

Corporate
Disaster Recovery
Planning Project

Prepared for:

Disaster Recovery Department

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Table of Contents

Topics:	Page:
A. Management Overview	4
1. Definition and Scope.....	5
2. Project History.	6
3. Tasks remaining to be accomplished.	7
B. Disaster Recovery Environment	9
1. Contingency Operations Planning (COP) Overview.	9
2. Shared Resources and Communications.....	13
3. Communications Switch.	15
C. Current Capacity and Resource Requirements.....	16
1. Production Systems.....	16
2. Development Systems.....	16
3. Shared Resource requirements.....	17
4. Roseland - Contingency Operations Planning.	18
5. The Recovery Facility.	19
C. LAN Component Management.	22
D. Development and Maintenance Cycle.	24
1. Mainframe Development	25
2. Roseland Development.	27
3. Custom Code Development and Maintenance Cycle.....	28
4. General Development improvements.....	29
E. Component Controls.	30

Table of Contents

Figures:	Page:
Figure 1 - Contingency Teams.	8
Figure 2 - Contingency Operations Planning (COP) Disaster Recovery Environment.	11
Figure 3 - Roseland - Contingency Operations Planning.	12
Figure 4 - Shared Resources.	14
Figure 5 - The Communications Switch.	15
Figure 6 - Source Code Repository.	18
Figure 7 - The Recovery Environment.	21
Figure 8 - LAN Component Management.	23
Figure 9 - Development and Maintenance Cycles.	24
Figure 10 - The Development Cycle.	26
Figure 11 - Components and Controls.	31

Disaster Recovery Requirements and Management Planning Document for: ADP Roseland facility

A. Management Overview

This **project** was commissioned to create a Disaster Recovery Plan to support mission critical operations at a secondary location, should the Roseland facility be inaccessible due to a disaster event.

Accomplished activities and accumulated information have provided an insight into the extent of **activities to be performed** and their importance.

The purpose of this **document** is to:

- review accomplishments,
- outline identified project objectives yet to be accomplished,
- and gain management concurrence before going forward.

1. Definition and Scope.

- a. **Develop a Contingency Operations Plan (COP)** to **recover** mission critical Roseland applications and support services located to a pre-defined Contingency Recovery Facility.
- b. **Identify Critical Applications and Resources** needed to sustain recovery operations.
- c. **Select and Contract** a **Contingency Recovery Facility** capable of supporting ADP mission critical applications and support services.
- d. Create a **Disaster Recovery Organization** consisting of Disaster Recovery Teams assigned specific responsibilities associated with recovering mission critical applications and support services.
- e. Provide Disaster Recovery **Awareness Training**, as needed to support recovery operations.
- f. Include the **Treasury LAN** within this study as a prototype for further LAN COP plans.
- g. **Work Stations** are not included within this study, but a statement from Josh Weston (CEO of ADP) requesting that Work Stations be recoverable has expanded the requirements for COP planning.
- h. Determine which Work Stations should be placed onto the **Emergency Power** Grid and supplied with **Secondary Communications** Channels.

2. Project History.

- a. This project **started in late May** of this year and is scheduled for completion in September of 1993.
- b. To date, **over forty interviews** have been conducted with various members of the ADP organization from upper management to first line managers and their supporting staff.
- c. From these interviews, research data, and the questionnaires that were completed by selected staff members, a **picture of the Roseland operating environment** (hardware, software and supporting functions) was defined.
- d. **Mission Critical Applications and Support Functions were determined** and a list of staff members responsible for supporting the requirements of these applications and functions was developed.
- e. **The next steps** in this project are to assist departments within the ADPHQ in **updating functional and operational procedures** already in existence and creating operating procedures where none exist. These procedures will include COP plans for disaster situations.
- f. Create a **Disaster Recovery Organization**.
- g. Formulate **Disaster Recovery Teams** and assign specific recovery functions to team members.
- h. **Develop Disaster Recovery Plans** through interactions with Disaster Recovery Teams.
- i. **Test Disaster Recovery Plans** until successful.
- j. Implement a Disaster Recovery **Plan maintenance and distribution** process.
- k. Insure that a **working COP plan** for all departments has been accomplished, whereby ADP could recreate the production environment and keep business critical functions running at a remote location.

3. Tasks remaining to be accomplished.

- a. After management approval of the detailed requirements within this document, a **kickoff presentation** will be provided, during which:
 - teams will be established,
 - requirements reviewed, and
 - task lists distributed.
- b. At that time, regular meetings will be scheduled with team members and assistance will be provided to help start the development of the **individual COP plans for Corporate Headquarters**.
- c. A **contingency organizational structure** will be created and mechanisms defined for quickly identifying disaster events, so that only required **Disaster Recovery Team(s)** are activated.
- d. **Recovery Plans** will be finalized and entered into the automated Disaster Recovery product being utilized by COP.
- e. The **plans will then be tested** on paper via ad-hoc scenarios, then unit tested, and finally system tested before the actual Hotsite Test, scheduled for January 1994.
- f. Details of the recovery process will be documented within a **Disaster Recovery Manual**, which will contain:
 - Disaster Identification and Declaration procedure,
 - Disaster Team activation procedure,
 - Disaster Recovery procedures for each Team and Event,
 - Recovery Operations and Support procedures,
 - Procedures to follow when returning to the Roseland Facility,
 - Post Disaster Review procedures,
 - Disaster Recovery Maintenance and Support procedures.
- g. Personnel will become aware of Disaster Recovery procedures through the creation of recovery plans, recovery testing, and **training** classes.

Figure 1 - Contingency Teams.

Contingency Teams		
Team:	Purpose:	Members:
Executive	Corporate Support and Emergency Decision Making	ADP Executives Public Relations
Emergency Response	Safety of People and Securing Building to minimize damage	ADP Security
Logistics	Off-Site Storage of Vital Records and Materials, Movement of materials to recovery site	Operations, Off-Site Storage Vendor
Processing Operations	Facilities, Operations and Critical Application Support	Operations
Input Operations	Input Requirements, Set-up, Scheduling, Client Services	Operations, Client Svcs.
Output Operations	Break-down, Balancing, Report Review	Operations
Traffic Operations	Forwarding Production output to Clients, Statements	Operations
Telecommunications	Communications support for Voice and Data	Communications
Critical Applications	Each Critical Mainframe Application, Support Group and Critical Development System has own team	Application and Group Teams
Server / LAN	Critical Servers and LAN's support	Server / LAN Teams
Salvage and Recovery	Salvage and recover disaster site	ADP and Insurance Co.

B. Disaster Recovery Environment .

1. Contingency Operations Planning (COP) Overview.

- a. The initial goal of Contingency Operations Planning is to **define the Disaster Recovery Environment** that will be restored to a remote Hotsite in case of disaster declaration.
- b. Figure 2 depicts, in global terms, the **Roseland Corporate Headquarters** production environment that must be recovered and the Recovery Facility.
- c. The **Critical Applications** have been defined as:
 - those running in the MVS Production LPAR3 and CARMS LPAR5 within the **IBM 9121/732** mainframe
 - and the Financial Guest system running under VM/VSE in LPAR1 on the **Hitachi GX/420**.
- d. Aside from critical applications within the LPAR's listed above, the following **Support Functions** have also been defined as being critical:
 - Central Stats
 - InfoMan
 - NetMan
 - Development Support for National Account Custom Code
 - Day to day production Region Support
 - Treasury LAN in Delaware and a LAN in Roseland.

- **Central Stats** has been included because of its ability to report on technical and business related information and as a trouble shooting aide. There is also a recommendation further on in this document intended to enhance the synchronization of the regions.

- **InfoMan** is used to report and track problems from the field and is seen as a critical support function.

- **NetMan** tracks inventory and aside from the business need, will be useful in case of declaration. The inclusion of a Criticality Field within this product will allow for the isolation and reporting of location resources, by criticality level. This information will prove

invaluable when planning for and readjusting resources (i.e., what's critical at a location, or what resources can be used in support of critical operations away from the location).

- **Development of Custom Code** is supported by a relatively small group as compared with full application development and can easily be accommodated. This group is also necessary to maintain the companies largest clients, and therefore has been added to this project.

- **Day to day production** support is seen as a critical function but cannot be directly recovered at this time due to flaws in source management. The ability to provide continued support to the field will be addressed by way of a procedure that will quickly allow for support while the disaster recovery procedures are being put in place. The creation of Source Code Repositories for LAN and Mainframe programs will provide additional safety for the Source Code and allow for a more controlled environment where Component and Release Management principals are adhered to.

- **LAN recovery** for one LAN at Roseland and the Treasury LAN located in Delaware is also part of this project and is detailed in this document.

- e. The **Critical Development Systems** have not been defined as yet, but their definition and inclusion within the Disaster Recovery environment is expected to be accomplished when the Disaster Recovery Team associated with these systems defines their needs and requests recovery services.
- f. **Recovery Support for Regions** may be considered as a Critical need and the resources needed to support this function added to the recovery requirement, as deemed necessary by management.

Figure 2 - Contingency Operations Planning (COP) Disaster Recovery Environment.

The following exhibit illustrates the extent of **environmental research** that Contingency Operations Planning (COP) must perform to insure that sufficient resources are available at a recovery facility to support Critical .Businesss Operations.

Beyond resource planning, COP must provide procedures for:

- Identifying disaster situations and Declaring disasters.
- Activating recovery / salvage actions.
- Processing Critical Applications at the Recovery Facility.
- Initiating Insurance processes.
- Returning the business to normal operations.

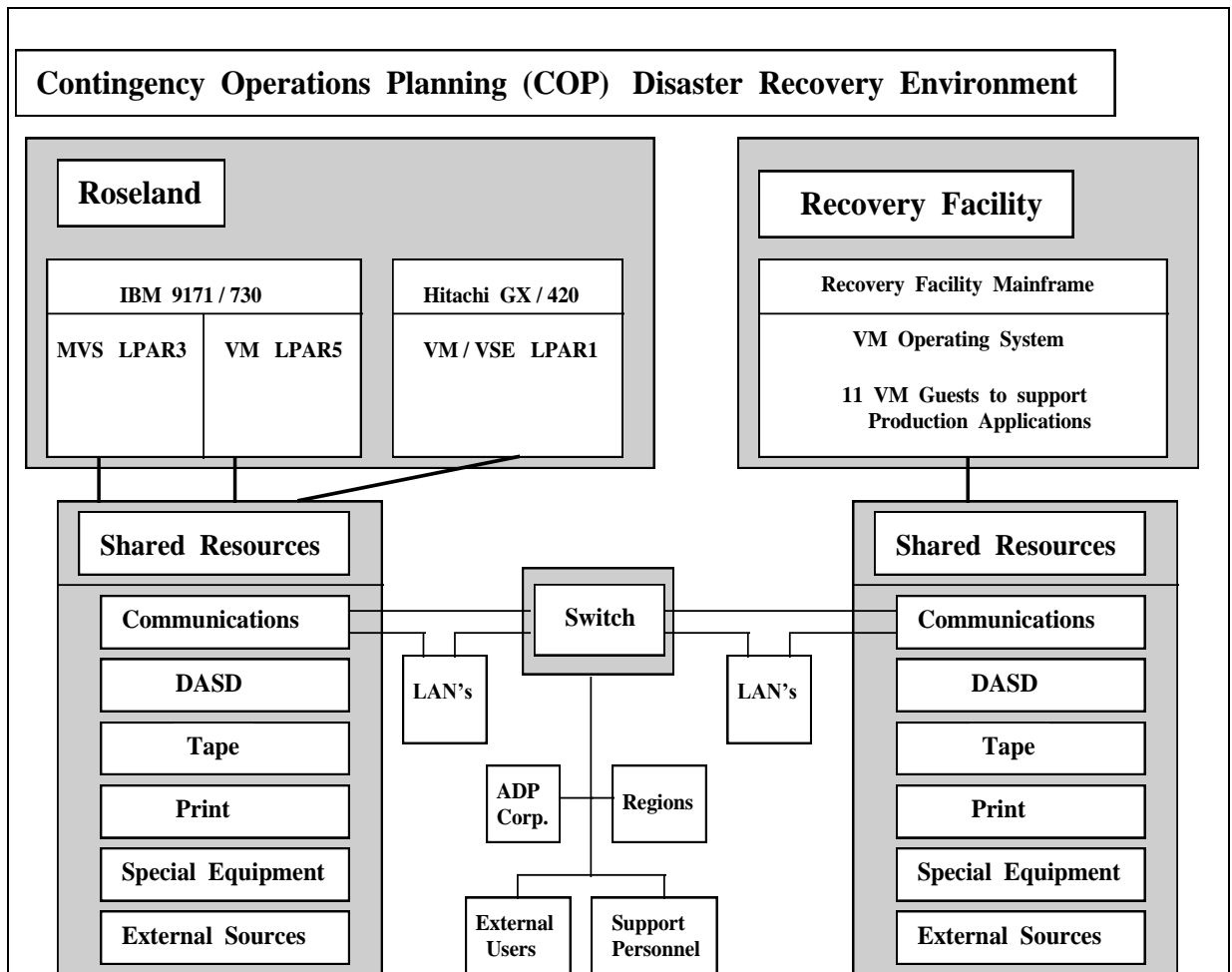
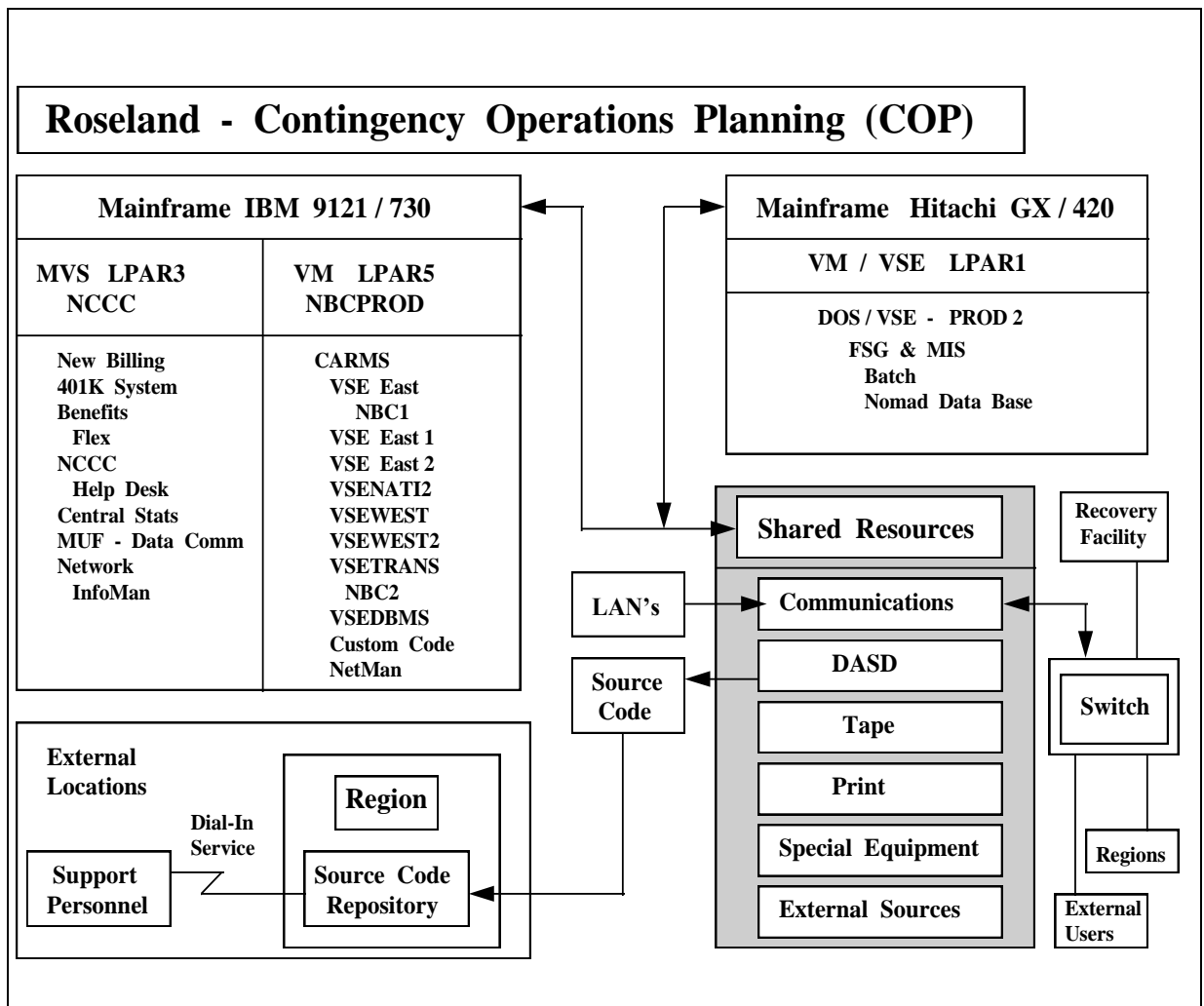


Figure 3 - Roseland - Contingency Operations Planning.

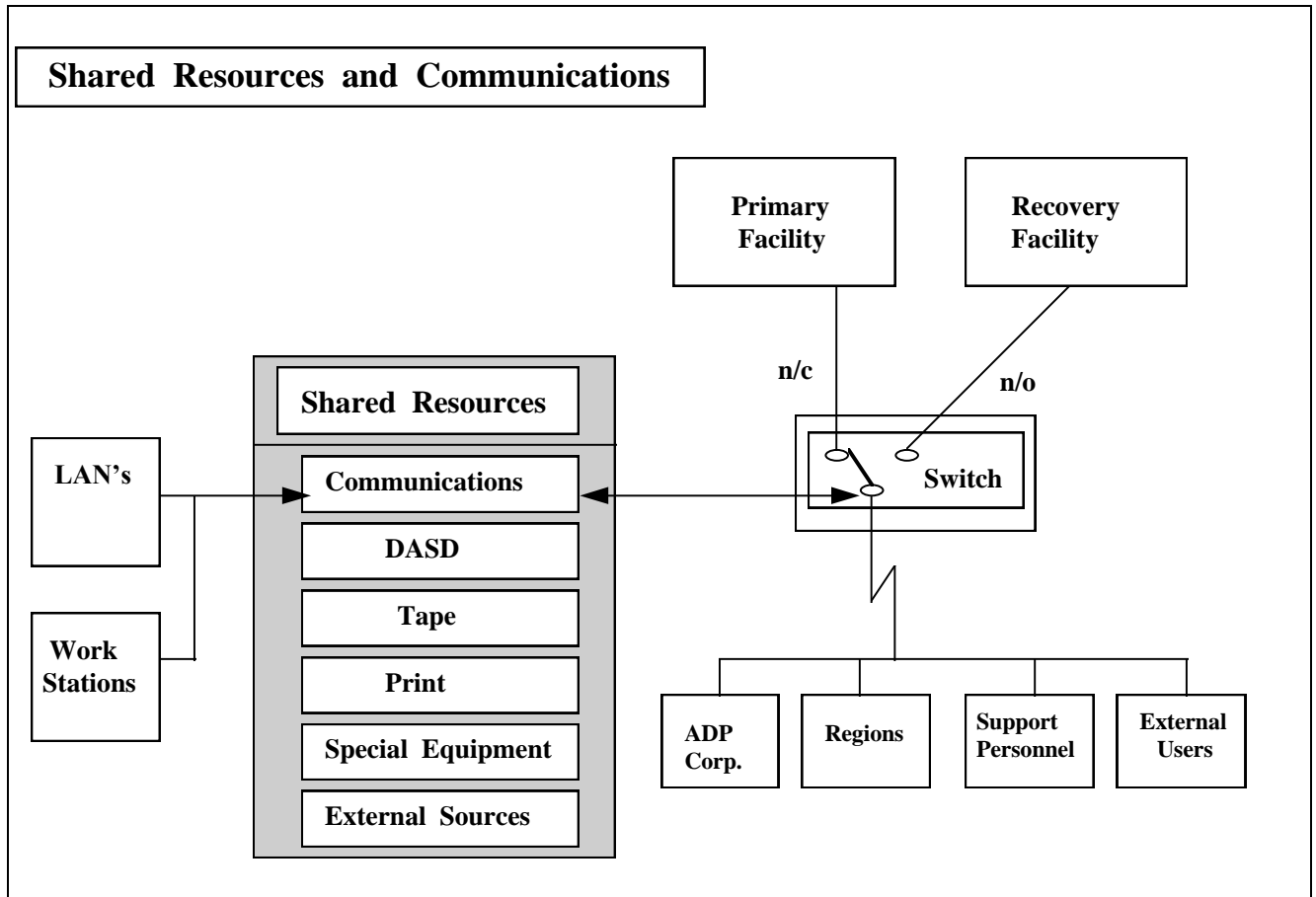
The Roseland Critical Applications and Support Functions that must be recovered are illustrated within Figure 3.



2. Shared Resources and Communications.

- a. All **Shared Resources and Communications** feeds that support critical systems (as defined earlier within this document) will be reviewed and integrated along with the Critical Applications, Support Functions and Development Systems to insure the completeness of the recovery environment.
- b. Although most statistics for Shared Resources and Communications have been defined, a **detailed analysis** of the resources required to support recovery operations must still be conducted.
- c. This detailed study will be performed by the established **Disaster Recovery Teams** who are most familiar with the Critical functions and resources.
- d. By following this technique, it will be possible to **Train and Familiarize** ADP personnel with Disaster Recovery requirements, so that current and on-going resource statistics for Critical Applications and Services can be accumulated and maintained.
- e. As **changes and additions** are made to critical applications and services, a mechanism must be utilized to update recovery plans.
- f. Integration of recovery information updates with Change Management is therefore a primary requirement for **maintaining Recovery Plans** in a current and accurate condition.

Figure 4 - Shared Resources.

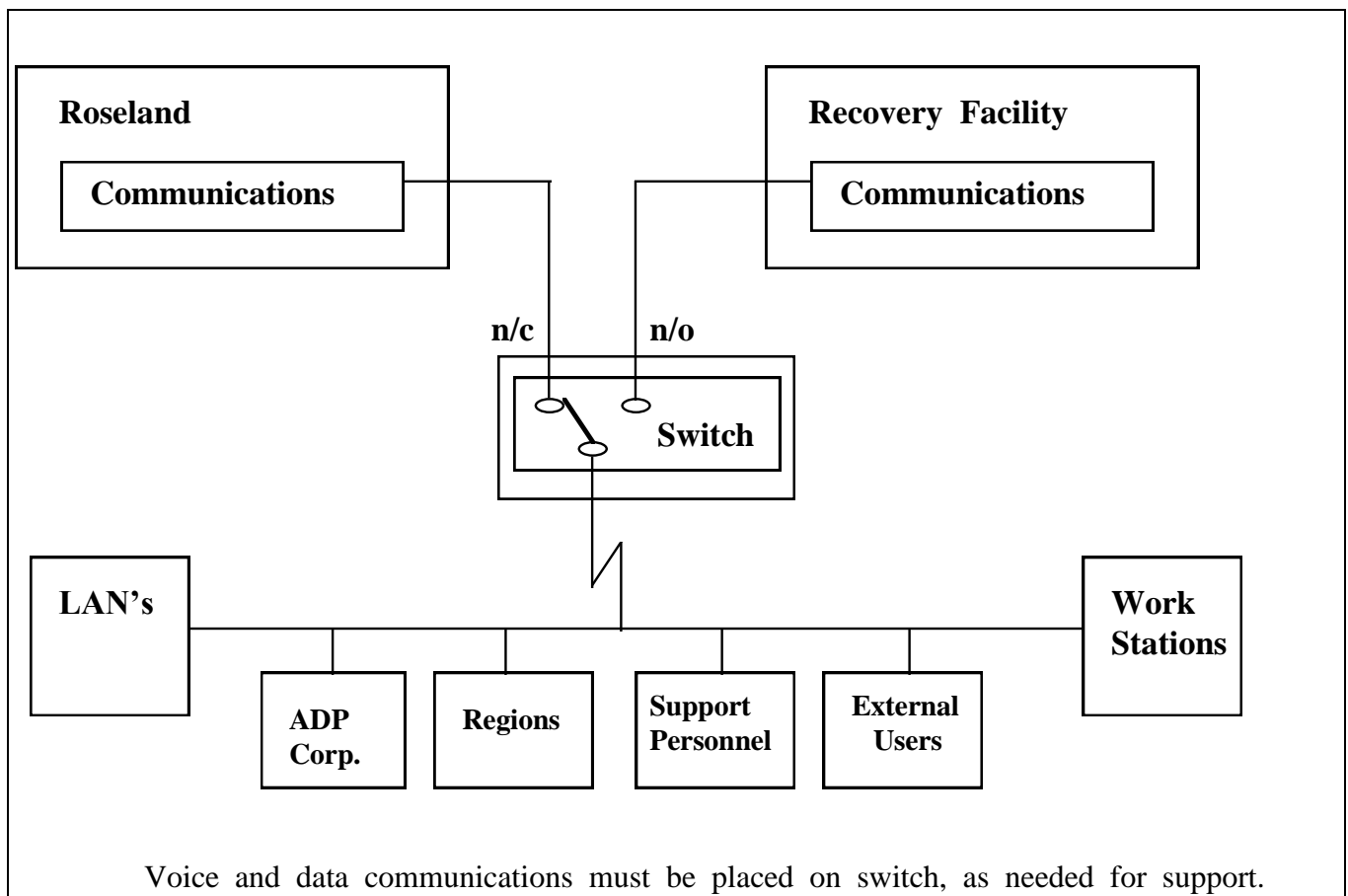


The range of shared resources that must be identified and recovery actions planned for is illustrated within the above exhibit.

3. Communications Switch.

- a. A **Communications Switch** to automatically reroute external users from the Roseland Facility to the Recovery Facility must still be defined and implemented.
- b. This task will be performed by the **Operations Communications Team** who will be responsible for defining all critical communications needs and for implementing the communications circuits needed to support critical external users (Data and Voice requirements must be included within the recovery plan).

Figure 5 - The Communications Switch.



C. Current Capacity and Resource Requirements.

The following charts itemize the **current capacity requirements** for the Critical Applications, Support Functions, and Development Systems contained within the Production and Development Environments at the Roseland Headquarters Facility.

1. Production Systems.

The resources listed here are the **minimum resources needed** to support Production and Support recovery requirements.

<u>LPAR/System</u>	<u>MIPS</u>	<u>DASD</u>
LPAR3 (MVS)	30.0	90 - 110 G
LPAR5(CARMS)	8.0	60 - 70 G
LPAR1(FIN/MIS)	3.5	5 - 25 G
NetMan	2.0	5 G
InfoMan	3.0	5 G
Custom Code	3.0	10 G
Region Hotsite support	15.0	70 G
-	-----	-----
	64.5	245 - 295 G bytes

2. Development Systems.

General DASD Requirements	735 G
Regional Hot Site Testing	106G
MVS Conversion	310G
Supporting 700 Programmers and 50 Support personnel	
35 - 40 LANs for Development	

	1,129G bytes

<u>Grand Total</u>	<u>1,324G bytes</u>

3. Shared Resource requirements.

Although most of the information needed to define Shared Resource requirements to support Recovery Operations has been obtained through interviews and research, the **following remains to be accomplished.**

- a. A detailed break-down of these components must be finalized through the various **Disaster Recovery Teams.**
- b. Total requirements must be accumulated by the **Operations Recovery Team** (Facilities Management and Application Scheduling).
- c. Required resources must be provided by **Recovery Facility** as stated within **Recovery Contract.**

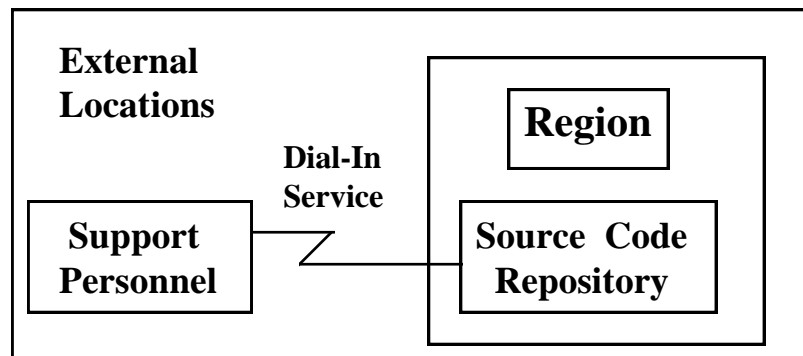
4. Roseland - Contingency Operations Planning.

a. The **Roseland COP environment** is described in Figure 3, which includes the details associated with:

- Critical Applications and Support Functions,
- the mainframes they reside on,
- the LPAR's that are used to support their operation,
- Regions supported by Roseland,
- External Users connected to Roseland,
- Shared Resources,
- Communications Switch to reroute communications from Roseland to the Recovery Facility.

b. Included within this diagram is a suggested methodology for **providing continuous support** for Regional Production problems.

Figure 6 - Source Code Repository.



In order to maintain continuous support to the Regions for day-to-day problems, it is required that at least one Region (in addition to Roseland) be designated as a **Source Code Repository** in which all Source Code for Critical Applications can be obtained via authorized Support Personnel.

These individuals would be responsible for retrieving Source Code for damaged, or lost, program modules, compiling and transmitting repaired program modules to Regions experiencing **Code Related Problems**.

The **secondary Repository** will allow for continued Region support in the event of a Roseland disaster.

5. The Recovery Facility.

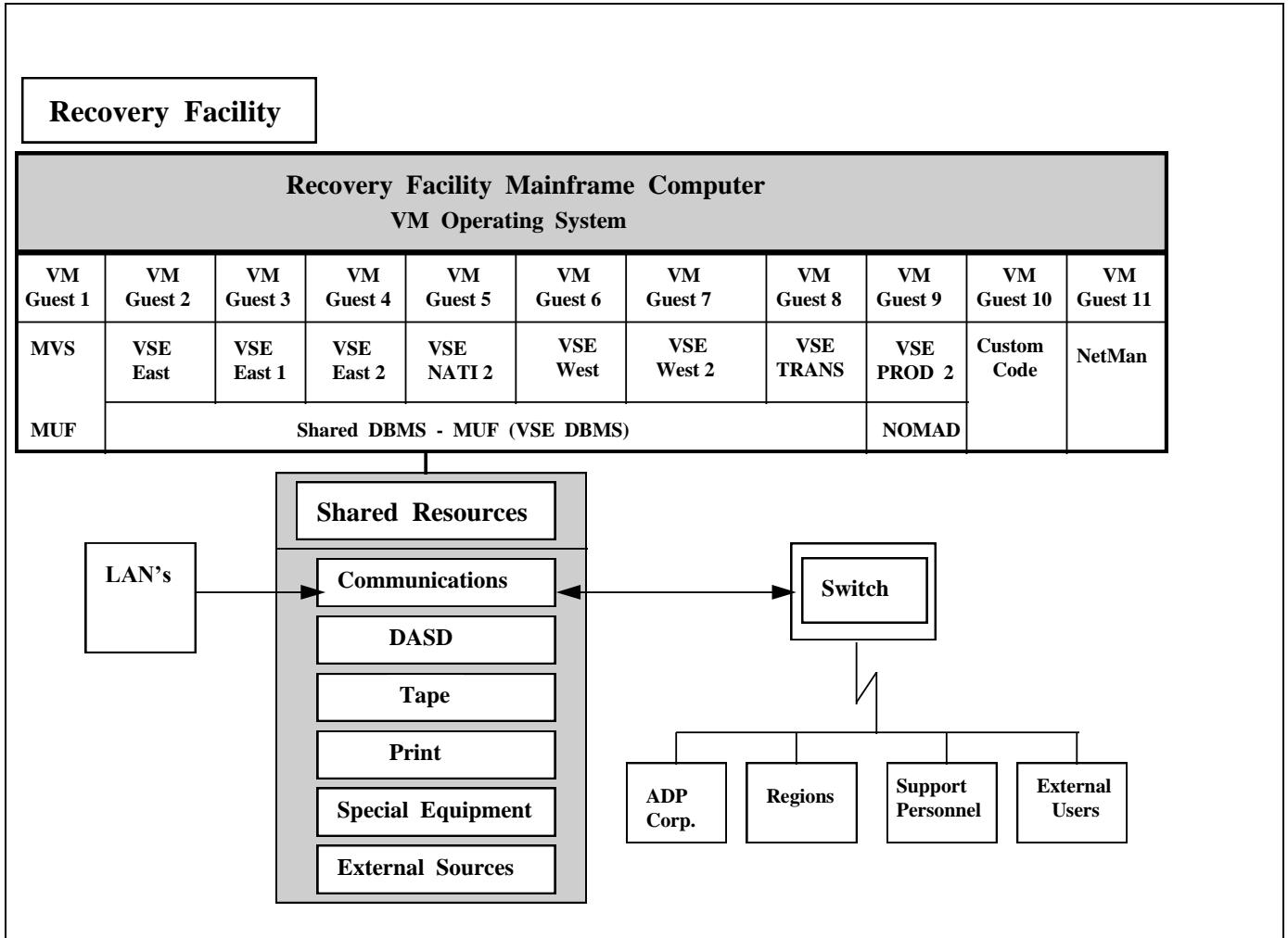
- a. This planned configuration utilizes the **VM Operating System** with Critical Application Operating Systems under its control (see Figure 7).
- b. By utilizing the VM Operating System, it is **not necessary to alter the Critical Applications** to process under a different operating environment than what they are presently being serviced by.
- c. The virtual environment of **VM will simulate the operating environments** of MVS and DOS/VSE, which are presently utilized at Roseland.
- d. Because of the uniqueness of the VM Operating environment, **some additional tasks must be performed** to support critical application processing at the Recovery Facility. These tasks are:
 - MVS must be added as a Guest.
 - Chet Monroe's VM Exec must be altered to identify all DASD addresses at the Roseland facility associated with critical applications running on the IBM 9121 / 732 VM LPAR5 and the Hitachi GX / 420 LPAR1 and to then perform back-up and restore operations for the critical applications associated with these LPAR's. This procedure must be added to the recovery procedure used to bring-up the Recovery Facility.
 - A similar facility must be implemented for the MVS environment running LPAR3. A Rescue Pack(s) could be utilized to support this function. This pack would be restored first and it would contain all the JCL needed to restore all of the critical applications and DASD resources needed to support these applications.
- e. Currently, the **Recovery Facility is equipped with a 3090-600J and an IBM ES9000 mainframe**. ADP is contracting for use of the ES9000 mainframe for Recovery Operations of Roseland Production, while the 3090-600J is planned to be utilized for Application Development Support (which is outside of the scope of this specific project).
- f. The Recovery Facility has a **TeraByte of DASD storage space available**, which is more than sufficient to support the needs associated with recovery of Roseland Production environment

(DASD projections were previously stated at from 245-295 G, but an additional 70 Gbytes of DASD is needed for Production CMS Users and for the rest of MIS).

- g. An August 9, 1993 memo from the DASD Manager to Lance Hurley stated DASD resource requirements for Production at 368 Gbytes and for Development an additional 713 Gbytes would be required. If these numbers are to be utilized, then the **Hot Site DASD capacity** would not be sufficient to support ADP needs.

- h. Because of these differences, **action should be taken to finalize the exact DASD resource requirements** associated with ADP Recovery requirements (the Operations Facilities Disaster Recovery Team should be responsible for obtaining this information).

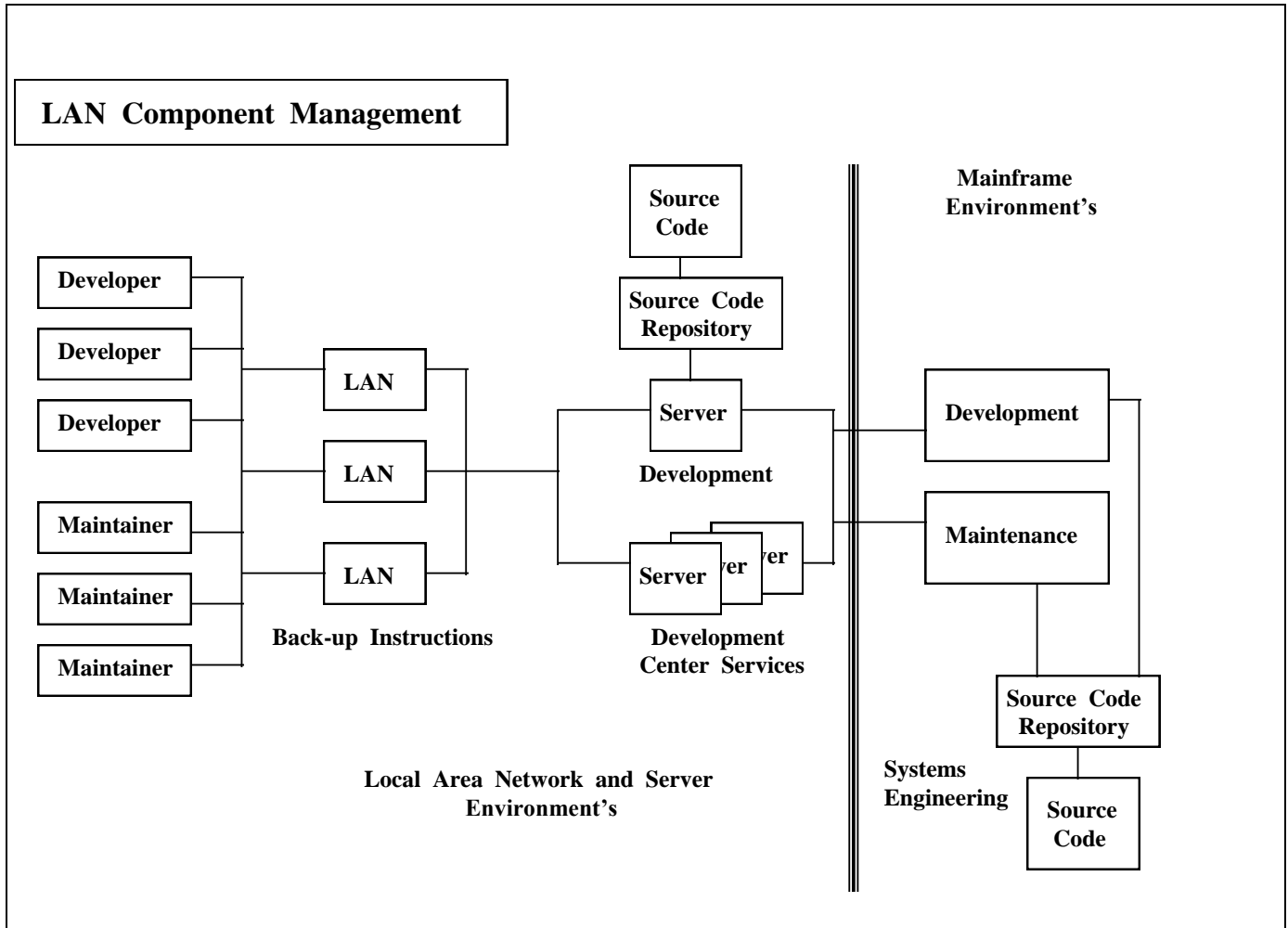
Figure 7 - The Recovery Environment.



C. LAN Component Management.

- a. Development programmers **create code** on their PC platforms and forward completed modules to Development via the LAN and Server assigned to them by the LAN Administrator (see Figure 8).
- b. Included within the LAN Administrator's function is the performing of **back-up** processing for Development Programmers, as defined to the LAN Administrator by the Development Programmer.
- c. Presently, a **formal procedure** is not in place to govern this process and one must be defined and implemented.
- d. The **LAN Administrator** performs file back-up as directed by the Development Programmer to the Development Server.
- e. The **Development Center Services Group** has automated procedures for performing back-up and restore operations, but the LAN Administrator is not presently utilizing this facility on a formalized basis. Use of this process will be expanded to cover all LAN's in ADPHQ facilities.
- f. Development Programmers will inform the LAN Administrator of the Files that require back-up and restore services, then the LAN Administrator will direct the Development Center Services group to perform these **back-up and restore operations on a nightly basis**.
- g. The back-up's will be directed to a back-up server under the control of the Development Center Services Group (Development Center Services presently performs back-ups to tape drives connected to the three back-up servers and archives these back-up tapes **off-site on a weekly basis**, while daily back-ups are stored in the vaulted server room).
- h. By utilizing this procedure, ADP will adhering to a controlled process and ensure **the back-up and restore protection** currently associated with in-flight development source code (source code that has not been uploaded to the mainframe environment, but is still on the PC / LAN environment).
- i. To **eliminate the proliferation of unidentified LAN's**, a procedure will be implemented to identify and register all LAN's within the ADPHQ environment.

Figure 8 - LAN Component Management.



Source Code Repositories are required for both LAN (Development Center Services) and Mainframe (Systems Engineering) resident program modules. This will allow for Support Personnel to access program code for applications that are experiencing code related problems for either PC or Mainframe based products.

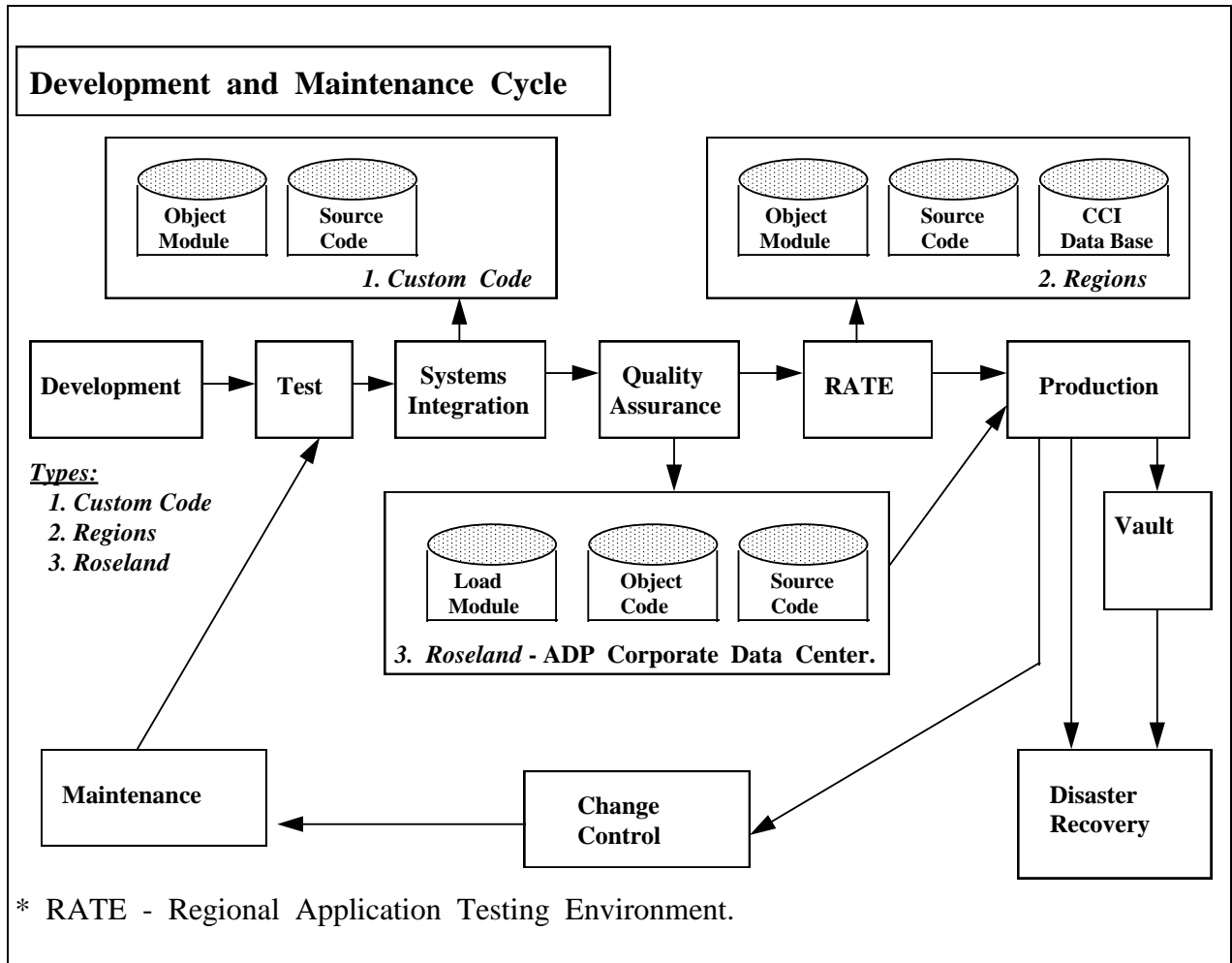
Data contained within repositories will be considered **Vital Records** and protected through vaulting and archival.

D. Development and Maintenance Cycle.

In order to perform **Disaster Recovery in an on-going basis**, it is necessary to integrate recovery requirements within the development and Maintenance cycles, so that information relating to critical applications is collected and provided to COP for inclusion within recovery plans.

Figure 9 provides an overview of the environments used to migrate development and maintenance changes on the mainframe.

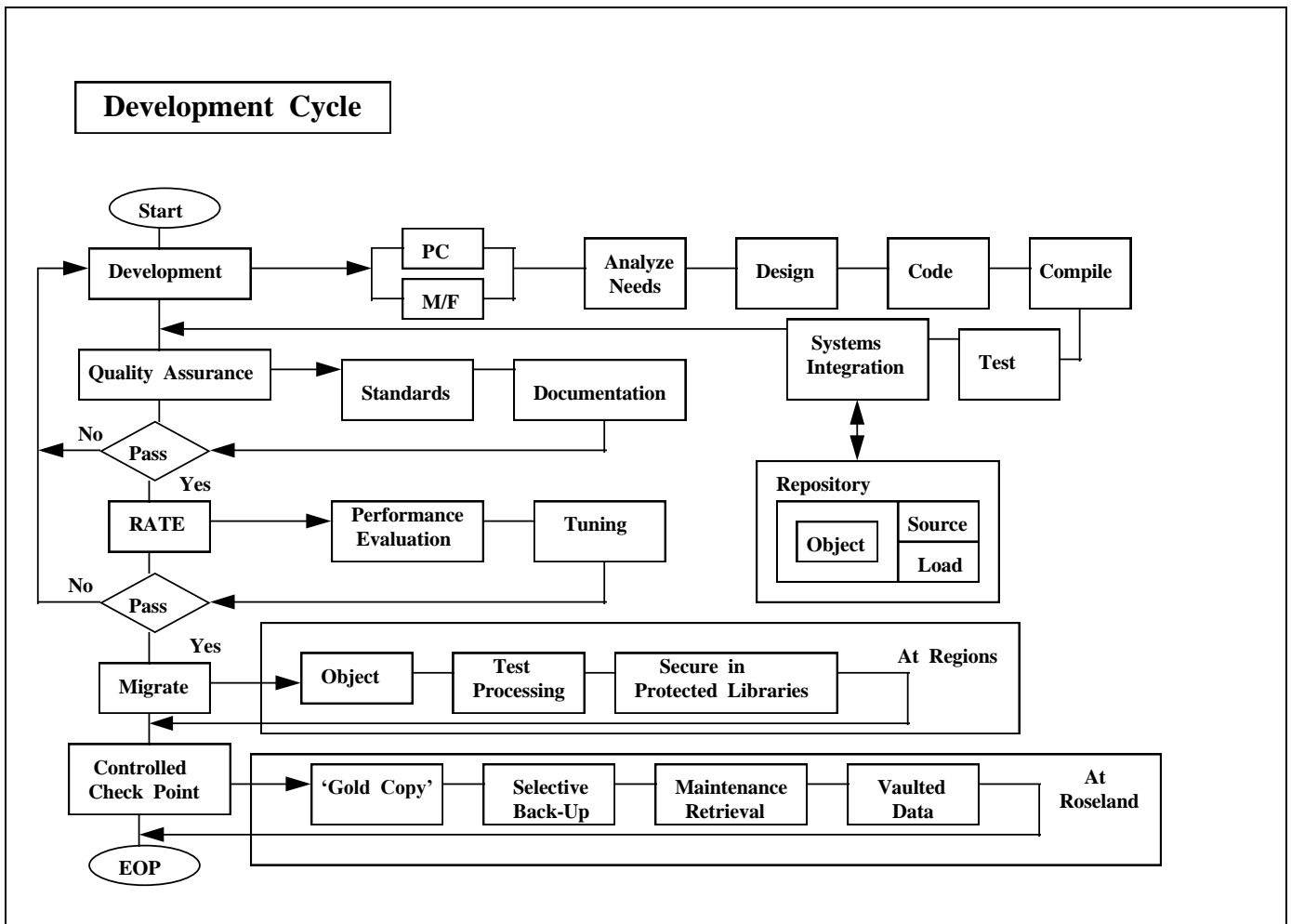
Figure 9 - Development and Maintenance Cycles.



1. Mainframe Development

- a. Development starts with the programmer **creating code in Source Code format.**
- b. At this point, programs will be **compiled into Object and Load modules** within Systems Integration by the Systems Engineering Group.
- c. Source and object code will be **protected in the Systems Engineering Repository.**
- d. Object code will then be **migrated to:**
 - Quality Assurance for Region Development.
 - Regions for Custom Code.
 - Production for Roseland.
- e. This **Systems Engineering Repository** will:
 - ensure the synchronization between production '**gold copy**' and object modules prior to shipment to the field,
 - allow for **selective back-up** processing of production source only,
 - guarantee that **maintenance retrieval** is performed on 'gold copy source',
 - allow for disaster recovery back-ups that can be **vaulted.**
- f. These **vaulted backup** datasets will be sent to a designated region as a repository for source, allowing for continuing region problem support via dial-in communications in the event of a disaster declaration.
- i. Although all compilers are currently being removed from the regions, all utilities necessary to change and generate code to implement **fixes to the field** must be kept in that designated region and accessible only to **Authorized Support Personnel.**

Figure 10 - The Development Cycle.



Note: Shaded boxes are newly required procedures for COP's Disaster Recovery Services.

2. Roseland Development.

- a. Development for **Roseland Production Applications** is initiated in the same way as Region Development, but does not migrate to Quality Assurance.
- b. Instead, **Object / Load Modules** are sent directly to Production, while Source Modules are migrated to VSE Libraries.
- c. The **same philosophy** that is depicted in Figure 10 will be applied to the Roseland Development Cycle, so that a more controlled and protected environment is created.

3. Custom Code Development and Maintenance Cycle.

- a. **Custom Code originates** in the Development Environment and is modified within the Maintenance Environment.
- b. After leaving the Development or Maintenance Environment, Custom Code is Tested and presently **shipped directly to the Region in Object Code format** (Source Code remains within the VM/CMS library under a specific userid).
- c. This process will be modified to provide for a **Source and Object Code Repository** to support the Regions. By implementing this Repository, it will be possible to duplicate problems experienced by the Regions, and to recreate Source Code modules when the Region Modules is damaged.
- d. Additionally, the Repository will be able to supply Disaster Recovery with the Source Code modules that would be needed to **support Recovery Operations**.

4. General Development improvements.

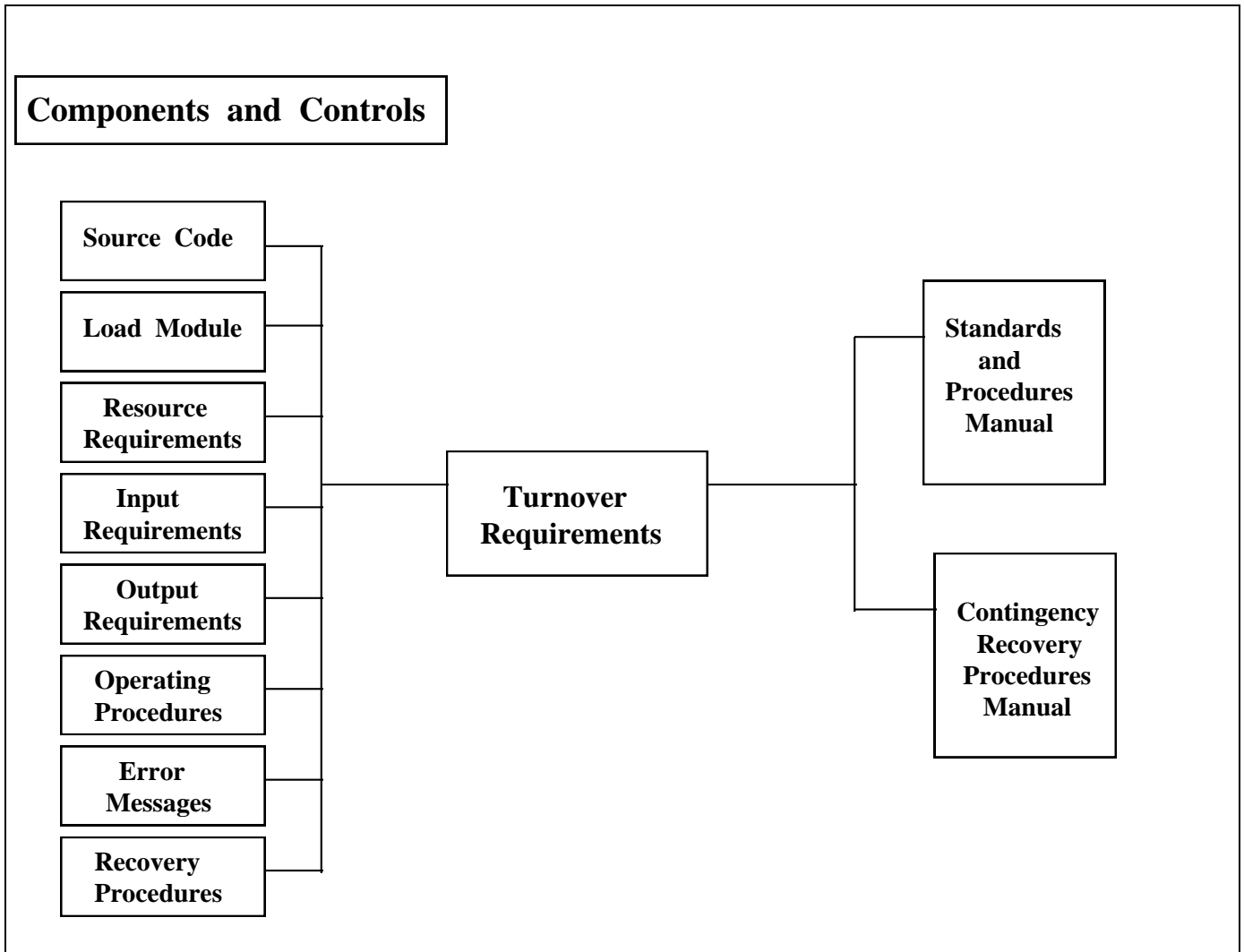
- a. The **Systems Engineering Group** will be responsible for developing, implementing, and supporting the Repository for mainframe applications.
- b. Interfaces must be developed for Central Stats to insure that Region **Release levels** are in sync.
- c. Operations, Applications and Users will develop and implement a **coordinated back-up and recovery procedure** that will guaranty that critical files are backed-up at the most appropriate time and placed on appropriate media (i.e., transportable media for recovery purposes, or high speed storage devices for rapid retrieval).
- d. The **type and frequency of back-up / restore operations** will be defined for critical information as well (i.e., immediate mirroring, periodic logging, daily back-up's, or weekly back-up's, as needed).
- e. By defining the criticality of data and the frequency of back-up with this data, it will be possible to develop the global back-up / restore procedure **required for the Roseland COP Plan**.

E. Component Controls.

The **components** (see Figure 10) that are associated with a Developed Program consist of:

1. Source and Object Code
 2. Load Modules
 3. DASD Requirements
 4. Input Requirements
 5. Output Requirements
 6. Operating Procedures
 7. Error Messages and Recovery / Restart Procedures
 8. Disaster Recovery Procedures for critical applications
- a. Presently these components are **well documented** and controlled for the Regions supported by the Roseland Mainframe environment, but we found no evidence that they exist for the Roseland Mainframe environment. Because of this, it is recommended that a team be formulated to emulate the Region Support in the Roseland environment.
 - b. The goal of this team will be to **create a procedure** by which a selective recovery of the Roseland Mainframe environment can be backed-up and restored to the Recovery Facility.
 - c. By performing a selective back-up / restore of the Roseland environment, only critical applications will be restored at the Recovery Facility - thereby reducing the **Recovery Facility Size** requirement to less than the entire Roseland Facility.
 - d. The implementation of a **Component and Release Management** philosophy within the ADP environment will result in the insurance that all components and documentation residing within an ADP environment are at the same release level.
 - e. To reduce the likelihood of this problem arising, it is recommended that the implementation of stringent Component and Release Management principals be included within the ADP **Change Management** environment.

Figure 11 - Components and Controls.



Component and Release Management principals, incorporated within the Change Management System, will insure that information is maintained in sync with program and system changes.

Exhibits

Directory of Exhibits

Exhibit Title:	Number:
Contingency Teams	1
Contingency Operations Planning (COP) Disaster Recovery Environment 2	
Roseland - Contingency Operations Planning (COP)	3
Shared Resources and Communications	4
The Communications Switch	5
Recovery Facility	6
LAN Component Management	7
Development and Maintenance Cycle	8
The Development Cycle	9
Components and Controls	10
IBM 9121 / 732 5 LPAR's 88 MIPS	11
GX - 420 2 PPARS / 4 Processors 172 MIPS	12
ADP Roseland Network (Channel Attached Only) 13	
Management Overview of Disaster Recovery Tasks	14
NCCC - detailed description of Resources and Users	15
Roseland connected LAN's (Token Rings) 16	
Roseland and 4 Becker Farm LAN Connections	17
Recovery Site Required Components	18

