

# *Hispanic Digital Archive*

## **Life Cycle Plan (LCP)**

### **Team 5**

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# Life Cycle Plan (LCP)

## 1 Introduction

### 1.1 Purpose

The objectives of the development plan of the project are as follows:

1. Guide the CSCI577b construction effort.
2. Help make the best use of people and resources throughout the life cycle.
3. Plan to overcome the difficulties likely to arise at the time of development.
4. Serve as the basis for controlling the project's progress in achieving the software product objectives and as a plan for ensuring the timely execution of the project.
5. Ensure that the quality elements of the Feasibility Rationale including business-case analysis and resource level feasibility are met.

### 1.2 Scope

The plan covers the Engineering and Construction phases as described in Walker Royce's Unified Software Management. It answers the questions Why, What, When, Who, Where, How, How Much and Whereas for the system.

### 1.3 Audience

This document is primarily intended for use by

1. Developers in CSCI577b in Spring 1999.
2. Boeckmann Center for planning its responsibilities
3. Information Services Division, which will maintain the software after May 1999.
4. Center for Software Engineering to guide the future evolution of the system.

More importantly, though, it is a baseline for developers of more elaborate life cycle plans. The customer can also use it for monitoring and evaluation of progress.

### 1.4 References

Life Cycle Plan version 2.1

Operational Concept Definition version 2.1

Software and System Requirements Description version 2.1

Software and System Architecture Definition version 2.1

Feasibility Rationale Document version 2.1

HDA Documentation standard

Unified Software Management – Walker Royce, 1998.

Spiral Model of Software Development and Enhancement – Boehm. 1988.

Meeting with Barbara Robinson on February 12, 1999.

COCOMO II user manual

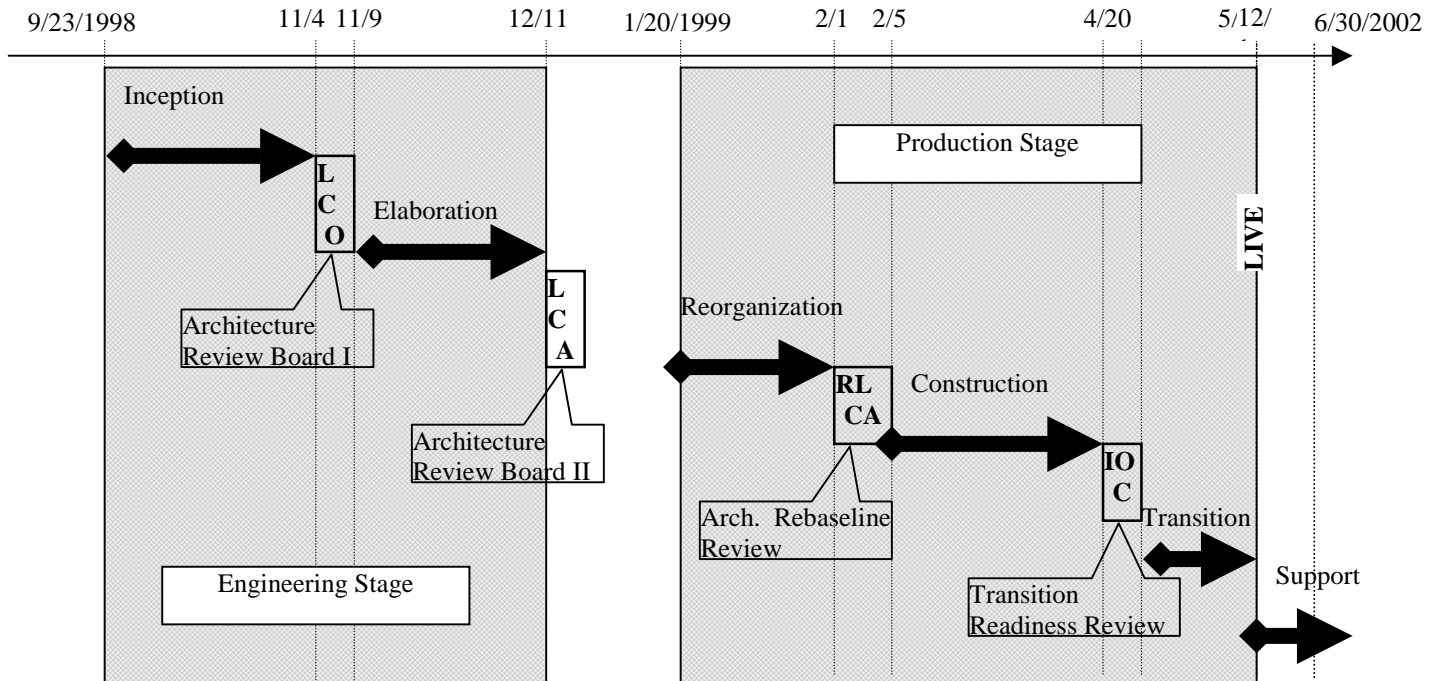
## 2 Milestones and Products

This section describes the choice of the software engineering process that would be employed for developing the Hispanic Digital Archive. The process consists of responsibility identification, achieving specific milestones, and satisfying the key stakeholders.

### 2.1 Overall Life Cycle Strategy

The proposed system envisages a moderately understood set of requirements to be met with a low degree of robustness but with a high amount of flexibility. Therefore, we propose to use the evolutionary development as our software engineering process as suggested by the Process Model Decision Table. Further, we propose to use the WinWin Spiral Model as it is understood fairly well by the team members

and is supported by the Center for Software Engineering, University of Southern California. The schedules for project activities have been estimated using the COCOMO II post-architecture model with SLOC estimates. Figure 1 shows the life cycle phases and major milestones.



**Figure 1 Life cycle phases and Milestones**

Each of the phases shown above would constitute a single WinWin spiral followed by a review as shown in the attached box. An important objective of each of the reviews would be to assess the progress of the project as well as to decide on the feasibility of continuing work on the project. The project is split up into three stages:

1. Engineering stage – Fall 1998 – CSCI577a
2. Construction stage – Spring 1999 – CSCI 577b
3. Support stage – Summer 1999 to Summer 2002

Prototyping is carried on concurrently with other activities in the Engineering stage, since that provides critical user interface requirements and validates the architecture. Prototyping results are used as design constraints. Support, including software and system maintenance, is also carried out concurrently with data conversion. Feasibility Rationale [FRD 2.1.2] describes the time estimates of the project.

The metric used for measuring the activity size is one project week. One person week corresponds to 12 person hours in a week, which is consistent with the CSCI577b requirements.

The software would be built in increments of delivered functionality, so the construction activities are to be split up into two increments. If there is any spill over from the 1<sup>st</sup> increment, the feature could be built in the 2<sup>nd</sup> phase and optional features could be dumped. [FRD 3.2]

**2.2 Phase Milestones and Schedules**

The elaboration phase lasts from November 9, 1998 to December 12, 1998 during which the complete system architecture has to be designed. This architecture is to be implemented by a team of 5 members of the CSCI577b class in the spring 1999 semester. The duration is from Jan 14, 1999 to May 4, 1999. However, the initial couple of weeks will be spent in reorganizing the teams. In all the construction team would have a period of 12 weeks starting February 1 to implement the system in two increments. All the management activities including progress monitoring and control, client meetings and site preparation are

covered in Project Management. Table 1 describes phases and activities to be performed in those phases in terms of the modules to be constructed.

Sub system	Module	Increment I	Increment II
Zaguán	Static Pages	◆	
	Dynamic Pages	◆	◆
	Item Pages	◆	◆
Archivo	COTS preparation	◆	
	Query Processor	◆	
	Item Builder	◆	◆
Mayordomo	Item/Image Manager	◆	◆
	Miscellaneous Management		◆
Project Management	Developer Training	◆	
	Test Descriptions	◆	◆
	Manuals	◆	◆

**Table 1 Construction Schedule**

## 2.2.1 Engineering stage

### 2.2.1.1 Architecture

The CSCI577a team will perform domain analysis and produce a feasible architecture for construction. We would suggest an architecture that can be realized by another team in the next semester, by a possibly different team.

### 2.2.1.2 Prototype

We would also test our system architecture by building prototypes and testing them with the users of the system. We would obtain feedback primarily from the Customer and Manager Barbara Robinson. Prototypes would be developed in a spiral manner to ensure an interchange of views between Barbara Robinson and us.

## 2.2.2 Production Stage

The CSCI577b team would be responsible for the development of the software according to the architecture designed by the CSCI577a team after rebaselining it. This would involve a change or adjustment in the architecture to allow for changes in project context and promote common understanding among the new team members.

### **A Construction Phase I – February-March 1999**

This increment lasts for 4 weeks from February 15, 1999 to March 15, 1999 consisting of 15 person weeks.

The increment begins by preparing for the construction phase in terms of user accounts and database preparation. Project Management functions including planning, staffing and training would also be carried out. The phase would involve construction of *Core Essential* features, which are:

#### **Mayordomo:**

1. Creating the Digital Library database
2. Store data in Digital Library
3. Filter/Retrieve data from Digital Library
4. Modify data/status of items
5. Add images

#### **Zaguán**

1. Query processing
2. Results page
3. Item details and Table of Images
4. Layout of web pages
5. Content of static pages

Since the system involves a large amount of data conversion, the interface would be an important success factor for the Customer. As the Customer would follow an IKIWISI (I Know It When I See It) success model, in this case, it is important to develop the interface in the first increment. The archive database can be created simultaneously with the administrative interface. The database would consist of all tables, indexes, procedures, and triggers. Also, since the operator interface is heavily dependent on the underlying database schema, its early design is essential. It will also help clarify the system capabilities as the database schema matures.

A primitive user search interface would be built in the first phase. This is necessary to prove the feasibility of the software architecture. It is not required to build a graphical interface for this purpose, only data structures need to be verified. The search interface can be restricted to provide just the textual information on archive materials.

Database preparation would proceed in parallel with the Mayordomo development. This interface will be based on the prototypes built before the Construction phase including the CSCI577a class during Fall 98. A user manual for the Operator interface should also be built in this phase. Another group would build the Zaguán interface in parallel. The online manual for archive users will be developed. At the end of this phase, the Zaguán interface developed would be tested for user acceptance. Required changes would be completed before the end of this phase. Any major requirement changes would be incorporated in the next phase. A visually attractive interface would be developed with the help of the illustration expert, Juan Carlos Díaz.

## **B Construction Phase II – March-April 1999**

This increment lasts for 4 weeks from March 16, 1999 to April 20, 1999 consisting of 18.75 person weeks.

In case any Core Essential features are incomplete, they would be completed in this increment. The *Core Priority* features would be developed in this phase, which are:

### **Mayordomo:**

1. Type management
2. Field options management
3. Modify/remove images
4. Print item report
5. Authorization and security
6. Access management
7. Context related help

### **Zaguán:**

1. Image navigation
2. Item Page request page
3. Email page
4. Online help for Zaguán

As permitted by available time the following *Optional* features would be built in this increment:

### **Mayordomo:**

1. Direct scanner support
2. Watermarking

### **Zaguán:**

1. Browse page

2. Installation program

Complete system testing would be carried out. Two phases of systems test would occur. The first test would be conducted before Transition Readiness Review. After the first test, the system would be offered to the Customer for beta testing. Release Readiness Review would be conducted after this test. Good-to-have features would be built based on the availability of time and completion of the previous phase activities.

2.2.3 Support Stage

The team would provide necessary documentation for carrying out support activities like maintenance and installation of the software along with system usage. They will also provide software support for a period of two weeks starting April 20, 1999 to May 1, 1999. USC-ISD would provide the support for software and system maintenance.

The remaining Optional features of the Construction phase along with considered but not required features of [OCD 3.5] and evolution requirements of [SSRD 6] can be built in another CSCI577 student project. They would also release a support version to consider all changes required after the end of the Construction phase. Data preparation and archive digitization would be performed within a duration of two and a half years until December 2001. The system would be available for use by the general public in the December of 1999 when 1000 items have been digitized.

**2.3 Phase Deliverables and Completion Criteria**

Internal deliverables for CS577b include the following documents:

<b>Date</b>	<b>Name</b>	<b>Includes</b>	<b>Completion Criteria</b>
2/23/1999	Revised LCA package	Operational Concept Description, System and Software Requirements Definition, System and Software Architecture Description, Rose Model Files, Feasibility Rationale Description, Life Cycle Plan, Prototypes	Customer and developer concurrence on requirements, stability and completeness of architecture, prototype acceptance, acceptable effort estimates, prioritization of tasks, credibility of feasibility analysis, major risk assessment
3/2/1999	Construction Planning Set	Iteration 1 Plan, Quality Management Plan, Test Plan, Inspection Plan, Configuration Management Plan	High fidelity of construction plan and software architecture, Acceptable levels of schedule and cost estimates
3/23/1999	Construction working set	As-built architecture and design specifications, Iteration I Assessment Reports, Iteration 2 Plan, Inspection Reports, Test Reports, Release Notes, Source Code baselines, Component Executables	Stability and maturity of constructed software, Acceptable levels of schedule and cost actuals
2/9/1999 through 5/4/1999 Tuesdays except 3/16/1999	Status Assessment Set	Weekly Effort Metrics, Weekly Status Report	Indicates true progress and effort on the project.

<b>Date</b>	<b>Name</b>	<b>Includes</b>	<b>Completion Criteria</b>
4/20/1999	Initial Operating Capability	As-built architecture and design specifications, Iteration II Assessment Reports, Inspection Reports, Test Reports, Release Notes, Source Code baselines, Component Executables,	Stability and maturity of constructed software, Acceptable levels of schedule and cost actuals
4/20/1999	Transition Set	Transition Plan, User Manual, Training Plan	Credible operational impact analysis
5/4/1999	Product Release	Support Plan, Training materials, Regression Test Package, Packaging Tools and Procedures	User satisfaction, Software Acceptance, Acceptable levels of deployment schedule and costs

**Table 2 Deliverables and Schedule**

### 3 Responsibilities

The project involves various stakeholders to be satisfied. This section describes the responsibilities of each of those stakeholders so that all the stakeholders can eventually benefit from mutual interaction. This section identifies the key stakeholders and their responsibility in meeting the project goals.

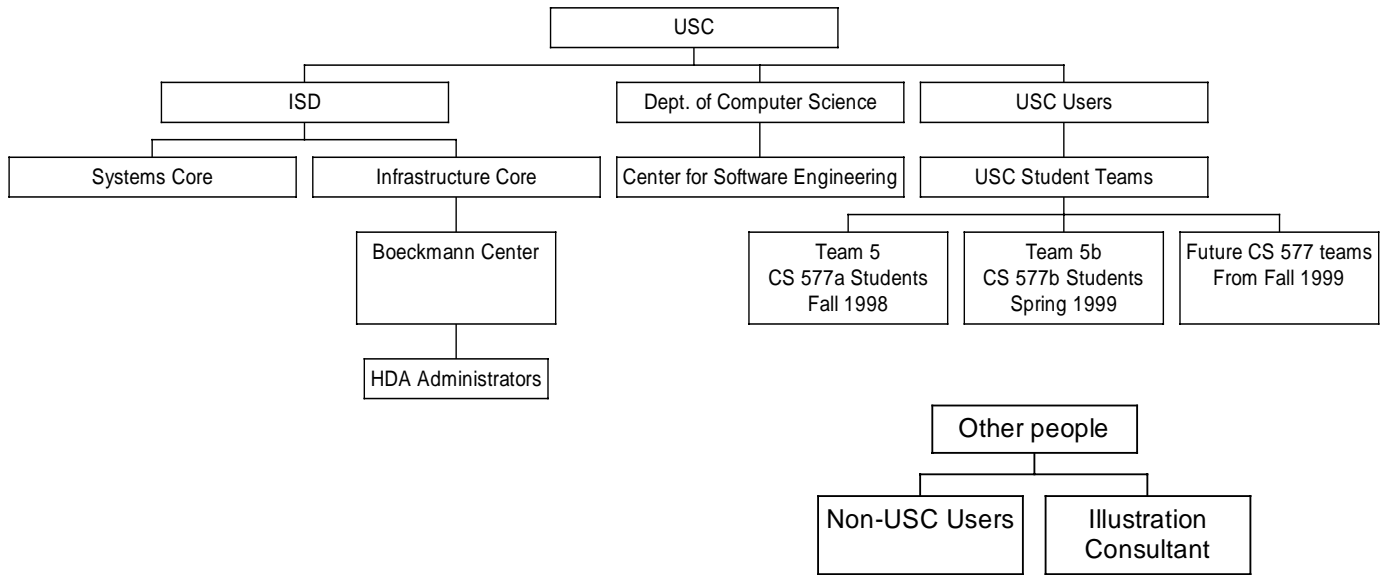
#### 3.1 Organizational Responsibilities

The following organizations are involved and responsible for the life-cycle needs of the system.

<b>Organization</b>	<b>Responsibility</b>
Student teams in CSCI577	Find system requirements, architect, design implement, test and maintain the system
Information Services Division	Provide development environment, COTS and tools, provide maintenance support for the system
USC Libraries	Identify potential reuse possibilities and provide generic requirements on archives
Boeckmann Center	Explain and evaluate operational concept and requirements. Digitize archive materials, maintain the archive, and assist the users.
Center for Software Engineering	Provide student teams for designing, constructing and maintaining systems and provide detailed guidelines for various development activities

**Table 3 Organizational Responsibilities**

### 3.1.1 Global Organization Chart



**Figure 2 Organization Chart**

### 3.1.2 Organizational Commitments

Organizational commitments for project scope, schedule and budgets would be with:

Organization	Person
ISD	Phil Reese
USC Libraries	Julie Kwan
Boeckmann Center	Barbara Robinson
Center for Software Engineering	Prof. Barry Boehm
Team 5b	Nikunj Mehta

**Table 4 Organizational responsibilities**

## 3.2 Stakeholder Responsibilities

The key life cycle stakeholders are identified along with their responsibilities are shown in the table below:

Role	Stakeholder	Responsibility
Customer	The Boeckmann Center and ISD.	Provide COTS and development environment. Staff administrators and provide execution environment
Users	Students and researchers on Hispanic studies all over the world.	Use digital archive items and page for archive materials
Developer	CSCI577a and CSCI577b Teams	Engineer the solution
Maintainers	Future CSCI577 teams	Perfective and corrective maintenance
Administrators	The Center Manager and her/his assistants	Archive operator
Liaison	Center for Software Engineering and Computer Science Department	Facilitate project initiation and ensure smooth progress
Illustration Consultant	Juan Carlos Diaz.	Design logo and graphic design for user interface.

**Table 5 Stakeholder responsibilities**

The responsibilities of these key stakeholders are as below:

	<b>Inception</b>	<b>Elaboration</b>	<b>Construction</b>	<b>Transition</b>
<b>Customer Boeckmann Center</b>	Provide a clear understanding of the operational concept and requirements, accept/reject alternatives	Judge prototypes, monitor progress and provide feedback during review.	Monitor intermediate stages, test intermediate work products to evaluate the correctness of path. Evaluate quality attributes. Determine transition readiness.	Monitors progress and provide administrative support to maintainers. Staff personnel for data entry operations. Evaluate release readiness.
<b>Customer ISD</b>	Provide the guidelines for the development of the systems according university policies	Provide the constraints within which the system should be developed.	Provide the tools for the development of the system.	Monitors the transition of the system and going live.
<b>User</b>	Support concept definition, review prototype and provide feedback	More GUI exercise, provide test data critique proposed architectures during ARB meetings	Give feedback on GUI, performance. Provide more test support, alpha testing	Perform beta-testing in operational environment
<b>Maintainer</b>	Support definition of concept, review prototype and provide feedback	Observe operational impacts, provide use scenarios.	Review and test product.	System and database maintenance, carry out operational updates, monitor system performance, Adapt changes.
<b>Developer</b>	List system requirements, study feasibility suggest architecture alternatives, develop prototypes to demonstrate understanding	Design feasible architectures, build more prototypes to assess feasibility and suitability of options. Prepare test plan, Manage risks	Refine design, build software, carry out integration and tests, write manuals of operation	Aid in making a transition to operational environment. Provide installation and training, rectify defects found during transition phase.
<b>Illustration Consultant</b>	Understand system needs	Develop graphical components for user interface, test usability	Refine graphical components, provide images and logos for construction	

**Table 6 Phasewise stakeholder responsibilities**

### 3.2.1 Engineering Stage

Components to be developed are the LCO and the LCA package. These also contain prototypes for user interface and architecture feasibility demonstration. The external illustration consultant Juan Carlos Diaz, has agreed to design graphic components including the system logo. Barbara Robinson has made this arrangement. The ISD has agreed to provide personnel with expertise on the IBM Digital Library, Dennis Smith, for consultation on the system architecture. Besides the client Barbara Robinson would be arranging meetings with Juan Carlos, the Graphics Consultant.

Mainly the CSCI577a class would provide the training required. However, team members would learn use of certain tools themselves. In case a tool has to be used by more than two persons, one team member would be designated to carry out this internal training.

### 3.2.2 Production Stage

Barbara Robinson would plan for staffing the personnel required for training on the administration of the software system in coordination with the project manager. She would also provide the necessary hardware resources as identified in [SSRD 5.2.3.1] and necessary COTS software as identified in [SSRD 5.2.3.2]

### 3.2.3 Support Stage

The Center for Software Engineering in association with the ISD would carry out support of the system constructed in the previous phase. Installation, operation and support manuals shall be developed in the production phase to assist the above organizations. The Boeckmann Center shall draw up detailed staffing plans for performing data digitization and maintenance operations and provide them required training. Essentially, the following table shows maintenance responsibilities:

Activity	Organization
Maintaining the archive data	Boeckmann Center
Maintaining the hardware and facilities	Information Sciences Division
Maintaining the HDA software	Center for Software Engineering through student teams

**Table 7 Support Responsibilities**

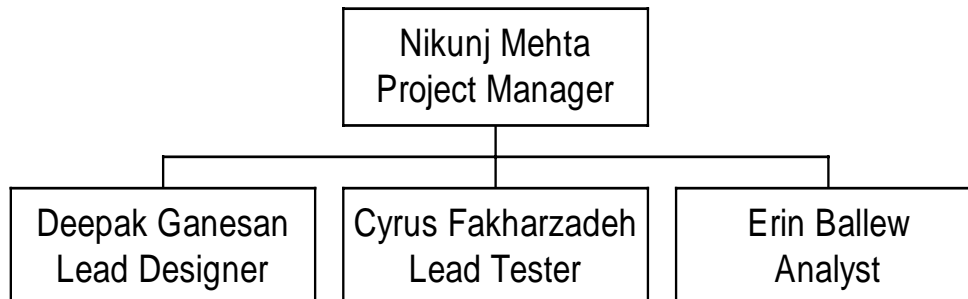
### 3.3 Development Responsibilities

This chart identifies developer responsibilities during construction. Some tasks have multiple assignments and some super tasks cover more than one task. The person responsible for each major subtask would provide the necessary coordination among the task assignees.

Nikunj Mehta	Deepak Ganesan	Cyrus Fakharzadeh	Erin Ballew
Project Management	Training	DL installation	Training
Site preparation	Detailed Design	Test data preparation	Static pages
LCA Rebaseline	Mayordomo	Testing	User Manual
Construction	Data Management	Test case descriptions	Transition plan
Zaguan/Archivo	Image management	Test plan	Reviews
Increment I Delivery	Add images	Inspection plan	Training
Plan for plan	User Access	Quality management	
Iteration plan	Support plan	Inspections	
Inspections	Inspections	Configuration Management	
Reviews	Reviews	Installation	
Requirements management	Documentation	Team Website	
Client facilitation			
Release notes			

**Table 8 Developer Responsibility**

#### 3.3.1 Development Organization Chart



**Figure 3 Construction stage chart**

### 3.3.2 Staffing

Title	Team Member	Effort required per week (hours)
Project Manager	Nikunj Mehta	15
Lead Developer	Deepak Ganesan	12
Lead Tester	Cyrus Fakharzadeh	12
Analyst	Erin Ballew	6

**Table 9 Staffing Plan**

### 3.3.3 Training

Training has already been performed for the developers on Digital Library tools and required additional training and consulting support would be provided by ISD in the form of consultants such as Dennis Smith and Nava Herman.

### 3.4 Client Responsibilities

Dates required	Responsibility
Once a week for an hour	Review progress and evaluate intermediate products
Before February 16, 1999	Provide IBM Digital Library Windows Software
February 20, 1999	Order AccuSoft Image Gear 98 software
Before February 25, 1999	Identify materials for digitization for testing
February 25 – 28, 1999	Provide personnel for digitization for testing
February 22 – 28, 1999	Provide content for static pages including main page, acknowledgements page and overview page.
Before April 4, 1999	Provide AccuSoft Image Gear 98 software
April 14, 1999	Review Transition readiness
Before April 20, 1999	Provide hardware resources for software installation
April 20, 1999	Provide personnel for training
April 28, 1999	Review Support plan

**Table 10 Client Responsibilities**

## 4 Approach

This section describes the management and technical approaches used in the project.

### 4.1 Risk Management

Risks likely to affect progress of the system are documented in [FRD 4.0]. This document only describes techniques to prevent them or deal with them in case they materialize.

#### 4.1.1 Risk Monitoring

A list of top risks would be maintained that would describe their likely impact and state of resolution and the length of time they have been active. This would help focus attention on more important risks and identify risks that are becoming delinquent. The following template describes the format of the Top Project Risks that would be generated each week in the Project Status Report.

<i>This week</i>	<i>Last week</i>	<i>Description</i>	<i>Action</i>	<i>Weeks</i>

**Table 11 Top Project Risks Template**

### 4.1.2 Contingency plans

#### 1. Personnel Shortfalls and Group Member Interaction

- Reassign team members to areas their specific areas of expertise.
- Modify those requirements, which have alternatives for accommodating team members, such as using a more familiar programming language.
- Reassigning the available people to more appropriate roles and reassessing the project priorities.
- Convey the problem to the client so that an understanding can be reached before any more decisions are made.
- Work around a risk so that it is not a threat. This can be difficult if the risk involves much rework.

#### 2. Schedules and budgets

- Set and achieve short-term deadlines and goals so that final schedule is incrementally achieved.
- If Operators are hired late, then the rate of item entry must be adjusted so those intermediate deadlines are met.

#### 3. COTS and external components

- Find new, more suitable COTS.
- Use more appropriate COTS or use the COTS for its intended purpose. Do not try to force COTS to work for wrong objective.

#### 4. Requirements mismatch, Quality mismatch

- Reanalyze requirements and thoroughly discuss them with the client and all group members to ensure requirement understanding.
- Redesign architecture to handle non-functional requirements such as scalability.
- Get feedback from users and client to improve user interface.
- Redesign prototype to account for feedback on the user interface. Consider all feedback received from any user testing the system.
- Review all possible points of entry into the HDA and secure each entryway. Restrict modification functionality.

#### 5. Architecture inadequacy

- Redesign architecture if not too much effort is required.
- Review all entry points into the HDA. Secure each entryway. Restrict modification of functionality.

#### 6. Requirements changes

- Advise Customer of potential setbacks if changes are implemented. Defer change to next increment if consensus can be achieved.
- If this architecture were to be changed once design is completed, then much of the design will have to be redone to account for the changes.

#### 7. Straining computer science capabilities

- Remove new technology elements if determined to be unhelpful or unreliable and use more low-tech alternatives.

### 4.2 Support Environment, Methods and Tools

Tools would be used for automating software development. An activity-wise breakdown of tools is listed below. Tools can be added to this suite as they become available or otherwise felt needed.

#### Life-cycle:

- Microsoft Word: Word-processing
- Adobe Distiller – Publishing
- Netscape Communicator – E-mail

#### Engineering phase:

- WinWin – Requirements investigation
- Rational Rose –Modeling and Design
- USC COCOMO II.98 – Cost estimation
- Symantec Visual Café – Prototyping
- Claris HomePage – Prototyping
- Visual Basic - Prototyping

**Production phase:**

- Rational Rose 98 – Object oriented analysis and design
- IBM Digital Library 2.01 Client Toolkit for Windows
- IBM Digital Library 2.01 Client Application for Windows
- Microsoft Visual Basic 5.0 – IDE
- Claris Home Page 3.0 – Web page construction
- Adobe Photoshop 5.0 – Art and graphics
- AccuSoft ImageGear 98 – Image format handling
- Netscape Navigator 4.0.6 – testing
- USC COCOMO II.1998 – Cost and Effort Estimation
- Microsoft Project – Project planning and control
- Microsoft Word 97 – Document creation
- Adobe Distiller 3.0 – Document publishing

### 4.3 Reviews

This section identifies the objective and schedule for major reviews for the project. Reviews are conducted for:

- Assessing progress
- Ensuring consistency
- Providing baselines
- Preparedness assessment

Review Plan will be prepared in CSCI577b. It will be based on these steps:

- Identify the artifacts for reviewing
- Identify the criteria for review
- Identify the participating organizations and individuals
- Provide the artifacts for review to participants in advance
- Expect participants to come prepared with readings
- Document the review proceedings
- Be completed in a time bound manner
- Follow-up on action taken

The customer wants to accomplish review with multiple meetings, demonstrations, and training sessions. The meetings are scheduled once a week, unless an ARB is taking place in the same week. Demonstrations will not occur as often, however they can take place during a scheduled weekly meeting. There will be a demo following each construction phase. The training and testing sessions will occur during the final two weeks of the CSCI577b project. The testing will then continue internally at the Boeckmann Center by those trained during the semester.

Inspection Plan will be prepared in CSCI577b. It will be based on these principles:

- Identify the artifacts for inspection, what portion/scope of the code
- Ensure the chosen code is a completed version
- Identify the criteria for inspection, code and unit tested.
- Identify the participating organizations and individuals
- Provide the artifacts for inspection to participants
- Document the inspection proceedings, inspection report

- Be completed in a time bound manner
- Follow-up on action taken

Inspection Reports mentioned in the Inspection Plan will be based on the principles

- Document the code areas and associated problems
- Document overall code quality
- Identify improvement procedures

#### 4.3.1 Architecture Review Board I

Review meetings involve short presentations by each team member, followed by the prototype demonstration. A review scribe documents proceedings in review logs. The template to be used is provided in the appendix.

CSCI577a/b reviews require the associated materials to be published on the Web a week in advance. The materials include the 5 LCO documents and the prototype. A convenient time must be arranged for all participants including:

- CSCI577a/b instructors
- Customer representatives
- Team members

It is conducted at the end of the inception phase. Purpose is to review the LCO package and prepare the team to enter into the construction stage. Primary purpose is to assess understanding of operational concept and project requirements. It is scheduled between November 9, and November 13, 1998.

#### 4.3.2 Architecture Review Board II

This is conducted at the end of the production phase. Its purpose is to review the LCA package, the 5 documents and prototype, and prepare the team to enter into the production phase. Its primary purpose is to assess feasibility of software and system architecture and risk resolution strategy. It is scheduled between December 7 and December 12, 1998.

#### 4.3.3 Architecture Review Board III

This is conducted at the beginning of the production phase to re-baseline the architecture developed by previous team. Its purpose is to review the entire Revised LCA package and prepare the team to start the software construction. Its primary purpose is to assess the response to changed project needs and preparedness for detailed design. ARB III is scheduled between February 15 and February 21, 1999.

#### 4.3.4 In-process Reviews and Walkthroughs

Walkthroughs are conducted to evaluate the progress of artifacts including:

- Documents
- Plans
- Manuals
- Code

For example, there will be user manual and installation manual inspections, detailed design inspections, and code inspections. It has been determined that unit text completion reviews will not be required for a team of this size. They help the author to understand the lacunae in their documents and provide a wholesome perspective for creating the document. It also fosters team building as members share their views and ideas to help improve each other's work. It also serves as a risk resolution strategy as project knowledge becomes more widely accessible and the failure of a critical person no longer holds. Two to three persons perform walkthroughs in a period of no more than 2 hours. All observations and remarks are documented in a log. The template of the walkthrough log is provided in the appendix.

### 4.3.5 Transition Readiness Review (TRR)

TRR serves a valuable role in verification. The TRR verifies the transition pre-conditions listed below are satisfied:

- The software is ready to install and compliant with the SSRD
- The User's Manual, Installation Manual, training material, and operational procedures are ready to use
- The description document is at a draft version
- Client facilities, equipment, software infrastructure, and applications data are ready to use
- The Customer is committed for transition and training
- A transition plan, including completion criteria for the Release Readiness Review (RRR), is ready

Conducted at the end of construction stage. Its purpose is to assess user acceptance of software and preparedness for the transition stage. It is scheduled between April 14, 1999 and April 15, 1999. However, some transition preconditions may be deferred to the RRR.

### 4.3.6 Release Readiness Review (RRR)

The RRR also serves a valuable role in verification. With the RRR the transition plan, the readiness of the system, and the client's readiness to transition into client operations should be successfully completed. The operation-critical items below should be reviewed in the RRR:

- System preparation
- Training
- Usage
- Evolution support with clients

The RRR is conducted at the end of the Production stage. Its purpose is to assess user acceptance of system and associated documents for user release. The acceptability criteria for deliverables must be addressed. Also, to assure satisfactory transition the review plan should indicate how the client wants to accomplish the final review along with candidate dates. It is scheduled on April 28, 1999. The completion criteria for the RRR include the completion criteria for the phase deliverables in [LCP 2.3] in addition to any situation-specific criteria.

## 4.4 Project Communications

The team web page would contain an up-to-date release of all deliverable documents. It would be located on the following URL: [nunki.usc.edu:8082/team5b](http://nunki.usc.edu:8082/team5b). All the LCO and LCA documents can be obtained from the previous URL: [nunki.usc.edu:8082/team5](http://nunki.usc.edu:8082/team5). The web site would also host team communications pages listing links to useful information. Each team member would setup team aliases for e-mail to include the following addresses:

Nikunj Mehta: [nrm@usc.edu](mailto:nrm@usc.edu)

Deepak Ganesan: [ganesan@usc.edu](mailto:ganesan@usc.edu)

Cyrus Fakharzadeh: [fakharza@usc.edu](mailto:fakharza@usc.edu)

Erin Ballew: [eballew@usc.edu](mailto:eballew@usc.edu)

Barbara Robinson: [brobinso@usc.edu](mailto:brobinso@usc.edu)

Telephone contact of Barbara Robinson is: (213) 740-3566

Barbara Robinson's University Mail address is:

Boeckmann Center

Doheny Library

MC 0182.

Juan Carlos can be contacted at the following telephone number: (310) 374-9847

Mail address:

1106 Manhattan Avenue #2

Hermosa Beach, CA 90254.

The development team meets with the client at least once a week for an hour. Friday 1:30 PM is the preferred time for both parties. The members of the development team also meet at least once a week on Friday at 3:00 PM.

### 4.5 Configuration Management

Configuration management is required to ensure smooth progress of artifact construction. It provides a stable foundation for development by baselining the key documents and maintaining strong control over their changes. The artifacts that are baselined and the milestones at which they are baselined are shown in Table 12.

	Inception	Elaboration	Construction	Transition	Support
Operational Concept Description	+	◆	◆	◆	
System Requirements Definition	+	◆	◆	◆	
Software Architecture	+	◆	◆	◆	
Life Cycle Plan	+	◆	◆	◆	
Feasibility Rationale	+	◆	◆	◆	
Prototype	+	◆			
Quality Management Plan			◆		
Test Plan			◆		
Inspection Plan			◆		
Source code			◆	◆	
Component executables			◆	◆	
Transition Plan				◆	
User’s Manual				◆	
Installation Manual				◆	
Support Plan				◆	◆

◆ - Baselined  
 + - Informal Baselines

**Table 12 Artifact Baselines**

A formal process is described to perform changes.

- 1 Baselined documents should not be directly changed.
- 2 Explicit and non-concurrent permission to change must be obtained.
- 3 Each version is to have a unique identifying number.
- 4 All previous versions should be maintained in a repository.
- 5 A history of all changes is recorded.

Three types of configuration management have been identified for different levels of problems impacting the system. The problems are listed in order of decreasing impact on the system:

1. Changes to the architecture, implementation, and operation – The configuration manager, architect, project manager, customer, and remaining developers would take part in meetings to discuss configuration management.
2. Changes to the architecture and implementation – Configuration management would include the configuration manager, the architect, and those developers impacted by the changes.
3. Changes to the implementation – Configuration management would require the configuration manager and those developers whose work is impacted.

Cyrus Fakharzadeh would handle the project Configuration Management.

### 4.6 Quality Management

The project has certain success models based on the quality of the software system. The quality of system is ensured by clear identification of plans and policies and each team members’ adherence to those. It is each member’s responsibility to produce a high-quality product. The project would adhere to the following:

- 1 Documentation standards
- 2 Coding standards
- 3 Testing and review standards
- 4 Change and configuration control standards.
- 5 Style standards

Cyrus Fakharzadeh would handle the project Quality Management.

#### **4.7 Facilities and related concerns**

Development is to be carried from the CSE lab where IBM Digital Library software is installed. All work must be saved on the UCS computers. ISD would house and maintain archive server hardware and software and administrator hardware, database and scanner. The ISD would also perform database maintenance including backups every week. Required software includes IBM Digital Library version 2.01 Client for Windows and AccuSoft Image Gear 98.

#### **4.8 Status monitoring and control**

Monitoring and controlling responsibilities include:

- Project Manager – major milestone completion, test plan management
- Quality Manager – inspections and product content
- Configuration Manager – configuration management
- Architect – overall system

Gantt charts would be used to plan and track progress or milestones of development. Gantt charts show when operations will occur along a calendar scale. A Gantt chart is often used as the benchmark by which a project's progress is measured, and it also shows how much each operation can be delayed without affecting the finish date of the entire project. The Gantt charts will be constructed by hand or using an art tool, since Microsoft Project may not be available for use. This task is assigned to the project manager.

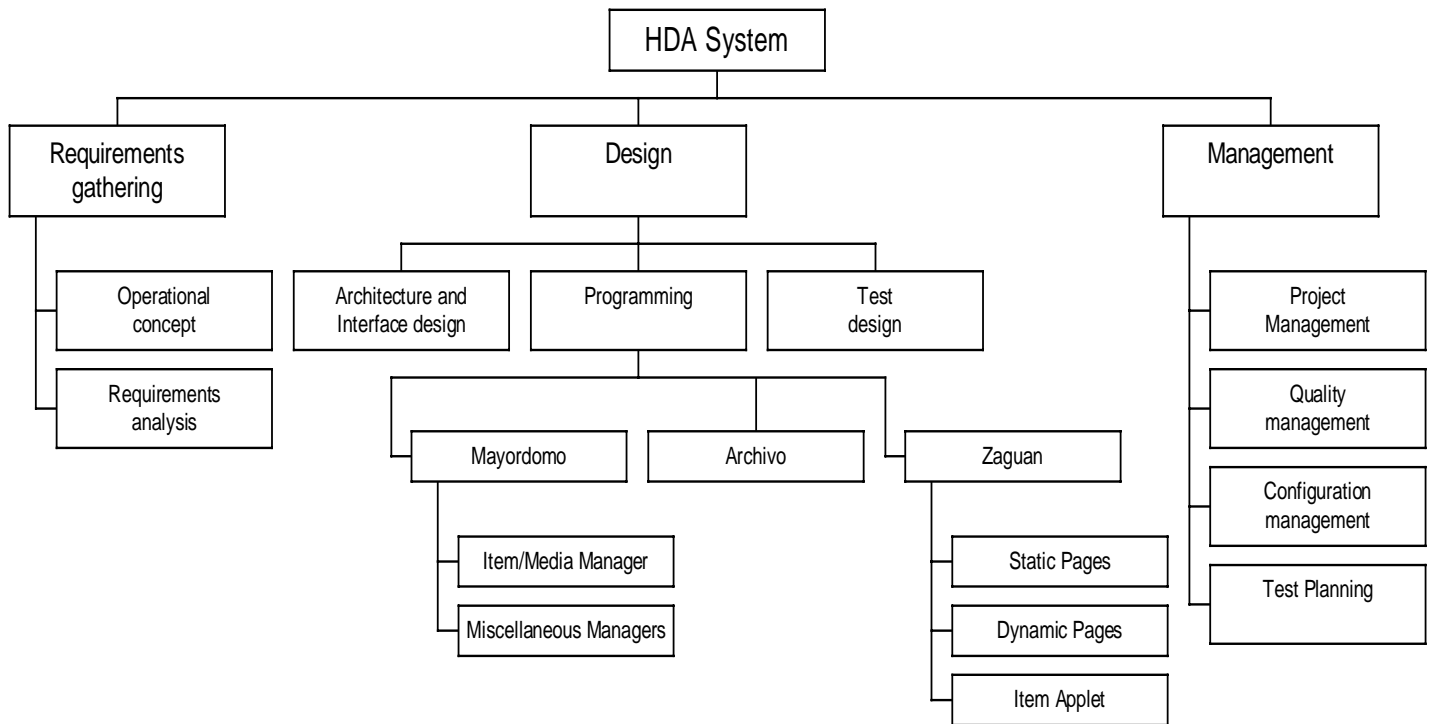
A web based reporting system managed by the CSCI577b TA would be used to track weekly effort. All weekly data is to be reported by Monday midnight. A Weekly Status report consisting of progress and effort metrics and Top Project Risks would be generated each Tuesday.

## **5 Resources**

Resources for this project include costs of various COTS products and manual labor required for the management and development of software.

### **5.1 Work Breakdown Structure**

Work breakdown structure for the entire life cycle is shown in Figure 4. The specific iteration level details can be found in the specific increment's detailed plan.



**Figure 4 Work Breakdown Structure**

The components described here are covered in more detail in the SSAD [SSAD 3.1].

The three main portions of the system, Zaguán (Archive Viewer), Mayordomo (Archive Administrator), and Archivo (Server), are broken up further to understand the types of tasks involved in each. This breakdown reflects the type of work that must occur in each portion in order to improve COCOMO II results by allowing each different type of work to have a different EAF.

Zaguán will consist of approximately:

1. 6 static web pages
  - Main
  - Browse
  - Feedback
  - Help
  - Overview
  - Acknowledgements
2. 5 dynamic pages
  - 1 COTS
  - Results summary
  - Item
  - Paging request
  - Email request
3. Item pages
  - Item details and Table of Images
  - Images

Mayordomo consists of:

1. 2 COTS
2. Image and item managers
  - Item detail manager

- Media list manager
- Field options manager
- 3. Miscellaneous managers
  - Type manager
  - User Access Manager

Archivo consists of:

1. 6 COTS
2. Query processor
3. Item builder

## 5.2 Budgets

The resources for the design and implementation of the Hispanic Digital Archive will consist mainly of manpower in the form of development effort. The system will be designed and implemented on a 24-week schedule. The first 12-weeks entails designing the architecture and system requirements. A 5-person team from CSCI577a handles this portion of the project life cycle. No design costs are incurred at this point because the design is considered class work. The second 12-week period also incurs no costs since this implementation portion of the project life cycle is considered class work. Group size for the implementation stage of the system is 3.5 people in CSCI577b.

The non-zero cost resources are the manpower needed for the actual entry of data into the Hispanic Digital Archive. This will require a 2-person group working approximately 3 years or 156 weeks with each person working 40 hours per week to completely convert and enter data for all 50,000 items in the HDA. The Customer may decide to use more people having each person spend less time per week, but that configuration has no major impact since 80 hours of work per week are required no matter how many people are hired. An estimate of \$11 per hour per person has been determined, which amounts to a total of \$140,000 for complete data entry costs of the initial 50,000 items.

ISD would provide the necessary COTS software, hardware and support. Software includes IDE environments, IBM Digital Library, and tools used for design and documentation such as Rationale Rose. ISD would also provide the hardware for the storage of 50,000 Hispanic Digital Archive items. Additional software is required to be purchased from AccuSoft to provide integrated access to scanners using the TWAIN interface. This software will handle image format conversions and support TIFF, GIF, JPEG, and BMP formats. AccuSoft ImageGear ActiveX-LT 16/32 is priced at \$300.

Hardware costs will only consist of any PCSCITo be purchased for administrative and data entry use. 2 PCSCIIare needed for the 2-person data entry group since we are assuming only 2 people working concurrently. The price of a sufficient PC with moderate performance is estimated to cost \$1,850 as of December 1998. This price may change when the PC is actually purchased because of the continuously decreasing price of PCs. Also, vendors may be willing to donate hardware, given due recognition.

<b>Project Elements</b>	<b>Cost</b>	<b>Responsible Parties</b>
Design Stage	\$0	CS577a group
Implementation Stage	\$0	CS577b group
Data Entry	\$140,000	Data Entry Operators (3 years)
Imaging and Scanner	\$300	Customer must purchase software to convert image types and provide scanner interface
Hardware (2 PCs)	\$3,700	Purchased by Customer prior to Data Entry Stage
Data Content Expert	\$120,000	Project Manager hired by Customer (3 years)
Total Costs	\$264,000	\$300,000 Sponsor support (3 years)

**Table 13 Deployment Budget**

The total cost of \$264,000 does not include the entry of any additional items beyond the 50,000 initial items into the HDA. The cost also does not include any type of future upgrades to the system or

implementation of future functionality or capability. The cost of software still in question is not included in this total figure. The final neglected cost is the cost of administration for ISD in maintaining the IBM Digital Library. This cost, if a related cost even exists, is expected to be negligible because the Hispanic Digital Library and the Information Services Division are both entities within USC.

## **6 Assumptions**

The life cycle plan is based on the following assumptions. If the environment changes or any of the following assumptions do not hold good, then this plan needs to be reviewed.

- 1 The operational concept and requirements are stable
- 2 Current staffing plan does not require changes
- 3 Available development schedule does not vary
- 4 Continuity of funding
- 5 Customer continues to be available for feedback and clarifications
- 6 The ISD continues to support the development environment and the class CSCI577b
- 7 Required tools are furnished on time
- 8 The ISD takes a commitment on deploying the system on IBM Digital Library
- 9 IBM Digital Library would be available as per System architecture
- 10 Digital Library client is available for installation on Windows NT

## 7 Appendix

### A. Walkthrough log template

<b>Walkthrough log</b>			Form no.
Artifact being reviewed:	Version:	Date:	
Authors of Artifact:			
Review criteria:			
#	Reference	Remarks (D, M, I) <sup>1</sup>	Resolution priority (A,B,C) <sup>2</sup>

Summary:

Number of D -	M-	I-	Total -
---------------	----	----	---------

Acceptance Status:

<sup>1</sup> D – Defect, M- Mistake, I - Issue

<sup>2</sup> A - Within three days, B – within a week, C- in a fortnight

### B. COCOMO Results

C:\USER\hda20.est - USC-COCOMO II.1999.0

File Edit View Parameters Calibrate Phase Maintenance Help

Project Name:  Scale Factor  Schedule

Development Model:

X	Module Name	Module Size	LABOR Rate (\$/month)	EAR	NOM Effort DEV	EST Effort DEV	PROD	COST	INST COST	Staff	RISK
	Archivo	S:500	0.00	0.61	1.6	1.0	524.5	0.00	0.0	0.2	2.1
	Item pages/Arc	S:300	0.00	0.61	0.9	0.6	524.5	0.00	0.0	0.1	2.1
	Misc. pages/Ar	S:200	0.00	0.78	0.6	0.5	406.7	0.00	0.0	0.1	2.1
	Data Managemen	S:800	0.00	1.46	2.5	3.7	218.6	0.00	0.0	0.6	2.1
	Image Manageme	S:550	0.00	1.19	1.7	2.1	267.4	0.00	0.0	0.3	2.1
	Reports/Mayodo	S:250	0.00	0.71	0.8	0.6	447.0	0.00	0.0	0.1	1.4
	User Access/Ma	S:250	0.00	0.81	0.8	0.6	391.6	0.00	0.0	0.1	1.4

	Estimated	Effort	Sched	PROD	COST	INST	Staff	RISK
Total Lines of Code: <input type="text" value="2850"/>	Optimistic	7.1	5.5	398.9	0.00	0.0	1.3	
	Most Likely	8.9	5.9	319.1	0.00	0.0	1.5	13.2
	Pessimistic	11.2	6.3	255.3	0.00	0.0	1.8	

Project File : C:\USER\hda20.est Is Loaded

EAF - Archivo

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE

base

Incr%

Platform: TIME STOR PVOL

base

Incr%

Personnel: ACAP AEXP PCAP PEXP LTEX PCOM

base

Incr%

Project: TOOL SITE

base

Incr%

User: USR1 USR2

base

Incr%

EAF is also affected by Schedule

EAF:

**EAF - Item pages/Archivo** [X]

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE  
base VLO LO NOM NOM NOM  
Incr% 0% 0% 0% 0% 0%

Platform: TIME STOR PVOL  
base HI NOM LO  
Incr% 0% 0% 0%

Personnel: ACAP AEXP PCAP PEXP LTEX PCON  
base VHI LO VHI LO VLO LO  
Incr% 0% 0% 0% 0% 0%

Project: TOOL SITE  
base NOM VHI  
Incr% 0% 0%

User: USR1 USR2  
base NOM NOM  
Incr% 0% 0%

EAF is also affected by Schedule  
EAF: 0.61

OK Cancel Help

**EAF - Misc. pages/Archivo** [X]

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE  
base LO LO NOM NOM NOM  
Incr% 0% 0% 0% 0% 0%

Platform: TIME STOR PVOL  
base HI NOM NOM  
Incr% 0% 0% 0%

Personnel: ACAP AEXP PCAP PEXP LTEX PCON  
base VHI LO VHI LO VLO LO  
Incr% 0% 0% 0% 0% 0%

Project: TOOL SITE  
base NOM VHI  
Incr% 0% 0%

User: USR1 USR2  
base NOM NOM  
Incr% 0% 0%

EAF is also affected by Schedule  
EAF: 0.78

OK Cancel Help

**EAF - Data Management/Mayordomo** [X]

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE  
base HI HI NOM HI NOM  
Incr% 0% 0% 0% 0% 0%

Platform: TIME STOR PVOL  
base HI HI NOM  
Incr% 0% 0% 0%

Personnel: ACAP AEXP PCAP PEXP LTEX PCON  
base VHI LO VHI LO VLO LO  
Incr% 0% 0% 0% 0% 0% 0%

Project: TOOL SITE  
base NOM VHI  
Incr% 0% 0%

User: USR1 USR2  
base NOM NOM  
Incr% 0% 0%

EAF is also affected by Schedule  
EAF: 1.46

OK Cancel Help

**EAF - Image Management/Mayordomo** [X]

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE  
base LO NOM NOM HI NOM  
Incr% 0% 0% 0% 0% 0%

Platform: TIME STOR PVOL  
base HI VHI NOM  
Incr% 0% 0% 0%

Personnel: ACAP AEXP PCAP PEXP LTEX PCON  
base VHI LO VHI LO VLO LO  
Incr% 0% 0% 0% 0% 0% 0%

Project: TOOL SITE  
base NOM VHI  
Incr% 0% 0%

User: USR1 USR2  
base NOM NOM  
Incr% 0% 0%

EAF is also affected by Schedule  
EAF: 1.19

OK Cancel Help

**EAF - User Access/Mayordomo** [X]

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE  
 base [NOM] [NOM] [NOM] [NOM] [NOM]  
 Incr% [0%] [0%] [0%] [0%] [0%]

Platform: TIME STOR PVOL  
 base [NOM] [HI] [NOM]  
 Incr% [0%] [0%] [0%]

Personnel: ACAP AEXP PCAP PEXP LTEX PCON  
 base [VHI] [NOM] [VHI] [LO] [VLO] [LO]  
 Incr% [0%] [0%] [0%] [0%] [0%] [0%]

Project: TOOL SITE  
 base [NOM] [VHI]  
 Incr% [0%] [0%]

User: USR1 USR2  
 base [NOM] [NOM]  
 Incr% [0%] [0%]

EAF is also affected by Schedule  
 EAF: [0.81]

[OK] [Cancel] [Help]

**EAF - Reports/Mayodomo** [X]

base + Incr % = rating

Product: RELY DATA DOCU CPLX RUSE  
 base [LO] [NOM] [NOM] [NOM] [NOM]  
 Incr% [0%] [0%] [0%] [0%] [0%]

Platform: TIME STOR PVOL  
 base [NOM] [NOM] [NOM]  
 Incr% [0%] [0%] [0%]

Personnel: ACAP AEXP PCAP PEXP LTEX PCON  
 base [VHI] [NOM] [VHI] [LO] [VLO] [LO]  
 Incr% [0%] [0%] [0%] [0%] [0%] [0%]

Project: TOOL SITE  
 base [NOM] [VHI]  
 Incr% [0%] [0%]

User: USR1 USR2  
 base [NOM] [NOM]  
 Incr% [0%] [0%]

EAF is also affected by Schedule  
 EAF: [0.71]

[OK] [Cancel] [Help]

