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U. S. DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT
DIRECTIVES SYSTEM

Subject Number:

ADP-3

Transmittal Number:

277

Date: 09/01/86

Subject: Systems Implementation Standards

Approval: *J. O. Christensen*

Title: Director

1. Purpose: This directive establishes systems documentation standards contained in the attached guide to be followed by the Office of Surface Mining Reclamation and Enforcement (OSMRE) Staff and contractors who develop automatic data processing systems and data bases.
2. Definitions - are contained in the Systems Document Standards.
3. Policy/Procedures
 - a. Policy. To insure standard ADP documents requirements for the documentation of existing and proposed systems under development in accordance with the attached Systems Document Standards.
 - b. Responsibilities. All OSMRE staff and contractors responsible for developing existing and proposed systems including those under development will use the Systems Documentation Standards when documenting ADP systems.
4. Reporting Requirements. None.
5. References. FIPS Pub 38.
6. Effect on Other Documents. None.
7. Effective Date. September 1, 1986.
8. Contact. Chief, Information Systems Management Staff, (202) 343-1150.

Attachment:

Systems Documentation Standards Guide

OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT
INFORMATION SYSTEMS MANAGEMENT STAFF
SYSTEMS DOCUMENTATION STANDARDS

*
* The following pages present guidelines for a contractor *
* and OSMRE Staff to follow in order to meet the Office of *
* Surface Mining Reclamation and Enforcement documentation *
* standards when developing applicable components of an *
* application system. *
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	<u>Page</u>
<u>I. Implementation Plans</u>	
1. Feasibility Study	3
2. Project Plans	12
3. Contingency Plans	14
4. Quality Assurance Plan	17
5. Configuration Management Plan	19
6. Training Plan	20
7. Conversion Plan	22
<u>II. Application Documentation</u>	
1. Functional Requirements	26
2. System Overview	29
3. Program Specifications	32
4. Users Manual	34
5. Operations Manual	37
6. Technical Specifications	41
7. Program Maintenance Manual	44
8. Program Source Code Listing	48
9. Job Stream Listings	48
10. Data Dictionary/Directory/DBMS Schema	49
<u>III. Testing Plans</u>	
1. Unit Test Plan	52
2. Integration Test Plan	53
3. System Test Plan	54
4. System Test Analysis Report	56
5. Acceptance Test Plan	58
6. Acceptance Test Analysis Report	61

I. IMPLEMENTATION PLANS

1.1 FEASIBILITY STUDY

The Feasibility Study outlines a conceptual design for the new system or enhancement to an existing system. The purpose of the Feasibility Study is to ensure that the new system or enhancement is justifiable and to recommend a predictable solution to the problem from a number of alternative approaches. The goal of the study is to provide OSMRE management and ISMS systems with the information they need to determine the advisability of proceeding with the system development project.

FEASIBILITY STUDY

1. General Information

- 1.1 Summary - Describe the general nature of the proposed system, including justification, schedule, and end products.
- 1.2 References - List applicable documents which support or simplify the justification for the system.

2. Management Summary

Present pertinent facts to assure that the proposed system addresses current system requirements and proposed requirements to be served by the system. Include brief statements of system requirements, objectives, assumptions and constraints, methodology, evaluation criteria, and a summary of recommendations. Detailed analysis is presented in Section 3.

- 2.1 Requirements - State the requirements of the proposed system, such as: new services, increased capacity, or audit controls.
- 2.2 Objectives - State the major performance objectives of the proposed system, such as: reduced costs, increased productivity, or improved controls. Describe the user community that will be using the system and the purpose of the system as it relates to this user community.
- 2.3 Assumptions and Constraints - Present the assumptions and constraints of this study, such as:
- * Operational life of the proposed system
 - * Period of time for comparison of system alternatives
 - * Interaction of the proposed system with other systems and organizations
 - * Input, processing, and output requirements
 - * Financial constraints
 - * Legislative and policy constraints
 - * Changing hardware/software/operating environment
 - * Availability of information and resources

- 2.4 Methodology - Identify how this study was accomplished and how the proposed system was evaluated. Summarize the general method or strategy employed, such as: survey, weighting, modeling, benchmarking, prototyping, or simulation.
- 2.5 Evaluation Criteria - Identify the criteria employed in arriving at the recommendations, such as: cost, priority, development time, or ease of use.
- 2.6 Recommendation - State the recommendation for the proposed system, including consequences of not taking action, and what delays can be tolerated.
- 2.7 Other Alternatives Considered - Summarize each alternative considered and state the reason for non-selection.

3. System Requirements and Objectives

This section should provide a high-level description of the requirements and objectives of the proposed new system. Mandatory items should be identified.

- 3.1 Requirements - Describe the requirements for the system.
 - 3.1.1 Outputs - Describe system outputs, e.g., reports, documents, or data. For each output, include characteristics, such as: use, frequency of production, interfaces, and distribution.
 - 3.1.2 Inputs - Describe system inputs, including: source of data; type, volume, and organization of data; and frequency of submission.
 - 3.1.3 Files Description - Describe the contents, purpose, use, and update frequency of each file.
 - 3.1.4 Validation - Describe any validation criteria.
 - 3.1.5 Processing/Data Flow - Describe the major processing/data flow. The flow should be presented in graphic form,

e.g., flowchart or block diagram supplemented by narrative.

3.1.6 Security, Privacy, and Control - State the detailed requirements for security, privacy, and control.

3.1.7 Information Storage and Retrieval - Specify any information storage and retrieval requirements.

3.1.8 Interface - Identify any systems with which the proposed new/changed system must interface.

3.2 Objectives - State the major performance objectives of the proposed system, in terms of stated requirements

4. Analysis of Existing System

The purpose of analyzing the existing system is to provide a basis for determining the economic and management advantages of the proposed new system or change.

4.1 Processing/Data Flow - Describe the major processing/data flow of the existing system. The flow should be presented in graphic form, e.g., flowchart or block diagram supplemented by narrative.

4.2 Workload - Specify the volume of work handled by the existing system.

4.3 Costs - Itemize costs incurred in operating the existing system, e.g., manpower, equipment, space, support services, materials, and overhead. Details of costs may be presented in a Cost/Benefit Analysis Document or an appendix to this document.

4.4 Personnel - Identify skill categories and number of personnel required to operate/maintain the existing system as related to OSMRE and contractor resources.

4.5 Equipment - Itemize any equipment used by the existing system.

4.6 Limitations - Identify any limitations of the existing system, such as: inadequate or untimely information needed to make a decision, delay in getting data to

the user, resource constraints, technical limitations (slow response times, etc.) and organization and policy problems.

5. Proposed System

This section should describe how the objectives and requirements of the proposed system will be met. All concerned parties must be made aware of impacts on other systems. This section should be prepared for the proposed system; note that Section 6 contains descriptions of other feasible alternative systems.

- 5.1 Description of Proposed System - Present the overall system concept and describe how requirements will be met. If software tools or methodologies associated with software engineering are used, describe them in the context of the overall requirements.
- 5.2 Improvements - Describe the improvements of the proposed system in terms of the objectives in Section 3.2.
- 5.3 Impacts - Describe the anticipated impacts of the proposed system, including potential conversion problems.
 - 5.3.1 Equipment Impacts - Describe new equipment requirements and changes to currently available equipment.
 - 5.3.2 Software Impacts - Describe any additions or modifications needed to existing applications and support software in order to adapt them to the proposed system. If software conversion is required, a separate section should be devoted to a discussion of conversion feasibility and proposed conversion methodology.
 - 5.3.3 Organizational Impacts - Describe any organizational, personnel, and skill requirement changes.
 - 5.3.4 Operational Impacts - Describe the effects on operations, such as: manual procedures, data retention requirements, etc.

5.3.5 Developmental Impacts - Describe specific activities to be performed by the user, the resources required to develop the data base and to test the system, and the privacy and security implications.

5.3.6 Site/Facility Impacts - Describe building modification requirements.

5.3.7 Cost Impacts - Describe cost factors that may influence the development, design, and continued operation of the proposed system.

6. Alternative Systems

Describe each alternative system considered. If new alternatives were considered, so state.

6.1 Alternative System 1

6.N Alternative System "N"

7. Rationale for Recommendations

State the reasoning which supports the recommendations of the proposed system (presented in Section 5) over the alternative systems (presented in Section 6). Include all quantifiable and non-quantifiable benefits, required resources, possible effects of delay, and consequences of not taking action.

APPENDIX. COST BENEFIT ANALYSIS

1. Management Summary

Present a concise overview of the cost/benefit analysis conducted.

1.1 Scope - State the purpose of the cost/benefit analysis, the alternatives for development and operations, and major elements of cost.

1.2 Performance and Characteristics - State the operational requirements, system life, and workload for which the cost/benefit analysis was conducted.

1.3 Assumptions and Constraints - State the assumptions and constraints under which the cost/benefit analysis was conducted.

1.4 Methodology - Summarize the procedures for conducting the cost/benefit analysis and techniques used in estimating and computing costs.

1.5 Evaluation Criteria - State criteria for evaluating alternatives, such as:
organizational objectives,
operational efficiency, and reduced
operating costs

1.6 Summary of Recommendations - Summarize the recommendations for development and operation of the system.

2. Description of Alternatives

Briefly describe the technical and operational characteristics of the alternatives considered, including the existing system. If no alternatives were considered, so state, giving reasons why alternatives were not considered.

2.1 Current System - Describe the technical and operational characteristics of the current system.

2.2 Proposed System - Describe the technical and operational characteristics of the proposed system.

2.3 Alternative System 1 - Describe the technical and operational characteristics of alternative system 1.

2.N Alternative System "N" - Describe the technical and operational characteristics of alternative system "N".

3. Costs

Describe the development and operational costs of each alternative. If there is an existing system, include costs associated with its continuation. Where applicable, compare the costs of a system developed, operated, or maintained in-house with the costs of those developed, operated or maintained by contractors.

3.1 Non-Recurring Costs - Present non-recurring costs of each alternative over the system life. These include capital investment costs for acquiring, developing, and installing equipment, facilities and proprietary software, and costs for ad-hoc or one-time-only studies or activities.

3.2 Recurring Costs - Present the monthly and/or quarterly recurring costs of operating and maintaining the alternative over the system life, including:

- * Equipment lease, rental, and in-house maintenance
- * Software lease, rental, and in-house maintenance
- * Data communications lease, rental, and in-house maintenance
- * Personnel salaries and fringe benefits
- * Direct support salaries (intra-agency services)
- * Travel and training
- * Space occupancy
- * Supplies and utilities
- * Security and privacy
- * Contractual and interagency services, such as: ADP services, data communications, software, technical, and other support
- * Include overhead expenses that represent additional or incremental expenses attributable to the alternative
- * If inflation or depreciation factors are used, these should be explained as well as the cost regression analysis methodology used.

4. Benefits

Describe non-recurring and recurring benefits which could be attained through the development of each proposed alternative. State benefits in quantifiable or

non-quantifiable terms that relate to organizational objectives, goals, missions, functions, and operating environment.

4.1 Non-Recurring Benefits - Describe benefits that can be assigned dollar values. Describe benefits in terms of data processing, user, administrative, and support categories.

4.2 Recurring Benefits - Present the monthly and/or quarterly recurring benefits of operating and maintaining the alternative over the system life.

4.3 Non-Quantifiable Benefits - Describe benefits which cannot be quantified in terms of direct dollar values, such as: improved service; reduced risk of incorrect processing; improved information handling; and enhanced organizational image. Intangible benefits can sometimes be assigned values in terms of estimates and tradeoffs.

5. Comparative Cost/Benefit and Recommendation

5.1 Comparison of Cost/Benefit of Alternatives - Based on the data collected in Sections 3 and 4, compare the costs and benefits of each alternative.

5.2 Sensitivity Analysis - Sensitivity analysis is a tool used for assessing the extent to which costs and benefits are sensitive to change in key factors, e.g., length of system life; volume, mix, or pattern of workload; requirements; and configuration of equipment or software. Sensitivity analysis, conducted on different configurations with each alternative proposal, can provide a range of costs and benefits which are likely to be a better guide than a single estimate.

6. Recommendation

Select the most desirable alternative in terms of best cost/benefit ratio. Justify the selection.

1.2. Project Plan

The Project Plan is designed to document the resources and activities necessary to complete the application implementation activities. This plan will identify all tasks to be performed and the schedule for task completion. It will identify the resource requirements in terms of equipment, development staff and operations staff, and provide an estimate of their costs. Since the Project Plan is intended to be a dynamic document, it will evolve as application implementation phases are performed. Each update of the plan will provide greater detail to current and near-term tasks. In addition, any changes in project direction will be incorporated into the document as needed.

Each task will be defined in terms of its purpose, activities, staff responsibilities, and output. To the maximum extent, output will be defined in terms of deliverable products (e.g., functional requirements, system documentation, test plans, etc.) with a formal sign-off and approval process. At a project and task level, the Project Plan will contain schedules based on manpower loading and other dependencies. Cost estimates will be included for staff and operations for the life of the proposed system.

PROJECT PLAN

1. OVERVIEW

- 1.1 Objectives and Scope
- 1.2 Organization
- 1.3 Resources
- 1.4 Milestones
- 1.5 Assumptions and Constraints

2. ORGANIZATIONAL RESPONSIBILITIES

- 2.1 Organization of the Project
- 2.2 Reporting Relationships
- 2.3 Unit/Staff Responsibilities

3. RESOURCES

- 3.1 Human Resources
 - 3.1.1 Skills Mix
 - 3.1.2 Manpower Loading
 - 3.1.3 In-House/Contractor Support
- 3.2 Equipment (ADP)

4. PROJECT EXECUTION (by phase)

- 4.1 Task Description
- 4.2 Phasing Requirements (Task Dependencies and Schedule)
- 4.3 Products to be Delivered

5. PROJECT COSTS (by phase)

- 5.1 Equipment
- 5.2 In-House Staff
- 5.3 Contractor Staff
- 5.4 Operations

6. PROJECT EXECUTION FEEDBACK

- 6.1 Measuring User Satisfaction
- 6.2 Enhancement Evaluation Plan
- 6.3 Configuration Management Transition Plan

1.3. Contingency Plan

At any stage in the system life cycle, substantial change in management direction, or a catastrophic or highly unusual event, may require a partial or complete alteration to planned events. The purpose of the Contingency Plan is to ensure that the best solutions are outlined and, more importantly, to discuss the methodology for managing the change regardless of its abruptness or magnitude.

The Contingency Plan will contain the major risk areas associated with unexpected system operations, failures and disasters, and the procedures for backup and recovery from these risk areas.

CONTINGENCY PLAN

1. PRELIMINARY PLAN

- 1.1 Purpose - Statement regarding the reason for the plan, its objectives, and scope
- 1.2 Assumptions
 - 1.2.1 Events Included
 - 1.2.2 Events Excluded
 - 1.2.3 Priorities
 - 1.2.4 Support Commitments
- 1.3 Responsibilities
 - 1.3.1 Plan Preparation/Maintenance
 - 1.3.2 Emergency Chain of Command
 - 1.3.3 Operations Supervisor
 - 1.3.4 Shift Supervisor
- 1.4 Response Procedures - Depending on the type of contingency, different sets of procedures are required. Regardless of the type of contingency, however, procedures will be completed and appropriately detailed.
 - 1.4.1 Emergency Procedures - Designed to protect life, and property. These procedures are narrowly scoped.
 - 1.4.2 Backup Procedures - Designed to restore an adequate level of operations until all repairs are made.
 - 1.4.3 Recovery Procedures - Designed to deal with catastrophic events.

2. PREPARATORY ACTIONS (TASKS)

- 2.1 Organization - Complete a listing of assigned personnel with address, phone number. Design appropriate teams.
- 2.2 Inventory - Develop and maintain an inventory (on and off-site) of critical items, e.g., data files, software, lists of hardware vendors, supplies.
- 2.3 Procurement - Develop and maintain lists of suppliers, order forms, emergency acquisitions, agreements.

- 2.4 Environment - Define backup or alternative space requirements, including power requirements and site preparation procedures.
- 2.5 Transportation - Develop procedures for supplying adequate levels of transportation based on added requirements.
- 2.6 Communications - Define requirements and procedures required to maintain adequate level of communication.
- 2.7 Legal - Determine likely legal issues to be addressed, e.g., alternate site agreements, vendor performance, liability.

3. ACTION PLAN

- 3.1 Determine Level of Response Required - A statement of who has authority and responsibility for implementing the proper level of procedure
- 3.2 Implement Response Procedure
- 3.3 Monitor Operations
- 3.4 Return to Normal Operations

1.4. Quality Assurance Plan

A Quality Assurance Plan is prepared for each project initiated. The plan outlines the specific quality assurance functions to be carried out for a particular project. The plan identifies the QA coordinator for the project and the ad hoc QA group responsible for reviewing and approving system documentation. Specific QA review activities for the Requirements Analysis, Design, Software Development, and Acceptance Testing phases in application implementation are outlined in the plan. A preliminary plan is prepared in the project initiation phase and is updated in succeeding phases as more detailed information becomes known.

The Quality Assurance Plan will contain the quality assurance standards to be implemented during the developmental phase of the project and the standards to be implemented once the system becomes operational. This plan shall include procedures and guidelines to verify the integrity of contractor/OSMRE developed software products to ensure software integrity. The plan shall also include instructions on checks and balances to be tested on an ongoing basis to maintain software integrity. In addition, the plan shall include schedules for the Preliminary Design Review, software design walk-throughs, Final Design Reviews, and system plan reviews.

QUALITY ASSURANCE PLAN

1. INTRODUCTION

- 1.1 Purpose and Objectives
- 1.2 Summary of Tasks and Resources

2. QUALITY ASSURANCE PRODUCT REVIEWS (by phase)

2.1 Product 1

- * Person responsible for conducting the review
- * Attendees
- * Materials to be reviewed
- * Documents that should be read by attendees prior to the review meeting

2.N Product "N"

Include all information shown in Section 2.1 for all other products.

3. QUALITY ASSURANCE REVIEW SCHEDULE

3.1 Product 1

- * Date
- * Time (Start Date and End Date)
- * Place
- * Duration
- * Person responsible for conducting the review

3.N Product "N"

Include all information shown in Section 3.1 for all other products.

4. SUMMARY OF RESULTS

- * Exceptions
- * Correction Requirements
- * Re-review and Re-testing Required

1.5. Configuration Management Plan

Configuration Management is concerned with coordinating and controlling changes, certifying new releases of an existing system through regression testing, and maintaining a library of all baseline documentation for a system.

The Configuration Management Plan will contain all of the procedures and processes concerned with coordinating and controlling changes to the system, new releases of the system and maintenance of all relative documentation. This plan will also identify the organization entities who have responsibility for each procedure identified. The plan will contain the procedures to:

- * Receive, classify, and dispose of system problems
- * Control and coordinate revisions to the system
- * Receive, classify, and dispose of requested system changes
- * Prepare test material and perform regression tests for all system changes
- * Certify and release the new version of the system
- * Standards and requirements for a change control process
- * Testing for changes and enhancements
- * Documentation baselining procedures

1.6. Training Plan

The key components of the Training Plan are the identification of the users (management, operational, and clerical) to be trained, the materials to be used in the training, the staff who will conduct the training, and the development of a curriculum and schedule. A successful training effort requires that each of these components be completely designed and carefully executed. The purpose of the plan is to provide the detail required and to alert management to the impact of the training program on system implementation and operation.

The Training Plan will contain the training requirements necessary for the system, background and scope of the training, training schedules and facilities required, organizational responsibilities, and resource requirements. The final Training Plan shall include the course curriculum and course materials, including all teaching guides and class handouts.

TRAINING PLAN

1. Introduction

- 1.1 Background
- 1.2 Scope

2. Logistics

- 2.1 Schedules
- 2.2 Facilities

3. Organizational Responsibilities

- 3.1 Developing/Conducting Training Sessions
- 3.2 Attending Training Sessions
- 3.3 Evaluating Training

4. Resource Requirements

- 4.1 Course Development
- 4.2 Execution

5. Course Curriculum (contained in final plan)

- 5.1 Course Content
- 5.2 Media and Format
- 5.3 Materials Required

6. Training Evaluation

- 6.1 Methods of obtaining feedback
- 6.2 Training evaluation methods
- 6.3 Evaluation report

I.7. Conversion Plan

The Conversion Plan outlines the schedule and strategy for converting to the new system or enhancement that is being developed. Conversion usually involves one-time activities for data base transformation, parallel operations, user training, and organizational revisions.

The Conversion Plan will contain all required tasks necessary to accomplish the transition to the new system. The plan provides the following information:

- * Procedures for the one-time collection, purification, and transformation of data and files
- * Develop and test computer programs to support the data transformation
- * Develop the sequence of events and schedule for the phased implementation of data and processing procedures
- * Define the activities and schedules for any organizational realignment
- * Define activities for training users for one-time data collection and/or processing activities
- * Develop any special forms, procedures, and controls required for conversions

CONVERSION PLAN

1. Introduction

- 1.1 Background - A brief description of the requirements and events which have led to the need for a conversion plan
- 1.2 Scope - A statement which describes the extent of the conversion effort (e.g., hardware, software, manual procedures, organizational impact)

2. Current Environment

- 2.1 Current System Inventory
 - 2.1.1 Hardware Configuration
 - 2.1.2 System Software Inventory
 - 2.1.3 Application Software Inventory
 - 2.1.4 File/Data Base Inventory
 - 2.1.5 Overall System Complexities
 - 2.1.6 Privacy/Security Requirements
 - 2.1.7 Current Documentation Status
 - 2.1.8 Manual Procedures
- 2.2 Operating Environment
 - 2.2.1 Facilities
 - 2.2.2 Processing Modes (batch, timesharing, etc.)
 - 2.2.3 Agency Conventions/Standards
 - 2.2.4 Communication Modes
 - 2.2.5 Personnel
- 2.3 Conversion Constraints
- 2.4 Parallel Operations Plan
 - 2.4.1 Parallel operations environment
 - 2.4.2 Resources
 - 2.4.3 Parallel operations comparison test results

3. Target Environment

- 3.1 Requirements of Target System
 - 3.1.1 Hardware
 - 3.1.2 System Software
 - 3.1.3 Application Software
 - 3.1.4 Files/Data Bases
 - 3.1.5 Manual Procedures
 - 3.1.6 Privacy/Security Procedures

3.2 Operating Environment

- 3.2.1 Facilities
- 3.2.2 Processing Modes
- 3.2.3 Conventions/Standards
- 3.2.4 Communication Modes
- 3.2.5 Personnel

4. Conversion Activities

A description of those activities which are required to achieve the target environment

- 4.1 Task Plan - For each area in the target environment which is different from the current environment, a task must be formulated to achieve the change. The task should be specific, and related to the differences between the current and target system inventory/operating environment. Each task should be described in terms of its purpose, how it is to be accomplished, and the expected results.
- 4.2 Schedule - Using a target completion date as a fixed milestone, each task will be scheduled in terms of dependencies and known constraints. After resource levels are known, the schedule will be adjusted.
- 4.3 Resource Requirements - For each task, the amount of resources required for completion is estimated. Also included in the estimate are additional operational resources required for interim operations.
- 4.4 Interim/Fallback Operating Capability - To achieve the processing described in the target environment, it may be necessary to adopt temporary processing procedures during the conversion effort. In addition, to limit the possibility of a major shutdown due to the failure of any part of the system, fallback procedures will be developed to cover all reasonable contingencies.

11. APPLICATION DOCUMENTATION

II.1. FUNCTIONAL REQUIREMENTS

The purpose of the Functional Requirements document is to provide a basis of understanding between users and designers with respect to the problem to be solved, the system requirements, and related planning activities. It describes "what" the system is going to do. It includes a complete and detailed description of user needs. It describes processing requirements in terms of work flows, controls, and procedures; and performance requirements in terms of deadlines, constraints, and response times. The Functional Requirements document addressed interfaces to other systems, security and privacy, and organizational and regulatory requirements.

Functional Requirements

1. Overview of Existing Methods and Procedures

Describe the current methods and procedures that satisfy the existing objectives. Illustrate the existing data flow from data acquisition through its processing and eventual output. Explain the sequence in which operational functions are performed by the user.

- 1.1 Organizational and Personnel Responsibilities
- 1.2 Equipment Available and Required
- 1.3 Volume and Frequency of Inputs and Outputs
- 1.4 Deficiencies and Limitations
- 1.5 Pertinent Cost Considerations

2. Requirements

- 2.1 Functions - State the functions to be supported in quantitative terms, and how these functions will satisfy the performance objectives.
- 2.2 Performance - Specify the performance requirements in terms of accuracy, validation, timing, and flexibility.
- 2.3 Inputs and Outputs - Explain and show examples of the various data inputs. Specify the medium, format, range of values, accuracy, etc. Provide examples and explanation of the data outputs required of the system, and any quality control outputs that have been identified. Include descriptions or examples of hard copy reports (routine, situational, and exception) as well as graphic or display reports.

3. External Considerations

- 3.1 Interfaces - Describe the interfaces with other software.
- 3.2 Security and Privacy - Describe the overall security and privacy requirements imposed on the system. If no specific requirements are imposed, state this fact.

3.3 Audits and Controls - Describe the operational audits and controls on the system. Identify the sources of these controls.

11.2. SYSTEM OVERVIEW

The System Overview documents the system's functions in a discussion that is geared toward higher level managers. It provides historical and operational perspectives on the system through a discussion of the system's origin and the environment in which it operates. It includes a discussion of the key issues and approaches used during system development and acquisition. Also included is a brief discussion of volumes, processing characteristics, and resource requirements.

SYSTEM OVERVIEW

1. Introduction

- 1.1 Description - Provide a general description of the system in terms of its major characteristics. Indicate any unique requirements supported by the system and describe its size in general, but quantitative terms.
- 1.2 Functions - Briefly describe the major functions of the system and delineate in broad terms areas of automated and manual procedures.

2. Operating Environment

- 2.1 Equipment - Identify the equipment required for the operation of the system. Identify any new equipment required and relate it to specific functional requirements to be supported. Include information, such as: 1) Processor and size of internal storage; 2) Storage, online and offline, media, form, and devices; 3) Input/output devices, online and offline; 4) Data transmission devices.
- 2.2 Support Software - Identify the system software and describe any test software.
- 2.3 Interfaces - Describe the interfaces with other systems.
- 2.4 Security and Privacy - Describe the overall security and privacy requirements imposed on the system/subsystem. If no specific requirements are imposed, state this fact.
- 2.5 Audits and Controls - Describe the operational audits and controls imposed in the system/subsystem. Identify the sources of these audits and controls.

3. Concept of Operations

3.1 Automated Capabilities - Describe the automated support offered to the user. In nontechnical terms explain the automated processing accomplished by

the system.

3.2 Manual Procedures - Describe those processes which will be accomplished manually. Provide references to appropriate manuals and new forms (if any).

3.3 System Performance

3.4 System Sizing - Description of file and transaction size, volume, and frequency.

4. Summary of Improvements

4.1 Improvements to Program Operations

4.2 System Improvements

4.3 Provide in diagram or matrix form a comparison of the capabilities and limitations of the existing system as compared to the system to be developed.

11.3. PROGRAM SPECIFICATIONS

The Program Specifications document provides descriptions of the computer programs which have to be developed to perform the system application, and software products which have been acquired. The purpose of the Program Specifications documentation is to specify for programmers the requirements, operation environment, and design characteristics of each computer program.

The documentation which accompanies software products must be of sufficient quality to perform system testing, and to install in an operational environment. While it is not possible to prescribe the exact format of acquired documentation, certain minimal standards will be observed.

PROGRAM SPECIFICATIONS

1. Introduction

- 1.1 Purpose
- 1.2 Scope
- 1.3 Applicable Documents
- 1.4 Maintenance of Program Specifications

2. Program Overview

- 2.1 Program Description
- 2.2 Program Flow
- 2.3 Program Unit Identifications
- 2.4 Program Interfaces

3. Program Characteristics

3.1 Program Design

3.1.1 Program Unit No. 1 Identification

- 3.1.1.1 Requirements Allocation
- 3.1.1.2 Unit Functions
- 3.1.1.3 Unit Description
- 3.1.1.4 Program Logic Flow
- 3.1.1.5 Interfaces
- 3.1.1.6 Special Requirements

3.1.N Program Unit No. "N" Identification

Duplicate sections 3.1.1.1 through 3.1.1.6
for each program unit.

- 3.2 Performance Requirements
- 3.3 Inputs/Outputs

4. Environments

- 4.1 Equipment Environment
- 4.2 Support Software Environment
- 4.3 Interfaces
- 4.4 Security and Privacy

II.4 USERS MANUAL

The purpose of the Users Manual is to describe in sufficient detail to the user the functions performed by the application software. It should serve as a reference document for the preparation of input data and parameters, and interpretation of results. Several factors determine whether, and in how much detail, user documentation will be generated. Generally, the topics covered and the level of detail provided vary according to the extent of user involvement.

The Users Manual addresses the direct user involvement with a computer capability, or when instructions are necessary for the user to prepare inputs to, and interpret outputs from, a manual capability. The manual addresses three general areas: general information about the system; a system overview; and, where appropriate, detailed procedures.

USERS MANUAL

1. General Information

- 1.1 Summary - Describe the general functions of the software.
- 1.2 Environment - Identify the user area organization and computer center capability which will run the operational system.

2. Applications

- 2.1 Description - Describe when and how the software is used and the unique support provided to the user organization.
- 2.2 Operation - Identify the operating relationships of the functions performed to the organization that provides support to, and receives output from, the software. Describe security and privacy considerations.
- 2.3 Equipment - Describe the equipment on which the software can run.
- 2.4 Structure - Describe the logic of the system
- 2.5 Performance Characteristics - Provide quantitative information on inputs, outputs, response times, processing times, and error rates. Provide qualitative information about flexibility and reliability.
- 2.6 Inputs, Data Preparation, and Outputs - Describe the inputs, the flow of data into the processing cycle, and the resultant outputs. Include any applicable relationships among inputs or outputs.
- 2.7 Data Base - Describe all data files in the data base that are supported, referenced, or kept current by the software. The description should include the purpose for which each data file is maintained.

3. Detailed Procedures

- 3.1 Initiation - Describe the step-by-step procedures required to initiate processing of individual transactions or batches of transactions.
- 3.2 Input - Define the requirements of preparing input data and parameters.
- 3.3 Output - Describe the requirements relevant to each output (e.g., use, frequency, documentation)
- 3.4 Error and Recovery - List error codes or conditions generated by the software, and corrective action to be taken by the user.
- 3.5 File Query - Provide instructions necessary for initiation, preparation, and processing of data base queries. Describe query capabilities, forms commands used, and control instructions required.
- 3.6 System Access - Describe user access procedures to system resources and security features imposed on the system.
- 3.7 Audit and Controls - Describe user procedures for system audits and control operations.

11.5 OPERATIONS MANUAL

The Operations Manual is directed toward the ADP system staff who will actually run the system. The manual contains the information and procedures necessary to properly operate the system once it has been put in a production mode. The Operations Manual describes job setup procedures, work schedules, control procedures, data retention schedules, backup and recovery procedures, and job output distribution requirements. The computer equipment and special software required to complete each job or runstream is also specified. Quality control requirements and procedures, such as verification of expected output, are also included in the manual. Job streams for the on-demand, daily, weekly, monthly, quarterly, and annual processing cycles are defined.

OPERATIONS MANUAL

1. General Information

- 1.1 Summary - Identify the system in terms of its general purpose and where it fits in the user organization. Describe the system in terms of the general functions it performs and the operations cycle.
- 1.2 References - Identify any project documents which are relevant to the operation or maintenance of the system.

2. Overview

- 2.1 Software Organization - Provide a diagram showing the inputs, outputs, data files, and sequence of operations of the software. Runs may be grouped by periods of time cycles, or by other appropriate groupings.
- 2.2 Program Inventory - Identify each program by title, number, and mnemonic reference.
- 2.3 File Inventory - Identify each permanent file that is referenced, created, or updated by the system. Include the title, mnemonic reference, storage medium, and required storage.

3. Description of Runs

- 3.1 Run Inventory - List the various runs possible and summarize the purpose of each run. Show the programs that are executed during each run.
- 3.2 Run Progression - Describe the manner in which progression advances from one run to another so that the entire run cycle is completed.
- 3.3 Run Description - Organize the information on each run into the most useful presentation for the operating center and operations personnel involved.

3.3.1 Control Inputs - List the run stream control statements needed for the run.

3.3.2 Operating Information - Provide information for the operating center personnel and management, such as:

- * Run identification
- * Operating requirements
- * Initiation method, such as: on request, at a predetermined cycle, etc.
- * Estimated run time and turnaround time
- * Operator commands and messages
- * Contacts for problems with the run

3.3.3 Input-Output Files - Provide information for files created or updated by the run, such as:

- * File name or label
- * Recording medium
- * Retention schedule
- * Disposition of file

3.3.4 Output Reports - For each output report or type of report, provide information, such as:

- * Report identification
- * Medium
- * Volume of report
- * Number of copies
- * Distribution

3.3.5 Reproduced Output Reports - For those reports that are computer-generated and then reproduced by other means, provide information, such as:

- * Report identification
- * Reproduction technique
- * Dimensions of paper or other medium
- * Binding method
- * Distribution

3.3.6 Restart/Recovery Procedures - Describe the procedures to restart the run or recover from a failure.

3.4 Subsequent Run Description - Present information about the subsequent runs in a manner similar to that used in Section 3.3

4. Non-Routine Procedures

Provide any information necessary concerning emergency or non-routine operations, such as a switchover to a back-up system. Identify relevant documentation which includes emergency or non-routine procedures to be followed under non-standard operating conditions.

11.6 TECHNICAL SPECIFICATIONS

The purpose of the Technical Specifications document is to specify the requirements of the computer software and hardware which will support the functional components of the system. It will describe the requirements for data handling and other special purpose software, as well as operating system software. Included in this document are the requirements for achieving system integrity, reliability, and security.

TECHNICAL SPECIFICATIONS

1. Introduction

- 1.1 Background - Provide a general discussion on the technical requirements for the system, its importance, and its relationship to other systems.
- 1.2 Functions - Specify the technical functions to be supported by the system. Provide quantitative and qualitative information to describe each function.
- 1.3 Performance - Describe the system in terms of general performance requirements the technical specifications are to support.

2. Hardware Specifications

Describe the logical and physical configuration of the equipment required for the operation of the system. Provide space diagrams and floor plans as appropriate.

3. Telecommunications Specifications

Provide a logical and physical description of the communications network.

4. Support Software

Identify current releases in effect and any planned releases by proposed installation dates.

- 4.1 Operating System
- 4.2 Test Software
- 4.3 Other Proprietary Software

5. Data Base

5.1 Logical Organization of the Data Base

- 5.1.1 Design Description
- 5.1.2 Graphical Representation of Data Base
- 5.1.3 Files
- 5.1.4 Records
- 5.1.5 Fields
- 5.1.6 Tables and Entries
- 5.1.7 Relationship of Computer Program Components to Data Base
- 5.1.8 Data Element Definitions and Chains

5.2 Physical Organization of the Data Base

5.2.1 Physical Description of the Data Base
(Partitioning)

5.2.2 Physical Description of Each Partition

5.2.3 Size and Storage Requirements

6. Application Software Description

6.1 Subsystem 1

6.1.1 Operating Characteristics

6.1.2 Subsystem Logic (Overview)

6.N Subsystem "N"

Include the same sections for all subsystems as shown in Section 6.1.

11.7 PROGRAM MAINTENANCE MANUAL

The Program Maintenance Manual is developed for use by analysts and programmers in the performance of program maintenance or enhancement activities. It provides the information necessary to understand the coded programs, their operating environment, and their maintenance procedures.

PROGRAM MAINTENANCE MANUAL

1. General Information

- 1.1 Summary - Describe the system in terms of the functions it performs and the general nature of the software.
- 1.2 Reference - Identify any documents which might be useful to the maintenance programmer in understanding the programs and the operating environment.

2. Program Descriptions

Describe each program in the system/subsystem for the maintenance programmer. If a complex system is being described, provide a general description of that system identifying each program and its function.

- 2.1 Program Description - Identify the program by title, tag or label, and programming language.
 - 2.1.1 Problem and Solution Method - Describe the problem to be solved or the program function and the solution method used.
 - 2.1.2 Input - Describe the input to the program and provide a layout. Identify the medium used. Include information, such as: codes, units of measurement, format, range of values, or reference a data element directory.
 - 2.1.3 Processing - Describe processing features and purposes important to the maintenance programmer, such as:
 - a. Processing logic
 - b. Linkages
 - c. Variables and constants
 - d. Formulas
 - e. Error handling provisions
 - f. Restrictions and limitations
 - g. Locations, settings, internal switches, and flags
 - h. Shared storage
 - 2.1.4 Output - Describe the output of the program and provide a layout. Identify the medium used.

2.1.5 Interfaces - Describe the interfaces with other software, such as: data formats, messages, parameters, conversion requirements, interface procedures, and media.

2.1.6 Tables - Identify each table and its items. Describe the location, structure, and purpose of each.

2.1.7 Run Description - Describe or reference the operating procedures to run the program, including loading, operating, terminating, and error handling.

2.2 Program Description - Describe the second through "Nth" computer program in a manner similar to that used in Section 2.1.

3. Operating Environment

3.1 Hardware - Identify the equipment required for the operation of the system. Describe any unusual features used. Relate the hardware to each program. Include information, such as:

- a. Processor and size of internal storage
- b. Storage online or offline, media, form, and devices
- c. Input/output devices, online and offline
- d. Data transmission devices

3.2 Support Software - Identify the support software needed for each computer program.

3.2.1 Operating System - Identify and describe the operating system, including the version or release number and any unusual features used.

3.2.2 Compiler/Assembler - Identify and describe the compiler or assembler, including the version or release number and any special features used.

3.2.3 Other Software - Identify and describe any other software used, including data management systems report generators, etc.

3.3 Data Base - Describe or reference documentation on the data base used. Include information, such as: codes, units of measurement, format, range of values, or reference a data element directory.

4. Maintenance Procedures

4.1 Programming Conventions - Identify and describe the programming conventions.

4.2 Verification Procedures - Describe the verification procedures to check the performance of the programs, either general or following modifications. Include a reference to test data and testing procedures.

4.3 Error Correction Procedures - Describe all error conditions, their sources, and procedures for their correction.

4.4 Special Maintenance Procedures - Describe any special procedures required for the maintenance of the programs. Include information, such as: periodic purges of the data base, temporary modifications needed for leap years or century changes, etc.

4.5 Listings and Flowcharts - Describe the method for obtaining copies of listings or the programs and flowcharts.