acquired will satisfy the approved mission needs.

(2) Include in this summary a description of how the management concepts relate to technical, business, resource, and other aspects of the project.

(3) Indicate whether or not a project manager, construction manager, or other integrating contractor, including Government management and operating contractors, will be used in the project and the extent to which such contractor will be responsible for implementing the project acquisition strategy.

(4) For projects to be funded jointly by industry or utility partners, describe the cost sharing or cooperative agreement that exists. Where the agreement is yet to be negotiated, describe nonproprietary and/or nonsensitive aspects of the cost sharing plan and indicate when the agreement is scheduled to be negotiated. Describe the treatment of future changes in project scope of an early termination.

(5) In cases where major contracts have already been awarded, identify each contractor, work being performed, award date, current contract amount, contract number, and contract type. In cases where major contracts are yet to be awarded, indicate the work to be performed, planned award date, estimated cost, contract type, and approving official to the extent known. When there are several prime contractors, this information shall be summarized in a table appended to the plan rather than described in narrative form.

(6) Indicate the basis and applicable controls for award of subcontract work and summarize the approach to be employed for subcontract management.

f. Project Schedule. This section should be a one-paragraph statement that refers to the project schedule as an attachment. It should also include any qualifying statements. The schedule attachment must be consistent with the project work breakdown structure (WBS) and contain, as a minimum, the schedule for project WBS elements down to and including level 2, including the following:

(1) Key project activities, by applicable acquisition phase, for the life of the project;

(2) Key phases of the project described in the technical plan section;

(3) Identification of all Acquisition Executive key decisions and appropriate Level O milestones, Program Secretarial Officer's decisions and appropriate Level l milestones, and other approval points as appropriate;

(4) Identification of major environmental and/or safety documentation, reporting or permit requirements and milestones which may impact the projects critical path; and

(5) The initial schedule can be in bar chart format. The schedule for Key Decision 2 and subsequent decisions shall include a C&M critical path method diagram(s) that will depict the project's critical path.

g. Resources Plan. This section refers to the resources plan as an attachment, includes any qualifying statements, and states the total project cost. This section also indicates the projected total manpower level of the project office management staff (DOE, contractor and other personnel). Life cycle cost considerations for all resources impacting total project cost, such as energy efficient new building design features, selection of materials and systems for maintainability, and selection of the most cost effective utility services to meet program requirements, etc., shall be included in this section. These cost considerations shall address all costs for construction and operation of the project, including the utilities requirements (e.g., electric, water, steam, gas) and maintenance requirements, as appropriate. The resource chart shall be consistent with the WBS and include:

(1) Actual funding (budget authority and budget outlay) for prior years, as recorded in the Financial Information System, and the current year and estimated funding for budget year and annually over the life of the project for each WBS level 2 project element and the total project.

(2) Separate identification of operating expense and plant and capital equipment budgeting. Operating expenses for utilities, maintenance, and janitorial services shall each be separately identified.

(3) The above cost data must correlate with the costs stated in the cost baselines of the controlled items section of the plan.

h. Controlled Items/Baselines. The controlled baselines shall be cost, schedule, and scope (technical).

The baselines shall be presented in a format similar to that depicted in Figure III-15 which defines both the baselines and the approval authority for the baselines.

Thresholds for change control authority of the baselines shall be presented in a format similar to that depicted in Figure III-16 which defines the thresholds and approval authority for changes to the baselines identified in Figure III-15.

These items may be included as an attachment.

i. Project Charter. The project charter can be prepared and approved prior to the preparation of the project plan but should be included as part of the plan. The project charter clearly delineates management responsibility, authority, and accountability for the project. It establishes the operational management relationships between Headquarters and field project management organizations. The project charter should contain the information outlined below:

(1) The responsible managing organization (e. g., special project office, DOE Field Office, energy technology center).

(2) The name of the designated project manager and the effective date of assignment.

(3) The location of the project management office.

(4) The support (including interface coordination) to be furnished to the project manager by other participating organizations such as other Departmental components.

(5) The authorities of the project manager including appropriate references to DOE Orders, acquisition regulations, and other guidelines.

(6) The reporting channel of the project manager, established to account for the size, complexity, and importance of the project and to eliminate unnecessary layers of authority above the project manager.

(7) Special instructions, or delegations of authority, to the project manager for the execution of the approved project.

(8) Special requirements for a transition or termination plan to outline tentatively the conditions under which the project management organizational shall phase out or responsibility shall be transferred.

(9) The staffing positions, including matrix staff, to be provided for project execution.

3. <u>REVIEW, CONCURRENCE, AND APPROVAL.</u>

a. Major system acquisitions and major projects require Acquisition Executive approval of the project plan prior to or concurrent with Key Decision 1. The Headquarters concurrence chain for the plan includes the Chief Financial Officer, Director of Administration and Human Resource Management, General Counsel, Director of Procurement, Assistance and Program Management, and the Assistant Secretary for Environment, Safety and Health.

(1) Concurrence and approval can be facilitated if these offices are provided with copies of the plan for concurrent review before forwarding for Acquisition Executive approval. The reviewing organizations shall take no longer than 2 weeks to complete their action.

(2) The concurrences of the Director of Procurement, Assistance and Program Management and the Chief Financial Officer mean that the business management, procurement, and financial information presented in the plan are consistent with Departmental business/financial practices, project requirements and budget requests. The Director of Procurement, Assistance and Program Management concurrence further confirms that the acquisition strategy reflected in the plan is consistent with applicable Federal and Departmental procurement or financial assistance policies and regulations. The Associate Director for Program/Project Management and Control concurrence confirms that the plan is consistent with applicable OMB and DOE major system acquisition policy, circulars, and directives. Assistant Secretary of Environment, Safety and Health concurrence, in turn, independently confirms that the plan adequately addresses project conformance with applicable environmental, health, safety, and quality assurance requirements.

b. Timely review and approval of major system acquisitions and major project plans are essential. In order to ensure timely review and approval:

(1) The off ice of the responsible Program Secretarial Officer is the focal point for managing the Headquarters staff review and approval process.

(2) The Associate Director of Program/Project Management and Control is responsible for assuring the adequacy of project plans relative to Departmental policy and implementation guidance. Furthermore, the Office of Program/Project Management and Control maintains the DOE repository for project plans and provides oversight of the change control process.

(3) Acquisition Executive approval will be provided in the Key Decision 1 ESAAB Decision Memorandum. Project plan approval will be reaffirmed at Key Decision 2, 3, and 4.

PROJECT PLAN CHANGES

1. INTRODUCTION. The following requirements will be met for all project plan changes on major system acquisitions and major projects. Field office managers are responsible for change requirements for Other Projects. Such requirements should be consistent with those indicated here.

   a. Changes to approved Project Plans shall be in accordance with Chapter III, Part A;

   b. Only changes approved at the appropriate management level will be incorporated into Project Plans.

   c. The responsible project office will incorporate the approved changes. Each revised page or attachment to a Project Plan will include the revision number and the date revised.

   d. Each Project Plan will include a Project Plan Change Log which will contain:

      (1) The revision number;

      (2) A list of the pages that were revised and the revision date; and

      (3) The authorizing Baselines Change Proposal number.

   f. Whenever changes in a project would, under existing legislation, require notification to the Congress, such notification shall be provided with the Baseline Change Proposal. An example is a congressionally imposed limit on total project cost. This is approved by the PSO and submitted to Congress by the CFO.

   g. The cognizant project office will be responsible for preparing all requested changes. The cognizant program office will prepare all directed changes.

GUIDANCE FOR PREPARING A PROJECT MANAGEMENT PLAN

1. OVERVIEW. The project management plan (PMP) is the document which sets forth the plans, organization, and systems that those responsible for managing the project shall utilize. The content and extent of detail of the PMP will vary in accordance with the size and type of project and state of project execution. The plan is developed by the managing organization and approved by the Head of the Field Element following review by the cognizant program office and other offices as deemed appropriate. The plan should be kept current as the project progresses and an annual review of the plan, with appropriate updating of sections, should be made by the managing organization to assure that it is current. The document may be of the magnitude described here, if the effort is a major system acquisition or a major project: or it may be as simple as a memorandum of understanding between the project manager and other interested parties, if the project is small. See Attachment II-5. The content should include the data described below.

2. THE PROJECT MANAGEMENT PLAN.

a. Introduction. This section should provide an overview of the sections which follow and describe in general the project's purpose, scope, primary participants, and contracts. It should reference other project documentation including the justification of mission need, the project plan, which includes the project charter and indicate subsequent plans which are to be developed (e.g., environmental, quality assurance, safety, and configuration management).

b. Objectives. This section should expand the specific measurable objectives of the project delineated in the project plan. The following types of objectives shall be stated:

(1) Measurable technical and economic objectives in terms of design criteria or performance capability;

(2) Schedule objectives for major items on the project critical parts showing their relationship to the project summary work breakdown structure elements; and

(3) Cost objectives for work breakdown structure level one, two, and three elements and their relationship to the total project cost provided in the project plan.

c. Management Organization and Responsibilities. This section consists of descriptive text accompanied by appropriate organization charts. The charts should be comprehensive in scope and at a level of detail consistent with the current project phase of the acquisition cycle, and should show significant project interfaces as well as lines of authority, responsibility, accountability, and communication. Definitions should be provided for all significant interfaces in the project such as between project geographic locations, functional units, and contractors. Any interface management control techniques that will be utilized should be explained. Where there are industry or utility partners, the partners should be identified and the management relationships, their role in management, and implementation of the project should be described; also, existing agreements (cost sharing and other) with them or the status of agreements still to be negotiated should be referenced. The staffing plans for the project organization should be described in detail; this will include both the present staff organization and future staffing plans, the mix of dedicated project staff, grade levels, and the manpower plan by fiscal year.

d. Work Plan. This section should describe in detail what is going to be done and how it should be accomplished in accordance with the project summary work breakdown structure. The major subsystems or elements being developed or constructed, relating to the level two and associated level three elements, should be described in detail. Summary system design descriptions relating project performance requirements and design parameters should be provided. Each phase of project activity should be described, including what is to be accomplished in the current and subsequent phases of the acquisition cycle and the products to be developed. The technical criteria for project design and construction should be defined including environment, safety and health requirements; codes, standards, and specifications of Federal, State, and local Governments and their agencies; industry and trade organizations; and intermediate technical goals and milestones to measure accomplishment. A discussion of quality assurance as it relates to the project, containing the status of development of the quality assurance plan for the project, should be included. A description of the structure and links between all quality control and/or quality assurance elements, identification of responsible individuals, and a description of the interaction and coordination among various quality control and quality assurance functions should be provided.

e. Work Breakdown Structure. This section should briefly discuss the role of the work breakdown structure in the management of the project. Provide the project summary work breakdown structure, dictionary, and element definition to Level 3.

f. Schedule. This section should expand upon the project schedule attachment to the project plan, show at level 3 of the project summary work breakdown structure the integrated schedules of all project effort including related research and operations, and disposition. These schedules should use standard DOE symbols and contain the following:

(1) Key project activities, by applicable phases of the acquisition cycle;

(2) Key aspects of the project described in the work plan section;

(3) Identification of all required Acquisition Executive key decisions and equivalent program Secretarial Officer decision points;

(4) Significant milestones (particularly those on the critical path) by which progress of the project can be measured, including required environmental documentation; and

(5) Milestones for major approval/concurrence/coordination requirements from other Federal or State agencies or officials.

g. Logic Diagrams. Depict the proper sequencing of all project elements, reflecting the work plan and schedule for the project. The logic diagram shall portray the critical path of activities/events for the project. It shall set forth all major activities, milestones and activity interface relationships and cover related research and development, remaining planning elements, criteria development, land acquisition, utility acquisition and appropriate National Environmental Policy Act documentation. It should also cover directly related elements charged to operating or capital equipment not related to construction accounts.

h. Performance Criteria. Expand upon the technical objectives found in the project plan, and state in measurable, quantitative terms, the performance criteria for major subsystems (at a minimum for each level two element of the project).

i. Cost and Manpower Estimates. Provide cost and manpower estimates for each project summary work breakdown structure level two and three element for the duration of the effort by fiscal year to the degree feasible, using the cost objectives stated in the project plan,

j. Project Functional Support Requirements. Referencing the project charter, describe in brief summary the relationship between the project office, field organization, and Headquarters with respect to the project/functional organization structure. Describe lines of authority, operating interrelationships, areas of responsibility, and procedures for resolution of conflict between responsible organizations.

k. Project Management, Measurement, and Planning and Control Systems. This section describes the integrated systems that shall be used to manage the cost, schedule, and technical performance of the project. This section shall also address funds management and control. Items which should be addressed include the project management philosophy toward project control goals, and objectives and integration of the systems. Each system shall be discussed with respect to required documentation, level of control, relationship to other systems documentation and change control procedures to be utilized.

l. Information and Reporting.

(1) This section briefly summarizes all pertinent project documentation, including the document number and dates of original issuance and latest revision.

(2) Describes contractor reporting requirements as required by the uniform reporting system and reflected in the various contracts and/or agreements concerning the project.

(3) Provides a description and an indication of the frequency of project reviews that shall be used to keep Departmental management apprised of project progress and problems from contractor reviews to project management through reviews for DOE Headquarters management.

m. Systems Engineering Management. Where systems engineering is an integral part of project execution, this section should describe the extent to which systems engineering shall be used, how the process should be managed, and who should be responsible for various aspects of management. Chapter III, Part B, contains a discussion of systems engineering and a sample systems engineering management plan.

n. Configuration Management. This section describes the details of technical interface management and control during project execution. The configuration management plan should highlight the establishment and operation of a Configuration Control Board (CCB), and the identification, recording, and reporting of product interface data. Chapter III, Part C, discusses the content of a typical configuration management plan and the workings of a CCB.

o. Contingency. This section shall outline the conditions for use and the responsibility for approval of contingency funds during execution of the project.

p. Quality Assurance. A section which contains the quality assurance program elements for an activity, group of activities, or a project and describes how conformance with such requirements is to be assured for such structures, systems, components and their operation commensurate with: (1) the system complexity, duration and importance to satisfactory performance; (2) the potential impact on environment, safety and health; (3) requirements for reliability and a continuity of operations; and (4) reporting of unusual occurrences and remedial actions.

g. Utility Services. This section defines specific actions being taken on the project to assure availability of reliable utility service for both project activities and operation.

r. Responsibility Matrix. A responsibility matrix is a two-dimensional delineation of project actions/decisions and those responsible for carrying them out. Figure II-11 below is a sample of a typical responsibility matrix. This tool is intended to allow all personnel and organizations involved in the project to ascertain quickly the roles played by everyone in project planning and execution.

s. Annexes. The project management plan shall contain three annexes: Annex I - Advance Acquisition or Assistance Plan, Annex II - Test and Evaluation Plan, Annex III - Environmental, Safety, and Health Protection Implementation Plan. When comparable documents exist, these documents may be referenced instead of included as part of the project management plan.

(1) Annex I - Advance Acquisition or Assistance Plan. (See Chapter II, Part E.) This plan describes the objectives and functions of acquisition or assistance. Attachment II-7 describes its content.

(2) Annex II - Test and Evaluation Plan. (See Chapter III, Part B.) The scope of the test and evaluation plan is dictated by the size, complexity, and technical risk associated with the project. This annex is detailed to the extent necessary to show the rationale for the kind, amount, and schedule of the testing planned for the project. Attachment, III-3 illustrates a typical test and evaluation plan approach. Attachment III-4 is a comprehensive test program example.

Responsibility Matrix

Organization / Decision	Program Manager	Office Manager	Project Manager	Project Engineer	Controller
Change in Budget					
Allocate Manpower					
Change in Design Specification					
Change in Schedule					

R = Responsible A = Approve C = Consult I = Inform

Figure II-11
Responsibility Matrix

(3) Annex III - Environmental, Safety, and Health Protection Implementation Plan. (See Chapter II, Part F). This annex defines specific actions being taken on the project to comply with existing directives on environment, safety, and health issues. These actions include environment, safety and health policy; organization; training; preparation of safety analyses, National Environmental Policy Act documentation, and environmental permits; reviews and audits; reporting of unusual occurrences and remedial actions; and related management implementing procedures to protect the health and safety of employees and the public, and to minimize risks from hazards to life and property. DOE/EV-1032 Environmental Compliance Guide and DOE 5480.1A provide complete details on environmental planning for the project.

t. Submission and Approval. This section shall begin on a separate page. The signature page for the project management plan shall include the following:

(1) Submitted by: Project Manager

(2) A paragraph that contains a brief statement of the work that is approved (e.g., Approved: Head of the Field Element).

u. Review and Concurrence. Timely review and concurrence of project management plans are essential. The specific sequential steps in the review and approval of project management plans are as follows:

(1) Step 1. The project manager notifies the program manager and the field office that preparation is beginning on the draft plan or update.

(2) Step 2. The project manager submits for review and comment one copy each to the program manager, the Head of the Field Element, and other offices deemed appropriate.

(3) Step 3. The field element, program manager and other reviewing offices submit comments to project manager (within 14 workdays).

(4) Step 4. The project manager prepares the approval version in accordance with comments on the draft plan.

(5) Step 5. The project manager sends one copy of the approval version to the program manager for concurrence.

(6) Step 6. The program office sends concurrence or a list of deficiencies to the project manager (within 7 working days).

(7) Step 7. If critical deficiencies exist, the project manager ensures that the project management plan is corrected to eliminate deficiencies and obtains program manager concurrence.

(8) Step 8. After obtaining program manager concurrence, the project manager forwards the project management plan to the Head of the Field Element for approval.

(9) Step 9. The Head of the Field Element approves the project management plan and returns the plan to the project office.

PLANNING GUIDANCE FOR OTHER PROJECTS

1. Projects other than major system acquisitions or major projects need careful planning. The principal responsibility for initiation of other projects lies with the Head of Field Element. He or she shall develop and implement procedures for project managers to follow.

   a. Project Manager Appointment. As the size of projects diminishes, there is less likelihood of a formal appointment of a project manager and establishment of a project charter. This does not mean that there will not be responsible people, but simply, that the responsibility shall be understood rather than officially delegated in writing. This expedient can create problems, but its reality must be recognized.

   b. Project Management Tools. Local procedures will differ in terms of managing other projects, reflecting the management concepts of the field element. There are certain requirements that project managers shall meet in order to effectively manage the project. These requirements include:

      (1) Effective planning;

      (2) Realistic scheduling;

      (3) Realistic budgeting;

      (4) Identification of key personnel; and

      (5) Proper change control.

   c. Planning Checklist. Before starting any complex planning sequence, it is valuable to have a checklist of what shall be done. The process can save the project from aborted planning efforts, redundant actions, and forgotten details.

2. OTHER PROJECT MANAGEMENT PLAN. A project management plan is necessary, but it does not have to be elaborate. In some instances, a generic PMP may be sufficient. Even if the project is part of a larger one that has its own overall PMP, it is still necessary for managers to have a plan from which to work. The essentials of a PMP are as follows:

   a. A summary of the project that can be read by anyone in a few minutes and that will provide an understanding of the essentials of the project. It states briefly what is to be done and may mention the methods and techniques to be used. It lists the deliverable end products in such a way that when they are produced they can be easily identified and compared with the plan.

b. A list of tangible and discrete milestones, identified in such a way that there can be no ambiguity about whether a milestone has been achieved. In general, the number of milestones shall correspond to reasonable dollar portions of the project budget in order to provide adequate monitoring.

c. A Work Breakdown Structure that is detailed enough to provide meaningful identification of all tasks, plus all higher-level work groupings.

d. From the milestone list and the WBS, an activity network that shows the sequence of the elements of the project and how they are related (which ones can be done concurrently, which can start only when another is finished, and so forth). This is more useful than just marking end points on bar charts.

e. Separate budgets and schedules for all the elements of the project that some individual is responsible for.

f. An interface plan that shows how the project communicates with the rest of the world, most particularly with the contractor, but also with Departmental line or staff organizations that are involved.

g. An indication of the reporting and review process--what reports are needed, who reviews the project, when, and for what purpose.

h. A list of key project personnel and their assignments in relation to the WBS. Key personnel are those responsible for the various phases of the project.

3. PROJECT MANAGEMENT PLAN CONSIDERATIONS.

a. Work Breakdown Structure. Each project, no matter how small, shall have a two- or three-level WBS. It is easy and efficient to review a plan on paper and see how things are organized and where each piece fits. The WBS also becomes a handy tool for estimating, scheduling, and reporting, as well as a checklist for what is going on. Chapter II, Part B, and the WBS guide DOE/MA-0040 describes the WBS as a project tool.

b. Master Milestone Schedule. Each element of the project has its own set of milestones. The PMP, therefore, needs a master milestone schedule. The schedule has two functions:

(1) It shows the time phasing and relationships of the different jobs to be done, indicating which can be done in parallel and which must be done in series, or where overlaps are possible; and

(2) It serves as a basic management tool for monitoring progress.

c. Project Budget. When a project is initiated, funds are allocated for its execution and are expended over some period of time. As time progresses, however, the project manager will find that managing the project to the total budget amount rather than by a rate of expenditure will be inadequate. The project manager should be able to estimate the rate of expenditure as a function of time and plot it on a graph.

(1) Other Direct Charge (ODC) items can present a problem throughout the life of the project since they often do not appear in the cost reporting system until long after they were incurred. To make the planned budget look more like the actual reported costs, it might be wise to build in a time delay for the ODC items that can be foreseen.

(2) The project budget shall consist of a set of plots of expenditures versus time, one for each project element and one for the total project. As the work is being done, one can plot reported actual expenditures on the same graphs, note the variances and then determine from the plan, the reasons for any large deviations. By tying budgets and costs to specific pieces of work, it is possible to determine the true cost variance using the “earned value” technique.

d. Key Personnel. Key personnel are the people who cause things to happen, and are differentiated from others in that they exercise judgment and discretion in deciding how a thing is to be done, who is to do it, and when it is to be done. A key employee controls the day-to-day expenditure of the part of the project budget for which he or she is responsible. The number one key person is the project manager; other key persons are those that have been delegated some responsibilities. For purposes of the PMP, a list of the names and titles (or responsibilities) of the key people on the project is necessary. The list may be needed in preparing periodic project reports. Moreover, it is a form of insurance in case the project manager is removed from the project by sickness, accident, emergency, or sudden draft for another job need. Anyone who has to take over will find his or her job easier if it can be seen at a glance who the key persons are and what their functions have been.

e. Project Reporting and Review. The PMP shall include a reporting and review plan. In planning for reviews of projects, two kinds of reviews shall be considered.

(1) Project Manager Review. The project manager shall be sufficiently close to the project so that the status is known all the time. This is normally assured by the reporting system output. Most projects, however, have certain points where it is appropriate to assess the status of all the parts. These points are usually easy to identify--for example, the end of requirements analysis and the beginning of

the design phase; or the end of the design phase, before implementation is started. Care shall be taken in scheduling periodic reviews in the form of project review meetings unless there is something positive to be expected.

(2) Management Reviews. The field organization may have a policy of periodic review of all projects. Find out when these reviews are scheduled and show them in the PMP. If none are scheduled, there shall be an agreement with management as to when the project shall be reviewed, and this too shall be shown in the PMP.

(3) There must be some plan for an orderly review process. Do not assume that it is possible to keep track of everything informally, even if the project is small. Management will want to know the status of the project, and the project manager must have good information to give them. Be sure to allow time in the schedule for preparation of such reviews, as well as money for travel or other expenses of preparing a presentation.

4. PROJECT CHANGES. Changes are normal and to be expected, but unless they are made in an orderly way they can lead to chaos. The PMP contains all the essential data on the project. When significant changes occur, the PMP should be revised and all concerned parties shall be notified. Changes should not be made without previous evaluation of all repercussions. There are several types of changes:

a. Technical Changes. Consider the consequences on cost and schedule. Evaluate the elements of the project that interface with the one changed.

b. Schedule Changes. Evaluate the effect of schedule change on the other parts of the project that may be dependent on it for inputs. Does it affect the delivery dates of the deliverables? Has the contracting officer been notified? Will it result in increased costs?

c. Cost Changes. Are the unexpected costs within budget constraints (contingency reserve), or will they cause an overrun? Can an overrun be justified? If so, have the contracting officer and appropriate levels of management been notified? An explanation should be provided.

d. Personnel Changes. If key personnel have changes, will deliverable dates be affected? Does the new person have all the information necessary. Are any contractual requirements affected? Is the former person available for consultation, if needed?

e. When any change is made, the project manager shall do the following:

(1) Revise the project management plan, making sure that all concerned parties are notified;

(2) Evaluate all the consequences of the change and make sure that all affected parts of the project (including budget and schedule) reflect the change; and

(3) Ensure that program manager is requested to change the project plan if there is a revision to the project baseline.

BUSINESS STRATEGY GROUP AND ACQUISITION STRATEGY

1. INTRODUCTION. The following procedure describes the role of the business strategy group in developing acquisition strategy for a DOE project. The procedure is related predominantly to major system acquisitions and major projects, but may be used in an abbreviated form for other significant projects.

2. DEFINITION. A business strategy group is an ad hoc group of experienced functional specialists established to furnish recommendations to program or project managers relative to the business aspects of large projects. Membership of the group may vary depending on the nature of the project and its relation to other projects, the stage of development of the project life cycle, and whether or not the group is responding to a significant change or problem with an ongoing project requiring current reassessment of strategy as previously planned.

3. RESPONSIBILITIES AND AUTHORITIES.

   a. The Director of Procurement, Assistance and Program Management, in consultation with the cognizant Program Secretarial Officer (or their respective representatives), establishes business strategy groups for the purpose of furnishing recommendations on major system acquisitions and major projects to program or project managers developing acquisition strategies, project management plans, which include advance acquisition or assistance plans, and other purposes.

   b. Director of Field/Headquarters Liaison or Field Procuring Activities or their designees shall:

      (1) Establish business strategy groups at the request of program or project managers, or their representatives, for projects other than those designated major system acquisitions and major projects, to furnish the program or project managers with recommendations for the development of acquisition strategies, advance acquisition or assistance plans, and for other purposes.

      (2) Serve as chairperson unless the cognizant Assistant Secretary or his representative requests that a senior program management official serve as chairperson in connection with Headquarters initiated business strategy groups. In this later case, the Director of Field/Headquarters Liaison or heads of field procuring activities (or their designees) shall serve as a member.

c. Heads of Departmental Elements, when called upon, shall furnish knowledgeable representative(s) to participate in the business strategy groups. These representatives shall be of sufficient professional stature to provide meaningful and authoritative input to the business strategy groups in their respective areas of expertise.

d. The Business Strategy Group Chairperson:

(1) Determines the functional disciplines that shall be represented at a business strategy group and requests participation from the appropriate organizations;

(2) Convenes and leads the discussion of the business strategy group in order to formulate the recommendations; and

(3) Designates, from the chairperson's organization, a secretary to the business strategy group, who prepares the recommendations report for the chairperson's signature and distributes the completed report.

e. Program or Project Managers furnish appropriate background information on the project to the chairperson for review by the members of the group prior to the meeting and attend meetings of the business strategy group.

4. PROCEDURAL AND OPERATING GUIDANCE.

a. Business Strategy Group Participants. Participants normally include the following individuals: The chairperson, a secretary, the program or project manager (depending upon the purpose for which the group is established), the cognizant contracting officer (if known), and representatives from the following Headquarters (or equivalent field) organizations: General Counsel, Chief Financial Officer, the Office of Procurement, Assistance and Program Management and, the Office of Environment, Safety, and Health. Depending upon the circumstances, representation from other functional or staff organizations, such as personnel and labor relations, may also be required. In the case of a business strategy group established to provide recommendations relating to the development of a project acquisition strategy, if the field organization that will have management responsibility for the project has been determined, representatives from that organization shall also be invited to the meeting.

b. Topics Considered by a Business Strategy Group. The Chairperson, in coordination with the members, develops a list of topics to be considered and furnishes this list to members prior to the first meeting of the group. This list is tailored to the particular circumstances and requirements of the project and situation involved. A list of topics which would typically be considered by a business strategy group held to advise program or project managers on the development of a project acquisition strategy is contained in paragraph 5, below. Attachment II-7 contains a description of topics which would typically be considered by a business strategy group held to advise project mangers on the development of an advance acquisition or assistance plan. Because the interrelationships between topics are often as important as the topics themselves, the business strategy group considers these interrelationships in its deliberations, as well as the topics themselves.

c. Organization and Direction of a Business Strategy Group. The official requiring the establishment of a business strategy group does so in a memorandum to the Director of Field/Headquarters Liaison (PR-132), or if initiated in the field to the cognizant procuring organization, with a copy to the program and project managers. This memorandum requests the designation of the chairperson and the convening of the business strategy group. The designated chairperson, along with the program/project manager (if different), determines the appropriate functional specialties to be represented on the business strategy group. After this determination has been made, the chairperson asks each of the organizations that will be represented to designate a member. The program or project manager provides the chairperson a draft of the acquisition strategy statement, advance acquisition or assistance plan, or other documents on which the group will be providing recommendations, together with any other available background information that would help the group understand the project and its objectives. Once the membership has been determined, the chairperson sends a memorandum to each member stating the purpose of the business strategy group and outlining the issues that will be considered by the group, together with the project background information, the agenda, and time, date, and place of the meeting.

d. Distribution. The recommendation is prepared and furnished by the chairperson to the cognizant program official. No particular format is specified for the recommendation, but it should include a summary of the purpose for establishing the business strategy group, a listing of the members, a summary of the topics discussed, and the conclusion and recommendations of the group. Copies of the recommendation are furnished to each member of the business strategy group. A copy for all business strategy groups established at Headquarters or in the field shall be furnished to the Director of Field/Headquarters Liaison. The recommendation shall generally be distributed within 10 working days of the meeting.

e. Termination of a Business Strategy Group. A business strategy group is terminated after submittal of its recommendation. A copy shall be retained in the project file. If a subsequent meeting is considered necessary to provide advice regarding the same project, to the extent possible the same members as those participating in the first business strategy group(s) shall be designated for participation in the subsequent group.

5. ITEMS FOR CONSIDERATION - ACQUISITION/STRATEGY BUSINESS STRATEGY GROUP. The following list of topics includes matters which would typically be considered by a business strategy group held to provide recommendations to the cognizant program official on the development of an acquisition or assistance strategy and an advance acquisition or assistance plan for a project. The list is not all inclusive nor will all business strategy groups held for this purpose necessarily consider all of these topics. The exact list of items to be considered by a business strategy group shall be tailored to the state and the particular characteristics of the project.

a. OMB Circular A-76 concerns - role of public versus private sector and determination of appropriate technical, cost, and management risk balance among the parties involved.

b. Role of other governmental bodies, laboratories, operating and management contractors, and non-profit organizations.

c. Methods of obtaining and sustaining competition, including use of multi-phase contracts and parallel development.

d. Lessons learned from past similar projects.

e. Project and construction management responsibility, including responsibility for and method of site acquisition.

f. Plan for cost sharing and/or contractor incentives in light of project risk balance and potential benefits for contractor. This topic includes consideration of the structure and capabilities of the industry involved and the interest of firms and/or the users of the project results.

g. Project-to-project and project-to-program relationships.

h. Susceptibility of the schedule to change and the impact on contractual strategy.

i. Preliminary contracting plan, including use of procurement or financial assistance; general method of contracting and types of contracts, any perceived requirements and scheduling for establishment of source evaluation boards and/or architect-engineer devaluation boards; procedure and justification for any noncompetitive procurement, general solicitation/invitation content and timing; and tentative qualification (if any) and evaluation criteria.

j. Demonstration and test criteria - adequacy of criteria and testing time allowed.

k. Licensing, royalties, and receipts.

l. Preliminary plan for disposition of patents and data rights.

m. Independent cost estimates.

n. Funding plan and risks of reduced funding.

o. Organizational conflict of interest concerns.

p. Participant responsibilities for obtaining necessary permits and environmental approvals.

q. Environmental, safety, and health and quality assurance considerations.

r. Plan for site, facility, and equipment disposition at the end of the project. Includes site restoration and transfer of title.

s. Use of options and/or follow-on considerations.

t. Long-lead time items impact.

u. Government furnished property.

v. Public release of information - press releases.

w. Security.

x. Preliminary work breakdown structure.

y. Lease versus buy.

z. Incentives.

aa. Liquidated damages.

bb. Breakout of requirements for small or minority business.

cc. Real estate aspects.

dd. Multiple awards.

ee. Project organization/staffing.

ff. Pre-award survey requirement.

ADVANCE ACQUISITION OR ASSISTANCE PLAN

1. PURPOSE. Annex I to the project management plan is an Advance Acquisition or Assistance Plan (AAAP). The document is to be detailed to the extent necessary to provide a clear understanding of how DOE is to accomplish its acquisition or assistance process for the project. An AAAP is to provide a description of the contractual means by which the project's acquisition strategy will be carried out. Use of an AAAP aids in reducing procurement lead time and ensures consistency in the preparation of project contractual execution documents by providing contracting officers and others involved in project management with specific information about project business objectives. In addition, the AAAP or the documentation which normally accompanies it provides these personnel with an understanding of overall project goals. The AAAP also serves as a lessons learned checklist to help bring to the attention of the project manager and the business advisor(s) to the project manager items that have been found to be of significant importance in the contractual execution of past projects. It is a means for considering all of the diverse, interacting factors which affect the contractual implementation of a project and developing a coordinated plan for dealing with those factors. An AAAP is prepared as an annex to the project management plan (PMP) for each major system acquisition (MSA) or major project. The use of an AAAP is encouraged for other projects. Acquisition or financial assistance planning is initiated at the earliest practicable time in the project life cycle. This is normally just after project approval for those projects which do not have a mission need statement prepared. Thus, the initial acquisition or assistance planning commences concurrent with project budget planning. This initial advance acquisition and assistance planning is summarized (for major system acquisitions and major projects) in the acquisition strategy section of the project plan and for all construction projects in construction planning and budget exhibit documents.

2. CONTENT OF AN ADVANCE ACQUISITION OR ASSISTANCE PLAN.

   a. An AAAP is entitled: "ADVANCE ACQUISITION OR ASSISTANCE PLAN FOR (Name of Project)." If a project management plan is not prepared for a project, or if the AAAP is submitted separately from the project management plan, then the following additional information is also required at the beginning of an AAAP: (1) the cognizant Headquarters program manager, (2) the cognizant field project management organization, and (3) the Project Information Control System (PICS) project number of MSA's and major projects. The AAAP is signed by the project manager, concurred in by the contracting officer, and approved by the operations office manager.

b. Paragraph 3 below lists the elements of an AAAP. The items of information included in the subparagraphs under paragraph 3 are commonly included in an AAAP. This listing is not intended to be all-inclusive, nor will all such plans include all of this information. However, each of the elements should be considered for inclusion where appropriate in an AAAP. If a particular item of information described in that paragraph is provided in an attached project management plan or in another attached document (such as a project plan) which accompanies the AAAP, then the only entry needed for that item of information in the AAAP is a reference to where that information is located in the other attached document. In this case, the information contained in the other document is incorporated by reference into the AAAP, and if a change is made to the referenced information, this constitutes a change to the AAAP.

c. If an element listed in paragraph 3, below (other than those described in subparagraphs a through g) is not applicable to a particular project, the AAAP for that project includes only the title of the element followed by "N/A."

d. The amount of discussion in a particular element of an AAAP will vary depending upon the overall size and complexity of the project as well as the significance of that particular item in the project. If an item of information which the project manager deems appropriate for inclusion is not available at the time that the AAAP is prepared, that fact is stated as an entry for that item together with a statement indicating when the information will be available. When the information subsequently becomes available, it is distributed as a change to the original AAAP.

3. ADVANCE ACQUISITION OR ASSISTANCE PLAN ELEMENTS.

a. Description of the Project Work. This element includes discussion of the followlng items:

(1) The overall project objectives in terms of the established technical, cost, and schedule baseline objectives to be attained as well as a description of the major phases and decision points of the project, which will be reflected in the manner in which major contracts are structured.

(2) The applicable “principal purpose” of the project in terms of either procurement (acquisition) or financial assistance. This would include a reference to the applicable “Principal Program Determination” (PPD) made pursuant to public Law 95-224, “The Federal Grant and Cooperative Agreement Act of 1977,” if such a determination has been made.

(3) Identification of the technical and contracting organizations that will have primary responsibility for the project. This includes a statement about the capability of the cognizant contracting organization to carry out this responsibility in terms of available, experienced staff. The identification should also include a description of the manner (dedicated staff, matrix, or other) in which administrative support will be provided to the project.

b. Funding Plan. This element consists of a description of the present authorization and appropriations for the project and planned requests for budget authority. It also includes a statement about the risk of possible funding changes and the impact that these changes would have on planned contracts and contractual provisions. For example, if a reduction in the overall project funds is a significant threat, this element would address how funding would be made available for contract termination costs.

c. Award Schedule. To the extent to which it can be determined at the time the AAAP is prepared, this schedule describes the projected items for which a separate award is to be made, the type of award, the estimated amount, the dates that procurement/assistance requests are planned to be delivered to the contracting offices, and target-dates for award and contract completion for all planned procurement contracts or financial assistance awards of $1 million or more. This information can be depicted in graphic form. An important consideration in developing the schedule is to plan for phased awards and reselections (if parallel development is employed) to eliminate gaps in project effort and unnecessary contract extensions. Another consideration is to fit contractual actions together so that, if appropriate, data resulting from one award is available for use in Departmental decisionmaking or under other project awards. The schedule must incorporate appropriate contractual action lead times for the type and magnitude of contract involved, including those for support services and Source Evaluation Board activities. The schedule of contractual actions should be organized according to the work breakdown structure. If a significant number of award actions will be sent to the cognizant contracting office for accomplishment in the same time period, some indication of the relative priority of these actions should be included in the schedule or in an accompanying narrative.

d. Discussion of Project Risks. This element contains a description of the desired balance of project risks (i.e., cost, technical, schedule,) between the Government and potential contractors. The element should also describe how this desired balance is to be contractually implemented. This includes discussion of anticipated tradeoffs regarding project management responsibility, the anticipated degree of interest which potential contractors have in the project, and the cost participation negotiating plan, if applicable. Another topic that would be included is the extent to which contractual award fee provisions and/or cost, technical, and schedule incentives will be used to alleviate potential project risks for the Government.

e. Source Selection. Source selection of architect-engineer contractors is guided by Interim Procurement Regulations Handbook No. 2, "Architect Engineer Selection Procedures." Source selection of other major contractors is guided by DOE/MA-0154, Acquisition Regulations Handbook Source Evaluation Board (SEB). The SEB Handbook treats this subject in more detail. This element consists of discussion of the following items:

(1) The means by which sources of expertise in the private sector will be selected to assist in or carry out the project activities. This includes a description of the means by which competition will be obtained and sustained in the performance of these activities, such as through use of parallel development contracts containing options for extension from one phase of the project to another. If such contracts will be used, the basis for deciding whether to exercise the options should be discussed.

(2) The types of solicitation documents that will be used to obtain proposals for performing the project work, including qualification criteria (if any) and evaluation criteria to be used in judging those proposals.

(3) The extent to which functional as opposed to detailed specification statements of work will be employed in concept development and other project research and development and design contracts. If appropriate, a statement is also included discussing the degree to which commercially available products and services will be acquired when possible in preference to acquiring a Government-unique item. Any opportunities for grouping requirements within this project and with other projects to obtain quantity discounts should be addressed. If the project involves repeated procurements of the same item over a period of years, the possibility of using multiyear procurement procedures should also be discussed.

(4) Requirements for any special contractual provisions not discussed in other parts of the AAAP. This would include, for example, provisions in long leadtime acquisition contracts which cover non-site-specific as well as site-specific items to alleviate the impact of delays that might occur because of problems in obtaining approval to perform the project at a particular site. It would also include award fee provisions incorporated in accordance with an Award Fee Determination Plan (see DOE/MA/06007-1, "Types of Contracts and Agreements Guide (Plan 1)").

f. Anticipated Contractors and Participants. This element describes the types of project contractors or participants. Because their presence may create special contractual needs if other Government agencies, consortia, advisory committees, nonprofit organizations, laboratories, other operating and onsite service contractors, or integrating contractors will be involved in a project, their roles and any special contractual arrangement(s) governing their roles should be described in this element. If a justified noncompetitive award is planned to be made to an organization that has not previously received a DOE award, this fact should also be noted.

g. Socioeconomic Programs. This element describes the contribution which the project is expected to make to DOE's socioeconomic programs (e.g., anticipated utilization of small and small disadvantaged businesses, labor surplus areas, and women-owned businesses), as described in the Annual Call for Goals required by Public Law 95-507 as implemented annually by the Office of Management and Budget guidance. This contribution can occur through either prime awards or subcontracts. A contribution could be achieved, for example, through use of the small business set-aside for construction procurement actions.

h. Equipment and Supplies. The information in this element forms the basis for planning the provision of project equipment and supplies. Included in the element are the following items:

(1) A description of any equipment or supplies to be furnished by the Government or a third party, as well as a generic description of contractor-furnished equipment and supplies.

(2) This element also discusses which party will ultimately receive title to Government-furnished equipment as well as the Government's rights to restore or abandon this equipment. Questions of equipment disposition should be considered early in the project life cycle, when the positions developed as a result of this consideration can influence the Government's negotiation strategy where appropriate. If title to such equipment is to be vested in the contractor, this element also includes a reference to the statutory authority for vestment and, if appropriate, any congressional notification required for vestment.

(3) If computer equipment must be purchased by the Department for the project, the element should discuss plans for coordination with the Headquarters Office of ADP Management (MA-24), preparation of an Automated Data Processing Implementation Plan and the submittal of a request to the General Services Administration for a Delegation of Procurement Authority to DOE, in accordance with DOE 1360.1.

i. Anticipated Organizational Conflict of Interest Concerns. This element includes an explanation of any such concerns together with a statement about whether legal counsel has been consulted and, if so, the results of such consultations.

j. Patents and Data. Any special provision requirements for patents generated in the course of an award are discussed in this element, as well as any other anticipated issue involving patent and data rights or licensing, such as possible problems with obtaining Government rights because of background patents.

k. Reporting Requirements. General types of reporting that will be required for administration of each contract under the Uniform Reporting System are listed in this element.

l. Receipts. Any anticipated receipts, such as from royalties, sale of products, fees, and other charges for services and special benefits, and sale of Government property including scrap, should be described in this element. All such receipts are described and estimated by fiscal year over the life of the project.

m. Non-Government Participation. This element should describe the means by which potential contractors or participants and ultimate users have been and should be involved in the development and implementation of the project acquisition strategy and the work description for major projects awards. This would include any plans for having these parties comment on draft solicitations for major contracts and for holding presolicitation conferences.

n. Site Selection and Acquisition of Real Property. Acquisition of title, and, in some cases, lesser interests in real property requires a formal site selection. Site selection and acquisition of real property must follow DOE policy as stated in DOE 4300.1A, REAL ESTATE (REAL PROPERTY) MANAGEMENT, of 7-7-83. This element describes any plans for site selection and real property acquisition and ultimate disposal, including the party responsible for it, with particular emphasis on any implications of these actions on project contract provisions. Also included are plans to contract for utility services for the sites, including a statement about whether the provision of such services will necessitate an increase in capacity for the local utility.

o. Use of Other Procedures. If other procedures, such as design to cost, life cycle costing use of surveys, questionnaires, or warranties which will require special contractual provisions, will be used in the project, they are discussed in this element.

p. Other Information. Other information included in an AAAP would include a discussion of any aspect of the project not previously discussed which would have a serious impact on contractual actions or scheduling, such as the following:

(1) Any special congressional notifications or approvals required:

(2) Approvals or permits required from other organizations, such as from the Nuclear Regulatory Commission;

(3) Special Headquarters reviews and approvals such as those required prior to some sole source acquisitions (see DOE 4200.1C) or before the acquisition of such items as consulting services, periodicals, and audiovisual products; and

(4) Any anticipated protests of a planned contract award (such as might occur in a noncompetitive acquisition).

4. AAAP DEVELOPMENT AND APPROVAL PROCEDURES. Regardless of the size and complexity of the project, there should be an AAAP developed to cover the contractual aspects of the project. In developing and obtaining approval of an AAAP, the following procedures should be utilized:

a. For Headquarters-initiated projects, the project manager, with the advice and assistance of the Office of Procurement Support business advisor and a business strategy group, normally starts the development of the overall business strategy for a project after the approval of the Justification of Mission Need. This overall business strategy is summarized in the acquisition strategy section of the project plan. Initial advance acquisition or financial assistance planning is a natural product of this business strategy development process and is also reflected in the statement of that strategy contained in the project plan. Thus, initial advance acquisition or assistance planning starts after approval of the Justification of Mission Need. For field-initiated projects, the cognizant management organizations within the field element perform the functions above to develop the project business strategy and perform their initial advance acquisition or assistance planning.

b. The initial general advance acquisition and assistance planning, summarized in the acquisition strategy section of the project plan, forms the basis for development of the comprehensive AAAP. After project manager assignment, a draft AAAP is prepared with the assistance of the cognizant field office contracting officer (or representative). This draft AAAP includes elements appropriate for the particular project involved.

c. The draft AAAP is then submitted to a business strategy group for its consideration, if such a group is used to advise the project manager in developing the AAAP. The BSG reviews the draft AAAP in light of the project objectives and characteristics and includes any recommended changes to the AAAP in a report to the project manager. If a business strategy group is not used, the project manager obtains the necessary advice to complete the AAAP from different functional areas within the manager's own organization, from other Headquarters and field elements, and as appropriate, from supporting contractors.

d. The project manager, with the assistance of the cognizant contracting officer or representative(s), prepares the final AAAP, taking into account the advice received and the contents of the business strategy group report (if any). The plan is signed by the project manager and concurred in by the cognizant contracting officer prior to its approval by the operations office manager.

e. If a project management plan is prepared for a project, the AAAP normally becomes an annex to the project management plan and is reviewed and approved as a part of the project management plan. If a project management plan is not prepared for a project, or if the AAAP is submitted separately from the project management plan, the AAAP is then reviewed and approved in the same manner as is a project management plan. After approval, the AAAP is distributed to the cognizant contracting officer, the members of the business strategy group (if any) that provided advice on preparation of the plan, the program manager, and all other organizations involved in project execution. A copy of the AMP, together with the project management plan, if one exists, is also sent to Headquarters. The AAAP should normally be completed and distributed in time for it to be received in the cognizant contracting office and other offices involved in project execution at least 6 months prior to the time that the first procurement (or financial assistance) request for a project contractual action (other than for conceptual design activities) is scheduled for release.

CHAPTER III

PROJECT CONTROL

PART A CHANGE CONTROL AT THE EXECUTIVE LEVEL

1. INTRODUCTION. This chapter discusses the management of cost, schedule, and technical baselines of MSAs and MPs. Establishment and maintenance of baselines are the most important aspects of project control. Change to baselines must be carefully controlled to avoid loss of control and distortions in performance reporting.

2. OBJECTIVES. The objectives of this chapter are to:

   a. Assure cost, schedule, and scope baselines are clearly defined, documented and approved at Key Decision 1, approve New Start;

   b. Assure baseline changes are defined, documented, and approved, and authority and responsibilities for such approval are delineated;

   c. Provide assurance that decisions are made at the appropriate management level; and

   d. Enhance accountability and traceability in the DOE decision-making process.

3. REQUIREMENTS.

   a. Establishment of Baselines. Initial scope, cost, and schedule baselines for D0E executive level and field level control will be derived from the Conceptual Design Report (CDR) and related support documentation. These baselines will be reviewed and approved by the AE at KD 1.

   b. Baseline Change Decision-making Authority. BCCBs will be established at the D0E executive level (ESAAB and Program BCCBs, identified as Level O and Level 1 Boards, respectively) and DOE field level (Project BCCB identified as the Level 2 Board). Membership of the Level O Board will be the same as the ESAAB. Membership of the Level 1 and 2 Boards will be at the discretion of the respective board chairperson. Authority and responsibilities of each board are to be defined in its respective board charter. The BCCB Chairperson shall have full decision-making authority; a BCCB is an advisory, not a voting board. A BCCB Chairperson, at his/her discretion, may provide disposition of a requested change without conducting a board meeting.

   c. Baseline Change Authority Thresholds. The thresholds that shall be used to determine the appropriate management approval level for requested changes to project baselines follow.

Vertical line denotes change

(1) The Level O Baseline Change Control Board shall provide disposition for changes within the following thresholds:

Cost:	± $50,000,000 and greater
Schedule:	± 6 months and greater

(2) The Level O BCCB shall provide disposition for changes within the following thresholds:

Cost:	less than $50,000,000
Schedule:	less than 6 months to Level O Milestones

Authority thresholds for Level 2 Milestones will be established at KD 1.

(3) The thresholds for lower level boards will be established for each project at KD 1.

(4) Any change to scope baselines identified at KD 1 must be submitted to the appropriate level board.

(5) Any change which exceeds ± $50,000,000 but does not impact Level O scope may be approved by the Director of Procurement, Assistance and Program Management (PR-1). PR-1 may convene a Level O BCCB meeting for these changes if he/she deems it necessary. Any change that exceeds ± $50,000,000 and impacts Level O scope and/or TPC requires Level O BCCB approval.

(6) The cost threshold values identified above are the estimated costs of a change, (design, construction, and testing costs) regardless of source of budget and funding (increases or decreases to Total Estimated Costs (TEC), Total Project Cost (TPC), or available contingency as defined in Attachment 3 of this order).

d. Baseline Change Decision-making Process Time. Initiators of requested changes will designate each change as either “priority” or “routine.” The allowable change processing timeframe for the Level O and 1 Boards for these designations shall be:

Priority: Maximum 10 working days each

Routine: Maximum 20 working days each

Lower level boards will define their respective processing designations and timeframes in their charters.

e. Baseline Change Accountability, Traceability, and Overview. Each board will provide auditable and traceable documentation for (1) board members’ evaluation and comments and (2) BCCB decisions. Information copies of BCCB meeting minutes and approved Baseline Change Proposals will be provided to the next higher level BCCB Secretariat.

f. Submittal of Requested Changes to Level 0, 1, and 2 BCCBs.

(1) Only changes endorsed by the next lower level BCCB Chairperson will be presented to Executive Level BCCBs for action.

(2) Existing contractor change forms currently utilized by projects may be utilized for documenting contractor requested baseline changes, providing that the forms address the following minimum requirements:

(a) Change justification;

(b) Change description;

(c) A unique identification number and title;

(d) Change request processing time designation (priority or routine);

(e) Cost impact including impacts on TEC and TPC;

(f) Schedule impact on controlled milestones identified at KD 1;

(g) Designation of a Point-of-contact for coordination;

(h) Impacts on funding profile;

(i) Impacts on scope;

(j) Programmatic impacts;

(k) Mitigating or corrective action if appropriate; and

(l) Other impacts as appropriate.

(3) For directed changes, the directive will be the authorization for implementing the change (directed changes do not require BCCB approval). The project office will determine and document resulting impacts to other baselines, when appropriate, and provide information copies of the change impacts to appropriate management levels.

(4) If changes (either approved or directed) exceed Congressionally mandated thresholds, Congressional notification is required prior to approval and authorization to proceed. All Congressional notifications must be coordinated through the Chief Financial Officer prior to submission in accordance with DOE 5160.1A, REPROGRAMMING, RESTRUCTURING, AND APPROPRIATION TRANSFER PROCEDURES.

4. Guidance.

a. Figure III-13 depicts the DOE change control authority hierarchy of BCCBs. Figure III-14 presents the flow diagram for the DOE Baseline Change Control Process.

b. Figure III-15 is a sample format that should be utilized for documenting the initial cost, schedule, and scope (technical) baselines for approval at KD 1. Subsequent to approval, these documented baselines will be maintained current by the appropriate project offices and will be included as a part of documentation requirements for all ESAAB and Program Reviews.

c. Figure III-16 is a sample format that should be used for documenting change control thresholds to the baselines for approval at KD 1. These thresholds define delegation of change control authority within the DOE. Upon approval of these thresholds, changes to them must be approved by the appropriate level of authority (AE, Program Manager, Project Manager).

d. Figure III-17 is a sample format that meets the requirements stated in Section 3 above for a Baseline Change Proposal (BCP).

e. Contractor level Change Control Boards and change processes will meet the provisions of Part C of this chapter.

f. Figure III-18 is a sample format for the Baseline Change Control Board Change Disposition Record.

g. Instructions for completing Figures III-15, III-16, III-17, and III-18 are presented in Attachment III-8.

h. Change Activity Reporting. Baseline Change Control is one of the Department's key initiatives to strengthen the current project management system and has received the full endorsement of the Acquisition Executives. An effective change control process is critical to the management of project cost, schedule, and scope baselines and assuring that the Department is utilizing its limited resources in the most effective manner possible. To increase visibility into change control activity, MSA quarterly progress reports shall be required to include a change activity status. All level O, 1, and 2 changes are to be reported.

Vertical line denotes change

	BOARD		MEMBERSHIP
	ESAAB CHANGE CONTROL BOARD LEVEL 0	HQS	SAME AS ESAAB
	PROGRAM CHANGE CONTROL BOARD LEVEL 1	HQS	***
	PROJECT CHANGE CONTROL BOARD LEVEL 2*	FIELD	***
	CONTRACTOR CHANGE CONTROL BOARDS LEVEL 3**	FIELD	MEMBERSHIP DETERMINED BY CONTRACTOR, DOCUMENTED IN CONTRACTOR'S CM PLAN AND PMP

* There may be separate boards at the project level and field office level if appropriate.

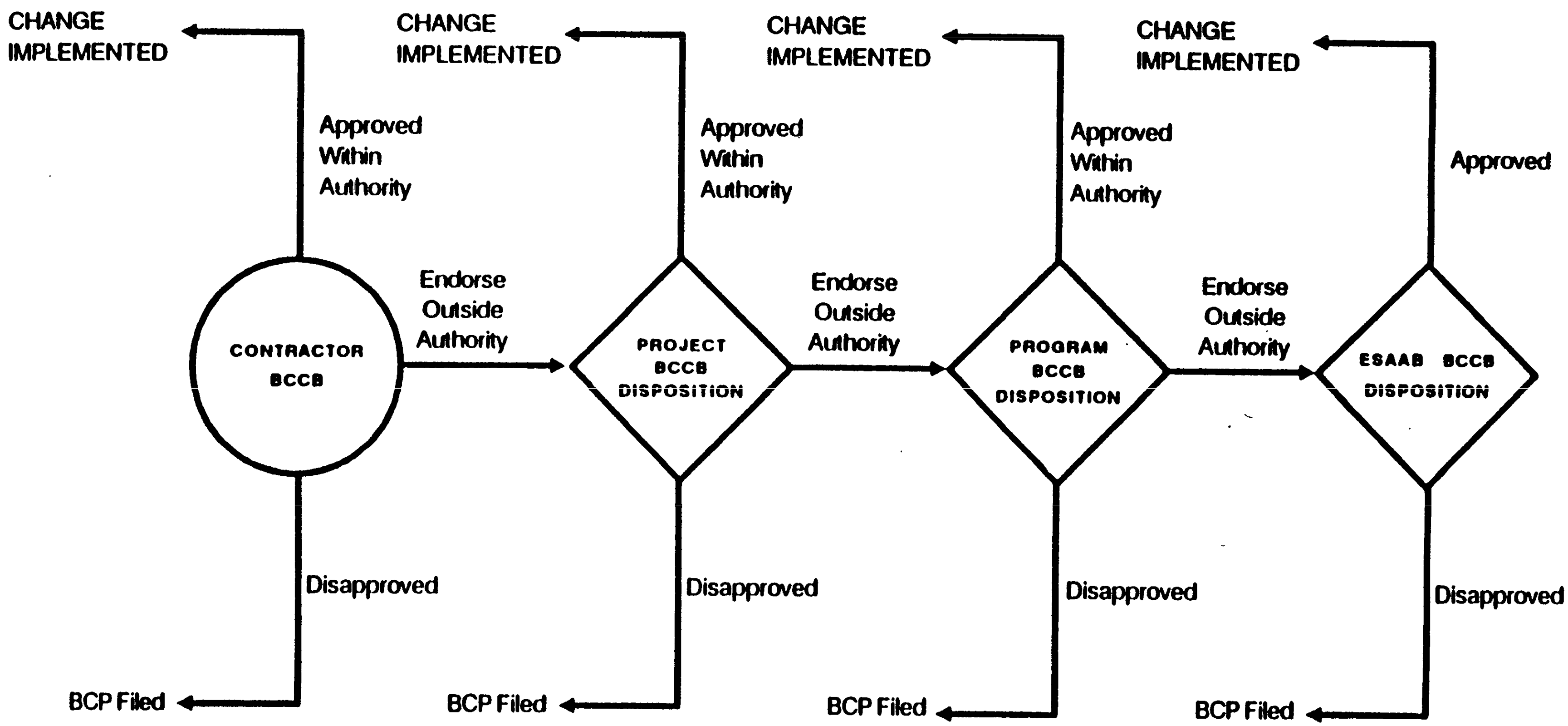
** Lower level field boards may be established at contractor level.

*** Membership recommended and approved at key decision no. 1

Change Control Board (CCB) Hierarchy of Authority

Figure III-13

Vertical line denotes change



DOE BASELINE CHANGE DECISION-MAKING PROCESS

Figure III-14

Vertical line denotes change

REVISION:
DATE:

	ACQUISITION EXECUTIVE (LEVEL 0)	SECRETARIAL/PROGRAM (LEVEL 1)	PROJECT (LEVEL 2)
TECHNICAL (SCOPE)			
SCHEDULE			
COST			

NOTE 1: REQUIREMENTS AND GUIDANCE FOR COMPLETING THESE BLOCKS ARE PROVIDED IN ATTACHMENT III-8

SUMMARY OF BASELINE INFORMATION FORMAT
Figure III-15

Vertical line denotes change

REVISION:
DATE:

	ACQUISITION EXECUTIVE (LEVEL 0)	SECRETARIAL/PROGRAM (LEVEL 1)	PROJECT (LEVEL 2)
TECHNICAL (SCOPE)	ALL CHANGES IMPACTING LEVEL 0 SCOPE	ALL CHANGES IMPACTING LEVEL 1 SCOPE	ALL CHANGES IMPACTING LEVEL 2 SCOPE
SCHEDULE	SCHEDULE CHANGES IN EXCESS OF ± 6 MONTHS	SEE NOTE 1	SEE NOTE 1
COST	COST CHANGES IN EXCESS OF ± $50M OR CHANGE TO TEC/TPC	SEE NOTE 1	SEE NOTE 1

NOTE 1: REQUIREMENTS AND GUIDANCE FOR COMPLETING THESE BLOCKS ARE PROVIDED IN ATTACHMENT III-8

SUMMARY OF THRESHOLDS FORMAT

Figure III-16

0-0D0-7365/24

PAGE 1 OF

U.S. DEPARTMENT OF ENERGY
BASELINE CHANGE PROPOSAL

PROJECT NO.:	PROJECT TITLE:	BCP LEVEL: [ ] 0 [ ] 1 [ ] 2
BCP NO.:	BCP TITLE:	

POINT-OF-CONTACT:

PROCESSING DESIGNATION: [ ] PRIORITY [ ] ROUTINE

CHANGE DECRIPTION:

CHANGE JUSTIFICATION:

IMPACT OF NON-APPROVAL:

IMPACTS ON COST BASELINE:

TOTAL COST ______

IMPACTS ON: TEC ______ TPC ______ CONTINGENCY ______ OTHER ______

CHANGE TO FUNDING PROFILE INCLUDED YES [ ] NO [ ]

IMPACTS ON SCHEDULE:

LEVEL 0 [ ] ______
LEVEL 1 [ ] ______
LEVEL 2 [ ] ______

IMPACTS ON SCOPE:

TECHNICAL DOCUMENTS [ ] ______
PROGRAM DOCUMENTS [ ] ______

OTHER IMPACTS:

MITIGATING OR CORRECTIVE ACTIONS:

SAMPLE BASELINE CHANGE PROPOSAL FORMAT

Figure III - 17

0-1156

Vertical line denotes change

SAMPLE FORMAT

U.S. DEPARTMENT OF ENERGY
PROGRAM BASELINE CHANGE CONTROL BOARD
CHANGE DISPOSITION RECORD

BCP NUMBER	BCP TITLE	DATE REC'D: DISPOSITION DATE:
PROJECT NUMBER	PROJECT TITLE	CHANGE DESIGNATION: [ ] PRIORITY [ ] ROUTINE
PROGRAM MANAGER, ROUTING SYMBOL, TELEPHONE NUMBER		

DISPOSITION RECOMMENDATIONS

BOARD MEMBER SIGNATURES	RECOMMENDATIONS
ASSISTANT SECRETARY, ES&H (EH-1)	
DIRECTOR, A&HRM (AD-1)	
CHIEF FINANCIAL OFFICER (CR-1)	
DIRECTOR, P&AM (PR-1)	
GENERAL COUNSEL (GC-1)	

CHANGE DISPOSITION

[ ] APPROVED [ ] CONDITIONAL/LIMITED APPROVAL [ ] DISAPPROVED

APPROVAL AUTHORITY: PROGRAM BASELINE CHANGE CONTROL BOARD CHAIRMAN SIGNATURE AND DATE

CONDITIONS/LIMITATIONS:

0-1149

SAMPLE FORMAT BASELINE CHANGE DISPOSITION RECORD

Figure III - 18

Vertical line denotes change

PART B - SYSTEMS ENGINEERING, TEST, AND EVALUATION.

1. INTRODUCTION. The system engineering process is a sequence of activities and decisions that transforms an identified mission need into a description of system performance parameters and a preferred system configuration. The Department's objective is to ensure that products satisfy their functional requirements, operate effectively in their intended environment, and demonstrate a level of performance and reliability that justifies the investment. The approach outlined below is illustrative of one method of applying systems engineering principles. The system engineering process is detailed further in Attachment III-1.

2. SYSTEM ENGINEERING APPROACH.

    a. The system engineering process considers all aspects of system requirements from the earliest stages of design through development, test and operation. The process supports project management by ensuring that technical control is on a level and integrated with funds, cost, schedule, and performance controls.

    b. For MSA's and major projects, the system engineering management process is normally controlled by adherence to a System Engineering Management Plan (SEMP) (see Attachment III-2), prepared and maintained at the project level and by non-DOE organizations contributing to the engineering efforts. The project level SEMP may be an integration of the plans of other contributing organizations.

    c. For any project requiring an integrated engineering procedure, the project office should consider a SEMP as a component of the project management plan. Similarly, any non-DOE organization contributing to the engineering effort should prepare and maintain a SEMP that integrates with the project level plan. The plan should include a discussion of how the various system engineering management elements will be utilized and controlled on the project. System engineering management elements include the following:

        (1) Planning.

            (a) Technical Objectives. Technical objectives for each project should be established so that relationships among project needs, urgency, risks, and value can be established.

            (b) Engineering Integration. Coordination should be provided for among the engineering disciplines and specialties, and their integration into the design process should be provided for as early as possible.

(2) Design Concepts.

(a) Completeness. The design should be complete from a total system viewpoint to include facilities, utilities, hardware, software, personnel, and procedures.

(b) Interface Compatibility. Requirements regarding design compatibility of engineering interfaces should be defined in appropriate specifications. Interface requirements related to major system elements, facilities, utilities, hardware, software, and procedures should be established, coordinated, and maintained. Clear lines of communication and timely dissemination of changes to these interface documents should be maintained.

(c) Simplicity. The concept of design simplicity and maximum standardization should be promoted (e.g., existing technology and standard off-the-shelf hardware items should be used whenever requirements and analyses permit).

(3) Technical Requirement Definition.

(a) Technical Baseline. The technical baseline should initially be developed with top level requirements based on mission needs and an assessment of existing available technology, and should become more detailed as the project progresses. Specifications should be prepared in accordance with specified standards. Attainable performance and other required technical parameters should be established prior to commencement of development, construction, or fabrication.

(b) Engineering Data. Engineering data (e.g., design drawings, specifications) should be the primary source of performance requirements used in the design and production/construction of the system. Where possible, plans, reports, and other existing data items should be used to record the system engineering process. Government technical information may be made available to project participants.

(c) Traceability. It should be possible to track system requirements from a function to all of its elements; from an element to its functions; and, from a specific requirement to its source analysis or contractual constraint. Traceability includes tracking requirements through the work breakdown structure between the system level and the lowest level of assembly requiring logistic or maintenance consideration.

(4) Controls.

(a) Work Breakdown Structure Compatibility. The technical tasks to be performed are identified as work breakdown structure elements. System and technical requirements also should be consistent and traceable throughout the work breakdown structure so that the impact of cost, schedule, and technical problems can be promptly determined and accurately evaluated.

(b) Technology Risk Assessment. Specification development, cost estimates, engineering decisions, and assessments of alternative development schemes should be aided by estimation and evaluation of risk in the various project elements, activities, and technologies.

(c) Technical Performance Measurement. Technical performance measurement is the comparison of actual achievement against the technical baseline. It includes an analysis of the differences between the achievement to date, the current estimate, and the technical baseline, with any new problems and risk areas identified.

(d) Compatibility with Related Activities. The system engineering management activities should be compatible with related project management activities. For example, changes to system requirements in response to identified problem solutions should be evaluated for total project impact with respect to performance, cost, and schedules.

(e) Review of Data. System engineering includes design documentation and review to ensure that all system requirements have been met. "In process" reviews should be utilized to the fullest extent possible. The project manager should ensure that all system engineering procedures, requirements, and data are available for review and that the contractor's ability to satisfy them is documented in the SEMP.

(5) Analysis.

(a) Engineering Decision Studies. Engineering decisions regarding design options should reflect analysis of system cost effectiveness based on performance and other technical parameters, project schedule, resource constraints, risk assessments, and life cycle cost factors. Significant engineering decisions should be traceable to the system engineering analysis on which they were based.

(b) Life Cycle Cost Estimates. These cost estimates include acquisition and ownership costs including operation, maintenance and disposition costs.

3. TEST AND EVALUATION.

a. It is difficult to develop and utilize a standard project test and evaluation plan for DOE projects. The test and evaluation plan should consider both component and systems testing to help ensure technical performance. The plan should relate the test and evaluation effort to the project's technical risks, operability, performance criteria, reliability, availability and maintainability. The test program should measure technical performance, to assure the project manager that the technical baseline can be met. Attachment III-3 provides a suggested outline of a test and evaluation plan for MSA/MP's and Attachment III-4 gives an illustration of a comprehensive test program for the measurement of technical performance for an integrated, complex project.

b. Technical performance measurement involves the assessment of current and expected performance and identification of technical problems. These assessments coincide with the completion of significant design and development tasks. This provides visibility into actual versus planned technical performance, and facilitates verification of results achieved. If performance is different than planned, change options are proposed. Revised work plans to complete major design and development milestones may be developed. The revised work plans provide the basis for forecasting cost and schedule impacts.

c. A technical performance measurement effort which includes the following items and is tailored to meet specific project needs should be planned and executed:

(1) Parameters. The technical performance parameters selected for tracking and testing should be the key indicators of project success. Each parameter should be related to a specific work breakdown structure element and identified in the SEMP. The relationship of technical performance parameters can be depicted through a specification tree.

(2) Planning. During test and evaluation planning, the following data, as appropriate, should be established for each parameter:

(a) Specification;

(b) A time-phased planned value profile that plots the expected growth over time of the parameter being tested, along with a tolerance band, the boundaries of which indicate the range within which the value is expected to be achieved within current budget and schedule, including usual forecast error;

(c) Other events significantly related to the achievement of the planned value; and

(d) Test conditions.

(3) As design and development progresses, achievement is evaluated for each technical performance parameter. If actual achievement falls outside the tolerance band, a new current estimate should be developed. The current estimate should be determined from the actual achievement and the remaining schedule and budget. Variation should be determined by comparing actual achievement against the technical baseline. An analysis should be accomplished on the variation to determine the causes and to assess the impact on higher level parameters, on interface requirements, and on system cost effectiveness. For technical performance deficiencies, alternate recovery plans should be developed with cost, schedule, and technical performance implications fully explored. For performance in excess of requirements, opportunities for reallocation of requirements and resources should be assessed.

d. The technical test planning function defines the detailed work requirements and forms the basis for scheduling of task elements, allocation and costing of resources, assignments of authority and responsibility, and the integration of all technical aspects of the project. On contracts subject to the cost and schedule control systems criteria, the test and evaluation planning function is carried out to prescribed work breakdown structure levels as part of compliance.

e. Cost and schedule performance measurement employs earned value to identify cost and schedule variances and performance trends. Unexpected technical problems are often the source of cost and schedule variances. Technical performance, evaluation may facilitate early identification and definition of these problems and estimation of their cost and schedule impact.

PART C - CONFIGURATION MANAGEMENT

1. INTRODUCTION.

a. Configuration management is a project management tool that is designed to: (1) determine and control baselines; and (2) ensure and document that all components of a project interface both physically and functionally. The purpose of configuration management is to ensure that the product acquired satisfies the project's technical and operational requirements, and that the technical requirements are clearly defined and controlled throughout the development and acquisition process.

b. The objectives of configuration management are to:

(1) Assist in achieving, at the lowest cost, the required system performance and operational efficiency.

(2) Promote the maximum degree of design and development latitude, yet provide the appropriate degree and depth of configuration control.

(3) Attain maximum efficiency in the management of configuration changes with respect to their necessity, benefit, cost, timing, and implementation.

(4) Provide a systematic review of all changes to assure that all primary and secondary effects of proposed changes are identified and their costs/benefits are weighed in making a decision to incorporate a change.

2. CONFIGURATION MANAGEMENT.

a. The configuration management plan establishes technical interface requirements and procedures, establishes a configuration control board, and indicates approval levels for changes. Attachment III-5 outlines the configuration management process, and Attachment III-6 outlines a configuration management plan.

b. As a project progresses, the technical requirements become better defined. At appropriate decision points these requirements are approved and become part of the project's technical baseline. The configuration management requirements are:

(1) Configuration Identification. Configuration identification is established in the form of technical documentation. With DOE review and approval, the technical baseline initially identified in the project plan is controlled, detailed, and updated through conceptual design, preliminary design (e.g., Title I), definitive design (e.g., Title II), and as-built drawings (e.g., Title III). Operations and maintenance manuals and specification may be controlled separately or as part of the definitive design.

(2) Configuration Control. Documentation may be changed as agreed to by DOE and as described in the contractor's configuration management plan. Contractor proposed changes should be screened by the contractor to determine whether DOE approval is required prior to implementation. If prior approval is required, the change shall be formally proposed to the project office prior to implementation. The project office will approve or disapprove the change or endorse and forward to the next higher board if the change exceeds the project office approval authority. If prior DOE approval is not required, the contractor may implement the change. The contractor's control system should:

(a) Permit identification of the status of a proposed change;

(b) Permit identification of status of change implementation; and

(c) Provide an audit trail of change history.

(3) Configuration Recording and Reporting. As a project progresses, the status of proposed changes to configuration and the progress on implementation of approved changes need to be identified and reported. The project office is responsible for selecting specific data elements, choosing record and reports formats, and keeping the actual records. As appropriate, contractor's records and report formats will be accepted when they provide the necessary information. (Attachment III-5 identified typical configuration identification and reporting data elements.)

(4) Waivers and Deviations. The change process includes a procedure for converting change proposals to an approved waiver or deviation where conditions and potential cost benefits warrant. A deviation constitutes contractual relief prior to producing a product; a waiver constitutes contractual relief after producing the product.

3. CONFIGURATION MANAGEMENT PLAN. The configuration management process is controlled at the project level by a configuration management plan. For major MSAs and MPs the project office should include a configuration management plan as a component of the project management plan. For other projects, which may not require a project management plan, a configuration management plans should still be utilized. Each non-DOE organization participating in the engineering effort should similarly be required for their portion of the work to prepare and maintain a configuration management plan that integrates with the project level plan. The project level configuration management plan may be an integrated cohesive assembly of the plans of participating organizations. The plan should include discussion of how configuration management will be conducted on the project and what items will be so managed.

4. CONFIGURATION MANAGEMENT PROCESS.

a. Application.

(1) Configuration management should be consistent with the quantity, size, scope, and complexity of the project involved. Complex projects may require a highly organized configuration management system, while less complex projects may require nothing more than the control of the applicable technical specification.

(2) The configuration management process should be tailored to the specific project and to particular products. The selection of a facility, equipment, or other item for formal configuration management is determined by the need to control its inherent characteristics or to control its interface with other items.

(3) Initially, performance oriented functional requirements should be used for configuration identification. Where appropriate, these requirements may be allocated to selected items that are part of a higher level item. Finally, a detailed design should prescribe "build to" requirements and associated quality assurance provisions. This identification should be the basis for the preparation of technical, administrative, and management documents, (e.g., technical reports and spare parts) that concern or depend upon configuration.

(4) A permanent copy of the controlled identification documents should be maintained throughout the life cycle, beginning with the initial baseline documentation and including proposed and approved changes from those baselines.

(5) Configuration control must be exercised on a basis appropriate to the management level concerned and to the stage in the 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 item throughout its life cycle. This would normally be accomplished through a Configuration Control Board.

b. Change Control.

(1) Changes affecting the configuration of an item are to be limited to those which are necessary or offer significant benefits to the Department. Changes are required to:

(a) Correct deficiencies;

(b) Incorporate approved changes in operational or logistic support characteristics;

(c) Effect substantial life cycle cost savings; or

(d) Correct safety deficiencies.

(2) The project office ensures that all data required for effective evaluation of changes are made available to those individuals responsible for change decisions. For example, an analysis of the effect caused by the change in the item's performance as prescribed in the configuration identification should be provided. Insofar as practicable, test data needed to validate claimed technical and economic advantages will also be included in this analysis. Every proposed configuration change affecting Departmental interests should be evaluated on the basis of the change criteria, including not making the proposed change. The evaluation should take into consideration all aspects of the change on the products or systems with which it interfaces and other contractors affected, Such aspects may include design, performance, cost, schedule, operational effectiveness, logistics support, transportability, and training.

(3) The project office establishes priorities and time requirements for change proposal processing based on its nature and its relative urgency.

(4) When a configuration change is approved by DOE, the necessary instructions need to be issued to ensure timely and economical implementation.

c. Duration. Planning for configuration management should start with preparation of the project plan and continue as part of the project planning process. Configuration management continues throughout the product's life cycle until it is removed from inventory.

d. Recordkeeping and Reporting.

(1) Configuration records and reports include identification of:

(a) Technical documentation comprising the approved configuration identification;

(b) Essential data (e.g., engineering test data);

(c) Contractual information required for each item subject to configuration management, and contractor identification;

(d) Proposed changes to configuration, the status of such changes and the individual responsible for change decisions; and

(e) Approved changes to configuration, including the specific number or kind of items to which these changes apply, and the activity responsible for implementation.

(2) The project manager tailors the recording and reporting requirements in order to ensure that only the minimum information necessary to manage configuration effectively and economically will be recorded and reported. The special instruction section of DOE F 1332.1, "Reporting Requirements Checklist", should be used to list the reporting requirements which should be a part of the Request for Proposal and contract.

5. <u>TECHNICAL BASELINES.</u>

a. Baselines can be revised several times during the life of a project. Insofar as performance measurement is concerned, the current configuration of the end product represents the current technical baseline.

b. <u>Functional Requirements Baseline</u> is the initial technical baseline and is based on the functional requirements of the end product that are derived from the mission needs.

c. <u>Technical Requirements Baseline</u> is the basis for preliminary (Title I) design and is established at the completion of conceptual design. It consists of the documentation which describes the selected design approach and specifies its design and performance requirements.

d. <u>Design Requirements Baseline</u> is the collection of documentation which defines the preliminary (Title I) design. It is established at the completion of preliminary (Title I) design and is the basis for the definitive (Title II) design.

e. The final baseline is established when definitive (Title II) design is complete. 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.

f. Project baseline management is completed with the execution of the project, but there is a continuing need to update the technical baseline during its operation. When a completed project goes into operation, there should be a set of "as-built" drawings which reflect the final configuration of the project. During operation, many changes will take place which will modify these drawings. It is the responsibility of the project manager to ensure that the operating contractor makes changes to the specifications and drawings, so that all "as-builts" remain current for the life of the facility.

PART D - QUALITY ASSURANCE.

1. INTRODUCTION.

   a. Quality assurance (QA) begins at project conception and runs through design, development, construction, fabrication, and operation. QA affects cost, availability, effectiveness, safety and impact on the environment; therefore, quality assurance aspects should be given careful consideration during the preparation of system acquisition documentation.

   b. DOE determines the requirements for assuring quality where there is a recognized need to obtain the level of product and performance quality necessary to accomplish Departmental program objectives; for reliability and continuity of operations, commensurate with Departmental responsibility for health and safety; and for the protection of the environment and Government property.

   c. Responsibility for quality assurance activities is a multifaceted situation as reflected in Departmental QA policy.

      (1) The program independent Office of Quality Assurance and Standards at Headquarters is responsible for quality assurance overview and management appraisals of Departmental QA programs.

      (2) The program Secretarial Officer is responsible for implementing the Departmental QA policy.

      (3) The project manager is responsible for defining and assuring effective implementation of required QA activities to be established and implemented by the contractor.

      (4) Contractors shall be responsible for installing and implementing QA in accordance with their contractual requirements.

      (5) DOE 57OO.6A provides the policy obligations required.

2. ELEMENTS OF QUALITY ASSURANCE MANAGEMENT. The quality requirements and the QA activities considered necessary to accomplish the project objectives shall be prescribed. Consideration shall be given to the following elements for their appropriate inclusion in a QA program.

   a. Quality Assurance Organization. Organizational responsibility for the establishment and execution of QA is required. The authority and duties of persons and organizations performing quality implementation and assurance functions shall be clearly established and delineated. QA requires management measures which provide for checking, auditing or otherwise verifying that procedural controls are defined and implemented, independent of the individual or group directly responsible for performing the specific activity.

b. Quality Assurance Plan. The QA plan documents policies, procedures, and instructions which should be used throughout the life of any specific activity. Test procedures shall be incorporated into the QA plan by reference and shall take into account the need for surveillance, special controls, processes, test equipment, tools, and skills to attain the required quality, as well as performance and the attendant need for verification. The plan shall provide for indoctrination and training of personnel performing activities effecting quality to ensure that suitable proficiency is achieved and maintained.

c. Design Control. Design controls should be established to enable designs to be correctly translated into specifications, drawings, procedures, and instructions. The measures for accomplishing these translations and the attendant design reviews and provisions for independent assessment inputs should be addressed. Design change control, including field changes, should be subject to design control measures commensurate with those applied to the original design, and should be approved by the organization that performed the original design.

d. Procurement Control. Measures should be established to assure that design bases and applicable regulatory requirements, which are necessary to assure adequate quality, are suitably included or referenced in the documents for procurements of material, equipment, and services. To the extent necessary, procurement documents should require contractors and subcontractors to provide a QA program and implementation plan.

e. Instructions, Procedures, and Drawings. Activities affecting quality should be prescribed by documented instructions, procedures, or drawings which include quantitative or qualitative acceptance criteria that can be used to determine whether activities have been satisfactorily accomplished.

f. Document Control. Document control is a means by which all program documentation can be controlled, tracked, and updated in a timely manner to ensure that applicability and correctness shall be established. The control measures, which should be initiated and followed, should assure that such documents are reviewed for adequacy, approved for release by authorized personnel, and are distributed to and used at the location of the prescribed activity.

g. Control of Purchased Material, Equipment, and Services. Measures should be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures should include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery. Documentary evidence that material and equipment conform to the procurement requirements should be available at the facility site prior to installation or use of such material and equipment. This documentary evidence should be retained, be available for inspection (as required), and should be sufficient to identify Conformance of material or equipment to the specific requirements, such as codes, standards, or specifications.

h. Identification, Control, and Traceability of Materials, Parts, and Components. This step addresses a configuration control system which should enable identification, control, and traceability of all materials, parts, and components in the system throughout all phases of construction and use. Supportive procedures are necessary for activities such as management approved control, coding, provisions for updating and changes, and the presentation format for systematized configuration control.

i. Control of Special Processes. Measures should be established to assure that special processes are controlled in accordance with applicable codes, standards, and specifications, and are performed by qualified personnel. Where processes are to be controlled, the appropriate control measures and procedures should be defined and the applicable codes, standards, specifications, and personnel qualifications criteria should be identified.

j. Inspection. Inspection methods of activities affecting quality should be established and executed by or for the organization performing the activity. The inspection should validate conformance with the prescribed documented instructions, procedures, and drawings. Examinations, measurements, or tests of material or products processed should be performed for each work operation, where necessary, to assure quality. If inspection of processed material or products is impossible or not advantageous, indirect control by monitoring processing methods, equipment, and personnel should be provided. Both inspection and process monitoring should be provided when control is inadequate without both. If mandatory inspection points which require witnessing or inspection by the contractor’s designated representative, and if work cannot not proceed beyond these points without the consent of its designated representative, the specific points should be indicated in appropriate documents.

k. Test Control. A test program should be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service, is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program should include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during facility operation of structures, systems, and components. Test procedures should include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that each test is performed under suitable environmental conditions. Test results should be documented and evaluated to assure that test requirements have been satisfied.

l. Calibration and Control of Test and Measurement Equipment. Standards should be established to assure that tools, gauges, instruments and other testing and measuring devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Records of calibration, maintenance, and other control activities must be maintained.

m. Handling, Storage, Shipping, and Preservation. The inherent quality of the design shall not be degraded by lack of attention to these activities. When necessary, special protective environments such as inert gas atmosphere, specific moisture content levels, and temperature levels shall be specified and provided.

n. Inspection, Test, and Operating Status. Measures should be established to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspection and tests performed upon individual items of the facility. These measures should provide for the identification of items which have satisfactorily passed required inspections and tests where necessary, to preclude inadvertent bypassing of such inspections and tests. Measures also should be established for indicating the operating status of structures, systems, and components of the facility, (e.g., by tagging valves and switches) to prevent inadvertent operation.

o. Nonconforming Material, Parts, or Components. Controls should be implemented for materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation. These measures should include, as appropriate, procedures for identification, documentation, and notification to affected organizations. Nonconforming items should be reviewed and accepted, rejected, repaired, or reworked in accordance with documented procedures.

p. Corrective Action. Measures should be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material or equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures should assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken should be documented and reported to appropriate levels of management.

q. Quality Assurance Records. Sufficient records should be maintained to furnish evidence of activities affecting quality. The records should include at least the following: operating logs and the results of reviews, inspections, tests, audits, monitoring of work performance, and materials analyses. The records shall also include closely related data such as qualifications of personnel, procedures, and equipment. Inspection and test records should, as a minimum, identify the inspector or data recorder, the type of observation, the results, the acceptability, and the action taken in connection with any deficiencies noted. Records should be identifiable and retrievable. Requirements for record retention, such as duration, location, and assigned responsibility shall be established.

r. Audits. A comprehensive system of planned and periodic audits should be carried out to verify compliance with all aspects of the QA program and to determine the effectiveness of the QA plan. The audits should be performed in accordance with the written procedures or checklists by appropriate trained personnel not having direct responsibilities in the areas being audited. Audit results should be documented and reviewed by management having responsibility in the area audited. Appropriate follow-up action, including reaudit of deficient areas, should be taken.

PART E - CONSTRUCTION MANAGEMENT

1. INTRODUCTION.

a. Most projects accomplished by the Department require the construction of facilities as a part of the project. The activities normally associated with construction execution are depicted in Figure III-1. A detailed construction management plan may be required by the Program Secretarial Officer prior to the start of the construction. This may be included as an attachment to the project management plan. Coordination with the managing field organization should be established to determine the specifics of each construction activity.

b. Construction management includes implementing procedures and providing guidance for project activities that occur during the execution phase of a project. The execution phase begins upon completion of detailed design and receipt of construction funds at the level responsible for project management, and continues until the completion and closeout of the construction effort.

c. Since project management is the responsibility of the Head of the Field Element, considerable latitude in the establishment of procedures for execution of a project are left to the discretion of the Head of the Field Element. Managers of the Field Elements establish and update, as required, written procedures that their organizations follow in fulfilling their construction project responsibilities.

d. The specific activities and the sequence in which they occur vary according to the project characteristics and category. The managing field organization shall establish logic diagrams for each project and include these logic diagrams in its project management plans.

2. CONSTRUCTION EXECUTION. Construction efforts execution procedures are in Chapter V.

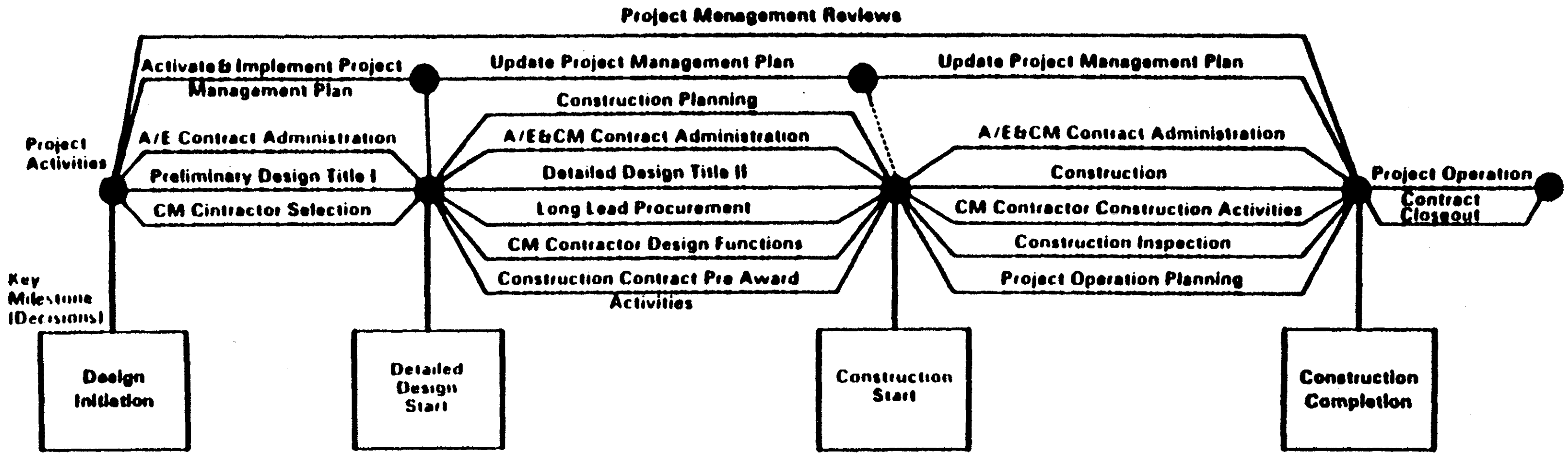


Figure III-1
Construction Project Execution

PART F - PROJECT CONTROL

1. INTRODUCTION.

   a. Reporting and performance measurement systems in project management are used to effectively control project execution. Contractor compliance with work breakdown structure, cost and schedule control, and performance reporting provides the necessary assurance that the Department has the basic data required for timely and meaningful management decisions.

   b. These systems must produce standardized, timely, consistent, and accurate data. The use of these data requires that the cited characteristics be present. Specifically, these reporting and performance measurement data are used to:

      (1) Provide essential management information;

      (2) Meet the information needs of several organizations with minimum reporting requirements;

      (3) Collect and integrate the minimum data required to manage and monitor contractual agreements;

      (4) Support approvals which may be required for periodic disbursement of funds pursuant to provisions of contractual agreements; and

      (5) Enable the detection of possible delays or excess costs early enough to resolve the difficulties.

2. GENERAL DESCRIPTION OF THE UNIFORM REPORTING SYSTEM.

   a. The Uniform Reporting System (URS) addresses the reporting requirements for contracts, Federal assistance (grants and cooperative agreements), and financial incentives (loans and loan agreements). In general, it is a basic process by which reporting requirements are identified, requirements are specified, and reports are provided. Although URS is built around a common process, and some components are common to all contractual agreement types, some remain unique to a specific type. Because of the similarities, integration of the reporting systems into a single system provides features of significant advantage both to DOE and to reporting participants. Figure III-2 illustrates the major steps in the URS. Figure III-3 illustrates the URS components.

   b. Just as the Head of the Field Element, the program manager, and the Assistant Secretary use project reporting (see Chapter IV) to assess project progress during execution, the project manager uses the URS reports to assess the participant's progress. The cost, schedule, and technical report data are measured against original baselines to determine variance and assess percent completion.

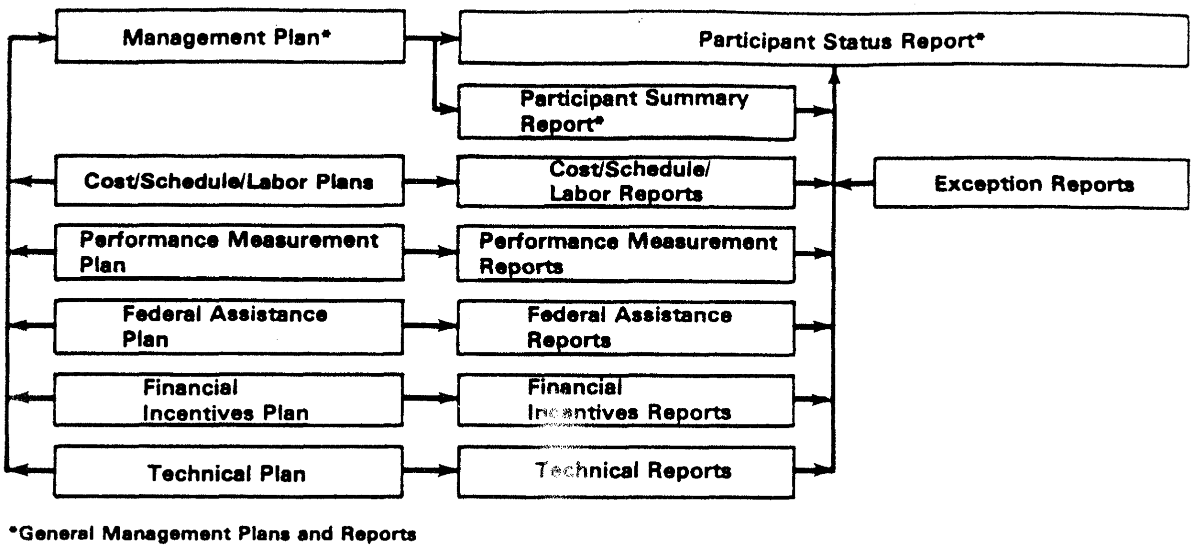


Figure III-2
Uniform Reporting System Components

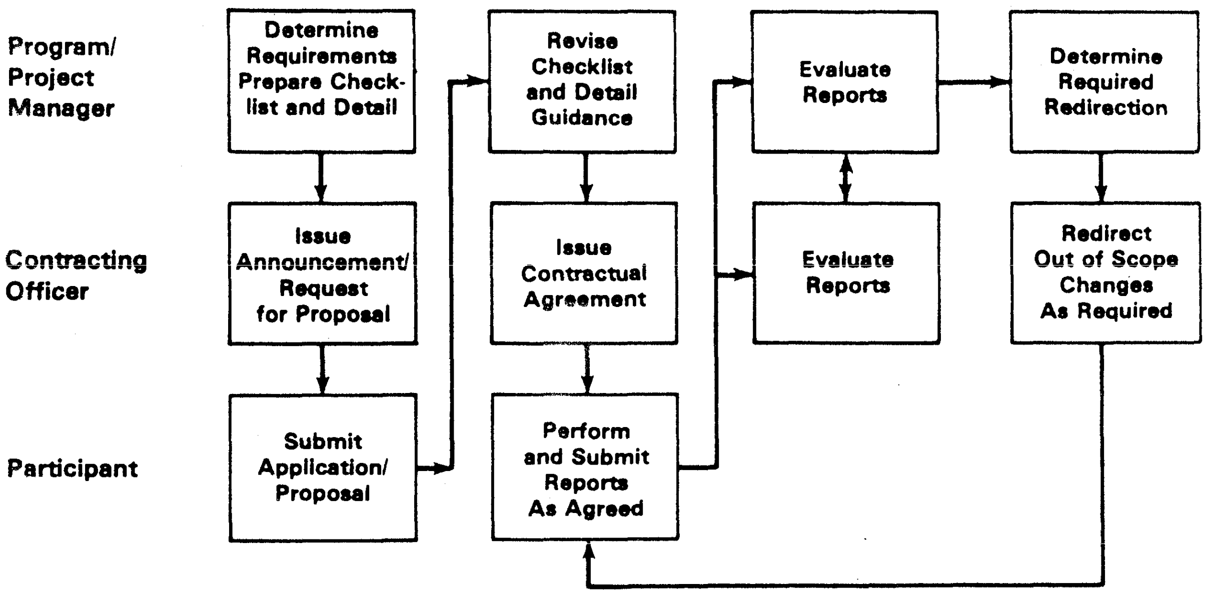


Figure III-3
Uniform Reporting System Process

3. SELECTION OF PLANS AND REPORTS.

a. It is important to select the plans and reports for each project which will provide proper visibility of project status during execution. This selection requires a knowledge of the project objectives, baselines to be tracked, total estimated cost of the project, and the type of contract or Federal assistance involved. With this information in hand, a reasonable selection of plans and reports can be made. A further determination of how plan and report data is to be displayed shall also be made. Figure III-4 lists the forms available in URS.

b. Once a decision is made as to which plans and reports are required for the project, this information should be transferred to a Reporting Requirements Checklist (Figure III-5). The checklist which becomes part of the solicitation document, and, ultimately, the contract or agreement, provides these specifics:

(1) Selection of reports;

(2) Frequency of reports;

(3) Distribution of reports (name/title and address);

(4) Number of copies to be submitted; and

(5) Identification of attachments.

c. The project manager should be aware of the information needs of Other Departmental Elements and shall make arrangements for them to receive the necessary reports in the required quantity. Organizations designated to receive reports shall be so advised. DOE 1332.1 includes complete details on the specific distribution of reports.

4. SPECIAL REQUIREMENTS.

a. Multi-Participant Projects. On occasion, it will be necessary to summarize information from several contractual agreements into a single report for an overview of the project. A project involving construction is an example of such an occasion. In this instance, the system shall feed report information to the project manager or the integrating contractor to meet DOE reporting requirements. Pagination and title page requirements shall be adjusted to reflect the single document nature of this type of submittal.

b. Second Tier Participants. In some instances, DOE may require reporting on work that is subcontracted, in which case the prime contractor may require detailed reporting by the subcontractor.

REPORT		TYPE OF CONTRACTUAL AGREEMENT				
		CONTRACT		INTER AGENCY AGREE-MENT	FI	
CATEGORY/Name	Form Number	Firm Fixed Price	Cost Type		Loan	Loan Guarantee
A. GENERAL MANAGEMENT						
Management Plan	N/A	X	X	X	X	X
Summary Report	1332.1		X	X	X	X
Status Report	N/A	X	X	X	X	X
B. SCHEDULE/LABOR/COST						
Milestone Schedule/Plan	1332.3	X	X	X	X	X
Labor Plan	1332.4		X			
Cost of Money Factors	1332.5		X	Excluded by Definition		
Contract Cost of Money	1332.6		X			
Cost Plan	1332.7		X	X	X	X
Milestone Schedule/Report	1332.3	X	X	X	X	X
Labor Management Report	1332.8		X			
Cost Management Report	1332.9		X	X	X	X
C. EXCEPTION REPORTS						
Conference Reports	N/A	X	X	X	X	X
Hot Line Record	N/A	X	X	X	X	X
D. PERFORMANCE MEASUREMENT						
Management Control System Description	N/A		X	Excluded by Definition	X	X
WBS Dictionary						
Index	1332.10		X		X	X
Elem. Def.	1332.11		X		X	X

Figure III-4
Forms Included in Uniform Reporting System

REPORT		TYPE OF CONTRACTUAL AGREEMENT				
		CONTRACT		INTER AGENCY AGREE-MENT	FI	
CATEGORY/Name	Form Number	Firm Fixed Price	Cost Type		Loan	Loan Guarantee
Cost Performance Report						
Form 1-WBS	1332.12		X		X	X
Form 2-Function	1332.13		X		X	X
Form 3-Baseline	1332.14		X		X	X
E. FINANCIAL INCENTIVES						
Statements of Income and Expense	N/A	Excluded by Definition			X	X
Balance Sheet	N/A				X	X
Cash Flow Statement	N/A				X	X
Statement of Changes in Financial Position	N/A				X	X
Loan Drawdown Report	N/A				X	X
Operating Budget	N/A				X	X
Supplementary Information	N/A				X	X
F. TECHNICAL						
Notice of Energy RD&D Project	DOE 538	X	X	X	X	X
Technical Progress Report						
Draft for Review	N/A	X	X	X	X	X
Final App. Report	N/A	X	X	X	X	X
Topical Report	N/A	X	X	X	X	X
Final Technical Report						
Draft for Review	N/A	X	X	X	X	X
Final App. Report	N/A	X	X	X	X	X

Figure III-4

DOE F1332.1
(11-84)

U.S. DEPARTMENT OF ENERGY
REPORTING REQUIREMENTS CHECKLIST

FORM APPROVED
OMB NO. 1900-1401

1. PROGRAM/PROJECT TITLE: Energistic Pilot Plant
2. IDENTIFICATION NUMBER: AC01-81TS90009

3. PARTICIPANT NAME AND ADDRESS: LTW, Inc., 1234 Science Drive, Germantown, MD 20874

4. PLANNING AND REPORTING REQUIREMENTS

	Frequency
A. General Management	
[X] Management Plan	XO
[X] Status Report	S
[X] Summary Report	S
B. Schedule/Labor/Cost	
[X] Milestone Schedule/Plan	XO
[ ] Labor Plan	
[X] Facilities Capital Cost of Money Factors Computation	XO
[X] Contract Facilities Capital and Cost of Money	XO
[X] Cost Plan	XO
[X] Milestone Schedule/Status	XOC
[ ] Labor Management Report	
[X] Cost Management Report	XOM
C. Exception Reports	
[ ] Conference Record	
[ ] Hot Line Report	
D. Performance Measurement	
[ ] Management Control System Description	
[ ] WBS Dictionary	
[ ] Index	
[ ] Element Definition	
[ ] Cost Performance Reports	
[ ] Format 1 – WBS	
[ ] Format 2 – Function	
[ ] Format 3 – Baseline	

	Frequency
E. Financial Incentives	
[ ] Statement of Income and Expense	
[ ] Balance Sheet	
[ ] Cash Flow Statement	
[ ] Statement of Changes in Financial Position	
[ ] Loan Drawdown Report	
[ ] Operating Budget	
[ ] Supplementary Information	
F. Technical	
[X] Notice of Energy RD&D Project (Required with any of the following)	OY
[X] Technical Progress Report	
[ ] Draft for Review	
[X] Final for Approval	Y
[X] Topical Report	A
[X] Final Technical Report	
[ ] Draft for Review	
[X] Final for Approval	F
[X] Software	A
[X] Other (Specify) ______	A

5. **FREQUENCY CODES**

A – As Required	**M – Monthly**	**S – Semi-Annually**
C – Change to Contractual Agreement	**O – Once After Award**	**X – With Proposal/Bid/Application or with Significant Changes**
F – Final (end of effort)	**Q – Quarterly**	**Y – Yearly or Upon Renewal of Contractual Agreement**

6. SPECIAL INSTRUCTIONS (ATTACHMENTS)

- [X] Report Distribution List/Addressees
- [X] Reporting Elements
- [X] Due Dates
- [X] Analysis Thresholds
- [X] Work Breakdown Structure
- [X] Other

7. PREPARED BY (SIGNATURE AND DATE): [signature] 1-11-84

8. REVIEWED BY (SIGNATURE AND DATE): [signature] 1-20-84

Figure III-5
Example of DOE F 1332.1, Reporting Requirements Checklist

c. Integrated Contractors. Integrated contractors who use the work package authorization system (WPAS) are required also to use URS reports. It shall be explained clearly to these contractors that individual efforts must be identified and baselined for reporting purposes.

5. THE MANAGEMENT PLAN.

a. The management plan is the key contractor input to URS. The management plan describes how to produce the products identified in the contractual agreement, and names the management control systems to be used to manage that performance. It is required as part of the proposal and after negotiations become a binding part of the contractual agreement. Figure III-6 is an outline of a typical management plan.

b. The management plan should reflect how the contractor(s) plans to execute the project. The DOE project management plan should also reflect the same basic data. These two documents should contain the contract baselines against which future reports will be measured.

c. Separate from the management plan, but included with it, are the milestone schedule plan and the cost plan. These two plans detail the schedule and cost aspects of the project as viewed by the participant. The plans are an extension of the summary WBS, the schedule, and the cost estimate generated by DOE.

6. STATUS REPORTS. The project status reports which periodically might be completed by the participant include:

a. Participant status report;

b. Milestone schedule status report;

c. Labor management report;

d. Cost management report;

e. Conference record;

f. Hotline report; and

g. Technical reports.

7. PERFORMANCE MEASUREMENT.

a. The importance, complexity, and cost of many DOE projects require the use of performance measurement techniques that promote highly effective planning, managing, and control. The Department uses the cost and schedule control systems criteria for this purpose. It has the following characteristics:

MANAGEMENT PLAN

EXECUTIVE SUMMARY

I. INTRODUCTION/BACKGROUND

II. EXPECTED RESULT OF EFFORT
   - A. Technical
   - B. Schedule
   - C. Cost
   - D. Financial

III. MANAGEMENT CONTROL SYSTEMS DESCRIPTION (Cost and Schedule Performance Measurement)
   - A. General
   - B. Organization
   - C. Planning and Budgeting
   - D. Accounting
   - E. Analysis
   - F. Revisions and Data Access

IV. TECHNICAL SYSTEMS AND CONTROLS DESCRIPTION
   - A. Systems Engineering
   - B. Configuration Management
   - C. Quality Engineering
   - D. Safety Engineering
   - E. Environmental Engineering
   - F. Data Processing
   - G. Other

V. ADMINISTRATIVE SYSTEMS AND CONTROL DESCRIPTION
   - A. Security
   - B. Health and Safety
   - C. Personnel
   - D. Legal
   - E. Procurement
   - F. Data Processing
   - G. Property Management
   - H. Other

VI. FINANCIAL SYSTEMS AND CONTROL DESCRIPTION
   - A. Income
   - B. Expense
   - C. Cash
   - D. Inventory
   - E. Receivables
   - F. Fixed Assets
   - G. Payables
   - H. Other Current Liabilities
   - I. Long Term Liabilities
   - J. Equity
   - K. Other

ANNEXES

Figure III-6
Management Plan Outline

(1) Sets forth the capabilities required of a contractor's cost and schedule control system;

(2) Requires the integration of work organization, planning and budgeting, accounting, analysis, and change incorporation; and

(3) Requires that baselines be established and maintained for purposes of performance measurement and that such measurement be on the basis of earned value.

b. DOE does not impose any specific systems on the contractor, as these elements are normally inherent in the contractor's management control systems. The contractor is allowed maximum flexibility in determining how internal operations are to be conducted as long as the internal management control systems satisfy the needs of both the contractor and the Department for contract performance information.

c. As can be seen in Figure III-7, compliance with the Cost and Schedule Control Systems Criteria (CSCSC) is integral to proper contractor direction and performance measurement. These criteria are delineated in Attachment III-7. They do not prescribe specific methods or procedures; rather, contractors can define work, organize, and use procedures best suited to their needs, environment, and management philosophy, subject only to meeting the criteria. They are intended to ensure that contractors submit valid and uniform performance reports which permit data analysis to be performed by both the contractor and DOE using a common data base and common analytical methods.

d. Complete discussions of CSCSC application can be found in DOE/CR-2250.1B, DOE/CR-0015, DOE/CR-0017, and DOE/CR-0047.

8. APPLICATION OF REQUIREMENTS.

a. Departmental policy requires that the CSCSC approach (full or modified) be implemented contractually on all new major system acquisitions, major projects and other projects as program Secretarial Officers may elect. The approach is sufficiently general in nature to permit its use by research, development, demonstration, construction, or production projects.

b. Each contract is individually evaluated, taking into consideration the following guidelines:

(1) Estimated cost of the contract (over $50 million--full implementation; $2 to $50 million--modified criteria implementation).

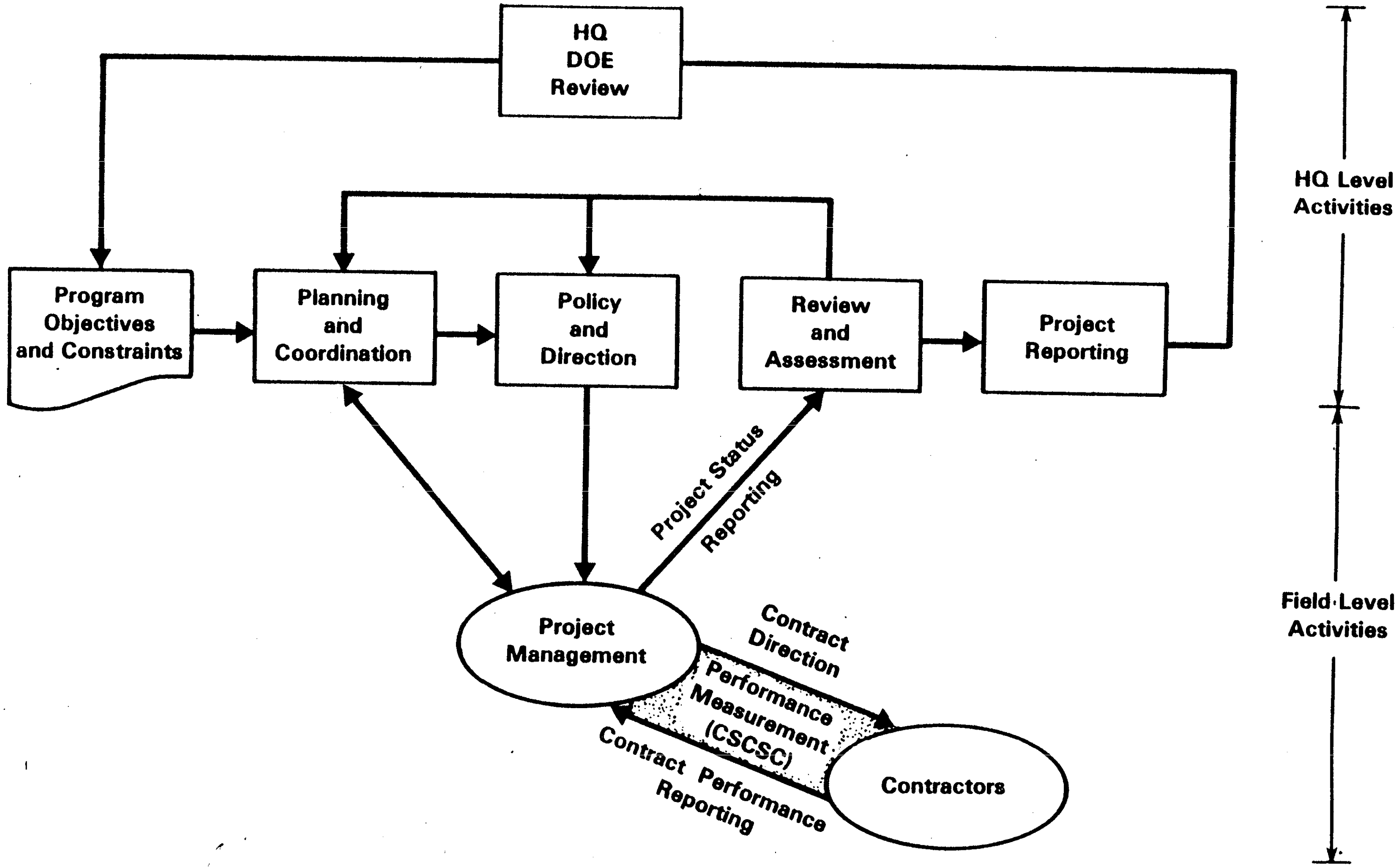


Figure III-7
DOE Management Functions/Contract Performance Measurement Interface

(2) Contract duration (contracts with a duration of less than 1 year are normally not considered for application).

(3) National urgency of the project.

(4) Special problem areas or high risk known or expected to exist during the contract period.

(5) Recommendations by appropriate DOE management (program Office Director, program Secretarial Officers).

(6) Type of contract (firm-fixed price or fixed price with escalation contracts normally are not considered for criteria implementation).

c. <u>Full Implementation.</u> After the contractor demonstrates compliance with the contractual requirements, a formal review report shall be prepared to document in detail how the contractor's management control systems comply. Based on this report, DOE issues a certificate of validation and the cognizant contracting officer officially notifies the contractor of the validation. The contractor shall then be required to update systems documentation, as necessary, to maintain an accurate description of the systems. Any changes are forwarded for review and approval by the DOE project manager prior to incorporation. Upon contractor request, a Memorandum of Understanding, referencing the validated systems, may be issued relative to application of the systems to other DOE contracts. The contractor may then respond to solicitations for potential contracts with similar requirements by citing the Memorandum of Understanding in his proposal.

d. <u>Modified Implementation.</u> Unlike the full implementation, an acceptance in a modified implementation is only for the specific contract and the Memorandum of Understanding is not applicable. The contractor shall be notified by letter through the routine contract administration process. Any system operational changes require notification to the DOE project manager.

9. <u>COST AND SCHEDULE CONTROL SYSTEMS CRITERIA.</u>

a. These criteria (Attachment III-7) serve as DOE standards in evaluating the adequacy of a contractor's management control systems. The criteria by themselves do not represent a management system nor do they prescribe specific methods of organization or operation. Contractors may organize in the manner best suited to their individual environments and management philosophies and use the internal methods and procedures of their choice. The criteria are grouped into the following five major categories:

(1) Organization. The organization criteria require that the contractor provide for clear definition and subdivision of the overall contractual effort, including major subcontractors, within the contractor work breakdown structure (CWBS). Integration of the CWBS with the organizational structure is required in order to provide for assignment of responsibility of identified work tasks and to facilitate performance measurement. Additionally, integration of the planning, scheduling, budgeting, estimating, work authorizing, and data accumulating systems is required to ensure an effective operational system.

(2) Planning and Budgeting. All the contractually authorized work shall be planned, scheduled, budgeted, and authorized by the contractor. Although no specific scheduling techniques are required by the criteria, all authorized work shall be formally scheduled in a manner which shall permit the evaluation of actual progress against contract milestones, and the contract master schedule shall be clearly supported by lower-level schedules. Establishment of the contract performance measurement baseline is based on scheduled cost accounts and provides the key in properly planning and budgeting the contract effort. Cost accounts, because of their importance, are further discussed in paragraph 9b, below.

(3) Accounting. The accounting criteria require that contract costs and performance measurement data elements be accumulated and summarized from the bottom up as directly as possible, without allocations. The contractor's system must be able to provide material price and usage variances, cost accumulation for materials on a basis consistent with the budgets, and full accountability for all contract materials ordered, received and used. Indirect costs shall be controlled and procedures are required for identifying management control of overhead costs.

(4) Analysis. Comparisons of actual versus planned performance are required by the analysis criteria. Thresholds for variance analyses are established to avoid excessive contractor effort in analyzing every variance. Variances are examined in terms of increments or aggregations of work which are large enough to produce significant information. Estimates of contract costs, based on performance to date and on estimates of future conditions shall be developed.

(5) Revisions and Access to Data. Contract changes authorized by DOE and those due to contractor internal replanning and formal reprogramming shall be incorporated in a timely manner. Particular emphasis shall be placed on the need to retain a meaningful performance measurement baseline. Requirements include reconciling original budgets to current budgets and prohibiting retroactive changes to records. DOE shall be allowed access to contractor data for systems evaluations and surveillance.

b. The Cost Account. The cost account is an inherent and essential feature of the CSCSC approach. It is the main action point for assignment of internal management responsibility and planning and control of contractual effort. In full CSCSC implementations, the cost account is composed of work packages (i.e., detailed short-span jobs).

10. CONTRACTOR REPORTING.

a. DOE Information Requirements. A group of related reports are used in conjunction with contract performance measurement to satisfy Departmental information requirements. The contents of the reports are obtained from the same data base that supports day-to-day contractor management and that provides the means of reporting summary level cost, schedule, and funding data to DOE. These reports also serve as a basis for project status reporting to upper DOE management.

b. Performance Measurement Data Elements. For performance measurement purposes, a unique set of data elements is generated for the contractor's internal use in managing and reporting to DOE. Figure III-8 lists the data elements for earned value reporting. Figure III-9 provides a graphic representation of their relationship. Actual cost of work performed (ACWP) consists of the direct and indirect costs applicable to the work which has been performed. The budgeted cost for work scheduled (BCWS) is the time-phased budget plan (baseline) which represents the contract work plan. The budgeted cost for work performed (BCWP), the "earned value" or the "planned value of work accomplished," represents the value of work completed. 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 terms of dollars. 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 contractors to identify problems, to determine reasons for deviations from plans, to take corrective actions, and to report the results. Based on performance to date and estimates of future conditions, an estimated cost at completion (EAC) is computed and compared to the total BCWS or budget at completion (BAC). At the contract level, total budget is usually equal to the contract value; therefore, the difference between BAC and the EAC forecasts a contract overrun or underrun.

c. Technical Achievement. A key to effective cost and schedule control is correlation of technical achievement with accomplishment of the work effort. If the project is properly defined, correlation of cost, schedule, and technical performance is greatly simplified. Since unfavorable cost or schedule variances are usually caused by technical difficulties, the quantitative information in the contractor's cost and schedule reports shall be supplemented by narrative to explain the technical problem and its impact.

ELEMENT DESCRIPTION	CRITERIA TERM	ACRONYM
WORK PLANNED	BUDGETED COST FOR WORK SCHEDULED	BCWS
WORK ACCOMPLISHED (EARNED VALUE)	BUDGETED COST FOR WORK PERFORMED	BCWP
COST OF WORK ACCOMPLISHED	ACTUAL COST OF WORK PERFORMED	ACWP
WORK AUTHORIZED	BUDGETED COST AT COMPLETION	BAC
ESTIMATE OF FINAL CONTRACT COST (LATEST REVISED ESTIMATE)	ESTIMATED COST AT COMPLETION	EAC
COST DIFFERENCE	COST VARIANCE (BCWP MINUS ACWP)	CV
SCHEDULE DIFFERENCE	SCHEDULE VARIANCE (BCWP MINUS BCWS)	SV
COST AT COMPLETION DIFFERENCE	AT COMPLETION VARIANCE (BAC MINUS EAC)	ACV

Figure III-8
Earned Value Data Elements

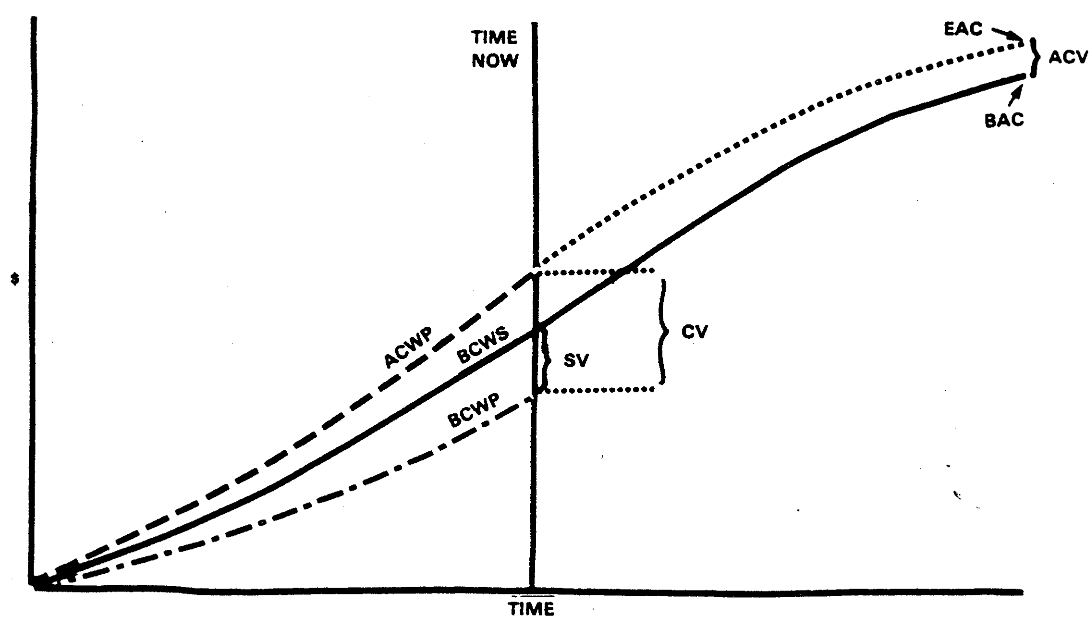


Figure III-9
Earned Value Data Elements Relationships

d. Data Analysis. 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. Contract data analysis is initiated at the cost account level by the appropriate manager. 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-level management. The contractor-furnished performance reports fulfill this need. They present systematically summarized information in a manner designed to assist overall assessment of contract status. These reports may require additional processing by DOE project personnel to facilitate their use and understanding and to extract their full benefit.

The use of various analytical techniques will assist both the contractor and DOE in:

(1) Determining the current contract cost and schedule performance status;

(2) Highlighting areas requiring more detailed data;

(3) Identifying deviations and trends; and

(4) Forecasting, verifying, or questioning future work status.

The proper collection, analysis, and use of contract performance data are major ingredients in successful performance measurement. The importance of making effective use of the data by the contractor and DOE cannot be. overemphasized.

PART G - PROJECT TERMINATION

1. INTRODUCTION. Project termination is similar to project transition with the exception that termination may happen relatively quickly with little planning having been done. While significant effort goes into properly planning and effectively executing a project, it sometimes happens that a project must be stopped abruptly.

2. PROJECT TERMINATION.

   a. The issue of project personnel is forced upon the project manager, and must be dealt with in as enlightened and expeditious a manner as is possible. There is no plan that can be prepared beforehand, but reasonable actions on management's part can alleviate the difficulties.

   b. Of major significance to a project termination is disposition of the unfinished facility or hardware. While there is no set policy for dealing with disposition, it is almost always better for the Department if the project products can be disposed of to the contractor(s) involved. Even if sold at a loss, the situation may be better than future storage, maintenance, or non-usage costs. The project manager and the program manager shall determine disposition as early as possible, once termination is imminent.

   c. Equally significant is the cost of termination to DOE. These costs can b impressive. All contracts and subcontracts shall be settled, and disposition--either mothballing, dismantling, or disposal--shall be paid for before the project is closed. The project manager shall plan and budget carefully to properly effect project termination.

SYSTEMS ENGINEERING PROCESS (TYPICAL)

1. SYSTEMS ENGINEERING.

a. Overview. Systems engineering encompasses management of the engineering and technical effort required to transform the project objectives into an operational system. It includes the engineering required to define the system performance parameters and the configuration to best satisfy the project objectives. It also includes the planning and control of technical tasks, integration of the engineering specialties, and the management of a totally integrated design effort to meet cost, schedule, and technical objectives of the system engineering process.

b. Iteration. The systems engineering process is an iterative one encompassing changes at any point in the process. Possible impacts of change to the system should be analyzed during the conduct of the project. These impacts should be examined for validity, consistency, desirability, and attainability with respect to current technology, physical resources, human performance capabilities, life cycle costs, and other constraints. The output of this analysis should either verify the existing requirements or lead to the development of new requirements which are more appropriate for the mission.

c. Process Flow. There are seven steps in the systems engineering process as advocated by DOE (see Figure III-10):

(1) Mission Need, Project Objections, and Constraints. Prepared by DOE, these broad requirements provide the basis for the systems engineering process. All subsequent design and development is traceable to, and is conducted for, the purpose of satisfying these top level requirements.

(2) Function Analysis consists of the three interrelated activities described below:

(a) Functional Identification. Analysis of system objectives to identify functions and subfunctions that should be performed to satisfy the system performance and design parameters.

(b) Functional Performance Requirements Analysis. Development of technical performance requirements for each function identified. These requirements define the input and output functions in sufficient detail for direct use as criteria for equipment design and operation, personnel skill development, computer programming, environmental, safety and health considerations, logistics support, and so forth.

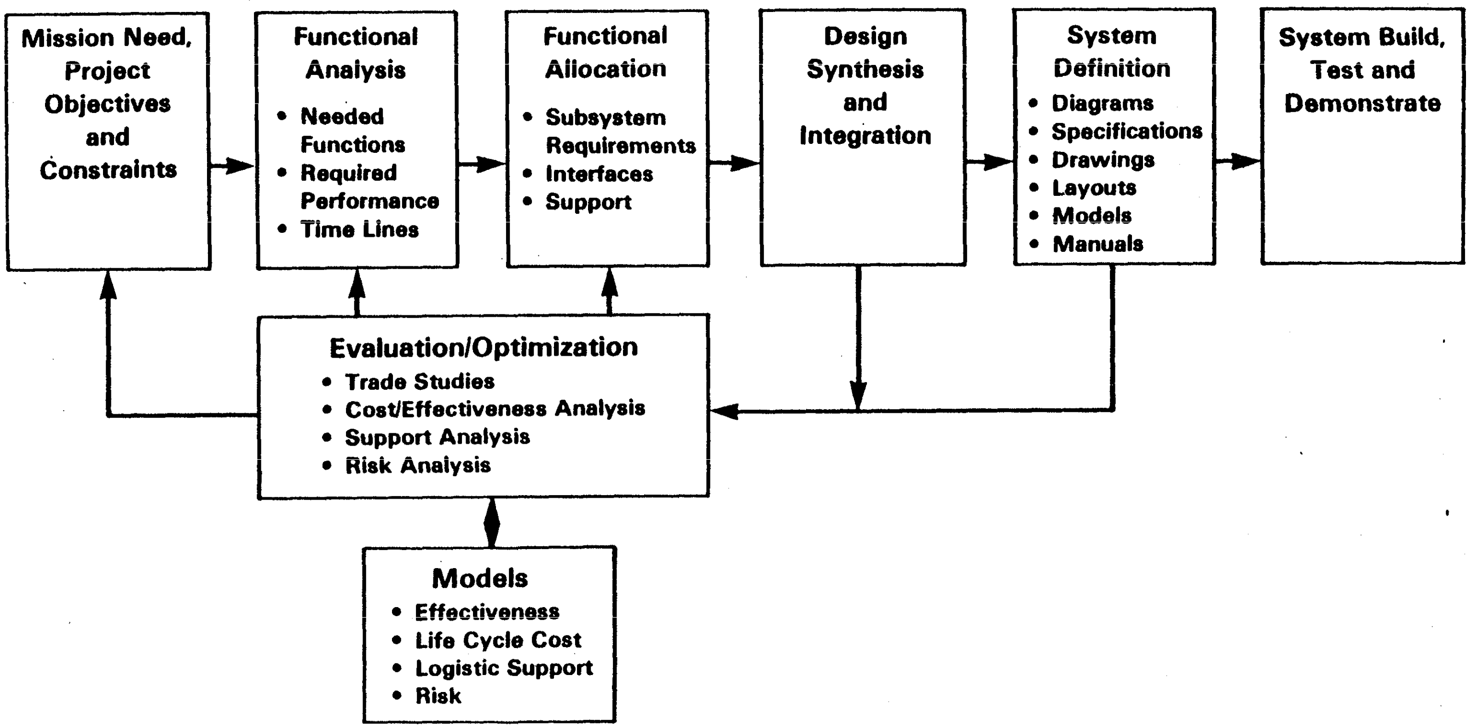


Figure III-10
Systems Engineering Process

(c) Time Requirements Analysis. An analysis to determine an appropriate "time line" of functions of functional sequences in which time is critical to mission success, safety, utilization of resources, minimization of downtime and/or increasing availability.

(3) Functional Allocation. Each function and subfunction is allocated a set of performance and design requirements. Derived requirements should be stated in sufficient detail for allocation to facilities, hardware, software, personnel, and procedures. When necessary, special skills or peculiar requirements are identified. Allocated requirements should be traceable through the analysis by which they were derived to the system requirement they are designed to fulfill.

(4) Design Synthesis and Integration. Design synthesis is the point in the systems engineering process at which a design concept is created to satisfy the stated requirements. All system elements should be considered in arriving at a design concept. Requirements that have been allocated analytically are satisfied through design synthesis. The resulting component and subassembly level details are then integrated into a consolidated overall design. Sufficient preliminary design is then accomplished to confirm and ensure completeness of the performance and design requirements allocated for detail design. Reallocation of requirements may be required.

(5) System Definition. The performance, configuration, and arrangement of a chosen system and its elements are portrayed in suitable forms which may include schematic diagrams, physical and mathematical models, computer simulations, layouts, detailed drawings, and similar engineering graphics. These portrayals illustrate system and item interfaces, permit traceability between the elements at various levels of system detail, and provide means for complete and comprehensive change control. The specifications for test, support, and operation are similarly documented in plans and manuals as appropriate. The system engineering process generates system and item configuration specifications for project-peculiar items in accordance with DOE configuration management guidance.

(6) Evaluation and Optimization.

(a) Desirable and practical tradeoffs among stated operational needs, engineering design, project schedule and budget, producibility, constructability, supportability, affordability, and life cycle costs, as appropriate, should be continually identified and evaluated. Tradeoff studies should be accomplished at the various levels of functional or system detail or as specifically designated and approved by the project manager to support the decision needs.

(b) The following evaluation and optimization techniques should be performed:

1 Tradeoff Studies. Appropriate tradeoff studies should be conducted to postulate design alternatives to satisfy the functional performance requirements allocated. Tradeoff stu-ies should consider all factors bearing significantly on operational and logistical support functions of the system.

2 Cost/Effectiveness Analysis. A continuing system cost effec-tiveness analysis should be conducted to ensure that engi-neering decisions resulting from the review of alternatives are made only after considering their impact on system effec-tiveness and cost of acquisition and ownership, including operations, maintenance, and disposition. Alternatives which would provide system effectiveness or costs significantly different from those based upon contract requirements should be identified. System effectiveness models should be approved by the project manager for development and use if they contribute to the decision process. The models facili-tate sensitivity analysis by allowing the input parameters to be varied individually so that their relative effect on total system performance and life cycle cost can be determined. Parameters in the effectiveness models relate to parameters expressed in the performance characteristics allocated to system functions. The modeling and analysis of life cycle costs should be updated periodically to identify the cost of acquisition and ownership.

3 Support Analysis. Analyses should be conducted to define logistics support needs (e.g., maintenance, transportation and handling equipment, spares, repair parts, personnel, technical orders, manuals). These analyses address all levels of operations and maintenance and result in iden-tification of system support requirements for full operation following key decision 4, production/operations.

4 Risk Analysis. A continuing analysis should be conducted of the risks associated with the related cost, schedule, and technical baseline as design progresses. This analysis should identify critical areas and investigate methods for minimizing risk, including prototypes, testing, and backup development. The analysis should also identify test require-ments, technical performance measurement parameters, and critical milestones.

(7) Building, Testing, and Demonstration of System. The system should be fabricated, assembled, and constructed in accordance with the detailed design. The objectives, scope, and type of system testing should be products of the engineering effort wherein all engineering specialties are integrated to define an effective and economical total system test effort. Whenever practicable, tests for different objectives should be combined. Test data that are used for technical performance measurement analysis should be identified and integrated with system test planning for maximum utility in updating and verifying the technical parameters being tracked. Verification of the acceptability and compatibility of human performance requirements, personnel selection, training, and man-machine interfaces are also integrated into the system test effort. Following system test, the system should be demonstrated in accordance with the approved demonstration plan.

2. TECHNICAL REVIEWS.

a. A series of technical reviews are conducted jointly by the Department and other project participants to assess the degree of completion of technical efforts related to technical baseline development. The number and type of reviews are determined by the DOE project office. The following technical reviews are normally utilized:

(1) System Requirements Review. This review is conducted to ascertain progress in defining system functional requirements; and implementing other engineering management activity.

(2) System (Conceptual) Design Review. This review is conducted to: (a) evaluate the optimization, correlation, completeness, and risks associated with the allocated technical requirements; (b) ensure a technical understanding among all participants on the updated or completed system (or system segment) specifications, and other systems definition effort, products and plans; and (c) summarily assess the system engineering process which produced the allocated technical requirements as well as the engineering planning for the next phases of the effort.

(3) Preliminary Design (Title I) Review. This review is conducted in order to: (a) evaluate the progress, technical adequacy, and risk resolution (on a technical, cost, and schedule basis) of the selected design approach; (b) determine its compatibility with performance and engineering specialty requirements of the development specification; and (c) establish the existence and compatibility of the physical and functional interfaces among facilities, hardware, software, personnel, and procedures,

(4) Definitive Design (Title II) Review. This review is conducted in order to: (a) determine that the retail design satisfies the performance and engineering specialty requirements of the development specifications; (b) establish the detail design compatibility among the items of equipment, facilities, computer programs, and personnel; (c) assess productivity and risk areas (on a technical, cost, and schedule basis); and (d) review the preliminary product specifications.

b. Subcontractor/Vendor Reviews. The project manager is responsible for ensuring that contracts require that technical efforts by any system subcontractor are reviewed. These reviews may be organized by the contractor or the subcontractor, as mutually agreed. Government participation in subcontractor/vendor reviews shall be as specified by the DOE project office.

SYSTEMS ENGINEERING MANAGEMENT PLAN GUIDELINES

1. PROJECT LEVEL PLAN. As appropriate, the project office should prepare a Systems Engineering Management Plan that describes how systems engineering will be conducted and managed on the project. The Systems Engineering Management Plan should include the following sections:

   a. Technical Planning and Control section identifies organizational responsibilities and authority for managing the systems engineering process, including control of subcontracted engineering; levels of control established for performance and design requirements and the control method to be used; technical assurance methods; plans and schedules for design and technical reviews; and control of documentation.

   b. Systems Engineering Process section contains a detailed description of the process to be used, including the specific tailoring of the process to the requirements of the project and its contracts; the procedures to be used to implement the process; in-house documentation; tradeoff study methodology; the types of mathematical and/or simulated models to be used for system and cost effectiveness evaluations, if applicable; and the generation of specifications.

   c. Engineering Integration section describes the coordination of the engineering specialties to achieve a best mix of the technical performance in the contract, with the detailed specialty plans being summarized or referenced, as appropriate. This portion of the plan depicts the integration of the specialty efforts and parameters into the system engineering process and shows their consideration during each iteration of the process. Where engineering specialties overlap, the responsibilities and authorities of each are defined in this part.

2. CONTRACTOR/RECIPIENT/BENEFICIARY LEVEL PLAN. The project manager should ensure that potential contractors, recipients of Federal assistance, or beneficiaries of financial incentives submit Systems Engineering Management Plans, in accordance with the above outline, in support of the project level System Engineering Management Plan, and following DOE Uniform Reporting System guidance. This contractor/recipient/beneficiary level Systems Engineering Management Plan may be a component of, or subsidiary to, the contractor/recipient/beneficiary project management plan.

SUGGESTED OUTLINE FOR A TEST AND EVALUATION PLAN AND PROCEDURE

1. TEST AND EVALUATION PLAN. Annex II to the project management plan is the test and evaluation plan. This document should be detailed to the extent necessary to show the rationale for the kind, amount, and schedules of the testing planned for the project. It should relate the test and evaluation effort clearly to the project's technical risks, operational issues and concepts, performance criteria, reliability, availability, maintainability, and acquisition phase key decisions. It explains the relationship of component, subsystem, integrated system development tests, and initial operational tests which when analyzed together provide confidence that the project is ready to proceed to the next phase of the acquisition process.

   a. The plan addresses the testing and evaluation to be performed in each acquisition phase with the upcoming phase discussed in more detail. In general, the plan should address critical tests and evaluations, and near-term and long-term plans, by acquisition phase.

   b. The plan should outline the test and evaluation management responsibilities of participating organizations including independent testing and evaluation to be performed by another agency or Departmental elements. If independent testing is not going to be performed, Justification shall be provided. Highlight arrangements between participants for sharing test data and responsibilities for test management decisions, and discuss the adequacy of the planned test periods and schedule to provide confidence in test results.

   c. An integrated test and evaluation plan shall consider the following phases:

      (1) Summary Total Project Developmental Test Planning. On a summary level milestone chart, display the integrated time sequencing of developmental tests (sometimes known as research and development tests) and evaluations for the project and the acquisition cycle key decision points. Discuss developmental test and evaluation objectives for the project in relation to the acquisition cycle key decision points. Relate the planned testing to the critical technical issues appropriate to each phase. The near-term portion of the plan contains the most detail; the long-term portions are as specific as possible. Provide, as an attachment, a listing of the issued and planned test procedures, indicating the level two, level three, and selected high risk, lower level project summary,work breakdown structure elements to which they are applicable.

      (2) Developmental Testing Conducted. Provide, by phase of the acquisition cycle, a summary of the developmental tests and evaluations already conducted based on the best available information. Briefly describe test articles. Emphasize events and results related to

required performance characteristics, critical issues, and requirements from earlier management decisions. Highlight technical characteristics or specification requirements that are to be demonstrated or, from related projects or test programs, systems, subsystems, or components which have failed to be demonstrated.

(3) Developmental Testing Remaining. Discuss remaining tests and evaluations planned for the life of the project beginning with the current phase of the acquisition cycle. Address separately each remaining phase, including the specific objectives to be addressed during the phase. The objectives identified shall be the discrete major goals of the effort, which, when achieved, shall provide solutions to critical technical issues and demonstrate that the engineering is progressing satisfactorily and the project is prepared to proceed to the next acquisition phase. Summarize the key events planned to address the objectives, so that the amount and thoroughness of testing are clearly apparent. Highlight those items, the availability of which are critical to conducting adequate tests and evaluations. If appropriate, display these items on the integrated schedule.

(4) Operational Test Planning. Discuss the operational tests and evaluations to be performed in the demonstration, and the production or operation phases of the acquisition cycle intended to address operational effectiveness and identify deficiencies in the system. Relate the test conditions and expected results to the operational effectiveness and suitability of the systems being acquired.

(5) Developmental and Operational Testing Resource Requirements. Summarize the resources required that are unique to the project. Identify, the actual number of articles and support elements of the system required for testing in each phase. If subsystems are to be tested individually, identify each subsystem and the quantity required. Identify planned testing facilities and whether they are Government or non-Government facilities.

2. AN INTEGRATED TEST AND EVALUATION PLAN shall consider the following:

a. Total Project Development Test Plan.

b. Operational Test Plan.

c. Test Resource Requirements.

d. Test Procedures:

(1) Identification of tests.

(2) Preparation, approval, and issance of test procedures.

(3) Detailed scheduling.

(4) Review and analysis of test results.

e. <u>Project Tests.</u>

(1) Acceptance tests.

(a) Installation check.

(b) Strength and tightness.

(c) Operation.

(2) Alteration and repair tests.

(3) Special tests.

f. <u>Test Documents.</u>

(1) Test specifications.

(2) Test procedures.

(a) Preparation and approval.

(b) Distribution.

(c) Review.

(d) Changes.

g. <u>Test Index.</u>

h. <u>Test Sequence.</u>

i. <u>Prerequisite Lists.</u>

j. <u>Test Instructions.</u>

(1) Organization.

(2) Document control.

(3) Status reporting.

(4) Verification of testing.

(5) Signoff.

(6) Interruptions and incidents.

(7) Testing events.

(8) Monitoring records.

3. PERFORMANCE OF TEST PROCEDURES. All operation of the plant and equipment is to be performed in accordance with Departmental procedures in applicable component technical manuals, and approved test documents. Test operating procedures supplied by the plant contractor, which are approved by DOE, may specify procedures which differ from those in applicable component technical manuals for purposes of the test program.

EXAMPLE OF A COMPREHENSIVE TEST PROGRAM

1. GENERAL.

a. Accomplishment of a project test program requires the following actions:

(1) Identification of necessary testing;

(2) Preparation, approval, and issuance of appropriate test procedures and associated testing documents;

(3) Detailed scheduling and performance of approved test procedures; and

(4) Review and analysis of results to verify acceptability.

b. The documents required to accomplish a project test program and the administrative processes associated with such documents are described in the following paragraphs. Test specifications and procedures are required for components, systems, and subsystems which are contract end items; will be contractually identified; and will be referenced in the quality assurance plan.

2. GENERAL DESCRIPTION OF PROJECT TEST PROGRAMS. Project test programs are normally of three types:

a. New Project Acceptance Tests. An extensive series of individual equipment, plant, and integrated project tests required to establish that the project is properly built and will perform as designed.

b. Alteration and Repair Acceptance Tests. Tests performed to establish the acceptability of project equipment or systems which have been altered or repaired.

c. Special Tests. Tests for purposes other than those listed above, such as periodic maintenance tests or troubleshooting tests.

3. TEST PROGRAM SEQUENCES. The paragraph defines the sequence of testing to be used for the three basic types of project test programs described in paragraph 2 above.

a. New Project Acceptance Test Program. This test program is accomplished in five phases. The sequence for accomplishing the new project acceptance test program is keyed to five phases, each of which is discussed below:

(1) Installation Checks. This phase will include a visual inspection by system of all components and equipment to assure that installation is in accordance with design plans. Fluid systems will be checked for proper arrangement, including locating and mounting of components, hanging and anchoring of piping, alignment and bolting of machinery locking devices, space envelopes required for maintenance, and the accessibility of operating parts of the system. Instrumentation and control systems will be checked for proper installation, including grounding, connections, mechanical operability of components, and proper wiring, including wrapping, servicing, sleeving, and marking. Circuit continuity, wiring, insulation, and proper ventilation will be checked, including heat dissipation features.

(2) Flushing and Strength and Tightness Tests. Upon completion of the point of construction at which filling can proceed, the fluid systems are filled and flushed. The strength and tightness of fluid systems are proven by hydrostatic testing. Appropriate piping systems are fitted with filters that simulate the pressure drop and a test head prior to filling, and instrumentation and control systems are calibrated. The calibration tests are conducted prior to, and concurrently with, strength and tightness tests sequenced to meet test procedure requirements.

(3) System Operation Testing with Minimum Parameters. Fluid systems are operated at minimum parameters for operation of appropriate equipment in order to assure, at the earliest possible date, that all components are operable and ready for further testing. Instrumentation and control testing proceed concurrently, sequenced to meet test procedure requirements.

(4) System Operation with Normal Parameters. When fluid systems have been tested adequately to indicate that operating parameters can be reached, the systems are tested at designated higher parameters. Safety and protection devices are tested as parameters are increased. When all testing designated for this period has been satisfactorily completed, the designed parameters are reduced, the filters are removed, and the entrapped contents are examined.

(5) Operational Testing. Upon completion of all tests in the preceding phases, the project is prepared for the initial operations with designed fluids/solids. After operations testing is achieved, and as the equipment is taken to operating conditions, the equipment is tested through various operating levels up to 100 percent. Then the project is tested over various expected specified transients. The intent of this phase is to assure readiness for full operations.

b. Alteration and Repair Acceptance Test Program. This test program consists of only those tests required to establish the acceptability of project equipment or systems which have been altered, repaired, opened, inspected, disassembled, and so forth, during any upgrade period. The test program is under the cognizance of a testing review board or equivalent group.

c. Special Test Programs. These consist of tests performed on a project for purposes other than above, such as varying the output stream, shifting the feedstock, or varying operating parameters for integration purposes.

4. TEST DOCUMENTS.

a. Test Specifications. Specifications will establish test requirements and parameters for all levels of tests performed on major components, subsystems, or systems as applicable to ensure that essential design, interface, and performance requirements are met. The specifications will be developed as the system design evolves.

b. Test Procedures. Test procedures are the basic documents of the project test program. They specify prerequisites, special equipment, precautions, and the steps to be followed during conduct of the test. Approved written test procedures are required for the performance of all project tests. Test requirements specify the testing to be performed and are used to prepare the detailed procedures for accomplishing testing.

(1) Preparation and Approval.

(a) New Project Acceptance Tests. Test requirements are provided to the contractor as approved operating and acceptance test procedures. These procedures are prepared by the contractor and approved by DOE.

(b) Repair Tests. The contractor develops test procedures using procedures or requirements contained in approved documents which are applicable to the equipment being tested, such as component technical manuals. Other test procedures and the project’s book of completed test procedures may also be used if it can be determined that these procedures fulfill the postrepair test requirements specified in the component technical manuals. If approved documents do not contain the procedures required or if the contractor is uncertain as to which procedures in approved documents to use, then the contractor submits recommended test procedures or test requirements to DOE. In some cases a repair test will consist merely of an operational check which does not require a test procedure (e.g., an instrument alignment check or an inspection of a mechanical joint for leakage at normal operating pressure).

(c) Use of Manual Procedures in Conducting Evaluations. Where test procedures to be issued by the contractor provide for performance of operations in accordance with the component technical manual, the sections of the manual involved should be reproduced verbatim by the contractor and attached to or integrated into the test procedures, procedure changes, or procedures where the signoff of steps is necessary to provide a record of completion of testing. Although the contractor has the option of retyping test procedures in order to integrate applicable steps from component technical manuals into the portions of the basic test procedure where they are to be performed, reproduction of these manual sections where possible is the preferred method. If test procedures are retyped, each addition to component technical manual steps should be clearly marked as such and its source identified. All reproductions or retyping of test procedures should be accomplished prior to presentation to the members of the testing review board.

1 If any caution statements in the plant or component technical manual procedures to be reproduced require a specific action to be performed, these cautions should be integrated into the test procedures as a procedural step.

2 One copy of the test procedures, including reproduced pages from the manual, should be designated the official record copy for concurrence by the testing review board.

3 It is not intended to require that routine procedures in the manuals concerned be reproduced and attached to, or integrated into, each test procedure, provided that these manual procedures can be followed in a step-by-step manner by a test monitor without change. Where circumstances are such that reproduction of sections of the manual involved is not practicable or desirable and applicable manual sections are merely referenced, the contractor shall determine an alternate method of maintaining an official status of accomplishment of the procedure, such as through use of the test monitor log. In any event, the contractor shall assure that the sections of the manual involved are complete and compatible for use by the test monitor in performing the procedure.

(d) Test Procedure Addenda. Test procedures may be supplemented by test procedure addenda to specify such information as valve status and details for flushing or hydrostatic testing. Local addenda may also be issued by the contractor to incorporate supplementary information from other approved documents. These addenda become part of the applicable basic test procedures in a manner that does not require retyping the basic procedures. Test procedure addenda are approved by the testing review board.

(2) Distribution.

(a) New Project Acceptance Test Procedures. New project acceptance test procedures are endorsed and confirmed for performance on a specific project by means of an endorsing and confirming record which is prepared and approved as follows:

1 Prepared by the project contractor;

2 Endorsed by the field organization;

3 Confirmed by the Departmental representative at the facility; and

4 Distributed by the project contractor to the project manager and field organization.

(b) New project reporting and acceptance test procedures, test procedure changes, and engineering change record sheets are distributed by the plant contractor to all applicable activities. Each contractor engaged in the construction plants receives a reproducible master and a limited number of copies of each test procedure; these are retained in a master file. When a contractor receives an engineering change record authorizing performance of a test on specific equipment being tested, the contractor produces sufficient copies of the test procedure from the appropriate master for testing review board review and subsequent testing. The contractor is responsible for incorporating into the master test procedure all approved changes which apply to the equipment being tested, including such local changes as are approved by the testing review board.

(3) Review of Test Procedure Prior to Performance. Test procedures are reviewed approximately 3 months, and again approximately 3 weeks, prior to scheduling performance.

(a) Three-Month Review. A comprehensive technical review of all operating and acceptance test procedures is conducted 3 months prior to the scheduled performance date. This review by the board serves the following functions:

1 Assures a mutual understanding of the document content;

2 Provides lead time for procurement of special test equipment and instrumentation;

3 Provides information necessary for detailed planning; and

4 Provides time for contractor/DOE resolution of comments resulting from this review.

(b) The contractor may, on a case-by-case basis, delete the 3-month review of operating and acceptance test procedures provided all of the following conditions are met:

1 The procedure has been used successfully by the contractor in prior test programs of the same equipment type;

2 The procedure will be extended to all equipment without change in scope, intent, or method of performing the test;

3 Twelve months or less has elapsed between the previous performance of the procedure and the date the 3-month review would be required;

4 The board must concur with deletion of the 3-month review for each specific procedure; and

5 The procedure for which a 3-month review will not be performed should be identified in the project test index.

(c) Three-Week Review. A comprehensive technical review of all operating and acceptance test procedures is conducted 3 weeks prior to the scheduled performance date. This review by the board serves the following functions:

1 Assures that planning for both personnel and equipment is adequate for proper performance;

2 Assures that all sections of the procedure are applicable and current;

3 Assures a formal status review of prerequisite lists;

4 Assures adequate resolution of comments from the board on the procedure at the 3-month review;

5 Assures that special test equipment is available; and

6 Assures that all applicable documents are available.

(4) Distribution of Test Procedures. After the test procedure has been reviewed and approved by the board, the contractor should formally

distribute the procedure by memorandum. The distribution memorandum should request written acknowledgement on one of its copies that the procedure has been received by the project manager. In the case of approved changes to procedures, this acknowledgement further signifies that the approved changes will be incorporated into the procedure prior to performance of the affected portions of the procedure. An example of distribution and acknowledgment memorandums are included in Figure III-11.

(5) Test Procedure Changes. Changes which unnecessarily increase the scope of existing procedures, and which are not required for safe operation or to correct errors, should not be submitted. Procedure change requests must be submitted to the plant contractor, must include the reason why the change is required, and must give a technical evaluation showing why the change is satisfactory. The contractor should obtain concurrence of the board in the need for a change prior to submitting the change request for approval.

(a) Requests for Test Procedure Changes. Changes to test procedures should be minimized. Changes should be requested only in cases where:

1 The equipment cannot be operated safely using an existing approved procedure;

2 A planned operation cannot be conducted because of an error in the existing approved procedures; or

3 A change is required to be consistent with an approved system or component change.

(b) Approval of Test Procedure Changes. Locally identified changes required to test procedures which were provided or initially approved by the DOE representative must be approved as follows:

1 Correction of obvious typographical and editorial errors, addition of items to equipment lists, addition of local quality control instructions, addition of local work codes, practices, and safety precautions, addition of caution statements as specific procedural steps when required, and deletion of sections of procedures not applicable to a specific project may be approved by the members of the board. These local changes must be clearly marked as such.

XYZ CONTRACTOR COMPANY

From: XYZ Contractor Co. Chief Plant Test Engineer for ANR Project

To: Project Manager, ANR Project

Subj: ANR Project- Plant Test Procedure 782-3, Test Change Notice No. 2

1. The subject test procedure change has been approved by all members of the testing review board for the ANR Project.

2. You are requested to acknowledge below on a copy of this memorandum that you have received the subject test procedure change. This change will be incorporated into the contractor's copy of the procedure prior to performance of the affected portions of the procedure.

/s/ A. B. Jones

Enclose: (1) Test Change Notice No. 2 to Test Procedure 782-3

Copy to: DOE Program Office (w/encl)
DOE Operations Office (w/encl)

From: Project Manager, ANR Project

To: XYZ Contractor Co. Chief Plant Test Engineer for ANR Project

Subj: ANR Project - Test Procedure 782-3; Test Change Notice No. 2

Receipt of the subject test procedure change is hereby acknowledged. The acknowledgment signifies that the change will be incorporated into the ANR Project's copy of the procedure prior to performance of the affected portions of the procedure.

/s/ H. E. Smith

This example is for distribution of a procedure change. The same format should be used for initial distribution of a procedure.

Figure III-11.
Example of Test Procedure Distribution Memorandums

2 All other procedure changes must be submitted to the project contractor for concurrence and to the DOE representative for approval. In the case of the acceptance test program for a new design project, DOE may designate other categories of changes which may be approved locally by the board.

(c) Contractor Distribution of Test Procedure Changes. After a test procedure has been approved for plant testing by the board, additional approved test procedure changes shall be issued locally as follows:

1 After receipt, the contractor shall review the revision for use in the specific test program. The contractor shall prepare a change to a test procedure and obtain concurrence of the members of the board in the proposed change.

2 Procedures need not be retyped when they are changed unless it is essential to make them readable. However, changes to procedures shall be issued as whole page changes.

3 A modification of test procedures shall be used to document board concurrence with procedure changes. The modification shall be issued by the contractor after being approved by the board. The modification must be signed by the applicable members of the board unless all of the following conditions are met:

a It is identified and approved during the course of testing;

b Waiting for a board member signature will delay the testing;

c The change and any documents or procedures invoked in the change by reference are presented to the board member verbatim; and

d The change is presented to the Departmental members of the board by the contractor head engineer.

4 If all of the above conditions exist, the board member, after concurring in the change orally, may authorize an individual actually onsite to sign for him. Such onsite individuals have no board authority on their own. There is no intent to authorize delegation of group board responsibilities to such individuals.

5 Distribution of the procedure changes shall be effected in accordance with Paragraph 4B(4) of this attachment.

(6) Review of Completed Test Procedure. Following performance of testing, the members of the board review and concur with the data for the completed test and sign to the effect that the test has been satisfactorily completed.

(7) Book of Completed Test Procedures. The completed test procedures are compiled into a book as specified for the project. Completed test procedures and their supplements are distributed in accordance with Departmental instructions for the project.

c. DOE Project Test Index. The text index is a summary of all project testing to be performed during the construction period. For existing projects, in addition to specifically identifying each test to be performed, the index also identifies the reason for the test (acceptance test, repair, and so forth) and the document used for the source of the test requirement and/or procedure. For new construction projects, the test index is prepared and approved as follows:

(1) Prepared by the contractor;

(2) Approved by the Department;

(3) Issued by the contractor in sufficient time to allow planning; and

(4) Changes to the test index approved by DOE and issued by the contractor.

d. Project Test Sequence. The project test sequence consists of tests, or parts of tests, and significant events for each plant arranged in order of performance so that all prerequisites for testing are met and so that the results will provide the data required to satisfactorily complete the test program and the sequence required for project safety. The test sequence is prepared and approved as follows. For all projects the test sequence is prepared, reviewed, approved, and issued in the same manner as specified in subparagraph 4c above, for the test index, and is submitted with or subsequent to the test index.

e. Prerequisite Lists.

(1) Key Events which Require Prerequisite Lists. For key events in a test program, prerequisite lists are prepared which specify the requirements to be satisfied in order to assure readiness and safety to perform the event. Accomplishment of the items indicated in these lists is considered to be the minimum required prior to the

performance of the specified event. Additional requirements may be incorporated into these lists. The following key events require prerequisite lists:

(a) Initial individual component testing;

(b) System operations - minimum parameters;

(c) System operations - normal parameters;

(d) Initial operations testing; and

(e) Full operation.

(2) Administration of Prerequisite Lists. The procedures for administering prerequisite lists are as follows:

(a) Initial project individual component and initial operations testing prerequisite lists.

1 Prepared by the contractor.

2 Approved by DOE.

3 Issued by the contractor.

4 Reviewed and approved for local use by the testing review board; items added as considered necessary by testing review board members.

5 Issued by the contractor.

6 Prior to individual component testing during installation of the component, the contractor identifies, submits justification for, obtains approval of the testing review board for, and informs DOE of any Departmentally approved prerequisite list items not to be completed prior to the event. Approval of the testing review board constitutes approval to proceed with individual component testing.

7 Prior to initial operations testing during project construction, the contractor identifies, submits justification for, and obtains concurrence of the testing review board for, concurrence of the project contractor, and approval of DOE for all Departmentally approved prerequisite list items not to be completed prior to the event. In addition, specific Departmental approval is required prior to presenting to initial operations offices.

(b) All other prerequisite lists shall be:

1 Prepared by the contractor;

2 Approved by the testing review board; and

3 Issued by the contractor.

(c) Changes to DOE approved prerequisites are concurred in by the project contractor and approved by DOE. Although not a mandatory requirement, experience has shown that test time is kept to a minimum and more management and supervisory attention is directed to test operations if all test documents required for a complete test sequence are issued and ready for use before the sequence is allowed to commence.

f. Test Instructions. A set of test Instructions shall be prepared by the contractor to establish the detailed procedures for administration, control, and performance of project equipment testing by the contractor. The test instructions shall implement those requirements and additional local requirements for the administration, control, and performance of project testing, as required. The following is a minimum list of test instructions and the minimum requirements to be specified in each test instruction. Each contractor should have additional test instructions as necessary to administer test programs in accordance with these requirements.

(1) Responsibilities of the Test Organization and Other Contractor Elements for Project Testing and Operations. This test instruction shall cover the following:

(a) Definition of the responsibilities of various contractor elements involved in a project test program and how their efforts are coordinated. For example:

1 Functions, assignments, responsibilities, and qualifications of personnel within the test organization. This should include the responsibilities of personnel designated to prepare procedures in support of project testing and operations.

2 Responsibilities of production personnel such as managers, supervisors, technicians or support personnel. It should be made clear that functions and responsibilities such as correction of system and component deficiencies, and test equipment and contractor support system preparation, checkout, hookup, and maintenance, should be carried out by production personnel rather than test organization personnel.

In this manner; test organization personnel can devote full attention to the safe and proper conduct of plant testing and operations rather than to production functions.

3 Responsibilities of support personnel such as quality engineers, inspectors, and control monitors in conjunction with plant test and operations.

(b) Designation of the boundaries between each project and other systems and how such boundaries are maintained.

(c) Division of responsibilities between the testing organization and procedures for transfer of control of project systems and conditions for operational testing.

(d) Procedures for coordination of efforts between the test organization and contractor elements responsible for project safety.

(2) Test Document Administration and Control. Each contractor shall have a test instructIon which implements these requirements for test document administration and control.

(3) Performance of Plant Test and Operations. This test instruction shall establish the following:

(a) Control Locations for Testing. The test monitor shall be where he can exert the proper control over testing being performed.

(b) Communications. Requirements shall be established to assure that formal, consistent, communication procedures are used in accordance with standard practice for conduct of testing or changing equipment conditions or system status.

(c) Briefings and Dry Runs. Contractor shall designate tests or test operations which require briefings and dry runs and establish procedures for their conduct.

(d) Location Assignment. Contractor test instructions shall identify testing and evolutions which require specific assignment of locations for individuals in a test. These assignments provide for the test monitor, operating personnel, data takers, and observers for all locations to be present on each shift during certain tests. The assignment specifies both contractor and DOE project manager personnel by name. Location assignments are required for the performance of major tests such as initial individual component testing, initial operational testing, and fuel operational testing.

1 Location assignments are prepared by the contractor and reviewed and approved by the members of the testing review board. Approval of the location assignment by the members of the testing review board does not constitute approval of the qualifications of the personnel or of the specific individuals listed in the location assignments.

2 The DOE project manager participates in the preparation of location assignments for tests in which Departmental personnel are involved.

3 The DOE project manager will supply the contractor with the names and locations of Departmental personnel for inclusion in the location assignments.

4 Approved location assignments shall be posted.

5 Deviations from approved location assignments are allowed only with the approval of the members of the testing review board.

(e) Operation of Components and Systems. This test instruction shall establish how operational control systems or parts of systems are transferred from the contractor to the operating personnel and vice versa. This test instruction shall require formal transfer of systems and shall designate contractor persons authorized to operate systems or components where the contractor has control of these systems or components. Minimum qualification requirements for such contractor persons and a list of qualified persons shall be established and maintained.

(4) Control of Project Conditions and System Status and Project Work. This test instruction shall include:

(a) Procedures for formal control of:

1 Project conditions and systems status; as defined;

2 Initiation of project work, including repairs and modifications, in the project and project systems or structure which could directly affect the project or the conduct of project testing;

3 Connection of contractor support systems or test equipment to, and disconnection from, the project; and

(b) Definition of the role of test personnel in approval and signoff of work permits and establishment of system status.

(5) Out-of-Service Procedures. Each contractor shall have a test instruction governing out-of-service procedures which complies with prudent safety requirements.

(6) Valve Lineup Procedures. Each contractor shall have a test instruction governing valve or switch status procedures.

(7) Verification and Signoff of Testing Steps. This test instruction shall cover the following:

(a) When test or operating procedures require that an individual sign for an action after verifying the action based on personal observation, and certify by his signature that the action has actually been performed in accordance with the specified requirements, it is the responsibility of the contractor to sign for the action unless the procedure specifies otherwise. This responsibility cannot be assigned to another organization without the approval of the DOE representative.

(b) Responsibilities for and manner of verification and signoff of prerequisites, plant conditions, special precautions, test preparations, procedural steps, and data sheets, including:

1 Initial performance of a procedure;

2 Periodic review of prerequisites, plant conditions, and special precautions during an extended procedure;

3 Reverification and signoff required after interruption of a test, including reverification of valve or switch status affected by the test interruption;

4 Review of status at shift turnover;

5 Reverification and signoff when steps in a procedure must be reperformed;

6 Verification and signoff for restoration of the plant; and

7 Manner in which inspections shall be performed and data sheets shall be filled out.

(8) <u>Test Interruptions,</u> <u>Unusual Occurrences, and Incidents.</u> Contractors shall have a test instruction which establishes formal requirements for handling interruptions, unusual occurrences, and incidents which occur during plant testing. This test instruction shall include the following details:

(a) What interruptions, unusual occurrences, and incidents require reporting to higher authority, and to whom they should be reported;

(b) The procedure for a critique, including what occurrences require critiques;

(c) Requirements for casualty bills;

(d) Written reports required to document occurrences;

(e) Requirements to be satisfied before resuming testing, including reverification of valve or switch status affected by the test interruption; and

(f) Method of voiding signed-off prerequisites, plant conditions, procedural steps, and data sheets affected by the interruption and manner of reverification and signoff of these items before resuming testing.

(9) <u>Testing Events Schedule.</u>

(a) This schedule is a document issued daily by the contractor (or less frequently as required), listing the following types of items which are to be started or accomplished during the period covered by the testing events schedule:

<u>1</u> Authorized plant tests (including reference to the specific procedure and revision thereof to be used).

<u>2</u> Test briefings.

<u>3</u> Installation of test equipment.

<u>4</u> Project conditions in effect (may be by reference to applicable project procedures in effect) and any changes in project conditions to be accomplished (including reference to the specific procedure and revision thereof to be used).

<u>5</u> Training to be conducted, if any.

6 Other test documents and functions, as necessary.

7 Project work including preventive maintenance, to be started or accomplished during the period covered by the schedule which requires changing project conditions or affects project testing. Project work, including preventive maintenance, which does not affect project conditions or project test performance, need not be listed on the schedule and may be accomplished at the discretion of the test monitor.

8 Nonproject work or testing which could affect project testing during the period covered by the testing events schedule.

9 Other requirements which must be satisfied for testing or changes in project conditions to proceed.

(b) The members of the testing review board should concur in the testing events schedule. Work or testing not listed on the testing events schedule plan should not be performed until a formal change to the schedule has been issued. Changes should be concurred in by the parties who signed the original testing events schedule.

(c) It is not intended that the members of the testing review board concur with the detailed scheduling of contractor production work except to concur that work planned is compatible with project testing or changes in project conditions to be performed. The important function of the testing events schedule is to assure that all work and testing or project operations planned are formally identified ahead of time and determined to be compatible. In order to facilitate review and resolution of comments or questions, the proposed schedule is normally provided to members of the testing review board in advance of the testing events schedule meeting.

(10) Test Monitor Record. This is the official record of the conduct of testing and operation under the direction of a test monitor for the project. All information pertinent to the testing and operation must be entered into the record. This does not include data required to be recorded in test procedures. The contractor shall issue a test instruction describing the administrative requirements and controls for the preparation and maintenance of the record. The instruction should require that copies of the test monitor record be provided daily to the DOE project manager. The test monitor record will note the date of the start and completion of events, vital information pertaining to performance, and any other pertinent information. The

test monitor records will be formal and will conform to standard recordkeeping practice. The test monitor is responsible for all entries and must sign and date the test monitor record at the end of each shift. The record should identify holdups and delays in testing and operations, plus giving the reason for such delays. Problems identified during testing should be documented.

(11) Test Monitor Shift Turnover. This test instruction shall specify the shift turnover requirements to be observed by test monitors during the performance of project testing and other applicable operations. The minimum requirements described below shall be included. Shift turnover is an important evolution which must be performed in a thorough, formal manner and must assure that necessary information is transferred between shifts. The relieved test monitor must assure that all pertinent information is given to the oncoming test monitor, who must be satisfied that he or she fully understands the condition of the project and the status of the test procedure in progress. They may desire to utilize checklists for shift turnover. In addition, the contractor may develop a test procedure briefing book for use by the test monitor prior to shift turnover. This book contains information, such as expected results or test duration, which has been gathered from the contractor's past experience, and the experience of other contractors in performing the test. Debriefings after test performance should be used to keep the briefing book current.

(a) Prior to shift turnover, a brief meeting of key oncoming test personnel should be held to review the provisions of the test events schedule, discuss the status of test progress, coordinate planning for testing to be conducted during the next shift, and review potential problems which could occur during the testing planned and the corrective action which would be necessary. The oncoming test monitor should direct the meeting after having obtained necessary status information from the test monitor in charge of the previous shift. The time and place for the meeting and for shift turnover should be noted in the test events schedule.

(b) Before commencing the shift turnover process, the oncoming and offgoing test monitors must agree on a safe point in the test in progress when shift turnover should take place and on the place and manner for shift turnover. The offgoing test monitor should assure that the project is in a safe, static condition before the turnover commences. The oncoming test monitor should review the test monitor record entries since his last shift before commencing the turnover.

(c) The following should be discussed between the oncoming and offgoing test monitors prior to shift turnover:

1 Past shift progress and the status of completed and uncompleted steps in the test procedure, including the specific point in the procedure from which the next shift should proceed;

2 Project conditions and system status including replacement inventories available;

3 The status of test equipment and contractor support systems connected to the project; and

4 The status of out-of-service equipment and any switches in cutout or abnormal position or electrical jumpers installed and the reason for same.

(d) The oncoming test monitor shall make an inspection of the spaces to observe the condition of vital systems, test equipment, number of personnel in each area, availability of protective gear, and so forth. During this tour, the test locations will be observed to verify that each location is manned by a person adequately briefed in the action expected of him or her. A communications check should also be performed.

(e) Relief of contractor personnel directly associated with project testing may proceed when agreed to by the test monitors. When turnover of information is complete, the oncoming test monitor will formally accept responsibility from the offgoing test monitor.

(12) Performance of Installation Checks (Mechanical and Electrical). This test instruction shall contain requirements for performing installation checks to verify that systems comply with applicable plans and requirements.

(13) Performance of Strength and Tightness Tests. This test instruction shall contain the detailed requirements to perform hydrostatic testing in accordance with applicable requirements. This test instruction should include or refer to the procedure or means to assure that all joints to be inspected during the hydrostatic test are identified and can be located for ready viewing once the hydrostatic test commences.

(14) Operational Checks. This test instruction shall contain requirements governing operational checks which do not require a test procedure. As a minimum it shall:

(a) Define the scope of such checks. Operational checks not requiring a test procedure are limited to those which meet all of the following conditions:

1 The check is simple and can be performed verbatim directly from the applicable component technical manual without changes or additional operating instructions.

2 The check does not require operation of the equipment outside of normal operating limits.

3 The check does not involve any deviations from specification requirements.

(b) Establish responsibilities and procedures for identifying each operational check required, for assuring it is performed when required and for reviewing and accepting the results.

(c) Establish responsibilities for performing the operational checks and for documenting their performance.

(15) Preventive Maintenance During a New Project Test Program. This test instructIon shall cover the following:

(a) Description of how preventive maintenance is to be scheduled and accomplished during the test program prior to system turnover to the operating personnel;

(b) Definition of responsibilities for scheduling and accomplishment of preventive maintenance and recordkeeping subsequent to system operational control transfer to the operating personnel and type of agreement to be executed at system turnover;

(c) Designation of responsibilities for contractor review of preventive maintenance results including alignment and calibration data sheets;

(d) Actions to be taken by the contractor when improper preventive maintenance results are noted; and

(e) Preventive maintenance documentation to be turned over to operating personnel.

(16) Responsibilities for Contractor Support Systems and Test Equipment. Each contractor shall have a test instruction governing the responsibilities for contractor support system and test equipment. As a minimum this test instruction shall:

(a) Provide for control of contractor support systems and test equipment.

(b) Establish procedures for assuring that contractor support systems are properly identified and maintained in a state of cleanliness.

(c) Establish procedures for assuring that required test equipment is properly identified, stored, and maintained in a state of cleanliness and readiness to support testing and identify responsibilities for such equipment.

(d) Require that contractor support systems and test equipment comply with all applicable requirements and define the responsibilities for inspection prior to use. Require that periodic audits be conducted to verify compliance with requirements and identify responsibilities for assuring compliance.

(e) Require that responsibilities for operational control of contractor support systems and test equipment be agreed to between the contractor and the operations personnel for each application.

(f) Identify who in the contractor's organization is authorized to operate contractor support systems and test equipment.

(g) Establish procedures for control of work on and maintenance of contractor support systems and test equipment.

(h) Require that operating procedures be prepared for contractor support systems where necessary.

(i) Require numbering of contractor support system valves and switches in a consistent manner and require the use of these valve and switch numbers where appropriate in test and project conditions documents.

(j) Require specifying in appropriate test and project conditions procedures those valves, switches, and breakers in contractor support systems and test equipment which shall be the responsibility of the operating personnel to operate and require those valves, switches, and breakers to be so identified.

(17) Administration of Test Instructions. Each contractor shall have a test instruction which establishes a formal method of maintaining, revising and disseminating test instructions. The application of the test instructions to each specific plant shall be approved by the testing review board. In addition, the board has the option to request that they approve application of other test instructions, which may be prepared to supplement the test instructions listed above, prior to contractor application to specific equipment. Unless a specific compelling reason overrides, this shall be carried out by approval of a cover sheet implementing the identical words in effect for previous similar equipment. A copy of all test instructions (or equivalent documents) prepared, and changes thereto, should be provided to DOE for information. Test instructions shall not be used in lieu of or to circumvent requirements of approved operating procedures or technical manuals. Departmental approval must be obtained for any deviations from applicable technical manuals, approved test or operating procedures, or Departmental directives.

5. PERFORMANCE OF TEST PROCEDURES. All operation of the plant and equipment is to be performed in accordance with Departmentally approved procedures in applicable component technical manuals, and approved test documents. Test operating procedures which are supplied by the plant contractor and approved by DOE may specify procedures which differ from those in applicable component technical manuals for purposes of the test program.

SUGGESTED CONFIGURATION MANAGEMENT PLAN

1. Each contractor should submit a Configuration Management Plan, describing how it will manage and conduct the configuration management effort in response to the requirements of a solicitation.

   a. The offeror identifies in the plan, items proposed for inclusion in the contract. Only those items which are basic to the satisfaction of project objectives need to be placed on contract. The plan must be updated as required pursuant to contract award.

   b. Contractor procedures and other planning baselines need to be prepared in sufficient detail to support Departmental requirements for visibility, validation, and verification of the contractual items.

2. The contractor's plan should conform to the outline below. Paragraphs listed may be further subdivided.

Cover Sheet

Section 1 - Introduction
- 1.1 Table of Contents
- 1.2 Special Material Features
- 1.3 Special Organizational Features

Section 2 - Organization
- 2.1 Responsibilites
- 2.2 Structure
- 2.3 Policy Directives

Section 3 - Technical Baseline Identification
- 3.1 Functional Requirements Baseline
- 3.2 Technical Requirements Baseline
- 3.3 Design Requirements Baseline
- 3.4 Product Configuration Baseline

Section 4 - Configuration Change Control
- 4.1 Procedures
- 4.2 Interface Control

Section 5 - Status Recording and Reporting
- 5.1 Data Bank Establishment
- 5.2 Data Bank Content
- 5.3 Reporting
- 5.4 Audits

Section 6 - Special Considerations

3. The information described in the following paragraphs is required to be included in each plan:

   a. Cover Sheet. The cover sheet shall provide the nomenclature of the system or product, contractor, contract number, and date of issue.

   b. Section 1 - Introduction. The special features of the contractor's facilities, which have a determining effect on the nature of the configuration management program, shall be briefly described. Characteristics such as manufacturing capabilities, design and drafting personnel, and organizational relationships shall be defined.

   c. Section 2 - Organization. This section shall outline the contractor's organization and the organizational relationships of the individuals and activities involved in the configuration management program. Individuals in the contractor's organizational structure, in related contractor's organizations, and in Government activities shall be depicted. The responsibilities of each shall be defined. Their relationships shall be outlined in chart form, and the policy directives that govern the program shall be listed. Procedures shall not be included in this section.

   d. Section 3 - Baseline Identification. Requirements covering preparation, submission for DOE approval, and subsequent release of the Departmentally approved documentation which defines each of the required baselines shall be established in this section. The contractor's method under which the documentation shall be prepared, approved by DOE, and released, shall be described and the time periods in which these steps shall be accomplished shall be indicated.

   e. Section 4 - Configuration Change Control. Procedures for processing engineering change proposals and requests for deviations or waivers shall be outlined in this section.

   f. Section 5 - Status Recording and Reporting. This section shall outline plans for collecting, storing, handling, verifying, and reporting of configuration status information. It shall indicate the techniques to be applied to provide a dynamic information system, responsive to the needs of the entire management team.

   g. Section 6 - Special Considerations. Peculiarities of the configuration management program that result from participation by a large number of organizations, use of many commercial items, use of existing drawings and specifications or other departures from the normal, and innovations for more effective configuration management shall be described here.

CONFIGURATION MANAGEMENT PROCESS FLOW (TYPICAL)

1. INTRODUCTION. The configuration management process flow will vary from project to project depending upon the product, complexity, estimated cost, and technical interface details. There is, however, a general flow in configuration management which will be relatively consistent. This flow is illustrated in Figure III-12.

2. HEADQUARTERS PROGRAM OFFICES should:

   a. Approve baseline identification documents.

   b. Approve an engineering change proposal (ECP) if cost, schedule, or technical impact exceeds parameter thresholds prescribed by the project charter, or project management plan. Program office approval is normally limited to changes to documents which require such approval for the original document.

3. FIELD ORGANIZATION/PROJECT OFFICE should:

   a. Establish project procedures, define engineering change classes, and establish the Configuration Control Board (CCB).

   b. Develop the functional requirements baseline in support of the objectives delineated in the justification for new start.

   c. Furnish contractor with copies of the technical requirements baseline documents.

   d. Review contractor ECPs:

      (1) An ECP form should provide a means for suggesting or recommending changes to configuration identification. At a minimum, it should include the basic data elements identified below. An ECP is normally accompanied by an ECP checklist, which identifies documents and functional organizational elements affected by the change as well as organizational elements responsible for implementation of the change. (Other documents required, therefore, may also be attached.)

         (a) Baseline Impact. Indicate whether the cost, schedule or technical baseline shall be impacted. If more than one baseline will be impacted, so indicate.

         (b) Priority. Indicate whether the change priority is Emergency, Urgent or Routine.

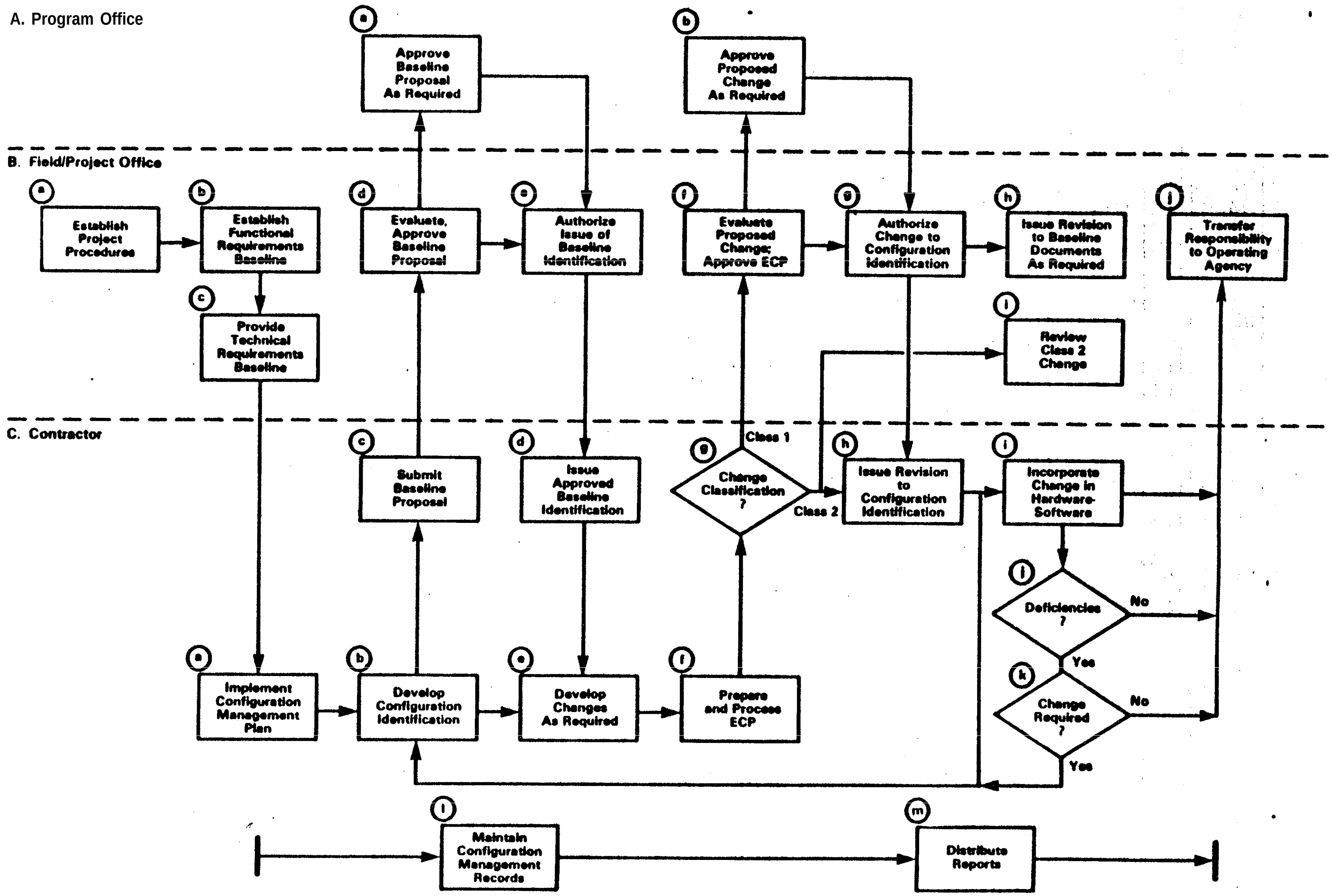


Figure III-12
Typical Configuration Management Process

(c) Approval Need Date. Enter the date by which Departmental CCB approval is required in order to allow work to continue without additional cost or schedule Impact.

(d) Class. Enter the number indicating whether the ECP is Class 1 or Class 2 (or other, as agreed to with the DOE project office).

(e) CIN/Date. Enter the contractor identification number, which uniquely identifies the ECP, and the date on which it was assigned.

(f) Category of Change. Indicate the reason for the change.

(g) Project/End Functions Affected. Briefly describe the top level functions that will be affected by the CCB decision.

(h) Prepared By. Enter the name and phone number of the responsible engineer, and the date the ECP was completed. Also enter the name of the organizational element of the preparer.

(i) Change Title. Enter a brief, descriptive phrase which describes the proposed change. To the extent practicable the title shall be unique.

(j) Description/Justification of Change. Describe the proposed change and the reasons in sufficient detail to fully inform the CCB members of what is being proposed and why. Continuation sheets and other documents may be used as required.

(k) Cost Impact. Identify the type of funds affected by the change. Enter the estimated impact on cost and the fiscal years in which the impact shall occur. Also enter the total cost estimate at completion resulting from execution of the proposed change.

(l) Schedule Impact. Enter a brief statement of the effect that the implementation of the change will have on the contract end date (e.g., slip 2 weeks; none; gain 3 months). A more detailed impact statement may be provided on a continuation sheet.

(m) Impact of Change If Not Made. Explain briefly what the effect of not making the proposed change shall have on cost, schedule, and technical performance.

(n) Approvals. The contractor CCB Chairman, the Departmental CCB Chairman, and DOE project manager shall indicate their approval.

(2) Each contractor-proposed change must be forwarded to the contractor CCB for approval. On approval, it is forwarded by the contractor to the DOE CCB.

e. Notify the contractor of approval of the baseline, authorizing the contractor to issue the baseline identification documents.

f. Receive and evaluate Class 1 engineering change proposals and engineering changes which require contract modification (i.e., change order). The project manager approves or disapproves recommendations. Disapproved ECPs are returned to the originating office with an explanation of the reasons for disapproval.

(1) Engineering Change Evaluation.

(a) A change evaluation form provides a means for CCB members to record their evaluation of each ECP considered by the board. The form illustrated may be modified as required by the project office. However, at a minimum, it must include the data elements identified on the sample form and in the related instructions below.

(b) The following should be included in the change evaluation:

1 ECP number, revision, correction and title;

2 Recommended modification to ECP as submitted and reasons;

3 Recommended actions and remarks; and

4 CCB member signature and date.

g. Authorize change implementation through the appropriate authority.

(1) The purpose of a change concurrence form is to provide a means for documenting the deliberations of the DOE Configuration Control Board. It provides identification of each ECP and the CCB meeting at which it was considered, a summary cost and schedule impact of the proposed change, directed modifications to the ECP, and the position of each board member with respect to the ECP. It also provides a vehicle for transmitting, through the work authorization and contract administration processes, directions to the contractor with respect to each ECP. The change concurrence should be structured so that it may also be used by the contractors for documenting the deliberations of their own CCBs. The concurrence should include the data elements identified below:

(a) ECP number and date, revision number and date, correction number and date, and ECP title;

(b) Configuration control board meeting date;

(c) ModificatIons to submitted ECP;

(d) Cost impact summary;

(e) Schedule impact summary;

(f) Board members position on ECP as modified above;

(g) Recommended action on ECP; and

(h) Signature of chairman and date.

(2) A change concurrence should be prepared for each ECP considered by the CCB. It can then be submitted to the contracting officer as an attachment to work authorization documents for his use in transmitting to the contractors the directions resulting from CCB actions.

h. Initiate any required revision to an earlier or higher level baseline document and provide to all affected parties.

i. Review Class 2 changes. If the project office does not concur in the Class 2 classification, notify the contractor to resubmit the change as Class 1.

4. <u>CONTRACTORS</u> shall:

a. Upon contract award, implement the contractually required configuration management plan.

b. Develop configuration identification in support of the current baseline requirements.

c. Using the ECP format, submit the proposal to issue baseline identification documents.

d. Issue the baseline identification documents and maintain the document masters.

e. Develop changes to configuration identification documents that may result from the contractor's normal engineering process, from other contractor initiated ECPs, or from changes in project requirements directed by the project office.

f. Prepare and process ECPs in accordance with the configuration management plan.

g. Segregate Class 1 and Class 2 ECPs and forward them to the DOE project office.

h. Issue the revised configuration identification.

i. Incorporate the authorized change into the hardware/software in accordance with the revised documentation and track the incorporation of these changes.

j. Monitor the inspection, acceptance, and checkout to verify that the "as built" configuration of hardware/software is consistent with its current configuration identification. Identify deficiencies.

k. If a change is required, proceed to develop configuration identification, ECP, and supporting documentation.

l. Establish and maintain the administrative records and files necessary for support of the configuration management process.

m. Prepare and distribute periodic configuration status reports in accordance with contract reporting instructions.

COST AND SCHEDULE CONTROL SYSTEMS CRITERIA

1. GENERAL. The prospective contractor's cost and schedule control system proposal shall be evaluated to determine whether it meets the criteria described in paragraph 2 below. An element in the evaluation of proposals will be the proposer's systems for planning and controlling contract performance. The prospective contractor shall agree to operate systems that are in compliance with the cost and schedule control systems criteria throughout the period of contract performance if awarded the contract. DOE shall rely on the contractor's systems and, therefore, shall not impose separate management control systems.

2. CRITERIA. The contractor's management control systems shall include policies, procedures, and methods which are designed to ensure that they will accomplish the following:

   a. Organization.

      (1) Define all authorized work and related resources to meet the requirements of the contract, using the framework of the contract work breakdown structure.

      (2) Identify the internal organizational elements and the major subcontractors responsible for accomplishing the authorized work.

      (3) Provide for integration of the contractor's planning, scheduling, budgeting, estimating, work authorization, and cost accumulation systems with each other, the contract work breakdown structure, and the organizational structure.

      (4) Identify the managerial positions responsible for controlling overhead (indirect costs).

      (5) Provide for integration of the contract work breakdown structure with the contractor's functional organizational structure in a manner that permits cost and schedule performance measurement for contractor work breakdown structure and organizational elements.

   b. Planning and Budgeting.

      (1) Schedule the authorized work in a manner which describes the sequence of work and identifies the significant task interdependencies required to meet the development, production, construction, installation, and delivery requirements of the contract.

      (2) Identify physical products, milestones, technical performance goals, and other indicators that will be used to measure output.

(3) Establish and maintain a time-phased budget baseline cat the cost account level against which contract performance can be measured. Initial budgets established for this purpose shall be based on the negotiated target cost. Any other amount used for performance measurement purposes shall be formally recognized by both the contractor and the Government.

(4) Establish budgets for all authorized work with separate identification of cost elements (labor, material, and so forth).

(5) To the extent the authorized work can be identified in discrete, short-span work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire cost account cannot be subdivided into detailed work packages, identify the long-term effort in larger planning packages for budget and scheduling purposes.

(6) Provide that the sum of all work package budgets, plus planning package budgets within a cost account equals the cost account budget.

(7) Identify relationships of budgets or standards in underlying work authorization systems to budgets for work packages.

(8) Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which cannot be identified as discrete, short-span work packages or as apportioned effort shall be classed as level of effort.

(9) Establish overhead budgets for the total costs of each significant organizational component whose expenses will become indirect costs. Reflect in the contract budgets at the appropriate level the amounts in overhead pools that will be allocated to the contract as indirect costs.

(10) Identify management reserve and undistributed budget.

(11) Provide that the contract target cost plus estimated cost of authorized but unpriced work is reconciled with the sum of all internal contract budgets and management reserve.

c. <u>Accounting.</u>

(1) Record direct costs on an applied or other acceptable basis in a formal system that is controlled by the general books of account.

(2) Summarize direct costs from cost accounts into the work breakdown structure without allocation of a single cost account to two or more work breakdown structure elements.

(3) Summarize direct costs from he cost accounts into the contractor's functional organizational elements without allocation of a single cost account to two or more organizational elements.

(4) Record all indirect costs which will be allocated to the contract.

(5) Identify the bases for allocating the cost of apportioned effort.

(6) Identify unit costs, equivalent unit costs, or lot costs as applicable.

(7) The contractor's material accounting system shall provide for:

(a) Accurate cost accumulation and assignment of costs to cost accounts in a manner consistent with the budgets, using recognized, acceptable costing techniques;

(b) Determination of price variances by comparing planned versus actual commitments;

(c) Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of actual receipt of material;

(d) Determination of cost variances attributable to the excess usage of material;

(e) Determination of unit or lot costs when applicable; and

(f) Full accountability for all material purchased for the contract, including the residual inventory.

d. Analysis.

(1) Identify the following items at the cost account level on a monthly basis using data from, or reconcilable with, the accounting and budgeting systems:

(a) Budgeted cost for work scheduled and budgeted cost for work performed;

(b) Budgeted cost for work performed and applied (actual where appropriate) direct costs for the same work;

(c) Estimates at completion and budgets at completion; and

(d) Variances resulting from the above comparisons classified in terms of labor, material, or other appropriate elements together with the reasons for significant variances, including technical problems.

(2) Identify on a monthly basis in the detail needed by management for effective control, budgeted indirect costs, actual indirect costs, and variances along with the reasons.

(3) Summarize the data elements and associated variances listed in subparagraph 2d(1) and (2), above, through the contractor organization and contract work breakdown structure to the reporting level specified in the contract.

(4) Identify significant differences on a monthly basis between planned and actual schedule accomplishment, together with the reasons.

(5) Identify managerial actions taken as a result of subparagraphs 2d(1) through (4) above.

(6) Based on performance to date and on estimates of future conditions, develop revised estimates of cost at completion for work breakdown structure elements identified in the contract, and compare these with the contract budget base and the latest statement of funds requirements reported to the Government.

e. <u>Revisions and Access to Data.</u>

(1) Incorporate contractual changes in a timely manner recording the effects of such changes in budgets and schedules. In the directed effort before negotiation of a change, base such revisions on the amount estimated and budgeted to the functional organizations.

(2) Reconcile original budgets for those elements of the work breakdown structure identified as priced line items in the contract, and for those elements at the lowest level of the project summary work breakdown structure, with current performance measurement budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.

(3) Prohibit retroactive changes to records pertaining to work performed that will change previously reported amounts for direct costs, indirect costs, or budgets, except for correction of errors and routine accounting adjustments.

(4) Prevent revisions to the contract budget base except for Government-directed changes to contractual effort.

(5) Document, internally, changes to the performance measurement baseline and, on a timely basis, notify the Government project management through prescribed procedures.

(6) Provide the contracting officer and his or her duly authorized representatives access to all of the preceding information and supporting documents.

GUIDELINES FOR PREPARING REWIRED SUMMARY OF BASELINE INFORMATION,

BASELINE CHANGE CONTROL THRESHOLDS,

BASELINE CHANGE PROPOSAL FORMATS, AND CHANGE DISPOSITION RECORD

1. Introduction. This attachment provides guidance for preparation of the required formats provided by:

Figure III-15, Summary of Baseline Information Format;

Figure III-16, Summary of Thresholds Format;

Figure III-17, Baseline Change Proposal Format; and

Figure III-18, Change Disposition Record Format

Figures III-15 and III-16 are required for inclusion in the controlled items section of all MSAs and MPs project plans.

Figure III-17 is the format that will be used to request Level O BCCB approval of changes to project cost, schedule, and technical baselines.

Figure III-18 is the format for the change disposition record following Level O BCCB actions.

2. Summary of Baseline Information Format.

Figure III-15, Summary of Baseline Information Format, is the format that shall be utilized to establish initial cost, schedule, and technical (scope) baselines. The responsible Program Secretarial Officer provides his/her recommendations for the project baselines for each of the four levels of authority that will be approving baseline documents and changes to those approved baseline documents on this format for ESAAB approval at KD-1. ESAAB approval is required prior to start of preliminary design.

Where necessary, attachments may be provided when space in the format prohibits clear and complete definitions of baselines. References to other documents should be minimized, as this format is to be included in each project plan which is the highest level program document in a project. In these cases where clear definition is not possible (i.e., the period prior to Key Decision 3 for the Level 2 and 3 baselines) recognized generic document titles may be used. The following guidelines/instructions for completing each block of the format is preceded by the column and row titles of the block.

a. Level O Technical (Scope) Baseline. Enter the primary project parameters which, if changed, would have significant impacts on all three baselines. These parameters should be selected from the Conceptual Design Report (CDR) and be expressed quantitatively. Example of those entries are:

(1) Total Plant Capacity

(a) reprocess 100 kg Pu per/yr.
(b) generate 2,000 MW (thermal).
(c) receive and store 3,000 gallons of low level waste/yr.

(2) Plant size

(a) 250,000 sq. ft.
(b) 60 acre secure zone
(c) 25 sq. mile exclusion zone

(3) Release limits

(4) Quantity of reactor coolant loops

b. Level O Schedule Baselines. Enter the titles and schedule dates (month/year) if key milestones to be controlled by the Acquisition Executive. The listing shall include Key Decisions 1, 2, 3, and 4 and an annual ESAAB review for those years, through Key Decision 4, for which no Key Decisions are scheduled. At least one milestone per year will be identified. A sample listing follows:

Milestone	Schedule Date
Key Decision 1	9/91
ESAR	9/92
Key Decision 2	6/93
ESAR	6/94
Authorize Long-Lead Procurement	4/95
Authorize Site Preparation	2/96
Key Decision 3	10/96
ESAR	10/97
Complete Construction	7/98
ESAR	7/99
Key Decision 4	12/99

c. Level O Cost Baseline. Enter TEC and TPC values.

d. Level 1 Technical (Scope) Baseline. Enter the remaining primary project parameters, not previously identified as Level O, selected from the CDR which, if changed, would have significant impacts on all three baselines. Examples of these entries would be:

(1) Design approach for HVAC heating and cooling
(2) Design approach for total electrical power
(3) Selected system performance parameters

e. Level 1 Schedule Baseline. Enter the titles and schedule dates (month/year) of key milestone to be controlled by the project Program Secretarial Officer. The listing shall include those milestones identified in section 4 g of Part F, Environmental Planning and Review, of Chapter II, Project Planning and Budgeting. Additional suggested control milestones are:

Milestone	Schedule Date
Complete Conceptual Design	7/91
Start Title I Design	11/91
Complete Title I Design	4/93
Start Title II Design	8/93
Complete Title II Design	8/96
Start Site Preparation	9/96
Start Construction	12/96
Start Testing	9/98
Complete Testing	10/99

f. Level 1 Cost Baseline. Enter control points (established from Level 2 WBS) for TEC and/or TPC, as appropriate.

g. Level 2 Technical (Scope) Baseline. List project performance parameters selected from the CDR and not identified as Level O or 1, which if changed, would have major impacts on all baselines. As the project proceeds through its acquisition phases, this baseline will expand to meet the needs of each phase. At the completion of Preliminary Design, DOE approved design requirements will be added. At the completion of detail design, DOE approved design/construction requirements will be added. At the completion of construction, DOE approved testing/operations documents will be added. This baseline evolves as the project evolves.

h. Level 2 Schedule Baseline. Enter the title and schedule dates (month/year) of major milestones to be controlled by the Project Manager. The listing should include:

(1) Start and completion dates for preparation of critical project documentation required for submission to and approval by the Program Office and Acquisition Executive.

(2) Start and completion dates of critical contractor documentation requiring Project Manager approval.

(3) Start and completion dates of critical system contractor developed engineering documentation requiring Project Manager approval. These milestones shall be supportive of Level O and 1 control milestones.

i. Level 2 Cost Baseline. Enter value of approved project contingency.

3. Summary of Thresholds Format. This format is used for baselining change control thresholds. Each threshold defines the limit(s) of authority of each of the four management levels for approving proposed changes to approved cost, schedule, and technical baselines agreed to at Key Decision 1 and documented in the Summary of Baseline Information format. Where necessary, attachments may be provided when space in the format prohibits clear and complete definitions of thresholds. The following guidelines/ instructions for completing each block of the format is preceded by the column and row titles of the block.

   a. Level O BCCB Technical (Scope), Schedule, and Cost Thresholds. Currently defined in Figure III-16. Variations to these currently defined thresholds must be justified and receive ESAAB approval at Key Decision 1 or subsequent ESAAB meetings or Level O BCCB meetings.

   b. Level 1 BCCB Technical (Scope) Threshold. Same guidelines/ instructions as provided by 3.a. above.

   c. Level 1 BCCB Schedule Thresholds. This block will define the thresholds for both Level O and Level 1 control milestones for which the Level 1 BCCB will have approval authority. An example of these thresholds is:

      (1) < ± 6 and > ± 3 months to Level O milestones
      (2) > ± 3 months to Level 1 milestones

   d. Level 1 BCCB Cost Thresholds. All proposed cost changes that impact TEC or TPC with an estimated cost >0 but less than $50M.

   e. Level 2 BCCB Technical (Scope) Thresholds. Same guidelines/ instructions as provided by 3.a. above.

   f. Level 2 Schedule Thresholds. This block will define the thresholds for Level O, 1, and 2 control milestones for which the Level 2 BCCB will have approval authority. An example of these thresholds is:

      (1) < ± 3 months to Level O milestones
      (2) < ± 3 months to Level 1 milestones
      (3) all changes to Level 2 milestones

   g. Level 2 Cost Thresholds. All proposed changes for which use of project contingency is required.

4. Baseline Change Proposal (BCP) Format. Figure III-17, Sample Baseline Change Proposal Format, is the format that should be utilized by all DOE Program and Project Offices and contractor personnel for proposing changes to DOE approved cost, schedule, and technical baselines. The format provided in Figure III-17 may be altered to meet the specific needs of a program; however, the BCP format must address, as a minimum, all of the subjects identified in the format. The BCP format will only be used for

presenting the problem, the proposed solution, and the impacts on affected Department of Energy (DOE) approved project baselines. Accountability and traceability of all DOE BCCB reviews and dispositions of proposed changes shall be documented on DOE BCCB Disposition Record formats.

The following guidelines/instructions for completing each block of the format is proceeded by the title of the block. Additional pages that may be required for completely defining a proposed change shall be identified by BCP number and page number and referenced in the appropriate block(s) of page 1 of the BCP.

a. Project No. This block is required for tracking/traceability purposes. Project numbers are assigned and included on the cover sheet of approved project plans. The initiator of the BCP may obtain this number from his respective BCCB Secretariat for insertion in the block. An example of a project number is 85-D-105. This number sometimes referred to as the budget line item project number.

b. Project Title. This block is required for tracking/traceability purposes. The initiator will enter the complete project title or recognize acronym/abbreviation for the project. An example is Plutonium Recovery Modification Project.” Its recognized acronym/ abbreviation is PRMP.

c. BCP No. This block is required for tracking/traceability purposes. As the Level 2 BCCB will have more change activity than the higher level BCCBs, responsibility for designing and maintaining a numbering system that meets project needs is delegated to it. The initiator of the BCP will obtain the BCP number from his respective BCCB Secretariat for insertion in this block. Once a BCP number has been assigned, it will not be reassigned; it will be retained and used with an appropriate suffix for all subsequent revisions or iterations of the basic BCP. The BCP numbering system for a project will be standardized within a project to aid in efficient maintenance of a Project Change Log.

   For multi-partite or Multi-site projects, it may be necessary to design intelligence into the BCP number; the alternative is assignment of blocks of numbers to affected sites. If intelligence is designed into the numbering system, a field of the number will be numeric and assigned only once so that a straight numeric sort of the Project Change Log is possible.

d. BCP Title. This block is required for tracking/traceability purposes. The initiator will enter a brief (60 characters or less) descriptive title of the proposed change. Examples of titles are “Increase Chilled Water System Slow Rated,” “Extend Deluge System 8 Main Header,” "Extend Schedule (FY-91 Funding Reduction).”

e. BCP Level. This block is required to indicate the BCCB which has final approval authority for the changes being proposed. The DOE Project BCCB Secretariat will check the appropriate box subsequent to determination of approval authority by the Project BCCB.

f. Point-of-Contact. This block is required for coordination purposes. In most cases, the name, phone number, and location of the person taking responsibility for initiation and implementation of the change, if approved, will be inserted.

g. Processing Designation. This block is required to identify the allowable timeframe for Level O, 1, and 2 BCCB processing of the proposed change. The Level O and 1 timeframes are specified in this document, and the Level 2 timeframe is specified in the appropriate BCCB charter. The Project BCCB Secretariat shall check the appropriate block as soon as possible (within 1 workday) after receiving the BCP. The definition of "priority" and "routine" is delegated to the Level 1 and 2 boards and will be defined in the change control board implementation procedures for each board.

h. Change Description. This block is required to define the scope of the change. A complete description of the change will be entered by the initiator and shall be stated in "from/to" terms in order to avoid confusion concerning the exact intent of the proposed change, and should be written in sufficiently clear language to be used as the "Scope of Work" statement or "scope of work" revision for contractual implementation. Reproducible attachments shall be included as necessary to support the change description.

Documentation affected shall be identified along with the affected WBS elements. The assistance of the A/E contractor and M&O contractor in identifying the affected documentation should be obtained as necessary.

i. Change Justification. This block is required to justify the need of the proposed baseline change. The initiator will provide a description of the problem the change proposes to correct or the new capability the change proposes to provide. When the proposed change is to provide a new capability, the potential improvements and benefits will be specifically identified. If alternative methods for resolving the problem have been considered and rejected, the rationale for selecting the method proposed should be included.

Inadequate justification is the most common reason for disapproval of a change.

j. Impact of Non-Approval. This block is required to provide project/ program impacts if change is rejected and not implemented or approval is delayed. Impact on the project schedule, resources, technical requirements, safety, environment, etc. will be addressed.

k. Impacts on Cost Baseline. This block is required to define Department baseline cost, budgetary and funding impacts and implications if the change is approved for implementation.

(1) Total Cost. The value inserted here is the total estimated cost for design, construction, and testing (implementation of change) if the change is approved regardless of sources of funds and regardless of whether the change is in-scope or out-of-scope (contractual). The value in this entry need not necessarily be equal to the summation of the remaining entries in the block but will be equal to the sum in many cases.

(2) TEC. If additional funding, or decrease, from TEC is being requested to implement the change, the value will be inserted here.

(3) TPC. If additional funding, or decrease, from TPC is being requested to implement the change, the value will be inserted here.

(4) Contingency. If the total cost of the change is going to be funded from contingency, providing change control thresholds are not exceeded, the value will be entered and the change may be approved at Level 2. If only part of the funding is from contingency, enter the value.

(5) Other. If part of the total cost will be budgeted from contractor management reserve or by a cost-sharing partner company, enter the value here.

(6) Change to Funding Profile Included. If the magnitude of cost impact significantly impacts the current funding profile, include the requested profile change in additional pages of the BCP and check the "yes" block. If profile changes are not being requested as part of the BCP, check the "no" block.

l. Impacts on Schedule.

(1) Level O. If implementation of the change will cause a delay or decrease in the duration of an approved Level O milestone greater than change control thresholds, check this block and enter the name of the milestone and its current and proposed schedule dates.

(2) Level 1. Same guideline/instructions as presented for Level O milestones.

m. Impacts on Scope.

(1) Technical Documents. If any technical documents require changing if change is approved and implemented, check the box and provide a listing of the documents requiring change to the extent possible. Include as technical documents approved Level O, 1, and 2 baseline design drawings and specifications, installation procedures, test procedures, operations procedures, environmental documents and permits, safety related documents, and contract

documents. The listing should include number, title, and revision identifier of the document requiring change, as appropriate.

(2) Program Documents. Same guidelines as presented for technical documents. Include as program documents approved Level O, 1, and 2 baseline strategic plans, project plans, project management plans, and quality assurance plans or procedures.

n. Other Impacts. When uncertainties exist as to whether or not an impact not affecting cost, schedule, or scope baselines could assist in the decision making process for the proposed change, it should be entered in this block. An example is the proposed change would have a significant impact on facility operating costs for the life of the plant or programmatic operating expenses directly related to the facility.

o. Mitigating or Corrective Actions. When mitigating work-arounds or corrective actions will be taken to minimize potential impacts, particularly in environmental and safety aspects, they should be included in this box.

CHAPTER IV

PROJECT REVIEW, REPORTING, AND ASSESSMENT

PART A - PROJECT STATUS REVIEW

1. INTRODUCTION. This chapter discusses the policy and procedures for project status review and reporting to upper levels of Departmental management. It examines form and substance of status reviews as well as report formats for project reporting.

2. PROJECT STATUS REVIEW. The objectives of project status review are to inform senior management of project status; problems which require their attention; imminent completion of a phase in a Major System Acquisition; an evaluation of concept and definition effort prior to major resource commitment; controlled goals and thresholds either threatened or exceeded; and other relevant issues and changes such as mission need, budget/financial redirection, scope, costs, timing, management structure, or changes having significant environmental quality assurance and safety impacts. Although presenting status of basic performance parameters is an important part of these reviews, sufficient time should also be allotted for the presentation of issues and problems which need to be brought to the attention of the management.

   a. Headquarters Reviews. Project reviews shall be presented to the respective Program Secretarial Officer(s) on all Major System Acquisition and Major Projects. A project review shall be held on a regular basis and/or as project progress dictates. Representatives from the office of Assistant Secretary for Environment, Safety, and Health; the Directors of Energy Research, Procurement, Assistance and Program Management; and Administration and Human Resource Management; the General Counsel; and other interested offices shall be invited as the subject material dictates. These reviews shall be clearly documented through a memorandum for the record. Copies of presentations and an Action Memorandum or memorandum for the record shall be sent to the Office of Program/Project Management.

   b. Project Review. Responsibility for day-to-day review of project status and application of corrective actions within his or her authority resides with the project manager. The Head of the Departmental Element shall maintain cognizance of the project status, giving special attention to problem areas, and shall direct that corrective actions be taken as appropriate. The responsible program manager shall maintain cognizance of project status through review of monthly and quarterly project manager status reports supplemented by special briefings as required. He or she shall take corrective actions within his or her authority as necessary to maintain project cost, schedule, and technical performance within baselines.

c. Field Reviews. Field reviews for field-managed projects shall be coordinated with the Program Secretarial Officers and conducted prior to decision points by the head of the field element responsible for the project. Field office support organization, (e.g., environment, procurement), the program manager, the Office of Program/Project Management, and other staff as appropriate, may participate in the reviews. Normally, field project reviews shall be conducted for validation prior to insertion in the budget; at the end of conceptual, preliminary and detailed design, prior to construction release; and at appropriate points as determined by the field element manager to update scope, cost, schedule, and funding baselines.

3. PROJECT STATUS REVIEW FOR MAJOR SYSTEM ACQUISITIONS.

a. The Acquisition Executive is the reviewing authority for Major System Acquisitions and shall call for these reviews on an exception basis to accomplish certain objectives. These occasional reviews shall provide a greater awareness of the progress of individual large projects that have a high level of visibility, program importance, technical complexity, and significant multi-year financial mortgages.

b. The project reviews for the Acquisition Executive shall be issue-oriented presentations and discussions. They shall provide clear and objective reports of project status, current and impending problems, and identification of areas where senior level management assistance would be beneficial.

c. A schedule for the project status reviews for the Acquisition Executive shall be maintained by the Office of Program/Project Management in close coordination with the Acquisition Executive and cognizant program managers.

4. Federal Managers' Financial Integrity Act and Audit Resolution and Followup. The Department is fully committed to the implementation of effective systems of internal controls and a rigorous program for audit resolution and followup. The Federal Managers' Financial Integrity Act requires the Department to evaluate the adequacy of its internal controls and to report the results annually to the President and the Congress.

a. Candid Reporting. In compliance with the Federal Managers' Financial Integrity Act, DOE has implemented an internal control program which is highly reliant on management self-assessments and candid reporting of problems or potential problems to permit expeditious, resolution. This must be done on a continuing basis to assure effectiveness.

b. Followup of Audits. The Inspector General Act Amendments of 1988 placed added responsibility on the Department for reporting to Congress on the effectiveness of the DOE audit resolution and follow-up activities. All recommendations made by the Inspector General or the General Accounting Office shall be responded to quickly and candidly and corrective actions undertaken and reported immediately without delaying until audit completion. Responsive and candid reporting will increase the effectiveness and efficiency of reporting systems and provide the high degree of credibility the Department wishes to achieve.

PART B - PROJECT REPORTING AND ASSESSMENT

1. INTRODUCTION.

a. It is Departmental policy to have a single reporting system, which provides the status of projects relative to established baselines. The reporting by the project manager to higher management and by the Department to Congress shall present the recipient with a clear picture of project status and resource utilization.

b. The system is flexible, but the degree of flexibility is limited in order to maintain a standardized structure of formats sufficient to provide adequate comparisons between projects and to facilitate preparation of consolidated reports for all Departmental projects. Standardization is also provided to minimize the workload involved at the organizational levels preparing the reports. In an effort to further minimize reporting burdens placed on field organizations, program-unique reports are discouraged except for essential management information. Reports to Headquarters shall be comprised of basic information already required by project managers to manage their projects.

c. The data requested in this reporting system are not intended to limit field organizations and project managers from requesting either additional detailed reports or more frequent reporting from their subordinate organizational elements or contractors. It is left to the discretion of each field organization to require additional reporting for use at its organizational level as long as such reporting is consistent with information provided to Headquarters in the reports specified below and with the guidelines of DOE 1332.1A.

d. The remainder of this chapter has been organized into two basic sections. The first section describes the reports to be submitted by project managers and includes report formats, reporting frequencies, and duration of reporting requirements. Report preparation instructions are provided for each format. The second section provides similar guidance for reports prepared at the Headquarters level and an explanation of the use made of project manager reports in their preparation.

2. REPORTS PREPARED BY PROJECT MANAGERS (EXCEPT FOR GENERAL PLANT PROJECTS).

a. Major System Acquisitions and Major Projects. Project managers of Major System Acquisitions (MSAs) and Major Projects (MPs) shall submit quarterly, supplemental, and annual reports unless directed otherwise by the program Secretarial Officer.

(1) Project Manager's Progress Report. The project manager shall provide to Headquarters quarterly reports through the Head of the Field Element, using the formats illustrated in Attachment IV-1, unless directed otherwise by the program Secretarial Officer. The Head of the Field Element shall transmit the project manager's reports by cover sheet memorandum. Indicated in the memorandum shall be comments on an exception basis of the project manager's assessment.

(2) Project Manager's Quarterly Supplemental Reports. Additional details On MSA'S and major projects shall be provided through submission of supplemental reports. There are four supplemental reports, three of which are optional:

(a) Supplement 1 - Project Activity Report. (See Attachment IV-3.) , This is a required supplement.

(b) Supplement 2 - Cost and Cost Plus Commitment Chart. (See Attachment IV-4.) This is an optional report prepared as negotiated between program and managing offices.

(c) Supplement 3 - Engineering, Management, and Construction Manpower for Cost-Type Projects. (See Attachment IV-5.) This is an optional report prepared as negotiated between program and managing offices.

(d) Supplement 4 - Progress Photographs. (See Attachment IV-6.) This is an optional reporting requirement dependent on physical progress of the project.

b. Other Projects with a Total Estimated Cost of $15 Million or Greater: Project Manager's Progress Report. (See Attachment IV-1.) Project managers of other projects with a Total Estimated Cost (TEC) of $15 million or more shall submit quarterly reports using the same formats used for MSAs and major projects reports. Reports shall be submitted quarterly as of December 31, March 31, June 30, and September 30 of each year.

c. Other Projects with a TEC of $5 Million to $15 Million: Project Manager's Progress Report. (See Attachment IV-1.) These projects shall be reported quarterly using an abbreviated format of the Project Manager's Progress Report. This abbreviated format consists of reporting on part I only of the two-part content of Attachment IV-1. Should the TEC increase on these projects to a level of $15 million or more, subsequent reports shall be governed by paragraph 2b, above.

d. Other Projects with a TEC Under $5 Million: Semiannual Status Report. (See Attachment IV-2.) All non-general plant projects, including in-house energy management with a TEC under $5 million shall be reported to Headquarters on a semiannual basis as of March 31 and September 30. These reporting dates have been selected to assist in preparation of the annual budget. The data elements for these project reports consist of summary level data. Should the TEC on these reports increase to over $5 million, the appropriate reports form the above grouping of projects shall be used.

e. Annual Report for General Plan Projects. (See Attachment IV-7.) Operations offices shall submit an annual report as of September 30 on all GPPs.

f. Field Organization Reports. The Head of the Field Element may prescribe supplementary formats for internal reporting purposes. Any such requirements shall be included in the field organization implementation of the DOE Project Management System.

g. Cost Underrun Reporting: Each field office must notify the appropriate Program Secretarial Office of all potential cost underruns when construction is 80 percent complete. Information copies are to be provided to the Headquarters Office of Budget, Budget Execution Branch (CR-131), and to the Associate Director for Program/Project Management and Control, Office of Program/Project Management (PR-20). Headquarters DOE written approval is required prior to reapplication of these funds.

3. SUBMITTAL REQUIREMENTS. Four copies of each report prepared by a project manager shall be submitted through the field element manager to the responsible Headquarters program office and four copies directly to the Office of Program/Project Management. Reports shall be submitted in time to reach these offices by the 25th working day following the "as of" date of the reports. If meeting the 25th working day requires an earlier cutoff date for financial and cost performance report data, the prior month data will be acceptable, provided that other portions of the Project Manager's Progress Report address the project status through the current "as of" date.

4. DURATION OF REPORTING. Reporting shall commence once preliminary design is initiated and continue until full normal operations involving the project have commenced and the project is closed, and it is jointly determined by the Project Manager and the Program Secretarial Officer that further reporting is not required. Reporting on projects that have a definite operational or test period for demonstrating their visibility shall be required during such confirmatory testing periods.

5. SUMMARY OF PROJECT MANAGER REPORTING REQUIREMENTS. Project Manager reporting requirements to Headquarters are summarized below in Figure IV-1.

6. REPORT PREPARED BY HEADQUARTERS.

a. Project reports initiated in Headquarters shall be consistent with and incorporate the contents of the Project Manager reports identified above. Headquarters' summary reports on field projects shall be prepared by both the program office and the Office of Program/Project Management. Program offices shall be responsible for transmitting Project Manager's reports through their Program Secretarial Officers to the Acquisition Executive with Headquarters line management comments added as appropriate on an exception basis. The Office of Program/Project Management is responsible for preparing consolidated reports on projects for the Department.

(1) Program Manager's Report to the Acquisition Executive (Cover Sheet Transmittal). (See Attachment IV-8.) This report shall be provided to the Acquisition Executive quarterly by Program Managers of all MSAs and Major Projects. Submitted through appropriate program Secretarial Officers, this report shall consist of a cover sheet to the project manager's quarterly reports. It serves as the only mechanism for providing the project manager's report to the Acquisition Executive. The cover sheet shall provide program manager assessments if they differ from the project manager's assessments. It shall also address items raised as Headquarters' action items by the project manager and other topics considered to require top management attention. The Program Secretarial Officer is encouraged to add comments to the report as deemed appropriate. The cover sheet shall be submitted to the Acquisition Executive and the Office of Program/Project Management by the 25th working day following the "as of" date of the project manager's report.

(2) Summary Project Performance Report to Senior Management. (See Attachment IV-9.) This report on MSAs and Major Projects shall be provided quarterly by the Director of Administration and Human Resource Management to the Acquisition Executive and Program Secretarial Officers. The report shall consist of the Project Manager's assessment extracted from their reports plus the comments of the Associate Director, Office of Program/Project Management. The contents of the report shall be coordinated with appropriate program managers prior to its submission. The Summary Project Performance Report to Senior Management shall be submitted by the 35th working day following the "as of" date of the report.

(3) Quarterly Status of Department of Energy Project. (See Attachment IV-10.) The quarterly status report is a summary of baseline data for projects, indicating original and current cost baselines along with the schedule information. This report shall be prepared quarterly, as of March 31, June 30, September 30, and December 31, by the Office of Program/Project Management. The report shall be distributed Department-wide by the Office of Program/Project Management upon its completion.

b. Figure IV-2 provides a summary of reports prepared in Headquarters related to information obtained form reports submitted by project mangers.

7. <u>CRITERIA FOR EVALUATING PROJECT STATUS.</u> To allow for a meaningful comparison of the status of all projects, a standard set of criteria has been established. There are three levels of status: satisfactory, minor concern, and major concern. The technical, cost, and schedule performance of a project shall be separately evaluated against these three status levels. In addition, an overall assessment category shall be included. The overall status shall be determined by the project manager's composite evaluations of the impact of the individual ratings for technical, cost, and schedule. Figure IV-3 is a matrix of the criteria used for evaluating project status.

Type and Dollar Level of Project	Reports to Be Submitted by Title	"As-Of" Date	Report formats by Figure Number#
Major System Acquisitions (MSA) and Major Projects (MP)	Project Manager's Progress Report	Quarterly or as Required by Program Secretarial Officer	Attachment IV-1 Parts I & II
	Project Manager's Quarterly Supplemental Report	End of Each Calendar Quarter.	Attachment IV-3 thru 6. (1 mandatory, 3 optional)
Other Projects with a Total Estimated Cost of $15 Million or More	Project Manager's Progress Report.	End of Each Calendar Quarter.	Attachment IV-1, Parts I & II
Other Projects with a Total Estimated Cost of $5 Million to $15 Million	Project Manager's Progress Report. (excludes genaral plant project)	End of Each Calendar Quarter.	Attachment IV-1, Part I only
Other Projects with a Total Estimated Cost under $5 Million	Semi Annual Status Report (excludes general plant projects).	March 31 and September 30.	Attachment IV-2
General Plant Projects (GPP).	Annual Report for General Plant Projects.	End of Each Fiscal Year.	Attachment IV-7

Note: All reports are due 25 working days after report "as of" date.

Figure IV-1
Summary of Project Managers Reporting Requirements

Type and Dollar Level of Projects	Title of Report	Format for Report by Exhibit Number	Project Manager Reports Included or Used in Preparation of Report
Major System Acquisitions or Major Projects	Project Manager's Quarterly Report to Acquisition Executive	Attachment IV-8	Project Manager's Progam Report Attached to Cover Sheet Memorandum
Major System Acquisitions or Major Projects	Quarterly Project Performance Report to Senior Management.	Attachment IV-9	Extract of Project Manager's Narrative Highlights from Project Manager's Progress Report
All DOE Projects	Quarterly Status of Department of Energy Projects.	Attachment IV-10	Project Manager's Progress - Quarterly, Semi-Annual, and Annual -Reports.

Figure IV-2
Summary of Headquarters Reporting Requirements

	Satisfactory	Minor Concern	Major Concern
Technical	Essentially meetlng performance/ scope objectives.	Technical/Engineering problems may result in inability to meet established performance/scope objectives	Technical/Engineering Problems will result in inability to meet established performance/scope objectives.
	No known Congressional, Administration or external constraints influencing achievement of technicdal scope.	Potential Congressional, Administration, or external constraints jeopardizing achievement of technical scope.	Probable or confirmed actions by Congress, Administration or external constralnts preclude achievement of technical scope.
Cost	Obligations and costs within 10 percent of Plan.	Obligation and/or cost variance from Plan greater than 10 percent but less than 25 percent.	Obligation and/or cost variance from Plan greater than 25 percent.*
	Total estimated cost is within 10 percent of baseline.	Total estimated cost may or will increase by more than 10 percent but less than 25 percent	Total estimated cost may or will increase by more than 25 percent.
	Available contingency as percentage of uncosted balance is adequate.	Available contingency as a percentage of uncosted balance is ralatively low.	Contingency is exhausted or is not commensurate with technical risk.
	No known Congressional, Administration or external constraints influence cost.	Potential Congresslonal, Administration or external constralnts influenclng costs.	Probable or confirmed actions by Congress, the Administration, or external influences will affect costs.
Schedule	Essentially on baseline schedule and within 3 months of established project completion date.	Baseline interim milestones or completion dates projected to slip at least 3 months but not more than 6 months.	Baseline interim milestone or completion dates projected or conflrmed to slip by 6 months or more.
	No known Congressional, Administration, or external constraints influencing schedule.	Potential Congressional, Administration, or external constraints influencing schedule	Probable or confirmed actlons by Congress. the Administration, or external constraints will affect schedule.

*If the TEC for an actlve line item project increases by 25 percent or more, Congress must be notified before further obligations can occur.

Figure IV-3
Criteria for Evaluating Project Status

PROJECT MANAGER'S PROGRESS REPORT INSTRUCTIONS AND EXAMPLE

1. GENERAL.

a. This report is formatted in two-parts. Only non-general plan projects with a total estimated cost of $15 million or more require completion of both parts I and II. Projects with total estimated costs of $5 million to $15 million, that are not Major System Acquisitions or Major Projects, complete only part I of this report and report quarterly.

b. General plant projects and all other projects below $5 million in total estimated cost report in accordance with the instructions in Attachments IV-2 and IV-7, respectively.

2. INSTRUCTIONS. The following detailed data is to be provided.

a. Part I. Complete for all projects with a total estimated cost of $5 million or more.

(1) Item 1a, Project Title/Number. Show the full title of the project as it appears in its budget data sheet. Include geographic location of project, if determined. If project location has not been determined, indicate: "project location to be determined."

(2) Item 1b, Reporting Period. Show period of time reported (example: 1-1-81 to 3-31-81).

(3) Item 1c, Managing DOE Field Locations. Enter name of managing field organization. If project is not managed by a field organization, indicate appropriate program management organization.

(4) Item 1d, Project Sponsor/Program Office Contact. Indicate the Headquarters program organization with name and telephone number of the program manager.

(5) Item 1e, Project Manager. Enter project manger's full name, telephone number, and mailing address.

(6) Item 1f, Performing Organizations. Provide the names of laboratories and prime contractors involved in the project and their responsibilities.

(7) Item 2, Project Manager's Personnel Assessment.

(a) Item 2a, Summary Status. Complete this item using the definitions of satisfactory, minor, or major concern provided in Figure IV-3, "Criteria for Evaluating Project Status."

(b) Item 2b, Project Manager's Narrative Highlights. Using the space provided, summarize major accomplishments and problems involving the project. This narrative for Major System Acquisitions and Major Projects will be extracted to be included in the Summary Project Performance Report to senior management. Detailed discussion of problems and variances between baselines and current estimates of cost, schedule, or technical performance should be provided in item 5, "Significant Problems/Variance."

(8) Item 3, Summary Funding/Cost Status.

(a) Item 3a, Total Project. Baselines information should be taken from the latest approved project plan or subsequent Action Memorandum signed by the appropriate decision authority (Acquisition Executive for Major Projects, DOE Field Office manager for other projects). Congressional project data sheets will be used for baselines purposes only in the absence of project plans or Action Memorandums. Funding information requested should reflect the total project funding as shown in the last project data sheet formally submitted to Congress.

(b) Item 3b, Cumulative to Date. Reflect the balance of unused or unallocated contingency. Provide the actual amounts of funds appropriated to date for the project, the funds made available to the project manger to date, and the funds authorized to the contractor to date. Enter the cumulative actual costs accrued and the Departmental commitments to contractors to date.

(c) Item 3c, Baselines Documentation. All baseline information must be supported by appropriate documentation to include the title of the baseline document, identification of the approving DOE official, and the date of approval; e.g., "Project Plan, Acquisition Executive, 6-30-81."

(9) Item 4, Summary Schedule Status. Projects that cannot measure progress in terms of design, procurement, and construction may provide a composite percent complete estimate for the total project. Operations completion information pertains only to demonstration-type projects which have an operational test period included to provide the technology. Reporting status of operation is not required for those projects which have an indefinite operating period following completion of the acquisition process. Problems and significant variances depicted in this reporting section should be discussed in item 5, "Significant Problems/Variance Analysis."

(10) Item 5, Significant Problems/Variance Analysis. Problems and variances should be discussed here in terms of their impact on the project wherever possible. Problems satisfactorily resolved during the reporting period should be discussed in item 5a, particularly those problems reported as open in previous reports. Item 5b should reflect those actions which require Headquarters action to be taken (e.g., scheduling of major milestone decisions, allocation of funds, and major commitments of resources).

b. Part II. This part is applicable only to major system acquisitions, major projects, and other projects with a total estimated cost of $15 million or more.

(1) Item 6, Cost Status Report. This format is organized to accommodate projects which are managed in accordance with the traditional construction breakdown (design, construction, and so forth). Projects which are organized along work breakdown structure lines and use DOE 1332.1A reports, should use the Alternate Cost Status Report. Baseline costs and estimates for total estimated cost and total project cost must reconcile with amounts shown on the Summary Funding/Cost Status Report (Item 3 of Part I).

(2) Item 7, Alternate Cost Status Report.

(a) Projects receiving the Cost Performance Report, or its equivalent, should use the Alternate Cost Status Report. For projects involving two or more large contracts, data reported should be taken directly from the total line of format 1 of the contractor submitted Cost Performance Reports. For projects with multiple contractors with some reporting on the Cost Performance Report and others not, the Alternate Cost Status Report should be employed. For contractors not submitting the Cost Performance Report, budgeted cost for work performed will equal budgeted cost for work scheduled in the columns provided, and budgeted cost for work scheduled can be assumed to be the Cumulative Cost Plan data. If the project is contained essentially in one major contract, reporting should be for the level 2 elements of the project summary work breakdown structure. In all cases, copies of the Cost Performance Reports may be substituted for this format, provided that the project manager’s estimate of costs at completion, the estimated completion dates, and the reconciliations to total estimated cost and total project cost are included. See DOE 1332.1A for further detail.

(b) Project contingency is entered in the budget at completion column on the contingency line. Management reserve is the contractor's management reserve and is entered in the column provided for each total contract entry. (Management reserve for individual work breakdown stricture elements is not required.)

(3) Item 8, Milestone Log. In addition to the milestone information requested, milestones which require prior decisions by the Acquisition Executive or other senior level officials should be identified.

(4) Item 9, Technical Performance Parameters. Provide a brief listing of the key project technical performance criteria or objectives, the quantitative values for each reflected in the current projected technical baseline, and the current forecast of quantitative values which will actually be attained based on current knowledge and planning.

PROJECT MANAGER'S PROGRESS REPORT
PART I

1. IDENTIFIERS:

1a. PROJECT TITLE/NUMBER Materials Beam Accelerator AK-78-12B	**1b. REPORTING PERIOD** September 30, 1982
1c. MANAGING DOE FIELD LOCATION Richland Operations Office	**1f. PERFORMING ORGANIZATIONS** A. C. Martin Company (Conventional facilities Design) Safeguard Construction (Conventional Facilities Construction Management) Springfield National Laboratory (Special Facilities)
1d. PROJECT SPONSOR/PROGRAM OFFICE CONTACT FTS-252-7894 Office of Fusion Research/William Woods	
1e. PROJECT MANAGER Gary Strauss FTS 444-3624	

2. PROJECT MANAGER'S PERSONAL ASSESSMENT:

2a. SUMMARY STATUS

LEGEND

Satisfactory | Minor Concern | Major Concern

	LAST PERIOD	THIS PERIOD
COST		
SCHEDULE		
TECHNICAL		
OVERALL PROJECT		

2b. PROJECT MANAGER'S NARRATIVE HIGHLIGHTS (See Item 5 for details on problems and variances):

The project manager's assessment remains a minor concern since the accelerator in under study for possible configuration changes. Alternate accelerator concepts are being studied in the event funding considerations preclude construction of the accelerator in its present form. These include a neutron-proton configuration and a light-ion concept. Studies also continue on the proton-proton configuration for cost reduction possibilities which includes a 4 to 1 concept. Performance by A. C. Martin Company and Safeguard Construction continued satisfactory through the report period. Procurement packages have been released for the target assembly and experimental systems.

PROJECT MANAGER'S PROGRESS REPORT
PART I

PROJECT TITLE Materials Beam Accelerator

3. SUMMARY FUNDING/COST STATUS (See Item 5 for variance analysis):

3a. TOTAL PROJECT

ITEM	BASELINE	FUNDING	CURRENT ESTIMATE
TOTAL PROJECT COST (TPC)	192.0	141.5	180.1
DOE	192.0	141.5	180.1
NON-DOE			
TOTAL ESTIMATED COST (TEC)	176.7	129.6	162.1
DOE	176.7	129.6	162.1
NON-DOE			

3b. CUMULATIVE TO DATE

ITEM	AMOUNT
REMAINING CONTINGENCY	11.3
FUNDS APPROPRIATED	141.5
FUNDS AVAILABLE	141.5
FUNDS AUTHORIZED TO CONTRACTOR	141.5
COSTS ACCRUED	104.8
CONTRACTOR COMMITMENTS	114.9

3c. BASELINE DOCUMENTATION

DOCUMENT TITLE Project Plan APPROVING OFFICIAL James Murry DATE 9-30-81

4. SUMMARY SCHEDULE STATUS (See Item 5 for variance analysis):

PHASE	START DATE		COMPLETION DATE		PERCENT COMPLETE	
	BASELINE	FORECAST/ACTUAL	BASELINE	FORECAST/ACTUAL	BASELINE	ACTUAL
DESIGN	1-31-78	1-31-78	4-30-85	4-30-85	70.6	72.5
PROCUREMENT	6-30-79	6-30-79	4-30-85	4-30-85	57.7	54.1
CONSTRUCTION	5-30-79	5-30-79	4-30-85	4-30-85	54.5	56.5
OPERATIONS						

PROJECT MANAGER'S PROGRESS REPORT
PART 1

PROJECT TITLE Materials Beam Accelerator

5. SIGNIFICANT PROBLEMS/VARIANCE ANALYSIS

5a. PROBLEMS, IMAPCT ON PROJECT, CORRECTIVE ACTIONS

The lack of a definitive design for the dipole fabricator continues to be a major problem, reflected in the cumulative cost variance of $. Extensive research and development work is underway to achieve a reference design. Technical progress is good. The current schedule calls for a first cell test to be completed by March 1983 consisting of 4 dipoles and 1 quadropole. Also, an additional 10 sets of coils in their own iron are to be tested. Two of the 6 in the first cell and 8 of the 12 additional coil sets are to be accelerator quality.

The major milestone for testing of the 4 MeV accelerator has slipped from April 1983 to August 1983 due to the late selection of the AFQ fabrication. Significant November 1983 tasks were completed on schedule.

5b. ITEMS REQUIRING HEADQUARTERS ACTION

Provide funding guidance for FY 1984 and outyears.

PROJECT MANAGER'S PROGRESS REPORT
PART II

PROJECT TITLE Houston Test Reactor

6. COST STATUS REPORT

COST ELEMENTS	CUMULATIVE THROUGH PRIOR FISCAL YEAR		CURRENT FISCAL YEAR TO DATE		FORECAST					
					CURRENT FISCAL YEAR		NEXT FISCAL YEAR		TOTAL	
	BASELINE	ACTUAL	BASELINE	ACTUAL	BASELINE	ESTIMATE	BASELINE	ESTIMATE	BASELINE	ESTIMATE
DOE FUNDED COSTS ASSOCIATED WITH TEC:										
DESIGN	75,690	75,970	5,298	5,475	5,981	6,158	562	562	82,234	82,690
CONSTRUCTION	86,670	84,286	17,868	14,281	19,347	19,347	1,834	4,218	107,852	107,852
PROCUREMENT	109,950	110,299	28,796	26,851	36,564	36,564	1,268	918	147,783	147,783
CONTINGENCY	0	0	0	0	0	0	4,804	4,348	4,804	4,348
DOE TEC	272,310	270,555	51,962	46,607	61,892	62,069	8,468	10,046	342,673	342,673
OTHER COSTS:										
PE&D										
CONCEPTUAL DESIGN										
R&D										
ALL OTHER	148,097	149,576	50,846	41,643	56,316	56,002	34,853	33,688	274,751	274,751
TOTAL DOE PROJECT COST	420,407	420,131	102,808	88,250	18,209	118,071	43,321	43,734	617,424	617,424
NON-DOE COSTS:										
TOTAL ESTIMATED COSTS										
OTHER COSTS										
TOTAL PROJECT COST	420,407	420,131	102,808	88,250	118,208	118,071	43,321	43,734	617,424	617,424

(IF ON URS-C, USE ALTERNATE COST STATUS REPORT)

PROJECT MANAGER'S PROGRESS REPORT
PART II

PROJECT TITLE Materials Beam Accelerator

7. ALTERNATE COST STATUS REPORT

REPORTING ELEMENTS			CUMULATIVE TO DATE			MGT RES	AT COMPLETION			ESTIMATED COMPLETION DATE
CONTRACT NUMBER OR WBS ITEM NO.	CONTRACTOR	TASK DESCRIPTION	BCWS	BCWP	ACWP		BUDGET	CONTRACTOR ESTIMATE	PROJECT MANAGER ESTIMATE	
Special Facilities			57.3	59.0	59.4		125.8	126.3	126.3	4-30-85
10		Program Management	3.6	3.6	3.6		10.5	10.5	10.5	4-30-85
20		Mechanical Systems	7.1	7.1	7.1		9.4	9.4	9.4	4-30-85
30		Target Systems	5.1	5.2	5.3		18.4	18.5	18.5	4-30-85
40		Power	11.0	10.8	10.9		20.6	20.7	20.8	4-30-85
50		Optics	20.6	21.0	21.9		44.0	44.1	44.1	4-30-85
60		A/C/D	9.9	10.5	10.6		22.9	23.1	23.1	4-30-85
Conventional Facilities			35.2	34.7	35.4		35.2	35.8	35.8	1-30-82
70		Laboratory	25.4	25.0	25.6		25.4	25.9	25.9	6-30-82
80		Office Building	9.8	9.7	9.8		9.8	9.9	9.9	7-31-82
CONTINGENCY							15.7			
TEC			92.5	93.7	94.8		176.7	162.1	162.1	9-30-84
OTHER COSTS		R&D to complete construction	8.9	8.5	10.0		15.3	18.0	18.0	9-30-84
TOTAL PROJECT COST			101.4	102.2	104.8		92.0	60.1	180.1	9-30-84

PROJECT MANAGER'S PROGRESS REPORT
PART II

PROJECT TITLE Materials Beam Accelerator

8. MILESTONE LOG

SIGNIFICANT MILESTONES ACCOMPLISHED SINCE LAST REPORT	BASELINE DATE	ACTUAL DATE
Refrigerator installation completed	7-28-82	8-7-82
Sextant survey complete	8-20-82	8-20-82

SIGNIFICANT MILESTONES OPEN	BASELINE DATE	FORECAST DATE
Full length 2 in 1 dipole testing	9-10-82	11-16-82

KEY MILESTONES UPCOMING - NEXT THREE MONTHS	BASELINE DATE	FORECAST DATE
Second preproduction quadrupole complete.	10-30-82	10-30-82
Complete placing first cell magnets in tunnel.	11-10-82	11-10-82
Complete installation of first cell.	12-24-82	12-24-82

PROJECT MANAGER'S PROGRESS REPORT
PART II

PROJECT TITLE Materials Beam Accelerator

9. TECHNICAL PERFORMANCE PARAMETERS

ITEM	BASELINE DESCRIPTION	FORECAST
Office Building	74,000 square feet	Complete
Laboratory Building	163,000 square feet	Complete
Top Energy	450 x 450 GeV	Same
Operating Energy Range	30 x 30 GeV to 450 x 450 GeV	Same
Equivalent Fixed Target	340,000 GeV	Same
Injection Energy	30 GeV	Same
Circumference	4,348 meters	Same
Dipole Field at 400 GeV	70 KG (5 Tesla)	Same
Vacuum System	4 x 10-12 Torr	Same
Refrigeration Capacity	24,750 Watts @ 3.8 °K	Same

SEMIANNUAL STATUS REPORT FOR NON-GENERAL PLANT PROJECTS BELOW $5 MILLION IN TOTAL ESTIMATED COST, INSTRUCTIONS AND EXAMPLE

1. GENERAL.

   a. All nongeneral plant projects with a total estimated cost under $5 million are to be reported semiannually as of March 31 and September 30.

   b. All other projects are reported using a different format. Nongeneral plant projects with a total estimated cost of $5 million or more are reported in accordance with Attachment IV-1; general plant projects are reported per Attachment IV-7.

2. INSTRUCTIONS. The format of this report provides summary level information on projects under $5 million. Two lines of information are required per project allowing several projects to be reported on the same page. The following detailed data are to be provided using definitions provided in Attachment III.

   a. Identification.

      (1) Managing DOE Field Office. Enter the name of managing field office. If project is not managed by field office, indicate appropriate program management organization.

      (2) Reporting Period. Show the period of time reported (e.g., 9-30-80 to 3-31-81).

      (3) Report Date. Indicate the date the report was submitted.

      (4) Project Title/Project Number. Indicate the full project title with the project number (from, the project data sheet) below it.

   b. Status Information.

      (1) Type of Estimate. There are two lines of information for each project. The first represents the baseline and the second the current estimate of the project manager.

      (2) Cost Status. Provide both the baseline and current estimate for the total estimated cost of the project, cumulative actual costs accrued for prior years against the baseline estimate for that period, and the actual cost accrued for the current fiscal year to date against the baseline estimate.

      (3) Schedule Status. Provide the dates (month and year) for the start and completion of design, procurement, and construction, and for the

start of operations. Provide percent complete for in-process activities. Dates for activities completed prior to the as-of-date of the report should be actual dates instead of estimates.

c. Remarks. If the overall status of a project is other than satisfactory, provide appropriate remarks in footnotes.

SEMI-ANNUAL STATUS REPORT FOR NON-GENERAL PLANT PROJECTS BELOW $5 MILLION IN TOTAL ESTIMATED COST

MANAGING DOE FIELD OFFICE: Oak Ridge Operations Office

REPORTING PERIOD: September 30, 1981 to March 31, 1982

REPORT DATE: April 30, 1982

PROJECT TITLE / PROJECT NUMBER	TYPE OF ESTIMATE	COST STATUS			SCHEDULE STATUS										*
					DESIGN			PROCUREMENT			CONSTRUCTION			OPERATIONS	
		TEC	PRIOR YEARS	CURRENT YEAR	START	COMPLETE	%	START	COMPLETE	%	START	COMPLETE	%	START	
Fire Safety and Fire Protection Improvements 80-1-e	BASELINE	1.5	1.5	.1	12-78	12-79	---	---	---	---	3-80	4-83	---	3-83	
	CURRENT	1.5	1.4	.2	4-78	1-80	100	---	---	---	2-80	3-82	100	3-82	
DRE Security and Safeguards 80-ES-5	BASELINE	1.3	1.3	0	2-80	12-80	100	1-81	6-81	100	4-81	11-81	---	---	
	CURRENT	1.3	.5	.3	2-80	3-81	100	3-81	4-83	20	4-81	3-82	100	---	
FY 1980 Reactor Modifications 80-ES-05	BASELINE	.8	.5	.3	11-81	1-82	100	3-81	12-81	100	6-81	12-82	100	12-82	
	CURRENT	.8	.4	.2	11-81	7-82	95	3-81	9-82	90	6-81	11-83	80	11-83	
Decontamination Facility 80-ES-7	BASELINE	2.3	2.3	0	1-80	11-80	---	3-81	9-82	---	9-80	9-81	---	9-81	
	CURRENT	2.2	1.7	.5	2-80	11-80	100	9-80	9-81	100	3-81	3-82	100	3-82	
Boilers and Roof of Reactor 80-ES-2	BASELINE	1.9	1.9	0	11-79	2-81	---	2-81	11-81	---	6-80	1-82	---	1-82	
	CURRENT	1.9	1.9	0	4-81	8-81	100	2-81	11-81	---	6-80	1-82	100	1-82	

* Provide remarks in footnotes as appropriate.

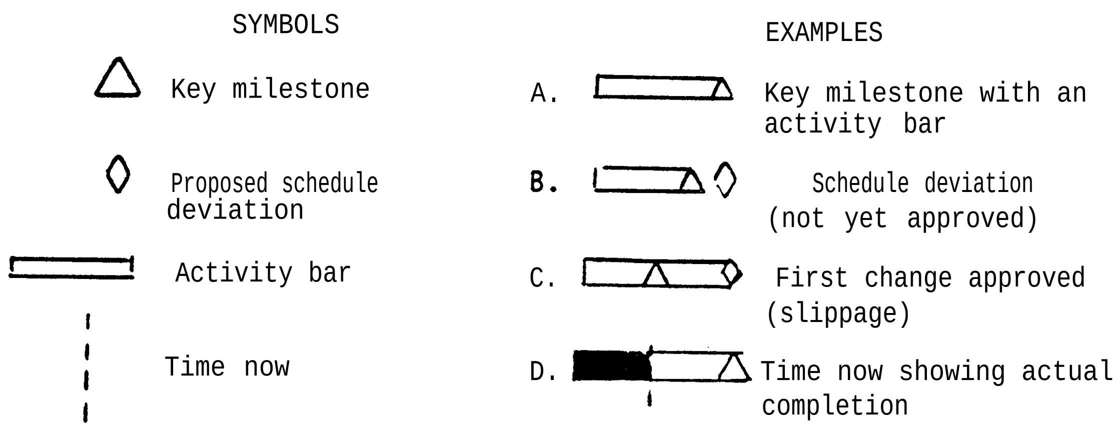
PROJECT ACTIVITY REPORT INSTRUCTIONS AND EXAMPLE

1. Prepare a complete project milestone plan to show scheduled activity and actual milestone status using the charting information shown below.

2. In the first column, list the key project milestones, including decision points.

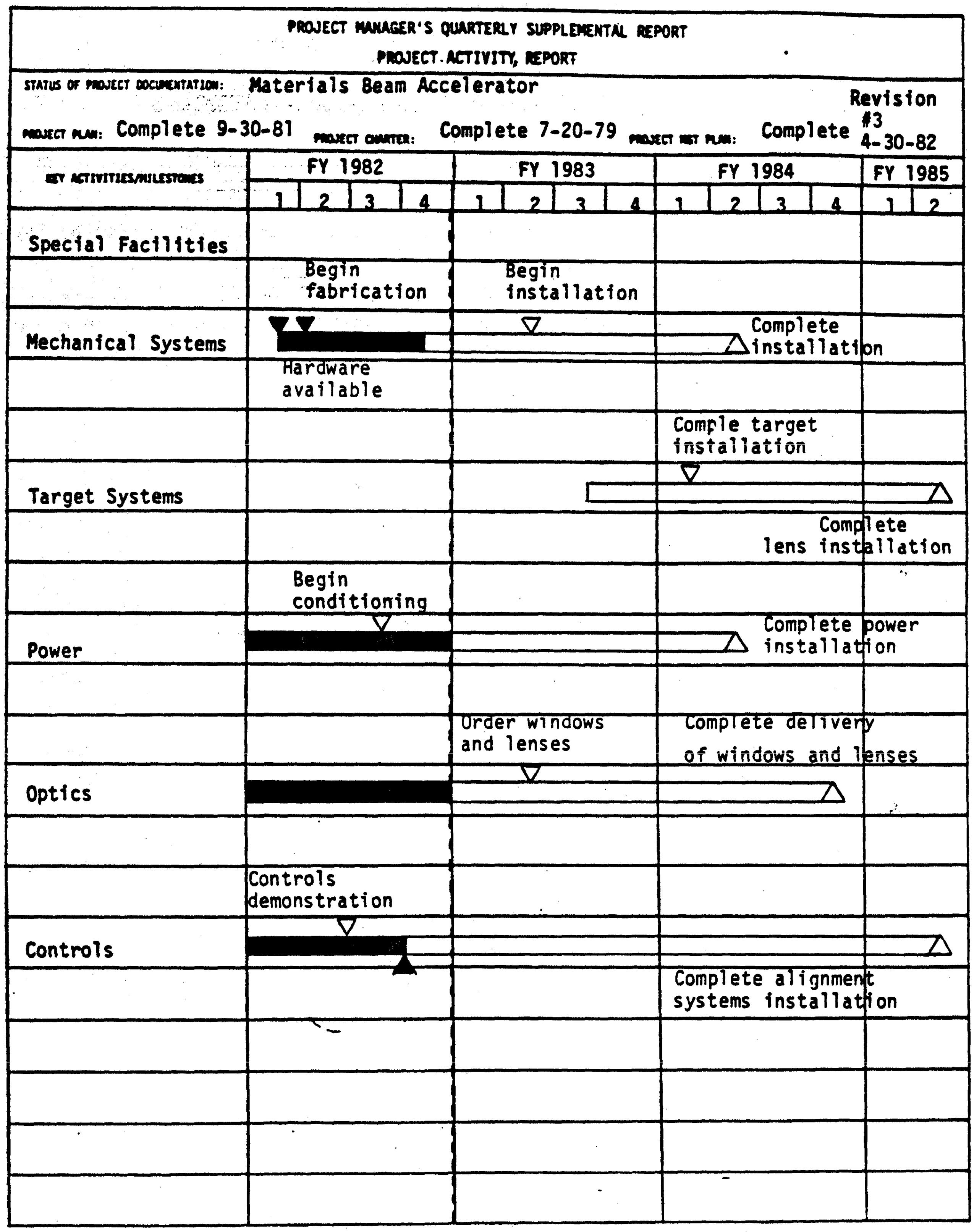
3. Across the top, list the timeframe (i.e., months, years, and so forth) to show total project time duration.

4. Each quarter, update the report by placing a vertical dash line to show the current reporting period cutoff and by darkening in the horizontal bar and milestones to show actual completion in relation to planned completion.



Charting Information

5. If available, the “Milestone Schedule and Status Report” (Form DOE 535) or equivalent may be substituted for this report.


PROJECT MANAGER'S QUARTERLY SUPPLEMENTAL REPORT
PROJECT ACTIVITY REPORT
STATUS OF PROJECT DOCUMENTATION: Materials Beam Accelerator
PROJECT PLAN: Complete 9-30-81
PROJECT CHARTER: Complete 7-20-79
PROJECT MGT PLAN: Complete Revision #3 4-30-82
KEY ACTIVITIES/MILESTONES
FY 1982
FY 1983
FY 1984
FY 1985
1 2 3 4 1 2 3 4 1 2 3 4 1 2
Special Facilities
Begin fabrication
Begin installation
Mechanical Systems
Complete installation
Hardware available
Comple target installation
Target Systems
Complete lens installation
Begin conditioning
Power
Complete power installation
Order windows and lenses
Complete delivery of windows and lenses
Optics
Controls demonstration
Controls
Complete alignment systems installation

COST AND COST PLUS COMMITMENT CHART, INSTRUCTIONS AND EXAMPLE
(OPTIONAL)

1. Enter an appropriate scale in dollars for the horizontal lines of the grid and indicate unit of measure (such as thousands and millions). On the grid formed by the dollar scale and the months and years, plot the cumulative planned costs and planned cost plus commitments. Plot the cumulative actual cost and the actual cost plus commitments for each month up to and including the month being reported. Extend the cumulative actual cost and cost plus commitment line to indicate a revised estimate. Provide a total obligation ceiling line at the top of the graphical representation; i.e., the total available funds to be obligated by the Government. When applicable, reflect changes in the obligation ceiling without changing prior the month's ceiling.

2. Enter the total planned dollar cost and cost plus commitment for each month and year shown.

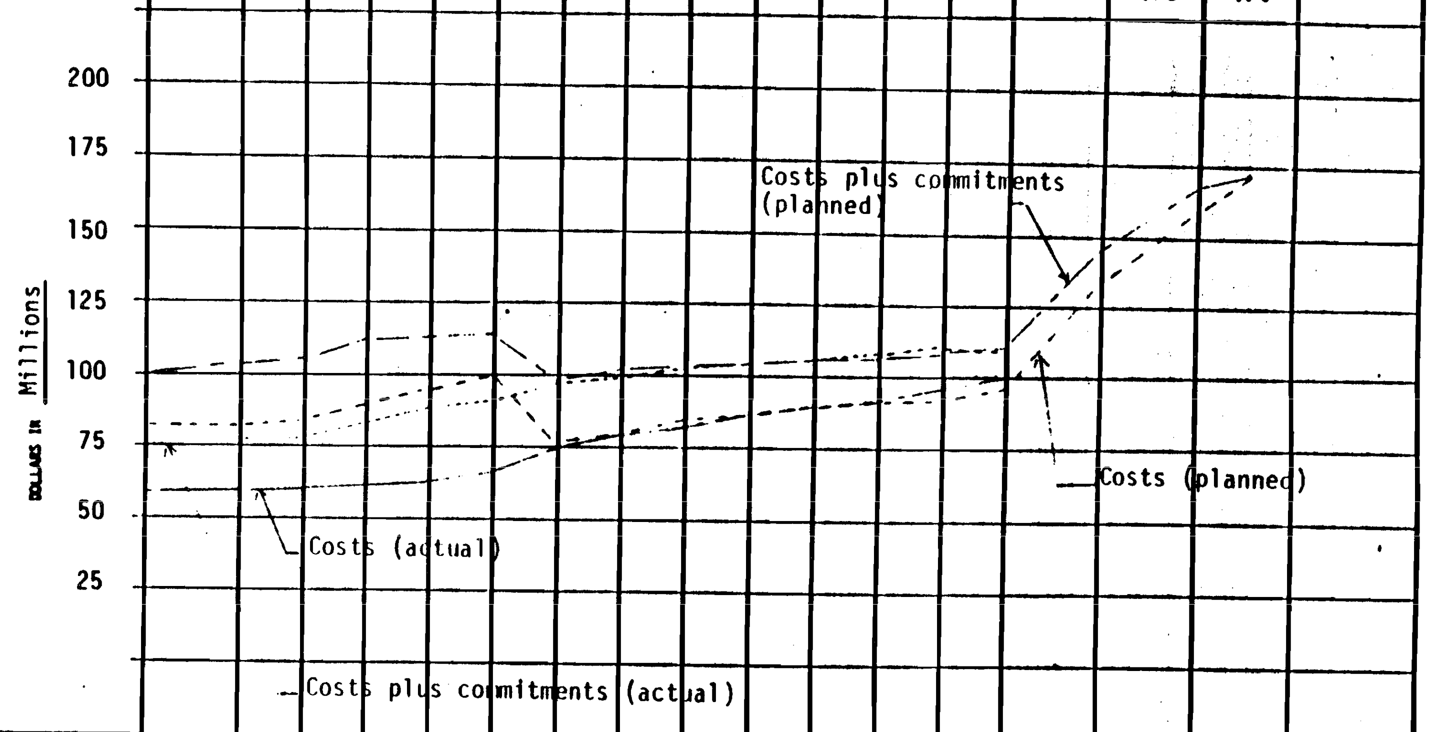
3. Enter the total actual dollar cost and cost plus commitment for each month up to and including the month being reported.

4. Enter the cumulative variance by month. Show unfavorable variances in parentheses.

5. Enter the total planned and actual costs for all prior fiscal years.

6. Enter the current estimate of total costs required for the project. This includes prior year actuals, current fiscal year actuals to date, plus the project manager's estimate of funds required to complete the remaining work on the project.

PROJECT MANAGER'S QUARTERLY SUPPLEMENTAL REPORT
COST AND COST PLUS COMMITMENT CHART



		PRIOR FISCAL YEARS	CURRENT FISCAL YEAR OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	FORECAST FY+1	FY+2	FY+3	TOTAL
COSTS	PLANNED	82	86	90	95	100	75	78	85	87	91	93	94	97	130	162	172	
	ACTUAL	59	61	64	66	69	75	79	82	87	91	94	97	100				
	CUM VARIANCE	23	25	26	29	31	0	(1)	3	0	0	(1)	(3)	(3)				
COSTS PLUS COMMIT-MENTS	PLANNED	106	107	112	113	114	98	102	103	104	107	107	109	111	147	168	172	
	ACTUAL	77	78	84	86	89	98	99	102	104	107	108	111	110				
	CUM VARIANCE	29	29	28	27	25	0	3	1	0	0	(1)	(2)	1				

ENGINEERING, MANAGEMENT, AND CONSTRUCTION
MANPOWER FOR COST TYPE PROJECTS REPORT, INSTRUCTIONS AND EXAMPLE

1. CURRENT FISCAL YEAR.

a. Using the grid formed by an appropriate manpower scale and the months, plot separate planned manpower graphs for engineering, non-DOE management and construction. On each graph, plot actual manpower for each month up to and including the quarter being reported. Also, provide a projection through the end of the fiscal year to indicate an estimate of manpower to be expended for the remainder of the time period shown. If applicable, enter a total manpower ceiling line at the top of the graphical representation. The total manpower ceiling is the total manpower funded by the Government plus the contractor's shares. Reflect changes in the manpower ceiling line without changing the prior month's information.

b. Enter the total planned manpower for engineering, management, and construction for each month.

c. Enter the total actual manpower for each month up to and including the quarter being reported.

d. Enter the manpower variance for each month up to and including the quarter being reported. Show negative amounts in parentheses.

2. TOTAL PROJECT MANPOWER.

a. Indicate the appropriate unit of measure (man-hours or man-months) and enter an appropriate scale. On the grid formed by the manpower scale and the quarters, plot separate average per quarter planned manpower graphs for engineering, non-DOE management and construction. Plot actual average per quarter manpower for each quarter up to and including the quarter being reported. Also, provide manpower projections to indicate an estimate of manpower to be expended for the remainder of the time period shown. If applicable, enter a total manpower ceiling line at the top of the graphical representation. The total manpower ceiling is the total manpower funded by the Government plus the contractor's shares. Reflect changes in the manpower ceiling line without changing the prior month's data. In subsequent fiscal year reports, adjust the graphic scale as necessary to accommodate cumulative reporting of total project data.

b. Enter the fiscal years being reported.

c. Enter the total planned manpower for engineering, management, and construction for each quarter through the completion of construction.

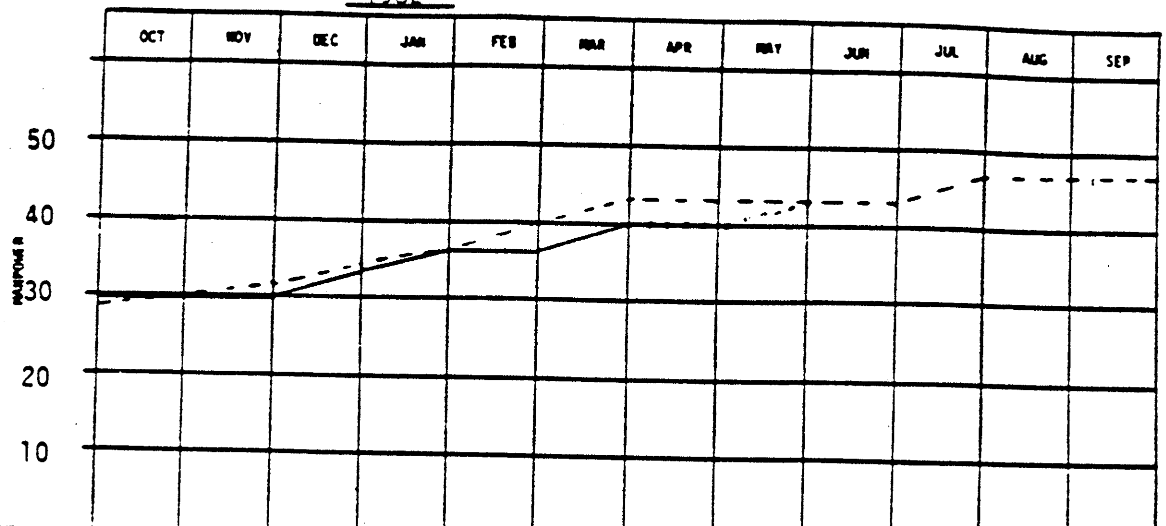
d. Enter the total actual manpower for each quarter up to and including the quarter being reported.

e. Subtract the actual manpower from the planned manpower and indicate the cumulative variance to date. Show minus amounts (when actual is greater than planned) in parentheses.

PROJECT MANAGER'S QUARTERLY SUPPLEMENTAL REPORT

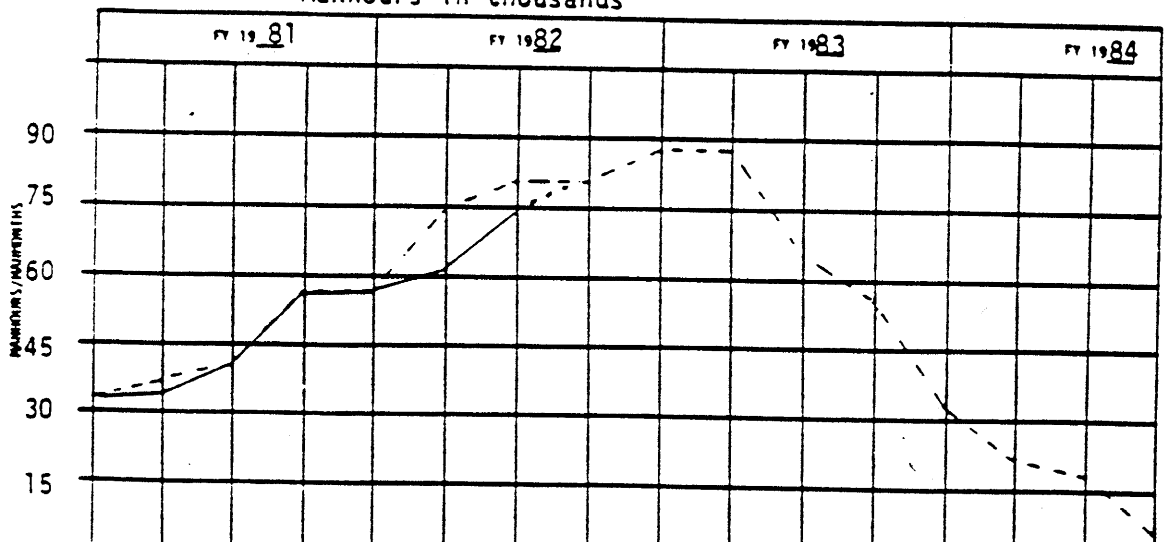
ENGINEERING, MANAGEMENT AND CONSTRUCTION MANPOWER FOR COST-TYPE PROJECTS

CURRENT FISCAL YEAR - 1982



PLANNED	30	32	34	36	40	43	43	43	43	47	47	47
ACTUAL	30	30	33	36	36	40						
VARIANCE	0	2	1	0	4	3						

TOTAL PROJECT Manhours in thousands



PLANNED	35	40	56	56	74	79	79	87	87	65	54	32	20	17	6
ACTUAL	32	40	56	56	61	74									
CUM VARIANCE	3	0	0	0	13	5									

PROGRESS PHOTOGRAPHS INSTRUCTIONS

1. GENERAL. This is an optional report based on the physical process of a project. Progress photographs on all projects estimated to cost $15 million or more, or on other projects that program offices or the Office of Program/Project Management may request, shall be submitted with the Quarterly Supplemental Progress Reports from time to time to show important stages in the fabrication or construction process and unusual features. Except for the larger projects (over $50 million in cost), or those of unusual interest, one photograph of the site at beginning of construction and 15 and 20 during the fabrication or construction period should suffice to meet these requirements for submission to Headquarters. Usually, only a couple of views need be submitted for each significant change in experimental device fabrication or construction progress. In most cases, it will be helpful if those submitted are taken alternately from different viewpoints. A few views of device components or significant elements of interior construction shall also be included during the project execution period. An aerial photograph that shows the relative position of major elements of a dispersed project is desirable.

2. INSTRUCTIONS.

   a. Three prints (8″ x 10″ including margins) of each view shall be submitted to the program division and the Office of Program/Project Management. Reproduced copies of good quality may be provided in lieu of glossy prints, with program office concurrence.

   b. On the lower right corner of each photograph, the following information shall be furnished:

      (1) Description (DOE Field Office and location, name and number of project, building, or facility, and any special feature of interest);

      (2) Name of principal contractors; and

      (3) Date photograph was taken and percent of device fabrication or construction completion as of that date.

   c. DOE Field Office managers or project managers may require additional photographic coverage of construction progress for their records.

ANNUAL REPORT FOR GENERAL PLANT PROJECTS, INSTRUCTIONS AND EXAMPLE

1. GENERAL. General plant projects reports shall be limited to a single yearend annualreport which confirms the work accomplished (or started) with the past year's general plant project funds. No Headquarters status or progress reporting shall be required, unless specifically required by a program manager. This annual report shall cover all general plant projects being accomplished in the Department. It shall cover general plant project work at both single and multiprogram installations.

2. INSTRUCTIONS. An annual report shall be provided which includes the following:

   a. End of the Year Summary.

      (1) List all general plant projects costing more than $85,000 that are being accomplished with the past years' general plant project funding. Identify program(s) supported, title, description, and total estimated cost.

      (2) Consolidate small general plant projects (those costing less than $85,000) and list them under miscellaneous.

      (3) Asterisk (*) new projects not included in the original plan.

   b. Upcoming Year - Planned.

      (1) List all general plant projects to be accomplished in the upcoming year that have costs greater than $85,000. Identify program(s) supported, title, description, and total estimated cost.

      (2) Consolidate small general plant projects (those costing less than $85,000) and list under "miscellaneous."

      (3) The list is tentative. It is recognized there may be some substitutions during the year. Confirmation of work actually performed and projects worked on shall be described in the end-of-year summary.

ANNUAL REPORT FOR GENERAL PLANT PROJECTS

(Dollars in Thousands)

END OF YEAR SUIMMARY - FISCAL YEAR 1977

PROGRAM SUPPORTED	TITLE	DESCRIPTION	TEC
Liquid Metal Fast Breeder Reactor	Building 221 Addition, Applied Mathematics	This project calls for construction of a 6,400 square foot addition, which will provide storage area and space for air handling equipment.	412,500
	Renovation of Seven Wash and Locker Rooms, Biological and Medical Research, Building 202	Renovation will include the Installation of new concrete block walls, door, toilet partitions, ceramic and floor tile, rockers and benches.	145,200
	Installation of Traffic Signals - Lemont Road, ANL-East	This project calls for installation of traffic signals, a left turn lane for Lemont Road southbound traffic, and improvement of eastbound lanes.	81,400
		Total $	639,100

UPCOMING YEAR - PLANNED

PROGRAM SUPPORTED	TITLE	DESCRIPTION OF PLANNED PROJECTS	TEC
Liquid Metal Fast Breeder Reactor	Criticality Monitoring System, Site, ANL-East	Replacement of existing criticality alarm system with a state-of-the-cost system in 13 buildings to provide maximum protection to laboratory personnel.	231,900
	Modifications to Kennels, Bldg. 202	Renovation of wings M, N, O and P dog kennels and runs.	303,800
	General Offices, Building 212	Conversion of existing unused north balcony space into general office area.	127,400
		Total $	663,100

INSTRUCTIONS FOR THE PROGRAM MANAGER'S
SUMMARY REPORT TO THE ACQUISITION EXECUTIVE

1. GENERAL. The purpose of this report is to provide the Acquisition Executive with highlights on the status and activities of major system acquisitions and major projects. This information keeps the Acquisition Executive apprised of existing or potential problems and allows such timely followup action as may be required.

2. DUE DATE. This summary report, covering activities on major system acquisitions and major projects since the previous report, shall be submitted by the program manager through the cognizant program Secretarial Officer so as to reach the office of the Acquisition Executive not later than the 25th working day following the end of the calendar quarter.

3. INSTRUCTIONS. The program manager receives the project manager's monthly report which may have an operations office manager's assessment included. The program manager attaches a cover sheet to the project reports within that program and provides the program assessment if different from that of the project manager. The program manager, at his or her discretion, may desire to address the following specific areas as concisely as possible:

   a. Status;

   b. Significant problems, issues, or accomplishments;

   c. Other items worthy of top management attention;

   d. Key events anticipated during the next 3 months;

   e. Cost;

   f. Schedule;

   g. Technical performance;

   h. Project manager's assessment; and/or

   i. Actions taken or planned on items identified by the project manager as items requiring Headquarters actions.

SUMMARY PROJECT PERFORMANCE REPORT TO SENIOR MANAGEMENT, INSTRUCTIONS AND EXAMPLE

1. GENERAL. This summary report is prepared by the Office of Program/Project Management, and is intended to provide the Acquisition Executive with an independent assessment of project status for comparison with the project manager's assessment. This independent assessment is based on information obtained from field reviews, budget validations, and other formal and informal sources. The project manager's assessment is provided to the Office of Program/Project Management on Part 1 of the Project Manager's Progress Report. The Office of Program/Project Management's comments shall be coordinated with program offices prior to official submittal to senior management.

2. INSTRUCTIONS.

   a. Project Title. Enter the title of the project as shown on the Project Manager's Progress Report.

   b. Type. Enter the designation of the project as either a Major System Acquisition or Major Project.

   c. Project Status - Last 6 Months. Enter the overall project status for each of the last 2 quarters as reported in the Project Manager's Progress Report.

   d. Project Manager's Comments. Summarize the project manager's current comments using key words or phrases to explain less than satisfactory performance status.

   e. Office of Program/Project Management Assessment. Enter the independent assessment of project status as determined by the office's engineers and analysts.

   f. Office of Program/Project Management Current Month Comments. Summarize the reasons for the Office of Program/Project Management assessment using key words or phrases.

   g. Reference Tab. Reference the tab number of the backup sheet which provides narrative explanations of project status by both the project manager and the Office of Program/Project Management.

Summary Project Performance Report to Senior Management (as of JUNE 1984)

NUCLEAR ENERGY

LEGEND

Satis factory	Minor Concern	Major Concern	No Report Received

PROJECT TITLE	TYPE (MSA or MP)	PROJECT MANAGER'S ASSESSMENT: STATUS Last Qtr.	STATUS This Qtr.	PROJECT MANAGER'S COMMENTS	OFC OF PROJECT & FACILITIES MGT ASSESSMENT: OPFM ASSESS	OPFM CURRENT MONTH COMMENTS	REF TAB
Safety Research Experiment Facilities (SAREF) (ANL W, ID)	MP			Forecast near term key milestones will be missed		Unusual occurrence 3 EPRI tests to go. 3 new metal fuel tests Changing Breeder Program requirements.	G
Shippingport Station Decommissioning Project (Shippingport, PA)	MP			Reactor defueling now projected to be complete September 1984 Turn over of site to DOE expected mid September		Physical start expected January 1985	H
Materials Facility (Savannah River, SC)	MP					Report not available on which to base an assess ment.	

EXAMPLE OF A QUARTERLY STATUS REPORT - CONSTRUCTION PROJECTS

R-4602551-005

U.S. DEPARTMENT OF ENERGY
OFFICE OF PROJECT AND FACILITIES MANAGEMENT
QUARTERLY STATUS REPORT OF DEPARTMENT OF ENERGY PROJECTS

PAGE 15.00
03/15/84

PROJECT REPORT

DEFENSE WASTE PROCESSING FACILITY, SR

81-T-105

ASSISTANT SECRETARY: DP
PROGRAM : DEFENSE NUCLEAR WASTE

OPERATION OFFICE: SAV RIVER
LOCATION : SR

	--- COST $(000 S) ---		--- SCHEDULE ---						
			--- DESIGN ---				--- CONSTRUCTION ---		
	TOTAL ESTIMATED COST	TOTAL PROJECT COST	START DATE	COMPL DATE	% COMPL	PROC START DATE	START DATE	COMPL DATE	% COMPL
ORIGINAL DATA SHEET	970,000	1,529,465	09/01/79	N/R	N/A	N/R	03/01/84	03/01/90	N/A
CURRENT DATA SHEET	910,000	1,350,363	09/01/79	N/R	N/A	N/R	03/01/84	03/01/89	N/A
APPROVED BASELINE (APPROVED PROJECT PLAN)	910,000	1,350,000	09/01/81	06/01/89	N/A	12/01/83	03/01/84	06/01/89	N/A
CURRENT ESTIMATE	910,000	1,279,742	09/01/81	06/01/89	45	09/01/83	10/01/83	06/01/89	40

COMMENT: CURRENT ESTIMATE DOLLARS REFLECT FY85 FIELD BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEET.

CHAPTER V

PROCEDURES FOR CONSTRUCTION MANAGEMENT

PART A - PROCEDURES FOR MANAGING CONSTRUCTION EFFORTS

1. INTRODUCTION.

   a. Each construction effort is unique due to the different and varying conditions, requirements, and problems associated with each project. In addition to the uniqueness of each effort, an individual project must comply with rather rigid procedures in relation to funding, safety, and other requirements. Construction industry and DOE experience have shown that efficiency and timeliness results when a construction program is conducted in conformance with a well-defined overall policy and detailed procedures for the construction effort undertaken. This chapter provides an overview of the Departmental construction policy and necessary procedures to assure a coordinated construction management effort within the Department. This chapter also provides guidelines to assist the managing field offices in developing their detailed management procedures.

2. MANAGEMENT ELEMENTS AND GENERAL PROCEDURES.

   a. Parameters and Requirements for Management of the Construction Effort.

      (1) Effective management of construction necessitates establishing the following parameters and requirements:

         (a) Clearly defined scope;

         (b) Adequate division of work into packages for management control;

         (c) Reliable cost estimates;

         (d) Realistic schedules;

         (e) Applicable standards and criteria;

         (f) Competent personnel;

         (g) Efficient organization;

         (h) Designated authorities and responsibilities;

         (i) Monitoring and reporting status of work;

         (j) Comparing progress and costs with schedules and estimates;

         (k) Identification of potential or actual problems; and

(1) Prompt action to eliminate or resolve problems,

(2) The importance of planning in developing parameters and requirements cannot be overemphasized.

b. Planning for Budget. Planning procedures directed toward the preparation of construction project data for formal budget submittal are contained in Chapter II. This separation is for editorial convenience. The entire process of planning and execution should not be rigidly segmented chronologically or substantively. Each phase of the process can overlap chronologically and can support the development of, or act as a reference point for performance measurement of other phases.

c. Planning for Execution. The primary objective of the execution phase is to complete successfully the facility design and construction while satisfying the programmatic needs within authorized funding limitations and schedule. To satisfy this objective, it is necessary that each field organization establish and utilize an effective project management plan for each project.

(1) Specific project management plans shall be prepared for each major system acquisition and major project per Chapter II. Any other project that cannot be managed by use of the locally established general management plan described in subparagraph (2), below, shall also have a specific management plan.

(a) The responsibility for development of this project management plan rests with the project manager. The field element shall provide assistance and guidance to the project manager for the development of the plan.

(b) Specific management plans will require amplification and revision as the design and construction progress.

(c) Detailed guidance on the content, form, and approval process is contained in Chapter II, Part A.

(2) General project management plans shall be prepared for categories or types of projects which are to be managed similarly, encompassing the same areas that the specific management plans address.

(3) Projects managed by general management plans shall have a specific document containing scope, estimate, schedule, and designated individuals assigned authorities and responsibilities. The project authorization document satisfies this specific document requirement.

(4) Specific project management plans may be established for projects normally managed by general management plans at the discretion of the managing field element.

d. Key Elements in Managing Construction.

(1) Delivery of a facility by construction requires a team effort on the part of the managing organization, operating contractors, architect-engineers, construction contractors, construction managers (if used), and the appropriate Headquarters program divisions and other Headquarters organizations. The field office which has the prime responsibility for management shall assure timely and accurate status and forecast reporting against established management plans, both to the field element and to Headquarters, and a capability for timely recognition of problems, and implementation of any necessary corrective actions.

(2) The Head of the Field Element shall appoint an individual responsible for each construction project. This individual may be designated as project manager, project engineer, or any other appropriate title. The responsibilities of the designated individual shall be well defined and the appropriate authority is vested in the individual to allow accomplishment of his/her responsibilities. However, for major system acquisitions, the project manager must be approved by the cognizant Headquarters program organization. Consultation with Headquarters program organization is required prior to selection of the project manager for major construction efforts.

(3) To ensure the completion of all line item projects, the Head of the Field Element shall establish procedures that contain as a minimum the following requirements:

(a) Routine management meeting during all phases of the project to review performance, schedules, and costs; identification of potential and real problems, and action for solutions and corrective measures.

(b) Written records of those management meetings which result in assignment of responsibilities for accomplishment and/or significant management actions.

(c) During the performance of major activities, periodic (normally monthly) management meetings involving representatives of all project participants.

(d) For projects requiring a specific management plan, management meeting attendance by at least one level of supervision above those responsible for the day-to-clay execution of the project. When Headquarters program organizations are providing technical direction, a representative of the Headquarters organization shall be invited to participate in the management meetings.

(e) Briefing of the Head of the Field Element or designee on significant results of the management meetings.

(f) Permit project managers to:

1 Determine what progress is being achieved;

2 Relate that progress to schedules;

3 Compare commitments to related estimates;

4 Compare budgeted and actual costs of work accomplished; and

5 Forecast estimates at completion based on current costs experience.

(g) Reporting systems which are established by project managers and are:

1 Based on the uniform reporting system for contractors for reports from contractors; and

2 Compatible with the reporting required for reports to DOE management.

(h) Photographs taken periodically to show construction progress, special features, and incident scenes and details. Photographs taken shall be properly labeled, dated, and included in the project record.

(4) Procedures established by field office managers for non-line item projects should incorporate as many of the requirements listed in subparagraph (2), above, as possible, depending upon the field organizations' contractor relationship, workload, and ability to perform the function.

e. Architect-Engineer Selection. Selection procedures for architect-engineers (A-Es) shall be in accordance with subpart 936.6, "Architect-Engineer Services," of the Department of Energy Acquisition Regulations. It is emphasized that, prior to the selection procedures, the professional experience and qualifications required for each project are accurately identified, and the evaluation criteria and prerequisites that are developed for each A-E services procurement adequately reflect these requirements. Prior to A-E selection, field office managers must ensure that the project design criteria package is complete and complies with DOE 6430.1.

f. Cost Estimates are important tools in the successful management of a project and quite often are compared to the actual cost of the project to judge the success of the management effort. Cost estimates should always be fully documented and contain the type of estimate, reference year for the dollar figures utilized and date of the estimate. Heads of Field Elements shall assure that contingency allowances included in estimates are developed utilizing an appropriate contingency analysis procedure for the project being estimated. The estimate documentation shall include the details on the contingency allowance development.

(1) Seven general types of cost estimates are developed and used by DOE throughout the life of a construction project. Identification of an estimate by type denotes a certain level of accuracy and confidence in the estimate.

(a) Planning estimates are developed for each project at the time of project identification. Since these are developed prior to conceptual design, they are ballpark-type estimates and have the least confidence level. Care should be exercised in these estimates to assure that the order of magnitude is correct since a tendency exists to avoid changing, particularly upward, this estimate once established.

(b) Budget estimates are required in order to obtain authorizing legislation and appropriations. These estimates should be based on a completed conceptual design and should also be well documented since they must be justified. Since these estimates are used to request authorizations and appropriations, they often must be used as baselines for justifications of cost overruns and underruns to the Congress. Accuracy and confidences are often assumed to be much better than they are. Contingency allowances can be substantial due to the lack of definitive design information, particularly for large complex projects.

(c) Title I design estimates are prepared upon completion of Title I design. Through use of plant engineering and design funds, Title I may be completed prior to inclusion of the project in the budget. If this should occur, the Title I design estimate becomes synonymous with the budget estimate. A guideline for contingency allowance during this stage could be from 5 to 25 percent of the construction costs.

(d) Title II design estimates are developed for each project by the designer as part of the Title II design requirements. The estimates, since they are based on the definitive design, are the most accurate and have the highest confidence level of any estimate. Contingencies generally should range from 5 to 15 percent of the construction cost dependent upon the extent of uncertainties (unknowns, risk) remaining.

(e) Government estimates are used to determine the reasonableness of competitive bids received in connection with sealed bids construction contracts; and serve as a control in evaluating cost and pricing data in negotiated contracts. Normally, the Title II design estimate prepared by the designer, after being reviewed and approved by the Government, is the basis for the Government estimate. However, the services of an operating contractor, architect-engineer, cost plus fixed-fee construction contractor (with respect to subcontracts) or construction manager may be used as appropriate to prepare, review, or revise the Government estimate prior to Government approval. Cost-type contractors shall be required to follow cost estimate procedures set forth in this paragraph when subcontracting for construction services. Government review and approval of the Government estimate are not required when the estimate is within the limits established by the Governments approval of the cost-type contractors procurement system. The specifics of a Government estimate vary with the size and type of contracts as delineated below:

1 Architect-Engineer, Design-Build Fixed-Price, and Cost Plus Fixed-Fee Construction Contracts. Government estimates shall be prerepared for all construction and architect-engineer contracts estimated at $25,000 and above. Such estimates may be revised when inaccuracies or inconsistencies are revealed during technical evaluation and/or negotiations.

2 Fixed-Price Construction Contracts.

a Government estimates for fixed-price construction contracts and modifications thereto shall be based on approved Title II working drawings and specifications. These estimates shall be prepared in accordance with the practices of the construction industry and in the same careful manner as if the Government were bidding in competition with private contractors.

b Government estimates shall be summarized to conform with bid items but shall include the following items, as backup, listed separately:

(1) Separate estimates for alternates set forth in the bidding documents;

(2) A breakdown indicating quantities and unit costs for labor, materials, and equipment entering into the work;

(3) Estimates for mobilization and demobilization; and

(4) Allowance for contractor's overhead and profit, including the cost of such items as sales tax, insurance, and bonds.

c Government estimates shall be prepared independently in advance of any bid or solicited proposal submitted by a prospective contractor or subcontractor.

d Prior to opening of bids, access to or disclosure of information concerning Government estimates shall be limited to personnel requiring such information in performance of their duties.

e Government estimates for formally advertised or competitive proposal fixed price construction contracts shall not be changed after the opening of bids or proposals unless careful reexamination indicates a definite error. In the event an estimate is changed under such circumstances, detailed reasons for the revision shall be documented.

3 Estimates for Work Under $25,000. The preparation of Government estimates in connection with work estimated to cost less than $25,000 is optional with the field element manager. Where the Head of the Field Element elects to use a contractor's estimate, bid, or proposal instead of a Government estimate under this limitation, the contractor's estimate shall be carefully evaluated to verify that it is fair and reasonable.

(f) Current working estimates are developed periodically during the life of a project for the primary purpose of determining that the project can be completed within the funds authorized. Working estimates are developed by updating previous estimates to ensure that the latest available cost and design data are reflected in the cost of the incomplete work. Working estimates should be designed to facilitate separation of the data required for accountability, cost control, and information for management. Special attention is needed in developing good, updated forecasts of all incomplete work. Standards should be adopted which will provide adequate internal control without requiring extensive examinations or duplication of effort. Careful review of working estimates for cost plus fixed-fee projects is important for early determination of adequacy of funds and control of construction costs. When the working estimate indicates a significant change in total estimated cost of the project, changes to the project documentation and/or financial plan must be made. When working estimates exceed the allowable construction cost, additional authority must be obtained prior to continuing the project. The appropriate program organization and the Controller shall be notified of the situation immediately.

(g) An independent cost estimate is a documented cost estimate that has the express purpose of serving as an analytical tool to validate, cross-check, or analyze estimates developed by proponents of a project. An independent cost estimate also serves as a basis for verifying risk assessments.

(2) Contingency Funds. Included in all cost estimates should be a contingency fund comprised of costs which may result from incomplete design, changes due to unforeseen, uncertain, and/or unpredictable conditions (e.g., construction work disturbances due to operations), and expected costs/savings associated with projected market conditions. The amount of the contingency funds will depend on the status of design, procurement, and construction as well as the complexity and uncertainties of the project's component parts. The market condition reserve requirements will depend upon an analysis of the anticipated availability of resources to complete the job. Market condition analysis may result in either a positive or negative requirement for reserves since, for example, an anticipated shortage of available construction work would indicate possible receipt of lower bids. Care must be exercised during the market condition analysis to consider only those items that are separate from the items utilized for computation of inflation rate. Market condition considerations are an addition to or subtraction from the project cost without regard to inflation.

g. Project Authorization System.

(1) Purpose. The project authorization system (formerly the project directive system) provides the Head of the Field Element with administrative control over significant construction project activities so as to assure himself or herself that adequate management control exists for successful execution of the work covered. The system also provides for control over the scope of activities, schedules, expenditure of funds, and administration of the activities to be performed.

(2) Activities Requiring Authorization. Authorization for the effort will be obtained from the field office manager or his designee prior to initiation of work or contracting for the activities listed below:

(a) Any conceptual design activity estimated to cost more than $200,000 and any plant engineering and design activity.

(b) Preliminary engineering (Title I work) when the cost is estimated to exceed $25,000.

(c) Any of the following activities when the total estimated cost of the project exceeds $150,000 when financed from the operating expenses or plant and capital equipment portions of the budget:

1 Preparation of working drawings and specifications (Title II design);

2 Construction of a new facility;

3 Additions, alterations, or improvements to an existing facility; or

4 Removal, demolition, replacement, or restoration of a facility.

(d) Design, procurement, fabrication, and installation of equipment or experimental facilities in connection with:

1 Any equipment of $1 million or more in estimated cost that is funded from the capital-equipment-not-related-to-construction portion of the plant and capital equipment budget and involving installation costs of $250,000 or more; or

2 Any experimental project or reactor test loop of $1 million or more in estimated cost that is funded from the operating expense budget.

(e) Procurement and stockpiling of material and equipment prior to authorization for construction by the field organization.

(f) Heads of Field Organizations may authorize funds to an operating contractor for non-line item projects utilizing an annual financial plan. However, if this authorization process is utilized, the operating contractor shall be required to implement an internal authorization system equivalent to the system described here. Field organizations shall assure that the operating contractor authorization are adequately monitored to ensure proper control over the scope of activities, schedules, expenditure of funds and administration for the activities.

(3) Activities Not Requiring Authorization. While use of the authorization system is encouraged for all activities, field office managers shall establish procedures for those activities not requiring authorization, to assure that the activities are managed and the funds expended are recorded.

(4) Documentation Requirements.

(a) As a minimum, the following information shall be included in a project authorization. Field office managers may include other information required to satisfy their locally established project authorization procedures.

1 Project title and project number shall be shown as they appear in the authorization act and in the financial plan (.e.g., 73-3-b, Laser Fusion Laboratory, Los Alamos, New Mexico). For other projects, suitable identification numbers shall be used for control purposes.

2 Description of the work to be performed.

3 Justificatfion for the work. If justified by prior project authorization, appropriate reference shall be made.

4 Method(s) of performance, including participants, contractors, consultants, types of contracts, and participant responsibilities.

5 Relationship of work to other work necessary to complete the project and any important interfaces.

6 Estimated cost of the work to be performed and cost authorized, by cost breakdown and participants, and including costs of directly related elements to be operating expense funded.

7 Source(s) of funds.

8 Source(s) of available excess materials or equipment to be used and authorization for transfer.

9 Required start and completion dates and appropriate milestones.

10 Any special conditions or requirements such as approval requirements for special features of the work, requirements for accelerated work performance, and any other special conditions or requirements.

11 References to applicable conceptual design reports, project design criteria, safety analysis reports, environmental assessments, management plan, preliminary proposals, and system design descriptions, or use of these applicable documents as part of the authorization documentation.

12 Requesting organizations (with signature and date, when applicable).

13 Field office authorizations (with signature and date).

(b) Attachment V-1 is an example of a recommended project authorization format that contains all of the above requirements and is recommended for use.

(5) Activities Approved by an Authorization. The various types of activities approved at one time by an authorization will depend upon such factors as the method of handling the work (operating and so forth), availability of funds, and the nature and urgency of the project.

(6) Modification of Authorizations. A significant change in the scope of work, appreciable delay in completion, anticipated expenditure or commitment of funds in excess of the amount covered by the authorization, or any other major change in the conditions set forth in the authorization shall be adjusted by a modification. The particular conditions requiring a modification shall be established by the Head of the Field Element in his or her local management procedures. Modification to project authorizations providing for continuation or abandonment of the work under the changed circumstances shall be issued promptly in the same manner as the basic authorization and shall be justified by the same type of supporting data. Modifications shall carry the same serial project number as the basic authorization and, in addition, shall be given a modification number. Modifications shall be consecutively numbered and filed with the basic authorization.

(7) Submittal of Authorizations. Submittal of authorizations to Headquarters shall be at the request of the appropriate Headquarters organization. A complete set of project authorizations shall be maintained in each project file and shall be subject to review by Headquarters personnel during field visits.

h. Construction Management. Heads of Field Elements shall assure that use of the construction management concept is considered early in the planning phase of a project. A discussion of the construction management concept is contained in Attachment V-2.

i. Design Criteria. Development of design criteria for a facility begins at the time the need for a project is identified. The base of the criteria is the statement of the functional parameters that the facility must meet. These functional criteria are further developed, validated, and expanded during the conceptual design phase. The development of criteria which are complete and specifically related to the facility requirements allows for orderly development of the design. Completeness of the design criteria is emphasized. However, care shall be taken to avoid citing superfluous codes and standards; the primary purpose of design criteria is to narrow the criteria to only those applicable to a specific design effort. Prior to the selection of an A-E, the design criteria should be consolidated into a document that will provide guidance to the A-E. The design criteria document should:

(1) Briefly define the purpose of the project.

(2) Provide a general description of the project.

(3) Give the designer room to exercise expertise in the engineering design disciplines and to use up-to-date design and construction applications. The A-E shall use his or her knowledge and expertise to assure that maximum efficiency and cost effective concepts are included in the design, in accordance with Departmental guidelines.

(4) Provide all design requirements to be applied by the designer to meet the needs of a specific facility. Usually a narrative format is used (limits, capacities, quantities, and space allocations).

(5) Incorporate or reference specific Departmental requirements, such as DOE 6430.1 and other applicable Orders.

(6) Include plans developed to mitigate environmental impacts in accordance with the National Environmental Policy Act documentation and environmental permit and license requirements.

(7) Refer to specific operating contractor requirements such as design standards, plant operating policies, and quality assurance manuals.

(8) Identify applicable national and area codes, standards, and guides not specifically identified in DOE 6430.1. If certain sections or parts of a specific code or standard are not applicable or are exceeded by a more stringent code or standard, this fact should be stated in the criteria document.

j. Design Criteria Package. The availability and use of a well-prepared design criteria package allows the designer to proceed with the design with a minimum of delays, allows for better management of the design, and prevents problems from arising during design work due to lack of project definition at the beginning. This package shall be provided to the designer prior to start of design and should contain as a minimum:

(1) The following information related to performance of engineering design:

(a) The design criteria document(s).

(b) Studies, reports, and conceptual designs related to the project.

(c) Copies of DOE 6430.1, applicable documents referenced therein, and any additional energy conservation, environmental, safety, and health standards, including National Environmental Policy Act documentation.

(d) Copies of applicable operating contractor standards, guides, and manuals such as design standards, plant policy and operating standards, quality assurance program manual, and cost estimating guides.

(e) Sketches or drawings developed during conceptual design which contain necessary information related to the specific facility, such as:

1 Site and location plan;

2 Typical floor plan;

3 Typical elevations;

4 Existing utilities plan and information;

5 Equipment layout plan and listing (operations or production);

6 Special systems layout plan and listing;

7 One-line piping and instrumentation diagrams (process or production flows); and

8 Other pertinent information.

(f) Information available on standard and special equipment items (this does not include building systems) such as:

1 Government furnished and operating contractor installed equipment (only if pertinent to design needs);

2 Government furnished and construction contractor installed equipment; and

3 Construction contractor procured and installed equipment.

(2) Other information related to criteria and performance of design (usually separate attachments to the criteria package):

(a) Listing of Departmental and contractor computer programs available for use by the designer and how they can be obtained.

(b) Listing of related submittals such as reports, calculations, conceptual design, and costs.

(c) Required drawing size and list of suggested drawings and titles (Separate attachments with the criteria package).

(d) Estimated cost of construction breakdown thereof.

(e) Copies of information pertaining to the management of the project (project management plan).

(f) Information pertaining to procurement of construction, such as bid package structure, required contract clauses, and types of specifications.

(3) A checklist which may be used as a guide in preparing or reviewing criteria packages is provided in Attachment V-3.

k. Site Selections. Personnel involved in project planning must be aware of the detailed and sometimes complex nature of the site selection and acquisition processes. The requirements and procedures for the accomplishment of these processes are detailed in DOE 4300.1A and DOE 4320.1A. Sequencing of these tasks, particularly in light of their interrelationships with environmental tasks, has a profound impact on the method of accomplishment of the project. Site selection and acquisition methods and the timing can affect the detailed planning of all aspects of the actual construction. In light of the above, it is imperative that considerable effort be expended to properly plan the site selection activities very early in the planning process. Project management plans should contain the detailed plan of action for the completion of the required site selection tasks.

l. Construction Health and Safety. A comprehensive health and safety program must be established and utilized for all Departmental construction projects. The goals of this program are to protect DOE employees, contractor employees, and the general public from hazards; to protect property from damage, and to prevent delay or interruption in the Department's programs caused by accidents and fires in connection with construction activities. The authorities, responsibilities, and standards for construction safety are contained in DOE 5480.1A, DOE 5481.1A, and DOE 6430.1, Chapter 10. Consideration of safety requirements must begin early in the planning phase of a project to ensure that they are included in all plans, studies, schedules, and cost estimates. An example of a safety requirement which must be considered early is the case in which additional real estate may be required to achieve fire separations necessary to meet the "improved risk" criteria of DOE 5480.1A.

m. Environmental Protection. In the planning of a project, it is important that planners are aware of environmental protection requirements and include them in all plans and studies prior to preparation of cost and schedule estimates. The Project Environmental Plan should describe the actions required to properly protect the environment. Particular attention must be given to satisfying the requirements of DOE 5440.1C. Early attention to environmental requirements may avoid costly and time-consuming delays in project implementation.

n. Control Aids.

(1) Successful completion of a construction effort usually depends upon management's ability to control the planning, design, and construction activities. The project manager must select, based upon the project particulars, aids to provide him the control he desires. Descriptions of the most common control aids are contained in Attachment V-4.

(2) Control aids utilized by the project manager must be compatible with the system utilized by the contractor performing the work. The contractor normally is permitted to utilize his or her established control system for the contracted work. The most important benefit from this approach is that the contractor operates in his normal fashion without extensive new requirements for a particular contract, which results in greater efficiency and lower costs due to avoidance of the learning process. The responsibility of the learning process is placed upon the project manager. It is imperative that the project manager and his staff fully understand the contractor's system. On large projects, it may be necessary for the project manager and his staff to receive orientation by the contractor on the operation of the contractor's system. Knowledge of the contractor's system will allow the project manager to utilize the system to enhance performance of the work. The major benefit from this knowledge will be the early recognition of problems and the opportunity to apply corrective action when it will provide the greatest effect.

o. Quality Assurance. The goals of quality assurance are to assure that research, development, demonstration, and production activities as well as strategic facility complexes are designed in a controlled manner; that components, system, and processes are designed, developed, constructed, tested, operated, and maintained according to sound engineering standards, quality practices, and technical specifications; and that resulting technical data are valid and retrievable. Quality assurance begins with the formative style of design and continues through Titles I, II, and III services. It comprises both quality engineering and quality control (inspection). Quality assurance elements that shall be considered during the design and construction effort are listed below.

(1) Design.

(a) Quality assurance during design shall include review of materials of construction and installed equipment for economics, compatibility with other components and maintainability.

(b) Continuous review of the design is required to ensure that the facility can be constructed as designed using the most efficient techniques available. In addition, the cost of construction can be greatly increased by the type of design. Constructability includes consideration of interferences between disciplines, compatibility of specifications with respect to seasonality of construction, and integration of different contractors on the job when applicable:

(c) Quality assurance during design shall include provisions to assess the operability of the facility after completion.

(d) The most important aspect of quality assurance during design is continuous surveillance of the design. Except in very small projects, accomplishment of periodic design reviews is seldom adequate to assure the proper level of quality assurance. Continuous surveillance assists in reducing the comments required during the design reviews (e.g., assuring that proper quality assurance requirements during construction are included in the specifications), and reducing the total design effort by reducing time spent on engineering change proposals and for correction of review comments. It is important to assure that the bid packages contain the proper clauses for accomplishment of quality assurance during construction.

(2) Construction.

(a) A submittal control system shall be established and operated. The project manager shall assure the contractor establishes and follows a plan for shop drawings, test results, and certification submittals. The project manager shall also assure that the architect-engineer, construction manager, or Government personnel act in a timely manner on approval of shop drawings, test results, and certifications.

(b) A reporting system shall be established and operated. The system shall include quality assurance reports from contractors and quality inspectors together with procedures for reviewing the reports and taking prompt effective action on quality assurance.

(c) Adequate staffing of quality assurance inspectors and assurance that they are qualified to perform the job shall be provided.

(d) Continual checks shall be made to assure that all of the quality assurance functions specified in the quality assurance plan are being performed and prompt corrective actions are being taken when necessary.

(e) All quality assurance reports, x-rays, and other quality assurance documents shall be filed and stored in Department-controlled storage facilities.

p. Decontamination and Decommissioning. Field office managers shall ensure that facilities are constructed and operated so that they may be decontaminated and decommissioned of in a cost-effective manner. Decontamination and decommissioning (D&D) considerations shall include:

(1) Limiting contamination of the facility, equipment and site to the minimum extent consistent with accomplishing the purposes of the facility.

(2) Providing design features that ease decontamination (see DOE 6430.1).

(3) Incorporate design features that promote reuse of the contaminated facilities.

(4) Consideration of D&D costs as part of the life cycle cost.

(5) Selection of a tentative D&D method during facility design.

q. Maintainability. Field office managers shall assure that facilities are designed and constructed so that they are easily and economically maintained (see DOE 4330.4). Maintainability considerations shall include:

(1) Incorporation into the facility of easily maintained features and durable materials;

(2) Ease of replacement of installed equipment (i.e., without structure modification);

(3) Accessibility of installed equipment and building systems for performance of maintenance;

(4) Life cycle costs in selection of features, systems, and finishes; and

(5) Provisions of maintenance instructions and as-built drawings, especially the location of underground and otherwise concealed utility lines, process chemical and coolant piping.

r. Compatibility with Master Plan. Facilities shall be constructed in accordance with the approved site development and facility utilization plan (see DOE 4320.1A). In relation to this plan, the following procedures shall be accomplished during the planning, design, and construction of facilities:

(1) Early in the planning stage the site development plan shall be utilized to determine:

(a) Building siting (location);

(b) Orientation;

(c) Exterior materials, if specified;

(d) Height and general configuration and footprint;

(e) Size; and

(f) Landscaping features.

(2) During the planning process, compatibility of the proposed design with the site development plan shall be assured. Should conditions arise in which the site development plan cannot be followed or prudence dictates that it should not, then action must be taken either to effect a change to the site development plan so that it and the design are brought in consonance, or to obtain a waiver of the site development plan criteria must be obtained. This waiver shall be approved by the cognizant field office, or for sites administered by Headquarters, by the outlay program manager. Any waiver that has an effect on an outlay program shall have the concurrence of the outlay program manager.

(3) During the process of design and construction, coordination with the organization responsible for site planning shall be effected to assure that:

(a) The design and construction remain in consonance with the site development plan; and

(b) The site development organization is aware of current developments.

(4) Upon completion of construction, the organization responsible for site planning shall be provided as-built drawings of the new facilities, if desired by the organization.

S. <u>Construction Project Records.</u>

(1) A project record shall be maintained for all construction projects. These records should be maintained by the field element for all line item projects. The project record may be maintained by operating contractors at the discretion of field office managers.

(2) The project record normally should be maintained by the project manager. The following documents shall, as appropriate, be contained in the project record:

(a) Short form data sheets;

(b) Conceptual design plans;

(c) Conceptual designs;

(d) Conceptual design reports;

(e) Copies of each submitted construction project data sheet;

(f) Project design criteria package;

(g) Management plan and changes thereto;

(h) Architect-Engineer selection plan, if utilized;

(i) Title I design summary;

(j) A-E design contract;

(k) Project authorization and all modifications thereto;

(l) Title II design;

(m) All cost estimates;

(n) All project reports;

(o) Construction contract and changes;

(p) Construction manager contract;

(q) Construction photographs;

(r) Minutes of project review meetings;

(s) Cost closing statements;

(t) Construction completion reports;

(u) As-built drawings; and

(v) Other documentation of a special nature such as audit reports or other items directly relating to the project.

(3) Disposition of project records will be governed by DOE 1324.2. Operations office managers shall maintain such records in the current records area for a minimum of 1 year after cost closing statement is issued.

3. ROLES OF PARTICIPANTS IN MANAGING CONSTRUCTION. Headquarters and field element roles in project performance tire well defined in Chapter I. However, it is necessary to define the roles of other organizations and individuals that may participate in the planning, design, and construction of a facility,

a. Contracting Officer. A contracting officer is a Departmental representative designated to enter into and/or administer contracts and make related determinations and findings. Of particular importance is the requirement that he or she advise the contractors of the names and authorities of those acting for him or her and providing technical surveillance of the work.

b. Project Manager. The project manager has direct primary responsibility and accountability for the management of the construction effort. He or she normally will be designated as the contract administrator or contracting officer's technical representative for the construction effort by the contracting office. Among the usual functions of the project manager are the following:

(1) Assures that cost, schedule, and scope requirements are met;

(2) Acts as the principal contact and serves as the liaison for the exchange of information between the contractor and DOE;

(3) Assures that instructions to the contractor are within the terms of the contract;

(4) Assures compliance by the contractor with the technical, safety, and administrative requirements of the contract;

(5) Participates in the formulating of, and approving, plans and schedules;

(6) Arranges for contacts between the construction contractor, other participants, and appropriate staff, as required;

(7) Assures continuity in performance and information exchange among the project team participants; and

(8) Initiates to the contracting officer procurement request packages for contract modifications.

c. Project Engineer or Construction Engineer. This engineer is the individual responsible for construction projects for which a project manager is not assigned. He or she performs within well defined responsibilities established by the Head of the Field Element. Specific responsibilities vary depending upon the field office management method. He or she may be assigned as the contracting officer's technical representative.

d. Architect-Engineer. The architect-engineer usually furnishes Titles I and II engineering services, with optional Title III services; consults with the contract administrator on questions concerning services; and coordinates the work with the operating and construction contractors and public utilities, as required by contract. The architect-engineer may also develop conceptual designs, assist in the preparation of design criteria, and perform special studies.

e. Construction Contractor. The construction contractor usually furnishes all materials of construction; performs all construction work in accordance with the construction drawings and specifications, except for equipment to be furnished by others; and coordinates his or her efforts with those of the construction manager, contracting office, and operating contractor as required by the construction contract.

f. Construction Manager. A construction manager provides professional services to and functions in support of the project manager. He becomes part of the project team consisting of the project manager, the architect-engineer, the construction manager, and operating and construction contractors. It is seldom beneficial for the construction manager to be the same firm (or a subsidiary of) as the architect-engineer or construction contractor because of the possibility of organizational conflict of interest. In cases where the construction manager is contemplated as being the same firm (or a subsidiary of) as any of the other project participants, specific approval shall be obtained from the responsible outlay program manager and the Department's senior procurement official. Tasks that the construction manager can perform encompass the full spectrum of management activities of a project. The decision to use a construction manager on a project is not as difficult as determining the tasks he must undertake and the method of payment for these services. Considerable thought must be given to the tasks assigned to the construction manager in order to affect the best management of the project at the minimum cost. Factors that help determine construction manager tasks are size and complexity of the job, capabilities of project management staff, and contemplated scope of the architect-engineer and the construction contracts.

g. Operating Contractor.

(1) The operating contractor may serve as the construction manager or perform jointly with the construction manager. Operating contractor's capabilities to perform these functions should be carefully evaluated. Operating contractors may not have the necessary expertise to perform all of the listed functions. Depending upon expertise, the operating contractor may be assigned the following functions associated with design and construction activities:

(a) Preparation of master plans for site and facilities development as directed by the field element;

(b) Planning for facilities, including conceptual design, preparation of construction project data sheets or other project proposals, and preparation of environmental assessments and environmental impact statements;

(c) Preparation of project and process design criteria for facilities;

(d) Preparation of safety analysis reports;

(e) Procurement of process, specialized, and long leadtime equipment;

(f) Participation in the review and concurrence in Titles I and II design work by the architect-engineer and in-house efforts.

(g) Performance of Titles I, II, and III engineering services, particularly for specialized areas;

(h) Participation in project management;

(i) Participation in final inspection and testing of facilities when construction is completed;

(j) Participation in the acceptance of facilities for operation; and

(k) Procurement of design and construction.

(2) If the operating contractor participates in the design, its coordination with the architect-engineer in the application of the basic design criteria and concurrence in functional design criteria, drawings, and specifications is of primary importance. The operating contractor should consult with the architect-engineer, the project manager, and any technical representatives concerning equipment requirements. The operating contractor should review the detailed design for compliance with the design criteria and suitability for operation.

4. LESSONS LEARNED. DOE has extensive experience in construction management. It is evident from this experience that it should be beneficial to focus management attention on lessons learned and problems that have plagued past projects. Some of these problem areas with some recommended solutions are discussed below. Field office managers should assure that their management procedures provide for the proper attention to these areas and that lessons learned are submitted to the Office of Program/Project Management and Control for incorporation into the Design Information Exchange System.

a. Failure to Design to Requirements. A tendency exists during design of a project to improve the design by consideration of only the benefits of different design options. Past experience has shown that this can result in a design with a project scope and costs substantially in excess of the initial baseline. This problem can be mitigated by utilizing a principle of the "design to cost" philosophy, where, if any option in a set of options, with increased costs over baseline is selected, it must be offset by equal decreased costs under baseline in other areas. Value engineering can help reduce the cost in some areas.

b. Failure to Establish Realistic Baselines. Baselines should be established for cost, schedule, and technical requirements when there are sufficient data to define a realistic cost and schedule. Since baselines are generally the basis for budgeting and tracking, they must be realistic.

(1) On occasion, baselines have been established when sufficient data for their establishment were not available. In addition, there may have been a tendency to scope projects and establish schedule in such a manner that initial costs are favorable. These problems may be mitigated if management procedures require a careful review of all project data, preferably by an independent organization or staff, prior to the baseline establishment. This review, to be effective, should consider the sensitivity of costs related to risks and possible scope and schedule changes.

(2) Generally, baselines are established after completion of conceptual design. A careful review of the conceptual design data should assist in determining the accuracy of the baselines.

(3) It is recognized that certain projects cannot be accurately scoped or scheduled prior to submission of data for a budget request. For these projects a contingency cost should be included in the cost baseline submitted for budget purposes. Scope and schedule uncertainties considered in determining contingency cost should be recorded in the project documentation.

c. Inadequate Change Control Procedures. Inadequate change control procedures can lead to large scope and schedule changes and result in large cost increases. Inadequate change control procedures can also preclude the inability to trace the reasons for cost growth from the original baseline. These problems can be greatly reduced by development and strict use of a detailed change control procedure. The procedures are most effective when they include cost as a consideration for approval, an independent review of the proposed change, and strict rules that a proposed change must meet to be considered.

d. Inadequate and Inaccurate Project Status Reports. To perform properly, project managers must continuously assess and analyze the project status. This has been impossible on some past projects due to the lack of, or improper reports, from the contractors. In addition, some reports have been found to contain inaccurate data, thereby resulting in incorrect analysis and assessment. Identifying early in the planning process what information is needed to assess and analyze the project properly, and requiring that information to be furnished by contract, will assist in minimizing this problem. The problem of inaccurate data may be mitigated by periodically verifying the submitted data against the data source and making corrections to the data recording procedure when necessary.

e. Lack of Sufficient Experienced Project Management Staff. Personnel assigned or hired to manage a project must have sufficient knowledge and experience to adequately perform the requirements of the position, and the number of positions on the project management team must be sufficient to perform the work. This problem can be addressed by conducting a resource requirements analysis which determines the manpower requirements for the project staff, the management philosophy, and the requirement for support contractors. If understaffing occurs, the problems discussed in this paragraph are more likely to occur. Use of the construction manager concept discussed above may solve some understaffing problems.

f. Insufficient Use of Incentives. Incentives have been shown to be effective to the construction industry. DOE has utilized incentives sparingly in the past. The establishment of an incentive policy by the managing field office for both Departmental personnel and contractors could provide benefits to the Government.

g. Insufficient Project Reviews. Both the frequency and the content of project reviews have been inadequate on some past projects. This problem can be minimized by assuring that project management personnel give the proper emphasis to the review process. Consideration should be given to establishing a control or interdisciplinary review group for certain projects.

PART B - CONSTRUCTION PROJECT PLANNING

1. PURPOSE. Part B defines the necessary budget process requirements for DOE construction projects. In addition, it prescribes the minimum planning elements and procedures that field element must accomplish to assure that policy and objectives with respect to construction projects are met. As in all areas of this Order, the Head of the Field Element is allowed considerable latitude in procedures. He/she is responsible for establishing internal procedures, where necessary, in order to implement the minimum requirements contained in this Part.

2. THE PROJECT PLANNING CYCLE, REQUIREMENTS, AND PROCEDURES.

   a. General.

      (1) The interconnected planning and budget cycles encompass an approximate 4-year period. During this time, project identification, project selections, project scope and construction requirements, reliable cost estimates, and advance project planning needed to assure timely project initiation are developed and accomplished. This time must be well utilized to assure that each of the required projects is clearly identified and adequately scoped and that sufficient conceptual design work is completed.

      (2) The planning chronology is contained in Attachment V-5. Program and Field Element should supplement this chronology with internal required actions and include the supplemental chronology in their organizational document and procedures that implement this Order.

   b. Requirements and Procedures.

      (1) Receipt of List of Candidate Projects at Headquarters.

         (a) Departmental Elements originating projects shall submit lists of candidate projects accompanied by short form data sheets to the appropriate program division and the Office of Program/Project Management, prior to February 15 each year for Current Fiscal Year (CFY) +3 candidate projects. For example, identification of candidate projects for the 1990 budget shall be accomplished by February 15, 1987. Heads of Headquarters Elements who will receive appropriate lists will be the following:

            1 Assistant Secretary for Conservation and Renewable Energy;

            2 Assistant Secretary for Fossil Energy;

            3 Assistant Secretary for Nuclear Energy;

4 Assistant Secretary for Environment, Safety, and Health;

5 Assistant Secretary for Defense Programs;

6 Director of Administration and Human Resource Management;

7 Director of Energy Research; and

8 Director of Program/Project Management.

(b) The information to be included on the short form data sheet is described in Attachment V-6. An example short form data sheet is provided as Attachment V-7. A currently updated construction project data sheet shall be utilized for continuing projects (i.e., projects previously partially authorized or submitted for consideration in a previous budget). Continuing project data sheets submitted at this time shall have the following information in the upper right corner of the first page:

"Short Form" Continuing Project
FY 19XX Budgeting Cycle
Submitted 2-1-XX

(2) Headquarters Review and Decision on List of Candidate Projects.

(a) Upon receipt of the candidate project lists, Headquarters program organizations shall review the projects and provide the Field Elements, not later than April 1 each year, notification of the tentative project to be considered for inclusion in the CFY+3 budget. This program organization review is conducted utilizing the short-form data sheets and the current 5-year energy program plan.

(b) Field Elements shall proceed with project planning on all projects submitted on the candidate lists after April 1 each year unless informed in writing to defer specific projects contained on the candidate list. It is imperative that program offices provide guidance to the field on projects that will not be included in the CFY+3 budget. Strict adherence to the above procedure will assure the maximum utilization of planning resources, both personnel and funds. Past experience indicates that lack of timely guidance has resulted in loss of planning effort. Program offices shall provide to the Office of Program/Project Management and Control a copy of their guidance furnished to the field.

(3) <u>Use of Tentative Project Data for Planning, Programming, and Budgeting Process by Headquarters Elements.</u>

(a) During April and May, program offices prepare program documents reflecting the initial approvals of candidate projects and perform other requirements of the planning, programming, and budgeting process.

(b) Actions taken are in accordance with the approved planning, programming, and budgeting system and the annual program review guidance. Information contained in short form data sheets is utilized for these actions.

(4) <u>Inclusion of Current Fiscal Year +3 Plant Engineering and Design Requirements into Current Fiscal Year +2 Budget.</u>

(a) In August of each year, program organizations revise the CFY+2 plant engineering and design line item request to include CFY+3 requirements as determined through the planning, programming, and budgeting process. Upon completion of this action, the program offices shall notify the affected field element to enable adjustments to be made to the affected project schedules.

(b) Data provided by the short form data sheets and supplemental data obtained from the field elements are utilized for this action. Decisions as to projects for which plant, engineering, and design funds will be requested evolve from the planning, programming, and budgeting system.

(5) <u>Headquarters Review of Current Program Status.</u>

(a) During November and December each year, the program organizations review the tentative construction program for CFY+2 in light of the approved CFY program and the CFY+1 program as submitted to and adjusted by the Office of Management and Budget. Upon completion of this review, and no later than January 1 each year, program organizations shall notify the field offices and the Office of Program/Project Management, in writing, of the CFY+2 budget projects for which planning should continue and actions to be taken on those projects that will be deferred to later budgets. Field elements shall adjust their planning activities accordingly.

(b) Information provided by the short form data sheets, the CFY+1 OMB budget, and the current appropriation act shall be utilized to complete this action. Program organizations shall assure that field elements are aware of all current plans to assure that the field can implement the plans if approved.

(6) Submission of Project Data Sheets.

(a) Prior to March 1 of each year, the field elements shall submit project data sheets to the appropriate program organization and the Office of Program/Project Management and Control. These submissions shall be accompanied by the conceptual design reports. Projects for which conceptual design was approved shall have conceptual designs completed and the report prepared at this time. Such projects for which the conceptual design report is not completed are subject to being dropped from consideration by the program organization. Failure to provide complete project data sheets and/or completed conceptual design reports on schedule will jeopardize programmatic support and the validation process. Support for any late submittal will be at the option of the outlay program in coordination with the Office of Program/Project Management and Control.

(b) Project data sheets shall contain all information required by current Chief Financial Officer instructions. Data that is not final and will be updated prior to August 1 each year shall be footnoted. Minimum contents of the conceptual design report are contained in Attachment V-10. Project data sheets shall contain the following information in the upper right corner of the first page:

FY 19XX Budget
Submitted 3-1-XX

(7) Headquarters Validation of Project Data Sheets and Planning, Programming, and Budgeting Actions.

(a) During the period from March through July, the Office of Program/Project Management and Control, in coordination with the program and field offices, shall validate the project data sheets planned for inclusion in the CFY+2 Internal Review Budget submittal. Headquarters Elements shall also complete all the actions required by the planning, programming, and budgeting system during this period.

(b) Validation shall be accomplished utilizing the project data sheets, conceptual design reports, and additional project details provided by the field elements during field meetings scheduled for validation presentation. Any changes made to the project data sheets by a Headquarters action shall be coordinated with the field by the program organization before the project is included in the budget submittal. Project data sheets and conceptual design reports shall be utilized in completing the required planning, programming and budgeting actions. Validation results shall be reported to the respective program organizations sufficiently in advance of internal review dates for use in budget determinations.

(8) Field Element Submission of Additional and Updated Data for Project Data Sheets.

(a) Field elements shall promptly provide mission and/or updated information for the tentative CFY+2 budget projects. A project for which mission or updated information, including conceptual design reports, has not been received at Headquarters prior to August 1 of each year will be subject to withdrawal from the proposed budget.

(b) Information to be submitted is identified as a result of the validation and other planning, programming, and budgeting actions. It is obtained as a result of conceptual design progress, additional studies, and other actions determined and managed by the field organizations.

(9) Submission of Budget to OMB.

(a) Headquarters takes necessary actions during August and September to incorporate the latest updated project data sheets for the approved CFY +2 projects into the budget document for forwarding to OMB.

(b) This action is completed in accordance with the planning, programming, and budgeting system, and yearly guidance.

(10) Allotment of Current Fiscal Year Plant Engineering and Desire Funds for Approved Current Fiscal Year +1 Projects.

(a) In October of each year, or as soon thereafter as possible, the plant engineering and design funds contained in the CFY appropriation for the approved CFY +1 projects shall be made available to the appropriate field organizations. Field elements shall accomplish the plant engineering and design in an efficient and timely manner.

(b) This action is completed by Headquarters in accordance with the procedures established for disbursement of funds to the field organizations, which accomplish their required actions in accordance with their locally established procedures.

(11) Administration and Legislative Actions. During the period from June through October, several actions take place with respect to the CFY +1 budget that do not require specific action on

the part of field elements. These actions are included in the chronology contained in Attachment V-5. The target dates may, in some cases, occur later than shown for other projects in order to increase the time available at the project level to produce better cost estimates. Where different target dates are to be used, new target dates shall be approved and published by the program office.

(12) Design and/or Construction on Current Fiscal Year Projects.

(a) From October to December, field elements take contractual actions to start the design and/or construction of the CFY projects for which funds have been appropriated and received.

(b) These actions are in conformance with Chapter V, Part C, Execution.

c. Variations for General Plant Projects.

(1) Project data sheets for General Plant Projects (GPP) contain only a tentative list of sub-projects to be accomplished with the line item funds since latitude is allowed in the actual use of these funds by Congress. However, field elements shall indicate their current priorities for this line item in each submission of the GPP project data sheets. While a considerable portion of these funds will be utilized for unanticipated projects, attention shall be directed to the planned use of GPP funds in regard to the institutional plans. Further information on site development and maintenance is contained in DOE 4320.1B and DOE 4330.4A, respectively.

(2) Conceptual designs for GPP are not required for inclusion into a budget. Field elements shall establish their requirements and procedures for management of the GPP program to include the project documentation and timing of these actions. It is the intent of Congress that GPP project funds be utilized during the fiscal year for which the funds were authorized and appropriated. Large amounts of funds uncosted for prior years in the GPP account can seriously affect the GPP funding for future years. Field procedures shall require that GPP funds are committed, obligated, and costed promptly.

(3) Field element procedures shall ensure that the GPP program for the CFY+l is established and plans for accomplishment have been completed prior to October 1 of each year. Minimal changes to the GPP program should occur after the beginning of the fiscal year for which the funds were authorized and appropriated.

(4) GPP funds are limited to projects $1.2 million and under in total project cost. Field elements, when the current estimate

for a GPP exceeds $1.2 million, shall submit a complete report to the Chief Financial Officer and appropriate program division. The report shall completely explain the reasons that the estimated cost now exceeds $1.2 million. The Chief Financial Officer shall comply with the congressional reporting requirement. The field element shall not allow the costs of the project to exceed $1.2 million unless approval is received from the Chief Financial Officer.

d. Variations for Multiprogram General Purpose Facilities.

(1) Because the Multiprogram General Purpose Facilities (MGPF) program is of extreme importance to the accomplishment of the DOE mission and the limitation on available funds, it must place different requirements upon the field organizations. While the project data sheets are utilized, other documents are utilized in the MGPF program which may require more detailed information than required by this Order for other projects.

(2) Specific instructions are provided each year on the information and documents required for candidate MGPF projects. These instructions are provided by the Office of Field Operations Management under the Director of Energy Research.

3. OTHER ESSENTIAL PLANNING REQUIREMENTS. This paragraph discusses planning requirements that are considered essential and are not contained in the chronology presented above. While these elements are essential, the timing of the performance and extent of their execution is dependent upon the management philosophy and desires of the executing organization. Therefore, Heads of Field Elements shall be responsible for incorporating the management elements discussed in this paragraph into their planning policies and procedures. Field Elements are solely responsible for the documentation and execution procedures of these elements, except as specified by this Order.

a. Preparation of Candidate Project Lists. Field elements shall establish policy and procedures that define how their candidate project lists will be determined.

b. Conceptual Design Plans. The importance of conceptual design cannot be overemphasized. Guidance on conceptual design, its contents and reports, is contained in Attachments V-8, V-9, and V-10. Because completion of conceptual design must be timely, field offices shall prepare conceptual design plans. Content and procedures are the responsibility of the Head of the Field Element.

c. Architect-Engineer Selection Plans. Past experience has shown that project schedules have been delayed due to lost time in completing the architect-engineer selections and awarding the contract. Planning for this effort will mitigate this problem.

d. Design Criteria Plans and Reviews. Delays in projects occur due to incomplete design criteria. Field elements shall prepare and implement plans and procedures to ensure that design criteria are properly utilized.

e. Management Plan Preparation and Change Procedures. Construction projects cannot be effectively managed without a management plan. Field elements shall have specific procedures for the preparation, change, and use of these plans. These procedures shall provide for timely initiation of plan preparation, completion, and implementation.

PART C - EXECUTION

1. PURPOSE.

a. The execution phase begins upon receipt of the detailed design and/or construction funds at the level responsible for project management and continues until the completion and closeout of the construction effort.

b. Since project management is the responsibility of the Head of the Field Element, considerable latitude in the establishment of procedures for the execution phase has been left to the discretion of the Head of the Field Element. Field managers shall establish and update, as required, written procedures which their offices will follow in fulfilling their construction project execution responsibilities. Copies shall be furnished to the Office of Program/Project Management and Control. Field office adherence to their established procedure shall be an area of concern during routine Headquarters review and assessment visits to the field organizations.

c. The specific activities and the sequence in which they occur vary depending upon the project characteristics and category. The field elements should consider establishing logic diagrams for each project category and including these logic diagrams in their project management directives.

2. DESIGN.

a. Design Objectives. Design objectives shall be:

(1) Achieving minimum construction costs consistent with programmatic, environmental, security, and safety requirements;

(2) Achieving technical adequacy;

(3) Achieving optimum economy in operation and maintenance; and

(4) Assuring that appropriate consideration is given to the expected period of use; quality construction practices; energy conservation, decontamination, decommissioning, and quality assurance requirements; and the appearance of completed facilities.

b. Design Methods. Considerable improvements in the method of design accomplishment are emerging with the use of computer-aided design. Field organizations shall utilize the advantages of computer-aided design when appropriate.

c. Tradeoff Studies. Tradeoff studies are an essential element of the design effort required to achieve the design objectives. Construction project managers shall assure that appropriate use of tradeoff studies is made during the design of facilities.

d. Importance of Criteria, Codes, and Standards. In the past, projects that have had the most problems during the construction phase have been those for which a project design criteria package did not exist, was incomplete, or was prepared after the design had started. Lack of an adequate criteria package prior to the start of design causes delays in the design and construction phases of the project. It is most important that the project design criteria provide a clear, concise, and professional description of the design requirements without the need to provide an extensive list of other documents as part of the criteria or numerous cross-references to other documents. Project-specific design criteria should, whenever possible, be included entirely within the package, thereby reducing references to other documents to a minimum. This requires that considerable effort be expended on the preparation of the criteria document. Expenditure of this effort during the planning phase, prior to the authorization and appropriation of the funds, can shorten the design and construction time for the project. Architect-Engineer evaluation boards should be assigned, as a task, to review the criteria package. This procedure provides three advantages:

(1) Better assurance that the criteria package is complete and that there is time to improve it, if necessary;

(2) Shortening the time required for the award of the architect-engineer (A-E) contract after receipt of funds; and

(3) Better matching of the required architect-engineering qualifications to the requirements of the project,

e. Preliminary Design (Title I).

(1) Scope. The preliminary stage of project design utilizes the conceptual design and/or design criteria that have been prepared for the project as a design basis. Sufficient design needs to be performed during Title I work to firmly fix (freeze) the project scope and features and further develop costs and schedules. Title I design generally includes:

(a) Conduct of preliminary (tradeoff) studies, including evaluation of alternative design approaches;

(b) Definition of the project design criteria and establishment of quality levels for systems and components in greater detail or revision to reflect data and information developed (during title I design), to be applied in the follow-on Title II design;

(c) Expansion of conceptual design drawings in greater detail and development of additional drawings, or development of new drawings based on new design concepts;

(d) Development of outline specifications for construction; and specifications for equipment procurement;

(e) Additional analyses of health, safety, environmental protection, and other program aspects;

(f) Development of preliminary estimates of construction labor, equipment, and material quantities and identification of long-lead procurement or other potential labor or material supply problems;

(g) Development of more accurate project cost estimates, time schedules for project performance, and methods of construction performance;

(h) Further evaluation and selection of energy conservation measures and energy sources of supply;

(i) "Preliminary Safety Analysis Report," if not in conceptual design report;

(j) Preparation of a Title I design summary; and

(k) Other work as required.

(2) Performance.

(a) In Title I, the design criteria are defined in greater detail and drawings for the approved project concept are expanded with more detailed information, together with additional required drawings. Also, further refined descriptive information and more detailed outline specifications are developed that will serve as the firm basis to proceed with definitive design (Title II).

(b) From the more detailed drawings and information developed, more accurate cost estimates and project schedules are developed. This may reveal the need at this stage of design for revisions in scope or project features to keep the project within authorized funds.

(c) The outline specifications should be sufficiently detailed to permit determinations of compliance with DOE 6430.1.

(d) The preliminary estimate of project costs should be sufficiently detailed by components, and in units and unit costs, to facilitate review and evaluation.

(e) An important concern during the preliminary design is to assure that proper considerations are being given to protection of the environment. Project managers shall assure that the project actions concerning the environment (i.e., environmental assessment and/or impact statement) are properly coordinated with the Title I design. Proper integration of the environmental concerns into the Title I design will prevent project delays and design and construction changes later in the project. The above also applies to safety considerations. A preliminary safety analysis report should be a product of the Title I design, if required, and not completed during conceptual design.

(f) Design coordination is needed between the field organization, the operating contractor, and the design contractor, and with Headquarters participation, where appropriate, to assure that the design contractor fully understands the project requirements, cost and schedule constraints, and the operational needs of the project, and to adequately direct and monitor the design contractor's efforts and performance. Periodic progress and manpower reporting by the design contractor is required for management purposes.

(3) Title I Design Summary.

(a) Definition and Purpose. The Title I report (summary) or updated conceptual design report, as appropriate, is an overview and record document of preliminary engineering and project management planning, reflecting completed Title I design and usually prepared under architect-engineer services or by the operating contractor. This document serves two purposes. The first and primary one is to provide the field office manager with summary design information for approval prior to authorizing start of definitive design (Title II). The second is to provide the Headquarters program office and other interested offices with the necessary project information to assist in program planning, improving policy, and criteria guidance for future projects. This summary will allow the field office manager to determine that:

1 The project, as scoped, is consistent with the project as authorized by the Congress or as previously authorized by the field organization.

2 Programmatic or other requirements are being adequately satisfied.

3 Applicable design criteria, incorporating simplicity and economy, are being followed in design.

4 Reasonably uniform standards of size, design, and materials of construction are being applied, and new construction will be compatible with existing structures and facilities where required.

5 Project cost estimates and schedules for performance are reasonable.

6 Safety and environmental impact assessments have been made, hazard and impact prevention measures are being applied, and compliance with environmental health and safety standards and guidelines will be achieved.

7 Applicable energy conservation and provisions for the handicapped regulations and guidelines are being followed.

(b) Projects Requiring Title I Design Summaries. Title I design summaries are required for:

1 Any construction project for which the total estimated cost exceeds $250,000 when financed from the construction projects portion of the budget.

2 Any project involving the design, procurement, fabrication, and installation of equipment of experimental facilities in connection with:

a Any equipment project of $1 million or more in estimated cost that is funded from the “capital equipment not related to construction” portion of the budget involving budget installation costs of $250,000 or more.

b Any experimental project or reactor test loop of $1 million or more in estimated cost.

3 Field office managers may, on some projects, elect to utilize a one-step design process without a separate distinction between Title I and Title II design. If this method is utilized, formal periodic review shall be made and properly documented to assure that the project objectives are being met. One of these formal reviews may be substituted for the Title I design summary, provided the project manager or field office manager approves the selected design review documents. The review selected as being the substitute for the Title I design summary shall be performed prior to the design reaching the 50 percent completion milestone. The guidance

provided herein pertaining to Title I design summaries should be considered in determining the format and content of the design review to be substituted for the Title I design summary.

(c) Contents of a Title I Design Summary.

1 For projects above $1.2 million in Total Project Cost (TPC), the Title I design summary should contain the applicable information listed in Attachment V-11, arranged as convenient to the field organization.

2 For all projects requiring summaries, the Title design summary may consist of the completed "Title I Design Report" or "preliminary proposal" submitted by the operating contractor, or any other document or documents utilized by the field organization to make the decision to proceed to Title II, provided it contains the applicable information listed in Attachment V-11, and a procedure is followed that requires the project manager of field office manager's approval.

3 Since the primary purpose of the Title I design summary is to provide a decision basis for the Head of the Field Organization, the contents of the summary must be determined by the individual. Attachment V-11 is provided only as a guideline to assist the field managers in selecting the contents of the summary. Field managers shall establish procedures that allow for determination of the summary contents for each project. It is suggested that the project management plan specify the form, source, and contents of the design summary.

(d) Dividing or Grouping Project for Title I Design Summaries. If desired, preparation and review of Title I design summaries for large or urgent projects may be handled in stages with the initial proposal covering the concept and general layout of the overall project and proposals on the components being submitted as soon as preliminary design is completed on each.

1 The scheduling of summaries for components of a major project may be arranged to fit the proposed construction schedule. The information furnished at each stage should include the data needed for authorizing the start of preparation of working drawings and specifications for the components and should show how the component fits into the overall project.

2 Related portions of several projects may be grouped into a single summary if this provides a logical distribution of the work and simplifies preparation and review of the summaries.

(e) Design Summary Procedures.

1 Field office managers should establish procedures for review and approval of all design summaries. Design summaries should be approved prior to authorization of detailed (Title II) design. A copy of the approved design summary shall be contained in the project files.

2 Copies of each design summary for major projects and major system acquisitions shall be submitted to each of the following Headquarters organizations immediately upon approval of the summary by the field organization.

a Appropriate program division;

b Director of Program/Project Management; and

c Deputy Assistant Secretary for Environment, Safety, and Health.

3 Headquarters submission of design summary for line item projects (over $1.2 million) other than major system acquisitions and major projects shall be on an as-requested basis by the Headquarters Elements. Design summaries for GPP shall not be submitted to Headquarters.

4 Design summaries provide the Headquarters offices with a source of information that will assist them in improving policy and criteria and should enable more enlightened program decisions. Summaries shall be submitted by cover letter providing information considered by the field office manager to be of importance to the Headquarters Elements in programming and policy actions. The letter serves as a "lessons learned" report during the project's execution and allows early application of the "lessons learned" to other projects and timely changes to be made to policy criteria and methods.

5 If modifications in a project involve significant changes in scope, TEC, schedules, or type of construction, a revised design summary shall be prepared and approved by the field office manager. Procedures for revised summaries shall be the same as for the basic summary.

f. Definitive Design (Title II).

(1) Scope. Title II definitive design (sometimes referred to as "final" or "detailed" design) is performed by an architect-engineer firm or, in limited circumstances, by the operating contractor who utilizes the approved Title I design and the revised project design criteria as the design base. Completion of the definitive design ends the design phase of a project and normally allows the beginning of the construction phase. Definitive design normally includes:

(a) Restudy and redesign work resulting from changes as may be required from the preliminary design;

(b) Development of final (working) drawings and specifications for procurement and construction;

(c) Estimate development of construction, labor, equipment, and material quantities;

(d) Development of detailed estimates of the cost of construction, procurement and construction schedules, methods of performance, and identification of work packages;

(e) Preparation of analyses of health, safety, environmental, and other project aspects;

(f) Identification of test plan and permit requirements, preparation of procurement plan, and determination of utility service requirements in coordination with the operating contractor and/or the supply utility companies; and

(g) Other work as required.

(2) Performance.

(a) The scheduling of definitive design shall be based upon a detailed analysis of a project and its component parts. Engineering work involved in defining equipment and materials having long-lead procurement time shall be scheduled for early completion, in order that procurement can be initiated prior to the construction contracting when timing would make inclusion of the procurement as part of the contract infeasible. When construction is to be performed under a number of fixed-price contracts or under a cost-plus-fixed-fee contract, construction drawings and related documents should be scheduled in the sequence required for construction operations.

(b) Of major assistance in scheduling the performance of definitive design is the early establishment of detailed schedules of the need for drawings and specifications to support construction and procurement. Such detailed schedules assist in determining engineering manpower requirements and assure that completion of individual documents meet procurement and construction schedules.

g. Periodic and Final Design Reviews. As a vital part of the overall management of the project, periodic design reviews need to be performed during the preliminary (Title I) and definitive (Title II) design to assure that project development and design are proceeding in an orderly manner; assure that the project will satisfy program and operating objectives; review performance, schedules, and costs; identify potential and real problem areas; and initiate action for timely solutions and corrective measures. Procedures for conducting, monitoring, and controlling these necessary design reviews must be developed by the Heads of the Field Elements. In addition to procedures for design review, Heads of the Field Element shall develop procedures for the distribution and approval of design documents.

h. Design and Construction Scheduling and Methods of Performance.

(1) Scheduling.

(a) Considerations Pertaining to Performance Time of Contractors and Effects on Cost. To the extent possible, schedules for engineering, procurement, and construction services shall be established concurrently to assure assignment of adequate time for performance and to properly coordinate the accomplishment of the services. Construction completion of project elements shall satisfy operating requirements, including time for tests and adjustments prior to operation. If required completion dates do not permit normal performance periods, the available time must be allocated to achieve maximum overall economy, based on a careful determination of the feasibility and cost of performance of each service in less than normal time (i.e., with premium time). Sometimes the total time available may not, by any reasonable allocation, allow completion of all design prior to starting construction. Under such conditions, the design shall be scheduled so that logically separable portions of the work, such as sitework, foundations, superstructure, mechanical, and equipment installation can be awarded as separate contracts, bearing in mind that for maximum effectiveness a contractor should have, subject to security limitations, full control of the area in which he is working. However, it may be necessary to perform both engineering and construction on a cost-plus-fixed-fee basis so that both can proceed concurrently. Where plans involve use of more than one fixed-price contract for construction, special care should be taken to assure that the plans and specifications clearly and completely define the scope of work to be accomplished under each contract. Sequential fixed-price contracts should be scheduled to permit orderly progress and timely completion.

(b) Considerations Pertaining to Performance Times Required to Accomplish Administrative Actions. Past experience indicates that schedule delays have occurred on many projects due to the insufficient allowance for the time required to accomplish the administrative functions on the project. In scheduling the work, proper consideration shall be given to the time required for such activities as the selection of the architect-engineer selection of a cost-plus-fixed-fee construction contractor, administrative approval requirements, and bidding and award of fixed-price construction or procurement contract(s). The field office manager shall determine the type and number of architect-engineer contracts to be used and the most appropriate type of contractual arrangements required. During the course of preliminary and definitive design, the field office manager reviews and firms up the preliminary determination as to the type and number of construction contracts to be used. Field office managers should ensure that realistic times are scheduled for selection of architect-engineer and construction managers, appropriate administrative approvals, and award of procurement and construction contracts. Appropriate procedures and controls shall be established and utilized for the accomplishment of these administrative functions that will ensure on-time completion of these actions.

(c) Use of Logic Diagrams. During the entire process of scheduling, the use of logic diagrams can be extremely helpful to the planner or scheduler to recognize the relationships between the various actions required on a particular project. It must be recognized that perhaps the largest benefit from the use of the performance evaluation review technique (PERT) or critical path method (CPM) can be gained during the early phases of project design. Design decisions and regulatory requirements during the design phase may create considerable changes to the project logic. In some cases, a design or other decisions may have such an effect on the project cost and schedule to require a modification or reversal of the decision. For this reason, the project manager must continually revise and utilize the logic diagram.

(2) Methods of Performance.

(a) General. In determining the manner and method of performance, consideration should be given to constantly evolving innovations which may result in improvements in the traditional methods of design and construction of buildings and facilities required for accomplishment of programs. New techniques and new ways of doing things may provide solutions to new challenges and problems which may arise. New practices should be adopted which will reduce design and construction time; use of other cost saving techniques should be maximized; and new methods of contracting should be considered which will produce economies in construction costs. Use of performance-type specifications may permit the application of new technology and produce improved designs to meet requirements. In adopting any new techniques or methods, care should be exercised to assure that the design criteria are satisfied, and that the results will be achieved without any decrease in desired quality and without any sacrifice in essential requirements. Methods of performance and scheduling must be considered together, comparing the advantages of a method with the effect it has on the schedule and cost. During the design phase of a project, this interaction between these two important actions must be continually considered. Construction contracting and erection methods can greatly affect the design method and sequence and should be determined early in the design phase. Field office managers must ensure that provisions for the above considerations are included in the project management plan.

(b) Cost Estimates. The importance of continual development of the project cost cannot be overemphasized particularly under the current market conditions of rapidly rising costs. Inclusion of “nice to have” features in the design, and failure to consider improved construction methods will contribute to excessive project cost growth. Consideration of cost during design evaluations can limit this growth, as well as facilitate the preparation of the formal cost estimates required during the life of a project. Further information and guidance on cost estimates is contained in Chapter II of this Order and DOE 5700.2C.

(c) Bidding and Award Activities. Projects may be delayed by the failure of bidding and award activities to be timely. The reasons for this delay can be a result of unrealistic allowance of time in the schedule for these activities or lack of attention to the accomplishment of these functions. Both of these reasons can be negated by the establishment of advance planning procedures within the field organizations for accomplishment of these tasks. The procedures established must contain controls or milestones to inform the project manager of delays so that immediate corrective action may be taken. Since these activities are of short duration in relation to the total schedule, many of the possible problem areas must be anticipated prior to the start of the actual bid and award functions. A useful technique is the utilization of a checklist by the project manager prior to the start of the bidding and award containing such items as availability of funds, bids containing proper information to allow preaward actions, availability of personnel for preaward audit, and possibility of bidding time being extended. In many cases, extension of the bidding and award activities are just accepted as fact without corrective actions attempted. Proper procedures and prior planning can allow the bidding and award activities to be accomplished in the least possible time.

(d) Change Control Procedures.

1 Change control procedures for both design and construction must be established early in the execution process. Delays in processing design changes can seriously affect the project progress. The planned or desired procedures should be included or referenced in the project management plan prior to the start of the execution phase. If consideration for contractor's method of change control is given and his method accepted, the modifications must be included in an update of the project management plan. The adopted procedures for changes should include rigid provisions for reporting the progress of changes timewise by the project manager's organization, in addition to the normal change control reporting provisions. Standard change controls procedures shall be established for projects not having specific project management plans. These procedures shall include authorities and responsibilities for changes during both design and construction.

2 Particular attention must be paid to the time when certain changes should be prohibited to allow completion of the work. Failure to establish design change procedures will almost guarantee delay of the project. During construction, the project manager should have the authority to prevent changes. During this period, changes should not be allowed unless they are operationally required, to meet safety requirements, and/or result in cost savings.

i. Traditional Engineering Services. These services which encompass Titles I and II as defined above, are normally performed by architect-engineer firms under DOE prime or subcontract arrangements. To obtain the highest qualified professional services available, Departmental Elements shall comply with the policy and procedure set forth by the Brooks Bill, (40 U.S.C. 471, et seq.); DOE implementing regulations; and OMB Circular A-76. Operating contractors may perform Titles I and II work when it is determined by the field office manager to be in the best interest of the Government and is not a violation of the policy and procedures set forth by the references cited above.

Projects for which the operating contractor might perform design services include those for which the design involves a high degree of interfacing with existing equipment, operations and/or facilities; work is closely tied to ongoing research and development; and/or special expertise and knowledge is required which is generally only available to the operating contractor.

3. CONSTRUCTION.

a. Fixed-Price Construction Contracts. As previously mentioned, allowance shall be made for the time required for bidding, bid evaluation, award, and subsequent mobilization by the contractor. The contractor must be assured adequate work space and free access to his work area within security limitations. In situations where several independent contractors will be performing work in the same area at the same time, detailed planning must be performed prior to the award of the contract to develop procedures to handle the unavoidable conflicts. These procedures should be included within the contract. The construction planning effort should attempt to minimize these situations. Government efforts should be devoted to ensuring that the contractor is free to manage his effort. Government functions should be done on time with no unnecessary disruption to the contractor's plan.

(1) Equipment Furnished by Others. When equipment or materials are to be installed by a fixed-price construction contractor but are procured by other participants, the field organization shall take necessary actions to assure that deliveries comply with schedule set forth in the construction contract, to minimize requests for time extensions and cost increases.

(2) Indoctrination of Contractor. After the contract has been awarded, the contractor should be advised as to:

(a) The extent of authority and responsibility of the contract administrator, the operating contractor and the architect-engineer, and any other project participant;

(b) The administrative procedures for review and approval of shop drawings;

(c) The administrative procedures for progress payments;

(d) The administrative procedures for changes to the contract;

(e) Contract provisions for special safety, environmental protection, security, quality assurance, and other requirements for performance;

(f) The conditions specified by the contract under which work shall be performed and accepted; and

(g) The reporting procedures required by the contract, and coordination and understanding of the contractor's cost and schedule control system by all appropriate project management personnel.

(3) Cost and Schedule Breakdown. After the award of the contract, the contractor shall be required to submit proposed schedules for the major features of the work and for the overall project, as well as a cost breakdown covering each element or subdivision of the schedule. The schedules and the breakdown estimates shall be reviewed by the project manager and/or the architect-engineer and approved by the contracting officer. Upon approval, the breakdown estimates and the weight factors incorporated in the schedules shall be used as a basis for progress payments. Fixed-price incentive fee contracts normally will be governed by cost and schedule control requirements.

b. Cost Reimbursement Construction Contracts (Fixed or Incentive Fee).

(1) Equipment Furnished by Others. As with the fixed-price contract, it is necessary to assure that equipment or materials furnished by others is supplied in accordance with delivery schedules. The cost reimbursement contract is more flexible in this respect; however, the flexibility has a cost associated with it. Rescheduling work, shifting personnel, and disrupting plans as a result of missed deliveries all cause an increase in the total project cost and possibly extend the project completion date. It must be recognized that the responsibility for assuring that availability of equipment and supplies not furnished by the contractor remains with the Government project personnel or the construction manager and not on the contractor.

(2) Advisory Services to the Architect-Engineer. Early selection of a cost-reimbursement contractor is desired because he can contribute practical and economical suggestions for inclusion in the plans and specifications, and can aid in establishing a coordinated design and construction schedule. If a construction manager is employed for the above purposes, then early selection of the cost-reimbursement construction contractor may not be necessary or appropriate.

(3) Separation of Work. If it is determined that cost-plus-fixed-fee construction contract should be utilized, buildings or elements should be separated whenever practicable from the main contract and handled on a fixed-price basis, either as prime contracts with DOE or a subcontract under the cost-reimbursement contractor. As many elements of the contract as practicable, such as subassemblies, reinforcing steel and ductwork, should be obtained on a fixed-price basis utilizing established industry sources. These elements should be fabricated off site whenever operationally and economically advantageous.

(4) <u>Experience Gained on Similar Project.</u> In cost-reimbursement contracts, Government experience or "lessons learned" on similar projects should be freely provided to the cost-reimbursement contractor. This is desired since any problems avoided by use of this experience by the contractor results in a direct benefit to the Government.

(5) <u>Indoctrination of Contractors.</u>

(a) Initial discussion, after the contract is awarded, with the construction contractor should cover the following topics:

<u>1</u> Indoctrination of the contractor's key personnel with policies, procedures and discussion of Government management interface with contractor's management plan;

<u>2</u> Clarification and understanding of the responsibilities and authorities of the various participants.

<u>3</u> The architect-engineer, DOE representatives or others who are authorized to issue field instructions and the limitations thereon;

<u>4</u> Procedures for progress payments;

<u>5</u> Procedures for changes to the contract;

<u>6</u> Procedures for review and approval of shop drawings, equipment, and material;

<u>7</u> Conditions specified by the contract under which the work shall be performed and accepted, to include environmental, health, safety, security, quality assurance, special safety, and other requirements for performance; and

<u>8</u> Administrative requirements including personnel, supply, fiscal and progress reports, and records.

(b) During these discussions, items such as organizational pattern, key personnel to be assigned initially, schedule of assignments for additional personnel, and recruitment program are resolved. The contractor shall be furnished with applicable Departmental regulations and procedures.

(c) Emphasis should be placed on the contractor's management plan. Specific requirements such as functional organization and personnel requirements, reporting and records procedures, subcontract procurement, construction plan, quality assurance plan, manpower scheduling, cost control, and estimates should be discussed. Discussion and resolution of problems early in the contract help assure that the contractor establishes a sound plan at an early date. A sound plan understood by both the Government and the contractor helps assure orderly and economical construction.

(d) Contractor personnel and industrial relations reporting must be discussed for those projects to which this reporting system is applicable. Generally, these reports are applicable only to projects being accomplished by onsite contractors. Project applicability and contracts requiring reports are defined in DOE 1332.2.

(6) Contractor's Procedures.

(a) The contractor should be required to develop subcontracts and purchase orders and related document forms as soon as possible after award of the contract. He/she may be requested to prepare other procedures covering the work to be accomplished within organization units, and indicate the distribution of documents such as construction drawings and specifications, subcontracts, requisitions, purchase orders, shop drawings, cost estimates, cost reports, progress reports, and results of safety inspections and meetings. The procedures may be especially tailored for the project or may be the contractor's standard procedures, provided that they meet the needs of the project manager.

(b) The contractor must assure that his/her accounting and reporting systems provide current cost data to management in accordance with the contract. The contractor's accounting system must be capable of providing the necessary costs to allow the field office to report completion costs and recording of capital investment for both facilities and installed equipment in accordance with applicable procedures.

(c) The contractor shall develop and furnish his/her plans and procedures on quality assurance as directed by the field element.

(d) The field organization, with assistance from Headquarters as required, shall review all of the procedures for adequacy and compliance with Departmental policies and procedures and, if satisfactory, approve the procedures. Revisions shall be made by the contractor as appropriate and shall also be reviewed and approved by the field element.

(7) Subcontract Planning and Scheduling. As design develops, the construction contractor or construction manager, depending upon the project team structure, analyzes the elements of the project to determine the most feasible method of construction. Based on design

schedule, necessary construction period, established completion dates, and nature of the work, the contractor usually recommends to the field element the type (fixed-price or cost), scope, and scheduled starting and completion dates of each proposed subcontract. The field element shall review these recommendations for compliance with the Federal and DOE procurement regulations, coordinate the subcontract requirements with design schedule, and approve the types and numbers of subcontracts to be utilized.

(a) Fixed-Price Construction Subcontracts are to be utilized to the maximum extent feasible. Such subcontracts may cover a complete building, group of buildings, or such work as excavating, steel erection, elevator installation, roofing, and so forth. In subcontracting to fixed-price contractors, consideration should be given to the factors covered in paragraph 3a, above.

(b) Cost-Reimbursement Construction Subcontractors should be utilized for specialty work when fixed-price subcontracts are not feasible. If cost-reimbursement subcontractors are to be used, their early selection is desirable to assist the prime contractor in planning, to initiate material takeoffs, and to initiate requisitions and purchase orders.

(8) Procurement Planning and Scheduling.

(a) The orderly delivery of equipment and materials at the site of the construction work, in a sequence that meshes with the installation schedule, is of major importance in meeting the required project completion dates at minimum cost. Receipt of equipment and materials subsequent to the time scheduled for installation tends to decrease the drive and effort of construction forces and thereby becomes a major contributing factor to decreases in labor productivity.

(b) The contractor determines equipment and material delivery schedules necessary to meet the required completion dates, taking into consideration times required for such activities as preparation of bid invitations and requisitions, bidding, shop drawing preparation, reviews and approval, fabrication, and transportation. The contractor provides the field elements with a schedule of milestones in his plan for completing the construction.

(c) If scheduled deliveries of items procured by other participants do not meet scheduled installation requirements, the contractor advises the field element as to the required delivery dates. The field element then takes action to expedite delivery to meet the installation requirements.

(d) To coordinate deliveries to the project, the administration of purchase orders placed by other participants for long lead-time items may be assigned to a contractor or subcontractor. This administration may include expediting, receiving, inspection and acceptance, and recommendations for partial and final payments.

(e) Prompt receipt and approval of shop drawings are essential to orderly fabrication of equipment and timely detailing of foundations and connections.

(f) For projects involving a considerable number of items procured by other participants, the procurement management function could most likely be best accomplished by a construction manager.

(g) For projects in which excess Government equipment and materials could be utilized, the project manager should require the contractor to establish procedures for reviewing "excess" tabulations and obtaining excess items.

(h) Priority and allocation authority shall be exercised in accordance with the defense materials and priorities system regulations. Assistance in exercising this system can be obtained from the Director of Procurement and Assistance Management. Special assistance should be requested from the Director of Procurement and Assistance Management when the defense materials and priorities system procedures have proven ineffective.

(9) Construction Equipment Requirements. Delivery and installation schedules for building equipment and materials assist in determining construction equipment requirements. The contractor establishes the construction equipment required by his own forces and by any cost-reimbursement subcontractor. If the field organization approves these requirements, equipment may be made available from excess stocks of the Department and other Government agencies, by rental from the contractor, or by rental or purchase by the contractor. The appropriateness of rental versus purchase requires detailed analysis of requirements. (See Federal Property Management Regulation, Chapter 101-25.5.)

(10) Construction Plant.

(a) The contractor recommends for field element approval locations for shops, warehouses, and other temporary construction facilities. These facilities should be located to minimize congestion within the construction area and to permit efficient flow of materials. The field element will consider the requirements of other participants and activities in the area when reviewing the recommendations.

(b) Project facilities such as roads, railroads, water supply, sewage collection and disposal, electrical, telecommunications, alarm systems, shops, and warehouses that can be utilized by the construction forces should be completed early to permit construction force utilization.

(11) Manpower Planning and Scheduling.

(a) As a guide to establishing and scheduling manpower requirements, the field element should assure that the contractor analyzes existing labor conditions, anticipated productivity, availability of housing, and other factors. Considering required completion dates, the contractor recommends the length of the basic workweek and the number of shifts. Every effort should be made to avoid extended workweeks. The field element shall approve the basic workweek and the number of shifts to be used on the project. This effort should be reflected in the contractor's manpower plan.

(b) The contractor develops overall manpower schedules by trades covering his own work and the work to be performed under the cost-reimbursement and fixed-price subcontracts. To the extent possible, manpower peaks of short duration should be leveled. The manpower schedules by trades will dictate the supervisory personnel required.

(c) The field element shall assure that the contractor establishes procedures for, and complies with, all mandated labor laws and regulations such as equal opportunity in employment and minority employee goals. All labor relation aspects shall be given consideration.

(12) Cost and Schedule Control.

(a) Since the contractor may utilize his own cost and schedule control system, which may have been established prior to award of the contract as meeting the DOE criteria, the field element should ensure that project personnel understand the contractor's system. On some large projects, assuring this understanding may require that the contractor provide some training to the Government, architect-engineer, construction manager, and operating contractor personnel as the case may be. Initial understanding of the system by all personnel involved can help minimize problems during the completion of the project.

(b) The contractor prepares his subcontract, procurement, construction, and manpower schedules, and when directed by the field element, consolidates these schedules with those of other participants to develop overall project schedules, including networks such as CPM and PERT. Work of the contractor's own forces is integrated with the work of subcontractors and offsite fabricators, and with the scheduled deliveries of equipment and materials.

(c) The contractor estimates direct labor costs, direct equipment and materials costs, and indirect costs, including administration,to determine the estimated total costs he will incur. This process is applied,to each physical unit (work package) of the project as established by the project management plan.

(d) The field element shall review the contractor's cost estimates for adequacy, and after approval, consolidate the estimated costs of the work of all participants to arrive at the overall project estimate. In establishing this estimate, the field element shall reconcile any difference between estimates prepared by the architect-engineer, construction, and operating contractors.

(e) Depending on the complexity of the project and the field elements management plan, the greater portion of the above work may be assigned to a construction manager.

c. <u>Inspection (Title III).</u>

(1) The organization or project manager may elect to have inspection services performed by the architect-engineer construction manager, or with in-house personnel. Inspection services shall not be performed by the construction contractor, and special conditions apply to the performance of inspection services by the architect-engineer.

(2) <u>Inspection Services.</u> Under Title III contract services, the contractor generally will:

(a) Furnish and maintain governing lines and benchmarks to provide horizontal and vertical controls to which construction may be referred;

(b) Verify all vendors' shop drawings to assure conformity with the approved design and working drawings and specifications;

(c) Inspect construction workmanship, materials, and equipment, and report on their conformity or nonconformity to the approved drawings and specifications;

(d) Make or procure such field or laboratory tests of construction workmanship, materials, and equipment as may be required.

(e) Prepare estimates of reasonable amounts of increase or decrease in contract price and/or contract completion time for contract modifications, evaluate proposals submitted by the construction contractor for such contract adjustments, and make recommendations for use in negotiating;

(f) Prepare reports and make recommendations on status of deliveries of materials and equivalent as may be required;

(g) Prepare monthly and other reports of the progress of construction, as may be required, and partial, interim, and final estimates and reports of quantities and values of construction work performed for payment or other purposes; and

(h) Furnish reproducible "as built" record drawings and marked-up specifications showing construction as actually accomplished.

(3) Performance of Inspection.

(a) Scheduling. Inspection schedules shall be based on the construction schedules and the quality assurance requirements of the project as set forth in the project quality assurance plan.

(b) General Procedures.

1 Inspection of construction work, including procurement and installation of associated equipment, shall be conducted in all cases prior to acceptance, and shall be consistent with the practices and procedures set forth in this section.

2 Inspection should be made at such times and places as may be necessary to provide the degree of assurance required to determine that the materials of services comply with contract and specification requirements, including quality level requirements.

3 The type and extent of inspection needed will depend on the nature, value, and functional importance of the project and its component parts. In determining whether inspection of manufactured articles should be made at the source (vendor's plants) or destination (construction site), the criteria contained in FAR 46.402 and 46.403 shall be followed.

4 Inspection requirements and testing required to be performed by the contractor or vendor shall be clearly established in the contract documents. Specific instructions shall be issued to define the scope of authority delegated to inspectors and the specific duties and responsibilities assigned to

them, and concerned contractors and vendors shall be furnished copies of such instructions to avoid disputes concerning inspection or acceptance of services or supplies.

(c) Types of Inspection. Because of the variety of types of contracts and subcontracts and the degree of responsibility assigned to the operating contractors, the architect-engineer, the construction contractors, and individual vendors, specific rules covering all phases of inspection cannot be prescribed. In general, inspection activities are divided into three types--functional, general, and detailed--as described below:

1 Functional Inspection is performed to determine overall compliance with contract drawings and specifications. It may vary from inspection of minor items to extensive testing of operating equipment (which must be provided for in the contract). It may also serve in making initial determination of the adequacy of the design effort. The field element and the operating contractor participate in functional inspections from the viewpoints of owner and user.

2 General Inspection is the fundamental and comprehensive inspection to ascertain that workmanship and kind and quality of materials conform to the contract specifications.

3 Detailed Inspection includes, but is not limited to, verification of details, such as checking location and size of reinforcing bars, maintaining records of concrete batching plant operations, verifying the use of proper welding rods, checking riveting and welding, and performing other inspection for quality assurance purposes. It starts with initial construction operations and extends through all construction stages.

(d) Assignment of Inspection Functions. Field offices shall:

1 Assure adequate and properly coordinated inspection of construction; and

2 Determine who will perform required inspection services. In addition to means at their immediate disposal, field offices may utilize the inspection services of other, Government agencies.

a Inspection by Contractors.

(1) Normally, the architect-engineer should have responsibility for inspection to assure conformance with the contract drawings and specifications.

(2) The operating contractor may have responsibility for inspection of any construction when advantageous to the Government.

(3) In unusual cases, the best interest of the Government may be served by having a single contractor perform design, construction, and inspection. In these cases, it is usually advantageous to the Government to obtain a construction manager as part of the project team and the construction manager perform the inspection services. If, in these cases, the "design-construct" contractor is to perform the inspection services, his organization and procedures for inspection must be carefully reviewed to assure that a department of the contractor, separate and distinct from the department furnishing construction services, performs the inspection services. The inspection performed under these conditions shall not constitute final inspection and acceptance by the Government.

b Departmental Inspection. General and detailed inspection by DOE personnel should be held to a minimum and should not duplicate competent inspection by contractors. Self-inspection of construction should be avoided whenever practicable. Inspection performed by DOE should, however, be sufficient to ascertain that the party or parties responsible for inspection are adequately qualified and are doing their jobs properly, and that proper coordination is attained. Participation in functional inspection by DOE personnel is of primary importance.

(e) General Practices. In carrying out the procedures set forth above, field organizations shall observe the following additional general practices:

1 At a minimum, inspection shall conform to accepted practices/methods used in private industry, and shall be supplemented, as necessary, commensurate with the quality assurance standards and objectives applicable to the particular construction project.

2 Inspection services shall not be procured from construction contractors with respect to their own work, since this would represent self-inspection.

3 A level of supervision partially equivalent to detailed inspection shall be furnished by cost-type contractors, as appropriate to reduce the requirements and costs of other detailed inspection services.

4 Sufficient inspection shall be provided for all work to assure minimum compliance with safety standards contained in DOE 5480.1A.

(f) Inspection Criteria and Recommended Practices.

1 Field inspection, in its general and detailed phases, frequently paces construction progress. It shall be scheduled so that inspection will not hinder the construction effort.

2 When one contractor is to inspect the work of another, written instructions should be furnished to the inspecting contractor defining responsibilities and stating that he is not authorized to modify the terms and conditions of the contract, nor to direct additional work, nor to waive any requirements of the contract, nor to settle any claim or dispute. Copies of these instructions should be furnished to the contractor whose work is to be inspected, with a request that he acknowledge receipt on a copy to be returned to the contracting officer. In this manner, both contractors are on express notice of the authority, and limitations on the authority, of the inspecting contractor.

3 For fixed-price construction contracts, inspection provisions are set forth in SF-23A, "General Provisions" of the contract. For both cost-reimbursement and fixed-price contracts, the extent of inspection is largely subject to determination by the project manager. He or she shall require thorough inspection with adequate documentation for all important phases and details of a construction job. Inspection is one of the prerequisites upon which final payment of the contractor is based.

4 Fundamentally, the construction contractor is responsible for the quality of his work. He must furnish detailed supervision of construction and be able to show that material, equipment, and workmanship conform to the contract. This requires coordination with design and inspection forces, the

scope and details of which shall be reviewed and approved by the field element. For complex quality level facilities, it may be necessary for construction contractors to provide their own inspection services to assure the quality of their work.

5 Continuous inspection and testing should be provided for all work for which the quality of workmanship cannot be determined by subsequent inspection or testing without detriment to the work as a whole. Classes of work in this category include pile driving, concrete work, testing of pipe and welding in enclosed or radiation-hazard areas, and verification of vital measured distances.

6 Frequently, special items must be inspected at the mill or fabrication shop to determine, in advance, that materials and workmanship are in accord with specifications. A requirement placed on the vendor for mill certification and certificates of vendor inspection, when properly identifiable with the special items, will often expedite matters. The contracting officer shall require that personnel assigned to offsite inspections be qualified both to interpret and obtain adherence to the specifications.

7 Field elements should assure that inspection procedures, instructions, and/or checklists, as a minimum, provide for the following:

a Statement of quality characteristics to be inspected;

b Organization or individual responsible for performing the inspection;

c Acceptance and rejection criteria;

d Method of inspection description;

e Evidence that inspection has been completed; and

f Records of the inspection.

8 An effective management practice for inspection is the use of a list of items that must be completed or corrected, normally referred to as a punch list. Punch lists are normally initiated shortly after the start of the physical construction and maintained throughout the work effort. The punch list may include major items that require completion before other work can proceed and both major and minor items on which

additional and/or corrective work must be performed prior to acceptance. The punch list is updated as inspections are performed and items added or deleted as appropriate. Normally, deletion of all items from the punch list results in the project being ready for final acceptance.

d. Acceptance of Completed Facilities. The following procedures for the acceptance of completed facilities, and the orderly transfer of these facilities from construction to operating responsibility, are intended to be a guide for the field element to use in the establishment of detailed procedures and responsibilities for accomplishment of these functions:

(1) Definitions.

(a) Acceptance Testing is the performance of all necessary testing to demonstrate that installed equipment will operate satisfactorily and safely in accordance with the plans and specifications. It includes required hydrostatic, pneumatic, electrical, ventilation, mechanical functioning, and run-in tests of portions of systems, and finally of completed systems.

(b) Inspection as used herein means the survey of a unit, facility, or area to determine status of acceptability. It includes a preliminary inspection to fix the number of work items remaining to be completed (list of exceptions or punch list), and a final inspection to accept the completed construction.

(c) Conditional or Provisional Acceptance is the acceptance of a unit or facility with a documented listing of the specific testing to be accomplished or work remaining, including furnishing of any outstanding submittals of technical and record data, to be completed by the construction contractor, and on or by what date the actions are scheduled to be complete.

(d) Final Acceptance is a written statement by the field element or its designee that the work performed by the construction contractor has been accepted as being in accordance with approved plans and specifications. The final acceptance also should be signed by the operating contractor, if applicable, indicating his acceptance of the facilities as constructed and the date the facilities are to be occupied or available for the use of the operating contractor.

(2) Assignment of Test and Acceptance Functions. Field elements shall assure that adequate test and acceptance procedures, defining the respective roles of the field organizations and its contractor participants to the fullest extent possible, are established and followed, and the requirements are included in the contractual arrangements.

(3) Roles of Contractors. The roles of the contractors normally are as follows:

(a) The architect-engineer, as part of Title II services, usually prepares the performance specifications for equipment and systems. Title III services include test scheduling and arrangements for preliminary and final inspection. The field office manager or designee should approve these procedures and schedules prior to distribution to all parties involved.

(b) The construction contractor usually participates in inspections and schedules and conducts acceptance tests. Allowing beneficial occupancy by the operating contractor after the acceptance test relieves the construction contractor from liability for damage caused by persons or operations not under his control. The construction contractor's conditional responsibility continues until all exceptions are cleared and final acceptance is signed by the field element or its designee. The contractor's responsibilities continue for any guarantees or warranties required by the terms of the contract.

(c) The operating contractor, rather than the architect-engineers may be assigned the responsibility for preparation of acceptance test procedures, schedule, and testing of process equipment. The field element should approve these procedures and schedules. Representatives of the operating contractor generally will participate in final inspections, observe tests, and sign acceptance papers when the facilities are to be occupied by, or for the use of, the operating contractor.

(d) Test and acceptance functions may also be assigned to a construction manager when one is utilized for the project. The functions are normally assigned to a construction manager when the "design-construct" approach is utilized.

(4) Procedures.

(a) Establishment of Procedures.

1 In preparing a procedure for the acceptance and transfer of constructions, field elements shall carefully evaluate the role of each organization. Each party involved in the acceptance procedures must have a clear understanding beforehand of the responsibilities and functions of the other participants.

2 Procedures will vary according to the complexity of facilities, and responsibilities will vary according to the methods of construction management. Buildings or facilities not involving operating equipment may require only preliminary

and final inspections, completion of punch list items, and signing of acceptance documents. Facilities involving operating equipment also will require acceptance testing. This may be complicated and extensive, requiring written detailed procedures, planning, and scheduling.

(b) Beneficial Occupancy.

1 Acceptance of a completed facility as a unit may be desirable. Construction forces are then completely removed, and interferences involved in having construction and operating labor in a common area are avoided.

2 It may be necessary, or more practicable, to turn over for beneficial occupancy, by operators, portions of a facility as they are substantially completed prior to final acceptance. A list of items remaining to be completed or corrected by the construction contractor shall be prepared to define fully the items that remain as the construction contractor's responsibility. The operating contractor can train personnel in these portions, proceed with dry runs, or, in some types of facilities, start operating in initially completed units.

3 Under beneficial occupancy, the field element may assign to the operating contractor prime responsibility for the facility and may limit access of construction forces to those engaged in cleanup of exceptions. Responsibility for maintenance of permanent facilities generally transfers to the operating contractor upon occupancy.

(c) Acceptance Testing of Equipment.

1 If procedures for acceptance testing of equipment are not covered by the specifications and detailed written procedures are required, they shall be prepared as early as practicable in the construction period so that portions of a system may be tested as construction progresses. The construction contractor usually will arrange the acceptance tests, and the field element will assure that tests are conducted promptly.

2 Acceptance tests may be made both on portions of systems and on completed systems. Such tests usually will be witnessed by the architect-engineer, the construction contractor, the operating contractor, and the construction manager, if applicable. The field element may, as appropriate, assign personnel to witness acceptance tests. All responsible witnesses shall sign the final test report.

(d) Final Inspection and Acceptance.

1 Upon substantial completion of construction and acceptance testing, a preliminary inspection usually should be made. This will establish the number of work items remaining to be completed and permit preparation of a list of exceptions. The A-E, construction manager, construction, and operating contractors should participate in the inspection. The field element may, as appropriate, assign Departmental personnel to participate in the inspection. A date should be set for the performance of the final inspection, allowing time for completion of exceptions.

2 Final inspection should be made by all parties who participated in the preliminary inspections. They shall indicate in writing that such inspection was made and note any further exceptions. Upon cleanup of such exceptions, the work is finally accepted through the signing of documents by the field element, construction manager, A-E, and construction and operating contractors, as appropriate.

(e) Testing, Inspection, and Acceptance Documents. Appropriate forms shall be developed and used for acceptance testing and final inspection. Forms shall be signed by all responsible individuals involved in tests and inspections. Documents for final inspection and acceptance may be combined in a single form.

4. MANAGEMENT TECHNIQUES FOR CONSTRUCTION ECONOMICS.

a. General. Construction by its very nature presents a very difficult problem in controlling costs and preventing waste and error. A principal problem is that the project can always be analyzed after completion and better ways theorized as to how it should have been done. Every well-run project, regardless of size, utilizes a program or method to control construction costs and reduce waste and error. Again, the methods and programs that will be effective vary with each individual project. Some of the major cost reduction and efficiency measurement methods used on past projects are summarized herein. Utilization of one or more of the techniques outlined will assist in reducing costs, preventing waste and error, and keeping management currently informed as to those features of the project which need corrective action.

b. Cost Reduction Methods for Cost-Plus-Fixed-Fee Construction Contracts.

(1) Force Account Construction Productivity Assessment. When major portions of the construction of a project are to be accomplished by

force account cost-plus-fixed-fee labor, provision should be made for monitoring and assessing labor productivity. A system should be employed which compiles data on actual productivity experience and enables comparison with estimated or budgeted unit labor costs for the activity. The forecasting of labor productivity on the balance of the work should flow from this system and the current working estimate should be maintained accordingly. Specifically, data should be provided on unit and total labor experience for such work elements as concrete forming, placement, reinforcing, piping, and electrical installation units. Summaries of productivity experiences versus budget estimates for civil/structural, piping, and electrical costs also should be available to enable overall assessment of trade performance. This productivity assessment system should accomplish the following:

(a) It should identify specific and general productivity problems in order to allow measurement of improvement.

(b) It should enable maintenance of a current project estimate reflecting force account labor experience.

(c) It should provide updated experience data weekly or biweekly.

(2) Foreman Training Program is designed to transmit policy and information through to the working level, train foremen to handle their assignments, increase overall job efficiency and safety, effect economies, and minimize labor difficulties.

(3) On-The-Job Worker Surveillance Program is the so-called “head count” which determines the number of employees gainfully occupied at a given time. It provides a valuable tool to relative productivity of workers and to locate areas where improvement is necessary. Its regular use is recommended for all cost-reimbursable, construction work. In comparing data for separate projects, allowance must be made for differences in jobs and job conditions, and in judgment of those making the counts.

(4) Other Methods. On moderate- and large-size jobs, periodic meetings should be held of supervisory and key staffs of the A-E, the construction contractor, DOE and, if desired, the operating contractor. At these meetings, the participants should discuss problems with which they are confronted. If solutions are not immediately available, efforts should be made to provide answers as soon as possible. Informal or round table meetings of craft and area superintendents also may be held. This permits the dissemination of new methods and information more rapidly than by formal programs. There also is a possibility that an accomplishment in one area that provided an outstanding competitive record for its originators can be passed on and utilized in all areas.

(5) Productivity Comparisons with Prior Work. The in-place value of work per person-month of labor for projects which have been completed can be used to check overall efficiency of the job. These figures are particularly useful for checking overall estimates in those limited instances where duplicate or similar projects are being constructed. Direct cost comparisons of cost-plus jobs are impractical unless similar facilities are being constructed, since numerous adjustments must be made for local situations before the relative efficiency of the work can be determined. Despite local variations, it is possible to compare features of projects on a unit basis and against estimates prepared by the A-E prior to start of work. Current cost data and records compared with the amount of work accomplished also will indicate areas where corrections or adjustments are needed for economical construction.

c. Cost Reduction Methods for Fixed-Price Construction Projects.

(1) Prevention of numerous change orders to the contract is the most important aspect of cost reduction on fixed-price contracts. This prevention is best accomplished during the design phase by having personnel with extensive construction experience review the plans and specifications in order to eliminate the possibility for changes once the contract is executed.

(2) Rapid action on problems that arise during construction will also reduce the total cost of the changes. Delay in providing the design modifications and providing instructions to the fixed-price contractor always increases the total project cost and, in most instances, the completion date. Project managers/field elements should assure that the proper procedures are established to rapidly satisfy Government responsibilities when changes or problems occur during construction.

(3) Value engineering incentive programs are being used widely in Federal construction to effect cost reductions in fixed-price construction jobs. The technique invites construction contractors to submit suggested changes in contract requirements which will result in reducing costs without sacrificing required quality or function, and to share in such savings. Such a program may not be very practical on complex and unique projects which are specifically tailored to meet special and unusual requirements. However, it may produce savings on more conventional construction projects to be accomplished under fixed-price contracts, and DOE field organizations should, whenever possible, use the technique.

d. Construction Performance Evaluation Based on Installation Rates. From the project schedule and work packages, the weekly bulk quantity installation rates for concrete piping and electrical work can be determined. Weekly installation experience can be observed and recorded. Continued analysis of installation performance will provide a check on the reasonableness of the schedule and a good method for assessing work progress and forecasts. This method can also assist in isolating areas in which problems are occurring and further analysis of that specific area can determine specific cause, whether it be productivity supervision or lack of supplies. The continued monitoring of installation rates will also assist in determining the effectiveness of corrective actions applied to the perceived problem.This method can be applied to cost reimbursement contracts and, to a limited extent, to fixed-price contracts.

5. <u>CONSTRUCTION COMPLETION REPORTS.</u>

a. <u>General.</u>

(1) Construction completion reports are required to ensure that the necessary information on the completed construction is entered into the Real Property Inventory System upon occupancy or acceptance of the new facilities.

(2) These reports are also helpful for purposes of project history, as references for future project planning and execution, use in training project personnel, and for recording benefits attained from innovative approaches to the project.

(3) The form, content and procedures for preparation of the report are the responsibility of the Head of the Field Element. Heads of Field Elements shall ensure that their use of this management tool is appropriate to ensure that the proper information is entered into the Real Property Inventory System.

b. <u>Preparation and Disposition of Reports.</u>

(1) The Head of the Field Element, in determining the form, content, procedures and timing of the construction completion report, shall comply with the Real Property Inventory System requirements that facility data be entered into this system upon occupancy or acceptance by DOE of the facility. Normally, this requirement will not allow combining the construction completion report with the cost completion report.

(2) The Real Property Inventory System timeliness of data entry requirement will require subproject completion reports for large projects where the construction is occupied or accepted in stages. The Heads of the Field Elements shall provide for this situation in their procedures regarding construction completion reports.

(3) Suggested contents of the construction completion report are contained in Attachment V-12. Use of these suggested contents would maximize the usefulness of the construction completion report.

UNITED STATES
DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE
P. O. BOX E
OAK RIDGE, TENNESSEE 37830

SYMBOL: CE-522:GAN

DIRECTIVE AUTHORIZATION

DIRECTIVE NO. CEM-31
MODIFICATION NO. 2
DATE 9/27/82
PLANT Gaseous Diffusion Plants
LOCATION Oak Ridge, TN; Paducah, KY; & Piketon, OH

1. TITLE
UTILITIES UPGRADING, GDP'S (PHASE I)

2. TO
Manager, CEMT, ORGDP
Director, Engineering Division, DOE
Director, Construction Division, DOE
Manager, PAO, DOE
General Plant Manager, GAT
Plant Manager, ORGDP; Plant Mgr., PGDP

3. WORK AUTHORIZED FOR USDOE BY
(Signature)
Name John T. Milloway, Assistant Manager
Title for Construction and Engineering

4a. Previous Directive Action
Mod. 1 Date 2/24/82

4b. Request for Directive Action
See 4e. Date

4c. Preliminary Proposal
Date

4d. Action Memorandum
EOD Endorsement Date 9/14/82

4e. Other References
Project In-Depth Review (June 1981); Engineering Change Request ECR UU105 (5/17/82)
Discussions with ORO Budget staff (August 17, 1982)
Engineering Change Request ECR 15646-1 (July 16, 1982)
Engineering Change Request ECR UU103 (March 31, 1982)

5. PRELIMINARY PROPOSAL APPROVED
☐ As Submitted ☐ With Exception as Noted on Reverse ☐ For Design Only
Date

6a. Current Start Date
Design: November 14, 1980
Constr: March 1, 1981

6b. Current Completion Date
Design: January 15, 1983
Constr: September 30, 1984

6c. Difference in Months
+4 1/2
NC

7. AUTHORIZED COST BY PARTICIPANTS

A. Participant	ORGDP	Paducah	Portsmouth		
B. Type of Contract	(See attachment for authorized costs by participant).				
C. Contract No.					
D. Con. Administrator					
E. Authorized Costs					Total
(1) Engineering	$ 1,333,159	$ 1,025,000	$ 825,000	$	$ 3,183,159
(2) Constr. Cost	424,453	1,350,000	3,300,000		5,074,453
(3) Std. Equip.	-	-	-		-
(4) Contingencies	125,000	400,000	575,000		1,100,000
(5) Total	$ 1,882,612	$ 2,775,000	$4,700,000	$	$ 9,357,612
RESERVE	13,642,388	-	-		13,642,388
TOTAL AUTH. THRU 9/30/82	$15,525,000	$2,775,000	$4,700,000		$23,000,000

8. SUMMARY OF FUNDING REQUIREMENTS

	Classification	Item Number	Item Name		Amount
A.	LI (N89)	39CD100181R503	Utilities Upgrading, GDP's (Phase I)	ORGDP	$ 15,525,000
B.	LI (N90)			PAD	2,775,000
C.	LI (N91)			GAT	4,700,000

D. Change This Action (If Applicable) $ N/A
E. Total Authorized $ 23,000,000
F. Remarks

Form OR-637 (8-72) (over) Page 1

EXAMPLE OF A PROJECT AUTHORIZATION

DIRECTIVE CEM-31 MODIFICATION 1 DATE 9/27/82

9. This Space to Be Used as Required for Description of Facility, Statement of Authorized Work, Participant Scope, Remarks, Special Notes, Etc.

Directive CEM-31 is modified to reallocate costs by participants and to revise scope and method of accomplishment per approved engineering change requests.

General Description of Overall Project Scope Where Changed

At Oak Ridge, the construction of the sanitary water tank has been deferred. Also, due to the deteriorated condition of the K-892-H cooling tower, approval has been requested from Headquarters DOE to add the cooling tower replacement to this project using the funds freed by deferral of the sanitary water tank and the anticipated project underrun.

At Paducah, the fixed filtration system proposed for C-637-2A&2B as a result of the budgetary reduction of last fall has been replaced by a header flushing system using a portable filtration device. The cost savings for this system will permit filtering of RCW water on C-631, C-635, and C-637 cooling towers.

There are no changes to the work to be accomplished at Portsmouth.

Method of Accomplishment Where Changed

Procurement

At Oak Ridge, the operating contractor shall procure the two 1250 Hp, 5000 SCFM air compressors and deliver them to the FPPC for installation. This will enable ORO to obtain the benefits and comply with DOE regulations governing life cycle costing of energy consuming equipment.

Schedule

Revision of the schedule reflects authorized AE design schedule resulting from the approvals of the engineering change requests.

All other provisions of the directive are unchanged.

SPECIAL NOTE

No field work authorized.

CONSTRUCTION MANAGEMENT

1. GENERAL.

a. The term construction management has been used in many different contexts, from something that covers all facets of the construction industry to something as limited as critical path method scheduling.

b. The construction manager is an additional participant in the project delivery team. The construction manager usually will be from private industry but may be selected from another Federal or local Government agency. The addition of this participant results in some modification of the responsibilities and authorities of the normal participants involved in the conventional delivery system of design-bid-build and design construct (or turn-key).

c. The construction management process is utilized on projects where the expertise of the construction manager can significantly benefit the Government in the performance of the variety of functions or services it is responsible for under the conventional delivery systems. The construction manager, through his or her expertise, assists and advises the Government to obtain the desired facilities at the lowest possible cost and delivery in the shortest possible time. The construction management process greatly enhances the opportunity to benefit from the advantages of phased construction. Normally, the construction management process operates most effectively when the construction management firm is employed at the start of the planning and predesign phase, and continues through to project completion. In this capacity, the construction manager can assist the Department in functions such as project planning and budget administration. Likewise, the construction manager could assist the A-E in such activities as providing information on materials selection, labor impact, construction techniques. With respect to quality, the construction manager is interested in maintaining the quality desired rather than assuring the quality is a part of the design, which is the responsibility of the designer.

2. ADVANTAGES.

a. The use of the construction management concept can result and has resulted in several advantages to the project owner, both in the civilian sector and the Government. Some of the advantages that can be gained from the proper use of the construction management approach are as follows:

(1) An additional professional input which, if provided during the planning and design stages, permits establishment of more accurate and reliable time, cost, and quality schedules and controls.

(2) Reliable information on market,and labor conditions and their effects on costs and schedules.

(3) The efficient use of phased construction (fast-track) procedures and thus, the reduction of project time and cost.

(4) Increased flexibility throughout the entire project, both in design and construction; adjustments to budgets and contracts may be made more readily as they arise.

(5) Competitive bidding for subcontracts; construction management improves competitive bidding under public laws, and reduces the possibility of bid shopping, auctioning, and similar unfair practices with respect to subcontractors.

(6) Provision to DOE of professional expertise in the particular construction services required for a specific project.

(7) Incorporation of the latest technology and current market conditions into the descisionmaking process.

(8) A reduction in the layering of bonding required. The financial structure is compartmentalized, and the effects of financial failure are minimized.

b. It is recognized that all the advantages above cannot be realized for all projects. As with most new concepts, use of construction managers has, in some cases, failed to realize any of the anticipated advantages. The results, as always, depend upon the management skill utilized in applying the concept. Tailoring the construction management contract to the particular project is extremely important.

3. <u>DETERMINING WHETHER A CONSTRUCTION MANAGER SHOULD BE USED.</u> Several factors should be evaluated when considering a project for use of the construction manager concept. These factors should be evaluated with respect to the benefits and costs expected to occur if the construction management method is utilized instead of a conventional delivery system approach.

a. Complexity of a project;

b. Size of project;

c. Required delivery schedule;

d. Procurement strategy;

e. Availability of qualified Government personnel to perform necessary functions;

f. In cost share contracts; capabilities of partners; and

g. Unique project characteristics,

4. CONSTRUCTION MANAGEMENT FUNCTIONS.

a. General.

(1) Construction management services are performed by firms with the knowledge and expertise required to provide the services listed in this section. Based on the unique requirements of each construction project, the Department project manager, as an integral part of the planning process, must determine which functions would be best performed by a construction management firm to accomplish the project in the most economic, efficient, and effective manner. Each project requires a separate combination of management functions and techniques to obtain the desired result of a complete and usable facility utilizing minimum time and money.

(2) Considerable care shall be exercised in selection and description, in the contract, of the services to be performed. Whenever possible, emphasis should be placed upon the construction manager as an expediter and advisor to all of the construction team members. The assignment of the construction manager as the director of any portion of the design and/or construction shall be avoided to prevent the introduction of unnecessary conflict into the construction team concept. The construction management service to be provided should be determined by the Government expertise available, project requirements, project specifics, and procurement strategy.

b. Planning and Design Services. Should construction management services be required during the predesign phase, the construction manager would be required to perform some of the following functions:

(1) Participate with the Department in the revision of preparation of project scope and design criteria with respect to construction process functions;

(2) Review scope and design criteria for effective compatibility with construction methods, materials, and techniques;

(3) Develop, in coordination with the Department, a comprehensive project management plan, including an overall project schedule to assure timely completion;

(4) Prepare preliminary construction cost estimates, and develop preliminary schedule for accomplishment of the project;

(5) Participate with the Department in completing other project elements such as environmental assessments and acquisition, quality control, and safety plans;

(6) Assist in the determination of applicable local, State, and Federal laws which the project must meet and develop procedures to ensure that the project complies with these laws;

(7) Perform market survey of available labor and materials;

(8) Monitor schedules for all project activities by the participating organizations; and

(9) Participate with the Department in contracting for field services such as collection of environmental data.

c. Design Phase. Should construction management services be required during this phase, the construction manager may be required to perform the following functions:

(1) Establish the project controls to be utilized, so that it will provide the agency with the data it requires and assure that prospective contractors understand the controls by including appropriate information in the bid packages;

(2) Participate in value engineering conferences and participate with the A-E in developing a design that will permit the use of the most economical and efficient construction techniques and methods;

(3) Provide the A-E with current market information on the availability of construction materials and labor conditions, with recommendations as to how design alternatives can reduce overall costs;

(4) Provide the construction cost estimate, and develop lead time requirements for acquisition, contracting, and the project accomplishment within the desired time frame;

(5) Utilize the advantages of phased construction to the extent possible and determine the contents of the separate bid packages for contract bid and award purposes, base the contract groupings on the work sequence, labor and material availability, trade union agreements, and other pertinent factors;

(6) Provide periodic updating of the estimated construction schedules and the development of a project budget as the design details evolve; and assist the Departmental project manager in solving problems related to costs and schedules;

(7) Review plans and specifications with the A-E to provide responsive specification terminology, to avoid overlapping trade jurisdictions, and to prevent overlapping or voids in the separate bid package specifications;

(8) Participate with the Department in conducting public hearings;

(9) Publish notices of work, prepare bidders lists, assemble and issue the invitation for bid or the request for proposal packages, answer inquiries, arrange prebid or prenegotiation conferences, issue addendums, and schedule bid openings or negotiation meetings;

(10) Conduct bid openings, evaluate bids, and recommend appropriate action to the Department, or award contracts;

(11) For projects utilizing the guaranteed maximum price, prepare the guaranteed maximum price, agree with Government on guaranteed maximum price, and perform functions required by the guaranteed maximum price concept, such as award of construction contracts;

(12) Implement the acquisition plan for the purchase of long leadtime items; and expedite these purchases to assure on-time delivery of supplies;

(13) Participate with the Department in contracting for field services such as collection of environmental data;

(14) Assist the project participants in securing necessary permits, licenses, and approvals, to satisfy the requirements of local, State, and Federal laws; and

(15) Accomplish or arrange for accomplishing any special studies required for the project such as transportation; social, economic, or archeological.

d. Construction and Postconstruction Phases. Should construction management services be required during this phase, the construction manager may be required to perform the following functions:

(1) Perform all management and administrative aspects of the project as required by the Department;

(2) Implement the project management plan by establishing and maintaining coordination procedures among all project participants;

(3) Furnish the various general condition items such as security, temporary field construction facilities, debris removal, general safety requirements, and any other similar project requirements not provided for in the bid packages, normally by contract;

(4) Provide onsite personnel to facilitate and coordinate the activities of the various contractors to assure that the workmanship and materials being used are in compliance with plans and specifications, and that interference among the trades is minimized;

(5) Perform functions necessary to obtain, verify, record, and consolidate required data, and prepare progress status reports required by the Department;

(6) Secure information from the contractors regarding necessary field and lab tests, and review results for compliance with specifications;

(7) Assist in the review and coordinate the submittal of samples and shop drawings;

(8) Adjust the project schedule for changed conditions and unexpected interferences;

(9) Maintain financial and cost accounting records and perform financial analysis;

(10) Recomnend, for approval by the Department, a procedure for processing requests for changes, and maintain records for change and notice to proceed orders in accordance with the terms and conditions of the contract;

(11) For projects utilizing the guaranteed maximum price, perform the functions required by the guaranteed maximum price concept, such as approval of change order and contract payments;

(12) Process contractor claims in accordance with the terms and conditions of the contract;

(13) Review and process vouchers and invoices from contractors and vendors in accordance with the contract requirements;

(14) Provide early identification of problems and take necessary actions to resolve them to minimize additional cost and schedule slippage;

(15) Maintain a record of changes made during the construction and prepare, or have prepared, as-built drawings that reflect the constructed work;

(16) Prepare and assist the agency in accomplishing project completion and acceptance procedures and tests; and

(17) Complete the postconstruction functions, including assembling operating manuals and warranties, maintenance manual preparation, warranty problem resolutions, startup assistance, training development and implementation, and preliminary operations assistance.

5. CONSTRUCTION MANAGER CONTRACT PROCUREMENT METHODS. Construction manager contracts are procured either by formal advertising or by negotiation. Contracts procured by formal advertising generally should utilize the two-step formal advertising method since the procurement is for professional services where technical and management approach is of considerable importance, and it is not normally desirable to specify the technical and management approach to be utilized.

6. TYPES OF CONTRACTS.

a. A construction manager contract may be of any type or combination of types listed below, which will promote the best interests of the Government subject to the restrictions placed upon the types of contracts by procurement regulations. The contract, if desired, may be structured to provide additional incentives.

(1) Fixed price contract.

(2) Cost-plus-fixed-fee contract.

(3) Cost-plus-award-fee contract.

(4) Cost-plus-incentive-fee contract.

b. Since the construction manager is procured to protect the best interests of the Government, the fixed-price contract is the preferred type of contract for construction manager contracts. However, the unique requirements of each construction project often require that other contract types be used.

7. THE CONSTRUCTION MANAGER CONTRACT WITH GUARANTEED MAXIMUM PRICE.

a. Guaranteed maximum price construction manager contracts require the contractor to stipulate, at a specified time during the design phase, a guaranteed maximum price. This guaranteed maximum price is the maximum amount the Government will be required to pay for completion of the work included in the guaranteed maximum price as prescribed by the contract. If the actual cost of the work exceeds the agreed-upon guaranteed maximum price, the construction manager is required to complete the work at no additional cost to the Government. The guaranteed maximum price is the sum of the following:

(1) The agreed-upon cost of all work to be performed by contractors awarded contracts by the-construction manager;

(2) The estimate of all reimbursable costs to be incurred by the construction manager;

(3) The fixed-fee for construction management services of the construction management contract; and

(4) The agreed-upon contingency to cover the cost of known and unknown items not included in the agreed-upon cost in subparagraph 7a(1), above.

b. The construction manager contract with guaranteed maximum price is utilized when it is beneficial to the Government to have the assurance that the project costs will be established prior to the beginning of construction. The guaranteed maximum price requires the contractor to offer a guaranteed maximum price for delivery of the entire project. If the guaranteed maximum price is agreed upon by the Government, the offered guaranteed maximum price is made a part of the contract. Using this type of contract, the construction manager assumes the financial risk of completing the project within the guaranteed maximum price. As with other construction manager contracts, it is not normally intended that the construction manager will do any of the actual construction work. The construction manager will solicit competitive bids and award subcontracts to construction contractors. If force account labor must be included in construction manager contract, it must be set forth in detail and shall require approval, in advance, by the contracting officer.

c. The construction management contract with guaranteed maximum price is procured in the same manner as other construction manager contracts. The construction manager guaranteed maximum price contract shall be so executed to provide conversion to a construction manager contract without guaranteed maximum price, should the guaranteed maximum price not be agreed upon, or provide the termination without costs. The guaranteed maximum price is formulated as the summation of the agreed-upon cost of the items of work unnecessary to the delivery of the project. These work items shall be set forth as separate line items in the guaranteed maximum price provision. Inclusion of specific construction management services are required in the guaranteed maximum price contract to allow the construction manager to comply with the guaranteed maximum price provisions. Some of these service functions, but not necessarily all, include action to:

(1) Award construction and service contracts;

(2) Process and approve change orders;

(3) Approve and issue notice to proceed;

(4) Approve and issue progress payments; or

(5) Formulate, coordinate, update, and change project schedule.

d. A guaranteed maximum price one-part contract requires the construction manager and the Government to execute a contract with agreed-upon cost for services provided by the construction manager throughout the project. The contract includes a guaranteed maximum price clause, as an option, providing for an agreement to a guaranteed maximum price. If a guaranteed maximum price is agreed to, all of the remaining services to be performed will be governed by the guaranteed maximum price clause.

e. The guaranteed maximum price two-part (A&B) contract requires the construction manager and the Government to execute a contract with agreed-upon cost for services provided by the construction manager during the predesign and/or design phase (part A) and construction phase (optional). Upon stipulation of the guaranteed maximum price by the construction manager, and agreed upon by the Government; part B of the contract is executed, whereby the provisions of a guaranteed maximum price clause are in effect. If a guaranteed maximum price is not agreed upon, part B is not executed and the construction manager performs the services during the construction phase at the cost agreed to under Part A (if provided for) or is terminated. In the latter case, the contract should provide for termination without cost.

f. The final cost to the Government for work under an executed guaranteed maximum price provision will be either the sum of the actual costs of subparagraphs 7a(1), (2), and (4) above plus the fixed-fee of 7a(3), or the guaranteed maximum price, whichever is less. Reimbursable costs should be kept to a minimum.

g. Adjustments should be made to the guaranteed maximum price utilizing the following guidelines:

(1) A change in the construction management fee may be negotiated when the Governments action changes the scope of services utilized to determine the construction manager fee.

(2) A change to the guaranteed maximum price may be negotiated when the Government's action increases the cost of any of the following elements:

(a) The agreed-upon cost of all work to be performed by contractors awarded contracts by the construction manager;

(b) The estimates of all reimbursable costs to be incurred by the construction manager;

(c) The agreed-upon contingency to cover the cost of known and unknown items not included in the agreed upon costs in subparagraph 7a(2)(a), above.

(3) The construction manager fee will not decrease when actions of the construction manager result in a reduction in the cost and/or time of performance of the project.

h. If, as a result of the award of a construction contract, any excess funds are generated because the award price is less than the guaranteed maximum price line item, these funds shall be placed in a separate line item identified as the reserve fund. This fund may be used by the construction manager to cover bids exceeding the line item amount set forth in the guaranteed maximum price for any of the line items, but shall not be used to cover change orders or claims arising after award of contracts. Any funds remaining in the reserve fund after all line items have been bid shall be released by the construction manager to the contracting officer.

8. <u>CONSTRUCTION MANAGEMENT FEES.</u> Normally, a construction management contract would be broken into two sections, one for the design services and one for the construction services. Fees should be likewise broken down. Normally, fees are stated in fixed, lump sum-amounts and are modified only when a change in project scope or time is directed by the Government. If the construction manager is solely responsible for the establishment of the schedule, then time extensions due to schedule slipping are the responsibility of the construction manager, and the fee is not subject to change as a result. Fees are not affected by changes in cost unless the cost changes are due to change in project scope. Fees shall include compensation to officers, salaries of home office personnel (including accounting, purchasing, estimating and cost control, related taxes, all insurance and pensions), profit, overhead, cost of home office facilities expenses, job-site personnel costs, professional fees for consultation, legal, labor relations, accounting, and bookkeeping expenses. Reimbursable costs must be itemized in definitive terms in the construction management contract, preferably set forth as a separate item in the contract. In order to keep administration of the construction management contract to a minimum, reimbursables should be limited to travel and per diem of construction management personnel, and general condition services provided by the construction manager.

DESIGN CRITERIA PACKAGE CHECKLIST

This checklist is intended as a guide to ensure the development of a complete criteria package. Field Elements may add to this checklist as necessary to meet their particular requirements. The checklist items are considered necessary to be included within the criteria package to ensure that adequate information is provided for the designer of the facility. The criteria package should:

1. Describe the functions or operations to be performed in the facility or project.

2. Provide a general description of the planned or proposed facility as conceived in the conceptual design, including:

   a. Proposed occupancy, type of buildings, parameters, work spaces, and special needs;

   b. Site location;

   c. Site preparations, conditions, removals, temporary roads, fencing, work areas, disposal, areas, borrow area, grading, drainage, and excavations;

   d. Site improvements, parking, roads, walks, fencing, and lighting;

   e. Utilities, existing and proposed; and

   f. Special security, environmental, safety, and health needs.

3. Refer to and include copies of applicable publications or information, such as:

   a. Departmental directives, studies, and references; and

   b. Operating contractor manuals, standards, and references.

4. Refer to applicable codes, standards, or guides.

5. Provide a general description of building requirements, including:

   a. General proposed layout and configuration;

   b. General operational or functional needs and special functional or system needs;

   c. Building fenestration and orientation;

   d. Dead and live loads, special loads, and wind loads;

e. General building structure or frame;

f. Foundation and soil conditions;

g. Walls, exterior and interior, and finishes, including insulation, moisture protection, doors, windows, and vestibules;

h. Roofing, moisture proofing, insulation, walkways, hatches, ceilings, and finishes;

i. Floors and finishes;

j. Energy usage targets and/or limits; and

k. Fixed fire protection features such as fire rated walls, doors, windows, and interior flame spread ratings.

6. Provide general description of the building mechanical systems requirements, including:

a. General heating, ventilation and air conditioning needs and requirements, heat recycling and/or recovery, monitoring, and control.

b. General heating, ventilation and air conditioning parameters, including:

(1) Occupancy loads and operations uses;

(2) U values for the building envelope;

(3) Design temperatures and humidity control;

(4) Controls systems; and

(5) Instrumentation.

c. Codes, standards, and guides.

d. Energy conservation parameters.

e. Special conditions or parameters, including:

(1) Special systems or equipment loads; and

(2) Special ventilating and filtering information.

f. Piping and plumbing needs, including:

(1) Codes and standards;

(2) Process water or cooling water-needs; and

(3) Cooling water chemistry control needs.

g. Fire protection.

h. Systems performance and operating tests.

7. Provide general description of building electrical systems requirements, including:

a. Lighting needs.

b. Power needs.

c. Electrical systems parameters including:

(1) Occupancy and operations use;

(2) Illumination guides and proposed methods; and

(3) Control measures.

d. Codes, standards, and guides.

e. Energy conservation measures.

f. Special conditions or parameters, including:

(1) Equipment loads and information; and

(2) Special system information.

g. Emergency or backup power, including:

(1) Onsite power from diesel generators; and

(2) Backup power from independent power transmission lines.

h. Lightning protection and grounding.

i. Controls and instrumentation.

j. Fire detection and alarm systems.

8. Provide general description of alarm, detection monitoring, and control systems, including:

a. General definition of systems:

(1) Safety;

(2) Security;

(3) Controls; and

(4) Fire Protection.

b. One-line diagrams and information.

c. Codes, standards, and guides.

d. Systems checkout and test requirements.

9. Provide general description of special facilities, equipment, or systems, including:

a. General definition of facilities, equipment, or systems;

b. Participants and roles for design, procurement, and installations;

c. Layout configuration and identification;

d. Piping and instrumentation diagrams; and

e. Equipment service needs, loads and information, including:

(1) Electrical and mechanical; and

(2) Ventilation and filtration.

10. Provide general description of standard equipment, including:

a. Definition of standard equipment;

b. Participants and roles for procurement and installation;

c. Layout and identification; and

d. Service needs and loads.

11. Provide general description of quality assurance measures, including:

a. General quality assurance levels, including:

(1) Project;

(2) Architectural and civil;

(3) Mechanical;

(4) Electrical; and

(5) Special facilities and standard equipment.

b. Quality assurance manual and/or guides (examples or copies).

12. Provide general information relating to:

a. Required procurement clauses;

b. Type of specifications;

c. Contents of bid packages;

d. Available computer programs; and

e. Available reports and calculations related to the project.

13. Provide a listing of suggested drawings and titles.

14. Provide required drawings size, type, and number of copies.

15. Provide estimated cost of construction and breakdown by cost elements.

CONTROL AID DESCRIPTIONS

1. GANTT CHARTS (BAR CHART). The GANTT or bar chart is the most common of control aids used in the construction industry. In many cases, it is the only aid used. Perhaps the reason is its simplicity, almost universal understanding, and ability to be used at all levels of supervision. The following shortcomings of the bar chart should be kept in mind:

   a. Failure to require a detailed analysis and breakdown of activities (freely overlapped timewise);

   b. Omissions of many time-consuming activities;

   c. Failure to communicate complete details of the project plan (sequential relationships not shown);

   d. Failure to adequately indicate the consequences of scheduling deviations; and

   e. Failure to provide a suitable project model for updating purposes.

2. NETWORKING TECHNIQUES such as the critical path method and program evaluation and review technique, were developed to overcome the disadvantages of the GANTT chart. Networking is extremely valuable in executing a job; a hierarchy of networks should exist in order to meet the needs of different levels of management. A network is a dynamic document and requires continuous update from the lowest detail in order to be of use to any level of management, a requirement which must be considered in conjunction with the cost of manpower and equipment to maintain the network system. Complicated and expensive procedures for updating and ineffectiveness as a management control at the low level will cause the entire system to be useless at any level and a cost burden to the project.

3. PERCENTAGE COMPLETION CURVE (S CURVE) illustrates forecasted and actual cumulative percent completion plotted on a time scale and is used primarily as a control tool. During the design effort productivity may be monitored, provided the system can measure actual work completed, by plotting in labor hours, forecasted effort, actual work completed, and actual effort expended.

4. LABOR SCHEDULES may be developed for separate classifications of labor, showing the number of persons required each time period.

5. MATERIAL SCHEDULES for important items of material or equipment indicating deadlines for such events as vendor quotes, procurement, preparation of shop drawings, beginning of fabrication, date of shipment, and date needed at job site.

6. EQUIPMENT SCHEDULES may be developed for separate types and sizes of equipment and showing the number of units required each time period.

7. FINANCE SCHEDULES indicate on a time scale the forecasted expenditures, the actual expenditures, and the difference between the two.

PLANNING CHRONOLOGY FOR FISCAL YEAR 1986
CONSTRUCTION BUDGET PROJECTS

YEAR		ACTIVITY ELEMENTS FOR FY 1986 PROJECTS	TARGET DATES
FY 1983	1.	Receipt of list of candidate projects for FY 1986 accompanied by short-form data sheets.	2-1-83
FY 1983	2.	Headquarters program--division review and decision on tentative 1986 projects. Notification to field of selected projects.	Feb-March NLT 4-1-83
FY 1983	3.	Headquarters elements utilize selected 1986 tentative projects in planning, programing, and budgeting process.	Apr-May
FY 1983	4.	Inclusion of FY 1986 plant engineering and design requirement in FY 1985 budget.	8-83
FY 1984	5.	Headquarters review of programmatic requirements and supporting construction program. Notification to field elements of changes to tentative candidate projects.	11-83 12-83 NLT 1-1-84
FY 1984	6.	Field elements submit updated construction project data sheets to Headquarters with conceptual design report, if available.	NLT 3-1-84
FY 1984	7.	Headquarters validation of construction projects and utilization of construction project data sheets for implementation of planning, programming, and budgeting process.	3-84 7-84
FY 1984	8.	Field submission of additional data for construction project data sheets.	NLT 8-1-84
FY 1984	9.	Submission of budget to OMB.	9-84
FY 1985	10.	Allotment of FY 1985 plant engineering and design funds for FY 1986 projects.	10-84

FY 1985	11.	Design started on FY 1986 projects with FY 1985 plant engineering and design funds.	12-84
FY 1985	12.	President's budget submitted to Congress.	1-85
FY 1985	13.	Authorization and appropriate acts passed.	6-85 9-85
FY 1985	14.	Design completed with FY 1985 plan engineering and design funds.	9-85
FY 1986	15.	OMB apportionment and DOE allotment to field elements.	10-85
FY 1986	16.	Design and/or construction started.	10-85 12-85

SHORT FORM DATA SHEET CONTENTS

Short-form data sheets should be limited in size and content to not more than two pages and shall contain, as a minimum, the following information:

1. HEADINGS. The first part of the data sheet shall contain:

    a. Project title and location;

    b. Program supported;

    c. Submitting field office;

    d. Total estimated cost and date of estimate;

    e. Design start date; and

    f. Construction complete date.

2. BACKGROUND AND JUSTIFICATION. This paragraph includes the requirements the project will meet and the urgency; historical data supporting the need, or reference thereto; and other indirect data which will support the necessity for the project.

3. DESCRIPTION OF EXISTING CONDITIONS. This section shall include specific standards, program milestones, regulations, orders, and guidance which are not currently being met. If a new mission, reasons existing facilities cannot be utilized should be indicated.

4. CONSEQUENCES OF FACILITY NOT BEING SUPPORTED. This section shall include effects of nonsupport on program, employees, maintenance, and other elements such as safety, environment, and operational costs.

5. TOTAL ESTIMATED COST (TEC). This section requires the best (planning) estimate of project costs available. Costs shall be indicated separately for engineering (Titles I through III), construction, and contingencies.

6. OTHER PROJECT COSTS. This section includes estimated direct costs not included in total estimated costs such as conceptual design and R&D necessary to complete construction.

7. PROPOSED SCHEDULE. Proposed start and end dates for conceptual design, definitive design (both Titles I and II), construction, operation, and other major milestones, if any, shall be indicated.

8. PLANT ENGINEERING AND DESIGN (PE&D) REQUIREMENTS. If PE&D funds are requested, reasons for the requirements, date funds are required, extent of design to be accomplished with these funds, and consequences of not providing these funds shall be indicated.

EXAMPLE OF A SHORT FORM DATA SHEET

Submission Date 2-1-83

SHORT FORM DATA SHEET
Fiscal Year 1986

Operations Office
Oak Ridge

Program
Enthalpy Research

Laboratory and Production Facility
for Prototype Devices

Design Start:
11-15-84
Construction Complete:
10-1-87

Oak Ridge National Laboratory
Oak Ridge, Tennessee

TEC: $30,000.000
Estimate date 1-15-83

1. Mission Requirements: Project supports new mission involving research on and production of prototype devices for the enhancement of that recovery from various bodies. Project is required to meet the national urgency needs as described in the Enthalpy Research program plan. Need exists from documented research and validated need for increased energy recovery. Complete justification for project and historical data are contained in Enthalpy Research program plan.

2. This represents a new mission for the Oak Ridge Laboratories. Current and future programmatic needs occupy 100 percent of available lab space and requirements exist for 2 million square feet of additional space for existing programs during the next 10 years. Details are provided in FY 83-88 Institutional Plan of 11-1-82 and current Oak Ridge Lab Site Development Plan with 5-year plan of 6-1-82.

3. If this facility is not operational on 10-1-87 the Enthalpy Research program needs will be met with temporary facilities such as trailers and program milestones will slip a minimum of 12 months. In addition, the program plan will require modification with certain research and production postponed until completion of adequate facilities for these programs.

Date 2-1-83

FY 1986
Page 2

SHORT FORM DATA SHEET
Laboratory and Production Facility
for Prototype Devices

4.	Total Estimated Cost (TEC)		$30,000,000
	a. Engineering (Titles I through III)	$ 4,000,000	
	b. Construction	22,000,000	
	c. Contingency	4,000,000	
5.	Other Costs		2,240,100
	a. Conceptual Design	240,000	
	b. R&D necessary to complete const.	2,000,000	

6. Tentative Schedule	Start	End
Conceptual Design	4-1-83	2-1-84
Title I	11-1-84	3-1-85
Title II	4-1-85	3-1-86
Construction	11-1-86	10-1-87
Operation	11-1-87	- - -

7. Due to urgency of meeting operational date, request FY 85 PE&D Funds of 1,200,000 for accomplishment of Title I and 40 percent of Title II design. These design funds will allow sufficient design to be completed during FY 85 so that construction can begin during the 1st quarter of FY 86. Failure to provide these funds will delay construction start one year from date contained in proposed schedule. This requirement is currently included in item 4a. If approved, CPDS submission will indicate reduction of TEC for PE&D Funds. If project is not considered in FY 86 budget, PE&D request for FY 85 should still be supported since project is urgent and validated requirement.

John L. Smith
Manager, Oak Ridge
Operations Office

CONCEPTUAL DESIGN

1. As a key element of project planning, conceptual designs shall be performed for construction projects for which congressional authorization is planned to be requested prior to requesting Departmental approval. Excepted from this requirement are general plant projects, line item projects, and contingency line items which are specifically excepted by the appropriate program organization. Conceptual designs for all projects shall be authorized by DOE prior to initiation.

2. The fundamental objectives of conceptual design are to:

   a. Develop a project scope that satisfies program needs, operating needs, and statutory requirements;

   b. Assure and/or validate project feasibility and attainable technical performance levels;

   c. Identify and quantify any project risks; and

   d. Develop a reliable cost estimate and a realistic performance schedule.

3. The guidelines developed as part of a conceptual design include the following:

   a. General project criteria and design parameters including applicable codes and standards;

   b. Quality assurance requirements to satisfy program and project objectives;

   c. Safeguards against potential environmental damage and methods for mitigating environmental hazards;

   d. Types and material of construction, basic facility drawings, and outline construction specifications;

   e. Space allowances for various functions;

   f. Significant features and components;

   g. Facility siting and utility services requirements;

   h. Site development requirements;

   i. Energy consumption and type(s) of energy supply;

   j. Energy conservation initiatives and associated design/construction features;

k. Health, safety, safeguards, and security requirements;

l. Barrier-free design/construction features for facility accessibility by the handicapped;

m. Total estimated cost, performance schedules for design, procurement and construction, and methods of performance;

n. Requirements, cost estimates, and performance schedules for prerequisite research and development related to the project;

o. Any other statutory or special requirements for the project;

p. Identification and elimination of uncertainties;

q. Acquisition strategy for the project;

r. Contingency requirements and analysis; and

s. Decontamination and disposal requirements.

4. Conceptual designs may be performed by operating contractors, onsite services contractors, or by A-E firms. When choosing a conceptual designer, the Head of the Field Element should, as a minimum, consider the following factors:

a. Availability and expertise of operating or onsite services contractor personnel;

b. Existing and projected workloads of these contractors;

c. Size, complexity, and urgency of the project;

d. Possibility of utilizing an economically disadvantaged A-E; and

e. The need to develop and enhance A-E capability within a geographical area of operations.

5. For general plant and contingency projects (under $1.2 million), the Heads of the Field Elements need to assure that the objectives of conceptual design are met. Due to the size of these projects, this assurance may be obtained by use of preliminary authorization requests or other locally defined documents. These documents generally are developed by the operating contractors in accordance with field element procedures. The information developed shall generally cover the same basic elements as conceptual designs, but in less detail.

6. It is important that sufficient conceptual design work be accomplished to adequately scope each project and develop supportable project cost estimates prior to project submittal to the Office of Management and Budget. Field office managers shall sufficiently manage the conceptual design effort to assure that the best possible scope and costs are established in the time available. Conceptual designs will include a preliminary work breakdown structure to delineate major project elements.

   a. Project urgency may require, in some cases, that a project be included in the budget although conceptual design is not developed sufficiently to establish reliable cost and schedule information. In these cases, order of magnitude, cost estimates, and tentative scope determinations shall be made. Reasons for this incompleteness shall be explained within the construction project data sheets. In many of these cases, the budget requests should be for design funds only.

   b. For some projects, establishing, the scope and determining reliable cost and schedule information may be beyond the reasonable limits of conceptual design. In such cases, the budget request should also be for design funds only.

CONCEPTUAL DESIGN REPORTS

1. GENERAL. The conceptual design report is a summary of the conceptual design results. The report contains the conclusions and recommendations reached as a result of the conceptual design. Heads of Field Elements shall determine the organization responsible for the preparation of the report. Normally, it will be the organization performing the conceptual design. Reports shall be approved and signed by the Head of the Field Element or his designee.

2. COVERAGE. A conceptual design report shall be prepared for all construction projects for which conceptual designs are performed prior to inclusion of the project in the DOE budget reports. Reports shall be submitted to Headquarters.

3. CONTENTS. Arrangements, format, and content of the conceptual design report shall be determined by Heads of Field Elements. The following items shall be included as applicable:

   a. Official project number and title.

   b. Project justification.

   c. Detailed description of the project scope.

   d. Performance requirements for the project system or process.

   e. Total estimated cost including individual estimates for each title of design (I, II, and III), construction, standard equipments uncertainties, and contingencies. Cost estimate methodology and backup details shall be included.

   f. Project design, procurement, construction, and environmental compliance schedules (critical path method schedule is recommended).

   g. Methods of performance for design, procurement, and construction with backup details.

   h. Work breakdown structure.

   i. Requirements and assessments for:

      (1) Safeguards and security;

      (2) Energy conservation;

      (3) Health and safety;

(4) Environmental protection (detailed schedule for compliance with National Environmental Protection Act and other environmental review requirements as appropriate);

(5) Decontamination and decommissioning;

(6) Quality assurance;

(7) Maintenance and operation;

(8) Telecommunications;

(9) Computer equipment; and

(10) Provision for handicapped and fallout shelters.

j. Analysis of uncertainties, contingencies, and effort required to resolve uncertainties.

k. Conceptual drawings and outline specifications.

l. Applicable codes, standards, and quality levels.

4. PROTECTION OF INFORMATION. Significant portions of conceptual design reports have been held by the courts to be exempt from mandatory disclosure under the Freedom of Information Act (FOIA) (5 U.S.C. 552), because the information is recommendatory in nature and includes information which will be instrumental in Government negotiations and which, if disclosed, would expose and jeopardize the selection process for A-E contractors.

a. The Head of the Field Element responsible for a conceptual design shall assure protection of the conceptual design information. Only sufficient copies of the conceptual design reports as are necessary to meet its official purpose shall be generated. Distribution shall be limited to those individuals or organizations which are necessary to fulfill Department requirements.

b. The following legend shall be included in each conceptual design report:

> "This Conceptual Design Report contains confidential commercial information that shall be used or duplicated only for official Governmental purposes, and this notice shall be affixed to any reproduction or abstract thereof. Disclosure of the confidential commercial information contained in this report outside the Government shall not be made without the advice of counsel. The restrictions contained in this notice do not apply to any data or information in this report which is not commercial information or to information generally available to the public on an unrestricted basis.”

CONCEPTUAL DESIGN REPORT
TITLE PAGE EXAMPLE

Conceptual Design Report

LABORATORY AND PRODUCTION FACILITY
FOR PROTOTYPE DEVICES AT
OAK RIDGE NATIONAL LABORATORY

Project 86-13-am

For the
U.S. Department of Energy
Oak Ridge Operations Office
Oak Ridge, Tennessee

Prepared by Design Tech, Inc.

Architects & Engineers

Contractor Approval

George Smith
George Smith 3-18-84

DOE Field Organization Approval

Robert Hart
Robert J. Hart 2-28-84
Manager
Oak Ridge Operations Office
U.S. Department of Energy

CONTENTS OF A TITLE I DESIGN SUMMARY

1. A Title I design summary should contain the applicable information listed below, summarizing preliminary engineering and project management planning and reflecting completed Title I design.

2. Project titles and project numbers shall be shown as they appear in the authorization act or the financial plan, and for other projects, suitable identification numbers shall be shown.

3. General description of work, consisting of a comprehensive statement outlining the purpose of the facility, its location, the overall concept and layout, and the types of facilities involved shall be included. If a fallout shelter is to be provided, its location and significant features should be described.

4. An analysis of safety and pollution aspects, reflecting the latest project planning and design information available prior to the start of any significant Title II effort, should include, such as:

   a. Discussion and analysis of the principal hazards and risks which may be encountered in the operation of the proposed facility.

      (1) Potential injury and property damage accidents due to fire, explosion, radiation, structural failure, seismic activity, and operating error;

      (2) Predicted consequences of such accidents; and

      (3) A thorough evaluation of the measures proposed for preventing such accidents or reducing risks to acceptable levels, including pertinent features of design and operation of the facility which would provide primarily for protection of life and property (e.g., monitoring of, and protection from, radiation and fire).

   b. Essential environmental considerations associated with the project. These should be described in concise narrative form and include the following kinds of information:

      (1) Nature of potential environmental (air, water, land) impact including types of pollutants, quantities, sources, release points, and probable impacts;

      (2) Measures proposed to avoid adverse environmental effects and meet applicable standards and guidelines (type and effectiveness of proposed control and treatment methods, quality of effluents to be discharged, and prevention of accidental releases); and

(3) Applicable environmental standards and guidelines currently in effect and anticipated (e.g., Federal, State, and local effluent regulations, EPA guidelines, DOE design criteria):

5. Justification and explanation of the factors used in establishing the size, capacity, and type of equipment and structures required, or otherwise having a bearing on the design and operation of the facility. The factors include:

   a. Initial and ultimate planned capacity;

   b. Type of feed, process flow diagrams, material balance flow sheet, and product specifications;

   c. Number of operating personnel, occupants, persons served, or extent of services provided;

   d. Type and extent of telecommunications and signal systems;

   e. Material accountability; and

   f. Security.

6. If a technical facility is involved, diagrams showing the processing or operations to be carried out should be furnished, including the reasons why the selected process or type of facility is considered best.

7. Consideration given to existing structures and commercial-industrial sources shall be outlined where not covered by prior project justification to Headquarters. This should include the reasons why existing structures cannot be utilized, and an explanation of why the goods to be produced or the services to be provided by proposed facility should not or cannot be obtained from private enterprise through ordinary business channels. Specific steps taken to determine availability from such sources and the basis upon which it has been determined that it is not reasonable to obtain the goods or services from such source, also should be provided.

8. Preliminary plans should consist of a plot plan, and building plans showing the principal dimensions, equipment layout, partitioning, elevations typical cross sections, space utilization, outside utility and site work, and so forth. If a fallout shelter is included, its layout should be indicated on the floor plan involved.

9. Outline specifications for buildings should consist of a statement showing the principal materials to be used, the structural framing system, and exterior and interior materials. The extent of features such as air-conditioning, ventilation, air and water pollution control facilities, acoustical treatment, hung ceilings, sprinklers, crane runways, and special construction because of radioactivity, should be described. As a minimum, an order of magnitude

statement is required instead of such statements as "to the extent required," and "as needed." Where alternate materials may be specified for fire protection or safety reasons, note the reason (e.g., "to provide a 4-hour rated fire wall," "to achieve a flamespread rating under 25").

10. Major operating equipment needed should be indicated, including the estimated electrical load for building services and operating equipment for major items of mechanical equipment (air conditioning, ventilating, heating, and so forth) type, functional requirements, and estimated capacity shall be given. For telecommunications equipment, give type and estimated size, number, power, or capacity.

11. Preliminary estimate of cost shall be prepared as accurately as possible from the information at hand. General, administrative, and other indirect costs shall be prorated among the various elements of the project estimate. The preliminary estimate shall be broken down as follows, generally conforming to the procedure utilized on the construction project data sheets as contained in the budget.

    a. Engineering, Design, and Inspection Costs. (Also indicate this item as a percentage of the construction costs shown in paragraph 11c, below);

    b. Land and Land Rights, when applicable;

    c. Construction Costs, including;

        (1) Improvements to Land, such as landscaping, roads, bridges, walks, paved areas, drains, and fences;

        (2) Buildings (Building Construction or Remodeling), Including site preparation directly related to the erection of the building and all facilities required in the operation of buildings;

        (3) Other Structures, such as retention basins, pits, special use towers and platforms, and stacks (when not an integral part of the building);

        (4) Special Facilities. Including major items of special equipment and systems specifically designed for the project, such as reactor vessels, high vacuum systems, accelerator components special environments, and movable shielding; and

        (5) Utilities, such as water, gas, electrical and sewer beyond a point 5 feet outside buildings (and utility extensions for building additions).

    d. Standard Equipment. Include all items, such as office, cafeteria, and laboratory furniture and equipment, hoists, and machine tools, that can be procured with only a nominal engineering effort for selection; specification, and inspection (as from a catalog or “off the shelf”). Exclude items properly included in subparagraph 11c, above.

e. Removal Cost Less Salvage. Include removal costs less savings incidental to the replacement of plant and equipment applicable to the project.

f. Contingency Allowance. Indicate the percentage this is of all other project costs.

g. Energy Conservation. Specifically identify those items included to reduce facility energy use. Provide the percent of the construction cost that these items constitute.

h. Total Project Estimate. Sum of items a through f, above.

12. The above breakdown shall include quantities and unit costs showing how totals were reached. For example, for buildings, give dimensions, the gross area, and the estimated cost on a square-foot basis; for utilities, roads, and so forth, give length, type, and size, with price per unit listed. Identify originating organization, basis of estimate, date made, status of plans, and any allowances made for isolation of construction area or speed up if other than normal working hours are planned. Explain any unusually high or low unit costs.

13. The cost or estimated value of any Government-owned materials or equipment transferred to the project shall be stated separately in the project estimate. Cost in this case refers to the current depreciated value (net book value), not the cost of original acquisition. However, when an activity is moved from one building to another, and the equipment that has been used by that activity is moved with it, and such equipment remains in custody of the same contractor, only the moving and reinstallation costs are included in the project.

14. Generally, the preliminary estimate includes only capital improvements. However, in projects for which operating expense costs may be incurred with the principal project activity, a cost description of work, and justification for these costs, shall be included in the preliminary proposal. (Do not include the cost of conceptual design.) Where a project requires directly related elements to be operating-expense funded, include a brief description of each item, its estimated cost, and a schedule for accomplishing the item, showing the estimated start and completion dates, and the relevant project interface dates.

15. Proposed or actual starting and completion dates shall be indicated for Title I and Title II engineering, procurement, and construction. Furnish the same information for each of the participants in paragraph 16 below.

16. Proposed method of accomplishment shall include scope and estimate cost by participants and types of contracts.

CONSTRUCTION COMPLETION REPORT CONTENT

1. GENERAL. The following applies to all construction completion reports.

a. Additional date may be included as deemed necessary by the field office manager.

b. The arrangement of information need not be as indicated in paragraph 2.

c. If a contractor is to prepare the report, the requirement should be included in the contract.

d. The report should be adequately titled. Elaborate formats and binding shall be avoided.

2. CONTENT.

a. Reports for all line item projects having a total estimated cost greater than $5 million should contain the following information:

(1) General Information.

(a) Identification of project (name, location, field element, and budget project number).

(b) Brief description of project, including its function, scope, and relationship to other DOE facilities.

(c) Statement of major criteria which dictate type of design.

(d) Starting and completion dates for both overall design and construction.

(e) Beneficial use dates for major components and initial operating dates of production units.

(f) Layout plan and limited number of significant photographs of the completed facilities.

(2) Contract Data. Contract data shall be furnished as outlined below. If a single contract covers more than one project, give details.

(a) Architect-Engineer Contracts. For prime contracts, and sub-contracts under operating contractors, furnish the following:

1 Name and home office of address of contractor, contract number, and scope of work.

2 Dates work was started and completed.

3 Final cost of work under the contract. Give breakdown of costs by Titles I, II, and III, and other services. For lump-sum contracts, list reimbursable costs separately.

4 Number of drawings and cost per drawing (based on Titles I and II costs only) if available.

(b) Prime Construction Contracts and Cost-Plus-Fixed-Fee Construction Subcontracts. Furnish all applicable information set forth in subparagraph 2a(2)(a), above, for all prime construction contracts (fixed-price and cost-plus-fixed-fee) and cost-plus-fixed-fee construction contracts.

(c) Fixed-Price Construction Subcontracts Under Cost-Plus-Fixed-Fee Contracts.

1 For principal fixed-price subcontracts under cost-plus-fixed-fee prime contracts or subcontracts, give name of subcontractor, contract number, type of work, and final amount of each subcontract.

2 Give total dollar amount of all fixed-price construction subcontracts.

(d) Operating Contractor Participation. Where operating contractors perform A-E and construction services, furnish all applicable information set forth in subparagraph 2a(2)(a), above.

(e) Construction Manager Contracts. Furnish the following where construction managers have been employed on the project;

1 Name and home office address of contractor and contract number;

2 Description of services provided during predesign, design, and construction stages, as applicable; and

3 Final cost of work under the contract. For fixed-price contracts, list reimbursable costs separately.

(f) Other Contractors. Give names of principal contractors, contract number, amount of contract, and brief description of work for special manufacturing, research and development, testing, and other items, charged to project funds.

(9) Major Equipment Suppliers. List the major suppliers of process and other equipment items. Furnish contract number, brief description of items, and final amount of contract.

(3) Descriptive Data.

(a) Buildings. Provide a description of major buildings, including brief information on the following items;

1 General description of building (number of stories, number of wings, overall dimensions, whether basement is provided, significant materials or construction, and finishes).

2 Each function or process carried on in the building. Care shall be taken to avoid higher classification of the complete report than necessary. Data of higher classification may be submitted as an appendix if desired.

3 Gross area and gross volume.

4 Building facilities, including:

a Ventilating and air conditioning (type and extent);

b Type of heating system;

c Major equipment;

d Type of fire protection (e.g., sprinklers, automatic alarm); and

e Number of elevators (passenger and freight).

5 Special features (e.g., describe any radiation shielding, protective construction, and so forth).

(b) Cafeteria. Give the overall size of kitchen and dining area, number of serving lines, and number of seats.

(c) Laboratories. Indicate the extent (if any) and the activity levels (high or low) of radioactive materials used.

(d) Utilities. Give a general description (materials, length size of lines) of outside utilities.

(4) Cost Data.

(a) Project Cost Summary.

1 Provide a cost summary broken down into the same major categories as given in original project data sheet.

2 If a project includes several buildings or units, the breakdown should give costs for major units separately.

3 The total cost of Government-owned materials or equipment transferred to the project should be included above and should be stated separately. Cost in this case refers to transferred cost, not the cost of original acquisition.

4 Give original budget estimate and any revisions thereof.

(b) Unit Costs.

1 For each major building give:

a Cost per square foot of gross area; and

b Cost per cubic foot of gross volume.

2 Other Significant Costs. Give any unit costs available for site and utility work of important building and equipment components.

(5) Performance Data.

(a) Schedules.

1 Progress schedules for design and construction of overall project as originally scheduled and as actually accomplished.

2 Labor hours schedule for A-E and for construction services as originally estimated and as actually employed.

(b) Factors Affecting Progress and Costs.

1 Discuss job progress and costs as affected by changes in scope and delays by DOE; operating, A-E, and construction contractors; vendors; weather; foundation conditions; and others, as applicable.

2 Actions which resulted in improvements in schedule or cost reduction should also be covered. These are extremely important since they can be utilized as case histories in training or project manager personnel, and can be disseminated Department-wide to assist others in providing successful solution to construction related problems. It is important that these items be recorded as they occur during the execution of the project then consolidated for inclusion in the construction completion report. This is desired since a great portion of the important data may be lost during the period of time between the action and the preparation of the completion report.

(c) Reports for all projects not covered by subparagraph 2a above, including sub-projects of line items when submitted individually, should contain the following information:

1 Project identification;

2 Start and completion dates for design and construction (both baseline scheduled and actual);

3 Cost summary baseline and actual costs in the same major categories included on the original project data sheet;

4 Factors that affected the cost and schedule, either positively or negatively, that may be of benefit to others, if any; and

5 All information required by the Real Property Inventory System.