Canada

DELIVERABLES REFERENCE MANUAL

INFORMATION SYSTEMS MANAGEMENT

Regional Economic Expansion

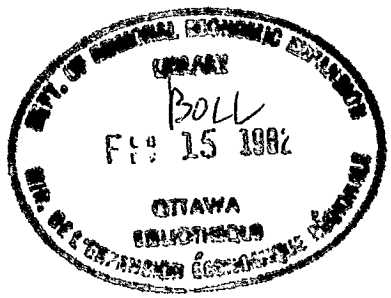
Expansion Économique Régionale

Canada.

DEPARTMENT OF REGIONAL AND ECONOMIC EXPANSION

SYSTEMS DEVELOPMENT LIFE CYCLE METHODOLOGY

DELIVERABLES REFERENCE MANUAL



OCTOBER, 1981

I N D E X

NOTE: It is recognized that all roles referred to throughout this document will be filled by persons of either sex. However, to maintain readability, personel pronouns of the male gender are used.

He should be read as he/she.

His should be read as his/hers.

Him should be read as him/her.

SYSTEMS DEVELOPMENT LIFE CYCLE METHODOLOGY

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SYSTEMS DEVELOPMENT LIFE CYCLE METHODOLOGY

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SECTION 1

INTRODUCTION

1. INTRODUCTION

1.1 Purpose

This is one of a set of System Development Methodology manuals. The other manuals in this set are:

- Project Management Handbook
- User's Guide
- Analysis Guide
- Design Guide
- Programming Guide

Each of the above describes a principal role in the Systems Development Life Cycle.

This Deliverables Reference manual supplements the other manuals by describing in detail the deliverables from each phase of the Life Cycle.

1.2 Scope

While the methodology described in the set of manuals is equally applicable to any information system whether it be a business or a technical system and automated or manual, its orientation, beginning with the Systems Design phase, is unavoidably towards computer applications. In view of this, it is important that when system solutions are conceived the status quo and manual systems be considered on an equal basis with automated systems.

Ideally, this methodology should be used in the context of DREE's overall departmental systems planning process. Thus, this methodology has been developed with the assumption that a proposed systems development project will be evaluated in relation to the Department's Long Range Systems Plan, which will make it possible to priorize systems development projects. It is also assumed that for significant projects, regular status information will be fed into the monitoring process of the Department's systems plan.

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SECTION 2

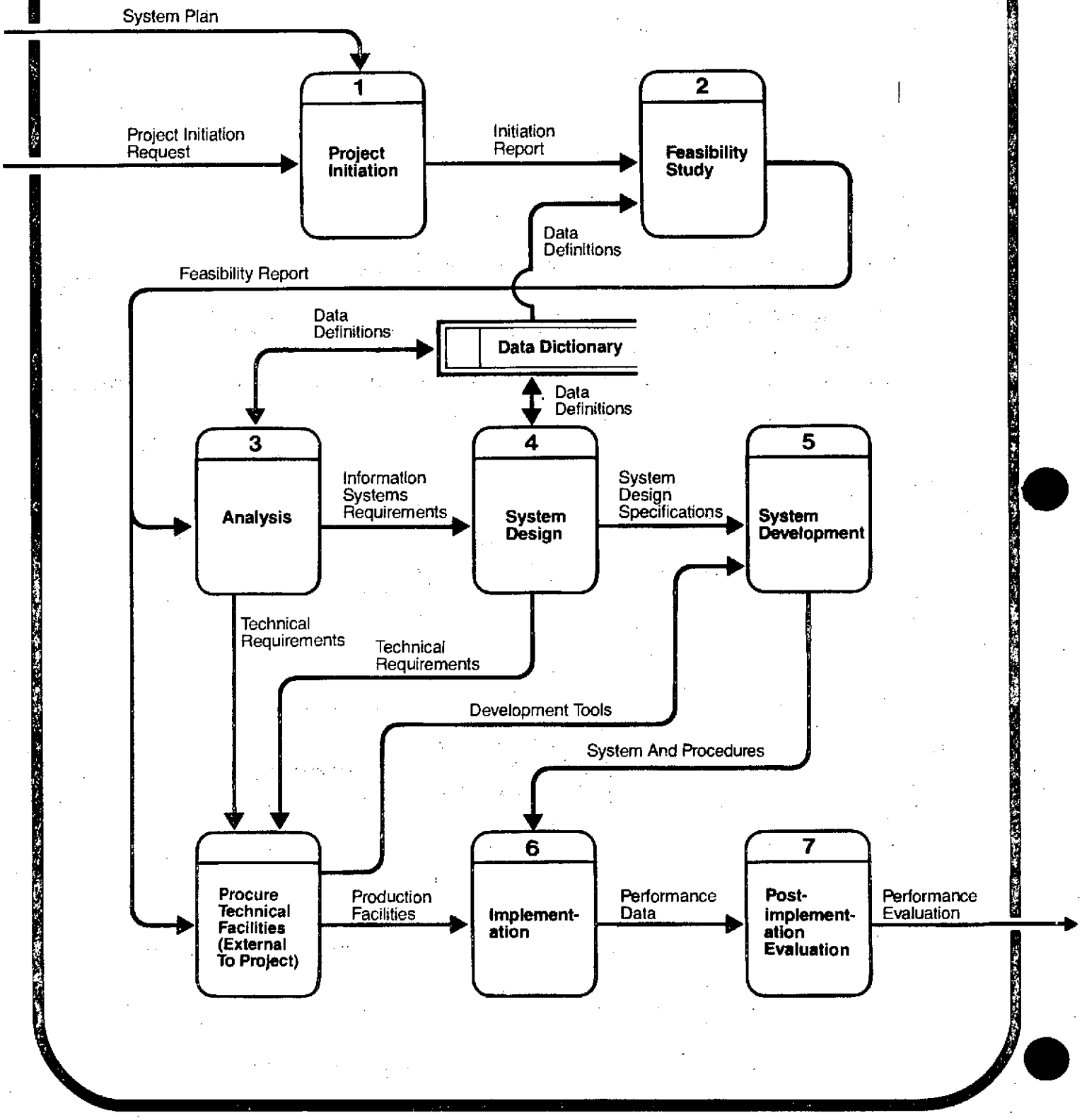
SYSTEM DEVELOPMENT LIFE CYCLE

2. SYSTEM DEVELOPMENT LIFE CYCLE

The data flow diagram on the following page identifies the principal groupings of deliverables (outputs) produced during the development life cycle of a systems project.

A complete description of the life cycle can be found in the Project Management Handbook.

Systems Development Life Cycle



SYSTEMS DEVELOPMENT LIFE CYCLE METHODOLOGY

DELIVERABLES REFERENCE MANUAL

SECTION 3

DESCRIPTION OF DELIVERABLES

3. DESCRIPTION OF DELIVERABLES

3.1 Initiation Report

A. Purpose

The Initiation Report documents the initial perception of the problem to be solved, opportunity to be exploited or requirement to be addressed and the initial agreement on the general nature and scope of the project in terms of:

- the reasons for the project;
- the benefits; and
- the project constraints.

In addition, the Initiation Report assigns a preliminary target date for completion of the total project and identifies staff and control bodies with project development and approval responsibilities.

B. Preparation

The Initiation Report is prepared in response to a Project Initiation Request.

C. Description

Initiation Reports are documented in a standard format.

The items to be provided in the Initiation Report include:

. Project Identification

PROJECT NAME	:	A descriptive project name.
PROJECT ORIGINATOR	:	The name and title of the person originating the request for the project.
ORIGINATING ORGANIZATION	:	The name of the originating organizational unit or branch.

3.1 Initiation Report

. Problem to be addressed

PROBLEM REQUIREMENT OR OPPORTUNITY : A brief description of the problem to be solved, opportunity to be exploited or requirement to be addressed.

. Approach to Solution

OBJECTIVES : A statement of what the project will achieve and expected outputs. These should coincide with Departmental objectives and contain statements which can be understood by those directly concerned.

SCOPE : A brief description of the boundaries within which the project will be conducted; for example, organizational units, business processes, geographical locations.

POTENTIAL BENEFITS : A brief statement of the anticipated benefits both tangible and intangible and quantified to the extent possible.

TIMEFRAME : Time range during which the system should be implemented.

ENVIRONMENT : Identify the manual and computer systems that may be affected.

CONSTRAINTS : A brief description of the constraints within which the project must operate.

For example:

- time constraints;
- dollar constraints;
- staffing constraints; and
- confidentiality of information constraints.

3.1 Initiation Report

BUDGET AND RELATIONSHIP TO SYSTEM PLAN : Identify source of funds and relationship to the Long Range Systems Plan.

RESOURCE PLAN FOR FEASIBILITY STUDY : State resource requirements, timeframe to carry out Feasibility Study and approach to be used.

RECOMMENDATION : Recommend course of action and indicate whether manual or EDP solution appropriate.

. Project Responsibilities

PROJECT MANAGER: Name

SYSTEM ASSURANCE MANAGER : Name

APPROVAL AUTHORITIES : Identify which committee or Manager is to approve project deliverables.

3.1 Initiation Report

BUDGET AND RELATIONSHIP TO SYSTEM PLAN : Identify source of funds and relationship to the Long Range Systems Plan.

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PROJECT MANAGER: Name

SYSTEM ASSURANCE MANAGER : Name

APPROVAL AUTHORITIES : Identify which committee or Manager is to approve project deliverables.

3.2 Feasibility Report

A. Purpose

The overall objective of the Feasibility Report is to present an analysis of alternative solutions for improving a present system or establishing a new one and to describe in general terms a proposed solution.

Usually, no major project costs are incurred until the end of the Feasibility Study phase. Enough analysis should be carried out during the Feasibility study to ensure that the proposed system is feasible, and to estimate its costs and benefits.

As a result of the feasibility study management may decide to develop a new system, to make improvements to an existing system, or to do nothing.

B. Preparation

The Feasibility Report is a product of the Feasibility Study phase and is the responsibility of the Project Manager. It should be reviewed by the user and approved by management before the Analysis phase starts.

The Feasibility Report does not need to be maintained in later Life Cycle phases. This is not to say that the concepts and assumptions made in this phase will not be reviewed, possibly revised and redocumented in later phases.

3.2 Feasibility Study

C. Contents

The Feasibility Report is actually made up of two separate sections. The first is the User Requirements Section, and the second section contains the presentation of a Conceptual Solution. In large projects these two reports may be produced during two distinct sub-phases, with development and approval of the user requirements taking place prior to any development and evaluation of alternative solutions for meeting the requirements. In other cases, where the scope of the project is more restricted, both sections may be completed by the project team prior to the formal review and approval by the user.

For the purpose of this document, the deliverables are presented as two separate reports:

- 3.2.1 User Requirements
- 3.2.2 Conceptual Solutions

3.2.1 User Requirements

A. Purpose

The purpose of the User Requirements Report, Section 1 of the Feasibility Report, is to present a comprehensive statement of the users' information requirements that need to be resolved by any system subsequently developed. Essentially it is an elaboration of the Initiation Report and as such expands the initial perception of the problem to be solved, opportunity to be exploited or requirement to be addressed. In doing so, the User Requirements Report documents the business environment within which the project scope is bounded, the users' information requirements and the extent to which these are being realized by the existing manual or computer systems.

B. Preparation

The User Requirements Report is a product of the data gathering and analysis activities of the Feasibility Study phase. For large projects, the report should be reviewed by the user and approved by user management before the activities involving the development and evaluation of alternative solutions begin. For smaller projects, there may be no formal approval of the user requirements; rather they may be incorporated with the report on the Conceptual solution (3.2.2) and be formally approved at that time.

Once approved, the user requirements provide the framework and basis for the remainder of the project.

C. Contents

The User Requirements Report consists of the following sections:

3.2.1 User Requirements

1. Executive Summary

2. Introduction

3. Description of Business Processes

   3.1 Overview
   3.2 Business Process 1
      3.2.1 Function Charts
      3.2.2 Function Descriptions
   3.3 Business Process 2, etc.

4. Evaluation of Existing System

   4.1 Overview
   4.2 Business Process 1
      4.2.1 Physical DFD
      4.2.2 Process Descriptions
      4.2.3 Observations
      4.2.4 Evaluation
   4.3 Business Process 2, etc.

5. User Requirements

   5.1 Overview
   5.2 Business Process 1
      5.2.1 Logical DFD
      5.2.2 Process Descriptions
      5.2.3 Requirements Notes
      5.2.4 Preliminary Data Definitions
   5.3 Business Process 2, etc.

3.2.1 User Requirements

D. Description

1. Executive Summary

The Executive Summary provides management with a précis of the contents of the User Requirements Report. The executive summary should address the following topics:

- Background Information

  This is a brief history of the project outlining the events leading to this phase and to the development of this report.

- Summary of Requirements

  This should provide a summary of the requirements and the extent to which they are currently being met.

2. Introduction

2.1 Objectives and Scope of the Project

This section should contain a brief description of the objectives, purpose and scope of the project.

2.2 Approach and Methodology

This section should specify the approach and methodology employed in gathering and presenting the information in this report.

2.3 Management Control

This section should outline how management control was exercised during this phase of the project.

If more than one project supervision authority exists for a given project, the function of each authority is to be identified as well as its relationship to both the project team, and if applicable, to the other authorities.

3.2.1 User Requirements Report

D. Description

2.4 Project Team

The team members and organization of the project team should be identified.

The team organization could be shown in both chart and narrative format. The chart should show the title of each member. The narrative explains the responsibilities of each member.

Each team member's name should be noted on the chart and a list identifying the title, department, or, in the case of contract personnel, the company by whom they are employed, should be provided.

2.5 Organization of the Report

This section should explain the organization of the report with a brief description of the contents of each section.

3. Description of Business Processes

Any system should be developed to support a business or a portion of a business. It is therefore important at the outset of the project to understand the business context within which the problem or opportunity lies. Much of this information would normally be available from the Department's Long Range Systems Plan.

3.1 Overview

This sub-section contains an overview of the business processes that are within the context and scope of the project and shows the relationship of these business processes to the overall Departmental business framework. This overview consists of the highest level of the functional hierarchy.

3.2.1 User Requirements Report

D. Description

3.2 Business Process 1

The heading of this sub-section should actually name the Business Process, e.g. Administer RDIP's.

3.2.1 Function Chart

The Function Chart shows all the required business processes arranged in a hierarchical fashion from the overall business process at the highest level to module processes at 3 or 5 lower levels. An example of a function chart is shown below. This diagram acts as a "graphical table of contents" for the requirements, allowing the reader to go directly to any process in the first few levels of the system and identify the required inputs and outputs, and the next level of process required to be performed to ensure that the higher level process is carried out.

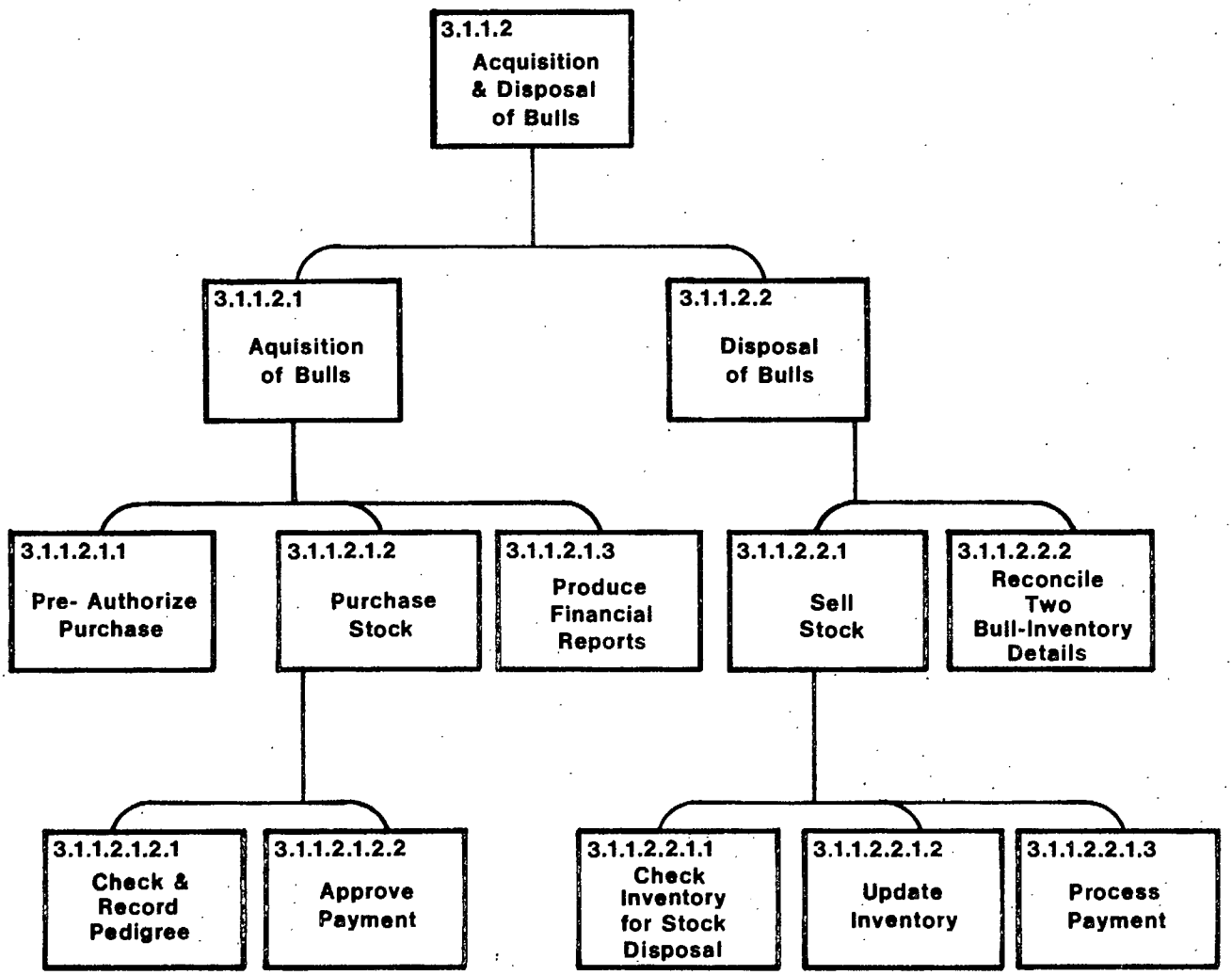
Processes not specifically addressed by the study, but, logically related to the processes being studied may appear on charts for informational purposes.

The process "title" should be a simple imperative sentence ideally starting with an action verb (calculate, extract, verify) followed by an object or object clause, for example:

Handle Contract Queries;
Establish Control;
Calculate Costs.

The action verb should not be so general as to make the intent vague - e.g. process. Usually this occurs when the function is not fully understood by the analyst.

ACQUISITION AND DISPOSAL OF BULLS



3.2.1 User Requirements

D. Description

Each process box, except those described for purposes of information only, is assigned a reference number which connects it to the boxes above or below it in the hierarchy. The numbering on the chart(s) should follow a standard. The highest level box should be that assigned at project initiation and should be the same as that identified in the Department's Long Range Systems Plan. The subordinates of each function are numbered from left to right starting from 1 as shown on the example.

The first digits of a lower level should match the digits of the parent box on the previous level. The next digit should start with '1' for the left-most box on that level and increment by '1' for each box on that level within the same parent.

The function chart will be expanded upon during later phases of the system life cycle.

3.2.2 Function Descriptions

The purpose of this sub-section is to briefly describe the business processes identified on the function charts. Only those business processes that are within the scope of the project need be defined; other processes shown on the function charts for context purposes need not be described. The descriptions for the higher level processes should be brief and general in nature since they are completely defined and explained by the lower level functions. Furthermore, the functions will be detailed in the Analysis phase and, thus, the description required at this stage is solely to enable the general user requirements to be ascertained and understood.

In describing the functions, the use of normal business terms and expressions is mandatory. The subject headings to be included in the function descriptions are as follows:-

3.2.1 User Requirements

Description

- Study Area

  This heading represents the overall business function or process addressed by this study.

- Date (completed or revised)

  This should be inserted at the completion of all descriptions within the study area. If a section of the chart is to be modified later, the revised date should appear only on those pages being modified.

- Business Function Name

  The exact name of the process as it appears on the function chart.

- Function Reference

  The exact reference number as it appears on the function chart.

- Objective

  A statement outlining the prime objective of the business function.

- Description

  A brief description of the function. For the lowest levels this description will be more detailed than for the higher levels. Usually this is a summary of the next level of sub-processes. No attempt should be made to describe how something is done, only what processes must be performed.

3.3 Business Process 2

The development of the function charts and the associated business function descriptions should be continued in the same manner as above, for each business process within the scope of the project.

3.2.1 User Requirements

D. Description

4. Evaluation of Existing Systems

A review and evaluation of the existing systems is the logical starting point for the determination of user requirements.

A knowledge and understanding of the existing system provide a framework for the data gathering activity regardless of which method is chosen from the various alternatives; observation, interviewing or questionnaire administration. In addition, many of the user requirements will be described as shortcomings or problems with the existing system. Finally, the overview of the present system will provide a basis for better understanding the proposed system and the reasons for change.

The "existing system" is not limited to any currently computerized system. Rather it incorporates the present methods and procedures that have been developed in support of the business processes and no differentation is made between manual or computerized procedures.

4.1 Overview

This sub-section should present a narrative overview of the present system and procedures and should identify any changes already planned.

The description and documentation of the present system does not need to be detailed since the system is likely to change when the proposed system is implemented.

4.2 Business Process 1

The existing systems should be organized and described in accordance with the business processes that they support. These business processes are the ones identified and described under section 3 above. In effect, the function chart depicting those business processes continues to be the graphical table of contents for this section on the evaluation of existing systems.

3.2.1 User Requirements

D. Description

4.2.1 Physical Data Flow Diagram

The function charts show the hierarchical dependency of processes but do not show the interrelationships or the data flows between processes. Data flows from one process to another to provide the inputs so that each business process can be carried out.

The Physical Data Flow Diagrams or PDFD's relate to the function charts and descriptions and provide a diagram of the flows of data among the processes. They are physical in that they represent how the flows of data exist as a consequence of the current system. The physical flows may not represent what is actually required to opitamally support the business function, but what has been developed and evolved to this point in time. Logical Data Flow Diagrams (LDFD's) represent the essential whats of the system; these are described below in Section 5. Although the manner in which they are depicted is as outlined here.

The level to be diagrammed depends on the specific characteristics of the system under consideration. Clarity is usually provided by preparing data flow diagrams of the different levels. The higher levels of diagrams can then be verified with the users before proceeding to the next lower level. The lowest level of diagram should provide information in a sufficient level of detail to clearly and fully understand the operation of the information processing system.

An example of a data flow diagram is shown below. It should be noted that the diagram depicts events in a steady state. It does not show any initiation of activities, decisions, flow of control or time sequence of events.

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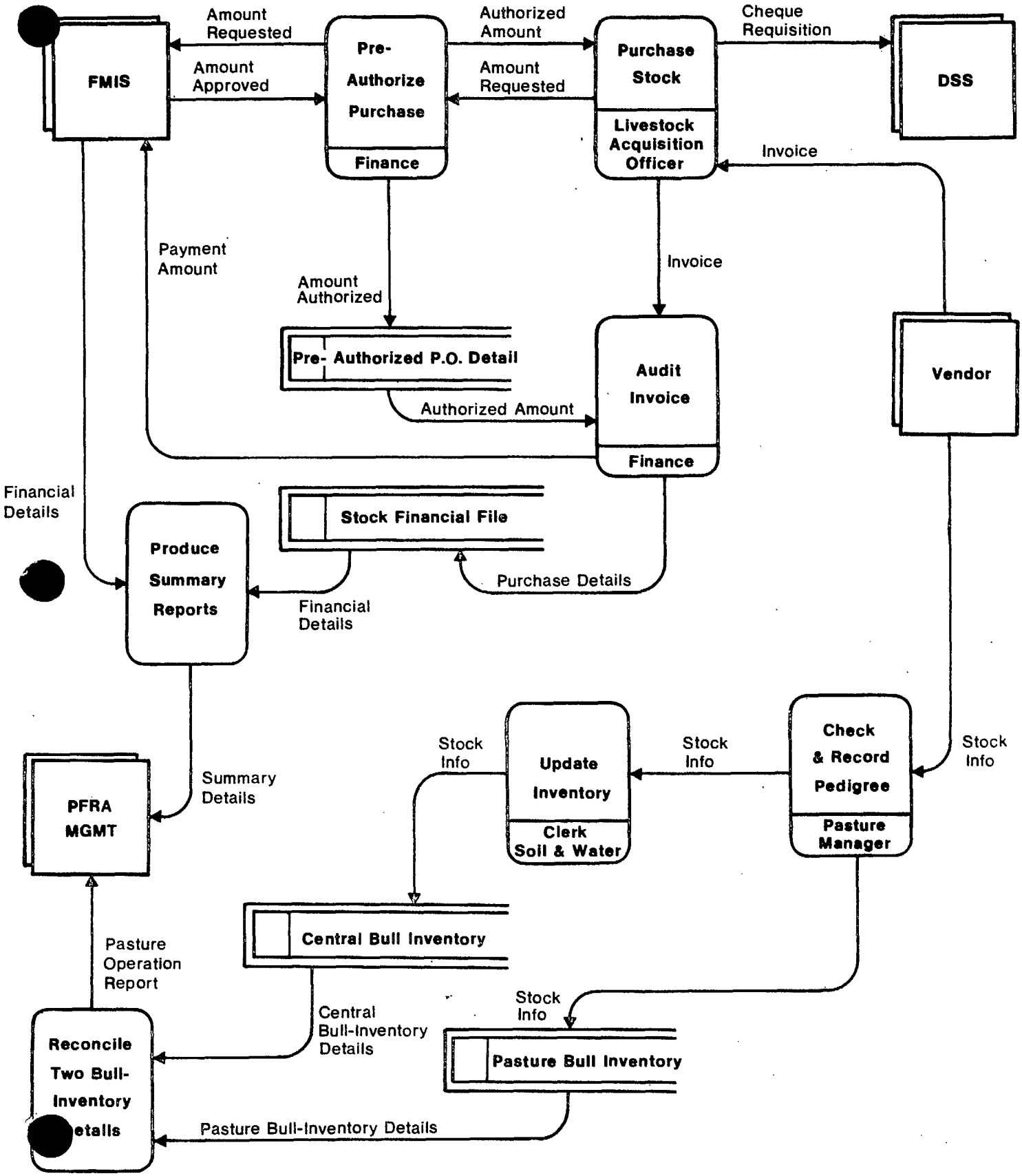
PHYSICAL 3.1.1.2.1



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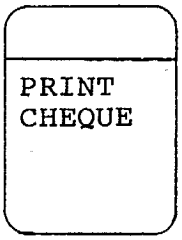
INFORMATION SYSTEMS MANAGEMENT
GESTION DES SYSTÈMES D'INFORMATION

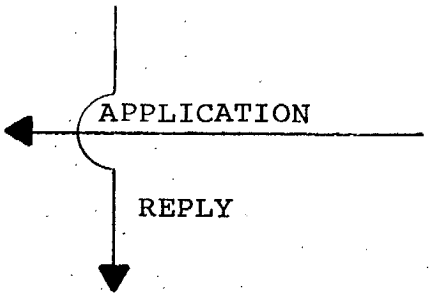
There are four symbols used in the DFD, which are described briefly below:

This symbol is called an "external entity" and represents any logical class of things or people which can be considered a source or destination of data.



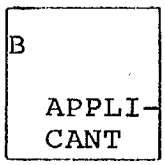
This is the "process" symbol. It presents a process or activity carried out on data as it moves through the system. The reference number is inserted at the top of the symbol. A dashed-line version of this symbol represents an optional process

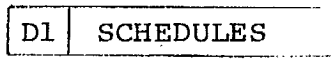
The "data store" symbol is used to show data at rest between processes. While data stores may be in the form of files, catalogues, forms, etc, the physical method of storage should be ignored for these purposes. Data stores should be viewed as "conceptual warehouses" for data. The data store identifier is inserted to the left of the data store symbol.



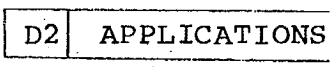
The arrow, which can be single - or double - ended, is used to show data in motion between external entities, processes and data stores. When one flow is required to cross another, the "little hoop" convention should be used. Optional data flows can be represented with a dashed line.

Reference numbers can be used with the external entity or data store symbols.





If the same reference is used more then once in a data flow diagram, it is easier to recognize them as the same, by marking them appropriately.



3.2.1 User Requirements

D. Description

The numbering system for DFD's follows the rules outlined under the description of function charts in Section 3 above. In fact the processes in the DFD have the same numbers as those assigned to the corresponding function on the function chart. Where the data flow diagram explodes a process to a lower level than that depicted on the Function chart then the same method of hierarchial numbering is used. For further information on the use and techniques of data flow diagrams, the book "Structured Analysis" by Chris Gane and Trish Sarson, published by IST Data books, New York, 1977, is highly recommended.

4.2.2 Process Descriptions

The purpose of this sub-section is to provide a more detailed description of the processes than that which is contained in the function charts. Again, however, it should be recognised that the descriptions are only required for the development of a statement of user requirements and a conceptual systems solution that meets these requirements. Indeed, to the extent that the current system is superceded by the selected project solution, a description of the existing system processes is completely wasted. Note also that in the later Analysis phase, precise and detailed specifications of processes, data manipulation, and the inputs and outputs pertaining to each elementary process will be added to enable the detailed system design to be completed.

In providing the process descriptions, those for higher levels should be very brief and general in nature as they are completely defined by the sub-processes.

3.2.1 User Requirements

D. Description

The subject headings to be included are as follows:-

- Study Area

  This heading describes the overall business function addressed.

- Date (completed or revised).

  This should be inserted at the completion of all descriptions within the study area. If a section of the DFD is modified later then the revised date should be entered on the pages modified.

- Process Name

  The exact name of the process as it appears on the data flow diagram.

- Process Reference

  The exact reference number as it appears on the data flow diagram.

- Objective

  A statement outlining the prime objective for which this process is performed.

- Description

  A brief description of the process. For the lowest levels this description will be more detailed than for the higher levels which are usually simply a summary of the next level of sub-processes. These descriptions should describe both what is done in the process and how it is performed.

- Trigger

  Identify the event which causes this process to be put in motion.

3.2.1 User Requirements

D. Description

- Sub-processes

  A list of reference numbers and their corresponding titles should be shown here for all sub-processes identified on the data flow diagrams. The reference numbers and titles must match the diagram references.

- Input

  Describe the data classes needed upon entry to this process in order to perform it.

- Output

  Describe the data classes which the process delivers as a result of it being executed.

- Reference Data

  Identify any other data which is referred to in order to execute the process. These references are not part of the data flow but are required as a "tool" to perform the task. It is unlikely that the reference data would be automated. Examples are: legal information, policies, correspondence.

- Service Level

  Identify any time constraints imposed on this process. Include the volume of data and frequency which may impact this service level.

- Documentation Reference (optional)

  Identify existing authorities (directives) which describe what the task consists of or any constraints placed on it.

- Problems (optional)

  Identify any problems which are impacting the performance of the present system or which, if not known ahead of time, may have an impact on the design of a new system - e.g. service level.

- Constraints (optional)

  Identify any constraints which must be taken into account when deciding upon a solution for the design of a new system, e.g. budget, staffing, geographic constraints, etc.

3.2.1 User Requirements

D. Description

4.2.3 Observations

This section presents the comments and observations resulting from data gathering in the user areas.

Aspects to be addressed are:

- Problems from a user perspective;
- Strengths of existing system;
- User requested improvements;
- Opportunities to be explored;
- Urgency of change.

4.2.4 Evaluation

This section should evaluate the existing system against the business process requirements described in section 3 above.

A statement as to whether to replace, modify or retain the existing system should be made and supported by a description of the advantages and disadvantages of following the stated course.

4.3 Business Process 2

The review and evaluation of existing systems is continued in the same manner for each business process within the scope of the project. Note that certain processes may not be supported or performed at all. These then represent requirements in their own right. It is important to establish and fully describe both what the process is and the urgency of the requirement.

3.2.1 User Requirements

D. Description

5. User Requirements

5.1 Overview

This section of the User Requirements Report is essentially a consolidation of the preceeding 2 sections. It brings together all of the requirements to support a business function. Additionally, however, it also is the first attempt to remove the current physical factors that represent the "how" of the business process and logically represent the business process. i.e. the "why" of the process.

5.2 Business Process 1

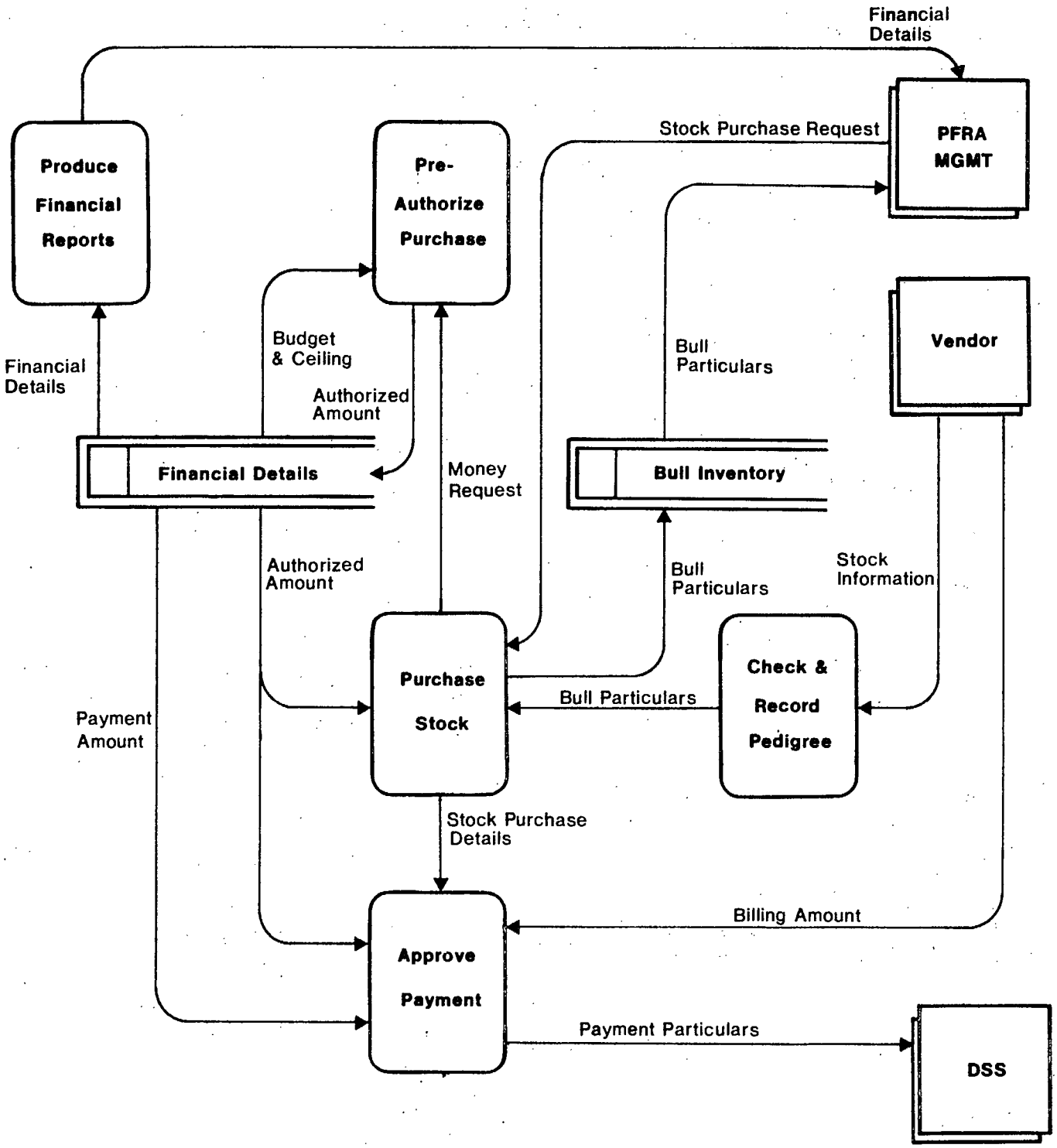
This should be the same business process as that identified under Sections 3 and 4 above.

5.2.1 Logical DFD

The logical Data Flow Diagrams are similar to the Physical Data Flow Diagrams presented above in Section 4 except that they concentrate on the what of the system and remove the "how". Logical DFD's are not concerned with the physical aspects of the system, only with the essential logical flow of data through the system. An example of a logical DFD is shown below, as transformed from the previous physical DFD.

The logical DFD's are depicted in the same manner as the Physical DFD's using the same symbols, techniques and conventions. They relate to the charts and descriptions of the business functions and provide a diagram of the flows of data among the processes. The data flows jointly with the process descriptions should indicate information processing requirements.

ACQUISITION OF BULLS
LOGICAL - 3.1.1.2.1



3.2.1 User Requirements

D. Description

5.2.2 Process Descriptions

The process descriptions in this section are developed in the same manner as the process descriptions associated with the physical representation of the existing systems. The descriptions themselves may be largely similar except for the removal of physical factors. Alternatively, the logical representation may result in a restructuring of the processes needed to logically support the business function. In the case where the modifications to processes previously defined in Section 4 are minor, only the revised or new descriptions are included. If the changes are significant, a complete set of process descriptions corresponding to the flow diagrams of 5.2.1 should be included. The same reference numbers should be used as were previously used under Section 4 except for new functions. Process descriptions should also be written using the same headings as earlier.

5.2.3 Requirements Notes

To the extent that the Logical DFD and associated process descriptions do not adequately describe the user requirements, then additional notes on those requirements should be made here. Statements should also be made on the relative urgency of each user requirement particularly as to whether a requirement is mandatory or just "nice to have". A useful manner for assessing requirements also would be the costs of not fulfilling the requirement or the benefits to be realized by having the requirement met.

5.2.4 Preliminary Data Definitions

This section is intended to provide notes on data which aid in understanding the contents of a data flow or are useful at this stage in communicating information on any aspect of the user requirements. These definitions are also useful to ensure consistency in the preparation of documentation by the various team members and is a useful starting point for more detailed definitions in later phases of the project.

3.2.1 User Requirements

D. Description

The data definitions can be prepared in the format and style of a data dictionary. They should, however, be high level only and make no attempt to define data to the element level.

5.3 Business Process 2

The development of user requirements for the remaining business functions should be continued in the same manner as described above.

3.2.2 Conceptual Solution

A. Purpose

The purpose of the Conceptual Solution Report, Section 2 of the Feasibility Report, is to present alternative solutions that appear to meet the user requirements, to define the criteria used in the evaluation of those alternatives, to present the analysis of each solution and, finally, to make recommendations on the solution which appears to be the most suitable. The Conceptual Solution report also presents the costs and benefits of developing and implementing that solution.

B. Preparation

The Conceptual Solution Report is a product of the activities in the Feasibility Study phase subsequent to the analysis and definition of user requirements. It should be reviewed by the user and approved by management before the Analysis phase starts. It provides management with an early opportunity, when expenditures have been minimal, to decide whether to continue with the development of a new system, enhancement of an existing one or to maintain the status quo.

C. Contents

The Conceptual Solution Report consists of the following sections:

3.2.2 Conceptual Solution

1. Executive Summary

2. Introduction

3. Solution Alternatives

   3.1 Evaluation Criteria
   3.2 Solution 1
   3.3 Solution 2, etc.
   3.n Selection of Preferred Solution

4. Conceptual Design of Proposed System

   4.1 System Objectives and Scope
   4.2 System Overview
   4.3 System Components
   4.4 Technical Requirements
   4.5 User Impact
   4.6 Conversion Requirements

5. Costs and Benefits

   5.1 Summary
   5.2 Cost Estimates
   5.3 Benefits
   5.4 Assumptions

6. Preliminary Resource Plan

7. Recommendations

8. Detailed Plan for Analysis Phase

3.2.2 Conceptual Solution Report

D. Description

1. Executive Summary

The Executive Summary provides management with a précis of the contents of the Conceptual Solution Report. The executive summary should address the following topics:

- Background Information

  This is a brief history of the project outlining the events leading to this phase.

- Principal Findings

  This should provide a summary of the requirements, a description of the conceptual design of the proposed system, brief explanations of the alternative system solutions considered and the overall costs and benefits of each.

- Recommendations

  This should present the recommendations of this study for further development of a particular system and outline the system philosphy to be applied. The corresponding costs and benefits and the reasons why a particular approach was selected should also be presented.

2. Introduction

2.1 Objectives and Scope of the Project

This section should contain a brief description of the objectives, purpose and scope of the project.

2.2 Approach and Methodology

This section should specify the approach and methodology employed in gathering and presenting the information in this report.

3.2.2 Conceptual Solution Report

D. Description

2.3 Management Control

This section should outline how management control was exercised during this phase of the project.

If more than one project supervision authority exists for a given project, the function of each authority is to be identified as well as its relationship to both the project team, and if applicable, to the other authorities.

2.4 Project Team

The team members and organization of the project team should be identified.

The team organization could be shown in both chart and narrative format. The chart should show the title of each member. The narrative explains the responsibilities of each member.

Each team member's name should be noted on the chart and a list identifying the title, department, or, in the case of contract personnel, the company by whom they are employed, should be provided.

2.5 Organization of the Report

This section should explain the organization of the report with a brief description of the contents of each section.

3. Solution Alternatives

3.1 Evaluation Criteria

This section should present the evaluation criteria which have been used for selecting a proposed solution. Typically, the evaluation criteria will separate the compulsory requirements from the optional requirements, and assign development time, impact, cost and other constraints.

3.2.2 Conceptual Solution Report

D. Description

3.2 Solution 1

3.2.1 Description

This is an overview of a proposed solution alternative. It does not need to be detailed. However, it should provide enough information to permit a meaningful comparison against the evaluation criteria and other solution alternatives.

3.2.2 Analysis

This is an analysis of the costs/benefits and advantages and disadvantages associated with the solution.

3.3 Solution 2, etc.

The report continues in a similar manner until all of the most viable solution alternatives have been presented.

The intent of presenting various potential alternatives is not to be exhaustive but to allow management to place the proposed solution in a better perspective.

3.n Selection of Preferred Solution

This contains a comparison of the costs, advantages and disadvantages of all the solutions and defines to what extent each meets the evaluation criteria.

The preferred solution is identified and the selection justified.

4. Conceptual Design of Proposed System

The proposed system will be described in full detail at a later stage of the development life cycle when more details about the business processes have been specified. This section describes a system in conceptual terms so as to establish general principles and an initial level of system sophistication.

3.2.2 Conceptual Solution Report

D. Description

4.1 System Objectives and Scope

The objectives should address major management problems and take advantage of major opportunities that may be offered as a result of implementing the system.

The scope should indicate the boundaries of the functional and organization areas that the system is to include. In some instances the definition of the scope may be enhanced by providing information regarding those items which the system will not include.

4.2 Overview

This section should describe the philosophy of the system's approach to dealing with the objectives of the system. It should indicate whether or not an EDP solution is appropriate and the level of system sophistication to be applied. It should be supported by a chart illustrating its relationship to other Departmental systems; an example of this is shown below.

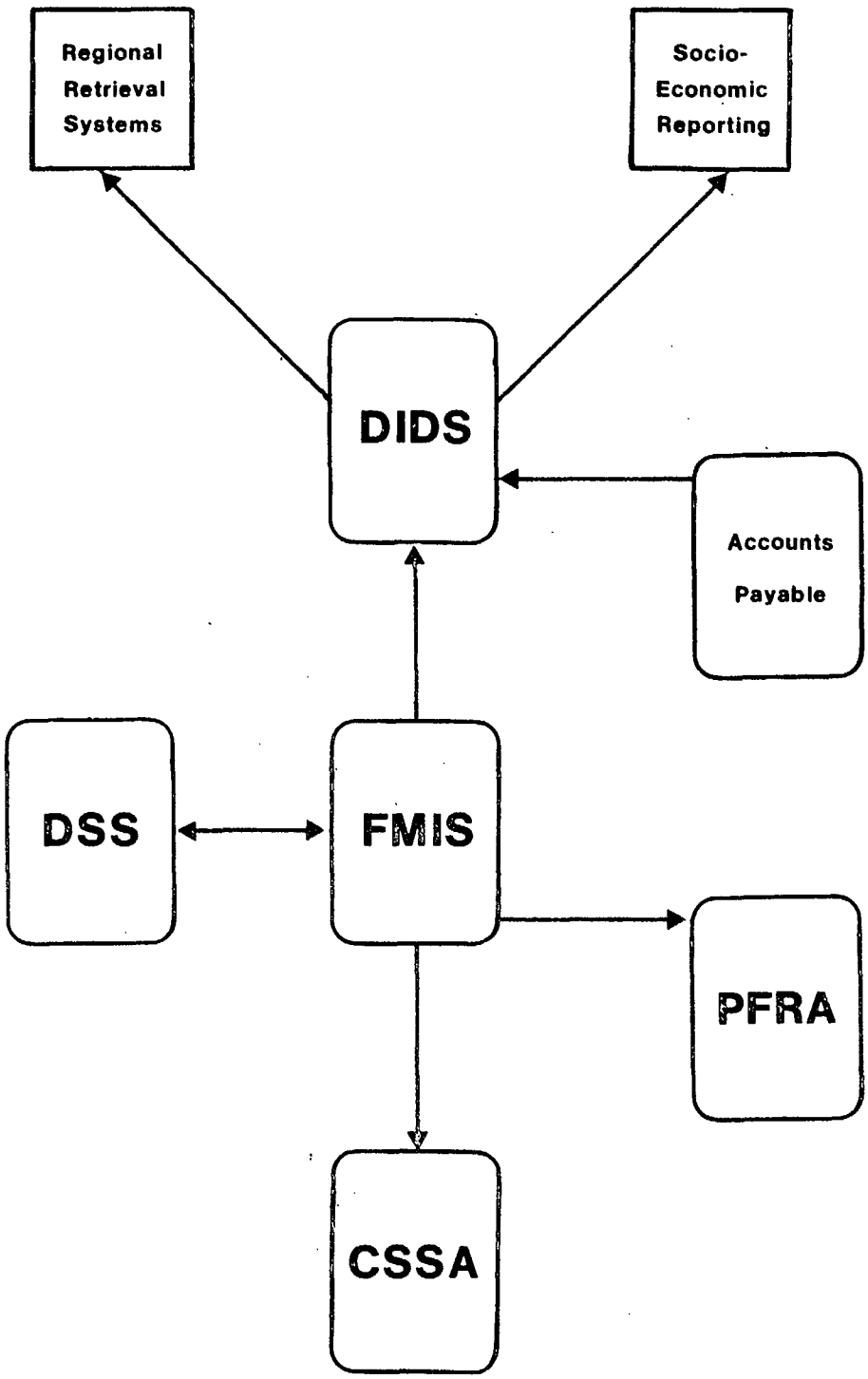
4.3 System Components

This section describes the proposed system in terms of its major transactional flows and their interfaces.

Data flow diagrams supported by narratives, describe these flows in the context of the physical business environment, and identify preliminary man/machine interfaces. External interfaces with the system, such as links to other systems and external input/output are also depicted.

Significant business transaction volumes are included in the narrative. These data flow diagrams should show relationships to the logical data flow diagrams contained in section 3.

SYSTEMS RELATIONSHIPS



3.2.2 Conceptual Solution Report

D. Description

4.4 Technical Requirements

This section summarizes the technologically significant requirements from the conceptual design and projects a preliminary list of software, hardware and communication needs to satisfy the requirements.

The requirements are expressed in terms of data entry, transaction processing, data storage, data transmission and output.

The system software, hardware and communication architecture to satisfy the requirements should identify existing facilities to be used and additional facilities needed.

This report should emphasize the preliminary nature of these requirements and facilities so that they are not interpreted as an order list.

4.5 User Impact

This sub-section should describe the significant items of impact implied by developing the proposed system. Statements should be presented on each of the following items:

- Changes in staffing: quantity and level;
- New, changed, or cancelled responsibilities as they affect organizational units or geographic locations;
- Training of staff;
- New or changed physical facilities: offices, furniture, etc.;
- Long Range Systems Plan;
- Policies;
- Priorities;
- Client Relations;
- Risks;
- Operations;
- Timing.

3.2.2 Conceptual Solution Report

D. Description

4.6 Conversion Requirements

An outline of how the present system would be converted to the proposed system is presented in this sub-section.

Topics to be addressed are:

- Implementation Strategy e.g. phased approach by location, and/or by system component;
- Consideration of pilot system implementation;
- Fall back strategy (e.g. parallel operation);
- Data conversion, clerical and computer records;
- Preparation for switchover and consequential lead times;
- Temporary staffing requirements.

5. Costs and Benefits

The fundamental justification for development of a proposed system must be based on a cost/benefit analysis. In this section of the report the costs and benefits of the preferred alternative are further detailed.

5.1 Summary

This section presents a summary of the development costs, the net change in operating costs, and the tangible benefits. Totals should be presented for each year to cover the time period chosen for the analysis, usually 5 years.

3.2.2 Conceptual Solution Report

D. Description

An example of the summary to be presented in these sub-sections is shown below:

	1982	1983	1984	1985	1986	TOTAL
Development Cost	(100)	(50)	(5)	--	--	(155)
Net Change in Operating Cost	--	10	30	35	40	115
Tangible Benefits	--	--	15	18	21	54
Total Net Gains/ (Losses)	(100)	(40)	40	53	61	14

A brief narrative should explain the table and indicate the factors used for inflation and cash discounting.

5.2 Cost Estimates

5.2.1 Development and Implementation Costs

This sub-section should include estimates of all costs that will be incurred in developing each new system from the time that the feasibility study is completed until the system becomes fully operational.

Typically the items included will fall under the following categories:

- Project Team Time;
- User Time;
- Travel and Expenses;
- Secretarial;
- Office Supplies;
- Computer Costs;
- Forms Design/Drafting;
- Outside Services;

3.2.2 Conceptual Solution Report

D. Description

- Office Space and Furniture;
- Other Overhead;
- Other Equipment;
- Courses and other staff training;
- Software packages for project control, testing, or other development related activities;
- Purchased application software or software required to support the operation of the new computer system.

The costs should be broken down by Systems Development Life Cycle phase and grouped into meaningful categories. Only cost summaries should be presented in this sub-section, supporting details should be included in an Appendix.

5.2.2 Operational Costs

This sub-section should present the operating costs of the current system, the proposed system and the net cost change over a period of at least 5 years.

5.3 Benefits

The benefits to be derived from using a new system should be described in this sub-section.

5.3.1 Tangible

These are the benefits which can be quantified in terms of dollars to be gained or saved.

All the dollar benefits should be summarized at the beginning of the section presenting yearly totals for the chosen time period. Amounts should be adjusted for inflation and may reflect the discounted value of the dollar over time.

The remainder of the sub-section should present a substantiation of each benefit.

3.2.2 Conceptual Solution Report

D. Description

5.3.2 Intangible

This section should present the intangible benefits by order of importance.

5.4 Assumptions

A brief explanation should be provided that indicates the major assumptions made in preparing the cost and benefit schedules and explains how the estimates were derived.

A proposed schedule for subsequent Systems Development Life Cycle phases should be presented indicating start and end dates for each phase.

The best clarity usually results from using bar-graphs to present the schedules. However, a list of phases with their corresponding start dates, end dates and milestone dates will satisfy the requirements of this section.

6. Preliminary Resource Plan

This contains:

- a description of the project organization and its relationship to approval authorities and user community or group;
- a list of major activities for each phase and costs by activity of user, project and contracted staff;
- description and costs of hardware and packaged software;
- description and costs of development tools;
- machine time costs;
- project schedule identifying end of phase targets and (if phased implementation) application component delivery targets.

3.2.2 Conceptual Solution Report

D. Description

7. Recommendations

Based on the findings and analysis carried out during the Feasibility Study, a recommendation should be presented.

The recommendation should briefly outline:

- What to do over the long term;
- What to do next;
- When to do it;
- Who should do it;
- Why to do it;
- What are the pertinent costs.

8. Detailed Plan for Analysis Phase

The work plan presents a detailed statement of the work necessary to complete the Analysis Phase. It includes:

- a description of each activity to be undertaken during the phase;
- the estimated staff years required, including both user and development staff;
- the estimated costs that will be incurred and the source of funds;
- a phase schedule identifying team member responsible for each activity;
- the outputs (deliverables) from the analysis phase;
- the individuals, management levels and organizational units responsible for project activities, user participation and review and approval;
- a summary of the approach to be used in carrying out the Analysis phase identifying dependencies on other departments and external organizations.

3.3 Information System Requirements

A. Purpose

The objective of this set of documents is to fully describe the business processes to be performed by the proposed system from a user perspective.

There are two primary purposes served:

- The business processes and information requirements of the system are described in such a way that they can be endorsed by individual members of the user community.

- The system requirements are specified in sufficient detail to permit the technical design of a system to be carried out by the design team.

B. Preparation and Maintenance

The documents are prepared after the Feasibility Study which provided a cost justification for the system, and before any attempt at computer systems design is started. The analysis must determine the "what" of a system before considering the "how". The preparation of these documents is a responsibility of the Project Manager.

The Functional Specification Modules should be prepared in such a way that additions, deletions, or changes can easily be made. They should be bound in loose leaf binders or with equivalent bindings, which readily permit insertions or deletions.

Once approved, these documents are used primarily as a system development tool. The responsibility for maintaining them rests with the Project Manager until the system becomes operational.

3.3 Information System Requirements

C. Contents

This set of documents is made up of the following components:

1. Executive Summary
2. Revised Cost/Benefit
3. Functional Specifications
4. System Performance and Security Goals
5. Revised Technical Requirements
6. Revised Resource Plan for Project
7. Detailed Resource Plan for Design phase

D. Description

1. Executive Summary

The Executive Summary provides management with a summary of the findings of the Analysis phase and contains evidence that the phase has been conducted in accordance with the planned activities approved at the end of the Feasibility Study.

It should contain descriptions for each of the following:

1.1 Analysis Phase Findings

- Background Information

  This is a short history of the project outlining the events leading to this phase of the study.

- Terms of Reference

  A summary of the terms of reference for the study should be included here. The detailed explanations will be contained in the Introduction Section.

- Principal Findings of the Study

  This summary should highlight to management the key results of the study.

3.3 Information System Requirement

D. Description

- Revised Benefits

  The benefits previously mentioned in the Feasibility Study Report should be reiterated here. Any new or revised benefits should be identified.

- Revised Costs

  The cost range estimates both for the remainder of the project and for the on-going system operation should be presented. If cost estimates have been changed, they should be discussed giving reasons for the change.

- Completion

  Proposed target dates for the remainder of the project should be presented as well as the number of man-months required.

1.2 Approach

Summaries of:

- project team organization and relationship with non-project organizations;
- methodology;
- management approval and control.

1.3 User Approval

This section should contain or refer to the evidence that participation of the user community has been active and comprehensive.

2. Revised Cost/Benefit

The cost/benefit statement detailed in the Feasibility Report is revised and included as part of the Information Systems Requirements document for submission to the approval authority. Differences from the original must be highlighted and explained.

3.3 Information System Requirements

D. Description

3. Functional Specifications

These are documented on a modular basis according to the number and size of business processes being studied. One functional specification should be created for each group of related business processes. In the event that the resulting documentation proves to be too large for easy review and then approval, it may be necessary to re-package the functional specifications.

Each module will have its own reference number which should be assigned as part of DREE's information system network. Each module is to contain the sections outlined on the next page and described on the pages which follow.

3.3 Information System Requirements

D. Description

3. Functional Specifications

1. Introduction

2. Principal Recommendations
   - 2.1 System Design
   - 2.2 Policies
   - 2.3 Other

3. Description of Existing Syatem
   - 3.1 Function Charts
     - . Overviews
     - . Detailed
   - 3.2 Data Flow Diagrams
   - 3.3 Narrative Description
   - 3.4 Trends

4. Description of Logical System
   - 4.1 Logical Data Flow Diagrams
   - 4.2 Narrative
     - . Objectives
     - . Description
   - 4.3 Data Dictionary

5. Description of Proposed Business System
   - 5.1 Physical Data Flow Diagram
   - 5.2 Process Descriptions
   - 5.3 Data Flow Descriptions
   - 5.4 Data Store Descriptions

6. Effect on Existing Systems
   - 6.1 Manual Systems
   - 6.2 EDP Systems

7. Conversion Considerations

3.3 Information System Requirements

D. Description

Functional Specifications Module Description

Each of the following headings relates to a section in a Functional Specifications Module.

1. Introduction

   This section of the module contains a narrative description of the purpose of the document as it relates to the function being specified.

   It is in the introduction that the category of function is identified - operational or managerial. If the latter, then the emphasis of the specifications contained in the module is on information requirements and thus processes are not specified in great detail.

2. Principal Recommendations

   This section provides the analyst with an opportunity to document suggestions as to potential solutions to the business problems he has been analyzing. These may be major hardware acquisitions, recommendations relating to policy which may need senior management approval, or other factors which could influence the direction of the project development or system implementation.
   The project manager summarizes these in the Executive Summary.

3. Description of Existing System

   This section contains a general description of the existing business process explaining how the functions are currently performed. This serves the purpose of providing the system designers with an overview of the current operational flows in the business context.

   3.1 Function Charts

   Functions, for the purpose of specification, are organized hierarchically, from the top down. The top function of any module is established by the feasibility study which contains a Function Chart.

3.3 Information System Requirements

D. Description

The lowest levels of the hierarchy in this "high level" Function Chart identify the business processes which are the subject of analysis. If not outside the scope of the project, each of the bottom processes on the chart is further broken down into its sub-processes during the development of the module. These are documented on function charts in the same format as the "high level" chart. Thus, within each module a sub-hierarchy of the overall function hierarchy will have been formulated.

The first part of this section is an overview chart containing the business process being described by the module. It places the process in a wider context showing charts at least a couple of levels up. The second part, contains the charts subordinate to the function itself.

Further explanation of this documenting format is contained in the description of the User Requirements Report (section 3.2.1 of this reference manual).

3.2 Data Flow Diagrams

A set of data flow diagrams is a key instrument in representing the existing system.

3.3 Narrative Description

Narratives describing each of the numbered processes are written in support of the data flow diagrams. This provides further elucidation of the diagrams by identifying job positions, organizations, and mechanism-type (computer or manual).

3.4 Trends

The last portion of this section concerns any developing business trends that are uncovered while gathering data. Enterprises rarely remain static. Business objectives change, programs change and volumes change. In examining the current system in its business context for the purpose of evaluating the needs of the future, it is essential that the trends detected during the Analysis phase are documented in this section.

3.3 Information System Requirements

D. Description

4. Description of Logical System

The logical system is specified through additions to the function charts and with logical data flow diagrams (see below) and in a set of process forms.

4.1 Logical Data Flow Diagram

Logical Data Flow Diagrams are developed in parallel with the function charts as an analysis tool. They also are used to demonstrate the data relationships between processes. This means that at the lower levels the processes on the data flow diagrams may be grouped to represent the logical operational flows with specific "beginnings" and "endings". The reference number of processes on the diagrams should correspond to those on the function charts.

Names of data flows at the higher levels, like the processes, must be all-embracing terms for the component data entities shown at lower levels. A data analyst assigned to the team will provide functional guidance in the application of standards relating to naming and grouping conventions.

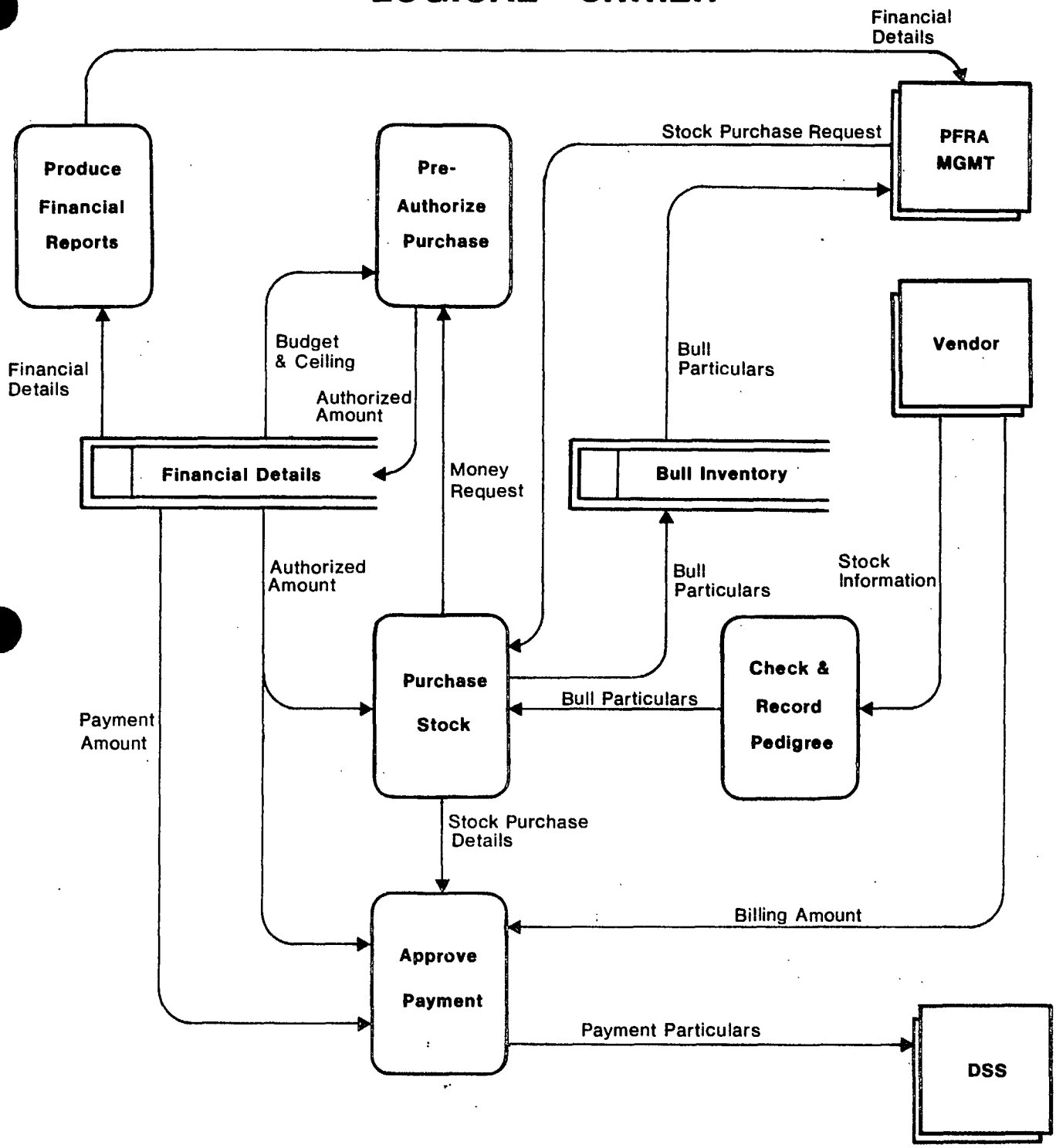
4.2 Descriptive Narrative

This section contains the narrative which supports the Data Flow Diagrams.

The first part of this section defines the objectives of the overall business process being described in the module.

The second part defines precisely the functional requirements in terms of data and processes.

ACQUISITION OF BULLS
LOGICAL - 3.1.1.2.1



3.3 Information System Requirements

D. Description

A standard format is used and is the same as that described for the Feasibility Report (section 3.2 of this reference manual).

4.3 Data Dictionary

This sub-section contains a definition of each data group and data element referenced in Section 4 of the module. Refer to the ISM standards for structure, format content, and usage of the data dictionary.

5. Description of the Proposed System

5.1 Physical Data Flow Diagram

Data flow diagrams of the proposed system identifying the manual and computer aided functions make up this section (see example below). Where appropriate the same reference numbers are used for corresponding processes on the logical data flow diagrams.

5.2 Process Descriptions

There are two alternatives to completing this section.

In the case where the modifications to processes previously defined in Section 4 are minor, only the revised or new descriptions are included using the standard format.

If the changes are significant, a complete set of process descriptions, corresponding to the flow diagrams of Section 5.1 should be included.

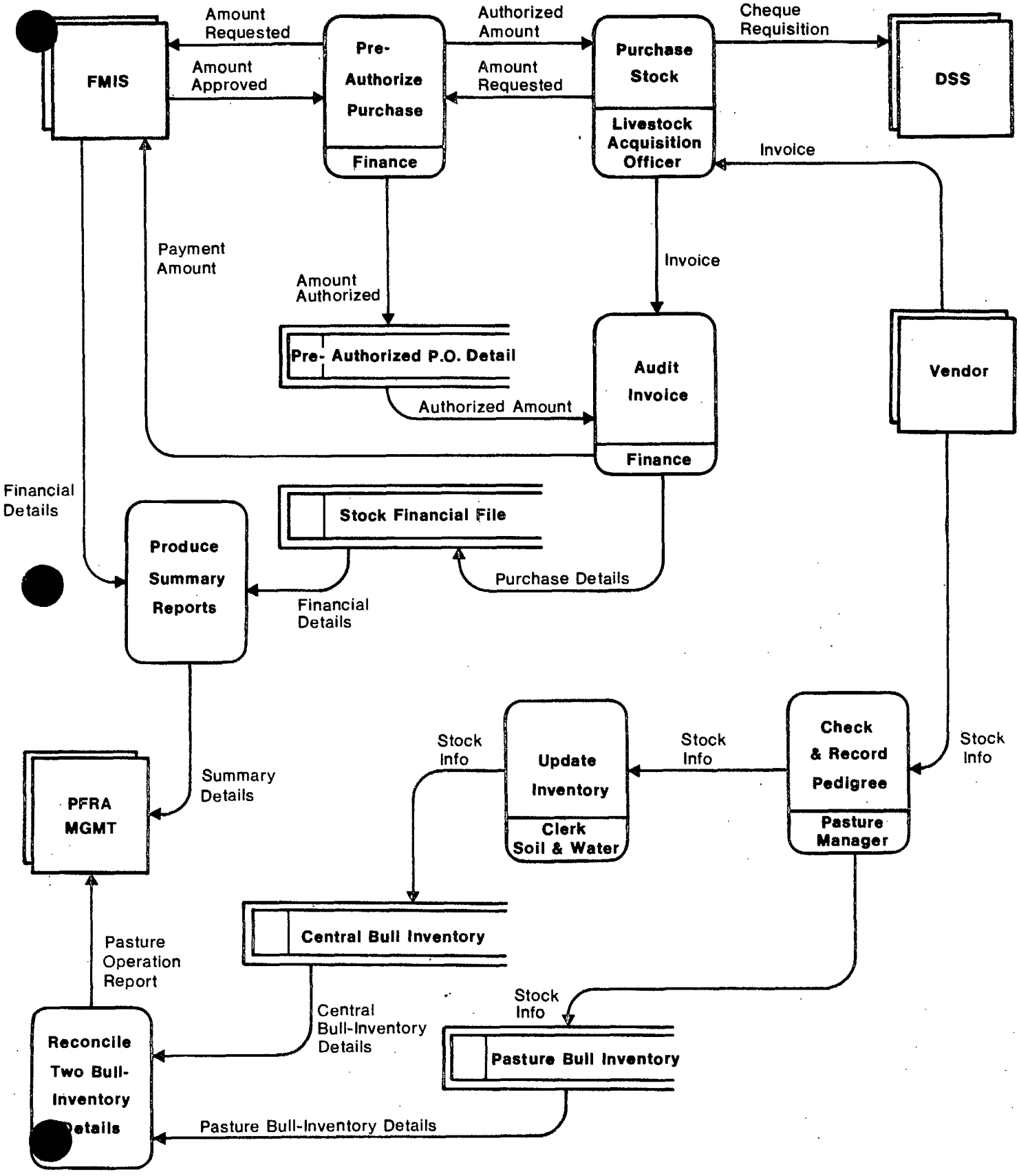
The same reference numbers from Section 4 should be used except for new functions.

5.3 Data Flow Descriptions

This section should describe all the data flows in the system as shown in the data flow diagram of Section 5.1. An index of the data flows should precede the descriptions.

Any data elements identified but not currently defined in the data dictionary should be submitted for dictionary entry.

ACQUISITION OF BULLS
PHYSICAL 3.1.1.2.1



Regional Economic Expansion
Expansion Économique Régionale

INFORMATION SYSTEMS MANAGEMENT
GESTION DES SYSTÈMES D'INFORMATION

3.3 Information System Requirements

D. Description

A standard form should be used for this purpose. The form should contain the following information for each data flow:

1. Name of Flow - as identified on the data flow diagram.

2. Source of Flow - the reference number and title. The source could be a process, data store or an external entity.

3. Destination of Flow - the reference number and title. Similarly, the destination could be a process, data store or an external entity.

4. Description of the Flow - a short narrative describing what the data flow is, why it exists and generally what it contains.

5. Included Data Structures - a list of all data structures (showing data elements within each structure) that are passed along this data flow.

6. Volume Information - the volume of each major type of data being passed through this data flow.

A sample format follows this page.

DATA FLOW DEFINITION FORM

NAME OF FLOW: _____

SOURCE REF: _____ TITLE: _____

DESTINATION REF: _____ TITLE: _____

DESCRIPTION OF FLOW: _____

_____

_____

_____

_____

INCLUDED DATA STRUCTURES:

_____

_____

_____

_____

_____

_____

_____

_____

_____

VOLUME INFORMATION:

_____

_____

_____

_____

_____

_____

_____

_____

_____

3.3 Information System Requirements

D. Description

5.4 Data Stores Descriptions

A data store represents a logical grouping of data at rest. The contents of each data store should be described in terms of the data elements which will be found in it. In addition, the data flows which feed the data stores and those which are extracted from it should be noted at this point in time.

These data stores are those associated with the computer system. A standard form for describing data stores is shown on the next page. The form should be filled out as per the following:

1. Name

   Refers to the name given to the data store. It should be the same name as shown in the data flow diagram and to be used in the data dictionary and should be meaningful to the User.

2. Ref.

   Refers to the data store reference number shown in the data flow diagram. Numbers should begin with D1 and proceed with D2, D3 etc. The numbers are unique within the system being documented.

3. Description

   A brief narrative definition of the data store.

4. Data Flows In

   A list of all data flows which flow into this data store. The reference name of each data flow plus the reference numbers of the start location for each data flow should be identified.

DATA STORES DEFINITION FORM

NAME: _____ REF: _____

DESCRIPTION: _____

DATA FLOWS IN:

DATA FLOWS OUT:
(SEARCH ARGUMENTS)

CONTENTS:

PHYSICAL ORGANIZATION:

VOLUME INFORMATION:

3.3 Information System Requirements

D. Description

5. Data Flows Out (key fields)

   A list of all data flows leading out of this data store. The reference numbers of the end of the flow (the next process box) plus the name of the flow should be given. If the key field(s) is known, it should be given in parentheses for each data flow. The key fields are the ones used to select the data that flows out.

   Any newly identified elements should be submitted for data dictionary entry.

6. Contents

   A list of the contents and structure of the data store. All data element names to be stored should be identified using standard naming conventions.

7. Physical Organization

   If the physical organization (sequence) is known, it should be specified.

8. Volume Information

   The volume of entities in the data store.

6. Effect on Existing Systems

This section describes the effects the proposed system will have on the existing systems within the organization. If both manual systems and EDP systems are involved, this section should be divided into two parts as follows:

6.1 Manual System

For each manual system being affected by the implementation of the new system, a narrative should be included in sufficient detail to describe how the new system impacts the existing system. Topics which may be addressed here are:

1. Data Stores

   What data stores are being eliminated, merged, changed, or are new to the system as a result of the implementation of the new system.

3.3 Information System Requirements

D. Description

2. Processes

What processes are being added, eliminated, changed, or merged within the existing system when the new system is installed.

3. Manpower

Changes to staff levels by job function.

4. Equipment

If some form of mechanical assistance is being added, upgraded or deleted from the present system, it should be identified.

5. Reports, Forms

What forms need to be designed or what new reports (manual only) are to be generated or to be scrapped.

6.2 EDP Systems

A narrative should be included for each existing EDP system which will be affected directly by the implementation of the proposed system. Topics which may be addressed here and some examples are:

1. Data Changes

- Files affected
- Data elements to be added, deleted or changed within existing file structures
- Access keys to be changed.

2. Storage Medium

- Card to tape or disk
- Printed report to tape or microfilm
- Batch transaction to on-line transaction.

3. Function changes

- Functions affected

4. Volume or Frequency Changes

- Significant change in volume of a file interface
- Requirement for changing the frequency or scheduling.

3.3 Information System Requirements

D. Description

7. Conversion Considerations

This section should identify the conversion requirements for the system. The following information should be included for each area of conversion:

a) Name of data to be converted.

b) Description of data to be converted - describe the data and purpose of conversion.

c) Source.

d) Status - indicate whether the data currently exists as manual data or as an automated file.

e) Volume - indicate volume of data which must be converted.

f) Outputs - identify possible controls to be established to ensure that the conversion is accurate.

(This page ends the description of a Functional Specifications Module).

3.3 Information System Requirements

D. Description

4. System Performance and Security Goals

This document specifies a set of global criteria which, subject to economic and technical feasibility, are to be accommodated by the system. This set of criteria should be classified under the following headings:

- System Availability;
- Recovery;
- Security;
- Response Times/Turnaround;
- Retention of, and Access to, Data;
- Security;
- Audit Requirements (Trails and Controls);
- Future Growth/Trends.

5. Revised Technical Requirements

The preliminary technical requirements identified during the feasibility study are reviewed and revised in light of the functional requirements specified during the Analysis Phase.

This document should confirm the major system software, hardware and communication requirements in order to facilitate the initiation of the procurement of any additional facilities.

6. Revised Resource Plan for Project

Having just completed an extensive analysis of the business processes, there is substantially more known than there was when the first cost estimates and benefits were described. This section presents a revised plan for later phases of the project based on the current understanding of the system.

Amendments to the approved plan from the Feasibility Study phase should be identified and explained.

3.3 Information System Requirements

D. Description

7. Detailed Resource Plan for the Design Phase

The plan presented here provides a detailed statement of the work necessary to complete the Design phase and includes:

- A description of each activity to be undertaken during the phase.
- The estimated staff required, including both user and development staff.
- The estimated costs that will be incurred and the source of funds.
- A phase schedule identifying the team member responsible for each activity.
- The outputs (deliverables) from the Design phase.
- The individuals, management levels and organizational units responsible for project activities, user participation and review and approval.
- A summary of the approach to be used in carrying out the analysis phase identifying dependencies on other departments and external organizations.

3.4 System Design Specification

A. Purpose

The objective of the Design Specification is to fully describe the system with respect to inputs, outputs, system interfaces and internal system architecture. This document, when approved, will be used as a vehicle to control the development and testing processes, and facilitates subsequent system maintenance.

B. Preparation

During the development cycle of the project, it is the Project Manager's responsibility to ensure the preparation and maintenance of the Design Specification.

C. Contents

The Design Specification is comprised of the following components:

1 Executive Summary

2 Revised Cost/Benefit

3 Revised Technical Requirements

4 EDP System Design Specification

5 Design Specification of User Aids

6 System Test Specification

7 Revised Project Plan

8 Detailed Plan for Development and Implementation Phases

D. Description

1. Executive Summary

The Executive Summary provides management with a summary of the results of the Design phase and contains evidence that the phase has been conducted in accordance with the planned activities approved at the end of the Analysis phase. As described in the Analysis Report, the Executive Summary should contain:

- Background Information - a short history of the project leading up to this phase.

3.4 System Design Specification

D. Description

- Terms of Reference - for the project in general and this phase specifically.
- A summary of the results of this phase.
- Revised Benefits and Costs.
- Revised Completion Dates.
- Approach and methodologies used in this phase.
- Summary of the Approvals Procedures.

2. Revised Cost/Benefits

Having just completed an extensive design of the system, there is substantially more known than there was when the first cost estimates and benefits to be derived from the system were described. This section presents a revised cost estimate for later phases of the project based on the current understanding of what the physical system consists of. The presentation of this estimate should be similar to the previous cost estimates described in the earlier reports in order to facilitate comparison.

If the benefits to be derived from this system differ from those described in the Feasibility Study Report, they should be identified. New benefits expected should be explained in detail. The reasons for the change in expected benefits should be explained.

3. Revised Technical Requirements

The technical requirements identified during the Analysis phase are reviewed and revised in light of the system specified during the Design phase.

This document should confirm the major system software, hardware and communication requirements in order to facilitate the installation of any additional facilities.

3.4 System Design Specification

D. Description

4. EDP System Design Specifications

TABLE OF CONTENTS

The following pages describe each section of the EDP System Design Specification.

3.4 System Design Specification

D. Description

EDP System Design Specifications Description

4.1 System Description

The system description is intended to provide an overview of the system. The following information should be summarized in this section.

a) System Objectives
b) System Functions
c) System Requirements
d) System Constraints
e) Background Information

All of this information is available or derived from documents from previous phases of the project.

4.2 System Flow

The purpose of this section is to illustrate the overall structure of the system. This illustration should include a system flowchart with the corresponding narrative to provide explanation.

The flowchart should illustrate the position of each program within the system and the files and reports associated with each program.

4.3 Data Element Dictionary

This section presents an index of the system's data elements. These data elements consist of the elements included in both permanent system files and intermediate system files. Each element should have a corresponding Data Element Description.

A listing of the system's data elements in alphanumeric sequence should be included in this section.

4.4 Index of Files

This section presents an index of all computer files whether they be permanent or intermediate.

3.4 System Design Specifications

D. Description

4.5 File Definition

All system files, both permanent and intermediate, should be defined.

For each file within the system the following information should be recorded:

a) File Name - a name assigned by the analyst according to the naming standards.

b) Retention Criteria - indicate the period of retention and release authorization.

c) Backup and Recovery Procedures - indicate the frequency of backups and the procedures to be followed when restoring the file to a particular point in time.

d) File Security - if applicable, identify the various levels of access authority,
i.e. who may read the file
who may update the file
what fields may be accessed
what field may be updated
etc.

e) File Description - layout.

f) Record Description - layout.

g) File Controls - indicate any file controls such as headers or trailers which have been established for the file.

4.6 Index of System Inputs

This section presents an index of system inputs to reference the System Input Definitions. This index will consist of Input Name and the page number corresponding to the appropriate Input Definitions.

4.7 System Input Definition

Inputs to a computer system may consist of data entered on-line, data entered on documents or data entered as an existing automated file.

With an automated Data Dictionary package, record layouts which pertain to a system input can be produced on request and should be kept with the Systems Manual.

3.4 System Design Specifications

D. Description

4.7.1 On-Line Inputs

For each on-line input to the system the following information should be recorded:

a) Screen Name - corresponds to the "Input Name" in the Index of System Inputs.

b) Screen Number.

c) Screen Description - gives a general description of the functions served by the screen.

d) Screen Specification - a Screen Specification form should be completed.

   If error messages and subsequent actions are associated with fields on the screen, they should also be specified on this form.

e) Screen Format - a Screen Format form should be completed to illustrate the layout of the screen.

f) Program(s) Involved - list the programs which access or process the screen.

g) File(s) Created - if the screen data is used to create a file, indicate the File Name of that file and the Record Names of the records created for that file.

4.7.2 Document Inputs

For each document input to the system, the following information should be recorded:

a) Document Name - corresponds to the "Input Name" in the Index of System Inputs.

b) Document Number - corresponds to the form number referenced in Forms Control.

c) Document Description - general description of the function of the document.

d) Document Sample - a sample of the document should be included.

e) Encoding Instructions - input preparation.

3.4 System Design Specifications

D. Description

f) Program(s) Involved - list the programs which access or process the document.

g) File(s) Created - for each file resulting from the processing of the document, indicate the File Name and the Record Names of the records in the file.

4.7.3 Automated File Inputs

In most instances an automated file input represents an interface with another system. Each of these files should be documented in the Index of Files and File Definitions. Therefore, in this section it is sufficient to identify the file by the "File Name" corresponding to the "File Name" in the Index of Files and "Input Name" in the index of System Inputs. The file's source or name of the system which created the file should also be specified.

4.7.4 Summary of Transactions

This section should provide a list of all input transactions. Each input transaction should be identified by the following information.

a) Transaction Code
b) Transaction Name
c) Description - a brief description of the transaction functions.
d) Cross-Reference - indicates which of the System Inputs this transaction is related to.

4.8 Index of System Outputs

This section presents an index of the system outputs to reference the System Output Definitions. This index will consist of Output Name and the page number corresponding to the appropriate Output Definition.

4.9 System Output Definition

Outputs from a system may consist of on-line screen reports, printed reports or automated files.

With an automated Data Dictionary package record layouts which pertain to a system output can be produced on request and should be included in this section.

3.4 System Design Specifications

D. Description

4.9.1 On-Line Outputs

For each on-line output from the system, the following information should be recorded:

a) Screen Name - corresponds to "Output Name" in the Index of System Outputs.

b) Screen Number.

c) Screen Description - general description of the output and its purposes.

d) Screen Specification - a Screen Specification form should be completed which defines fields, lines, columns, values of data elements, etc.

   Any notes which provide further clarification should also be included on this form.

e) Screen Format - a Screen Format form should be completed to illustrate the layout of the fields on the screen.

f) Programs Involved - a list of the programs which produce the output.

4.9.2 Printed Outputs

For each printed output from the system, the following information should be included:

a) Report Name - corresponds to "Output Name" in the Index of System Outputs.

b) Report Number - should follow numbering conventions.

c) Report Description - a general description of the report and its purpose(s).

d) Report Frequency - a layout to illustrate the report format should be included using a Report Layout form. If the report is produced on a special form a sample of this document should be included.

e) Report Frequency - an indication of how often the report is produced.

3.4 System Design Specifications

D. Description

f) Report Volume - an estimate of the volume of print lines expected.

g) Program(s) Involved - the program(s) which produce the report.

4.9.3 Automated File Outputs

In most instances an automated file output represents an interface to another system. Each of these files should be documented in the Index of Files and File Definitions.

In this section it is sufficient to specify the following:

a) File Name - corresponds to "File Name" in the Index of Files and "Output Name" in the Index of System Outputs.

b) Dispersal Specification - identify the file destination and the name of the destination system.

4.10 Index of Program Communication Areas

This section presents an index of all unique Program Communication Areas. These areas are used to pass data among programs. Each communication area should be identified by a name and a page number which references the corresponding Program Communication Area Definition.

4.11 Program Communication Area Definitions

Each unique Program Communication Area should be defined by the following information:

a) Communication Name - an arbitrary name assigned according to the naming conventions.

b) Record Description - for each program communication area, a Record Description should be completed to identify the elements within the area.

c) Programs Involved - list of programs which use this communication area.

3.4 System Design Specifications

D. Description

For each element the following information should be provided:

a) Element Name.

b) Element Content - the contents and function of the element.

c) Element Source(s) - how the element is derived and which program(s) derive it.

4.12 System Interfaces

This section should identify all system interfaces. Interfaces may be between sub-systems within the system or may be between external systems and the system.

4.12.1 Sub-System Interfaces

This section should clearly define the relationships between the sub-systems in terms of processes which must be performed by one sub-system on data supplied or maintained by another sub-system. This information is essential for successful completion of system testing.

4.12.2 External System Interfaces

These interfaces should be defined in terms of data received from and data sent to other systems as well as any changes required in the other systems.

For each external system that is interfaced with, identify the following.

4.12.2.1 System Input Interfaces

a) Input Name - name of the input received from the other system and corresponding to the name in the Index of System Inputs.

b) Input Description - brief description of the input and its purpose(s).

c) Input Source - which system the input originates from.

d) Changes - any known changes required in the other system to produce this input.

3.4 System Design Specifications

D. Description

4.12.2.2 System Output Interfaces

a) Output Name - name of the output sent to the other system and corresponding to the name in the Index of System Outputs.

b) Output Description - brief description of the output and its purpose(s).

c) Output Destination - where system output is to go.

d) Changes - any known changes required in the other system to accept this output.

4.13 System Controls and Audit Trails

This section should identify in detail all system controls, audit trails and interrelationships, e.g.:

a) Figure reported on Report A must balance with figure reported on Report B.

b) Sum of Report A and Report B must match figure on Report C.

c) Activity A must be completed before Activity B can proceed.

d) Computer controls and verifications on file totals.

e) Internal computer cross-checks between processes, files or both.

4.14 Software, Hardware and Communication Environment

This section should identify the software, hardware and communication environment of the system.

4.14.1 Software Environment

The following items should be identified:

a) Name of Package, e.g. Mark IV, SPSS, QUIZ.

b) Characteristics of Package - general description.

3.4 System Design Specifications

D. Description

c) Supplements - identify any supplements to the basic package required.

4.14.2 Hardware Environment

For each type of equipment, whether it must be acquired or already exists, the following items should be identified.

a) Name of Equipment, e.g. CSG-IBM, HP3000.

b) Characteristics of the equipment.

c) Quantity - indicate if equipment is to be fully dedicated to the system.

4.14.3 Communications Environment

4.14.3.1 Equipment

For each type of equipment, whether it must be acquired or already exists, the following items should be identified:

a) Name of Equipment, e.g. Modems, Communications Lines.

b) Characteristics of the Equipment.

c) Quantity.

4.14.3.2 Network

The network environment should be identified with the following information:

a) Required Baud Rate.

b) Dedicated, Multidrop, Packet Switch Lines.

c) Communications Protocol (e.g. synchronous, asynchronous).

d) Line Quality (e.g. voice grade).

4.15 Contingency Plans

This section should define the system recovery procedures to be used in the case of a catastrophe.

3.4 System Design Specifications

D. Description

Examples of items which should be considered here are:

- off-site processing requirements
- off-site storage requirements
- legal implications
- hardware
- communication lines
- data entry equipment.

4.16 Conversion

This section should specify the design of system conversion. Depending on the size of the system, conversion may be a separate document or a section in this one. It is a specification in its own right and should be designed once the conversion needs become apparent.

4.17 Index of Programs

This section presents an index of the system's programs to reference the Program Specifications. This index will consist of the Program Name and the page number corresponding to the appropriate Program Specification.

4.18 Program Specification (General Module Specification)

A program specification should provide complete and precise information on what the program is to do. However, the program specifications do not define the internal structure of programs. This is performed during program development.

The following information should be included in this package for each program.

4.18.1 Title Page

a) Program Name - this name is assigned according to the naming conventions. The name should correspond to the "Program Name" in the Index of Programs.

b) Date of Preparation of Specifications.

c) Programming Language.

3.4 System Design Specifications

D. Description

4.18.2 Table of Contents

Include a Table of Contents specifying the contents of the specification package.

4.18.3 Program Schematic

Using flowchart symbols, provide a schematic diagram illustrating the system inputs to and system outputs from this program. A sample of a schematic has been included on the following page.

4.18.4 Program Functions

A brief description should be provided to explain the functions performed by the program. With an automated Data Dictionary package this information can be provided upon request.

4.18.5 Program Structure Chart

An hierarchical diagram of the functional relationships within the program should be provided. An example follows the program schematic.

Further detail on how to develop structure charts can be found in the section "Design Sub-System Structures" in the Design Guide.

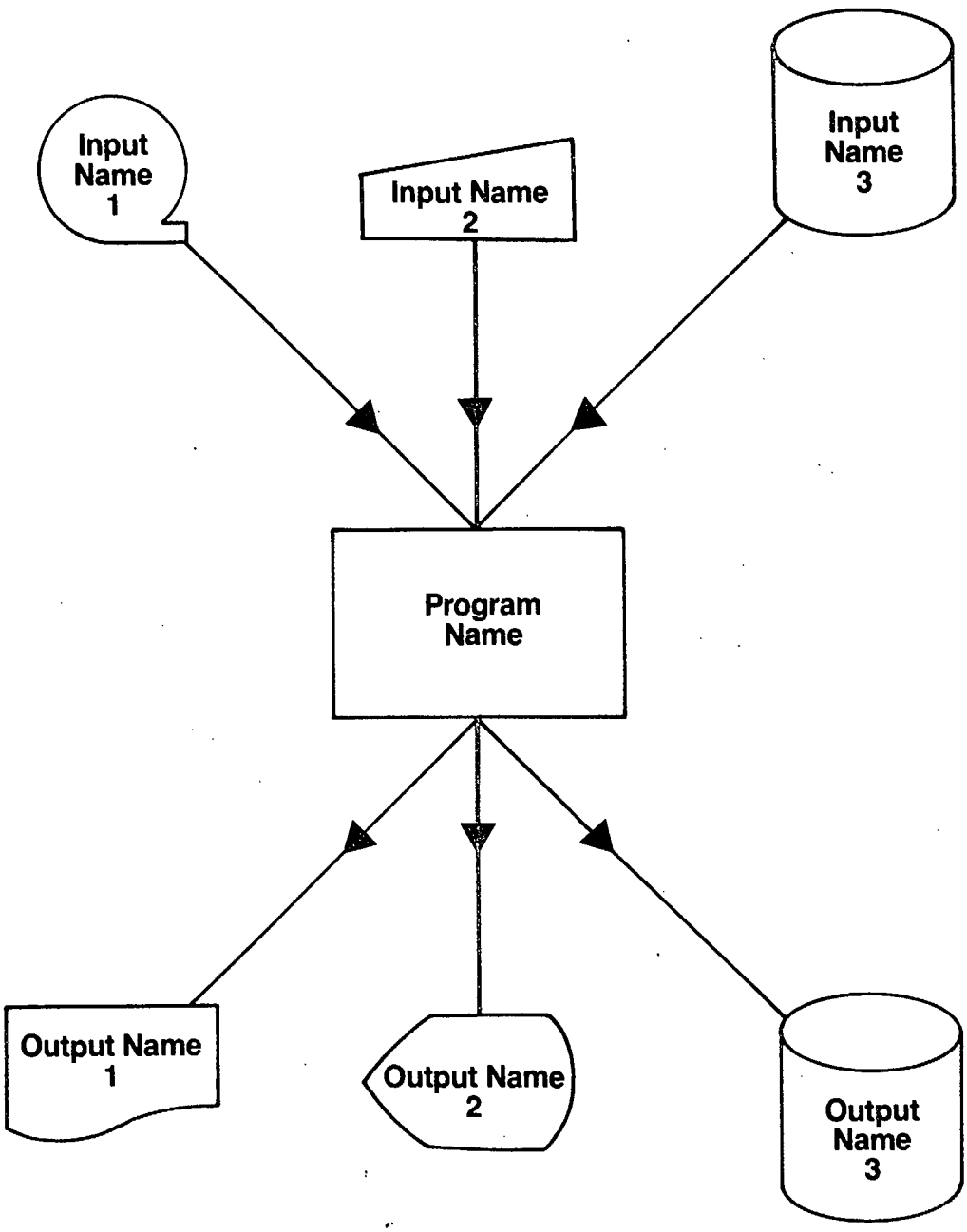
4.18.6 Inputs

Provide a list of all inputs to this program. Each input should be identified by "File Name" which corresponds to the "File Name" in the Index of Files or "Input Name" in the Index of System Inputs. Copies of the File Descriptions and Record Descriptions should also be included.

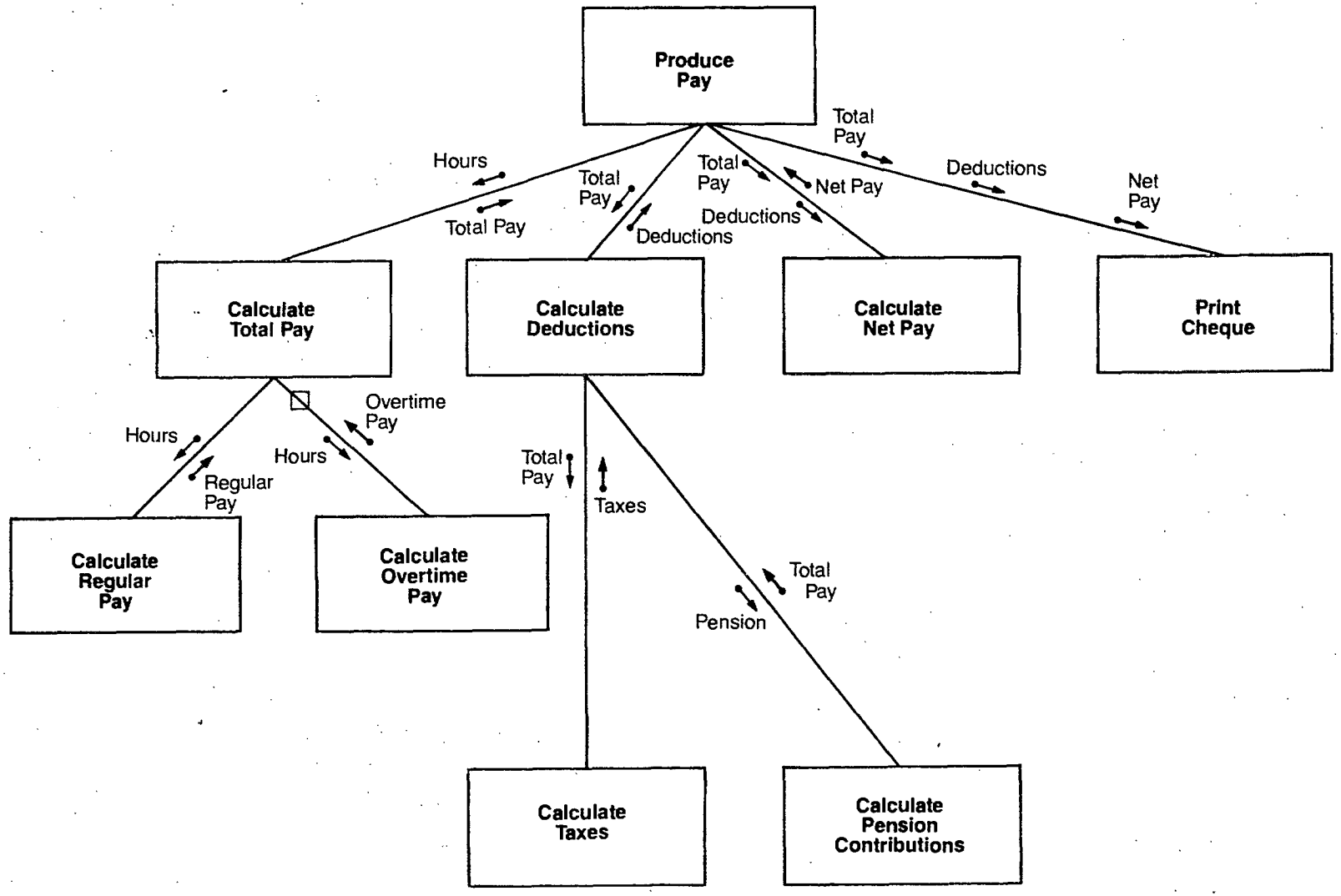
4.18.7 Outputs

Provide a list of all outputs from this program. Each output should be identified by "File Name" which corresponds to "File Name" in the Index of Files or "Output Name" which corresponds to "Output name" in the Index of System Outputs. Copies of File Descriptions, Record Descriptions and Report Samples should also be included.

Program Schematic



Program Structure Chart



3.4 System Design Specifications

D. Description

4.18.8 Updates

Provide a list of all update files. Each updated file should be identified by "File Name" which corresponds to "File Name" in the Index of Files, "Input Name" in the Index of System Inputs or "Output Name" in the Index of System Outputs. Copies of File Descriptions and Record Descriptions should also be included.

4.18.9 Data Base Access and Update

(to be written by Data Base Group).

4.18.10 Input Parameters

These parameters represent run parameters passed to the program via the Job Control Language and therefore this section is not always applicable.

For each parameter indicate

a) Parameter Name.
b) Element Picture and Usage.
c) Element Contents - content, source, derivation, function, etc.

4.18.11 Calling Program(s)

This section should be used to identify the program(s) which calls this program and the communication/linkage area between the programs.

For each calling program, identify the following:

a) Program Name - refers to the calling program.

b) Program Communication Area - identify the Program Communication Area with the Communication Name corresponding to the name in the Index of Program Communication areas.

4.18.12 Program(s) Called

Identify any program(s) called by this program and the communication linkage area between the programs.

3.4 System Design Specifications

D. Description

For each called program specify the following:

a) Program Name - refers to the called program.

b) Program Communication Area - identify the Program Communication Area with the Communication Name corresponding to the name in the Index of Program Communication Areas.

4.18.13 Program Description

The intent of this section is to clearly identify the processing functions of the program. The method of documentation used in this section could be pseudocode complemented with decision trees or decision tables when complex logic processes are involved. Details are provided in the Design Guide.

4.18.14 Special Considerations

This section should describe special features included in the program such as the use of special techniques for setting up tables externally to the program, the derivation of formulae, and areas for future change or improvements. Any maintenance considerations such as cautions about complex routines, and the areas where modifications must be made periodically, should be highlighted in this section.

4.18.15 Internal Controls

This section should identify:

(i) Audit Trail Requirements
(ii) File Sequence Checks
(iii) Program Aborts and Error Messages
(iv) Return Codes
(v) Control Totals.

4.19 System Maintenance Considerations

This section should highlight any system maintenance considerations such as table updates or periodic changes to "hard" code and provide a cross reference to the programs involved.

The description of Section 4 - the EDP System Design Specification component - ends here.

3.4 System Design Specifications

D. Description

5. Design Specification of User Aids

This component identifies the appropriate user aids required to implement and operate the system. They could be all or any of:

- User Manuals
- Operators Manuals
- Training Materials
- Procedure Manuals
- Conversion Procedures

The design is specified in terms of objectives and a table of contents for each.

Although, strictly speaking, the development of these are part of a later phase (see section on Development) it may be tactically appropriate to commence with it during this phase.

6. System Test Specification

6.1 Test Plan

The system test plan is intended to provide a global description or overview of how the testing will be accomplished. This plan should be documented prior to any actual testing. The following information should be present:

1. System Narrative - a brief description of the system or sub-systems which will be tested.

2. Testing Overview - a brief description of the test level, the general testing approach and the different test phases.

   For example, for integration level testing, the system will go through low volume testing and then high volume testing; or sub-system A will be tested before sub-system B; or the "daily" system will be tested first, followed by the "week-end" system, followed by the "month-end" system followed by the "year-end" system.

3.4 System Design Specification

D. Description

This section should also indicate how the results of testing are to be recorded and whether a particular result should be recorded or omitted from the report.

3. Resource Requirements - identify staff and resources required for testing. It should include:

   - a list of the individuals involved;
   - the hardware requirements (lines, terminals, etc.);
   - the software requirements (support and application programs);
   - a description of the system test plan; and
   - a description of the data base required.

4. Responsibilities - describe the responsibilities of the System Testing Group. It should describe what is received from the Development Group and what will be given to the Implementation Group. Normally, changes to the software must be made by the Development Group and not by the Testing Group.

   This section should indicate responsibilities regarding program and documentation corrections.

5. Schedule - provide a chart or a planning aid to identify the activities and individuals listed above. It should be in chronological order with supporting narrative as necessary and should include:

   - portions of time assigned to major cycles of testing;
   - dates hardware is required;
   - dates individuals are required;
   - duration of each individual's involvement; and
   - final completion date.

6. Test Case Coverage Matrix - this is a table of all the components to be tested, matched against objectives of the system testing. It is used in the review to ensure test cases will satisfy all system requirements.

3.4 System Design Specification

D. Description

6.2 Test Specifications

The test specifications describe the specific conditions and features to be tested.

These specifications should be developed in two major stages. The first stage begins before testing is started and the second stage occurs during testing.

During the second stage, additional testing specifications should be numbered sequentially so that tests can be cross-referenced to the specifications.

For each test specification or group of specifications the following information should be supplied:

a) Purpose - the conditions to be tested should be described; and

b) Method - the method to be used in the test should be described. This should indicate how the data is to be generated or prepared and the methods of input and output.

6.3 Performance Evaluation Criteria

An important aspect of system testing is to determine performance deficiencies, limitations and constraints in areas such as throughput, response time, and costs. Performance evaluation is often the last step of system testing.

7. Revised Project Plan

This is the current version of the overall project plan. Any amendments to the approved project plan from the Analysis phase should be highlighted and justified.

3.4 System Design Specifications

D. Description

8. Detailed Plan for Development and Implementation Phases

The plan presented here provides a detailed statement of the work necessary to complete the Development and Implementation phases.

It includes for each phase:

- a description of each activity to be undertaken
- the estimated staff required, including both user and development staff
- the estimated costs that will be incurred and the source of funds
- a phase schedule identifying team members responsible for each activity
- the outputs (deliverables) from each phase
- the individuals, management levels and organizational units responsible for project activities, user participation and review and approval
- a summary of the approach to be used in carrying out the phase identifying dependencies on other departments and external organizations.

3.5 Program Module Documentation

A. Purpose

To simplify the development and maintenance of program modules.

B. Preparation of Module Documentation

Programming documentation is developed by programmers during the Development phase and maintained when the system becomes operational.

Description of Contents

- Detailed Module Specification

  The intent of this section is to derive the detail module logic from the general module specification in the EDP Systems Design Specification. This is done by precisely describing the internal structure of each module prior to coding the module.

- Program Source Listings

  Program documentation files are to contain up-to-date annotated source listings.

- Unit Testing

  The following documentation should be included:

  Module Test Plan

  Describe approach to unit testing of program modules.

  Test Data

  Include a listing of the test data used, referring if necessary to the storage medium (e.g. tape number).

  Test Results

  Include any reports produced, dumps of output files and console listings or screen printouts for interactive programs.

  A brief description of the results of the tests indicating any possible problem areas could be included here.

  Date stamp test results.

3.6 User Manual

A. Purpose

During implementation of the system, and for the entire life of the system, the user's prime information document will be the User Manual. It will serve the user in three ways:

- the User Manual will provide management with an overview of the system, its functions and its features from the point of view of users and not from a computer point of view;
- the User Manual will serve as a technical reference document for line management and other system users;
- in conjunction with the Training Manual, it will aid in training system users through the examples and explanations of tasks.

It relates specifically to those functions which are part of the computer system. Manual methods and procedures are described in the Procedures Manual.

B. Preparation of User Manual

The User Manual is prepared by the Systems Development Team during the programming and testing phases of the project. It is essential for the development team to maintain a close working relationship with the user during this process in order to insure that the manual meets its defined purposes.

As the manual is aimed at users, it should be written in language that they are familiar with, computer "jargon" should be avoided.

3.6 User Manual

C. The User Manual is composed of the following sections:

1. Introduction
2. Maintenance and Distribution of Manual
3. Procedure for Obtaining System Support
4. Responsibilities for Various Organizational Units
5. System Overview
6. Overview of Tasks
7. Task Indices and Frequencies
8. Task Instructions
9. Input Indices
10. Input Descriptions
11. Output Indices
12. Output Descriptions
13. CRT Screen Index
14. CRT Screens

Appendices

3.6 User Manual

D. Description

1. Introduction

1.1 Purpose of the Manual

This sub-section should provide a description of the purposes for which a User Manual is used, and an explanation of its relationship to the Procedures Manual and the User Training Manual. It will be similar in content to the description of the purpose contained in these standards.

1.2 Organization of the Manual

This sub-section provides an explanation of the various sections of the User Manual and the manner in which each is used. This should guide the reader and enable him to make better use of the manual.

2. Maintenance and Distribution of the Manual

2.1 Maintenance Responsibilities

The maintenance responsibilities for the manual should be clearly stated in this sub-system to avoid any confusion at a later date.

2.2 Distribution List

Provide a list of all people to whom a User Manual has been or will be issued.

The list should include title, organization unit, location, and number of copies issued.

3. Procedures for Obtaining System Support

Provide the name of the organizational unit responsible for maintaining the system, their location and phone number.

3.6 User Manual

D. Description

4. Responsibilities of Various Organizational Units

In the event that the responsibilities for performing the tasks associated with the system rests with more than one organizational unit, it it essential that this division of responsibility be clearly defined.

This section should present a list of the major functions of the system as an indication as to the responsible unit. For reasons of simplicity, this list should be as general as possible; that is, the functions should be on the highest level that will still clearly define the responsibility rather than a listing of each specific detailed task.

5. System Overview

5.1 System Description

This sub-section is a brief narrative of the purpose of the system and how it operates. The length of this narrative will vary depending upon the size and complexity of the system. It will probably not exceed one or two single-spaced pages in length.

5.2 System Flowchart

The purpose of this sub-section is to illustrate the overall structure of the system and its relationship to other systems. It should correspond to the narrative presented in the previous sub-section and should represent the computer portion as a "black box". Computer sub-system and internals are not represented.

5.3 System Interfaces

If the system interfaces with any other systems via automated means, the interfaces should be described here. "Automated means" as used above, refers to magnetic tape or disks, diskettes, punched cards, etc.

3.6 User Manual

D. Description

Descriptions need not be lengthly; one or two sentences will generally suffice.

Example:

A computer file is produced containing data on cheque requisitions. The file is used to print the actual cheques and update the records of fiscal accounts.

5.4 System Functions

This sub-section of the User Manual is a list of the major functions of the system. It provides a quick reference to the casual reader of the manual, to determine if the system pertains to his area of interests.

Each point on the list should start with an action verb.

5.5 Systems Controls and Balancing

This sub-section is intended to highlight the control features and balancing procedures contained within the system.

It is strictly an overview and is not expected to contain specific detailed procedures. More detailed information will be available to the reader within the instructions relating to tasks that have control aspects and balancing (see Section 8 - Task Instructions).

5.6 System Error Correction

This is a description of the techniques that are used in the system for error correction. It is general in nature as it is oriented toward management.

It should refer to concepts, such as error transactions files and error reports and journals. Specific error correction procedures are described in the Task Instructions in Section 8.

3.6 User Manual

D. Description

5.7 System Files

The purpose of this sub-section is to provide the user with a better understanding of what information is stored by the system. It is not intended to be a technical description; such information is found in other places, such as the System Manual and the Data Dictionary. Rather, it is a brief, non-technical explanation which will enhance the user's knowledge.

For each file in the system provide the following information:

Name - The name by which the file is commonly known (e.g. Masterfile, Name and Address File, etc.).

Purpose - A brief description of the prime purpose of the file (e.g. provides a central storage location for all vendor names and addresses).

Content - A listing of the items of data in the file, (e.g. vendor name, street, address, province, postal code, language preference). No sizes or attributes are to be given.

Retention - Information regarding the permanence of the data (e.g. permanent file, purged monthly, daily file).

6. Overview of Tasks

This section is intended to provide the user with an overview of the relationship of the specific tasks contained within Section 8 - Task Instructions, and also with an understanding of the relationship of these tasks to the major system functions.

The section is aimed at both management and supervisory personnel and should be much more detailed than the information presented in Section 5 - System Overview.

3.6 User Manual

D. Description

The major functions of the system should be listed, and for each one, a list of the associated tasks in their order of occurrence should be provided. If two or more tasks are performed simultaneously, that fact should be indicated.

If necessary for a clear understanding of a complex relationship, a diagram may be used to supplement the listing.

7. Task Indices and Frequencies

This section serves two purposes. It provides the user with the means of locating any user Task Instruction contained in Section 8 and it provides a list of all tasks grouped under their corresponding frequency.

7.1 Task Frequencies

This is a list of all the tasks appearing in the next section, in their order of occurrence, prefaced by sub-section reference numbers.

Example:
8.1 Updating Name and Address Data
8.2 Processing Payments.

7.2 Task Frequencies

A list of user tasks grouped within their corresponding processing frequency should be provided in this sub-section. The most frequently performed tasks (probably daily) should appear first.

In the case of weekly or monthly frequencies, tasks performed earliest in the processing cycle should appear first (i.e. Monday tasks precede Wednesday tasks, etc.).

If a task is performed on a specific day of the week or month it should be noted.

Tasks performed on an "as required" basis should appear last in the list.

For each line of the list the following information should be provided:

- Frequency of Performance;
- Task Reference Number;
- Task Instruction Name;
- Remarks (optional).

3.6 User Manual

D. Description

8. Task Instructions

The section consists of one sub-section for each task in the system. Division of the system into tasks may be somewhat subjective. The team members preparing this manual should work closely with the users to arrive at a meaningful division.

If at all possible, it would be better to group associated tasks, as this will make the manual easier to use. This is not essential, however, as the Task Instructions are indexed both numerically and alphabetically.

Certain information is required for each task. No attempt has been made to specify a format for this information as the tasks will vary considerably in content and complexity. The required data items are described below:

1. Task Number - The same as the sub-section number.

2. Task Name - The name by which the task is commonly known. See above.

3. Task Purpose - A short statement regarding what the task accomplishes.

4. Task Frequency - How often the task is performed.

5. Inputs - A list of all inputs used by the task, with their associated reference numbers from Section 10 of the manual.

6. Outputs - A list of all outputs resulting from the task, with their associated reference numbers from Section 12.

7. CRT Screens - If the task is interactive using a CRT, a list of the CRT screens associated with the task should be provided with the appropriate reference numbers from Section 14.

3.6 User Manual

D. Description

8. Instructions - A step-by-step set of instructions as to how to complete the task. All Inputs, Outputs, and/or CRT screens as they appear in the logical flow of the instructions should be referenced. The instructions for filling out input documents are found in Section 10 and need not be included here. All instructions pertaining to the processing of outputs should appear, however. For example, any information about totalling or balancing the output should be shown. Any logging procedures should be related.

   If the task involves the assignment or maintenance of system codes, refer the user to the appropriate Appendix.

   If the task is interactive using a CRT or other terminal, the instructions should be presented as a dialogue between the user and the computer.

9. Error Messages - If the task includes an error report or error messages on a screen, a list of the exact text of each message with the meaning and appropriate action to be taken should be taken. It is very important to prevent the "What do I do now?" question from arising.

   ** In summary, it can only be stated that as much detail as possible regarding the task should be supplied, but it should be in an organized, simple-to-use manner. **

3.6 User Manual

D. Description

9. Input Indices

This section provides the user with the means of locating any Input Description contained in Section 10.

10. Input Descriptions

This section of the manual describes each of the system inputs which are processed by the user area. This includes forms filled in by the user, inputs used for data entry by the user, and any forms or other inputs submitted elsewhere for data entry and/or other processing. Computer interfaces are not to be included.

The descriptions are intended to supplement the Task Instructions (Section 8), but this section will also serve as a consolidated reference to all forms used by the system.

One sub-section is allocated to each input. The sub-sections are indexed in Section 9.

As a minimum, each sub-section should contain the following information:

Input Name - The name by which the input document is known. This name generally is printed on the document.

Form Number - If a form is used, it should be shown here.

Description - Information regarding the input medium (preprinted form, optical character form, mark-sense card, etc.).

Task Reference - A listing of all tasks for which the input document is used. Several tasks may use the same input document. Task names and reference numbers appearing in sub-section 7.1, Task Index, should be used.

Sample Input - A reproduction of the input document. Actual documents may be used, but if so, they must be of a form which can be bound in the manual.

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D. Description

If the document requires manual completion as part of the associated task(s), complete instructions should appear in this sub-section. The instructions are located in this part of the manual rather than in the Task Instructions because of the possible use of the document by several tasks.

The instructions should appear one per line and should be kept as simple as possible. The instructions will be used by people who do not have a thorough knowledge of the system and, quite possibly, little experience with data processing.

11. Output Indices

This section provides the user with ready reference to Section 12 - Output Descriptions.

12. Output Descriptions

This section of the User Manual contains descriptions of all the system hard-copy outputs which are received by the user. This includes printed reports, microfilm or microfiche.

The descriptions are intended to serve primarily as a supplement to the Task Instructions (Section 8). They will also be beneficial to the reader who is trying to extract information from the system, but who is unsure as to where the information might be found.

The section is sub-divided with one sub-section for each system output. The sub-sections are indexed in Section 11. It may prove useful to group outputs of one type.

As a minimum, each sub-section should contain the following information:

Output Name - The name by which the output is known. This will generally appear on the output document.

Form Number - If there is a form number associated with the output, it should be shown here.

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D. Description

Description - A general description of the report, its purpose, and information regarding the output medium (preprinted form, tab paper, microfilm, etc.) of the document.

Frequency - The frequency with which the output is produced.

Number of Copies - If the output is multi-part, the number of copies should be shown.

Distribution - The areas to which the report is distributed.

Retention - How long each copy of the output is retained and the location at which it is retained; also its disposition following this period.

Task Reference - A listing of all tasks which produce the output. Several tasks could produce the same document. Task names and reference numbers appearing in sub-section 7.1, Numerical Task Index, should be used.

Sample Output - If the output is printed, provide a photocopy. If, however, the output medium is microfilm or microfiche a reproduction of the document appearing on the film or fiche should be shown.

In the event that several different document formats appear on the microfilm or microfiche, include one of each with an explanation. Sample pages that give a good illustration of the output should be selected. In some cases, it may be necessary to provide 2 or 3 pages, but rarely more than that.

Any other supplemental information which might prove useful to the user should be provided.

3.6 User Manual

D. Description

13. CRT SCREEN INDEX

This section and the next section will be used if the system contains interactive CRT processing which is done directly by a User area.

14. CRT SCREENS

This section and the previous section are used if the system contains interactive CRT processing which is done directly by a user area.

The section consists of reproductions of all the CRT screens in the system. If facilities are available, photographic reproductions or printed screens are desirable.

There should be one screen per page and each page will be treated as a sub-section; that is, it will have a sub- section reference number (e.g. 14.1). In addition to the reference number, the following information should appear on each page:

Screen Name - The name by which the screen or task to which it applies is generally known. This will frequently appear on the actual screen.

Tasks Used By - A listing of all tasks for which the screen applies. This is usually only one but could be more. Task names and numbers appearing in sub-section 7.1, Task Index, should be used.

3.6 User Manual

D. Description

APPENDIX A - GLOSSARY OF TERMS

It would be unusual for this not to appear. Almost any system uses words and special terms, the meanings of which are not apparent to the average reader of the manual or new user of the system.

The appendix should be an alphabetically ordered list of these special terms with a brief explanation of their meanings, as applied to this system.

Printouts of the Data Dictionary could be used.

3.6 User Manual

D. Description

APPENDIX B - VALID CODES AND MEANINGS

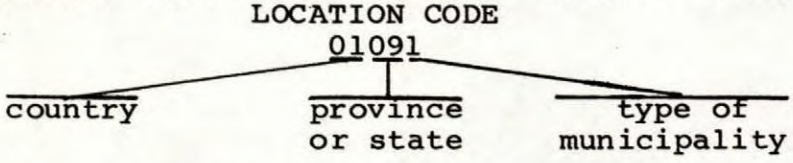
This appendix presents any system that must be maintained by the user. It may be that several different types of codes exist; in that case it might be better to use several appendices for purposes of clarity.

Any appendix of this type should contain a list of all the currently valid codes with an explanation as to their meanings. The list should be logically ordered (i.e. numerically or alphabetically) dependent upon the characteristics of the codes.

Lists of codes which are too large to keep in the User Manual could be kept in separate binders. The appendix in the User Manual should still include a description of those codes, the rules on how to form them, and a cross-reference to the binders where they are kept.

In addition to the list, rules for assigning new codes should be given. These should not include information on how to enter them into the system, but rather should show how to form a valid code. Any special editing criteria should be given. For example, certain letters might not be useable due to their vusial similarity to numbers (O and I).

In the case of complex codes, a breakdown of the structure should be shown. An example follows:



If codes are assigned by some other organizational area, this should be indicated so that the user will know whom to contact.

3.7 Procedure Manual

A. Purpose

Procedure Manuals contain the documentation of the complete procedures pertaining to all the manual and automated systems and the miscellaneous administrative activities followed in each organizational unit.

The difference from the User Manual is that the User Manual is oriented to describe how to use a specific computer system whereas the procedure manuals have a job orientation and specify when activities take place within a given organizational unit. Procedure manuals normally cover: policy, regulations, authorities, responsibilities, and detailed document flow.

For example, if a computer system impacts three organizational units, it will be documented in one User Manual but the procedures to use the computer system would be distributed among three procedure manuals.

B. Preparation and Maintenance

Procedure manuals are usually tailored to each organizational unit. In most units, the manuals already exist and it will only be necessary to update them, thus reflecting the changes caused by the new computer system. For this reason a description is not presented as part of these standards.

3.8 Training Manuals

A. Purpose

Training Manuals are intended to be supplementary documents to the User Manual. They provide additional examples of how to perform specific tasks, highlight particularly complex situations, specify what periodic training is to take place, and basically serve as an organized means of storing training material.

They are used during the initial training of personnel in the operation of the new system and also serve as a permanent staff training aid.

B. Preparation and Maintenance

Manuals are prepared by the system development team at the same time that the User Manual is being prepared and in conjunction with the training plan. They are an integral part of the system and are maintained as part of the overall system documentation.

3.8 Training Manuals

C. The Training Manuals are made up of the following sections:

1. Introduction
2. Training Responsibilities
3. Examples of Processing Cycles
4. Examples of Coding
5. Examples of Balancing
6. Examples of Tracing
7. Examples of Features
8. Required Training

Appendix A - Original Training Plan

3.8 Training Manuals

D. Description

1. Introduction

The introduction to the manual should provide the reader with an understanding of the purposes of the Training Manual. It should also contain a description of the manner in which the material is organized and an explanation as to how the manual is to be used.

2. Training Responsibilities

This section of the manual should begin with a clear statement regarding the training responsibilities of various organizational groups. Training responsibility may be divided between User management, supervisory staff, formal staff training groups, etc. The specific training functions performed by each of these organizational areas should be defined.

3. Examples of Processing Cycles

This section of the Training Manual serves to illustrate the various processing cycles within the system. Consequently, it should probably be organized with one sub-section for each cycle. This is not a requirement, however; the manual should be arranged in the manner which provides the best presentation of the available material.

Examples of all the inputs to and outputs from a specific processing cycle should be included within the sub-section applying to that cycle. It may be useful to relate specific data from an input to an output through the use of explanatory notes, which may be written directly on the examples.

By addressing each cycle from start-to-finish, the user of the manual will be able to obtain a better understanding of the overall system.

4. Examples of Coding

This section is oriented toward demonstrating how to complete the inputs to the system. Examples of coding each of them should be presented. If several variations exist, examples of each should be given.

3.8 Training Manuals

D. Description

Any particularly complex inputs should be explained. The use of notes and arrows, etc., written directly on the example, is encouraged.

In addition, the outputs resulting from each of the inputs should be included and suitably referenced. These will serve to reinforce the importance of the input procedures.

5. Examples of Balancing

The material contained in this section consists of examples specifically related to balancing and control totals. It is basically output oriented but could also include inputs if necessary for clarity of input balancing procedures.

Once again, the examples will probably benefit from the use of notes written right on the example, and if necessary, a variety of examples of the same procedure should be used.

6. Examples of Tracing

This section is used to present examples of how to follow audit trails and to trace data from one document to another. For example, the relationship of summary totals to detail data would be presented here.

Special instructions or explanations should be given. It may be necessary to use supplementary text, but an effort should be made to put as much as possible on the actual examples, as this will make them easier to use.

7. Examples of Features

Any special features of the system should be highlighted here. This includes especially complex procedures and tasks which are performed only occasionally, such as year-end processing, ad hoc reporting, or reconciliations.

The examples provided in this section may be inputs and/or outputs. The organization of the section and presentation methods used should be similar to the previous sections.

3.8 Training Manuals

D. Description

8. Required Training

This section of the User Training Manual should provide the reader with a definite schedule of required training. This should address both the training that an employee receives upon initially being assigned to a task, and training that employees receive on a periodic basis as a refresher. It will serve as a guide to aid training personnel in the assignment of specific individuals to training sessions.

APPENDICES

The appendices are used to present information that does not logically fit elsewhere in the manual. In general, they are optional as this additional information may or may not exist. An example of the type of data here might be any transparencies employed during training.

APPENDIX A - ORIGINAL TRAINING PLAN

The appendix contains the training plan used for the initial training of user personnel. This required appendix will serve as a permanent record of the original training that the user received. This material is often useful for later reference.

3.9 Computer Operations Manual

A. Purpose

The Computer Operations Manual is designed to fully describe all phases of the operation of a computer system.

B. Preparation

The Computer Operations Manual is prepared by the Systems Development Team during the programming and testing phases of the project. It is essential for the development team to maintain a close working relationship with ISM operating staff during this process in order to insure that the manual meets the defined requirements and objectives.

A typical format for this manual is outlined below.

3.9 Computer Operations Manual

C. Contents

1. Introduction
2. System Overview
3. Schedule
4. Job Submission
5. Report Distribution
6. Restart/Recovery Procedures
7. File Retention Schedule and Disposition

3.9 Computer Operations Manual

D. Description

1. Introduction

Content: Title page, table of contents and purpose of Operations Manual.

Methodology: Free format narrative.

2. System Overview

Content: Brief system description and an explanation of where the system is being run.

Methodology: Free format narrative.

3. Schedule

Content: A chart broken down by jobs showing:

a) when the system is initiated;
b) sequence of job executions for the remaining steps.

Any job conditions should be identified e.g. pre-requisites: Job 2 runs after Job 1 completion.

The data transmission events are also recorded in the schedule whenever they apply.

Methodology: The format shown on the next page is an example of a form which could be used for filing the information.

JOB SCHEDULE

System: _____

Account/Work Order: _____

Frequency: _____

Job Name	Run Date	Prerequisite	Comment
e.g. Job 1	1st Wednesday of each month		
Job 2		after completing Job 1	
Data Transmission			From IV Phase to HQ

3.9 Computer Operations Manual

D. Description

4. Job Submission

Content: The necessary information for an operator to submit all jobs in a system.

Methodology: Each job in sequence of execution is described in the following manner:

- Job submission instructions;
- Job quality control procedures;
  a) JCL checking;
  b) Audit control;
  c) Job warning/error messages showing the operator actions.

Note: All pages in the operation manual will have page numbers to trace information pertaining to a job.

The job submission instructions objective is to pass the necessary information to the operator so he can submit the job. It will contain as applicable the following items:

Item 1: Identification

Contains the system name, account/ work order and the job name.

3.9 Computer Operations Manual

D. Description

Item 2: Job Information

Contains the procedure name, storage location sign-on procedure, required resources (CPU time, number of work tapes to be mounted, etc.), the job prerequisites (special packs to be mounted, etc.), data transfer and finally a list of all job outputs (reports and files if applicable).

The following is an example of a job submission format that could be used to pass the information to the operator:

JOB SUBMISSION INSTRUCTIONS

PAGE OF

SYSTEM: _____

ACCOUNT/WORK ORDER: _____

JOB NAME: _____

PROCEDURE NAME: _____

STORAGE LOCATION: _____

SIGN-ON PROCEDURE: _____

REQUIRED RESOURCES: _____

JOB PREREQUISITES: _____

_____

_____

_____

_____

DATA TRANSFER: _____

_____

_____

LIST OF OUTPUTS: _____

_____

3.9 Computer Operations Manual

D. Description

The job quality control procedures objective is to describe to the operator the necessary procedures to be taken to insure the quality of the job execution. It covers the following items:

Item 1: Listing Verification

Contains the job listing name, the JCL checking instructions (e.g., condition/return codes, operating system messages, sort completion and files messages), the audit report control instructions (control totals, headings that will be printed, etc.) and a reference to the report's distribution section which contains the control instructions to verify the user report.

Item 2: Job Warning/Error Messages

Contains all system messages (warning or error messages) and a description of the operator actions required.

Following is an example of a Job Quality Control Procedure and of a Job Warning/Error Messages format that could be used to pass the information to the operator:

JOB QUALITY CONTROL PROCEDURES

JOB LISTING NAME:

JCL CHECKING INSTRUCTIONS:

AUDIT REPORT CONTROL INSTRUCTIONS:

JOB WARNING/ERROR MESSAGES

Warning/Error (W/E)	Description	Operator Actions

3.9 Computer Operations Manual

D. Description

5. Report Distribution

Content: List of user reports with distribution instructions, security and quality control instructions.

Methodology: The form "Job Output Handling and Distribution" on the next page can be used.

JOB OUTPUT HANDLING AND DISTRIBUTION

System: _____

Account/Work Order: _____ Page of

Job: _____

OFF-LINE SPOOL REQUESTS: _____

MICROFICHE PROCEDURES: _____

DECOLLATE/BURST INSTRUCTIONS: _____

OUTPUT REPORT CHECKLIST: (Report numbers, security, number of copies, page/line count estimates, special form requirements, etc.)

OUTPUT REPORT DISTRIBUTION: (Distribution list - packaging, delivery and carriers, number of copies)

Security: _____

3.9 Computer Operations Manual

D. Description

6. Restart/Recovery Procedure

Content: Restart procedures and the actions required prior to rerun.

Methodology: Free format narrative. A sample form is shown below.

JOB RESTART INSTRUCTIONS

(Restart procedures and the actions required prior to rerun)

3.9 Computer Operations Manual

D. Description

7. Error Retention Schedule and Disposition

Contents: Job file retention information and instructions as to when these files can be released for alternative use.

Methodology: The following form can be used for filling in the job file retention information.

Note 1: The retention period can be expressed in days/ weeks but can also be expressed in number of cycles.

Note 2: The operator will probably have been instructed not to keep any user reports.

JOB FILE RETENTION SCHEDULE AND DISPOSITION

System: _____

Account/Work Order: _____ Page of

Job: _____

TAPE FILES: (Retention, storage location, file log activites, security, etc.)

_____

_____

_____

_____

DISK FILES (Retention, release details, back-up, file log activities, etc.)

_____

_____

_____

_____

INPUT RECORDS: (Retention, release or send to information, security, etc.)

_____

_____

_____

_____

JOB LISTINGS: (Retention, file location, etc.)

_____

_____

_____

_____

REPORT CHECKLIST/TRANSMITTAL LETTERS: (Retention, file location, etc.)

_____

_____

_____

_____

3.10 Post-Implementation Report

A. Purpose

The Post-Implementation Report presents the conclusions and recommendations of the study group reviewing the performance of a system during a predetermined period after the system has been in operation. In addition, the report supplies background information on the development of the system, the measurement criteria applied, and the data upon which the conclusions and recommendations are based.

B. Preparation

The report is prepared at the conclusion of a review of the system's performance. This review generally takes place 4 to 12 months following the implementation of a new system or substantial modifications to an old one.

The time frame of the review and the management authority of the Post-Implementation Evaluation are generally specified during the development of the system.

C. Contents

1. Executive Summary
2. Introduction
3. Background
4. Evaluation Criteria
5. Analysis of Accomplishments
6. Current Problem Areas
7. Evaluation of On-Going Support
8. Conclusions and Recommendations

3.10 Post-Implementation Report

D. Description

1. Executive Summary

1.1 Objectives and Scope of the Review

The Executive Summary serves as a concise presentation of pertinent portions of the report of interest to senior management. It should contain a brief description of each of the following topics:

1.2 Methodology Applied

The goals of the review and the boundaries and constraints of the review.

1.3 Principal Findings of the Review

The techniques used to obtain the information.

1.4 Conclusions

A summary of the key findings.

1.5 Recommendations

A statement concerning the conclusions arrived at following an analysis of the findings. Supporting evidence should be presented to verify these conclusions.

If necessary, specific recommendations to improve system performance.

2. Introduction

This section starts the main body of the report and assists the reader in understanding the results of the study. The following items should be covered:

3.10 Post-Implementation Report

D. Description

2.1 Objectives and Scope

This sub-section identifies the objectives and the boundaries within which the review was contained. It served as a guide to the review team; thus, the more precisely the objectives and scope were defined, the better the review will have been. This sub-section also serves as a guide to the reader of the report as to what the review can be expected to accomplish.

2.2 Review Team

The team conducting the Post-Implementation Evaluation should be identified, giving:

1. The team organization structure;
2. The team members.

The team organization structure could be shown in both chart and narrative format. The chart shows the relationship and title of each member on the team. The narrative explains the responsibilities of each member. The team member's names should be noted on the chart.

A list should be given to identify the title, department, or, in the case of contract personnel, the company with whom they are associated. This list is required in case someone wants to contact a team member for further explanation of the review or to discuss a similar role in another review.

2.3 Approach and Methodology

This sub-section specifies the approach and methodology used in gathering and presenting the information contained in the report. Depending on the nature of the review, the approach may include certain interviews. The persons interviewed should be included in an Appendix.

3.10 Post-Implementation Report

D. Description

This sub-section should also give details about any special techniques, such as hardware monitors or software benchmark testing used to obtain data. Many of these methods may be new to the reader and it is important that they be understood if the user is to fully appreciate the report's contents.

3. Background

This section of the report provides the reader with background information, so that the results of the review may be fully appreciated. The background data is presented in four different categories, as follows:

- History of System Development;
- System Objectives;
- Expected Benefits; and,
- Expected Development and Operational Costs.

4. Evaluation Criteria

This section specifies the measurement which will be applied during the review to determine the success of the system.

The most obvious and most important measurements are how well the system has met the stated objectives, whether or not the system is returning the expected benefits and how close it has come to meeting the anticipated costs.

In addition to these criteria, other factors must be considered. For instance, any system requirements stated in the Systems Manual must be reviewed for conformance. The impact of the system on the total computer operation and particularly on the system hardware must be measured. The relation to the system of any new factors which have developed should be considered.

If design criteria were established in the initial stages of the project these should be stated and used in the evaluation.

These and similar functional and technical factors should be presented in this section. The evaluation of the system using these criteria will be contained in later sections of the report.

3.10 Post-Implementation Report

D. Description

5. Analysis of Accomplishments

5.1 Objectives

This section is a detailed analysis of how well the system has accomplished the objectives set out in the Information System Requirements Specification. Each objective should be presented separately with the appropriate findings. Wherever possible, quantitative evaluations should be made.

If an initial objective is no longer considered valid due to changed circumstances, an explanation should be included. Some objectives may only be achieved over a longer time frame; again this should be explained. An analysis of objectives which have arisen since implementation should also be included.

5.2 Benefits

This section is similar to the previous one in organization, but instead, details the analysis of the realization of expected benefits. The section should be divided into tangible and intangible benefits, and the analysis of each type should be presented separately. Tangible benefits will best be shown quantitatively.

If benefits which were not initially anticipated have accrued, they should be given with an explanation of the causes.

5.3 Planned to Actual Costs

This section reviews the performance of the system in the area of adherence to expected operating costs. In addition, a comparison of anticipated development costs to actual development costs should be shown.

Any variances from the estimated costs should be explained in detail.

3.10 Post-Implementation Report

D. Description

5.4 Other Criteria

The previous three sections highlighted the performance of the system in the areas of costs, benefits, and objectives. This section similarly presents an analysis of system performance against the other criteria listed in Section 4.

Evaluation of the system against the original design criteria should be included in this section when applicable.

6. Current Problem Areas

The section presents any problems that currently exist which fall within the scope of the system. These problems will typically fall into four categories:

- problems which existed prior to system implementation, but were not recognized;
- problems which existed prior to system implementation that were recognized; but have remained unsolved;
- problems which have arisen following system implementation, as a direct result of the system; and,
- problems which have arisen following system implementation, but not as a result of the system.

The impact of each of the problems should be fully explained and they should be arranged in order of their importance.

7. Evaluation of On-Going Support

As part of the Post-Implementation Evaluation, the review team will investigate the system support which is actually required in comparison to that planned and the currently available.

3.10 Post-Implementation Report

D. Description

8. Conclusions and Recommendations

An analysis of all the findings of the Post-Implementation Evaluation will result in conclusions being formed regarding the operational efficiency of the system, its viability, its development, need for improvement, and other similar factors.

Certain of the conclusions of the Post-Implementation Evaluation may have indicated that some action was required to improve the performance of the system. If so, a plan for implementing any required changes should be developed and specific recommendations should be made in this section.