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SYSTEM REQUIREMENTS ANALYSIS AND DESIGN DOCUMENT FOR AN OFFICE AUTOMATION SYSTEM IN THE BUREAU FOR PROGRAM AND POLICY COORDINATION

Agency for International Development
Washington, D.C.

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BOOZ·ALLEN & HAMILTON INC.

4330 EAST WEST HIGHWAY • BETHESDA, MARYLAND 20814 • TELEPHONE: (301) 951-2200 • TELEX: 710-824-0552

BOOZ·ALLEN & HAMILTON INC.

4330 EAST WEST HIGHWAY • BETHESDA, MARYLAND 20814 • TELEPHONE: (301) 951-2200 • TELEX: 710-824-0552

May 28, 1982

Mr. Linwood Rhodes
M/SER/DM/IM
Agency for International Development
Washington, D.C. 20523

Subject: IQC No. AID/OTR-I-1860, Work Order No. 7, PPC Requirements Analysis and Design Study--Final Report

Dear Mr. Rhodes:

Booz, Allen & Hamilton Inc. is pleased to submit this final report of our study to determine the requirements and design for an office automation system in the Bureau for Program and Policy Coordination (PPC).

As specified in the work order, the thrust of this effort has been to develop the requirements and design of an office automation system to address PPC's word processing needs. A secondary objective was to survey, in general, the data processing interests of PPC's offices in order to assess their broad implications for a more advanced PPC office automation system.

Chapters II through VIII of this report concern the requirements analysis, design, and implementation of a system to accommodate PPC's word processing needs. Chapter IX presents the results of the ADP interests survey and also certain technical issues that concern the use of the word processing system for data processing purposes and in conjunction with the Agency's mainframe computer. The chapter also describes the content of additional study which will be necessary to pave the way to meet the Bureau's data processing needs.

We appreciated the opportunity to work with the PPC working group and your staff on this important assignment.

Very truly yours,

John C. Newman (CJL)

BOOZ·ALLEN & HAMILTON Inc.

John C. Newman
Vice-President

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MANAGEMENT SUMMARY

At the request of the Bureau for Program and Policy Coordination (PPC), the Office of Data Management (M/SER/DM) contracted with Booz, Allen & Hamilton Inc. in mid-March to design an office automation system for advanced word processing support to the Bureau. A secondary objective of the study was to identify PPC's automated data processing (ADP) interests, in general terms. This latter study was undertaken in anticipation of an additional detailed requirements and design study focusing on meeting PPC's ADP requirements. This management summary highlights the major results of the two and one-half month study to design a system meeting PPC's word processing needs.

1. A WANG OIS 140, COMPOSED OF 12 WORKSTATIONS AND 8 PRINTERS, WAS RECOMMENDED TO MEET PPC'S MOST PRESSING OFFICE AUTOMATION NEED FOR EXPANDED WORD PROCESSING SUPPORT

PPC's equipment configuration is based on the Wang Office Information System (OIS) 140 Model III, AID having joined the State Department in an exclusive purchase contract with this vendor for word processing equipment. The OIS offers PPC several advantages stemming from the following set of capabilities:

- Advanced word processing features--in addition to efficiently processing typed documents, this system includes several features which store, retrieve and re-organize information, thus providing higher levels of automated support to PPC offices than existing equipment.

- Capacity for expansion--as PPC's work load and office automation needs change, other pieces of equipment can be attached to the system, and its on-line storage capacity can be increased.

- Linkage to computers and other automated systems--it is technically feasible to connect this system to the Agency's central computer and to office automation systems in other AID offices.

Such capabilities respond to PPC's immediate word processing needs and permit system refinement, especially through the OIS's ability to be interconnected with other automated processing systems.

PPC offices annually produce a large typing work load of approximately 124,000 pages. These estimates demonstrate a current need for 12 workstations and 8 printers which are being assigned to PPC offices on the basis of work load levels as follows:

- AA/PPC--one workstation and one printer
- PDPR--three workstations and two printers
- E--three workstations and two printers
- EA/IA--two workstations and two printers
- PB--three workstations and a printer.

Two offices, WID and EMS, which did not have sufficient work load to justify separate workstations will share access to equipment located in other PPC offices.

Following evaluation of system utilization, SER/DM and PPC may modify the number, type and location of OIS equipment to reflect changes in work load and office location.

2. USE OF THE OIS COULD POTENTIALLY RELEASE AN ESTIMATED 1,200 WORK DAYS OVER FIVE YEARS WHICH MANAGERS COULD DIRECT TO OTHER TASKS

Over a five-year useful life, the OIS 140 could represent a substantial incremental cost increase over PPC's existing word processing system. As explained in the cost-benefit analysis presented in Chapter V, the five-year start-up and operational costs associated with the OIS range from $37,000 to $197,000 more than the existing word processing system depending upon the equipment acquisition method selected.

In the study team's opinion, the Bureau would maintain considerable flexibility by leasing the equipment and exercising a purchase option within 180 days. Such an option is cost-sensitive and provides time to explore PPC's ADP requirements which may conclude that a different equipment configuration is needed to meet PPC's comprehensive office automation requirements.

An immediate, measurable benefit of use of the OIS is expected to be the release of typing and proofreading workdays due to the greater revision efficiency of this advanced system over PPC's existing typing support. These represent "costs avoided," and PPC managers may value and direct staff time to other work activities, invest the time to produce higher quality work or handle a larger work load.

The system will also produce qualitative benefits, such as, timeliness, accuracy and appearance. While intangible, such benefits are frequently the most highly valued benefits of expanded office automation with the greatest effect on staff performance and satisfaction.

3. BUREAU-WIDE OIS OPERATIONS WILL BE DIRECTED BY STAFF IN PB/PIA, AND A LEAD OPERATOR WILL COORDINATE OFFICE-LEVEL OIS OPERATIONS

OIS operations necessitate a new functional management arrangement to provide a single source of management control and enforcement for effective shared use of the advanced word processing system.

- A system administrator and an assistant in PB/PIA have been selected to manage the overall system on a daily basis.

- A lead operator in each of the PPC office-level organizational units serves as the local system expert, coordinating office-level system operations.

- Designated operators in each office are the individuals who will primarily use a given workstation under the direction of the lead operator.

PPC's advanced word processing system has been designed to be readily incorporated into current Bureau and office work routines. Document production will continue to be supervised by individual PPC offices. The OIS equipment will be located near the designated operators' desks to ease access. Regular typewriters will remain and should continue to be used for documents inappropriate for OIS support. While the study team recommends the establishment of regular hours of OIS operations, the system is readily available for staff use at all times.

4. AN ADVANCED WORD PROCESSING SYSTEM, THE OIS IS SIGNIFICANTLY LIMITED IN THE EXTENT TO WHICH IT CAN MEET PPC'S ADP INTERESTS

Based on a broad survey of staff's general ADP interests, this study found that PPC is interested in both data processing enhancements as well as new capabilities. The types of enhancements desired in current ADP capabilities included three general interests:

- Faster response from the AID computer
- Greater flexibility to access and manipulate existing data bases
- Greater accessibility to statistical analysis capabilities.

In addition, PPC staff expressed an interest in the following new capabilities:

- Ability to create data systems and generate reports
- Access to reference data bases
- Access to computer graphics.

The study team concludes that while the OIS will meet PPC's word processing needs and can provide some data input, manipulation and output support, the OIS is greatly limited in meeting PPC's ADP interests.

5. PPC CAN BEGIN TO RESOLVE ITS DATA PROCESSING PROBLEMS BY PROCEEDING WITH FURTHER ANALYSIS OF ITS ADP INTERESTS

PPC is not only a user and processor of information in critical Agency processes; it is also a provider to other bureaus and offices. As a key information and reference resource, PPC needs a comprehensive office automation strategy which incorporates needed word processing, data processing and telecommunications capabilities. However, a long-term PPC strategy must be consistent with AID's overall strategy, and efforts to develop such an Agency-wide strategy are now beginning.

While awaiting an Agency-wide strategy, PPC should forge ahead with the planned next step of its automation effort, a requirements study of its ADP needs. This study, described in Chapters III and IX, would prepare PPC to quickly formulate its long-term ADP strategy when the Agency-wide strategy is decided. In the event of a long delay in formulating the Agency-wide plan, the requirements analysis could serve as the basis for interim solution to alleviate PPC's most pressing ADP problems. The ADP interests that were identified in general terms for this study would provide a starting point for PPC's requirements analysis.

I. BACKGROUND

The Office of Data Management (M/SER/DM) contracted with Booz, Allen & Hamilton Inc. to design an office automation system in the Bureau for Program and Policy Coordination (PPC) in mid-March 1982. This background chapter presents the specific purposes of the study, its scope and approach, and also describes the organization of the report.

1. THE PURPOSE OF THIS STUDY IS TO DESIGN AN OFFICE AUTOMATION SYSTEM FOR ADVANCED WORD PROCESSING SUPPORT TO THE BUREAU FOR PROGRAM AND POLICY COORDINATION

At the request of the Bureau, and as part of an overall Agency effort to implement office automation, SER/DM has undertaken a series of studies in several AID/W bureaus and offices. This study was launched with unusual urgency at the request of PPC in order to meet some pressing needs for office automation and also to coincide with consolidation of PPC offices in the State Department Building. In terms of time, the intent was--and remains--to have accomplished the word processing-related part of the effort in sufficient time to have the necessary equipment installed in early June 1982 so that it can assist in the preparation of documents for the Annual Budget Submission (ABS).

Based on an analysis of word processing work load data provided to the study team, a preliminary assessment of the necessary equipment configuration and vendor-provided software to meet word processing needs was presented to SER/DM and PPC on April 5, 1982. This led to the initiation of an equipment order, which resulted in delivery during the week of May 10.

(1) The Principal Goal of this Study is to Design an Office System That Will Meet PPC's Word Processing Requirements

A word processing system design, in the AID context, contains the following elements:

- An equipment configuration which describes the type, number, and deployment of necessary hardware

- Associated software, which is provided by the equipment vendor, to operate the system.

- Specific document-related applications which will be performed on the system

- Management arrangements to operate the system

- An implementation "blueprint," including a determination of training requirements.

These elements have been designed and are described in sections of this report. As explained subsequently, this design also provides a starting point for pursuing the additional development of an office system capable of supporting the Bureau's data processing needs.

(2) A Secondary Goal of the Study Is To Identify PPC's Data Processing Needs and Interests, in General Terms, and To Assess Their Implications for the Bureau's Office Automation Strategy

In line with the intent of present Agency plans, the integration of word processing and data processing systems to serve PPC, to the extent practical, is another goal for the Bureau's office automation. This is likely to involve, to some degree, use of the word processing equipment to be installed for certain ADP functions, such as data input.

The work order under which this study is being undertaken contemplates additional work to determine PPC's data processing needs in detail and to prepare an appropriate cost-benefit analysis for an eventual equipment configuration capable of data processing, as well as an ADP-oriented automation plan.

In the present study, data processing-related activity is explicitly limited to taking an inventory of ADP "interests," in general terms. This initial level of understanding of the Bureau's ADP needs is essential in order to design a word processing system which does not foreclose any of the Bureau's future ADP options.

2. AID'S OVERALL OFFICE AUTOMATION PROGRAM CALLS FOR A THREE-POINT APPROACH TO IMPLEMENTING INDIVIDUAL OFFICE SYSTEMS

Following the approach taken in prior office automation design efforts within the Agency, as well as prudent systems development practice, the approach taken in PPC is characterized by the following characteristics:

- Identification of demonstrable needs
- Phased approach to permit "absorption" of the technology
- Anticipated integration of word processing and data processing, as appropriate.

(1) Needs for a System Have To Be Demonstrated

In accordance with General Services Administration systems acquisition policies, the Agency follows an approach which seeks to identify the costs and benefits of a proposed equipment configuration. This has been done in PPC by examining the estimated size, composition and flow of its typed work load and the forecasted benefits, in specific types of labor cost-avoidances, which the proposed installation can be expected to offer. Like many needs-based analytical approaches with a cost-benefit element, neither all benefits nor every cost can be captured, but the goal of identifying a substantial need for the acquired equipment needs to be met. In the course of this study, the substantial need for word processing support was found in PPC.

(2) A Phased Approach Permits the Bureau To Build Upon the Fundamentals Before More Sophisticated Office Automation is Attempted

As the Agency well knows from its programmatic work, new technology usually takes some time to be absorbed, regardless of the setting. The brief history of word processing systems and the longer experience with ADP both indicate that equipment operators and system users need some time to learn the capabilities of the system and to become skilled in exploiting them. This phenomenon militates against an approach which would have an organization "grow into" the most advanced system available. When attempted, this approach is likely to breed considerable frustration and impede productivity.

As a result, the Agency's approach to office automation has been to provide equipment which is compatible with existing skill levels and office environment, and then provide training and a period of experience before the system is enhanced with more sophisticated capabilities. In PPC's case, this approach means that word processing should be attempted before the need for ADP support and telecommunications linkages is satisfied.

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(3) Word Processing and ADP Support Should Be Integrated to the Extent Practical

This integration can be advantageous for several reasons, including the following:

- Limit equipment costs
- Reduce amount of equipment which must be housed in offices
- Permit the automated merging of text and data, thus easing document preparation tasks and reducing processing time
- Avoid putting undue strain on both ADP and word processing equipment.

As always, an equipment configuration which satisfies both needs should be cost-beneficial and convenient to use, and able to be supported with appropriate hardware and software maintenance services.

3. THE STUDY METHODOLOGY FOCUSED ON KEY PRODUCTS AND WORK PROCESSES IN PPC

The methodology used to explore word processing has been in use since the fall of 1981 in a series of studies performed by both SER/DM staff and Booz, Allen & Hamilton, using an approach approved by SER/DM.

(1) Typing Work Load Was Estimated Using Figures Generated by PPC As A Starting Point

The estimates of PPC's work load, by office and document type, were based on data originally collected by PPC following instructions provided by SER/DM. Before arriving at final figures for use in this study (to size the configuration and determine equipment locations), the study team discussed the previously collected data with representatives for each PPC office. In the course of these discussions, some limited adjustments and updating of original and revised page count estimates were made, and the documents were classified by type, i.e., text vs. tabular. Included in the total page counts and number of revisions are not only work typed by PPC support staff, but also the considerably smaller amount of typing done by professionals (for draft and final copy) and the commercial typing service used by PPC/E.

(2) Key Document Preparation Processes Were Analyzed

The study team devoted much of its initial interviewing to determining the principal types of documents produced and the process flow involved in their preparation. Of particular interest were any horizontal flows within the Bureau (among its components) and between PPC and other AID/W offices and bureaus, the amount of processing key documents undergo, and the amount of revision which occurs. These characteristics of the work load also contributed to determining the size and deployment of the equipment.

(3) ADP Interests, In General Terms, Were Surveyed and Their Apparent Technical Implications Were Assessed

Interests were initially identified through discussion with representatives of each PPC office. Both existing ADP systems and their enhancements, as well as prospective ADP support applications and satisfaction of presently unmet needs were discussed. In dealing with prospective interests, an effort was made, not always successfully, to determine basic technical characteristics, such as size of the data base and the frequency of use. When explored more deeply in subsequent study, these characteristics of ADP interests will have to be determined in order to properly size the equipment and to determine development and ongoing maintenance levels of effort.

Using the information gathered on interests, the study team made a preliminary assessment of their technical implications. For example, a present application, due to the size of the data base, may be limited from storage in the word processing system and might be best stored on the Agency's mainframe. The interface between the mainframe and the Bureau's word processing system was also examined, including its telecommunications requirements, in order to identify technical issues which need to be resolved before this linkage can be accomplished. In the course of this work, the study team consulted with SER/DM staff and the equipment vendor.

* * * * *

The balance of this report presents the results of this study in full:

- Chapter II describes the current environment of the Bureau for office automation and characterizes the work load for word processing

- Chapter III presents the study team's view of a system strategy for PPC, which should eventually include data processing and telecommunications elements

- Chapter IV discusses the word processing equipment configuration which has been supported by analysis and which is currently on order

- Chapter V provides a cost-benefit analysis of the word processing configuration

- Chapter VI describes the principal word processing applications--specific documents and their preparation processes--which should be accomplished with features of the recommended configuration

- Chpater VII recommends system management arrangements for operating the word processing system within the Bureau

- Chapter VIII provides an implementation plan for the word processing system

- Chapter IX contains the results of the ADP interests survey, describes its technical implications, and discusses the nature of additional study necessary to flesh out an ADP system design to support the Bureau.

A series of appendices provide detailed supporting and reference material for key topics discussed in the report.

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II. CURRENT ENVIRONMENT

This chapter presents study findings on the current document preparation and information processing activities in PPC. These findings shaped the office system design for PPC, which is presented in following chapters.

1. THE BUREAU FOR PPC IS RESPONSIBLE FOR AID'S OVERALL PROGRAM POLICY FORMULATION, PLANNING AND RESOURCE ALLOCATION, AND EVALUATION

The Bureau for Program and Policy Coordination is responsible for AID's overall program policy formulation, planning, resource allocation, and evaluation activities, and the management information systems and reporting that supports these activities. As such, PPC has a central role developing the Agency's long-term plans and managing the planning, programming and budgeting processes year by year.

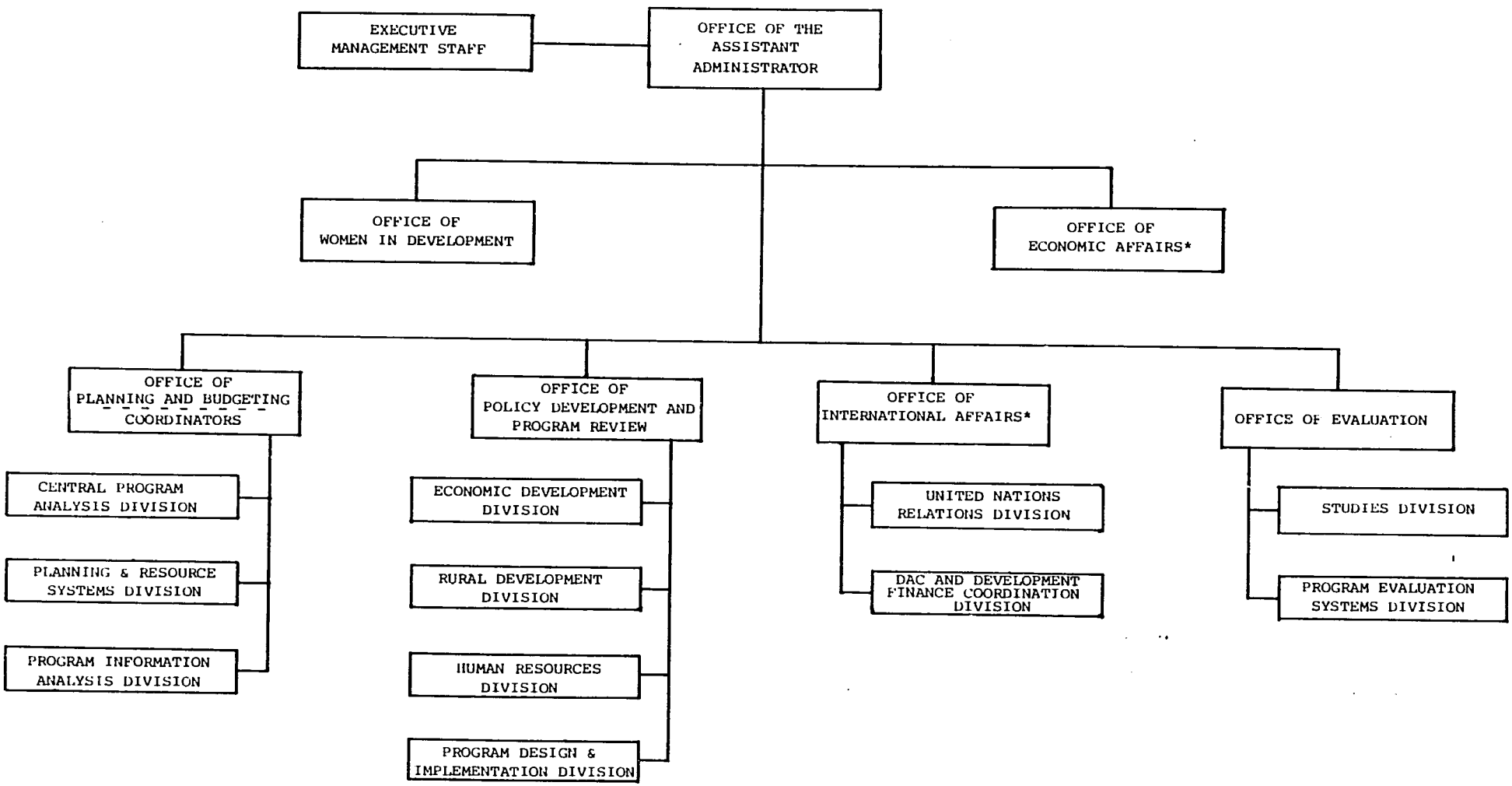
The Bureau's current organization of its approximately 139 AID/W and United Nations-based staff is shown in Exhibit II-1, on the following page. A brief summary of the role, current staffing, and the nature of the documents produced by each PPC office provides an orientation to the Bureau's work.

- Office of The Assistant Administrator (AA/PPC) -- is principal advisor to the Administrator and other AID officials on the overall planning, development, and evaluation of AID policies and programs. There are six posi- tions in the AA/PPC office. The major documents prepared in this office are memoranda, corres- pondence, and the PPC agenda. The office pro- vides final clearance and approval for major PPC and Agency documents.

- Executive Management Staff (EMS) -- provides the AA/PPC with assistance in managing the adminis- trative operations of the Bureau. There are four positions in EMS. The most frequently documents prepared in the office are brief memos and mis- cellaneous forms. There are several Bureau-wide documents maintained by EMS, e.g., employee lists, phone books, and operating budget.

EXHIBIT II-1

ORGANIZATION OF THE BUREAU FOR PROGRAM AND POLICY COORDINATION



* There is currently a proposal to combine the Offices of Economic and International Affairs to create a Directorate of International Development Coordination.

SOURCE OF CHART: Office of Management Planning, January, 1982, AID organization chart.

- Office of Policy Development and Program Review (PDPR) -- formulates and interprets AID policies and program strategies for assisting developing countries. The office conducts numerous analyses in support of its function. There are 39 positions in PDPR. The major documents produced by PDPR are AID Handbooks, policy papers, memos, and analytical reports and papers.

- Office of Evaluation (E) -- is responsible for AID program evaluation management and for promoting use of evaluation results. There are 19 positions in PPC/E, although the office extensively utilizes other AID and contractor staff in its evaluation and document preparation activities. Major documents produced by PPC/E include component documents of evaluation "packages", memos, and miscellaneous analytical reports.

- Office of Planning and Budgeting (PB) -- manages the Agency-wide planning, programming, and budgeting processes, and also manages the data systems, analysis and reporting processes associated with these activities. There are 36 positions in PB. Major documents produced in PB include periodic agency program reports (such as Quarterly Program Review, Special Concerns Reports), memos, analyses, and miscellaneous tables.

- Office of Economic Affairs (EA) -- conducts international economic policy analyses and recommends economic policies and development strategies in support of AID's mission. There are seven positions in EA. The major documents produced by EA include analytical papers, memos, and (in conjunction with IA and IDCA staff) "Development Issues".

- Office of International Affairs (IA) -- serves as the point of day-to-day contact between AID and international development organizations, including UNDP, DAC, and MDBs. The office has 21 positions, including positions in New York, and PPC staff serving in IDCA capacities. The major documents produced by IA include analytical and policy papers, memos, "Development Issues", USAID Memorandum and briefing books.

- Office of Women In Development (WID) -- provides guidance, reviews AID progress, conducts research and disseminates information on women in development. The WID office has seven positions. The major documents produced by WID include budget materials, Program Updates, memos, correspondence, and cover letters for document distribution.

2. THE PPC TYPING WORK LOAD CONSISTS MAINLY OF ANALYTICAL PAPERS AND REPORTS AND TOTALS AN ESTIMATED 124,000 PAGES ANNUALLY

The large majority of the typing (document production) work load in PPC is due to preparation of various analytical papers, reports, and memoranda. The annual typing work load in PPC is estimated at approximately 124,000 pages--two-thirds of which represent revisions to previously typed pages. Although PPC currently has 13 standalone word processors to facilitate its document production, much of this equipment is recently arrived and so has not been fully applied to the typing work load.

(1) PPC Analytical Papers and Reports Include Both One-Time and Periodic Documents

Due to its central policymaking role, PPC generates numerous policy papers, issue papers, briefing memoranda, evaluations and other issue or topic oriented documents for AID management. Most of these documents are prepared for a unique purpose and, thus, are "one-time" in nature, as compared to regular periodic reports. Similar to the one-time papers are the various AID Handbook volumes that PPC maintains. These volumes contain policy and procedure statements for the Agency, and the periodic efforts to update them comprise a process similar to that for developing ad hoc papers. The majority of pages in PPC papers and memos consist of straight prose text, although statistical tables and occassional charts are included in many documents.

PPC produces a number of regular, periodic documents, most of which are associated with PPC budgeting and program reporting responsibilities. Examples of these cyclical documents include the quarterly Program Review, Special Concerns Reports, Portfolio Supervision Report, and numerous analytical memos and tables associated with the budgetary cycle. Most of the statistical tables produced in PPC are in connection with the periodic reports and budget cycle documents.

(2) Approximately 65 Percent of PPC's Typing Work Load Is In Revision Pages

Nearly all of the documents prepared by PPC are subject to internal--and external--PPC review, comment, and/or clearance. Because of the Agency-wide importance of most PPC documents, the review cycles are often extensive or involve numerous internal-PPC iterations before the document is finalized. This is especially true for policy and other one-time analytical papers that serve as PPC recommendations or AID policy position statements. Documents that are primarily tabular also are subject to review, but more so for proofreading rather than content-editing purposes. These extensive review cycles result in multiple revisions to most PPC documents before they are finalized. Proportionally, revision pages comprise about two-thirds of PPC's estimated annual document preparation work load of 124,000 pages. Exhibit II-2, on the next page presents the aggregate PPC work load estimates for original and revision pages, broken into three document categories:

- Narrative -- prose text.
- Forms -- forms or formatted pages, e.g., cables, PIOs, PRS.
- Tabular -- numerical tables.

While these categories primarily serve to characterize the documents, the original and revision estimates also characterize the document preparation process itself.

Exhibit II-3, following II-2, presents an office-level breakdown of the document preparation work load. As shown, the estimated work load in PDPR and PPC/E were the largest among PPC offices. Although PPC/E has less than one-half the staffing of PDPR, its document work load is nearly as large as PDPR's for two reasons:

- Evaluation impact studies are conducted largely by geographic bureau and contractor staff, whose report writing becomes PPC/E's typing work load after the initial draft that is usually performed in-country by the evaluation team leader.

EXHIBIT II-2
Estimated Annual PPC
Document Preparation Work Load

Document Category	Original Pages	Revised Pages	Total
Narrative	38,000	69,000	107,000
Forms	3,000	5,000	8,000
Tabular	3,000	6,000	9,000
Total	44,000	80,000	124,000

Source: Work load data collected by PPC at request of SER/DM, and later verified and updated by Booz, Allen in conjunction with each PPC office.

EXHIBIT II-3
Estimated Annual PPC Document
Preparation Work Load By Office

OFFICE	ORIGINAL	REVISED	TOTAL
AA	3,000	6,000	9,000
PDPR	16,000	24,000	40,000
EVAL	10,000	26,000	36,000
EA/IA*	6,000	14,000	20,000
PB	4,000	8,000	12,000
WID	5,000	1,000	6,000
EMS	400	600	1,000
PPC Total	44,000	80,000	124,000

Source: Work load data collected by PPC at request of SER/DM, and later verified and updated by Booz, Allen in conjunction with each PPC office.

* Includes documents produced for IDCA as well as EA and IA.

- PPC/E augments its internal document production capabilities through services of an editorial and typing service, which produces an estimated 7,000 pages annually from draft material provided through PPC/E.

One other notable point about the office breakdown is that PPC's tabular document work load is concentrated in PB. Although the other offices' typing includes some tables and charts; the majority of tabular pages are produced by the several PB divisions. In general, a tabular page is more time-consuming to produce than a page of standard narrative text.

(3) Most Typed Documents In PPC Are Originally Keyed and Produced by PPC Typists

Another characteristic of document preparation that is important from an office system design standpoint is the workflow, and especially inter-office production of documents. In PPC, the majority of documents produced are keyed by PPC typists, either on word processing equipment or standard typewriters. Although PPC often requests other bureaus to contribute sections of a PPC document, the usual practice is to rekey the document after editing a photocopy of it. A typed draft from another office is incorporated without revision only infrequently.

In cases where revisions are minor, they are sometimes made on PPC typewriters. Because of the variety of typing font styles of the various brands of typewriters in AID, PPC may not be able to match the type of the original. This situation either results in inconsistent document appearance, according to PPC staff, or necessitates a rekeying of the entire section.

(4) There Are Currently 13 Stand-Alone Word Processors in PPC

In the past six months, PPC was acquired eight Wang 5-3 word processors, two on a purchase basis and the others through leasing. Previously, PPC had acquired five earlier generation word processors.

Although the Wang equipment has not been in place long, PPC has been using it and the other equipment for an estimated 60 percent of its applicable document preparation.

3. CURRENT DATA PROCESSING RESOURCES IN PPC PRIMARILY SUPPORT AID PROGRAM BUDGETING AND REPORTING ACTIVITIES

In addition to utilizing automated word processing, PPC is a substantial user of data processing in AID, primarily to support its Agency-wide budgeting and reporting responsibilities. Currently there are four main data systems in PPC, all of which are operated by the Office of Planning and Budgeting (PB). Summaries of the four systems are as follows:

- Program Budget Data System (PBDS) -- is the system used by PPC to compile, analyze and develop the Agency's OMB and Congressional budgets. PBDS operates using input from the various AID office and bureaus' budget submissions (e.g., ABS). PBDS is the largest PB system and drives a number of subsystems, e.g., special concerns, workforce, position, function, and Congressional notifications.

- PPC OYB System -- this system is used to maintain the AID operating year budget (OYB). Its initial data base is provided through PBDS, and it is updated throughout the year based on AID bureaus' program revision requests. The OYB system updates provide input to the Congressional notification subsystem of PBDS.

- Program Data Analysis Control File (PDAC) -- is a system used to maintain country and account control levels for the CP and other Congressional reporting requirements. A major input to PDAC is information on appropriations, allotments, and adjustments obtained from a report generated by the Office of Financial Management, through its CFR system.

- Loan/Grant System -- this system stores comprehensive historical information on loans and grants provided for development assistance by the U.S. The system is used to generate reports required by Congress, including the "Greenbook" reports, as well as other AID reports.

In addition to these principal data systems, PB has operated two other systems, which it plans to discontinue. These systems are the Country Program Data Bank System and the Comprehensive Program Analysis Reporting System.

Besides the PB systems, which comprise the large majority of PPC systems activity, there are several other current data processing applications in PPC, summarized below:

- Access to OMB Budget Preparation and Outlay Systems on the OMB's computer to prepare AID's OMB submission, the ABS

- Access to statistical packages on AID's central computer to conduct miscellaneous ad hoc analyses

- Access to DIU and PAIS files for multi-file search to generate evaluation studies' background data

- Search (through AID library) of external reference data bases for background data for evaluation studies

- Generation of tables, as needed, from PBDS and other PB data system files, for analysis by PPC offices.

PPC utilizes remote data processing terminals for its data system operations and individual applications. It currently has four Datagraphics terminals with Texas Instruments printers. With PPC's move from Rosslyn to the State Department Building, SER/DM is transferring its Sycor and Decwriter terminals and a high-speed line printer to the DIU office in the Bureau for Science and Technology.

4. <u>PPC HAS EXPRESSED A STRONG INTEREST IN ENHANCING ITS CURRENT ADP SYSTEMS CAPABILITIES AND IN DEVELOPING CAPABILITIES FOR UNMET NEEDS</u>

The following summarizes the types of enhancements and new capabilities PPC staff expressed during our survey of their general ADP interests:

- Faster response from the central computer, especially during interactive data or job entry

- Greater flexibility in accessing and manipulating PB systems to produce special reports -- especially by PPC offices other than PB

- The ability to print reports generated by PB systems with non-computer appearing type fonts, without necessitating rekeying to word processors or typewriters

- Accessibility to convenient automated analytical and report generating capabilities, such as:

  - File creation and retention

  - Statistical analysis

  - Graphics

  - Reference data bases, e.g., on economics, health, population, nutrition.

- The resources to automate the annual DAC data base and make it accessible for analysis.

Although a few of these capabilities are presently available through the AID computer, the lack of terminals, knowledge of operating procedures, programming, and other resources present barriers to their use. Descriptions of the individual ADP interests expressed by PPC staff, from which these general interests were summarized, are presented in Chapter IX as the results of the ADP "interest survey."

III. SYSTEM STRATEGY

This chapter outlines a PPC office automation system strategy. It represents a preliminary assessment of the core elements of a PPC strategy by discussing:

- Need for a specific PPC office automation system strategy
- Content of a comprehensive strategy
- Relationship between a specific PPC strategy and an Agency-wide strategy
- Near- and longer-term considerations shaping the recommendations of this report.

1. IT IS NECESSARY TO ARTICULATE A PRELIMINARY PPC SYSTEM STRATEGY AS A FOUNDATION FOR THIS STUDY'S GOAL OF DESIGNING A WORD PROCESSING SYSTEM WHICH DOES NOT FORECLOSE ANY OF THE BUREAU'S FUTURE ADP OPTIONS

While the objectives of this study did not foresee the need for inclusion of a PPC strategy statement, a discussion of the set of assumptions and recommendations which guided Booz, Allen's thinking on specified study components provides the rationale behind subsequent chapters of this report.

As noted in Chapter I, the focus of this study has been the Bureau's word processing needs, with ADP to be treated only at the level of interests, in general terms. The study team has examined the technical implications of these interests (including current systems, existing but unmet needs, and prospective needs) in PPC, and combined them with experience gained in office automation work for other AID/W elements. This study has therefore examined PPC's word processing requirements and approaches to meet them in the context of future ADP approaches which are not yet defined. Several major implications of PPC's objective of addressing both its word processing and ADP needs are, however, known at this time. They provide the basis for this preliminary articulation of a PPC system strategy which requires further examination and specification in future work.

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2. PPC'S OFFICE AUTOMATION STRATEGY SHOULD BE COMPREHENSIVE, INCORPORATING WORD PROCESSING, DATA PROCESSING AND TELECOMMUNICATIONS CAPABILITIES

Up to the present, the Agency has followed a phased-approach to implementing office systems. The establishment of word processing support in individual bureaus and offices demonstrating need has been the first priority with anticipated integration of word processing and data processing, as appropriate. The organizational role and system requirements of PPC have, for the first time, presented the opportunity of dealing with these three elements of a comprehensive strategy in a single bureau. Importantly, it provides the further opportunity of exploring comprehensive office automation needs in a program-related, as opposed to an administrative management-related, element of AID/W.

(1) PPC's Office Automation Needs Include Substantial Data Processing Applications in Addition to Basic Word Processing

PPC's Agency-wide leadership in programming and budgeting inherently calls for capabilities to gather, process, store, and report a large amount of numerical and textual information necessary for top-level review and decision-making. Not only are these two types of information necessarily combined in key documents, but they are also refined in iterative processes, such as the ABS and CP. Program reporting requires similar capabilities, while the Bureau's policy development and coordination functions generate a considerable amount of text, which frequently requires statistical and numerical supporting data.

Information on the utilization of the Agency's mainframe computer capacity shows that PPC is the largest user of the facility after the major administrative management offices. And the trend in PPC usage is increasing. Of the five AID/W bureaus or offices in which office automation systems have been designed, PPC clearly has the largest need for data processing.

However, like the other elements of AID/W, PPC also has a pressing general need for word processing support for document preparation and revision. This need is exacerbated by recent staff reductions.

(2) The Bureau's Office Automation Needs Also Necessarily Include Telecommunications for Text and Data Exchange Among AID/W Components

Providing telecommunications to PPC will measurably enhance its basic functions, which require gathering, storing, processing, and accessing some sizeable data bases. PPC relies heavily on information provided by other bureaus and offices, not only in the programming and budgeting processes, but also in policy development and coordination. Information exchanges also are necessary in the process of coordination and clearances, and are especially important when documents for coordination or clearance in PPC must be "re-cycled" if the substance must be changed.

PPC is also not just a user and processor of information; it is also a provider. Other bureaus and offices look to the Bureau as a source of information for reference purposes. Placing PPC in a telecommunications network would facilitate this use of PPC's data bases.

(3) To the Extent It is Feasible and Practical, Word Processing, Data Processing and Telecommunications Should Be Integrated

Integration of these three technologies offers the following types of advantages:

- Capability to easily merge textual and numerical data
- Reduce the amount and cost of automated system equipment (compared with the non-integrated case)
- Hold down the number of individual information sets which need to be stored and maintained
- Reduce the amount of information stored in hard-copy form
- Speed the document preparation process, various forms of substantive reviews of documents, and the transmission to document recipients.

As discussed in the following section, achieving these types of benefits is, in substantial part, dependent on Agency-wide policy.

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3. AN ULTIMATE STRATEGY TO MEET PPC'S DATA PROCESSING AND COMMUNICATIONS NEEDS CANNOT BE FORMULATED UNTIL CERTAIN PRECEDENT CONDITIONS HAVE BEEN MET

The specification of PPC's word processing needs and exploration of its ADP interests leads to a conclusion that not only do PPC's data processing needs require detailed examination, as anticipated in the present work order's statement of work, but also that certain Agency-wide approaches to system issues need to be established before a long-term solution for PPC can be articulated.

(1) A Detailed Study of PPC's Current and Prospective Systems and Needs for Data Processing Is Needed to Reliably Determine System Requirements

With the ADP interests initally identified and their technical implications broadly assessed, there is a reasonable foundation to fully design a data processing system which would satisfy PPC's needs. This study could lead to the integration of the word processing system, which is being installed, with a data processing system.

As explained in detail in Chapter IX, a number of technical considerations need to be examined, including:

- The total size of storage and processing needs
- Input and output requirements for each application, including size and frequency of transactions
- Source of computing power and location of storage
- Necessary hardware and software support, in both kind and amount
- Conversion tasks and costs to implement the desired approach for existing systems
- Total costs and benefits.

Organizational considerations raise a number of important issues. For example, given the magnitude of the Bureau's present and prospective data processing needs, where should the systems be housed? And, at the Bureau level, which organizational element is best

positioned in terms of function and expertise to manage all PPC automated systems? None of these issues is trivial, and the Bureau would be unwise to take an incremental approach because an error in identifying and characterizing desired applications, hardware selection, software selection, or management and organization arrangements could needlessly foreclose future options.

(2) A PPC Data Processing Strategy Needs to Be Consistent With an AID-Wide Strategy for Meeting Needs

Many of PPC's ADP applications and prospective interests involve input from, or interface with, systems in other AID/W components. For technical reasons alone--the connectability of hardware and associated software--the Bureau's systems need to be compatible with others. These include not only SER/DM's computer facilities, but, prospectively, word processing systems and data processing systems, which could also be stand-alones, within other bureaus and offices.

Efficient use of data processing resources is another important consideration. Whether expanding or contracting, hardware, software, and staff support necessary for automated systems can safely be considered to be finite, and need to be allocated among users with justifiable needs. This is an especially important issue as conditions of budget stringency persist, and, at the same time, expectations for system support increase from their recently modest level in the non-administrative portions of the Agency. As a result, there is a need to seek economies of scale in the delivery of data processing support. This cannot be done prudently unless all AID/W components' needs, and their individual strategies, are identified and taken into account.

At present, however, there is no articulated Agency-wide strategy to provide a context for an individual bureau strategy. As a result, there are substantial risks in approaching the problem piecemeal, i.e., bureau by bureau. These risks include the possibility of foregoing economies of scale (with any category of ADP resource), technical incompatibility, and needlessly re-inventing technical solutions with each project.

(3) The Approach to Achieving Data and Text Communications Among AID Components Must Be An Agency-Wide Strategy

Telecommunications features of a bureau's system support arrangements are perhaps the most obvious area where an Agency-wide approach is essential. Only when all AID/W inter-bureau/office linkages (which can be justified) are identified can the most efficient network, with the least number of connections, be mapped. This can have major impacts on the costs of cabling (where appropriate) and for the telecommunications devices and software needed at each system connection. And, again, technical compatibility is a threshhold issue.

At present, the Agency lacks an AID/W telecommunications strategy, which in light of the growth in office automation and data processing activity, requires an early solution.

4. THE BEST OFFICE AUTOMATION STRATEGY FOR PPC AT THIS TIME IS AN INTERIM STRATEGY WHICH ADDRESSES THE BUREAU'S MOST PRESSING NEEDS

From its continuing work with SER/DM and other offices and bureaus, the study team is aware that the case for an Agency-wide strategy of the type described above has been made, and a strategy could be developed and approved within the calendar year. However, in the meantime, PPC can take certains steps to make the most of its word processing system and its existing data processing arrangements.

(1) An Interim Strategy Which Is Non-Preemptive of Possible Long-Term ADP and Communications Strategies Is the Most Reasonable Course At This Time

This approach seeks to make the most of the word processing equipment. This involves not only learning and fully exploiting the word processing system, but also seeking to make the most of its advanced functions (such as list processing), and the eventual linkage with the Agency's mainframe computer. This will not only exploit the capabilities of the system, but will also contribute to an understanding of what is ultimately needed in the way of data processing. The word processing system's advanced capabilities will become known, and the ability of the system to interface with the mainframe will become fully defined.

This approach has the advantage of being reversible. First of all, the PPC word processing system on order is leased (see Chapter V) and can be turned back to the vendor on short notice; in the near-term, lease payments made, to a substantial degree, can be credited against a purchase. If kept, the system can be enhanced with various hardware and software options, such as increased workstation memory and central storage or additional printers. If replaced by other equipment from the vendor to which AID is committed, much of the skill gained with the equipment can be applied to the replacement equipment.

(2) The Most Pressing Office Automation Need in PPC Is For Improved Document Preparation and Revision

From the early stages of this project, it has been known that word processing support is the major expressed need in PPC, both in terms of offices and the number of users, e.g., originators of documents and staff who produce them. Data processing needs are secondary in these terms, and in terms of the urgency to develop improvements.

Although ADP interests have been expressed widely, most of the current needs are being met in some fashion, even if users' perceptions are that data processing support should, and could, be considerably better than it is. For example, key planning and budgeting systems are operational on the AID computer through remote terminals. Some of the manual recordkeeping and processing systems, which are candidates for automation, are operable in manual form. This is not to argue that the Bureau should settle for the present way its systems are operated and supported. The point is that the satisfaction of data processing needs can be delayed until word processing requirements have been met, and until the Agency's strategy for data processing and telecommunications has been articulated.

5. BY ACQUIRING AN ADVANCED WORD PROCESSING SYSTEM, PPC CAN MEET ITS MOST PRESSING AUTOMATION NEEDS AND KEEP ITS FUTURE DATA PROCESSING OPTIONS OPEN

Because the development of an Agency-wide strategy is viewed as an essential context in which to design appropriate data processing arrangements for PPC, the study team has conditioned its recommendations for the near-term in such a way that long-term options for an improved data

processing system are not pre-empted. By leasing an advanced word processing system PPC can meet its most pressing needs and retain the flexibility to map its long-term automation strategy to be consistent with the Agency's. While the overall Agency strategy is being developed, PPC can analyze its own long-term requirements in detail.

(1) An Advanced Word Processing System Would Meet Document Preparation, As Well As Some Information Storage/Retrieval, Needs

The study team has concluded that a Wang OIS 140 would meet PPC's word processing needs, which are the most pressing of all information processing needs faced by the Bureau, and support certain limited data handling needs.

The OIS 140 is a shared-logic system, capable of accommodating up to 32 peripherals, such as workstations and printers. The shared-logic design requires that each peripheral be wired to a central processing unit. This unit provides extensive storage for the entire system an contains essential system software to control the system and run programmed applications.

The OIS is capable of certain advanced text processing functions, which are described in detail in Chapter VI. These include capabilities to store formats for standard documents, merge portions of text from different documents, and perform mathematical calculations on tabular material surrounded by text.

Additionally, through a feature called list processing, the OIS is capable of several information storage and retrieval applications that have been identified by PPC as data system needs. These applications, which are described individually in Chapter VI, could be operated solely on the OIS, without requiring linkage to a computer. These applications would necessarily have small file sizes and simple manipulations, due to the practical limitations of the list processing feature. Although smaller and simpler than current PPC data processing applications, list processing applications nonetheless will each require considerable design, development and implementation effort.

As explained in detail in Chapter IX, the OIS 140 is capable of being adapted to perform some data processing functions, such as data input to a computer, which would address several of PPC's ADP interests.

As a result, the OIS is capable of housing some, but not all, data processing applications, without external linkage to a computer. These applications are necessarily limited to those of relatively small file size and which require only relatively simple data manipulation. Chapter IX describes which applications fall into this category.

Although the placement of these smaller applications on the OIS is technically feasible, their storage and retrieval would, however, require considerable design, development and implmentation effort. For example, some of them would require unique programming in the Wang BASIC language. Nonetheless, they could be accommodated on the OIS, and therefore would be consistent with the short-term strategy described above. PB/PIA, where data processing systems are currently housed within the Bureau, has some expertise in BASIC programming.

(2) Although Linkage of the OIS 140 With the AID Mainframe Is Feasible, Only Limited Data Entry and Output Applications Should Be Attempted At This Time

Although it is technically feasible to link the OIS 140 with the AID computer and use it to perform certain data processing functions, there are numerous complexities and limitations associated with such linkage. Chapter IX of this report provides detailed technical explanations of these complexities and limitations. In the view of the study team, these limitations are sufficient to rule out use of the OIS to process, independently of the mainframe, large and complex applications. Use of the OIS for data processing will, therefore, be limited to data input, job entry, and limited data output from the mainframe. In other words, the OIS workstations may function as data processing terminals, but the OIS cannot substitute for the mainframe's storage and computing capabilities.

It is not possible at present to specify the applications for which the OIS-mainframe linkage would be appropriate or advantageous. As Chapter IX explains, such conclusions would require considerable study of present systems and their conversion requirements. Even the simplest data entry use of an OIS workstation would necessitate programming, procedure design, and other development efforts.

In utilizing the OIS for data processing support, PPC might gain two principal advantages:

- The ability to utilize information in PPC's computerized data bases for document creation through word processing, without having to rekey it into the OIS

- The ability to perform batch data entry by storing input on the OIS disk for later transmission to the mainframe. This might obviate certain of the interactive data entry applications that PPC finds unsatisfactory due to slow response.

The likelihood of realizing these advantages and the specific applications to which they would pertain cannot be reliably assessed without the level of analysis described in Chapter IX.

(3) <u>PPC Could Expedite Its Overall Office Automation Effort By Defining Its ADP Requirements Before the Agency Strategy Is Formulated</u>

Although PPC should not formulate its own long-term ADP strategy before an Agency-wide strategy has been formulated, it can define its ADP requirements and thus be ready to formulate a strategy when the appropriate time comes. A system requirements analysis should be conducted before settling on an ADP strategy, in order to identify all the data processing needs the strategy should encompass. Nothing would logically preclude this analysis from occurring before or during the Agency-wide strategy study. In fact, the results of a PPC requirements analysis would be useful in deciding upon an Agency-wide ADP strategy. A description of the scope of work for such a study is presented in Chapter IX. The study outlined also addresses use of the OIS to provide limited ADP support until a long-term approach is implemented.

IV. EQUIPMENT CONFIGURATION

This chapter describes the word processing equipment configuration which as been ordered for PPC, defines frequently used equipment terms and presents office location recommendations for equipment placement.

1. THE RECOMMENDED PERIPHERALS FOR THE OIS 140 INCLUDE 11 WORKSTATIONS AND 8 PRINTERS, AND BOTH HARDWARE AND SOFTWARE FOR LINKAGE TO THE MAINFRAME COMPUTER HAVE BEEN ORDERED

As discussed previously, the Office Information System (OIS) 140 has been selected from the Wang family of office automation equipment to meet PPC's word processing needs in the context of its longer-term office automation objective for integrated word processing and automated data processing systems. The recommended OIS equipment configuration is presented in Exhibit IV-1, on the following page. The term "configuration" refers to the sum of various equipment components that constitute a word processing system. These components include peripherals, e.g., printers and workstations, which are connected to the system as well as software and hardware elements. This configuration was received in mid-May and is being installed in PPC offices for full operation in June 1982.

The number and mix of peripherals recommended for the system were primarily based on PPC's current document preparation work load estimates presented in Chapter II. Tempering generally recognized standards with experience, the study team concludes that PPC's current work load can be adequately handled on the recommended 11 OIS workstations and 8 OIS printers. SER/DM added a 64k workstation to the recommended configuration for use as a console to operate the system and to test advanced applications. In the future, additional equipment may be considered if PPC's document preparation work load increases, if peripherals are used as multi-functional terminals for ADP, or if PPC and the Agency move toward a professional workstation concept.

At this time, there does not appear to be a need justifiable by work load for retaining any existing word processing units in PPC. Therefore, following AID's practice, all existing stand-alone units should be returned to SER/DM after a reasonable transition period to be available for use in other AID organizations where needed.

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The configuration shown in Exhibit IV-1 includes several enhancements which were added to the OIS's standard word processing support. The optional list processing software is an advanced word processing feature which permits the user to create files of similar information for data manipulation and management, e.g. administrative recordkeeping, individual project status reports, supplies and personal records. Chapter VI of this report discusses several feasible list processing applications in PPC. Four additional software and hardware components are also included in the configuration:

- BASIC software
- Telecommunications (3271) software
- 3271 hardware
- 2780/3780 hardware.

These components are necessary for linking the OIS to the Agency's central computer to permit limited data entry/retrieval and to provide an opportunity to explore the potential and limitations of such word processing and ADP equipment interconnections.

2. DEFINITIONS OF OIS EQUIPMENT AND ACCESSORIES PROVIDE A HELPFUL REFERENCE TO PPC SYSTEM USERS

The introduction of a Wang OIS 140 requires many PPC staff to learn "systems" language and terms of reference. To assist staff in mastering these new words and concepts, definitions of frequently used OIS equipment-related terms are provided in alphabetical order below.

(1) Archival Workstation

A workstation equipped with an attachment to create diskettes for off-line storage of documents processed on the OIS and for reentry of information stored on diskettes into the OIS system disk for further processing.

(2) CPU

Central Processing Unit -- the power base for the entire OIS configuration -- the CPU serves as the processing source and system controller for all equipment (peripherals) attached to it. A total of 32 pieces of equipment may be connected to the CPU.

(3) Disk

A high-capacity magnetic storage medium.

(4) Diskette

A magnetic coated disk, similar to a record in shape, on which information is stored off-line.

(5) Daisy Printer

An electronic impact printer which produces high quality documents on any type of paper at an average rate of 40 characters per second (CPS). It utilizes interchangeable printwheels to produce a variety of type styles and sizes. (The circular printwheels resemble a "daisy" pattern.)

(6) Floppy Diskette

See Diskette.

(7) Font

The device which actually contains the characters, e.g., the IBM golf ball element and the daisy wheel.

(8) Modem

A device used to link two components by telephone line interconnection.

(9) OCR

Optical Character Recognition is a method of converting typewritten material into an acceptable computer input medium. Data are typed on a selectable typeface typewriter, converted by OCR, and entered directly into the OIS system for later editing or printout.

(10) OIS 140

Office Information System 140 is an advanced shared-logic word processing system consisting of a CPU and a variety of workstations, printers and other attachments. It allows for the creation, editing and transmission of a document as well as a host of other document specific functions, e.g., paragraph numbering, math support and pagination.

(11) Peripherals

Devices, such as printers and workstations, which are interconnected to the CPU.

Exhibit IV-1
Recommended Advanced Word Processing
Equipment Configuration

Wang Office Information System (OIS) 140 Model III

1	OIS 140 Model III central processing unit (CPU)
1	OIS 140 disk system (80.6 megabyte)
6*	64k workstations
5	64k archival workstations
8	40 cps daisy printers (with 8 twin-sheet feeders)
	List processing software
	BASIC software
	Telecommunications (3271) software
	3271 hardware
	2780/3780 hardware

---

* A seventh workstation has been ordered by SER/DM to control the OIS and develop BASIC programs.

(12) Stand-alone Workstation

A single-station word processor which does not share the processing power of a CPU, e.g., PPC's A.B. Dick unit.

(13) Twin-Sheet Feeder

An optional attachment to the daisy printer, which is mounted on the printer's top and automatically inserts sheets of paper into the printer and receives the finished copy in a special hopper. The twin-sheet feeder allows for the feeding of letterheads and second sheets automatically.

(14) Workstation

A component of the system consisting of a CRT (Cathode Ray Tube) and keyboard at which an operator keys in and edits a document. The workstation works in conjunction with the CPU and printer.

PPC staff may find several Wang publications useful in defining additional key OIS terms, especially the Office Information System 140 Data Sheet and the Wang Operator Guide.

3. THE ASSIGNMENT OF OIS EQUIPMENT TO SPECIFIC PPC OFFICE LOCATIONS SHOULD BE PRIMARILY BASED ON DOCUMENT PREPARATION WORK LOAD

Three criteria are generally used to determine appropriate locations for word processing components:

- Document preparation work load
- Role and responsibilities in document preparation processes
- Physical space considerations
  - Sufficient size
  - Temperature control
  - Accessibility to other users sharing the equipment.

Document preparation work load is the primary criterion since it represents a fair, standard measure of need, but

work load must be weighed with the other two factors to ensure that the OIS performs well as a shared Bureau-wide resource.

Division-level office locations recommended for PPC's OIS peripherals are presented in Exhibit IV-2, on the following page. The exhibit notes feasible options for offices sharing access to the equipment. As will be discussed further in Chapter VII, PPC has placed the OIS management functions in PB. The central processing unit (CPU) and the additional workstation to control system functions and permit testing will be housed together in the CPU room which will be located in PB for convenient and ready access as needed by OIS management staff.

Equipment locations should be periodically reassessed, at least as part of post-implementation evaluation. It may be necessary to move equipment to respond to changes in office locations or to more fairly allocate these shared resources if offices and divisions experience work load shifts or changes in management style which affect their equipment utilization rates.

EXHIBIT IV-2

Work Load-Based Recommendations
For OIS Equipment Location

OFFICE/ DIVISION*	64 K ARCHIVAL WORKSTATION	64 K REGULAR WORKSTATION	40 CPS DAISY PRINTER**	NOTES
AA/PPC	1		1	
PDPR				
. AAA	1		1	Other PDPR equipment sharing arrangements are feasible, and may be necessary depending upon final office locations.
. HR				
. RD		1	1	
. ED		1		
. PDI				
EVAL				
. AAA				AAA should share access with either division, depending upon work load and priority.
. ES		1	1	
. S	1	1	1	
EA/IA (planned change to DIDC)				
. AAA	1		1	Other sharing arrangements are feasible from a work load standpoint.
. EP				
. DC		1	1	
. DAC				
PB				
. AAA	1		1	Other sharing arrangements are feasible from a work load standpoint.
. PIA				
. CU				
. CP		1		
. PRS				
PPC TOTAL	5	6***	8	

* Current work loads in WID and EMS do not warrant separate workstations for either or both. These offices should access the OIS by sharing equipment located in other offices, on a scheduled basis.

** All printers to have twin sheet feeders. Printers should be located based on print volumes and spatial convenience.

*** A seventh 64 K workstation has been ordered by SER/DM for use as a console to operate the system and to test advanced applications. It will be housed in the CPU room.

V. COST-BENEFIT ANALYSIS

This chapter presents the costs and benefits associated with PPC's existing word processing system and with the alternative Wang OIS 140 system acquired for PPC described in the previous chapter.

1. OF THREE EQUIPMENT ACQUISITION OPTIONS WITH LARGE COST DIFFERENCES, THE OPTION TO PURCHASE THE OIS AFTER 180-DAYS LEASE IS BOTH COST-SENSITIVE AND CONSISTENT WITH THE RECOMMENDED OFFICE AUTOMATION STRATEGY FOR PPC

SER/DM is not able to purchase PPC's OIS equipment configuration at this time due to funding constraints, and it is uncertain over what period of time the system would continue to be leased. Under these circumstances, three different equipment acquisition options available to the Agency were examined to assess the range of costs associated with the new OIS 140. They include two purchase and one lease option:

- Purchase all system components after 90 days lease, and thereby credit 90 percent of the accumulated lease costs against the purchase price.

- Purchase all system components after 180 days lease, and thereby credit 50 percent of the accumulated lease costs against the purchase price.

- Continue leasing system components.

Exhibit V-1, on the following page, compares the five-year costs associated with each option. The five-year period was chosen in keeping with the standard assumption that office automation systems have a five-year useful life. The exhibit shows that the purchase after 90 days lease is the least expensive option, followed closely by the 180-day lease option, while the long-term lease option is substantially more expensive than either purchase option.

(1) The Cost Differences Among the Options Reflect the Equipment Investment Approach

Three cost elements are reflected in the exhibit's estimates:

Exhibit V-1
Five-Year Cost Comparison Among Acquisition Method Options for the OIS 140

Cost Category	Purchase Options 90-Day	180-Day	Lease Option
Equipment Lease or Purchase	$144,000	$158,000	$304,000
One-Time Only Costs	20,000	20,000	20,000
• Facilities modification • Furniture			
Recurring Costs	149,000	149,000	149,000
• Maintenance • Supplies			
TOTAL	$313,000	$327,000	$473,000

- Equipment lease or purchase includes either the accumulated monthly lease costs on system components over the five-year period or the total purchase price for all system components. (Purchase prices are specified in the State-AID contract with Wang.)

- One-time only start-up costs to install and implement the system include:

  - Facilities modification, e.g., cables and air conditioning

  - Office furniture for each workstation and printer

  - Starter supply kit, e.g., diskettes

- Recurring costs for maintenance and supplies

  - Maintenance costs for each system component reflect an assumed 14 percent annual increase

  - Supply costs were estimated on a system component basis based on SER/DM estimates and also reflect the 14 percent assumed annual increase.

The costs of all system components ordered by SER/DM (as discussed in Chapter IV) are included in the exhibit. This OIS 140 equipment configuration includes the following components which will initially be leased and may eventually be purchased:

- 1 OIS 140 Model III central processing unit (CPU)

- 1 OIS disk system (80.6 megabyte)

- 7 64k workstations

- 5 64k archival workstations

- 8 40cps daisy printers (with 8 twin sheet feeders)

- 2780/3780 hardware (for telecommunications)

- 3271 hardware (for telecommunications).

In addition, three software packages are being purchased--list processing, telecommunications and BASIC. Appendix A presents unit prices for the purchase, lease and maintenance of this equipment configuration as specified in the State-AID contract with Wang.

The cost differences among the three options result from a decision to eventually purchase or to continue leasing system components since all three have the same one-time only start-up costs and recurring maintenance costs. The continued lease option is substantially more expensive than either purchase option because accumulated lease costs begin to exceed purchase price in the third year.

(2) <u>The Purchase After 180-Day Lease Option Supports PPC's Office Automation Strategy</u>

Chapter III of this report recommends a PPC office automation strategy with several objectives bearing on the Agency's acquisition options. These points are highlighted below:

- The immediate objective is to acquire office automation which meets PPC's word processing requirements.

- The long-term objective is to integrate PPC's word processing, automated data processing and telecommunications systems.

- PPC's office automation requirements and strategy in these three inter-related areas should be developed in an Agency-wide context.

Within this strategic approach, the option of leasing the OIS is reasonable, but it quickly becomes expensive.

While the 90-day purchase option is the least costly alternative, it may not permit sufficient time for decision-making and planning activities. The 180-day purchase option appears more attractive since it offers the short-term leasing arrangement's benefits and provides AID and PPC managers the opportunity for near-term change.

- Given the impetus for Agency-wide decisions on office automation choices in several critical areas, six months would appear to be reasonable for formulating a more

comprehensive PPC office automation strategy which included ADP design elements and telecommunication requirements in addition to word processing needs.

- At the 180-day mark, an informed decision can be made on whether to purchase the OIS or to consider other equipment configurations meeting integrated word processing, ADP and telecommunications needs.

The six-month investment in the OIS represents a small cost increase over the existing system whether the decison is to purchase the OIS or consider another configuration meeting PPC's comprehensive automation needs. Furthermore, if the Agency purchases the OIS at this six-month mark and later replaces it with another equipment configuration, the investment has value since the OIS could be transferred for use in another AID office needing a shared-logic word processing system. In the interim, PPC will benefit from the document preparation support and the advanced word processing experience offered by this Wang system.

2. <u>THE OIS 140 REPRESENTS A FIVE-YEAR INCREMENTAL COST OVER PPC's EXISTING SYSTEM RANGING FROM $37,000 TO $197,000 DEPENDING UPON THE SELECTED ACQUISITION METHOD</u>

The five-year cost projections associated with PPC's existing office automation system are compared to the three OIS 140 acquisition options in Exhibit V-2, on the following page. Existing system costs were estimated for the same three cost categories used to examine OIS costs.

The existing system's equipment lease or purchase costs as well as one-time only costs are less than the OIS, and its recurring costs are higher. The existing system includes 13 pieces of both leased and purchased equipment:

- 1 IBM MC/A
- 4 A.B. Dick Magna II
- 8 Wang 5505-3 systems (each consisting of a central processing unit, workstation and printer.)

The $75,000 equipment estimate in Exhibit V-2 only reflects projected costs on leased equipment since purchased equipment is a sunk cost to the Agency (and can be used elsewhere in AID/W). The existing system does not include one-time only start-up costs since these past expenditures also represent sunk costs.

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Exhibit V-2
Five-Year Costs Associated With the
Existing System and Options for the OIS

Cost Category	Existing System	OIS Options 90-Day Purchase	180-Day Purchase	Lease
Equipment Lease or Purchase	$75,000	$144,000	$158,000	$304,000
One-Time Only Costs	-0-	20,000	20,000	20,000
Recurring Costs	201,000	149,000	149,000	149,000
TOTAL	$276,000	$313,000	$327,000	$473,000
INCREMENTAL COSTS OF THE OIS OVER THE EXISTING SYSTEM		+$37,000	+51,000	+197,000

The recurring cost category includes one cost element in addition to the ongoing maintenance and supply costs which are estimated for both the existing system and the OIS 140. This additional cost element is a two-year typing service contract in PPC/E whose value is not to exceed $68,000. This contract provides overload typing support needed to handle PPC/E's current document preparation work load. Exhibit V-2 costs reflect the two-year contract costs as recurring costs of the existing system but assumes that the contract would no longer be required with acquisition of the OIS 140.

Examination of the comparative costs between the existing system and the OIS shows that over a five-year period the two OIS purchase options represent relatively small incremental costs over existing document preparation costs:

- The 90-day purchase option represents an incremental cost increase of $37,000, which is 13 percent higher than the existing systems costs.
- The 180-day purchase option represents an incremental cost increase of $51,000, which is 18 percent higher than the existing systems costs.

The long-term lease option, however, is almost twice as expensive as the existing system. The five-year projected cost increment of $197,000 is a cost increase 71 percent higher than the existing system.

3. INCREASED EFFICIENCY IN THE REVISION OF PPC DOCUMENTS PRODUCED ON THE OIS IS EXPECTED TO RELEASE 400 WORKDAYS ANNUALLY WHICH CAN BE APPLIED TO OTHER PPC WORK TASKS

The two primary quantitative benefits of the OIS 140 over the existing system are reductions in workdays for:

- Typing, which is done primarily by secretaries
- Proofreading, which is done by all staff.

The source of these kinds of staff effort reductions is the OIS's greater efficiency in the preparation of revision pages. It is assumed that the existing word processing equipment is capable of processing approximately 60 percent of the work load which could be processed on the alternate OIS equipment configuration.

(1) The OIS Is Projected To Release As Many as 300 Typing Workdays Annually

In Exhibit V-3, on the following page, the estimated number of workdays required to produce PPC's

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EXHIBIT V-3
Comparison of Annual Typing Workday Requirements

Alternative	Document Category	Number of Pages Original	Number of Pages Revised	Daily Production Factor Original	Daily Production Factor Revised	Days of Effort Required	
Existing Word Processing	Processed on System						
	Narrative	22,800	41,400	19	49	2,000	
	Forms	1,800	3,000	14	36	200	
	Tabular	1,200	3,000	9	24	300	
					subtotal	2,500	
	Not Processed on System						
	Narrative	15,200	27,600	20	28	1,700	
	Forms	1,200	2,000	15	21	200	
	Tabular	1,200	2,400	10	14	300	
					subtotal	2,200	
	Annual Workdays						4,700
OIS 140	Processed on System						
	Narrative	38,000	69,000	19	49	3,400	
	Forms	3,000	5,000	14	36	400	
	Tabular	3,000	6,000	9	24	600	
	Annual Workdays						4,400

document preparation work load is projected for both the existing and the OIS system. Elements of the exhibit include the following:

- Work load estimates of original and revised pages were presented earlier in Chapter II

- It is assumed that 60 percent of this work load is currently being processed on word processing equipment and that 100 percent of this work load could be processed on the OIS

- Daily typing production rates using office automation support or typewriters are derived from National Archives and Record Service (NARS) standards.

The estimated number of typing workdays required is the result of dividing the work load by the estimated daily production factors.

This analysis indicates that the OIS could potentially release 300 workdays annually from greater efficiency in typing PPC's current work load.

(2) <u>The OIS is Projected to Release as Many as 100 Proofreading Workdays Annually</u>

The proofreading workday requirements for both systems are compared in in Exhibit V-4, following this page. These estimates are developed in a methodology similar to that employed in estimating typing requirements.

- Work load estimates of original and revised pages were presented earlier in Chapter II.

- It is assumed that 60 percent of this work load is currently being processed on word processing equipment and that 100 percent of this work load could be processed on the OIS.

- Workday requirement estimates were developed on the following assumptions:

  - Materials processed on office automation equipment or typewriters require the same amount to staff time to proof typed original pages against longhand written pages.

- Office automation equipment reduces the time to review revised pages by 90 percent of the original proofreading time since only the revisions must be checked, but pages revised on typewriters require 50 percent of the original proofreading time to review revised pages against edited draft pages.

Application of these assumptions indicates a potential 100 workdays which the OIS could release from current proofreading requirements.

(3) Over A Five-Year Period, PPC Managers Could Potentially Have 2,000 Staff Days To Re-Direct Toward Other Purposes

The estimated annual release of 300 typing work days and 100 proofreading work days which could be released by the OIS accumulates to 2,000 staff days over a five-year system useful life. PPC management many value these staff days and use them to achieve two alternative objectives:

- Handle an increased work load without staffing increases

- Improve document quality and enhance work processing with the current work load.

These alternatives are not necessarily mutually exclusive but permit PPC managers to assess their needs and priorities as a basis for trade-off decisions on which OIS benefits to exploit.

4. A COMPARISON OF FIVE-YEAR COSTS AND BENEFITS INDICATES THAT NEAR-TERM OIS PURCHASE OR REPLACEMENT IS MORE COST JUSTIFIABLE THAN LONG-TERM OIS LEASE IN PPC

The five-year costs and benefits associated with PPC's existing office automation system and the Wang OIS 140 are summarized in Exhibit V-5, on the following page. The five-year total cost comparisons summarize more detailed costs presented in earlier exhibits. The five-year total quantitative benefit statement takes the OIS's system management workday requirements into account.

- An estimated 800 workdays could be required to manage the OIS

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EXHIBIT V-4

Comparison of Annual Proofreading Workday Requirements

Alternative	Document Category	Number of Pages Original	Number of Pages Revised	Daily Production Factor Original	Daily Production Factor Revised	Days of Effort Required	
Existing Word Processing	Processed on System						
	Narrative	22,800	41,400	5	0.5	300	
	Forms	1,800	3,000	3	0.3	100	
	Tabular	1,200	3,000	10	1.0	100	
					subtotal	300	
	Not Processed on System						
	Narrative	15,200	27,600	5	2.5	400	
	Forms	1,200	2,000	3	1.5	100	
	Tabular	1,200	2,400	10	5.0	100	
					subtotal	400	
	Annual Workdays						700
OIS 140	Processed on System						
	Narrative	38,000	69,000	5	0.5	500	
	Forms	3,000	5,000	3	0.3	100	
	Tabular	3,000	6,000	10	1.0	100	
	Annual Workdays						600

Exhibit V-5
Summary Comparison of Existing
System and OIS 140
Costs and Benefits

FIVE-YEAR COSTS	90-Day Purchase Option	180-Day Purchase Option	Five-Year Lease Option
Existing System	$276,000	$276,000	$276,000
OIS 140	$313,000	$327,000	$570,000
TOTAL INCREMENTAL COSTS	$37,000	$51,000	$197,000

FIVE-YEAR QUANTITATIVE BENEFITS

	Required Workdays		
	Typing	Proofreading	
Existing System	23,500	3,500	
OIS 140	22,000	3,000	
subtotal	1,500	500	2,000
Less required workdays for OIS management			800
TOTAL RELEASED WORKDAYS			1,200

- This estimate is based upon the OIS system management structure recommended in detail in Chapter VII.

These 800 system management workdays, when taken from the 2,000 released typing and proofreading workdays, produce a total OIS benefit projection of 1,200 released workday.

Exhibit V-5 shows that the two OIS purchase options provide the opportunity for these released workdays for considerably less Agency investment than the lease option. This summary analysis, therefore, continues to support the recommended PPC office automation strategy and underscores the importance in cost considerations of establishing comprehensive office automation objectives for PPC within the near-term (e.g., a six-month) period.

VI. WORD PROCESSING APPLICATIONS

The immediate goal of office automation in the Bureau for Program and Policy Coordination (PPC) is to improve text preparation through advanced word processing. Beyond this, the goal is to automate several monitoring and tracking activities that are currently maintained manually. As discussed previously, the eventual goal is to meet PPC's data processing requirements and telecommunications needs.

This chapter presents an overview of how the Wang OIS 140 can support the first two of these goals in PPC. Following the overview, descriptions are presented of specific documents or other applications, which the study team recommends that PPC consider as priority word processing applications. The discussion on the third goal of office automation in PPC, to provide support for PPC data processing applications, is presented in Chapter IX, ADP Considerations.

1. THE CAPABILITIES OF THE OIS 140 PROVIDE PPC WITH THE OPPORTUNITY TO IMPROVE ITS DOCUMENT PREPARATION PROCESSES SIGNIFICANTLY

The advanced word processing system recommended for PPC is capable of significantly improving current document preparation processes. Through the system's document creation and revision capabilities, PPC should be able to produce final documents with more ease, less retyping due to corrections, and improved appearance. The advanced features of the OIS 140 will also improve document preparation, most notably through greater information storage and retrieval capabilities.

The following numbered points briefly describe the major features of the OIS to be installed in PPC. More complete descriptions of these features and their operations are presented in the standard manuals provided with the equipment by the manufacturer. The descriptions are intended only to summarize OIS capabilities. The second section of this chapter, following the summaries, presents examples of how these OIS features should be applied to the document preparation processes in PPC.

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(1) Powerful Editing

Powerful editing is the set of standard document preparation and revision features that permit text insertion and deletion, reorganization, margin change, string editing, spacing and tab changes, and automatic pagination. One principal advantage is that "correct" information in a document undergoing revision does not need to be rekeyed.

(2) Shared-Logic Design

This refers to the central, disk-based storage medium of the system, to which all peripherals (workstations, printers, and miscellaneous optional equipment) are connected. Thus, the documents stored on the system, as well as the system software (programs for the various OIS capabilities), can be accessed by each workstation (depending upon password and library organization specified by the users). Also, this design promotes sharing of equipment, for example, selective routing of output to any of the system's printers. The shared-logic design, in addition, makes interconnection of other OIS systems and computer resources possible.

(3) Document Storage

Storage can be on the central system disk and/or floppy diskette. The disk storage is "on-line", permitting rapid retrieval. On-line storage can be organized by "libraries", which can be associated with organizational units. Document ID Numbers are the means by which a particular document is designated and "known" to the system and user. Documents reside in libraries on the disk, and individually on diskette.

(4) Glossaries

Glossaries are convenient means to store and retrieve keystrokes that are used frequently or repetitively. Glossaries can be used to store form letters and programmed instructions specifying formats, and operator prompts. Cable formats are one example of a glossary application.

(5) Sort

Sorting is the capability to rearrange a list of information based on specified criteria, for example, to rearrange a list of names into alphabetical order. Use of the sort feature requires a list of items in a standard format.

(6) Document Merge

Merging is the capability to create individual documents by combining standard (e.g., form letter) with variable (e.g., mailing list) information. Both sets of information to be merged may be stored on documents and combined through a single set of operator instructions.

(7) Mathematics Support

This is a package that permits operation of the four basic arithmetic functions (+ - - x) on rows and columns of numbers. This feature is useful for checking totals on revised tables, calculating proportions, and other simple applications.

(8) Security

Security features provide the ability to protect libraries/documents from unauthorized access thrugh the use of passwords.

(9) List Processing

This capability will permit subsets of information to be created from a file of standard format records. One or more variables, or "fields", by which the records are classified can be specified in list processing as the basis for selecting the records desired in the subset. For example, from a file of all AID projects, whose fields include dollar amount of project and type of project, a subset could be created of all irrigation projects over $2 million. Although useful for this type of storage and selective retrieval application, list processing is not a general substitute for data processing. For example, relatively large applications are generally processed more slowly, and the data involved cannot be manipulated at the same level of complexity as through data processing.

Discussions of how these features should be applied to PPC document preparation processes are contained in the following section.

2. THE MAJORITY OF PPC'S DOCUMENT PREPARATION WORK LOAD IS APPROPRIATE FOR APPLICATION ON THE OIS 140

To some extent, PPC has been utilizing word processing equpment for document storage and revision purposes. Some of its present equipment, however, represents earlier

5D

generations of word processing technology, and has significant limitations compared to current equipment, for example, lack of full page display capabilities. Even the Wang 5-3s, which several offices have been using, have comparatively fewer capabilities than the OIS 140, although they represent more current technology.

For the documents PPC is currently preparing on its Wang 5-3s, the OIS will continue to provide word processing support. Documents not currently prepared on the 5-3s, but which would be appropriate for word processing, can begin to be prepared on the OIS. Through use of the OIS advanced features, basic text and tabular document preparation can be improved upon over current preparation using the 5-3s. Additionally, the OIS will permit PPC to develop several advanced storage and selective retrieval applications that are currently being performed manually.

(1) <u>The Principal OIS Application Will Be In Document Preparation and Revision</u>

The capabilities of the OIS as a word processor, to create and revise documents, will be the source of the largest OIS 140 system benefits in PPC. This is due to the fact that a large portion of all documents produced by PPC are subject to multiple iterations of review, comment, and revision. The types of revisions made most frequently include: insertion or deletion of text, typographical error correction, reorganization, reformatting, and revision of tables. The advantage provided by the OIS is that only the insertions and corrections need to be keyed (typed); the text or tables remaining unchanged in the document do not have to be rekeyed, and proofreading need only focus on the revisions.

As mentioned in Chapter II, the majority of these documents fall under the general category of analytical papers and reports. Exhibit VI-1, beginning on the next page, lists the types of documents prepared by each PPC office that should be prepared using the OIS. The section at the end of the list notes general documents prepared by most or all PPC offices. Many of these are currently prepared on the present PPC word processors. The list is not necessarily exhaustive; nonetheless, it is comprehensive with respect to the types of documents applicable to the OIS in PPC.

Exhibit VI-1
PPC DOCUMENTS APPROPRIATE FOR
OIS WORD PROCESSING APPLICATION

Office	Document/Application
AA/PPC	• AA/PPC agenda • Logs • CP material • Budget memoranda • Revisions to papers
PDPR	• Policy Papers for Handbooks 1 and 4 • Intermittent policy papers • Portfolio Supervision Report • Miscellaneous reports to congress • CDSS guidance • CP material • Status Report on PIDs/PPs • PID/PP Project Documentation Review System memos
E	• Evaluation "Packages" - Issues papers - Pattern analyses - Impact evaluations - Conference reports • Annual Evaluation Plan materials • Occasional papers • Program evaluation reports
EA/IA	• Intermittent policy papers/memos • Briefing books for DAC, other meetings • USAID Memorandum • "MDB Early Warning System" (Cables) • Intermittent policy papers/memos

Exhibit VI-1 (2)

Office	Document/Application
EA/IA (Cont'd)	• "Development Issues" • Contributions to papers, briefing materials
PB/PRS	• Intermittent policy papers/memos • CDSS guidance • ABS guidance • OMB submission • CP material
PB/PIA	• Quarterly Program Review • Special Concerns Reports • Miscellneous tables • Miscellaneous brief text sections of reports
PB/CPA	• Intermittent policy papers/memos • Miscellaneous tables • Budgetay cycle issues papers
PB/C	• Intermittent policy papers/memos • Budgetary cycle issues papers
WID	• Intermittent policy papers/memos • Cover memos for document distribution • Biannual CP section • "Program Updates"
EMS	• PPC phone books • PPC staffing rosters/reports • Miscellaneous administration reports/memos

Exhibit VI-1 (3)

Office	Document/Application
PPC-General	• Miscellaneous form letters
	• Mailing lists
	• Miscellaneous lists
	• Cables
	• Speeches, testimony
	• Miscellaneous forms
	• Office work plans
	• Responses to Congressional, other questions

The flowchart in Exhibit VI-2, on the next page, is intended as a generic model of the OIS preparation process for PPC policy papers, briefing books, and other analytical papers and memos. Although these documents differ in topic and format, their production steps are similar and straightforward. The following numbered points, keyed to the numbered steps of the flowchart, describe how the OIS is utilized to best advantage in preparation of these documents.

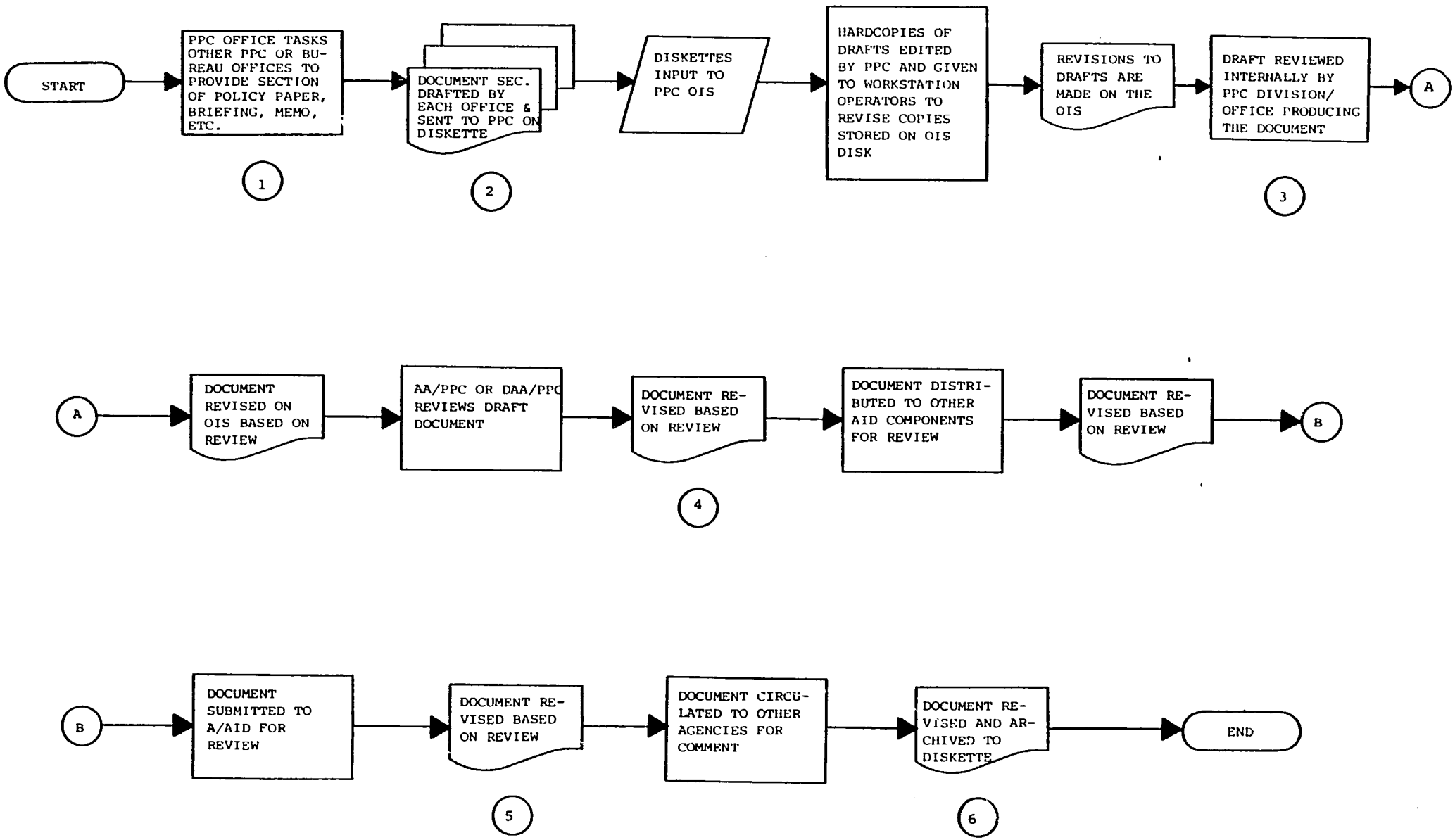
1. Most of the policy papers, briefing books, memos and analytical papers produced by PPC offices are largely authored by those offices. Some documents, however, include sections contributed by other PPC Offices or other AID bureaus. Development Issues and DAC briefing books are examples. For such documents, the PPC office leading the document preparation requests contributions by the other offices giving instructions on topic, points to discuss, length, format, and the like.

2. Typically, the contributing offices draft type these sections, perhaps conduct their own internal review of the draft, and forward it to PPC. Currently, most draft sections are transmitted in hardcopy form. The PPC office usually edits the draft-typed document received and then incorporates it into a draft of the entire document by retyping the entire document. In the future (as shown on Exhibit VI-2), the contributing offices should be requested by PPC to submit a copy of their drafts on diskettes, provided they have access to Wang equipment. PPC would enter the diskette contents onto its OIS disk. PPC would continue to edit the drafts by marking up hardcopies of them, but instead of having OIS operators rekey them, would have them revise the diskette copies of the drafts (now stored on the OIS) through the OIS editing features. (In instances where the drafts submitted by other bureaus are under five pages, or are to be used only for background and as such are not appropriate for revision, the diskette transfer is unnecessary.)

3. Usually, the compiled document undergoes review within the PPC division or office producing it. Based on this review, the document is revised and circulated to PPC top management for review. The revision is again accomplished through use of the OIS editing capability on the draft document stored on the system disk.

EXHIBIT VI-2

GENERIC FLOWCHART OF POLICY DOCUMENT PREPARATION



4. Revisions are again made based on comments from AA/PPC or DAA/PPC, and the revised document is printed out for further review. This can be an iterative loop. The document remains in disk (on-line) storage.

5. Depending upon the document, it may be appropriate to circulate it outside of PPC to other AID components for comment. Revision can occur as a result of the comments. The last AID review is in the Office of the Administrator, from which point another revision by PPC could take place.

6. A few documents PPC produces are reviewed outside of AID, either before or after finalization. Comments from other agencies may lead to document revision. Upon final revision, a decision must be made on whether the document should be permanently stored. If yes, then the document is archived to a diskette at an archival workstation. The document is then deleted from the OIS disk.

Few documents have to undergo all of these review steps. The flowchart is intended simply to illustrate the general revision process. The principal advantage of the OIS in this process is that only the parts of the document affected by the revision need to be rekeyed; unlike the situation created by using standard typewriters, in which the entire document, or large portions, need to be rekeyed. The fact that the document remains immediately accessible in on-line storage during preparation and revision is another advantage. This process represents a large portion of PPC's document preparation work load.

(2) Several General Formats Should Be Stored In Glossaries for Convenient Access

As described earlier, a glossary is a means of storing keystrokes. Glossaries are created for sets of keystrokes frequently used, in order to reduce the need for repetitive keying. Glossaries are stored in the OIS glossary library, which functions like other system libraries except that it is accessible to all system users. The types of glossaries that PPC would find useful are formats of margins, headings, columns, and other specifications; commonly used form letters; and any other text or tabular material repeatedly used. Examples of these include:

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- Forms

  - Cable formats that will allow cable contents to be keyed in the proper format. Cable forms can then be fed through the daisy printer and printed using an OCR (optical character reader) element that will permit easy input by the State cable room for cable generation.

  - Miscellaneous others -- PIO formats can be programmed for glossary, as can purchase requisitions, etc.

- Form letters

  - Responses to employment inquiries

  - Acknowledgement of receipt of a document, letter, memo

  - Other repetitive correspondence.

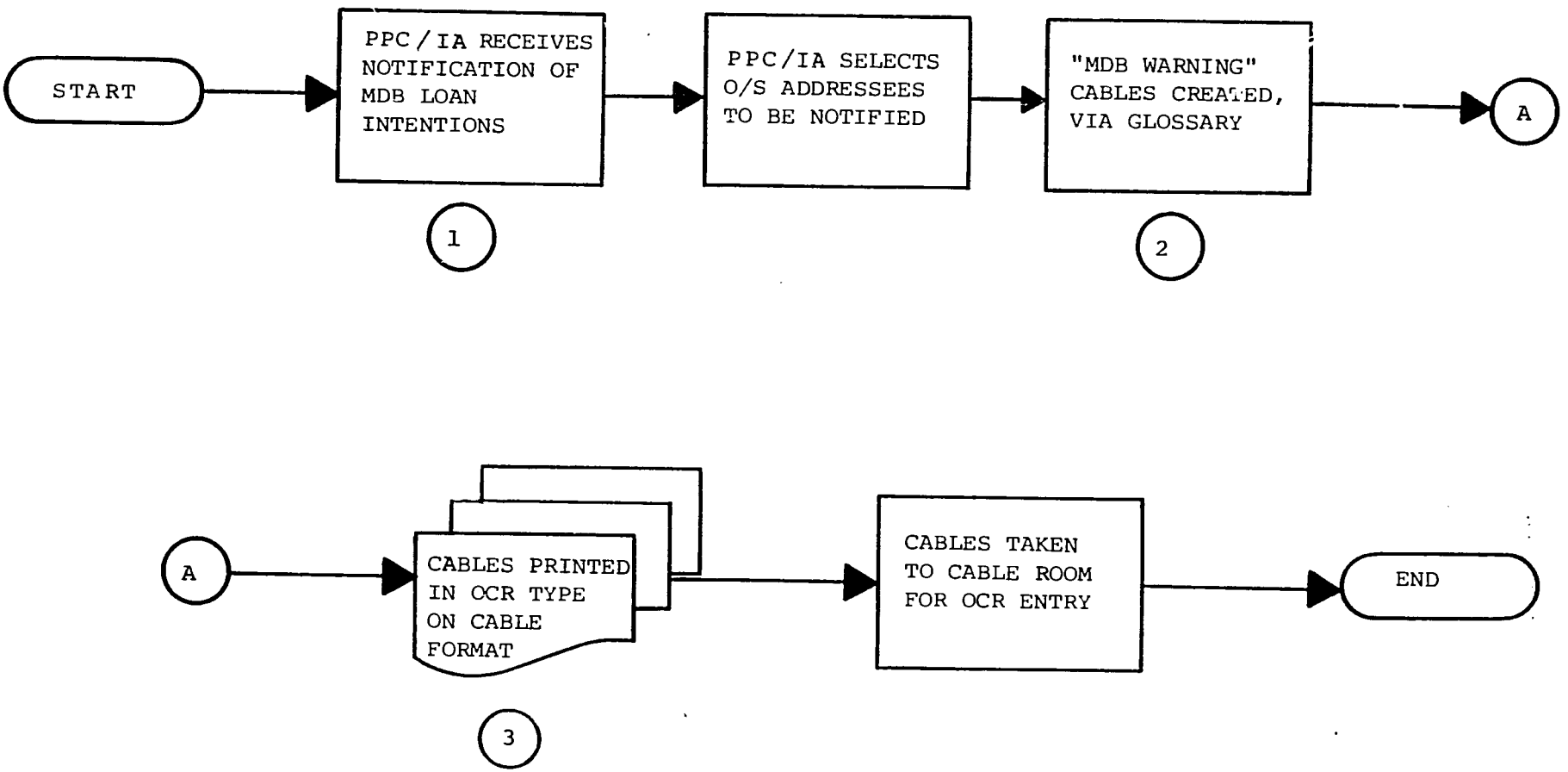
The OIS should be used for form letter generation when there is a need for a personalized response, or in other situations where sending a photocopied reply would be inappropriate.

In general, glossaries aid the user by saving keystrokes, providing a standard format, or providing a series of prompts to instruct operators to complete a form, table or other document, in a strict sequence or by adhering to a rigorous format.

Exhibit VI-3, on the following page illustrates an application utilizing a glossary to store and recall keystrokes that are frequently used. The example shows the general flow of how cables would be created by IA/Donor Coordination staff to alert AID O/S organizations of upcoming loans or loan intentions of the various multilateral development banks (MDB), and to solicit their comments. This is a new function, recently assumed from Treasury. Not all of the details have been worked out for the system yet, especially how the O/S responses should be handled. Nontheless, the cable generation process requirements are fairly clear at this time and the flow will likely end up similar to that illustrated in the exhibit.

EXHIBIT VI-3

FLOWCHART OF APPLICATION USING GLOSSARY:
"MDB EARLY WARNING SYSTEM"



1. The notification process begins when IA/DC receives notification of MDB loan intentions. Because the loans are normally for specific countries or projects, IA will know which AID O/S organizations should be notified. The addresses of the units to be notified are obtained from either a hardcopy mailing list of all AID O/S organizations or mailing lists stored on diskette.

2. Because the warning cables are intended to all serve the same purpose--to notify and solicit mission comments from the cognizant AID organizations--a standard cable has been drafted. Blanks have been left in the cable for the addressee and the particulars of the loan, for example, the lending institution, prospective loan recipient, project, and dollar amount. In the proposed flow of Exhibit VI-3, a glossary would exist of the one and one-half page cable. In addition to the cable text, there would be a series of operator prompts for each of the "blanks" that need to be completed. Thus, the first prompt would be "Addressee"; the second, "Date"; the third, country or project to be funded; and so on. The operator would create the cables by attaching the "MDB Warning Cable" glossary and providing the information requested by the prompts. The standard body of the cable would be provided by the glossary.

3. After providing the variable information, the operator would place a cable form in the daisy printer twin-sheet feeder, change the daisy print wheel to an OCR print wheel, and then command the OIS to print the cable. Because the glossary will contain instructions for margins and spacing in addition to the prompts and cable contents, the cable form will be precisely fed through the printer and printed as though generation properly in a manual typewriter. The generation of each cable, if more then one is sent at a time, will necessitate attaching the MDB cable glossary and providing the variable information for each cable addressee.

4. The last step of the process is to remove the cables from the daisy printer output bin, and take them to the State cable room for OCR input to the cable system. The cable forms would be removed from the twin-sheet feeder and the OCR print wheel removed.

In order to generate general purpose cables, a separate general cable glossary is needed that contains no stored text but only operator prompts for keying the necessary information. This glossary has been developed for the other AID bureaus with OIS 140s and is available for input to the PPC OIS.

(3) An Example of an Advanced Application: Mailing-List-and-Form-Letter-Merge Application

In several PPC offices, a need was indicated for an application that would merge the contents of a standard letter or memo with a list of addressees. This is commonly referred to as a personalized form letter application because it generates typed letters with a personalized address and salutation. Examples of such applications in PPC are:

- Cover letters produced by the Office of Women in Development that accompany reports or memos on WID efforts, which are distributed to a number of individuals and institutions

- Cover letters produced by the Office of Evaluation that accompany copies of AID evaluation reports and related documents, which are distributed to academicians, institutions, and a variety of other addressees

- Cover letters produced by various units in the Offices of Economic and International Affairs to distribute economic analyses and other reports.

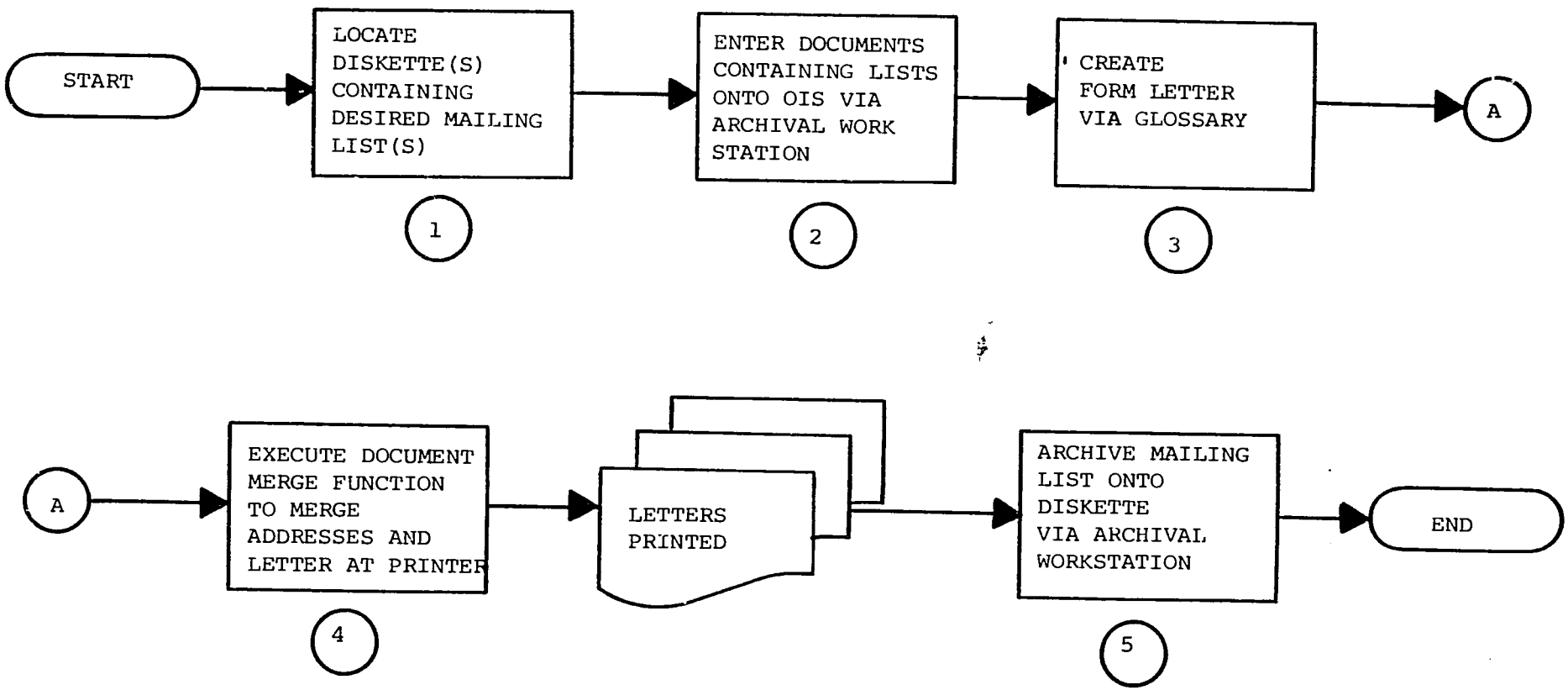
Currently, offices produce these letters by either typing them individually on standard typewriters for each addressee, or as in the case of WID, utilizing a Wang 5-3 word processor to type the body of the letter after individually typing the address and salutation.

The OIS 140 has a document merge capability that permits the contents of a form letter to be merged with the individual addressees of a mailing list to produce an individually typed, personalized letter.

The general process for this application is illustrated in Exhibit VI-4, on the next page. The numbered steps of the flowchart are described below. The process depicted assumes that the mailing list has been recorded on diskette according to a standard format, and that a glossary has been programmed for a

EXHIBIT VI-4

GENERIC FLOWCHART OF A MAILING
LIST-AND-FORM-LETTER-MERGE APPLICATION



general letter format specifying the address and salutation merge points. (Merge points are instructions that permit the OIS to combine documents at the appropriate points.)

1. Because of the diversity of mailings, most offices maintain several mailing lists, compiled on the basis of subject interest or other criteria. Unless a list is used more than once per week it should be stored on diskette when not in use; otherwise it should be stored on the OIS disk and "backed-up" on a diskette. Each list will comprise a "document" in the word processing terminology. Several lists, or documents, could be stored on a single diskette. The exception to this is when the mailing lists are large, in which case only one list might be on a diskette. The diskette containing the desired mailing list(s) will be selected from the office's diskette file as the first step in this application.

2. The second step will be to enter the mailing list onto the OIS disk. This is accomplished via an archival workstation as would be done to put any document onto the system from diskette.

3. To create the form letter, the use of a generic glossary, available for use by all PPC offices is recommended. The glossary will consist of margins, merge marks specifying the address location and salutation, and prompts for date, letter body, and closing. The operator will create the form letter by attaching the glossary and entering the date, letter body, and closing. The completed form letter will then be used to create a document and the glossary will remain on the system as a generic format.

4. The letter is merged with the mailing list through execution of the document merge function of the OIS. In effect, the information on the mailing list is merged with the form letter at an OIS printer via the merge instructions provided by the glossary used to create the letter. The letters are generated without operator intervention other than the set-up. The bins on the twin-sheet feeders (on the printers) should be loaded with letterhead (if desired) and plain bond. The feeder can be set to alternate pages, and as such, obviate operator intervention other than monitoring.

5. The mailing list must be re-archived to diskette via an archival workstation in order to store again for future use.

This general flow is applicable to all or most of the PPC mailing list applications. If a unique format is required for a mailing, the glossary would not be used to create the letter; rather, a document would need to be tailored to the purpose by an operator.

A similar application found in all PPC offices is the generation of memos for various distributions. The major difference between personalized letter and memo application is that most memos are reproduced by photocopy with the addressees are all listed on the memo, and are "checked-off" for distribution. Conceivably, the need may arise for personalized memos, in which case the personalized letter process described above would be applicable. In most cases, however, the current method of producing the memos via standard typewriter and photocopying them for distribution should be continued. It would be inappropriate to utilize the OIS simply as a means of reproducing a document via multiple printing.

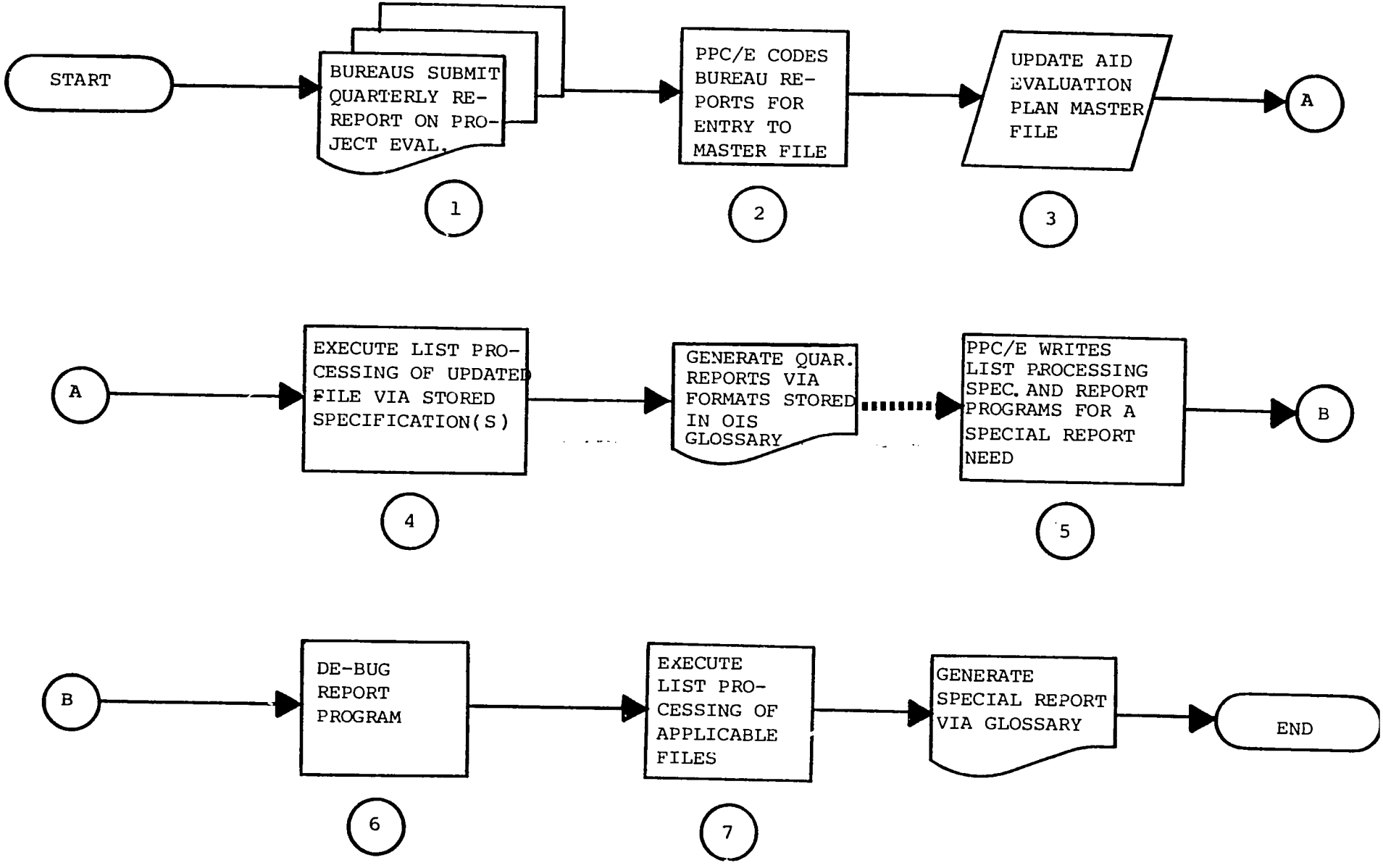
(4) <u>An Example of a List Processing Application: Automation of the AID Evaluation Plan Monitoring System</u>

An example of a small, non-complex data storage and retrieval system that appears to be an appropriate OIS list processing application is illustrated in Exhibit VI-5, on the next page. There are several such possible applications in PPC, which are listed at the end of this section. List processing applications, in general, could be considered small data processing systems, but can be operated entirely on the OIS, without computer support, unlike the larger data processing applications in PPC/PB, for instance.

The flowchart in Exhibit VI-5 illustrates the general operation of PPC/E's "AID Evaluation Plan Monitoring System". (This is currently a manual system, and as such does not now consist of the steps shown in the chart. The chart therefore, represents a hypothetical design for this candidate OIS application. Requests have been made to SER/DM by PPC/E for system development assistance for eventual operation of such a system on the AID IBM 370, but such support was not available due to other priorities.) Because of the small file size of this application (less than

EXHIBIT VI-5

ILLUSTRATIVE FLOWCHART OF LIST PROCESSING APPLICATION:
AID EVALUATION PLAN MONITORING SYSTEM IN PPC/E



1000 records) and the non-complexity of the manipulations needed to generate reports (aggregation, disaggregation, arithmetic calculations) it appears to be a good candidate for OIS list processing application.

The flowchart illustrates the general steps of maintaining the system and generating regular reports. The flowchart assumes the data base (AID projects scheduled for evaluation in the fiscal year) has been developed and is on an OIS storage medium (disk, or diskette).

The basic objective of the system, as described by PPC/E, is to track execution of the AID evaluation plan. The products are to be quarterly reports that indicate evaluations completed and overdue, which are disaggregated by country, region, type of project, and dollar value of project. Other such factors are likely to be included in the data base. As described by PPC/E, the record length per project would be less than the 2,280 character maximum imposed by OIS list processing constraints. The following descriptions of major steps of system operation, as described by PPC/E and adapted by the study team are keyed to the flowchart:

1. The AID bureaus would submit quarterly reports to PPC/E indicating evaluations conducted by project. These reports are currently submitted in hardcopy form from manual tabulations. This process would continue, as envisioned in VI-5 although a form redesign may be needed in the new system design for ease of file maintenance.

2. PPC/E would then need to code the bureau reports into a format whose categories/terms are consistent with the evaluation plan file stored on the OIS. The degree of such coding will depend on the bureau report format, the degree of data transformation PPC/E wants of the raw data, and other such decisions. (Coding means transformation of the bureau information into alphanumeric symbols as defined for the system).

3. When the bureau report data is coded, it will be input to the evaluation plan file. This file update process can be accomplished in various ways, depending upon file structures involved, but in general, involves keying the input data in similar fashion as a data processing input function.

It is necessary to verify the inputted data against the coding sheets to ensure accuracy of the files. Verification should be performed by visually comparing the updated values on the file with the coding sheet, as the updating occurs.

4. When the master file has been updated, PPC/E can then generate its normal quarterly reports on evaluation plan execution. The report generation occurs as a result of executing the list processing specifications stored on the list processing file. Specifications are instructions for selecting the variables the list processing is to be based on. For example, one specification could be to select all projects that remain unevaluated at present. The report specifications would be made as part of the system design. The data sets created by the list processing are formatted via instructions stored in glossaries. Because list processing is not as sophisticated as true data processing, there are several OIS operator interventions necessary to produce the reports. (The OIS requires several steps to produce reports, unlike most data processing applications.)

5. When the need arises for special reports from the master file, new list processing specifications will need to be written to generate the report data, and corresponding report programs will also need to be written to format the data. (Because this can be a time-consuming process, even for operators familiar with the system, it is advised that careful thought be given to the original design of the regular reports, in order that they will meet the majority of anticipated information needs.)

6. Prior to executing the report programs, it is necessary to de-bug them and verify that they will generate the intended reports. (De-bugging is not required for the list processing specifications.)

7. The new specifications and programs are executed similarly as those used to generate the regular quarterly reports. Data sets are created via the list processing mode and are formatted, via glossaries, in the word processing mode of the OIS.

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The above illustration indicates the general procedures involved in using list processing to achieve a limited data storage and retrieval application. As such, the other candidate list processing applications identified in PPC would have a similar structure. It should be noted that considerable development work is needed for even simple applications. Key tasks include:

- Clarify system objectives
- Define reports needed
- Define data fields of the record
- Define file structure
- Define file maintenance procedures
- Develop list processing specifications
- Develop and de-bug report programs
- Develop file storage procedures
- Develop initial files of information.

In a sense, the development effort resembles a data processing system design effort, but on a much smaller scale.

Based on the results of the ADP "interests" survey conducted during this study, several other candidate list processing applications were identified in PPC. Exhibit VI-6, beginning on the next page, summarizes these potential applications. In general, these applications would each necessitate a considerable development effort involving the steps mentioned above. Development could require between four to eight person-weeks of effort for each system. The design and operation of these candidate applications would include many of the elements of the system depicted in Exhibit VI-5. That is, there would need to be procedures for data gathering, coding, file updating, list processing, report generation. While the contents would obviously be different, the nature of the processing steps would be much the same.

As indicated in the "comments" section of the exhibit, for several of the candidates, there remains a question of whether list processing is feasible. These questions can be resolved only through a level of analysis more detailed than could be attempted in this study. In conducting the interests inventory, list processing candidates were identified using several criteria, including:

- Absence of a need for the application to have an interface with the AID or other computer

EXHIBIT VI-6

Candidate List Processing Applications in PPC

DESCRIPTION OF APPLICATION	COMMENTS/CONSIDERATIONS
1. PPC/E -- "Contrator Cost Monitoring System" -- This system would be used to track AID evaluation contractor costs and activities. Additionally, it would store data about each contractor that is required for various reporting purposes, e.g., minority employment. There would likely be several monthly reports on expenditure and performance. File updates would be monthly. The file would contain 80 to 120 records (contractors) of an estimated 200 to 300 characters each.	1. Currently, contractor cost and other information is contained in several loose leaf notebooks. Regular cost reports are prepared. The notebooks are updated intermittently based on information received from the contractors and AID units. Considerable design effort would be needed for this application, to consolidate the notebooks and associated procedures, define reports, etc. This appears to be the lowest priority of the three PPC/E "interests" identified.
2. PPC/E -- "Impact Evaluation Cost Tracking System" -- This system would track resource use for all AID impact evaluations. The system would be evaluation team member oriented, and would track costs and other resources used by contractor and AID staff. Other classifications that would be built in include country, dollars spent by program and OE funds, sector of project. There would be an estimated 100 records (team members) of 100-200 characters each.	2. This system, also, would require considerable design work before it could be automated. There is a possibility that the contractor cost information could be integrated with the impact evaluation information to permit a combined system. This would simplify updating and reporting if it is indeed possible. Any list processing design work with these two systems (1 and 2) should begin with an analysis of both of their respective files and report requirements. Either as combined or separate systems, these are feasible list processing applications.

EXHIBIT VI-6 (2)

DESCRIPTION OF APPLICATION	COMMENTS/CONSIDERATIONS
3. PDPR -- "Project Portfolio Supervision Report" -- This application may be feasible to partially automate preparation of the Supervision Report. After PDPR/PDI reconciles portfolio data manually, based on cross-checking of several sources of (currently) conflicting data, it could use the reconciled data to generate its regular report tables. The report tables would then be available to utilize in the report, which would be prepared on the OIS through word processing.	3. Even if this is a feasible list processing application, it can only partially solve what is a larger data systems problem. The time consuming portion of this process is the reconciliation of PAIS, FM, and bureau data on projects. The list processing possibility would only come into play at the point which PDI achieves reconciliation among these data. The possible advantage is that some of the computations and aggregations now done manually could be done via list processing. Because the Supervision Report document should be produced through word processing and stored for revision to produce subsequent reports, the list processing-generated tables could be incorporated via word processing into the report. This should be analyzed along with PPC ADP applications for feasibility.
4. PDPR -- "PID/PP Status Report" -- This application would automate the manual procedures now used to track various aspects of PID and PP development. Reports would be produced quarterly based on bureau's inputs. The file would contain an estimated 200-300 records. The estimated record length is 100 characters.	4. This appears to be a strong candidate for list processing because it does not involve ADP interfaces. The size is manageable, and the data manipulations are not complex.

EXHIBIT VI-6 (3)

DESCRIPTION OF APPLICATION	COMMENTS/CONSIDERATIONS
5. PB -- "DAC Data File" -- The interest and possible application is to store DAC-provided data on the OIS for access and limited manipulation by PPC offices. There are no specific, ongoing report needs from this data, at present.	5. Currently, the DAC data is stored on tape, and not regularly utilized. The data base in total is extremely large, covering all countries receiving assistance from DAC members, and listing their receipts by donor country, by type of project, etc. The ultimate solution for the access problem will probably require data processing support, simply because of the file sizes. In the interim, however, it may be feasible to create, and store on the OIS, subsets of the DAC data. This could be accessible to PPC offices for list processing and other applications. It would take considerable effort to survey the specific DAC data needs of each PPC office, analyze the DAC tape, and create the appropriate data subsets for OIS usage.

- Estimated size of the list processing file was less than 600,000 bytes

- The "processing" aspect of the application was disaggregation of a file by specified parameters, with only arithmetic operations required.

Booz, Allen did not attempt to evaluate the basic management need for the candidate applications identified by PPC staff, nor did we attempt to completely prioritize the candidates for sequence of development.

VII. SYSTEM MANAGEMENT

This chapter presents study conclusions and recommendations on key system management elements, including the overall PPC management structure, assignment of staff responsibilities, new operational procedures needed and PPC staff training requirements.

1. A NEW MANAGEMENT STRUCTURE IS NEEDED IN PPC TO DIRECT THE OPERATION OF THE OIS 140

Unlike the current stand-alone equipment in PPC, the OIS 140 equipment comprises a single, Bureau-wide system. This, coupled with the OIS's shared-logic organization, results in the need for a clear management structure to plan, operate, maintain and monitor OIS 140 usage.

This represents a new requirement for PPC, therefore, its current organizational structure and positions do not fully reflect these necessary office automation responsibilities. A new office automation system management structure must be established to meet the OIS 140's requirements.

While new, the system management structure is organized along functional lines and will not conflict with PPC's current supervisory lines. Staff assigned to the system management structure continue to report to and to be evaluated by their existing supervisors. Performance evaluation, however, should include assessment of system management responsibilities.

System management staff have been selected from PPC's current personnel who will assume these responsibilities as additions to their existing duties. Agency personnel policies and practices do not allow for full-time dedicated positions solely to administer an office automation system within a bureau or office. This does not represent a handicap to effective office automation operations since the tasks involved are less than full-time efforts for any position, following the intensive system start-up phase.

2. THE RECOMMENDED SYSTEM MANAGEMENT STRUCTURE IS COMPOSED OF THREE STAFF ROLES

The growing experience with Wang OIS 140 operations reinforces the assessment that an OIS management structure should be composed of the following three staff roles:

- System administrator who directs and enforces system policies and procedures to control system-wide operations

- Assistant system administrator who supervises daily routine system-wide operations

- Lead operators who guide daily system usage in their offices and coordinate local office use through the system administrator and assistant system administrator.

Appendix B to this report lists the large set of responsibilites associated with each of these three staff roles. The appendix provides a reference for orienting PPC staff to these new roles and for revising current position descriptions to adequately reflect these new collateral responsibilities.

This OIS system management structure has an important mandate to serve PPC managers as well as system users and operators.

- Staff in system management roles are accountable to PPC managers for the performance of the word processing system in meeting PPC's document preparation needs.

- System users, which refers to all staff whose work processes interact with and benefit from this OIS system, should expect response to their inquiries on potential system applications as well as support for their specific word processing needs in the Bureau-wide system.

- System operators, which refers to all staff who directly operate OIS equipment components, should also expect responses to their questions on specific equipment features and PPC applications as well as support and recommendations for system-related issues they may encounter, e.g., with training, work priority and other operational procedures.

The major responsibilities of each of the PPC system management roles are outlined in the sections which follow. Exhibit VII-1, on the following page, illustrates this recommended OIS management structure.

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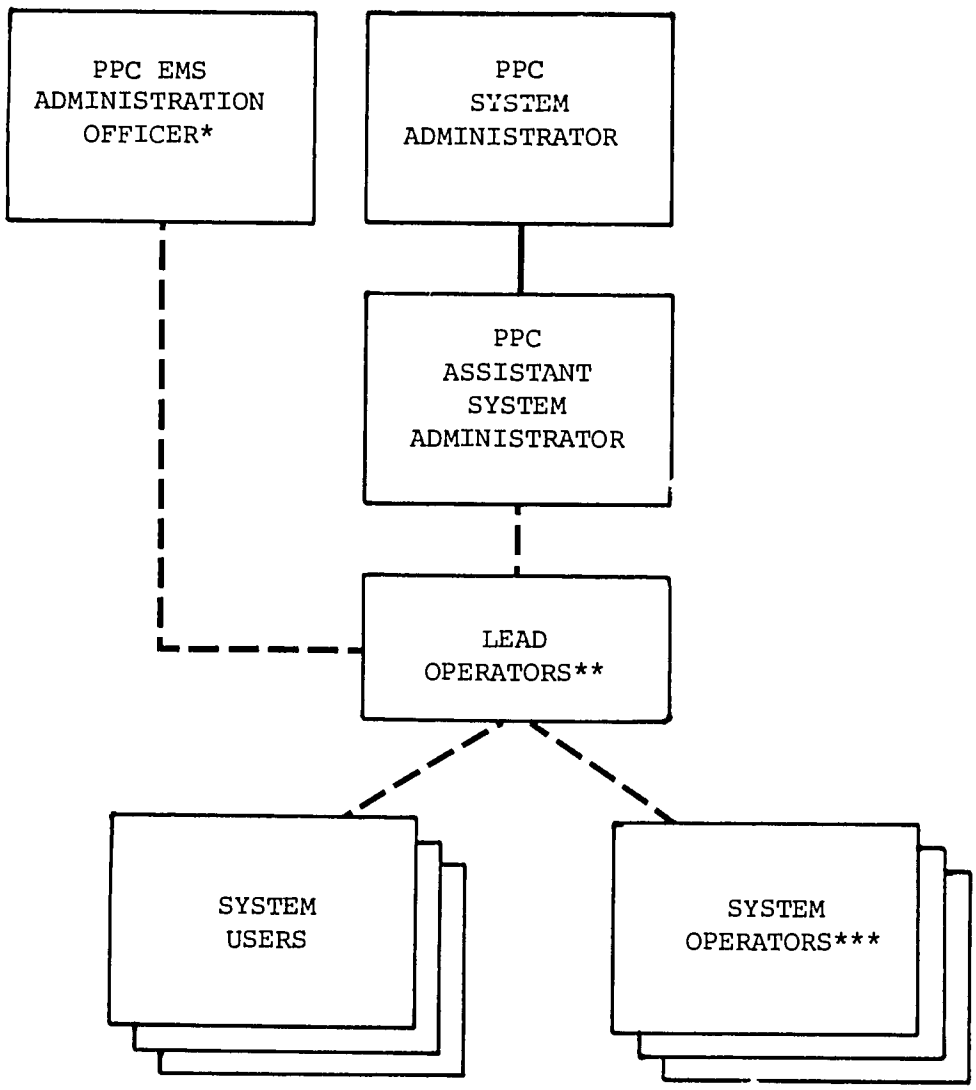
EXHIBIT VII-1

Recommended PPC System Management Structure



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* EMS would continue to distribute work load among PPC offices in the current manner.

** Each office would select a single lead operator to guide office-wide use of shared equipment and to coordinate system usage by both users and operators. In PPC, this arrangement would result in a total of seven lead operators associated with the seven office-level organizational units.

*** Each office would select designated operators who had primary responsibility for specific pieces of equipment whose use would be coordinated by the lead operator.

(1) The System Administrator Has Primary Responsibility for System-Wide Management and Decision-Making

The system administrator role carries the following types of responsibilities:

- Supervision of system start-up
- Provision of technical guidance
- Coordination with SER/DM, Wang and other offices on office automation topics
- Development and enforcement of system operating policies and procedures
- Formulation of issues and recommended strategies in office automation for OOC senior management.

The system administrator is the primary point of contact for PPC managers and system users on Bureau-wide system management and applications. While technical knowledge is desirable, management skills are more essential than technical expertise in performing these duties. It is anticipated that the initial start-up phase will demand considerable system administrator time and be reduced as the system enters routine operations.

(2) The Assistant System Administrator Carries Out Daily System Operations Supervision

The assistant supports the system administrator in managing the system on a day-by-day basis and is the primary system resource to lead operators and other system operators. The major responsibilities of this role include:

- Provision of expert technical assistance on operations on the OIS 140
- Carrying out daily maintenance funtions, i.e., brings the system up and takes it down
- Maintainance of supply inventory
- Supervision of daily usage in accordance with established procedures, i.e., system storage

- Maintainance of PPC performance logs for evaluation.

Following a brief transition period into the new responsibilities, the assistant system administer's role should require several hours a week.

(3) <u>A Lead Operator Coordinates Office-Level System Operations, and Designated Operators Are Responsible for Specific Workstations Under the Guidance of the Lead Operator</u>

The OIS is structured as a Bureau-wide system in which workstations and printers are assigned to PPC's seven office-level organizational units to support their document preparation work load. Workstations and printers are assigned on an office basis because both are intended to support the word processing work load of an entire office rather than specified divisions or individual staff members.

In PPC, it is anticipated that staff in a variety of job positions will operate the Wang equipment to support their work. However, to effectively manage this shared resource as well as to provide a clear line of system management responsibility, it is recommended that each office assign staff to two critical roles:

- Designated operators are staff whose current job responsibilities include typing and related functions, thereby making them the primary equipment operators.

- A lead operator is the staff member responsible for directing office-wide utilization and administration of the OIS 140 by both users and operators.

Specific workstations and printer locations should be assigned to the designated operators so these staff can:

- Receive the level and specific type of training necessary to support the type of applications their office uses

- Assume responsibility for maintaining proper operations at their workstation and notify the lead operator of system needs (e.g., re-ordering of supplies as well as equipment malfunction.)

The lead operator should be selected from an office's roster of designated operators to:

- Serve as the office's recognized expert on OIS operations

- Orient new operators and all system users to appropriate applications of the OIS's capabilities

- Coordinate equipment access among the office's divisions and staff when conflicts cannot be resolved by the designated operators

- Represent their offices in PPC-wide consideration of system operational procedures and equipment issues which appear to require corrective action

- Bring system-related problems and initiatives to the attention of the system administrator and the assistant system administrator.

Designated operators are usually selected from staff in clerical and secretarial positions since the word processing system is intended to directly improve their document preparation activities. The lead operator is usually the staff member with existing responsibilities for orientation and coordination of the work of all staff in clerical and secretarial positions within the office-level organizational unit.

(4) <u>The PPC/EMS Administrative Officer Should Continue to Distribute Typing Work Load Among PPC Offices</u>

Consistent with the observation that OIS operations are most successful when they incorporate established office practices, it is recommended that EMS continue to distribute work load among the Bureau's offices when demand exceeds availability in a given office. Several additional considerations also support this recommendation:

- PPC's work environment is characterized by frequent, unplanned work peaks, and this will continue with the introduction of advanced word processing equipment.

- The performance of work load distribution among PPC offices is consistent with EMS's Bureau-wide service role.

- Such a practice would reinforce the important OIS concept of a "Bureau-owned" as opposed to "office-owned" equipment through sharing this Bureau-wide resource to meet total PPC work load demands.

Specifically, EMS should coordinate work load distribution among PPC offices through consultation with the lead operators when either the AA/PPC or a PPC office/division requests additional support. As appropriate, the lead operators would then distribute overflow work load among their office's designated operators and call upon EMS to assist only when solutions within their own office cannot be found.

3. THE SYSTEM ADMINISTRATOR AND ASSISTANT SYSTEM ADMINISTRATOR ROLES SHOULD RESIDE IN THE PPC OFFICE WHOSE FUNCTIONS BEST FIT OFFICE AUTOMATION SYSTEM MANAGEMENT REQUIREMENTS

The system administrator and assistant system administrator roles should be associated with an office's function rather than with specific staff members', to ensure continuity and reinforce authority. Their organizational location should be based on the office whose mission and functions best support the office automation management responsibilities these two critical roles must carry out.

The following office functions are most supportive of the system administrator and assistant system administrative roles:

- Bureau-wide service orientation
- Management of shared Bureau responsibilities
- Point of contact with other AID offices supporting office automation administrative requirements
- Recognized authority to coordinate office-level activity in administrative areas
- Ability to make final decisions in administrative areas and to inform senior management of decisions requiring their approval, as well as the implications of alternatives for the Bureau as a whole.

PPC deliberations on where to house these two OIS management roles had focused on two offices -- PB and EMS.

PB staff have provided leadership in office automation systems and have coordinated PPC's efforts with SER/DM in this study to acquire advanced word processing support and in a planned effort to specify ADP requirements and strategies. This leadership role springs from PB's considerable experience with ADP systems which has established PB as the PPC office with the highest level of interest and knowledge in systems to date. For these reasons, PPC has assigned the OIS system administrator and assistant system administrator roles to PB staff.

Booz, Allen recommends that this decision be reviewed following acceptance of PPC's long-range office automation strategy. At that time, it may be more appropriate to locate system management functions in EMS. With its Bureau-wide orientation and recognized management authority, EMS's mission and functions are supportive of the office automation system management structure. While it is premature to speculate on the appropriate options PPC should consider when its comprehensive office automation strategy is articulated, several observations may assist in clarifying the issues to be addressed in reexamining the location of these roles. For example:

- If word processing and ADP needs continue to be met by separate equipment configurations supporting distinctive operational systems, PPC may consider housing the management function for word processing in EMS and assigning ADP management functions to PB if this office continues to have the majority of applications requiring data processing and telecommunications support.

- If an integrated office automation system approach interconnecting word processing, ADP and telecommunications technologies is adopted, the system management structure may be more appropriately located in PB than in EMS because of the potentially significant level of technical, policy and program knowledge that system management may require.

PPC may also want to consider establishment of a distinctive organizational unit reporting directly to the AA/PPC to manage its office automation system, especially if a comprehensive system integrating word processing, ADP and telecommunications is adopted.

4. A MANUAL OF PPC OIS 140 OPERATING POLICIES AND PROCEDURES SHOULD BE DEVELOPED IS UNDER DEVELOPMENT

In addition to requiring a new system management structure, the introduction of an office automation system also requires the development of new operational procedures. To promote successful operation, a number of activities must be performed in a standardized manner. These new OIS operating policies and procedures are currently being developed in PPC and should be approved by PPC management and distributed to all system users and operators prior to initiation of full system operations.

(1) Operational Procedures Need To Be Specified As Bureau-Wide Guidance On A Large Number of Topics

PPC-staff will need a wide range of information on how the system is organized and its capabilities, when it should be used, who should operate it and how it should be operated. The procedural topics include the following information:

- Overview of the OIS 140 and its operation
- Location of equipment
- Scheduled hours of operation
- Names and overview of system management and operations staff
  - System administrator
  - Assistant system administrator
  - Lead operators
  - Other trained operators
- Overview of equipment capabilities
- Use of document ID numbers
- Content of the available glossaries
- Standard revision marks
- Establishment of document priorities
- Library availability
- Library maintenance
- Guidance for filing documents to diskette

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- Back-up policy (copying to diskette)
- System security
- Care of diskettes
- Glossary origination
- Circulation of system update information
- Circulation of SER/DM system bulletins
- Supply acquisition
- Technical support acquisition
- Maintenance support acquisition
- Scheduling ongoing training
- Recording equipment utilization statistics.

Appendix C to this report provides definitions of each of these needed procedures as a foundation for their specification in PPC.

(2) Experience in Other Offices Indicates Areas Where Operational Problems Are Most Likely to Appear

PPC can benefit from the lessons learned by other organizations during system start-up and ongoing operations. Recurring procedural problem areas are identified below:

- Failure to label material with reference document ID numbers
- Inadequate verification of original input data for reports
- Leaving material on-line with no back-up copy of diskette
- Competing work priorities for system use.

The establishment and enforcement of system procedures will address the serious consequences which could result from improper system usage and/or non-standardized operational procedures.

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Some examples help to illustrate the importance of procedures. At inconvenient times, the system will go down, and some work will be lost. Back-up procedures and transfer of important information to diskettes will ease this problem. There will also be times when staff will compete for limited time on the equipment, and some work will be delayed. Clear work priority guidelines and staff discipline in scheduling can manage this problem. Finally, there will also be instances when staff will not clearly label a document with its reference ID number, and the work must be redone since it cannot be retrieved from the system. This problem can be largely prevented by maintenance of document identification logs and staff support of this process.

5. A PPC TRAINING STRATEGY SHOULD BE DEVELOPED TO GUIDE BOTH INITIAL AND ONGOING TRAINING FOR SYSTEM USERS AND OPERATORS

The primary objective of a PPC training strategy is twofold:

- Develop fundamental equipment operation skills in designated and lead operators
- Orient all system users to the PPC system concept, appropriate use of the OIS's capabilities and standard procedures they must observe for effective system operations.

The success of the OIS depends upon the achievement of this objective. In addition, the PPC training strategy establishes guidelines for selecting appropriate initial and ongoing training resources from among several options.

AID's contract with Wang includes three training courses for PPC staff:

- System administrator
- Basic skill (e.g., introductory course)
- Advanced concept (e.g., glossary, document merge, math package and other high skill features).

PPC is scheduling staff in these courses and may find the following guidelines helpful:

- The system administrator should attend the system administrator course and would benefit from both the basic and advanced skill courses.

- The assistant system administrator should attend all three courses.

- All lead operators should attend the basic skills course and be selected for the advanced concept course if their office's work regularly requires OIS's advanced features.

- All designated operators should attend the basic skills course, and like lead operators, attend the advanced course if their work regularly uses these features.

While PPC has a training advantage since several staff have already received Wang 5-3 training, it is still important to provide critical operators with OIS-specific training. The OIS has several significant differences from the Wang 5-3 which can reduce operator efficiency and create unnecessary frustration in skilled operators. The OIS-trained staff constitute an in-house resource for expanding skills to other operators and for training new staff.

PPC may find, however, that Wang-provided training is not sufficient for meeting PPC's needs. On the basis of such reports from other AID offices, SER/DM is in the process of developing and specifying needed additional training, including training for managers and system users.

One of the major reasons why AID offices have not been fully satisfied with the Wang introductory training is that it concentrates on equipment-specific operations. Some translation of these skills to the specific work environment is needed to provide a context which gives meaning to equipment features and functions. The study team recommends an applications-specific training approach which has been effective in other organizations. In this approach, operators learn how to complete an entire work process or document using automated support. (Chapter VI of this report provides good examples of applications-specific guidance for OIS operation.) Rather than emphasizing equipment operations, this approach emphasizes office-specific work routines. Equipment features, e.g., math and glossary, are not learned in isolation but as parts of the process of preparing a major series of exhibits in a recurring report. Such a learning approach permits the transfer of already acquired skills to additional work processes and directly harnesses the system's capabilities to improving important work documents and flows.

SER/DM has accepted these recommendations and is in the process of establishing at least two kinds of training courses:

- Applications-specific training for operators on the OIS 140

- Office automation and specific OIS 140 orientation for AID managers and staff using the system.

This Agency training program will not be offered in time to support PPC's OIS start-up phase. While such courses may eventually have much benefit to PPC as refresher courses in an ongoing training program, the PPC system administrator will need to develop PPC's training strategy to ensure adequate skill acquisition to support the OIS 140 when it is ready for full operation in June. Appendix D to this report outlines an OIS training manual which is linked to an OIS procedures manual. This appendix illustrates how these two documents could be used by PPC to train operators in PPC-specific applications and to orient system users to system capabilities and the standardized procedures they must observe.

VIII. IMPLEMENTATION PLAN

This chapter provides a blueprint for installation and start-up of the Wang OIS 140 advanced word processing system in PPC. This implementation plan identifies major tasks in:

- Physical site preparation
- Staffing
- Policy and procedures
- Training
- Equipment installation
- Library and glossary management
- Evaluation.

PPC has established an ambitious schedule for the start-up of this word processing system. Exhibit VIII-1, on the following two pages, presents a flow chart of critical PPC implementation activities as a guide to OIS system management staff and other PPC staff who will be directing the implementation effort. It should be noted that with receipt of the OIS in mid-May, responsible PPC staff have initiated many of the tasks described in the section which follow.

TASK 1 PHYSICAL SITE PREPARATION

The objective of this task is to prepare the sites identified by PPC management for the installation and operation of the OIS 140 system.

(1) Major Activity

There are two major activities which must be completed in this task:

- Confirming the locations for the OIS equipment and furniture

- Laying the cables and attaching the connectors to link the workstations and printers to the CPU.

PPC has already established equipment locations and has been monitoring the progress of the facilities modification work. EMS and system management staff should continue to monitor these activities which are provided through SER/DM and SER/MO to ensure that the following are addressed:

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EXHIBIT VIII-1(1)

Sequence of PPC OIS Implementation Activities

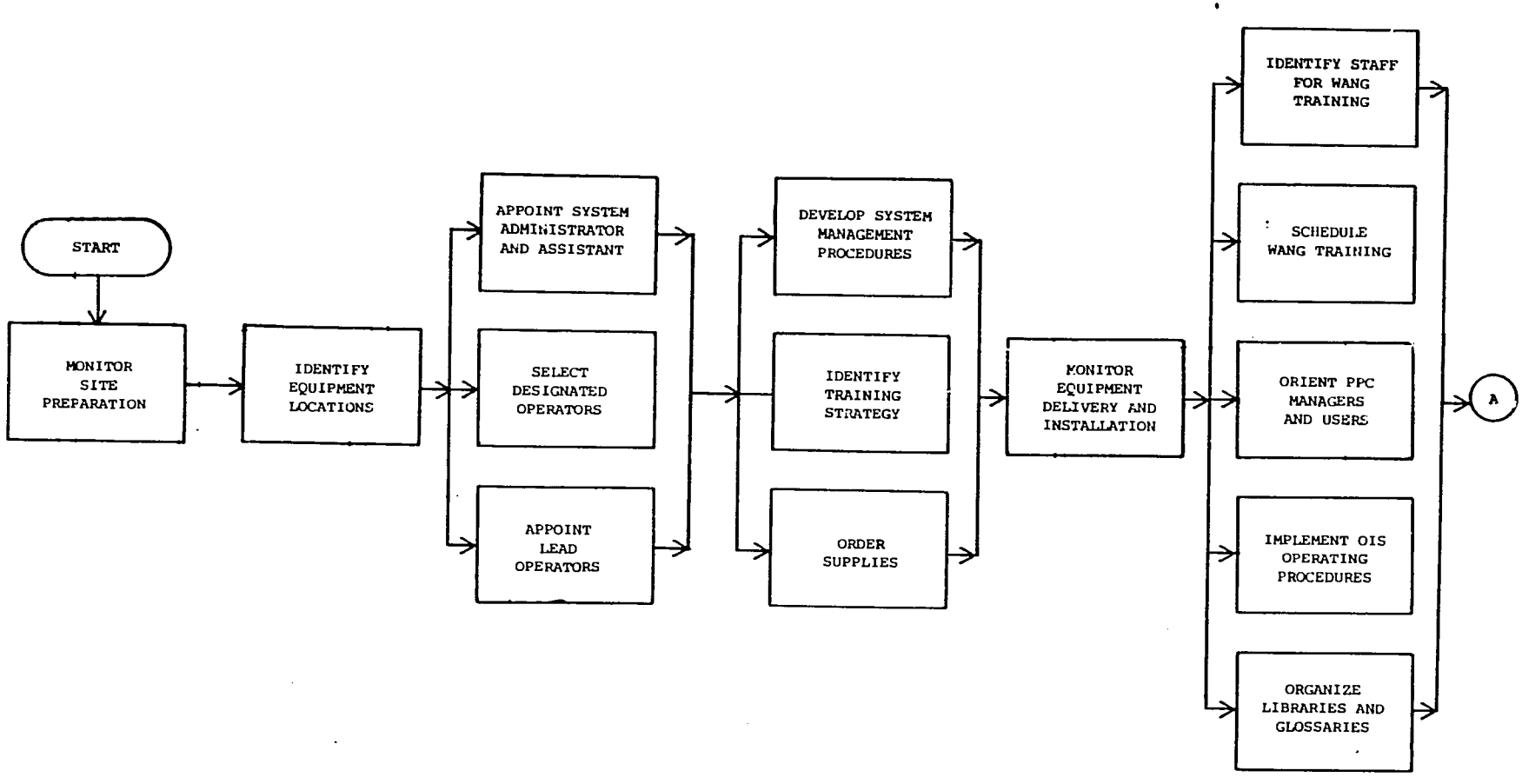
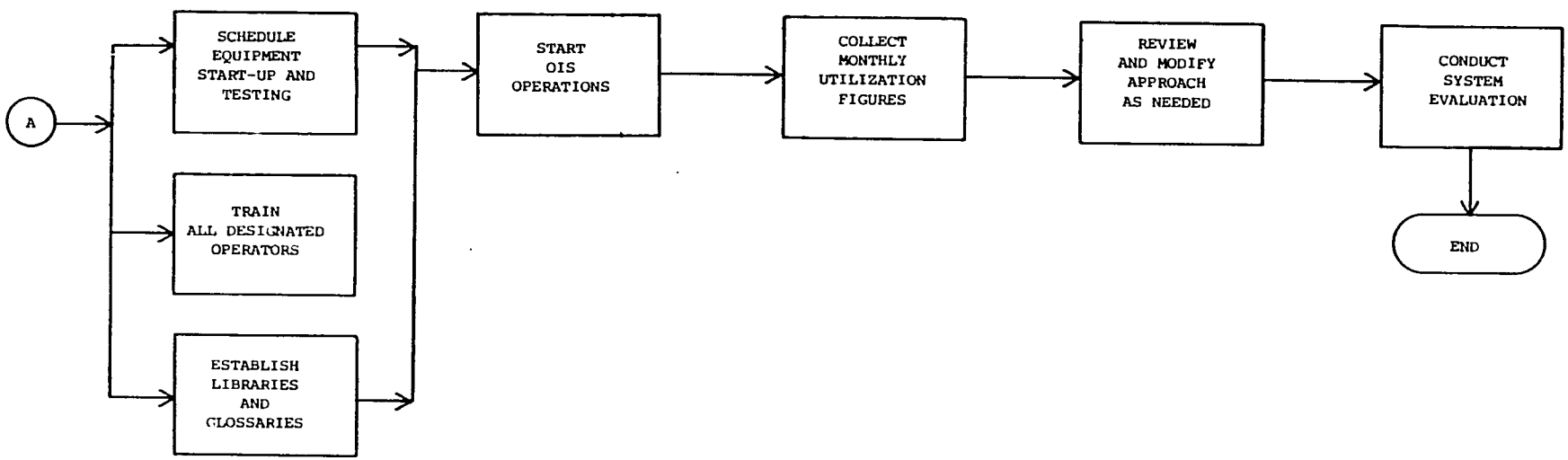


EXHIBIT VIII-1(2)



- Cables should be labeled on the ends entering the CPU room to indicate from which room they originate.

- Exposed cables in each location should be reviewed for correct length considering the planned furniture placement.

(2) Lead Responsibility

The OIS coordinator has worked with PPC office directors and EMS to determine exact room locations for the OIS equipment and related furniture.

The requirements and responsibility for laying the cables, attaching the connectors to the cables, and any electrical modifications are SER/DM's and SER/MO's.

These offices negotiate and secure the services necessary to address these requirements. However, it is the system administrator's responsibility to supervise the site modification work within the Bureau for proper compliance with the Bureau's needs.

TASK 2 STAFFING

The objective of this task is to properly define and assign the responsibilities of the staff who will manage and coordinate the Wang OIS 140 system. PPC has begun work on this task by naming staff in PB to the system administrator and assistant administrator roles.

(1) Major Activity

PPC management must approve a system management structure as a foundation for subsequent staffing activities. The roles and responsibilities of the system administrator, assistant system administrator, lead operators and designated operators should be specified and included as updates to formal staff positions. Finally, appropriate staff should be selected for these primary system management and operations roles. Specific activities include:

- Determine appropriate system management and operations roles based upon design study recommendations for:

  - System administrator
  - Assistant system administrator

- Lead operators
- Designated operators

- Write formal role descriptions

- Incorporate new responsibilities into position descriptions

- Select staff for system roles.

(2) Lead Responsibility

Written descriptions of the system administrator and assistant system administrator roles should be reviewed and approved by senior management, who should formally notify PPC offices of the staffing selections for these roles. Lead operators and designated operators should be appointed by each office director.

TASK 3 POLICY AND PROCEDURES

The objective of this task is two-fold.

- Establish uniform policies and standards on system usage and integration into PPC operations. These policies are the foundation for all office automation functions and provide PPC management a mechanism to guide and monitor office automation management and operational activities.

- Establish a procedural manual which will provide guidance to both the operators of the equipment and the staff generating documents as to the basic process by which a document is produced, revised and stored on the system.

PPC has begun development of a procedures manual in anticipation of full system operations during June 1982.

(1) Major Activity

In establishing policies and standards it is important to develop uniform regulations which can be utilized and followed by all PPC offices and staff. PPC management must decide the role it wishes to play in maintaining control and tracking system operations. For example, PPC management might delegate operational (day-to-day) policy making to the system administrator, while retaining control over all decisions which affect personnel, budget or equipment.

The procedural manual must accomplish the following:

- Orient the system users, including PPC managers, to system capabilities and applications
- Provide operational guidance on effective system and equipment usage for operators.

PPC staff have two sources of material to guide procedures development. Diskette copies of such manuals developed in other AID/W offices have been sent to PPC, and Appendix C to this report outlines PPC-specific procedures in major areas of operation.

(2) Lead Responsibility

The system administrator is responsible for establishing uniform policies and standards in a manual approved by PPC management.

Once this document is written and approved, it should be distributed by the system management staff to all PPC staff. As changes are made through experience in these procedures, the system administrator is responsible for updating the manual.

TASK 4 TRAINING

The objective of this task is to provide the training required to effectively use the Wang OIS 140 system. As discussed in Chapter VII, a successful training program is crucial to office automation success. The initial training program must address the production of key PPC documents as well as the basic and advanced operation of the system. By tailoring the training program to satisfy key document production as well as advanced office automation functions PPC can begin to form a core resource of in-house Wang expertise for new Wang users and applications.

(1) Major Activity

This task involves the following activities:

- Development of a training strategy
- Identification of trainees for vendor-provided courses
- Scheduling of training with vendor
- Planning for provision of additional operator training

- Preparation and presentation of OIS orientation courses for PPC managers and all system users

- Consultation with SER/DM on plans to meet additional and ongoing training needs.

The training strategy should be established to direct the formulation of the training program. This strategy should cover such questions as:

- Who should receive what types of training, e.g., managers, users, operators

- What should be included in each group's training

- What specific equipment training is required, e.g., text processing, glossary, list processing

- What types of outside supplemental training (e.g., Wang, contractor) are available to supplement PPC resources.

Appendix D to this report presents an outline of a Wang OIS training manual to guide training planning and strategy development.

(2) Lead Responsibility

The system administrator and the assistant system administrator have the lead responsibility in formulating and implementing the PPC training program. EMS staff may provide valuable assistance in this area. PPC management is responsible for approving a training strategy developed by the system administrator to guide the Bureau's training activities.

TASK 5 EQUIPMENT INSTALLATION

The objective of this task is to install the equipment in as efficient a manner as possible so that operations can begin as rapidly as possible. By receipt of this final report, most of this task should have been accomplished.

(1) Major Activity

The focus here is to ensure that the following tasks occur at the same time.

- Completion of all site modifications

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- Delivery of equipment and furniture
- Delivery of supplies (ribbons, print wheels, etc.)
- Beginning of operator training.

The Wang equipment and related furniture should arrive simultaneously. Upon its arrival in PPC, Wang and SER/DM should be notified of its arrival so that the on-site installation process may begin.

(2) Lead Responsibility

It is the responsibility of the PPC system administrator to coordinate the four prime equipment installation activities with PPC/EMS, SER/DM and Wang.

TASK 6 LIBRARY AND GLOSSARY MANAGEMENT

The objective of this task is to organize the system to support the document preparation functions. The initial, internal set-up of the Wang system requires the assignment of libraries and creation of glossaries.

(1) Major Activity

Libraries need to be assigned to each PPC office and division. It is recommended that each office and division should be assigned one library during start-up and additional libraries should be assigned later on the basis of system utilization information.

The specific activities in this task include the following:

- Approve and coordinate initial library assignments
- Specify any PPC-wide library assignments
- Monitor library usage and revise assignments based on need as indicated by work load
- Identify initial set of glossaries
- Design and program initial glossaries
- Maintain status on all PPC glossaries.

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(2) Lead Responsibility

The system administrator reviews and coordinates all glossary applications and library assignments. A copy of all glossary applications must be forwarded to SER/DM.

TASK 7 EVALUATION

The objective of this task is to prepare PPC to participate in post-implementation evaluation of the equipment with SER/DM. This evaluation compares projected productivity to the actual productivity achieved and identifies needed system refinements and corrective actions.

The primary indicators, e.g., pages produced and the hours used, are selected by SER/DM to meet National Archive Records Service (NARS) requirements for office automation productivity and utilization. The following description of an approach for system evaluation is consistent with SER/DM guidelines. PPC can expand the types of indicators and guidelines specified by SER/DM to satisfy any PPC monitoring requirements developed by the Bureau.

(1) Major Activity

To perform the evaluation, the methodology originally used to justify the system should be repeated. This involves ongoing collection of equipment utilization and work load information.

The information from the weekly logs of each workstation are the foundation of this evaluation. It is important to note that evaluation data is required on all standalone units as well as OIS workstations used in PPC. When the logs are submitted to the assistant system administrator each week, he or she calculates the original pages per day, the revised pages per day, and the hours of use per day averages for the total equipment configuration. This is done by:

- Adding the total number of original pages, revised pages, and hours used for each workstation
- Combining the workstation totals
- Dividing each total by the number of days in the week to get the daily system averages of original pages, revised pages, and hours used

- Dividing these averages by the number of workstations to get the daily workstation averages of hours used, original pages and revised pages.

A monthly report summarizing these weekly figures should be sent to SER/DM by the system administrator.

During the evaluation, the hours used, original pages, and revised pages per day averages are compared to the following criteria to determine if the system is meeting the projected productivity:

- 5 hours per day of utilization
- 17 original pages per day
- 44 revised pages per day.

The work load information in Chapter II of this report is compared to the current totals of original and revised pages produced on the system. Questionnaires or interviews could be used to indicate achieved improvements, for example:

- Reduced typing time

- Increased support time to do work delegated from the professional staff

- Increased satisfaction with the level of secretarial support provided.

This information from the evalution can be used to point to areas to investigate for system refinements if expected productivity has not been satisfactorily met or confirm that actual productivity improvements have been achieved and provide a basis for system expansion if needed.

The timing associated with performing the evaluation is an important factor contributing to valid results. If the evaluation is performed too soon after implementation, meaningful results are not achieved because of inadequate break-in time. Although the evaluation could take place six months after implementation, Booz, Allen recommends waiting one year to allow the work environment conditions to stabilize. The progress of planned future work on ADP requirements and a comprehensive office automation strategy will, of course, effect the timing of the evaluation effort.

(2) Lead Responsibility

The system evaluation task is an ongoing activity performed by all users and operators:

- System administrator specifies specific procedural policy in coordination with SER/DM
- Ongoing data collection of actual productivity is done by the lead operator through designated operators and other staff operating the word processing equipment
- Users assist with observations and recommendations for improvement.

SER/DM has the lead responsibility to ensure that system evaluation guidelines are current and met by PPC.

IX. ADP INTERESTS AND IMPLICATIONS

This chapter addresses several issues related to PPC's use of, and requirements for, automated data processing (ADP), including:

- ADP interests which have been mentioned in more general terms in previous chapters
- Data processing capabilities of the Wang OIS as they relate to PPC ADP interests
- Technical issues which must be resolved in order to use the OIS as a multi-functional word processing and ADP system
- Assessment of the feasibility of moving PPC's existing ADP systems from Agency's central computer to the OIS.

The chapter concludes with a discussion of the recommended content of a detailed data processing analysis and design study.

1. THE BUREAU'S ADP INTERESTS CONTAIN A MIX OF PROSPECTIVE APPLICATIONS IN ADDITION TO THE ENHANCEMENT OR MODIFICATION OF THOSE ALREADY ON EXISTING EQUIPMENT

PPC has recognized that new technologies have to be applied in order to meet the needs for information processing. This office automation design study was a vehicle for the initial articulation and exploration of the data processing interests within the Bureau as part of the major study focus on word processing requirements.

(1) General ADP Interests Were Identified Through A Survey Of Representatives From Each PPC Office

A survey of representative PPC staff was conducted to identify, in general terms, the ADP interests within each of the PPC offices.

These staff, as current or prospective system users, were asked to identify information needs which, in their opinion, required data processing support. These needs were of two types:

- Enhancements/modifications of existing applications/systems

- Prospective applications.

They also were asked to identify any internal or external data bases which they wished to access for reference or processing purposes.

Senior staff of SER/DM were also interviewed to gain a general understanding of the technical aspects of fulfilling the ADP needs within PPC from the system design and maintenance perspectives. They also provided objective data on current system utilization and performance, particularly volumes for printed reports.

Exhibit IX-1, on the following pages, summarizes the results of the interest survey, by PPC component. The matrix lists the desired or current ADP interest, the status or nature of the interest as it presently exists in PPC, and the technical characteristics, such as input frequency and volume, number of records, etc.

With the exception of WID and EMS, all PPC components expressed some ADP interests and are represented in the inventory. The compilation and analysis of data collected during the survey indicated a generally high level of interest in additional or enhanced ADP capabilities. Specific findings of the survey are discussed in detail in the following section.

(2) <u>The Interests Survey Identified A Range Of Desired ADP Capabilities, And Also Called Attention To Technical And System Management Concerns</u>

The survey disclosed a wide spectrum of ADP interests. These interests included the desire to develop new data processing capabilities, to convert manual processes to automated systems, and to enhance or modify operational ADP applications to meet current needs.

These interests fall into three categories of data processing capabilities:

- <u>Access to reference data bases in PPC, other AID offices or external agencies</u> -- This interest was expressed by several PPC components and reflected such applications as PPC/E's interest in accessing reference data bases relevant to sectoral evaluation topics.

EXHIBIT IX-1(1)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT PB/PIA

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
. PBDS IMPROVEMENTS -- To achieve several work saving and cosmetic improvements: - Increase data manipulation, reformatting ability - Improve maintenance through offline updating (or OIS) - Secure Historical Portion of project financial records - Improve appearance of tabular printouts (typeface change)	. On IBM 370	. Daily; in busy season	. 855, 231 printed lines*	. Project; 700 character central file on 370 . User Files	. 9400 (4000 new records created yearly) . 8 files	. 6,580,000 characters . 9,381,600 characters (allocated)	. INQUIRE . Interactive Data-graphics input: 132 characters form/screen . Total of 13 budget files and 8 user files on mainframe . Central file with one file per bureau
. PDAC IMPROVEMENTS -- To achieve timesaving improvements: - Improve ability to scrub FM (W-211) CFR tape - Eliminate manual entry to WANG	. On IBM 370	. Semi-annual	. Semi-annual . 6419 printed lines*	. 125 records	. 27,030	. 3,378,750 characters	. INQUIRE . Tape input . Data manipulation - Datagraphics

*AVERAGE PRINT LINE BASED ON FIVE MONTHS CUMULATIVE STATISTICS

EXHIBIT IX-1(2)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT PB/PIA (Continued)

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
. LOAN/GRANT "GREENBOOK" IMPROVEMENTS -- To achieve work-saving and cosmetic improvements: - Improve maintenance through off-line updating (or OIS) - Obviate COBOL print program; avoid type-setting and footnote limitations - Improve appearance of tabular data (typeface change)	. On IBM 370		. 32,268 printed lines*	. 80 records	. Country; 80	. 400,000 characters	. On-line Sycor input . COBOL print program . INQUIRE
. DATA ANALYSIS IMPROVEMENTS -- To increase capability to perform statistical, other analyses of data in AID data bases: - "Country" Analysis - "Personnel-by-Position" Analysis - Miscellaneous ad hoc analyses	. Now done on IBM 370; the lack of available time on 370, difficulty of manipulation are the major problems	. As needed; variable	. As needed; variable	. Country; 500 . Personnel; 132	. 600 . 5,000	. 300,000 characters . 660,000 characters	. SAS . INQUIRE . Regression analysis

*AVERAGE PRINT LINE BASED ON FIVE MONTHS CUMULATIVE STATISTICS

EXHIBIT IX-1(3)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT PB/PRS

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
. OYB MAINTENANCE -- To update OYB with reobligations, other changes during operating year	. Now done via INQUIRE; access to CRT a problem	. 2-4 times a month; 100-160 budget item changes per month	. Twice monthly; 1,320 lines	. Budget item, 105 characters	. 500	. 50,000 characters	. INQUIRE . 5 or 6 numbers per country, 70 or 80 countries
. OMB SYSTEM ACCESS -- To access OMB Budget Preparation System to revise AID budget and transmit to OMB the detailed back-up (OMB system has software that permits checking of subtotals, totals after entry)	. Now done via CRT; access a problem	. Annual period of 3-8 weeks intense use	N/A	N/A	N/A	N/A	. Incompatibility of PPC terminals and OMB computer
. OMB OUTLAY SYSTEM ACCESS -- To access outlay system to track status of obligated funds over their "lifetime"; calculate expected performance based on past performance	. Now done via CRT; access a problem; confidentiality from OMB	. Seasonal, once a year; 30 hrs of intense input	. Daily reports during update season	N/A	N/A	N/A	. Manual worksheets with outlay figures for 5 years are prepared before input cycle begins . Incompatibility of Datagraphics terminal and OMB computer
. TRACK INT'L AFFAIRS ACCT -- To track account by accessing OMB (or CBO) accounting systems; for AID intelligence on government-wide funding status	. Done manually when done at all	N/A	. As needed; 10 times yearly	N/A	N/A	N/A	

EXHIBIT IX-1(4)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT PB/CPA

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
. EXTRACTION AND MANIPULATION -- To access PIA data bases, extract data, and manipulate via low-level statistical treatment, e.g. PL 480 program data, other CPA programs	. PIA has provided tables in past, must be extracted, reformatted manually; retyped	N/A	. As needed; 10 times yearly	. Varies: PL480 -- 80 countries; 100 characters	. Varies: PL480 -- 80 countries, 4 subfiles	N/A	
. IMPROVE SPECIAL CONCERNS DATA -- To improve quantity, standardization of special concerns program data, by including new data elements in ABS on e.g., Peace Corps, PVO, S&T. Data useful in responding to Congressional, etc. questions, other analyses.	. Now must survey missions each time question arises on budget detail	. Annual, as part of ABS	. As needed, 10 times yearly	. Project; add 20-40 characters to ABS	. Same as project file	N/A	

EXHIBIT IX-1(5)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT: EVALUATION

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
. REFERENCE DATA BASE ACCESS -- Access to data bases relevant to sectoral evaluation topics to guide background	. Now use AID, State Libraries to conduct bibliography searches, etc.	N/A	. Start of new evaluation series; every three months	N/A	N/A	N/A	
. DATA ANALYSIS -- Access to stat packages, file creation capability to aid in sample selection and evaluation data analysis	. Some done manually or via contractor; desire to expand capability	N/A	. Occasional, as needed	Projects; 100 characters	. 50-150	N/A	
. EVALUATION MONITORING -- Ongoing monitoring of AID project evaluations	. Manual now	. Annually, update 835 projects	. Quarterly; and as needed	. Projects; 75 characters	. 835	N/A	. List processing candidate
. EVALUATION ANALYSIS -- Capability to extract data from evaluation reports and store for cross-sectional analysis	. Manually extracted, compiled now	. As completed project evaluations are received	. As needed	. Projects; 75-150 characters	. 500	N/A	. List processing candidate
. MONITORING OF CONTRACTOR'S AND EVALUATION COSTS(2)	. Manual systems	. Monthly; low	. As needed; monthly at least	. Contractor; Evaluation team member; 100 characters each	. 100 . 100	N/A	. List processing candidates

EXHIBIT IX-1(6)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT PDPR

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
. REFERENCE DATA BASE ACCESS -- Access to data bases (unspecified) to aid in policy analysis	. New capability	N/A	. Occasional; as needed	N/A	N/A	N/A	
. DATA ANALYSIS -- Access to stat packages, file creation capability	. New capability	N/A	N/A	N/A	N/A	N/A	
. PORTFOLIO SUPERVISION REPORT -- Improve ability to produce data for this report, and to produce it more frequently than once a year	. Manually compiled after manually reconciling conflicting data from several sources	. Annually	. Annually	. Projects; 200-300	. 800-900	N/A	. Desired improvements imply major effort among several data sources
. PID/PP STATUS REPORT -- Automate and firm up procedures to produce this report, which tracks PID/PPS	. Manually compiled based on bureau reports solicited by PDPR	. Quarterly	. Quarterly	. PIDs/PPs	. 200 est.	N/A	. List processing candidate

EXHIBIT IX-1(7)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT IA

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
REFERENCE DATA BASE ACCESS -- (Essentially for same purposes as PDPR interest)	. New capability	N/A	. As needed; 10 est. times yearly	N/A	N/A	N/A	
DATA ANALYSIS -- Analysis of AID and other donor assistance using basic arithmetic, statistical techniques: capability desired to extract and reformat tabular data	•New capability; have DAC tapes, PIA has helped create runs in past	•Annual update of large file	•As needed; 10 times yearly	•Country; 250 characters (maybe extract subset)	• 120	N/A	
CATALOG/RETRIEVAL -- To store over 1,000 reports, papers, etc. received annually from UN, DAC, MDB's; develop keyword filing system	•New capability; not now systematically stored by 1 FTE clerk	•Average 20 per week to catalog	•As needed; 50 times yearly	•Document; 50 characters	•1000+ yearly, accumulative	N/A	. List processing candidate

EXHIBIT IX-1(8)

INVENTORY OF PPC ADP INTERESTS

PPC COMPONENT AS INDICATED

ADP INTEREST	STATUS	INPUT FREQ. AND VOLUME	OUTPUT FREQ. AND VOLUME	RECORD UNIT AND LENGTH	NUMBER OF RECORDS	DATA BASE SIZE	SPECIAL CHARACTERISTICS
PPC COMPONENT -- PB/C:							
. CONGRESSIONAL NOTIFICATION TRACKING -- To improve ability to track CNs and generate reports by automating the process	. 370 used for CN recordkeeping only; bulk of process is manual	. As CNs occur; 550 per year	. Semi-annual reports and as needed	. Notifications; 100 characters; several hundred notifications per year	N/A	N/A	. Improvement effort implies analysis of PPC, LEG, Bureau procedures, and OYB interface
PPC COMPONENT -- EA/ILA:							
. DATA ANALYSIS -- For economic analysis and miscellaneous statistical applications	. Now use terminal to access statistical package	N/A	. As needed; 15 times yearly est.	N/A	N/A	N/A	

- Statistical and other analytical data manipulation -- There are currently four statistical packages on the IBM 370 including SAS, SPSS, BIOMED, and DYNAMO, and PPC staff expressed the need for easier access to these packages.

- Maintenance of data bases -- This interest was found mainly within PB and generally referred to maintenance of files in currently operational data processing systems.

The survey also identified two kinds of challenging technical issues (given AID's present system configuration) which emphasize the advantages of an integrated approach to information processing:

- The desire to share and exchange data both within the Bureau and among other AID/W components

- The need to combine textual data, such as text prepared on PPC word processing equipment, with data from data processing files in a single report.

These emerging interests will require new approaches and/or new technology, since they are not currently supported within PPC and are not addressed in a well-integrated manner by today's technology.

Some of the needs expressed by PPC staff also reflected concerns in the system management area. The following concerns were expressed repeatedly by PPC offices which have current data processing applications or are planning for future applications:

- Faster computer response time, especially during on-line data entry and processing

- Shorter lead-times for development of data processing applications

- An easier to use data base management system than INQUIRE.

These concerns have been the predominate driving factors of PPC's ADP interests.

2. A REQUIREMENTS ANALYSIS OF PPC'S ADP INTERESTS IS RECOMMENDED IN ANTICIPATION OF AN AGENCY-WIDE ADP STRATEGY

As stated in Chapter III and elaborated on in later sections of this chapter, a comprehensive strategy for addressing all of PPC's ADP interests cannot be formulated now because there is currently no Agency-wide ADP strategy. This circumstance will necessarily delay the development of a comprehensive PPC data processing strategy. Although the PPC strategy development must be delayed, PPC need not delay conducting the systems requirements analysis that is prerequisite to formulating an ADP strategy. Indeed, there would be an advantage for PPC in conducting its requirements analysis in advance of the development of an Agency-wide ADP strategy: less time would be necessary later to develop a PPC ADP strategy consistent with the Agency strategy.

In addition to providing PPC with a start in formulating its ADP strategy, results from the requirements analysis could also be used to design an interim strategy for meeting some of PPC's current data processing needs through a linkage of the OIS 140 and the AID computer. Such applications would also provide an opportunity to experiment with and learn to conduct portions of PPC ADP applications using the OIS workstations as data processing terminals. While it is not certain, the eventual ADP strategy may involve regular use of OIS workstations for ADP purposes.

While providing PPC with both of the benefits described above, this interim strategy would not preempt either the Agency-wide ADP strategy or PPC's options for its own subsequent strategy.

3. THE WANG OIS 140 IS VERSATILE AS A WORD PROCESSING SYSTEM, BUT HAS LIMITED DATA PROCESSING CAPABILITIES

The versatility of the Wang OIS as a word processing system was highlighted in previous chapters. The data processing capabilities of the OIS, as they relate to PPC applications, are discussed below.

(1) Data Input Via The OIS To Other Computer Systems is Technically Feasible Through Emulation In Both Batch And Interactive Modes

In the data input mode, a Wang OIS workstation can emulate, or imitate the functions of, an input device or computer terminal, allowing it to communicate directly with the AID mainframe computer. This communication occurs in both batch and interactive

modes. While the OIS workstation is in the batch data input mode of communication, data are transmitted from the workstation (terminal) to the computer without any intervening responses from the computer. Batch terminal capabilities support transmission of several types of batch data:

- Data files created on an OIS, e.g., files created by application programs
- Textual files created on an OIS, i.e., files containing word-processed text
- Job Control Language (JCL), the computer-specific language designed to initiate application jobs on the mainframe computer
- Source code files in various computer languages, i.e., computer programs.

Conversely, during interactive communications, an OIS workstation performs the function of an on-line computer terminal. The terminal functions which the OIS can also perform include the following:

- Inquiry, a request for information from stored data files
- Interactive transaction processing, a procedure in which an entry (transaction) from the terminal causes a particular action or result on the mainframe computer
- Data entry, particularly the process of entering data directly into data files.

With this combination of batch and interactive data entry capabilities, the OIS can duplicate the functions of most computer terminals.

(2) <u>Data Output From Other Computer Systems Can Be Received, Stored, And/Or Printed By The OIS</u>

In the data output mode, the OIS functions as a multi-purpose output device. Through its system disk(s) and printer(s), the OIS can store and print data which are received from other computer systems.

Data received from other systems is normally temporarily stored on disk by the OIS for subsequent processing or printing. With this capability, it may be possible to store data for a short period of time for manipulation, such as re-formatting, before printing.

The OIS can be equipped with a variety of print capabilities which will accommodate most user requirements for the production of printed reports, including the following:

- High-speed and low-speed printers
- Letter-quality and dot matrix type fonts
- Single-sheet and continuous form paper.

The Wang printers have speeds which range from a low of 40 characters per second (CPS) on the daisy printer to a high of 600 lines per minute (LPM) on the line printers. In an OIS to mainframe computer interface, the Wang printers can be augmented by an on-site mainframe line printer, which is being installed by SER/DM independently of the OIS.

Appropriate combinations of these print capabilities should meet all word processing and most data processing printing needs within PPC.

(3) Data Manipulation Functions On the OIS Can Be Accomplished Via the BASIC Language And Other Optional Software Features

The Wang OIS 140 has data manipulation capabilities through its various software features. The software features, which have been previously discussed in Chapter VI, include the sort, mathematics support package, glossary, list processing, and OIS BASIC.

Each of the data manipulation features can be initiated from an OIS workstation. Because processing takes place within each workstation and not in the OIS central processing unit, workstations can perform these tasks independently of each other.

4. THE WANG OIS CAN FULFILL ONLY A PORTION OF THE AID/PPC INTERESTS BY SERVING AS A DATA INPUT, DATA MANIPULATION, AND DATA OUTPUT DEVICE

An analysis of the capabilities of the OIS system in light of the PPC data processing interests led to the conclusion that the OIS capabilities fall short of accommodating all data processing interests within AID/PPC.

(1) The OIS Can Be Used By PPC As A Data Entry Terminal To The IBM 370 And Its Resident Systems Only After Certain Development Tasks Take Place

The capability of the OIS workstation to function as a data entry terminal has been discussed in the

previous section. This capability cannot be implemented by merely completing the installation of the workstation and the appropriate telecommunication software and hardware.

Before data entry operations can be performed on the OIS, a system development effort will be necessary. There are a number of technical, software-related tasks which must be completed on the IBM 370 and/or on the OIS. Some of these tasks may be performed concurrently and include the following:

- System generation (SYSGEN)
- Programming and testing of OIS
- Incorporation of translation tables or conversion programs for OIS-created files
- Development of new OIS operations/procedures.

A system generation operation (SYSGEN) must be performed from the mainframe in order to achieve the interconnect. During this process, the OIS workstations which will perform as data entry (or output) devices to the IBM 370, must be defined and named. The OIS must also be programmed and tested to incorporate any functions previously performed on the data processing terminals, including:

- Screen formatting
- Data edits handled by existing intelligent terminals.

Some of these terminal functions are special features of the existing data processing terminals currently used by PPC. Although the features can be duplicated on the OIS in some fashion, they may be cumbersome or difficult to implement on the OIS. An example of a special feature is the 132 character-wide screen on the Datagraphics terminal. This terminal, with its special wide screen, is used in certain applications within PPC, e.g., data entry for PBDS. There are two ways in which to duplicate this function on the OIS workstation, which has an 80 character-wide screen. The screen and data input form can be redesigned, or the horizontal scroll feature on the OIS can be utilized. This feature causes a line on the workstation screen to move from right to left and allows the user to view up to 158 characters per line.

Other development tasks on the OIS involve the transmission of document data on BASIC files from and to the OIS. Internal code translation tables may be necessary to enable the transmission of document data from and to the OIS. Document data contains special word processing control characters which are not recognized by computers and which are not standard among word processing vendors. These special characters must be translated or "stripped" from document data, depending on the external system which is communicating with the OIS.

Most data files created on the OIS cannot be directly transmitted to the mainframe, and will require some preparation for transmission, either through manual intervention or conversion by OIS software.

The necessity and extent of each of these tasks must be determined in a subsequent design study.

(2) Limited Data Manipulation Can Be Accomplished On The OIS, But Is Constrained By The System's Design

Although the OIS has a range of data manipulation functions, they are limited for data processing purposes by the basic design of the system. In addition, the sequential nature of the input/output architecture of the OIS can easily be overloaded by data processing demands.

Besides the limitations imposed by the architecture, none of the standard statistical packages currently used by PPC can be directly run on the OIS. However, all statistical packages which are resident on the mainframe can be initiated to run on the IBM 370 from any OIS workstation. Reports from these statistical packages can also be received and printed on the OIS printers, or on the independent line printer.

Although OIS BASIC is heavily promoted as a data processing feature, it has some inherent limitations. OIS BASIC does not handle large files or long records as efficiently as other languages. In addition, program design constraints imposed by the OIS architecture restrict the flexiblity of any OIS BASIC programs.

(3) Data Output From AID and Other Mainframe Systems To The OIS Must Be Selectively Chosen

Because output from other systems (such as the AID IBM computer) is generally spooled on the OIS

prior to printing and there is some limitation on disk space, the OIS is best suited for low-volume printing. (A second disk, to supplement the current configuration, may eventually be necessary.)

Moderate volumes of data can be received and temporarily stored for later manipulation on the OIS. File retention (the amount of time a file is retained on the system disk) must be controlled to avoid saturation of its storage capacity. Archiving of data files to remove un-used on-line data should be encouraged. File retention discipline and archiving will increase the availability of system disk space.

Large volumes of print data should not be routed through the Wang. Spooling of large volumes of data from the mainframe may quickly overload the system disk and may possibly cause degradation of other OIS functions which are concurrently operating on the OIS. This potential degradation was the major factor in SER/DM's decision to procure a 600 LPM printer to be available to PPC and other AID/W offices, which will allow for direct printing of large volume reports from the IBM 370 without utilizing the OIS.

5. THE RAPID EXCHANGE OF INFORMATION BETWEEN THE WANG OIS AND THE IBM 370 MAINFRAME WILL BE FACILITATED BY THE WANG TELECOMMUNICATIONS OPTIONS

The telecommunications capabilities on the Wang OIS 140 facilitate the timely and accurate flow of data between the OIS and the mainframe computer.

Emulation software will be installed on the OIS to enable batch and interactive communication between the OIS and the IBM 370. The Wang 2780/3780 emulation software will be installed for batch communication. The Wang 3270 emulation software will be used for interactive communication between the OIS and the mainframe. Once installation of these features is completed, utilizaton of the feature does not require a knowledge of complex teleprocessing concepts. The menu-driven communications software on the OIS minimize learning time and ensures efficient operation.

In addition to the software, specific telecommunications hardware is required to enable a point-to-point communication link between the Wang OIS 140 and the IBM 370.

The telecommunications software and hardware discussed here will not enable the OIS to OIS interface(s) envisioned for AID. The basis for this type of intra-site OIS system network is the Wang Inter-System Exchange (WISE), which is a combination of hardware and software, or WANGNET which is another type of local network. However, SER/DM is considering future installation of WISE or WANGNET on an Agency-wide basis.

6. ON BALANCE, THE OIS IS SIGNIFICANTLY LIMITED IN THE EXTENT TO WHICH IT CAN MEET PPC'S DATA PROCESSING NEEDS

The Wang to IBM 370 interface is technically feasible with the use of appropriate hardware and software discussed in the previous section. This interface has certain limited data processing uses, such as data entry and data output. However, a general analysis of the existing ADP applications has led the study team to conclude that is infeasible to attempt to move large ADP applications to the OIS from the IBM 370.

(1) Interfaces Currently Exist Between and Among IBM 370 Applications Which Prohibit Them From Being Singly Removed to the OIS

When viewed as stand-alone applications, some of the current PPC data processing systems appear to be suitable for the Wang. Closer investigation, however, reveals that there are existing interfaces between these applications and other mainframe applications. A prime example of a clear interface is the common boundaries among PBDS, CP, ABS, and OYB data. Under these circumstances, isolation of applications on the OIS will further complicate any interface between the IBM 370 and the OIS.

(2) Duplicating 370 Software is Inefficient and Cumbersome on the OIS

The OIS is rather versatile and has several capabilities that make it more than a word processing machine. The OIS, however, is not a computer and simply lacks the sufficient power and high level functions to accommodate large-scale applications efficiently. Furthermore, OIS BASIC is an inadequate substitute for higher-level, business oriented languages, such as COBOL or the INQUIRE user language. These languages do not have the same inherent limitations and can process large data files on various storage media.

(3) The Size/Structure of Some ADP Data Bases Will Strain the OIS System Resources, Particularly the OIS System Disk

It is apparent, after analyzing the limitations of the OIS, that system resources will be overtaxed by large data processing applications and their associated data files. The PBDS central file and its related sub-set of bureau files, for example, are too oversized and complicated for the OIS.

Before current applications are considered for Wang candidacy, the size and structure of the files must be reviewed for possible reduction and reorganization. Other potential areas for improvement to current systems are discussed later in this chapter.

(4) Simultaneous Processing of ADP Systems, Data Transmission, and Word Processing May Degrade OIS Resources

The constraints and limitations of the Wang OIS have been discussed in previous sections of this chapter. These limitations include the general architecture of the OIS, the system disk, and the OIS BASIC language. Although these limitations are not restrictive in a word processing environment, they are only exacerbated when data processing, data transmission, and word processing are simultaneously operating on the OIS.

(5) Any Current ADP Applications Being Considered for the OIS Must Be Reviewed in Terms of the Potential Areas for Improvement Which Have Been Identified

Although the scope of this study permitted only a general review of the characteristics of the current data processing applications, some potential areas for improvement have been identified for more thorough analysis in a future study. These include the following:

- File retention/archiving must be initiated or improved.

- Access methods/file structures must be analyzed. Currently, all PPC files are on-line, even though some are updated only semi-annually.

- Data redundancy exists across files, e.g. the PBDS Bureau Files and the Central File.

- Some files need to be redesigned, since there are many inactive data elements carried on these files.

Any inefficiencies which are found in an data processing application should be eliminated or mitigated before the application is considered for Wang candidacy.

7. PPC CAN BEGIN TO RESOLVE ITS DATA PROCESSING PROBLEMS BY PROCEEDING WITH FURTHER ANALYSIS OF ITS ADP INTERESTS

Although formulation of a long-term data processing strategy for PPC should only occur after an AID-wide strategy has been formulated, efforts could be undertaken by PPC at any time to prepare for this. The thrust of these preparatory efforts would be to analyze the Bureau's data processing needs in sufficient detail to permit specific definition of hardware and software requirements, given the context of an Agency-wide strategy for providing ADP services. In the event that the Agency-wide strategy is delayed significantly, this analysis could also serve as the basis for designing interim solutions to the Bureau's most pressing ADP problems. This concept of a separate requirements analysis based on identified ADP interests is consistent with the two-part study concept described in the work order that authorized the present study.

(1) PPC's Identified ADP Interests Would Form The Starting Point For The Requirements Analysis

The basis for the detailed analysis of PPC's data processing needs would be the general ADP interests identified in the present study (described previously in Exhibit IX-1). New interests, or applications otherwise not included in the ADP interests inventory, would also be examined in the requirements analysis.

The content of an ADP requirements analysis is fairly standard in the data processing field and is intended to define the following characteristics about prospective or existing ADP applications:

- The logical processing steps of the current application software or manual procedures (or envisioned procedures)

- The size and nature of inputs, outputs and files of the application

- The interfaces with other applications.

Based on this information and on information about the need for improvement in the current ADP arrangements, a specification of the system requirements is developed. Although the ADP interest inventory captured some of this information, it did not (and was not intended to) result in the level of detail achievable only through a requirements analysis study.

Ideally, the PPC requirements analysis would be conducted simultaneously with the Agency-wide ADP strategy study. This would permit the PPC study results to be utilized as partial input to the Agency-wide study, and would reduce PPC's wait for the essential Agency-wide approach to ADP services. Upon completion of the Agency strategy, it would be possible to formulate PPC's strategy in a manner that is consistent with the Agency plan.

(2) The Requirements Analysis May Provide The Basis For Interim Solutions To PPC ADP Needs

In the event that formulation of an Agency-wide ADP strategy is delayed, PPC could realize short-term (as well as an eventual long-term) benefits from the system requirements analysis. The analysis could provide the specifications for an interim solution to some of PPC's most pressing data processing needs while awaiting formulation of an Agency-wide strategy.

In order to utilize the findings of the requirements analysis to design interim ADP solutions, several tasks would need to be performed.

- PPC's applications would need to be ranked according to the greatest need for interim solution. Only the most pressing needs should be addressed on an interim basis.

- The feasibility of interim solutions for the prioritized ADP needs must be assessed. Some critical needs may not be feasible to address outside of the context of long-term change. Possible interim solutions could include: (1) changing how processing time/space is allocated on the AID central computer, or, (2) designing applications to run exclusively on the OIS. Interim solutions that would preempt longer-term solutions, for instance, acquisition of major hardware, would not be considered.

- Any supplemental analyses specifically for interim measures would need to be conducted, for example, study of the current operations of the AID computer in order to determine if there are ways of reorganizing its processing capacity. Also, it would be necessary to examine the ADP applications in other Bureaus as they interface with PPC applications. A change in one may necessitate a change in the other.

Finally, after prioritization and feasibility - assessment of the applications, a design would need to be developed for improving to be developed for improving the current applications on an interim basis. This would serve as the blueprint for detailed design and programming efforts.

UNIT COSTS OF OIS 140 EQUIPMENT CONFIGURATIONS*

Component	Unit Purchase Price	Unit Monthly Lease Price	Unit Monthly Maintenance Price
OIS 140 Model III CPU with 80.6 megabyte disk system	$24,900	$945.37	$340.92
64k workstation	4,067	169.32	33.96
64k archival workstation	5,197	203.35	59.12
40 cps daisy printer	5,358	163.42	53.72
Twinsheet feeder	1,660	52.50	23.02
List processing software	800	-	-
BASIC Software	940	-	-
Telecommunications (3271) software	2,075	-	-
3271 hardware	-	38.13	31.45
2780/3780 hardawre	2,324	88.81	31.45

*Costs provided by SER/DM reflect State-AID rates specified in the Wang Contract.

SYSTEM ADMINISTRATOR

The principal responsibilities of the system administrator are to:

- Identify, develop and distribute operational procedures under the technical guidance of SER/DM
- Revise (as necessary) the operational procedures
- Define and revise (as necessary) the system back-up policy
- Develop training strategy
- Monitor and assess training
- Determine and revise assignment of libraries
- Review glossaries for consistency with AID regulations
- Establish passwords
- Receive SER/DM bulletins
- Send copies of PPC-developed glossaries to SER/DM
- Participate in a group composed of office automation users, sponsored by SER/DM, to identify operational problems and solutions
- Distribute technical and procedural information throughout PPC
- Maintain knowledge of system operations and document applications
- Serve as the primary in-house expert on the use of the system
- Provide guidance to other PPC staff members on technical and procedural issues
- Place call to Wang for technical support if necessary
- Maintain inventory of installed equipment

- Critique new features and equipment as they become available

- Serve as advisor on equipment configuration modifications

- Help justify equipment changes

- Maintain equipment utilization statistics as required by SER/DM (e.g., operation logs that identify amount of time equipment is in use and the amount of output produced)

- Participate with SER/DM in operational reviews and post-implementation evaluations, as appropriate

- Advise PPC senior management of the status of office automation operations and the need for any corrective action.

ASSISTANT SYSTEM ADMINISTRATOR

The assistant system administrator serves as a back-up to the system administrator with emphasis on the following responsibilities:

- Maintain knowledge of system operations and document applications
- Serve as an in-house expert on the equipment operations of the system
- Provide guidance to equipment operators on technical and procedural issues.

In adddition, the principal responsibilities of the assistant system administrator are to:

- Schedule training and provide staff orientation
- Create and update the library assignments on the volummes of the disk
- Monitor the space utilization of the disks
- Notify operators to remove documents if space utilization is to high
- Bring system up and take it down daily
- Serve as advisor when equipment malfunctions
- Place service calls as necessary
- Maintain records of equipment problems, amount of downtime, responsiveness of service calls, and Wang service receipts
- Maintain equipment utilization statistics as required by SER/DM
- Maintain adequate levels of expendable supplies
- Order supplies as necessary
- Determine workstations not "in use" on request.

LEAD OPERATOR

In each office-level organizational unit, one person should be designated the lead operator. The objectives of this role are:

- Serve as the local expert on office-specific system applications and procedures
- Provide a central point of coordination within each office.

The person also works closely with the system administrator and the assistant system administration.

The principal responsibilities of the lead operator are to:

- Provide system orientation to office staff
- Recommend revisions to existing operational procedures to the assistant system administrator
- Check supply levels at work area
- Notify the assistant system administrator of supplies needed
- Determine equipment malfunctions
- Contact assistant system administrator to secure service
- Maintain knowledge of document applications and system operations
- Test new equipment
- Monitor the recording of system utilization statistics for the workstation
- Submit utilization statistics required by SER/DM to the assistant system administrator.

PROCEDURES

The following sections provide definition and some discussion of major operating procedures which need to be developed for the Wang OIS 140. This information may be used as the foundation for development of an OIS policy and procedure manual.

(1) Location of Equipment

This is a listing of each location, the equipment installed, and the system (port) number for each workstation and printer. The numbers for the printers are especially important because an operator can use them to direct a document to print at another location if desired.

(2) Scheduled Hours of Operation

The assistant system administrator routinely brings the system up and takes it down at specific times each day. The hours the system is available for use should be specified.

(3) Names and Overview of System Management and Operations Staff

This is a listing of staff and an overview of the responsibilities of each role:

- System administrator
- Assistant system administrator
- Lead operators
- Designated operators
- Other trained operators

This information establishes whom to contact for specific questions, comments, or tasks.

(4) Overview of Equipment Capabilities

This is a listing of the key features and functions the equipment provides to help the staff understand what can be done. Examples of key capabilities include:

- Largely on-line disk storage

- Ability to create a back-up (duplicate) copy of a document on diskette

- Expandable off-line storage
- Powerful editing
- Easy recall of stored repetitive text, formats, and instructions through glossaries
- Protection of documents from unauthorized access via assignment of passwords
- Shared access to designated documents
- Mathematic functions
- Hard copy printing
- Automatic paper feeding
- Creation, maintenance, and output of simple files
- Ability to sort (reorder) information alphabetically and numerically in ascending and descending order.

(5) Use of Document ID Numbers

The document ID number is the way the system easily retrieves a particular document. Therefore, it is important that the author and operators keep track of these numbers. To facilitate this tracking, the following steps should be taken:

- Develop a "Document Identification" form to transmit the ID number.
- Instruct the operators to attach the completed form to the document when it is typed and returned to the author.
- Instruct the author to return this form with the document when revisions are submitted.

Adherence to this procedure eliminates wasting operator time searching for the correct document.

(6) Content of Available Glossaries

Glossaries are created on the equipment to instantly retrieve commonly used words, phrases, and/or instructions. A list of glossaries available and a brief description of each should be provided. This list serves as a basis for processing work and a stimulus for identifying new glossary applications. Any

suggestions for new glossaries should be discussed with an operator so that development can take place.

(7) Standard Revision Marks

A list of standard revision marks helps create consistency throughout the Bureau and facilitates ease in understanding what revisions are desired. A sample list is provided in Exhibit C-1, following this page.

(8) Establishment of Document Priorities

The workstations in PPC will be shared by several operators. Occasions will arise when there is a conflict. When this occurs, there are two available choices:

- Attempt to use another office's equipment
- Make a document priority decision.

If the first choice is selected, the office's lead operator should call the EMS who can consult the assistant system administrator to quickly determine if any workstations are currently idle or turned off. EMS can then contact the lead operators for these workstations to determine the length of time the workstation may be available and make arrangements for use.

If an operator does not want to go to another location or another location's equipment is not available, a work priority decision must be made by the lead operator, in consultation with the office director or his/her designee if needed.

(9) Library Availability

Each office and division within an office is assigned a specific library for the on-line creation and storage of documents. Other libraries should not be used without system administrator approval.

(10) Library Maintenance

Libraries are designed to keep active documents on-line and accessible. Each operator should either delete or file to diskette any document that is not active.

(11) Guidance For Filing Documents To Diskette

When a document is filed to diskette, it no longer exists in the library. However, it can be retrieved at any time. Any document that has not been

EXHIBIT C-1

STANDARD REVISION MARKS

SYMBOL	DEFINITION
ital	set in italic
bf	set in boldface
—	hyphen
∨	superscript or superior (as in πr^2)
∧	subscript or inferior (as in H_2O)
∧ or ∨	centered (for a centered dot in)
∧,∧	comma
∨'∨	apostrophe
⊙	period
; or ;/	semicolon
: or ⊙	colon
∨"∨	quotation marks
(/)	parentheses
⊏/⊐	brackets
ok/?	query to author: has this been set as intended?
⊔	move up or move down
no ¶	no paragraph
⊐ ⊏	centered matter
cap + lc	capitalize first; lower case remainder

MISSILES AND SPACE

EXHIBIT C-1(2)

STANDARD REVISION MARKS

SYMBOL	DEFINITION
⌇ or ⌇ or ⌇	delete; take it out
⁀	close up; print as one word
⁀	delete and close up
^ or > or <	caret; insert here something
#	insert a space
eq #	space evenly where indicated
stet	let marked text stand as set
∽	transpose, change order the
/	used to separate two or more marks and often as a concluding stroke at the end of an insertion
⊏	set farther to the left
⊐	set farther to the right
═	straighten alignment
‖ ‖	straighten or align
⊗	imperfect or broken character
□	indent or insert em quad space
¶	begin a new paragraph
sp	spell out -- 5 lbs. as five pounds
cap	set in capitals (CAPITALS)
sm cap or S.C.	set in small capitals (SMALL CAPITALS)
lc	set in lowercase (lowercase)

accessed or printed in the past two weeks should be filed to diskette.

When a new document is created, a "Document Summary" screen appears. Operators should always complete the following entries:

- Document Name
- Operator
- Author.

Every two weeks, the lead operators should request that each designated operator print a list of documents processed on his or her workstation. The date the document was created, last revised, or last printed will appear on the list. Check with the author to determine if any documents not accessed in the last two weeks can be deleted. If deletion is not approved, file the document to diskette to make space available in the library.

The assistant system administrator monitors the status of on-line storage weekly. If the percentage of disk utilization is high, lead operators are asked to file documents to diskette. In this case, the office director's, or his/her designee's, discretion must be used to determine which documents should be removed from the libraries and stored on diskette.

(12) Back-up Policy

All documents are created and stored automatically in a library on the system disk. However, some important documents should be copied (back-up) onto diskette. When documents are copied, they exist in two places, on the disk and on the diskette. If the system should go down, the diskette could be taken to another system or standalone unit to process the document.

The following criteria should be used to determine whether a document should be backed-up:

- Document length over ten pages
- Document being prepared to go outside PPC
- Request for back-up from author.

If a back-up copy of a document exists, each time the document is revised the new version should replace the old version on the same diskette.

(13) Care of Diskettes

Diskettes have valuable data recorded on them. The following tips help avoid damaging them:

- Do not expose to sunlight or heat.
- Store in their jackets or envelopes.
- Do not touch the exposed areas.
- Keep magnets far away.

Other tips are available from Wang.

(14) Glossary Origination

Operators create new glossaries as suggestions are made or needs are addressed. When this occurs, the description of the glossary content and use should be sent immediately to the system administrator, who is responsible for the distribution of technical information throughout the Bureau. The information about the new glossaries is then circulated so that all operators can benefit. A copy is also sent to SER/DM for possible circulation throughout AID.

(15) Circulation of System Update Information

Periodically, Wang provides system update information. In addition, technical (e.g., new glossary) and procedural updates are generated within PPC. The system administrator is responsible for distributing this information. Any shortcuts or useful information discovered should be given to the system administrator for distribution.

(16) Circulation of SER/DM System Bulletins

SER/DM issues periodic bulletins to offices with Wang equipment to convey useful information. The system administrator circulates this information within PPC if it directly applies to the document preparation functions being performed.

(17) Supply Acquisition

The maintenance of adequate supply levels for PPC is the responsibility of the assistant system administrator. Requests for supplies should go to the office's lead operator who forwards the request to the assistant.

(18) Technical Support Acquisition

The system administrator and assistant system administrator are the in-house experts on the use of the equipment. Requests for technical support should go to them. If they are unable to provide assistance, the Wang customer support person is called and if necessary, an appointment for technical assistance is scheduled.

(19) Maintenance Support Acquisition

The assistant system administrator is the in-house advisor when equipment malfunctions. Requests for maintenance support should go to this person. If a malfunction is determined, the Wang customer service representative is called in to make the repair.

(20) Scheduling Follow-on Training

All operators are initially trained on the basic word processing and glossary functions. Depending on need, selected operators also receive advanced function training. Operators should periodically check the equipment capabilities list to determine if they could benefit from the use of any advanced functions. If so, consult the assistant system administrator to schedule the desired training.

Since Wang periodically upgrades its software, PPC may add new equipment and the system administrator may recommend additional training for operators to PPC management.

(21) Recording Equipment Utilization Statistics

A log should be designed to accumulate utilization figures. Utilization figures are kept for all word processing units, including any equipment PPC maintains in addition to the OIS workstations. This log can also serve as a means of reserving equipment. The lead operator monitors the log to make sure all equipment use is recorded. The entries in the log should follow SER/DM guidelines which include:

- Name of person typing
- Office of person typing
- Amount of time workstation used
- Number of original or revision pages produced.

The lead operators send the previous week's logs for their office's equipment each Monday to the assistant system administrator who maintains utilization statistics for each workstation. These reports are regularly reviewed by the system administrator prior to submission to SER/DM to assess performance, make needed adjustment and identify significant operational problems as early as possible.

TRAINING

The OIS training manual for PPC could be divided into three major chapters:

- General Information
- Procedures
- Equipment Operating Instructions.

The sample of the possible content of these chapters is outlined in Exhibit D-1, on the following two pages. Chapter II of this training manual includes the same information as the procedures manual each staff member is given as a system reference guide. In addition, Chapter II contains references to equipment operating instructions when necessary to perform a function. Chapter III, Equipment Operating Instructions, includes references to:

- Wang OIS Operators Guide (Version 2H, October 1980)

- Wang supplemental manuals

- Exercises developed by PPC showing the use of the operating instructions in performing daily functions.

Once the training manual is developed, it becomes the foundation for training both system users and operators. Chapters I and II of the manual contain the information that should be presented during the orientation sessions to all system users to introduce the system. Each staff member should leave the orientation session with a copy of the PPC procedures manual, which specifies the topics also included in Chapters I and II of the training manual. These orientation sessions provide all the necessary information for the system users.

However, those staff members who are either designated operators or plan to use the equipment directly require additional information. These trainees should use the training manual in conjunction with the equipment to develop the desired skills.

As trainees progress through the training manual, they are expected to read Chapters I and II. Although the information in these chapters is the same data that should be presented to the entire PPC staff during orientation sessions and is included in the procedures manual, it is

important to read these chapters to learn the equipment operating instructions necessary to perform specified procedural functions. Chapter III requires them to read the chapters of the Wang manual, perform the exercises included in the chapters, and then perform the supplemental PPC-specific exercises. Proper use of Chapter III requires tailoring to address specific operator needs and the availability of a trainer (e.g., the assistant system adminisrator or a lead operator) to monitor progress, answer questions, and review concepts.

EXHIBIT D-1

Outline of OIS Training Manual

I. GENERAL INFORMATION

1. Objectives of the system
2. Overview of equipment capabilities
3. Objectives of the training manual

II. PROCEDURES

1. Location of the equipment
2. Scheduled hours of operation
3. Names and responsibilites of equipment trained staff
4. Establishment of document priorities
5. Use of document ID numbers
6. Standard revision marks
7. Glossaries
   - Content of those available
   - Origination
8. Libraries
   - Availability
   - Maintenance
9. Diskettes
   - Back-up policy
   - Guidance for filing documents
   - Care
10. Support Acquisition
    - Supplies
    - Technical
    - Maintenance
11. Circulation of System Information
    - Updates
    - SER/DM bulletins
12. Scheduling on-going training
13. Recording equipment utilization statistics

III. EQUIPMENT OPERATING INSTRUCTIONS

1. Basic Concepts
   . Wang OIS Operator Guide
     - Chapter 1--A Wang Office Information System (OIS)
     - Chapter 2--System Description
     - Chapter 3--Basic Instructions
     - Chapter 4--Word Processing
     - Chapter 5--Creating a Sample Letter
     - Chapter 6--Create, Print, and Edit a Memo

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- Chapter 7--Create, Print, and Edit a Letter
- Chapter 8--Create, Print and Print a Four-Page Brochure

. PPC Exercises

2. Printing and Special Operational Feature Concepts
   . Wang OIS Operator Guide
     - Chapter 9--Printer Playout
     - Chapter 10--Special Print Functions
     - Chapter 16--Special Operational Features
   . PPC Exercises

3. Diskette and Indexing Concepts
   . Wang OIS Operator Guide
     - Chapter 11--Document Filing (Archival)
     - Chapter 12--Document Index
   . PPC Exercises

4. Advanced Concepts
   . Wang OIS Operator Guide
     - Chapter 14--Utilities
     - Chapter 15--Glossary Functions
   . Supplemental Manuals
     - Glossary
     - Mathematic Support Package
     - System Security
     - List Processing
     - Document Merge
   . PPC Exercises

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