FEB 27 1995
35 Station 21

ENGINEERING DATA TRANSMITTAL

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5. Proj./Prog./Dept./Div.: R40650	6. Cog. Engr.: Mark Holowczak	7. Purchase Order No.: NA
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		10. System/Bldg./Facility: QUEST2/CADS
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		14. Required Response Date: June 15, 1994

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(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-GN-CSWD-20010		0	QUEST2: SYSTEM ARCHITECTURE DELIVERABLE SET	Q	1		

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1/2	1	Cog.Eng. Mark Holowczak	<i>[Signature]</i>	4-86	B5-16	Bibi Jones	<i>[Signature]</i>	4-86	B5-16	3	
1/2	1	Cog. Mgr. Samuel A. Vega	<i>[Signature]</i>	4-86	48-07	OSTI (2)	<i>[Signature]</i>	4-86	48-07		1
1/2	1	QA Mark Hermanson	<i>[Signature]</i>	4-79							
		Safety									
		Env.									
1/2	1	Sara Y. Bian	<i>[Signature]</i>	6/1/94	B5-25						
1/2	1	Floyd D. Braaten	<i>[Signature]</i>	5/19/94	B5-25						

18. Signature of EDT Originator <i>[Signature]</i> 05/19/94 Date	19. Authorized Representative for Receiving Organization Sara Y. Bian <i>[Signature]</i> 6/1/94 Date	20. Cognizant/Project Engineer's Manager Samuel A. Vega <i>[Signature]</i> 6/5/94 Date	21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
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This document was reviewed following the
procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

V. L. Birkland
V.L. Birkland

1/25/95

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CA Data Systems

QUEST2: SYSTEM ARCHITECTURE
DELIVERABLE SET

TITLE:

Approved by

QUEST2: SYSTEM ARCHITECTURE DELIVERABLE
SET

S. A. Vega, Manager

INTRODUCTION

CA Data Systems

1.0 PURPOSE

This document contains the system architecture and related documents which were developed during the Preliminary Analysis/System Architecture phase of the Quality, Environmental, Safety Tracking System redesign (QUEST2) project.

2.0 SCOPE

Each discreet document in this deliverable set applies to a analytic effort supporting the architectural model of QUEST2. The P+ methodology cites a list of P+ documents normally included in a "typical" system architecture. Some of these were deferred to the release development phase of the project.

The documents included in this deliverable set represent the system architecture itself. Related to that architecture are some decision support documents which provided needed information for management reviews that occurred during April. Consequently, the deliverables in this set were logically grouped and provided to support customer requirements. The remaining System Architecture Phase deliverables will be provided as a "Supporting Documents" deliverable set for the first release.

3.0 FORMAT CONVENTIONS FOR THIS DOCUMENT

This deliverable set is composed of eight (8) Appendices. Each appendix is a discreet deliverable. These are:

Appendix	P+ DEL NO	Title and Content
Appendix A	120	Survey of Existing System: Provides a review of the current Corrective Action Management system support structure.
Appendix B	120	Survey of the Existing DOE System: Provides a review of the DOE-RL Corrective Action Management System support structure that was incorporated into the QUEST2 project scope

QUEST2: PROJECT PLAN FOR PRELIMINARY ANALYSIS/SYSTEM ARCHITECTURE PHASE (PA/SA) INTRODUCTION	Document Section Page Effective Date	WHC-SC-GN-CSWD-20010 Introduction, REV 0 2 of 2 May 15, 1994
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Appendix C	130	System Objectives: Provides a statement of system objectives which will fulfill those noted in the Opportunity Evaluation (see WHC-SD-PMP-30012 Appendix A)
Appendix D	230/240	External Design Alternatives and Basic System Concepts: Reflects the general system concepts which will be employed to address the system objectives..
Appendix E	140/150/170/ 180/190	Data Models: The complete set of data models completed to an SA level of detail.
Appendix F	250	Process Models: The complete set of process models completed to an SA level of detail.
Appendix G	260	Technical Alternatives: The analysis of the technical alternatives available to build the system with a resultant recommendation on the alternatives that present the best technical feasibility.
Appendix H	270	Implementation Strategy: The overview of various release options containing differing mixes of Unit Processes with the resultant cost/schedule estimates.

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SURVEY OF EXISTING SYSTEM
(P+ DOCUMENT #120)

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1.0 PURPOSE

To understand the initial situation and provide a basis for definition of the objectives and key issues of the new system.

2.0 CURRENT SYSTEM PURPOSE

QUEST is a central repository of information on adverse conditions and associated corrective actions.

QUEST automated and manual processes attempt to capture the essence of source documents (audits, appraisals, etc...) within a common denominator of data structures. The intent is to facilitate tracking, reporting and performance evaluation for Corrective Action Management (CAM) items.

3.0 USERS (THOSE WHO INTERACT WITH QUEST)

User Category	User Relation to QUEST Data
Corrective Action Database System (CADS)	Provides QUEST system administration, QUEST data transcription and data entry. (Approximately 25 total users)
Identifying Organizations (Internal and External to WHC)	Provide QUEST with source documents which identify the adverse conditions. Review QUEST performance status. There are approximately 80 unique document types tracked in QUEST. (See detail listing in Appendix A)
Condition & Action Owners (WHC employee)	Virtually any site employee or organization that is responsible for condition/action information recorded in QUEST. A few have on-line status update capability; the majority have read-only report access via Soft Reporting. (Approximately 600 total users)

The QUEST database averages about 6 concurrent users during regular business hours.

4.0 MODEL OF THE EXISTING SYSTEM

The current automated system has been in use approximately 5 years. QUEST functions are implemented in the NOMAD (version 5.52A) programming language, running under the MVS operating system on an IBM 3090 mainframe computer. QUEST software has experienced a progression of enhancements and upgrades in reaction to evolving user requirements. It is complemented and interacts with various manual activities. In total, the manual and automated support comprises the QUEST information system.

This information system is positioned within the Corrective Action Management System (CAMS) as one of CAMS' elements. The QUEST database is meant to track and report the status of conditions from their identification through corrective action and closure. Prior to May 3, 1993, QUEST contained CAMS data only. A significant enhancement implemented on May 3rd allowed QUEST to potentially process non-CAMS data. This broader tracking capability was a specific addition requested by the Plutonium Finishing Plant (PFP).

Figure 1 is a QUEST functional process diagram showing the automated and manual QUEST information system in graphical form. Information in Figure 1, and the graphical symbol used to convey it, is explained as follows:

- External Actors: entities that are outside the system boundaries
- QUEST Functions: processes or work that is supported by QUEST
- Data Stores: repositories for data
- Information Flow: represents the flow of information between processes and other processes and/or entities.

4.1 External Actors.

Responsible Actionee. A person (or organization) charged with completing an action item associated with a specific identified condition. The Responsible Actionee will provide status updates and closure information to QUEST.

Identifying Organization. The organization that identifies and reports the condition; the condition owner may be part of the identifying organization. The Identifying Organization will fall into one of two categories: External and Internal.

Sample External: DOE-RL, DOE-HQ, Washington State Dept. of Ecology, Washington State Dept. of Health, Independent Auditors and Tiger Team Auditors

Sample Internal: WHC QA, Safety and Environmental Audits or Individual site employees might identify and report conditions.

These organizations convey adverse "conditions" via a variety of documents which are a significant information flow to QUEST. Approximately 80 different document types are currently allowed. A "condition" is defined as a failure, malfunction, deficiency, unapproved deviation, defective item or nonconformance when compared to procedural or regulatory requirements.

Document types are categorized by class: Assessment, Audit, Surveillance, Occurrence, Appraisal and Inspection. The following table contains **some** examples:

Document type code	Document type description	Class
ATS	Automated Tracking System	Assessment
AUD	Audit Finding/Closure Report	Audit
CMP	Office of Compliance	Surveillance
CRT	Critique	Occurrence
EMA	Environmental Management Appraisal	Appraisal
NCR	Nonconformance Report	Inspection

This external actor represents a **manual** interface to QUEST. Identifying Organization is also an information recipient of the QUEST reporting function.

Site Organizations (CAMS). Hanford site organizations produce various PPG, RCA and LLA values while following Corrective Action Management procedures. The CAMS procedures include several steps which produce information that is passed into QUEST. The procedures of interest are:

Priority Planning Grid (PPG). A formal process to evaluate each condition and assign a PPG value. This is conducted by a trained member of the Corrective Action Evaluation Group. The higher the PPG value, the more attention its associated condition receives. The PPG function, a main step in the CAMS process, produces a PPG value which is entered in QUEST files. (**Manual** interface).

Root Cause Analysis (RCA). An important step in the CAMS process, RCA is performed when the PPG value is greater than or equal to 6. RCA defines the single condition which will, if corrected, prevent recurrence of the problem. RCA codes, once determined, are entered into QUEST via data entry screen. (**Manual** interface).

Lessons Learned Analysis (LLA). If the condition's PPG value is greater than or equal to 11, a Lessons Learned Analysis is performed (also a step within the CAMS procedure). Lessons learned is a central review across organizational boundaries to identify conditions at one location which could apply to other locations. LLA information is **manually** entered into QUEST files.

PeopleCORE. This Hanford Personnel data base provides organization codes and a method of verifying people's names when entering condition/action data to QUEST. This **manual** interface is a research source for DBAs or others transcribing information for QUEST use.

FacilitiesCORE. The Hanford Facilities information system supports verification of building-related information prior to QUEST system data entry. This is a **manual** interface for those transcribing information for QUEST use.

Corrective Action Management Board (CAMB). CAMB is charged with setting ESQ policies and procedures, provides guidance to condition/action transcription and CADS system administration functions. This is a **manual** interface.

Financial Data System (FDS). FDS provides a source of reference for CADS system administration: Organization codes, organization titles, and responsible person information. The process of collecting FDS information is also a **manual** interface.

CADS Manager. The CADS Manager, in addition to the CAMB, has a direct influence on the CADS Administration function. These functions influence the procedures, policies, and administrative rules which QUEST supports. For example, a new document type must be approved by the CADS Manager before it can be processed by QUEST. This is a **manual** interface.

Soft Reporting. Thirty-five (35) standard reports are transferred to the Soft Reporting facility via electronic file on a weekly basis. Soft Reporting

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system support personnel administer the distribution of QUEST standard reports by providing/denying user access to this on-line report viewing/printing utility.

Management Analysis Company - TEchnical services (MACTEC). A DOE contractor charged with the responsibility of administering several DOE-RL databases. Each database has its own specific purpose and contains a portion of QUEST's condition performance data. QUEST batch processing creates electronics files which are periodically downloaded to MACTEC databases. The databases are: Central Information Control System (CICS), Tiger Team, PAT, and Hanford Self-Assessment database (HSADB). These data bases are occasionally cross-checked against QUEST contents using manual processes. They are also used by some external actors to administer their portion of site oversight.

DOE. This external actor occasionally requests special QUEST reports.

Upper Level Management. This external actor receives condition/action status via QUEST reports (standard on-line, adhoc or Soft Reporting).

Various Site Facilities. Facilities such as PFP utilize the QUEST database to track non-CAMS items.

Total quality and Performance Evaluation (TPE). This organization administers the Self-Assessment program for WHC. TPE provides Self-Assessment and related policy/procedure guidance to WHC organizations.

CADS Organization. This external actor provides policies and procedures (e.g. issues and self-assessment) information that are not formally part of the CAMS procedure. (Manual interface)

4.2 QUEST Information System Functions.

Transcribe Condition/Action data. All condition/action data is entered during this key function. Data is gathered manually from various sources (i.e., source documents, FDS, etc ...) and entered into QUEST files via QUEST data entry screens.

Provide Condition/Action Information. This function provides reporting via on-line screens, special adhoc report requests and weekly updates to the Soft Reporting system. Reports are made available to all employees/organizations which have a need-to-know status for condition/action information.

CADS System Administration. CADS maintains the QUEST Administration database which controls general user privileges, error message tables, list of standard reports, valid document types, etc.

4.3 QUEST Automated Data Stores.

Administration database. The QUEST Administration database contains information which controls the system's operation. Tables within the Administration database contain the standard list of error messages, and a list of QUEST's standard reports. They also establish a user's classification for QUEST access security, establish QUEST user views, and determine which programs the user is allowed to access. They determine which document types, administrative programs and tracking systems the user is allowed to access. A user monitor table is also included which tracks the programs and reports that a user has operated and the CPU usage that the user has consumed while in the NOMAD environment.

Transaction database. The QUEST Transaction database is used to hold input, update, certification, cancellation and deletion records for QUEST conditions and actions. A separate transaction area is used to allow an independent review of the data prior to its entry into the Certified database and to reduce the number of physical records that must be traversed in order to perform reviews.

Certified database. The QUEST Certified database is a read-only database which holds the "certified" QUEST condition/action information. The Certified area contains QUEST data which has undergone a review of some kind prior to being released for use in QUEST's standard and adhoc reporting process.

History database. The QUEST History database holds a change history of the non-text portion of condition/action data. The History database provides the basic information needed to establish an accurate accounting of the status history of QUEST items for purposes of performance analysis and performance monitoring.

4.4 Manual Data Stores.

WHC-CM-1-3 Corrective Action Management System. This document provides the policy and procedures for the Corrective Action Management System (CAMS). It gives the overview of how the varying parts of the system are expected to work together and who has general responsibility for them.

WHC-CM-1-4 Corrective Action Management Manual. This document provides the detailed instructions for conduct of CAMS.

WHC-CM-4-2 Quality Assurance Manual. This manual covers the content, intent, and general management procedures associated with Quality Assurance (QA) for WHC.

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ES&H Information Management Network. This DOE document provides the management plan and requirements for central DOE network access to ESQ information.

WHC-CM-7-6 Environmental Compliance Verification Program Manual. This document covers such topics as Functional Appraisals, Management Appraisals, Environmental Audits, Surveillance/Compliance Inspections and resolution of disagreements on compliance verification findings.

WHC-CM-4-30 Nuclear Safety Manual. This document contains information about Safety Audits and Appraisals of WHC Nuclear Facilities and Reactors in addition to Operational Safety Assessments.

5.0 FINDINGS

5.1 Strengths

The QUEST database provides the best current central reference of Corrective Action Management's "conditions" and related "actions". This centralization has been of direct benefit to users needing a source of consolidated review.

The current system captures condition text data and transforms it into a form that can be reported in the current technical environment. This permits a data base query capability of information which would otherwise have to be provided after a manual search of many hard copy documents.

The system is well established on site. It is supported by a well trained system administration support staff that is intimately familiar with its operation. The manual processes and automated support are familiar to the user community.

Within the current hardware/software environment, the automated system is effectively utilizing the technology available.

5.2 Weaknesses

The structure and terminology of hard copy documents are translated into data elements and textual synopses when entered into the automated system. This process is subjective in nature and dependent on the data entry person. Information gleaned from source documents and passed into QUEST data stores may not be consistent among DBA's (who perform the translation process). Consequently, the credibility of the central data store contents is undermined.

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No direct interface is possible from QUEST data to the source document. During the translation process, the document identifiers are noted. However, a document may be in one of a multitude of storage sites. If needed for research, it must be traced to that storage site and physically retrieved.

Support for integration of CAMS related business processes is lacking. There is no central system architecture. As a result, elements of CAMS tend to be isolated and operated/modified without consideration of their relationships to each other. This results in "patchwork" system interfaces and sometimes conflicting decisions on the direction of specific CAMS support elements.

It is difficult to extrapolate trending information from QUEST data. The data is discreet without links to other data that may be related. The trending models require specific statistical retrieval on common events. Such commonality is difficult to identify.

Data entry screens are very busy (crowded). They are difficult to navigate to a specific field without studying the screen to find it. There are a large number of fields on the screen. Current technology does not provide many options on display shading, bolding, colors, etc. to make certain fields (such as mandatory fields) stand out in contrast. The result is a less-efficient data entry/data retrieval process which can be burdensome on the human interface.

4 people (CADS) spend 100% of their time in data entry. There are many other DBAs engaged in this activity throughout the site. Yet much of the data is already in electronic form. A substantial manpower savings may be possible if much of this electronic information can be integrated without manual transcription.

Other information is not readily available and requires research to complete the data entry activity. For example, identifying information on organizations is often not readily available. Consequently, 20% of 25 DBA's time is spent in researching organization codes, names, facility and site locations, etc.

Actionees associated with conditions are not automatically notified when assigned actions or when the status of their condition data changes. Consequently, actionees find themselves delinquent on actions they did not know were theirs or pursuing actions that have been changed/deleted without their knowledge.

CADS staff members labor to produce approximately 200 custom reports monthly. The current technology does not support direct tailored query by the average system user.

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6.0 DIAGNOSIS OF THE SYSTEM

The existing system is a collection of manual and automated processes that are not smoothly integrated. This situation makes the system difficult to use and administer. The automated portion processes redundant Condition/Action information which creates data credibility problems.

The automated system is based on older technology which manifests itself through both higher maintenance costs and archaic user presentation. A primary purpose of the system is to provide timely and consistent response to user query. The current technology does not make this possible without dedicated programmer support to create queries.

The manual portions of the system are poorly coordinated and inconsistently documented. Lack of common definitions for terms creates communication problems. Users are not always in compliance with their requirements.

Model of Existing System

(120)

ESQST
Created by: kinney
Revised by: kinney
Date changed: 28-OCT-93

DATABASE ADMINISTRATORS BY DOCUMENT TYPE

AMO	RL Assistant Manager of Operations Rosemary Keasling.....	376-2924
AUD	Audit Finding/Observation James Lauck.....	376-4521
CAR	Corrective Action Request Kaye Ray.....	376-2191
CMP	RL Office of Compliance Surveillance JoAnn McCoy.....	376-5362
CRT	Critique (Prior to 9/1/90) Keri Burrus.....	376-2889
CSA	Compliance Schedule *p961XApproval Pam Shafer.....	372-2742
DHE	DOE-HQ Environmental JoAnn McCoy.....	376-2924
EAU	WHC Environmental Audit Finding/Observation Jim Lauck.....	376-4521
ECI	Environmental Compliance Issue JoAnn McCoy.....	376-5362
ECO	Environmental Compliance Order JoAnn McCoy.....	376-5362
ECP	Environmental Compliance Plan JoAnn McCoy.....	376-5362
EFA	WHC Environmental Functional Appraisal Jim Lauck.....	376-4521
EFC	Environmental Facility Compliance JoAnn McCoy.....	376-5362
EMA	Environmental Management Appraisal/Audit Jim Lauck.....	376-4521
ENV	Environmental Audit/Appraisal Jim Lauck.....	376-4521
EPA	Environmental Protection Agency JoAnn McCoy.....	376-5362
ESI	Environmental Surveillance/Compliance Inspection JoAnn McCoy.....	376-5362
FER	Federal Energy Regulatory Commission Inspection Kaye Ray.....	376-2191

FMD	RL Financial Management Division Surveillance Rosemary Keasling.....	376-2924
GCA	General Counsel Audit Raymond Hilton.....	376-4865
IAA	Integrated Audit/Appraisal Jim Lauck (Audit/Environmental)..... Gary Carpenter (Emergency Preparedness).... Frances Turner (Safety).....	376-4521 372-2161 372-3525
INV	Property Inventory Kaye Ray.....	376-2191
ISA	Internal Self-Assessment Angela Horne.....	376-9412
ISR	Inspection/Surveillance Report Angela Horne.....	376-9412
NCR	Non-Conformance Report Keri Burrus.....	376-2889
OPA	RL Office of Performance Assessment JoAnn McCoy.....	376-5362
OPD	RL OPS Division Surveillance/Audit JoAnn McCoy.....	376-5362
ORT	Occurrence Report Keri Burrus (Balance of Plant)..... Cecelia Schmidli (K Basins)..... Karen Thomson (PFP)..... Carolyn Schuster (PUREX)..... Ray Ransier(Tank Farms).....	376-2889 373-2946 373-4929 373-9172 373-3684
OSA	Operational Safety Assessment Frances Turner.....	372-0517
OTD	RL Operations & Transition Division Surveillance JoAnn McCoy.....	376-5362
PAT	Progress Assessment Team Rosemary Keasling.....	376-2924
PEI	Preparedness Exercise Issue Carol Cook.....	372-1487
PMD	RL Project Management Division Surveillance Keri Burrus.....	376-2889
PMW	Property Management Walkthrough Kaye Ray.....	376-2191
PRO	Procurement Surveillance Report JoAnn McCoy.....	376-5362

PRP	Emergency Preparedness Audit Findings/Observations Gary Carpenter.....	372-2161
QAI	DOE-HQ Quality Assurance Inspection Rosemary Keasling.....	376-2924
QMA	Quality Assurance Management Assessment Kaye Ray.....	376-2191
QSH	DOE-RL Quality/Safety/Health Division Surveillance JoAnn McCoy.....	376-5362
REI	RL Environmental Surveillance/Inspection JoAnn McCoy.....	376-5362
RIV	DOE-RL Investigations Rosemary Keasling.....	376-2924
RLA	RL Quality Assurance Audit JoAnn McCoy.....	376-5362
RLE	RL Environmental Audit/Appraisal/Survey JoAnn McCoy.....	376-5362
RLS	DOE-RL Safety Audit Appraisal Keri Burrus.....	376-2889
RLW	RL Defense Waste Management Audit/Surveillance Keri Burrus.....	376-2889
RPR	Radiological Problem Report Janet Lindsey.....	373-1858
RRR	Readiness Review Request Kaye Ray.....	376-2191
RSI	RL Safety Surveillance/Inspection Keri Burrus.....	376-2889
RSR	RL Quality Assurance Surveillance JoAnn McCoy.....	376-5362
SAA	Security Applications Center Audit Bernadine Nelson.....	376-5232
SAF	Safety Appraisal/Audit Finding/Observation Frances Turner.....	372-0517
SAS	RL-Safeguards & Security Surveillance Bernadine Nelson.....	376-5232
SEA	Site Electrical Assessment JoAnn McCoy..... Dick Rasp (POC).....	376-5362 376-0142
SEC	Security Internal Audit Bernadine Nelson.....	376-5232

SED	RL Safety Environmental Division Surveillance Keri Burrus.....	376-2889
SFA	Safeguards Audit Bernadine Nelson.....	376-5232
SFM	Safety Factory Mutual Audit/Appraisal Keri Burrus.....	376-2889
SFP	Safety Fire Protection Survey Carolyn Hebert.....	376-8734
SHP	Safety Health Physics Appraisal Keri Burrus.....	376-2889
SID	RL Site Infrastructure Division Surveillance Angela Horne.....	376-9412
SMA	Safeguards and Security Program Audit Bernadine Nelson.....	376-5232
SMD	RL Site Management Division Surveillance Angela Horne.....	376-9412
SNF	Safety Nuclear Facility Appraisal/Audit Frances Turner.....	372-0517
SPA	Hanford Patrol Audit Bernadine Nelson.....	376-5232
STC	Short Term Compliance Pam Shafer.....	372-2742
TFO	RL Tank Farm Project Office Surveillance Keri Burrus.....	376-2889
TRB	Treatment Retrieval Branch of TPD Angela Horne.....	376-9412
TSA	Technical Safety Appraisal JoAnn McCoy..... Central Point of Contact Wiley Witherspoon (FFTF)..... Richard Szempruch (PFP)..... Roberta Eschenbaum (PUREX)..... Linda Barry (Tank Farms).....	376-5362 376-9022 373-1468 373-1017 373-5080
TSD	RL Technical Support Division Surveillance JoAnn McCoy.....	376-5362
TTA	Tiger Team Assessment Rosemary Keasling.....	376-2924
UOR	Unusual Occurrence Report (Before 9/1/90) Keri Burrus.....	376-2889
VPO	RL Vitrification Project Office Surveillance Keri Burrus.....	376-2889

WIA	Westinghouse Internal Audits Ray Hilton.....	376-4865
WIV	Westinghouse Investigations JoAnn McCoy.....	376-5362
WIP	RL Waste Isolation Pilot Plant Audit JoAnn McCoy.....	376-5362
WPE	Westinghouse Pittsburgh Environmental JoAnn McCoy.....	376-5362
WSE	Washington State Department of Ecology (WDOE) JoAnn McCoy.....	376-5362
WSH	Washington State Department of Health (WSDH) JoAnn McCoy.....	376-5362
WTG	WHC, Gov, Nuclear, Safety, Env, Oversight Jim Hagan.....	376-8169

ALTERNATE DATABASE ADMINISTRATOR

FFTF	Bill Kiou.....	376-9022
	Wylie Witherspoon (Backup).....	376-1805

1.0 PURPOSE

The purpose of this deliverable is to provide an understanding of the existing situation which will serve as a starting point from which to define the objectives and key issues of the new system.

2.0 MODEL OF THE EXISTING SYSTEM

The Central Information Control System (CICS) provides DOE-RL Management with visibility of identified deficiencies and status of corrective actions associated with Hanford Contractors. CICS provides the following functionality:

- Provides tracking of identified deficiencies and the status of the required actions for DOE-RL and DOE-HQ
- Provides tracking of violations from external agencies from external agencies (i.e. EPA, WDOH)
- Provides tracking of DOE-RL Employee Concerns
- Provides trending analysis
- Receives electronic downloads from Hanford Contractors in support of Tiger Team, PAT, and HSADB
- Provides reporting (Text and Graphics)
- Provides Ad Hoc query capabilities

In addition to this functionality the CICS system has various interfaces to existing system and organizations. The interfaces, although some have electronic files and are manipulated with batch files, are for the most part manual processes. Below is a breakout of each of the interfaces:

Satellite System Users - DOE Divisions on site

Amt/Freq: 4 different divisions / Weekly

Format: Paradox tables

Batch files that extract copies of the databases that contains only their data. These tables are put in password protected directories on HLAN.

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Contractors - WHC, PNL, HEHF, KEH Companies that provide services directly to DOE in support of the Hanford Mission.

Tiger Team Action Data - Status of actions for Tiger Team findings

Amt/Freq: Monthly
Format: Dbase III+, ASCII, Paradox

HSADB - Contractor identified conditions with PPG values ≥ 11

Amt/Freq: N/A
Format: Dbase III+, ASCII, Paradox

PAT Action - Status of actions for PAT Findings

Amt/Freq: Monthly
Format: Dbase III+, ASCII, Paradox

General Correspondence - Any and all correspondence that relates to the above items

Amt/Freq: On-going
Format: Hardcopy, CC:Mail, Wordperfect, Fax's

DOE-HQ Site Representative - On site DOE-HQ Representative perform assessments and collect findings. DOE-HQ issues reports to the Richland Field Office. The Richland Field Office will issue findings to the contractors. Responses are tracked to closure through CICS. Associated queries are performed on this data. Input for this might include queries from CICS and QUEST.

Report - Single format with different contents. Contains assessments, findings, and status. This report is received from the Site Rep in hardcopy format.

Amt/Freq: Single format with different contents. Received at a minimum quarterly.

Various DOE-RL Divisions - Various DOE Divisions on site

Received from: Request for information, findings, and general correspondence.

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Format: CC:Mail, Hardcopy, Fax's, and Wordperfect files

Send to them: Quarterly Status Reports and Query results.

Format: Hardcopy

Employee Concerns - DOE-RL Safety Concerns Program (SCP)

Received from: Concerns

Amt/Freq: 12/month
Format: CC:Mail, Hardcopy

Send to them: Monthly Status

Format: Hardcopy

DOE-RL Employee - Any DOE employee at the Hanford Site

Received from: Query Requests from CICS and QUEST

Amt/Freq: 15/month
Format: Telephone, CC:Mail, Walk-in, Hardcopy

Send to them: Query Report

Format: Hardcopy

DOE-HQ - DOE-HQ located off-site

Received from: Letters requesting various information on conditions and findings. High level rollup of contractor and DOE-RL self assessments.

Format: Hardcopy

Send to them: Report and Requested CICS/QUEST Information

Format: Hardcopy

Defense Nuclear Facilities Safety Board (DNFSB) - DNFSB has only done this twice, but now they know of the service, this number is expected to go up.

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Received from: Request for Information from CICS or QUEST

Format: Request Form or Walk-In

Send to them: Report of requested information

Format: Hardcopy

IMATS - Issue Management Action Tracking System - High level - Top issues for Hanford identified by DOE upper management.

Send to them: Report of status to Mr. Wagoner and DOE upper management.

Format: Hardcopy

Other Agencies - This interface does not exist today. This reports from other agencies such as EPA, WISHA, and others. Tracking the findings/violations, fines, and recommendations.

Received from: Reports

Format: Hardcopy

Send to them: Reports

Format: Hardcopy

3.0 USERS OF THE SYSTEM

The direct users of this system at this time is limited to the CICS group. This function is currently being performed by the MACTEC company for DOE.

4.0 FINDINGS

Strengths

The system was custom developed for DOE-RL for their needs.

The system is flexible and can easily be changed to meet changing needs.

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The language that it was developed in, Paradox, is common PC database language that is easy to learn and use. Once you understand the language it is user friendly for creating "Ad Hoc Queries" and routine reports.

Since it is a PC based system and resides on a local server the response time is very fast.

Weaknesses

CICS and Contractor systems are not uniform.

The system was not developed using structured coding.

No system documentation exists other than a user guide.

The system doesn't contain any field level edits.

Doesn't contain all the data needed to perform requested queries.

System must be redeveloped to migrate to the required new version of Paradox.

4.0 DIAGNOSIS OF THE SYSTEM

The current and future business practices of DOE and other Hanford Site contractors have an increasing need to share this information in more timely and efficient manner. With the current environment the possibility exist for information to be lost or never captured. No central control point exists for all of the different systems used. This could result in additional violations, fines, or corrective actions never being taken. It is recommended that a new work process be defined and common system be developed in support of this work process.

DOE CICS Current System Context Diagram

ESCICS
2/10/94 10:00 am

Note1: For the sake of simplicity, all data flows going from PNL, MCHV and XEH to CICS were not drawn, but are the same as those for WHC.

Note2: The data flows labeled "STATUS/IPTS/UPDATES" include various correspondence, verification, rejection, acceptance, closure, change reqts, notifications, responses, approvals, etc.

1.0 PURPOSE

- o To define the results to be delivered
- o To provide a basis for system modeling
- o To establish the reference criteria for system evaluation

2.0 PURPOSE OF THE SYSTEM

The purpose of the QUEST2 system is to provide an automated system which allows for the efficient and effective input, maintenance, tracking, analysis tools (e.g., RCA, PPG), trending and reporting of CAMS conditions in support of the CAM policies and procedures as administered by the CAMB. As a secondary purpose, the system will serve non-CAMS conditions to the extent such support is cost effective and feasible without disrupting or encumbering the CAMS-related data and processes.

3.0 OBJECTIVES OF THE SYSTEM

Objective #1	Provide a single and simple point of access for CAMS documents and data.
Objective #2	Provide the user with tools that will facilitate analyses such as RCA, PPG, LLE, and Trend Analysis.
Objective #3	Allow for the traceability of changes to the data.
Objective #4	Provide for automated interfaces with appropriate systems, minimizing manual interfaces where possible and cost effective.
Objective #5	Reduce yearly system maintenance costs by approximately 30%.
Objective #6	Reduce system user training and support costs per user by approximately 50 %.
Objective #7	Reduce the time required to make a system software/hardware change by approximately 40-50%.

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OBJECTIVES OF THE SYSTEM
(P+ DOCUMENT #130) (UPDATE)

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- Objective #8 Support and allow for consistent applicable site data standards, data definitions and formats.
- Objective #9 Allow users to create and generate their own on-line ad-hoc queries on relevant data.
- Objective #10 Allow immediate user notification upon an appropriate system trigger (e.g., data and/or status changes that impact a user and/or organization).
- Objective #11 Allow for an approximate 70-80% reduction in manual rekeying of CAMS data (i.e., DBA rekeying of data).
- Objective #12 Put the corrective action operations and data at the appropriate organizational level of ownership.
- Objective #13 Support non-CAMS information management by providing facilities with non-CAMS system support, as applicable.
- Objective #14 Provide input tool & report generator that allows originators to collect & report on their assessments (i.e., findings, conditions, etc.)
- Objective #15 Provide a mechanism to support system change control.
- Objective #16 Replace the DOE-RL CICS system.

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1.0 PURPOSE

This document contains a description of the QUEST2 basic system concepts and external design alternatives. The basic system concepts include functional concepts and control concepts.

2.0 FUNCTIONAL CONCEPTS.

The following functional concepts pertain to QUEST2.

- The system must be "easy to use" and offer support to its users.

Support will be provided through on line help facilities which assist in both system functions and business rule/terminology definitions. The Graphic User Interface (GUI)-based screens will provide:

- command buttons,
- tool bars,
- pull down menus,
- pick lists,

and other such industry standard GUI features. These features will be the basis for such tools as simple ad hoc query and report generator capability. In addition, these concepts must be adapted to daily end users and management users from both DOE and WHC.

- Continuity of Service.

If the system becomes unavailable for a period of time (e.g., due to network failure or Server failure), users will wait until the system is available again. They will then update the data base with information and data gathered during the down time. The hardware maintenance agreements in place for the system will include on-call 24 hour service. This will be supplemented with normal EUC maintenance urgency for all production systems.

- User notification.

The system will automatically generate notification messages to affected users when status updates occur for their assigned responsibilities. A cc:Mail interface will be present to accept a system message and generate electronic mail notices to the distribution list stored in the data base. Separate distribution lists can be maintained for each of initiating documents, conditions or actions. Status updates will be generated on a batch processing schedule occurring more than once each day rather than "real time" for each status update.

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- Documents generation (output).

The system will provide pre-defined correspondence quality documents. The document formats provided will be available on an optional basis for QUEST2 users at their discretion. For example, initiating documents, response documents, and PPG sign-off documents can be available if formats for them are defined. The system will also be able to generate a report to a Word Perfect compatible file. This will be available to users who wish to import such files into their own word processors to generate their own formatted documents.

The system will be able to generate a hard copy initiating document that can be signed and filed as the official "record copy".

- Initiating Document preparation (input).

The system will provide general data entry via one set of screens for each initiating document, condition and action. The initiating document form will have required fields based on a selected main assessment type:

- surveillance,
- assessment,
- audit,
- occurrence,
- appraisal

Non-required fields will either be subdued or available for optional use. The system will force required field entry and validate field contents when data integrity rules apply.

The system will allow input of free form text (for lengthy text description fields) using the site standard version of the WordPerfect word processing software. This functionality will be as transparent to the user as possible. The system will hold all data and text to be included on the initiating document report.

Original initiating document data and text will be stored to ensure that the same contents contained in the original hard copy "record copy" are also present within the system's various fields and files. If the data contents are later changed in the system, a new "record copy" will have to be generated.

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- Manual entry of initiating documents.

When it is not possible for initiating documents to be constructed through direct system use, pertinent data from a hard copy document will be manually entered by a "DBA". Screens and forms will be provided for this purpose.

- Support standard and user-generated ad hoc reports.

The system will provide automated standard reports to the site Soft Reporting system. It must also provide standard online, menu-accessible reports for system users. It must provide standard DOE reports which are provided to DOE Headquarters and to other agencies. An ad hoc report capability will be available for users wishing tailor made reporting.

- User queries.

QUEST2 will allow users to perform their own queries against the database. However, data access will be limited based on pre-defined security for a specific user type.

- Provide automated interfaces.

Automated interfaces will include other site contractors, other site repositories of needed data, and other site systems that use QUEST2 data. The system will support electronic file uploads of DOE reportable data from PNL and HEHF transmitted via predefined file over the LAN. A QUEST2 system administrator will be required to upload the file into QUEST2.

A download of data via electronic batch file will be available to pass action work data to AMS.

QUEST2 personnel and facility data elements from site standard systems will be refreshed via extract downloads in batch file. The QUEST2 system administrator will upload these files into QUEST2. Affected systems include:

- name, identification number, and organization code from PeopleCORE
- real property number and name, and area from FacilityCORE (FacilityCORE is a subset of PeopleCORE).

- Unique identifier for each person.

The Hanford Employee Identification Number, a data element of PeopleCORE, will be used to uniquely identify each person at the Hanford site. It will be implemented in PeopleCORE as a new data element in May of 1994.

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Since this closely parallels the QUEST2 development schedule, the new identification number will be used as a unique identifier for persons attached to QUEST2 conditions and actions. The development team will closely monitor the PeopleCORE implementation schedule.

The current Payroll number will be considered a "back up" unique identifier if the new identification number activation is delayed. This would be considered an interim measure only if the EIN is not implemented in time to support QUEST2. In that contingency, a DOE RL identification number will also be required. It will be artificially assigned to RL persons to use for system identification purposes until the EIN is activated. This interim approach would then require a system modification upon implementation of the EIN, and all records would require remapping to the EIN. During this interim period, personnel data validation checks for personal data will not be available for RL records.

- Responsibility for conditions and actions will be assigned to persons.

Responsibility for conditions or actions will not be assigned to organizations. Instead, responsibility will be assigned to persons, although persons may change organizations. The assigned person assumes the requirement to reassign his/her responsibilities to someone else if an organizational transfer occurs. The system will keep track of the original person's organization name and organization code to assist in researching old actions that may not be properly reassigned.

- Delinquent due dates.

Condition completion due dates are assigned to conditions and their associated actions. Only conditions will be considered "delinquent" in the formal definition of that word. Actions will be overdue when the current date is greater than the action due date. Condition due dates are determined by the latest due date of the longest action required to correct the condition.

- Query at the Action level.

Applicable users will be able to query and monitor actions to include their status dates.

- Support system administration.

The system will provide system administrators with the capability to monitor daily operations, update tables and other system features, control user access rights, and enhance system features to match new requirements as they arrive. The data base software will include

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maintenance and administration utilities as an integral part of the software package.

- Provide for DOE support for corrective action management.

The system must replace the current CICS system as indicated in the revised system context (Deliverable 140). It must accept data from other site contractors. It must provide for security of non-WHC data so only DOE users can view that data. It must support DOE-RL internal management requirements for corrective actions.

- Support non-CAMS data storage and access.

All system concepts for data storage, maintenance and access to CAMS data must be applied for non-CAMS data. The system must support the identification of non-CAMS data and recognize that certain CAM-unique functionality does not apply to non-CAMS data.

- Navigation.

The User interface will allow the user to 'navigate' from the initiating document screen to the condition screen and/or the action screen. With key information in any one of these three entities (initiating document, condition, action), a user will be able to navigate directly to any other related entity.

3.0 CONTROL CONCEPTS

The following functional concepts pertain to QUEST2.

- System access and security.
 - The system will keep a transaction log containing user and date for pre-defined system events.
 - The system will support two high-levels of security: DOE and WHC with multiple levels of security within each.
 - Read-only access will be granted at the record level for applicable users.
 - Field level security will be enforced for update transactions.
 - All normal menu options will be displayed but will appear "grayed-out" or subdued for users not granted access to specific menu options. The only exception to this concept will be for the System

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Administrator who will have all menu options, including some no other users will be able to see.

- Archiving.

The criteria for archiving QUEST2 data is as follows:

- All open items remain in the data base (not archived).
- "Closed" status can only occur for the initiating document and only "closed" items are considered for archival.
- The system manager will trigger the archiving process on a request basis.
- Archived data will be retained on magnetic tape in accordance with information storage and retention procedures as controlled by the central WHC records manager.
- Once an item is closed, it will be retained on line for the remainder of the current calendar year plus 2 years - then it will be archived during the next regular archival process running.
- Statistics will be maintained on-line which count the number of closed records including any archived records. (DOE requirement)
- The archival process will be activated at a consistent time interval e.g., January and June of each year.

- Performance monitoring.

System performance will be monitored to measure actual performance against performance goals. This will be done at the discretion of the system manager and is not planned to be incorporated into the QUEST2 automated processes. For example, the system manager may choose to evaluate every 6 months how many documents were entered by DBA's, etc.

- Reports and batch processing.

Batch processes will produce an execution report which will detail the run. An operator will be responsible to review the execution report and verify that the run processed satisfactorily. The system will allow user reports to be directed to either screen, printer or system files or all three.

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- Ensure data integrity.

Data will be protected against corruption through data validation checks and internal data integrity rules. The system will ensure that data is consistent across interfacing systems and internal unit processes. Data definitions and standards will match any that are already in existence on the site wherever QUEST2 is not considered the "owner" of the data.

- Electronic approval.

The system will support the formal change of data and information from a "draft" state to a "final" state. Based on system security parameters, records will be submitted as final when a person authorized to do so activates the submittal. Authorization to do so will be contingent on business rule definitions. Security parameters will reflect these rules. This functionality may be needed when:

- A lead assessor needs to approve an audit report before the document moves from draft to final status; or
- differing people must approve a PPG document before the PPG report is official.

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1.0 PURPOSE

This deliverable defines the context and a high level definition of the data included in QUEST2. Individual data elements will be defined in the supporting documents in an appendix titled Definition of Data Elements (320).

2.0 FUNCTIONAL STANDARDS

This document is composed of five Productivity Plus deliverables. Starting with the QUEST2 Subject Context Diagram (140), each succeeding diagram is an exploded view of an element on the previous diagram.

- **QUEST2 Subject Context Diagram (140):** This model defines the data used in QUEST2 that is defined and owned by external systems. It describes the scope of QUEST2 defined data. For example, QUEST2 will use personnel data but this is owned and defined by other systems, such as PeopleCore.
- **Definition of the Subject (150):** The word "subject" refers to all data defined and owned by QUEST2. This diagram illustrates a high level logical grouping of QUEST2 data. These are called facets. QUEST2 will contain data about Conditions, System Administration, Analysis and Change Control.

For each data facet described in the Definition of the Subject (150), there are the following models.

- **Definition of the Facet (170):** Each facet defined in the Subject Diagram (150) is divided into smaller logical groupings of data called entities. This diagram illustrates the relationships between the different entities, as well as, the external subjects defined in the Context Diagram (140). Entities and relationships may become tables in the QUEST2 database.
- **Definition of Entities (180):** This is a text definition of each entity, including integrity rules and dimensions, sufficient, after normalization, to define database tables.
- **Definition of Relationships (190):** This is a text definition of each relationship, including integrity rules and dimensions, sufficient, after normalization, to define database tables, if needed.

All of these models are provided as reports from the CASE tool used by the QUEST2 project and are included in this document as attachments.

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CONCEPTUAL DATA MODEL
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QUEST2 Subject Context Diagram (140)

DATE: 9-MAY-94
TIME: 18:13

Description of Subjects (140)

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Excelerator

Label	Name	Description
QUEST2 Data	SU01	The main subject of the QUEST2 system is QUEST2 Data. This subject contains or includes data on: <ul style="list-style-type: none">- Initiating Documents- Condition data- Action data- Root cause data (RCA)- Priority planning data (PPG)- Trending information- System administration data- Analysis Data- Change Control Data
Person	SU02	Personnel data will come from Hanford site personnel systems. Known types of information include employee name, organization code, managers name, employment status, employee number and manager level.
Building	SU03	Building is not well-defined from a site-wide perspective. It is currently being defined along with Facility because there is not one standard definition.
Work Control Task Data	SU06	Work Control Data includes that data that is maintained by one of the site's related systems such as the AMS or JCS system. This is detailed task-oriented action data that is tracked at the appropriate level.
Agency	SU09	Agency includes external organizations such as Washington Dept. of Ecology (WDOE) and Washington Dept. of Health (WDOH) that perform assessments and/or request information from the QUEST2 system.
Correspond. control	SU10	External data subject which contains correspondence control information.
RL-Div/Branch DOE	SU11	An RL Division/Branch number is the division/branch number as defined and maintained by the appropriate DOE-RL division. These are two separate fields which are currently being input into the CICS system as one field: example = "QSM/PSH" where QSM = the division and PSH = the branch.
Organization	SU13	This information about the organizational structure of WHC is maintained and defined by WHC PeopleCore.
Facility	SU14	Facility id's and descriptions are maintained by WHC facility core. We will use their information.
Contractor	SU16	A Contractor is any one of the organizational entities involved in doing work at the Hanford site. This includes DOE, WHC, HEHF, and KEH. Currently, there is no known site-wide owner/keeper of this data, therefore no known naming standards, etc.

COQST (140)
Created by: kinney

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Definition of the Subject (150)

SU01 (150)
Condition data
Created by: kinney

DATE: 9-MAY-94
TIME: 18:23

Description of Facets (150)

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Excelsior

Name	Label	Description
FA011	Condition Data	<p>The Condition Data facet will contain data about the Initiating Document, Condition and Action entities. Conditions may or may not be satisfactory (a "Noteworthy Practice").</p> <p>Kinds of (example) data:</p> <ul style="list-style-type: none">- Title of Audit, dates- Description of condition- Originator information- An executive summary- PPG 'as found' value- criteria/discussion information- Responsible person/organization, dates- Proposed recommendations for corrective action
FA013	Analysis Data	<p>The Analysis Data facet provides the data needed to assist in determining such information as Priority Planning Grid (PPG) values, Root Cause Analyses (RCA) and Trending data.</p> <p>Since the processes to perform these types of analysis is not well defined the required data is not well defined. The entities, relationships and attributes concerning analysis data will not be defined in detail at this time. Later releases of QUEST2 will include this information.</p>
FA015	System Admin	<p>The System Administration facet should contain information to support the System Administration function of system security, user access, control table maintenance, and the help function.</p>
FA017	Change Control	<p>The Change Control Facet contains data necessary for tracking and reporting on user-requested changes to the Quest2 system.</p>

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QUEST2: SYSTEM ARCHITECTURE
DELIVERABLE SET
CONCEPTUAL DATA MODEL
(P+ DOCUMENT #140, 150,
170, 180, 190)

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Deliverables for the Facet "Condition Data"

Definition of the Facet (170)

Definition of Entities (180)

Definition of Relationships (190)

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Entity Definitions for the CONDITION
DATA Facet (FA011)

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Name	Label	Description
EN0111	Initiating Document	<p>Definition of Entity: EN0111</p> <p>A document generated by any person(s) to identify one or more conditions.</p> <p>Integrity rules:</p> <p>Upon creation Initiating Documents must have the following information, a lead assessor and organization, a responsible person and organization, a document class, a subject, a title, date conducted, what was assessed and introduction text. Individual conditions will not be required until the status changes to draft-pending acceptance.</p> <p>Only DBA and assessor's will be allowed to input new initiating documents.</p> <p>Once status is final certain entities cannot be modified.</p> <p>Dimensions:</p> <p>Number of occurrences: 3000 from DOE + 25,000 from WMC = 28,000 total</p> <p>Number of characters : 10K to 80K</p> <p>Annual Rate of Increase: 20%</p>
EN01110	History Log	<p>Description text for progress made during the life of the Initiating Document.</p> <p>Integrity Rules:</p> <p>Free form text. Once created they cannot be modified or deleted. But any number of additional comments text will be allowed.</p> <p>Dimensions:</p> <p>Number of occurrences: Average of one per Init. Doc.</p> <p>Number of characters : 257</p> <p>Annual rate of increase: 20%</p>
EN01111	Doc Ref type	<p>Examples:</p> <p>Response document reference number</p> <p>Correspondence control number</p> <p>DOE Source document number</p> <p>PNL Source document number</p> <p>HEHF Source document number</p> <p>and any associated descriptions.</p> <p>Integrity Rules:</p> <p>Dimensions:</p> <p>Number of occurrences: 20</p> <p>Number of characters : 50</p> <p>Annual rate of increase: 1%</p>
EN01112	Doc Ref. number	<p>Reference number to other documents or an alias number for the same Initiating Document.</p> <p>Integrity rules:</p> <p>A Free form text field, no validation.</p> <p>It must have a document reference type.</p> <p>Only one of each Doc. reference type tagged as an alias is allowed.</p> <p>Dimensions:</p> <p>Number of occurrences: Average 2 per initiating document</p> <p>Number of characters : 32</p> <p>Annual rate of increase: 20%</p>
EN01114	Subject	<p>A categorization of the scope of the assessment ie Environmental, Safety or Administrative.</p> <p>Integrity Rules:</p> <p>Not required.</p>

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Entity Definitions for the CONDITION
DATA Facet (FA011)

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Name	Label	Description
		Dimensions: Number of occurrences: 3-5 Number of characters : 30 Annual rate of increase: 1%
EN01116	Response Document	The response document is either an agreement that the condition(s) exist and a plan of actions to correct it, or an explanation of why the identified condition(s) does not really exist. Integrity Rules: A response is due within 30 days of the initiating date on the initiating document. Not required for non-cams. Dimensions: Number of occurrences: Avg 1 per condition and one per init doc Number of characters: 4k minimum Annual rate of increase: 20%
EN0112	Condition	Definition of entity: EN0112 A deviation, failure, malfunction, deficiency, defective item or nonconformance. The Condition MAY or MAY NOT be adverse. (See WIC-CM-1-4, Glossary). Integrity rules: A condition must have an initiating document. If an init. doc is deleted, all associated conditions are deleted. If a condition is deleted, all associated actions are deleted unless that action is associated with another condition. A condition will be statused as pending verification when all the actions are complete. Active conditions can have both draft and active actions. Draft conditions can have only draft actions. If a user has access to view a condition they can also view the initiating document and actions. Dimensions: Number of occurrences: 50,000 whc + 8,000 DOE = 58,000 total Number of characters: 16,214 Annual rate of increase: 20%
EN01120	Cond. Ref. number	A number used to reference other documents or an alias number for the same condition. Integrity rules: free form text. It must have a type. Dimensions: Number of occurrences: Average 1 per condition Number of characters : 32 Annual rate of increase: 20%
EN01121	Cond. Ref. type	A description of other documents referenced by a condition or an alias number for the same condition. Integrity Rules: None Dimensions: Number of occurrences: 20 Number of characters : 50 Annual rate of increase: 1%

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Name	Label	Description
EN01122	Action Ref. number	<p>A reference number to another document or an alias number for the same action. Site wide assessments may have findings against several contractors each of these may have different actions.</p> <p>Integrity Rules:</p> <ul style="list-style-type: none">no validation of correct numbers.it must have a reference type.only one alias number type allowed <p>Dimensions:</p> <ul style="list-style-type: none">Number of occurrences: Avg one for every three actionsNumber of characters: 20Annual rate of increase: 1%
EN01123	Action Ref. type	<p>A description of the type of reference number. Examples include, PNL action number, HENF action number, a similar condition and action.</p> <p>Integrity Rules:</p> <p>Dimensions:</p> <ul style="list-style-type: none">Number of occurrences: 10Number of characters: 70Annual rate of increase: 1%
EN01125	Condition Type	<p>Conditions can be categorized into several types. The types can include an issue, commitment, milestone or perhaps even a good practice. This is used to distinguish between those conditions that are defined in whc-m-1-4 and those that may be defined by other procedures. These types should not be confused with the current quest document types (SEA, AUD).</p> <p>Integrity Rules:</p> <ul style="list-style-type: none">One required per condition. <p>Dimension:</p> <ul style="list-style-type: none">Number of occurrences: 5-10number of characters : 70annual rate of increase: 20%
EN0113	Document Class	<p>A classification of the type of process that generates an initiating document.</p> <p>Examples: Audit, Surveillance, Self-Assessment, Appraisal, Assessment, Investigation, Employee Concern (DOE) or other.</p> <p>Integrity rules:</p> <ul style="list-style-type: none">Required for all initiating documents. <p>Dimensions:</p> <ul style="list-style-type: none">Number of occurrences: 5-10Number of characters : 70Annual rate of increase: 1%
EN01133	RGA Data	<p>The root cause data determined in the analysis defined in whc-m-1-4 and RLID 1000.1.</p> <p>Integrity Rules:</p> <ul style="list-style-type: none">Root causes must be identified before closing CAMS conditions. <p>Dimensions:</p> <ul style="list-style-type: none">Number of occurrences: 1 per conditionnumber of characters : 40annual rate of increase: 20%
EN01134	PPG Data	<p>The PPG score and the data used to derive that score. This will include values from the PPG grid, their probabilities and scores they received,</p>

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Entity Definitions for the CONDITION
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Name	Label	Description
		as well as, a text justification. Integrity Rules: The PPG as found and as is scores will also be included. The as found PPG will be required, for CAMS conditions, before a condition can become active. As actions are completed the PPG score is re-evaluated. Only the original score and the latest score will be stored. For the first release only the final score and dominating consequence will be required. Dimensions: number of occurrences: Average 1.5 per condition. Number of characters : 2k annual rate of increase: 20%
EN01136	Distribution List	A list of people to be notified about status changes to an Initiating document. Integrity Rules: Not required. It will apply to all types automatic notifications. Dimensions: Number of occurrences: One per Init Doc, condition or action. Number of characters : 7 Annual rate of increase: 20%
EN01137	Requirements	The requirements or orders which the assessors have identified and could review for compliance. Integrity Rules: Required for each rl originated initiating document. This will be free form text. This will provide a pick list for entry of new initiating documents or conditions. Not required for non-cams. Dimensions: Number of occurrences: 500 Number of characters : 85 Annual rate of increase: 10%
EN01138	Intangible Item	The Intangible items assessed are activities or programs that cannot be described by a physical location. Examples include Industrial hygiene, Lock and Tag, Shipping or Permitting. Integrity Rules: Not required for an occurrence of Initiating Document. Valid values will be maintained by system admin. A intangible type is required with each occurrence. One activity is required for RL originated CONDITIONS and WHC HSADB items, PPG > 11. Dimensions: Number of occurrences: 10-20 Number of characters : 50 Annual rate of increase: 1%
EN01139	Intangible Type	The type of intangible item assessed. These could be programs or activities, but not physical locations. Integrity Rules: Valid values will be maintained by system admin. Dimensions: Number of occurrences: 5 Number of characters : 20

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Name	Label	Description
		Annual rate of increase: 1%
EN0114	Noteworthy Practice	<p>A noteworthy practice is the second of possible results from an assessment. This notes good business practices rather than conditions to be corrected.</p> <p>Integrity Rules: Not required</p> <p>Dimensions: Number of occurrences: average one per initiating document Number of characters: 2k minimum Annual rate of increase: 15%</p>
EN0115	Action	<p>Definition of entity: EN0115 Measures taken to correct conditions, and where necessary, to prevent or minimize recurrence of conditions. (WHC-CM-1-4).</p> <p>Integrity rules: Actions must have an owner person & org. An action must be tied to one or more conditions.</p> <p>Dimensions: Number of occurrences: 40,000 Number of characters : 8,108 Annual rate of increase: 20%</p>
EN0116	Status	<p>Current and historical state of the Initiating document, condition or action.</p> <p>Integrity Rules: Statuses can only break down to 3 levels. Example Active-Delinquent-Response Due</p> <p>Dimensions: Number of occurrences: 15 Number of characters : 80 annual rate of increase: 1%</p>
EN0118	History Log	<p>A narrative describing the progress and status changes of working an action to completion.</p> <p>Integrity Rules: free form text. Comments cannot be modified or deleted.</p> <p>Dimensions: Number of occurrences: average 3 per action number of characters : 257 annual rate of increase: 20%</p>
EN0119	History Log	<p>These are descriptions of the progress made in correcting the condition. Usually they contain references to the status changes of a condition.</p> <p>Integrity Rules: Free form text. History Logs cannot be deleted or modified but new ones maybe added.</p> <p>Dimensions: Number of occurrences: average 3 per condition number of characters : 257 annual rate of increase: 20%</p>

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Name	Alternate Name	Entities	Description
RE01101	Init Doc is of a document class	EN0111 EN0113	Initiating documents are classified into one of several types.
RE01102	Init Doc contains conditions	EN0111 EN0112	A condition must have an Init Doc, An Init Doc has 1 to many conditions or noteworthy practices. Integrity Rules: A condition or noteworthy practice belongs to only one initiating document.
RE01103	Action Corrects Condition	EN0112 EN0115	A condition is corrected by zero to many actions. Integrity Rules: An action must be tied to at least one condition. Dimensions: Number of occurrences: Average the same as the number of actions. Number of characters: 20 Annual rate of increase: 20%
RE01104	Init Doc Assesses Organization	EN0111 SU03	An initiating document can be written against many organizations. Dimensions: Number of occurrences: Average one per initiating document Number of characters: 25 Annual rate of increase: 15%
RE01105	Lead Assessor organization	EN0111 SU02	The lead assessor organization in charge of performing the assessment. Integrity Rules: The organization is maintained independently of the name. In case the lead assessor leaves someone else in the organization can be assigned to the initiating document. The default value is the Lead Assessor's organization but this can be overridden. There will be no validation that the lead assessor must belong to this organization. An organization is a required field. If the organization is changed the previous org code will not be kept. It can be found by reading the record copy document.
RE01106	org is responsible for init doc	EN0111 SU02	The Assessment Responsible Organization: This is an organization in the assessed company or organization who must respond to the originator for the entire assessment. They will compile the responses for each condition and submit one response document. Integrity Rules: There will be only one Assessment Responsible Organization per Initiating Document. This org may be the default condition responsible organization. There will no validation that the Assessment Responsible Person is within the Assessment Responsible Organization. However, the default value will be the organization of the Assessment Responsible Person. This organization is retained independently of the person. In case the person leaves someone else within the organization may be assigned to the assessment. If the organization is changed a record of the previous org will be kept. Attributes: Date Dimensions:

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Name	Alternate Name	Entities	Description
			Number of occurrences: One per init doc. Number of characters: 30 Annual rate of increase: 20%
RE01107	person identifies a condition	SU02 EN0112	The identifier is the Lead Assessor or an assessment team member who identified a condition. This person may have the authority to close out the condition. This is a required field. The default value is the Lead assessor. They may be able to reject responses to assessment and conditions. If this person changes the previous value will NOT be kept, but can be viewed on record copy documents.
RE01108	Org originates the init doc	SU02 EN0112	This is the organization originating the initiating document. They sign the letter issueing the initiating document. Integrity Rules: The organization of the originating person serves as the default value. This can be overrriden and there is no validation that the person belongs to this org. Should the organization change the previous value will not be kept but can be viewed on a record copy document. It is kept independently. In case the person changes another may be reassigned from this organization.
RE01109	person owns a condition	EN0112 SU02	The condition owner is responsble for correcting the condition. They create new actions and assign actionees. With the proper approval they can consolidate conditions and create sub-conditions. They send their action plans to the assessment responsible person who includes it in the assessment response document. In some cases they have closure authority. This is a required field. The default value is the Assessment Responsible Person. Their organization is the default value for the Owner Organization. If the owner changes previous values will be stored to allow queries of the audit trail. Dimensions: Number of occurrences: one per condition Number of characters: 25 Annual rate of increase: 20%
RE01110	person closes a condition	EN0112 SU02	This person signs off that the condition has been corrected. This person is generally not known until the time of closure. Depending on the risk value of the condition the closing person may be the Lead assessor, originator, the assessment POC or the condition owner. This required at the time of closure.
RE01111	Person is POC for condition	SU02 EN0112	The Point of Contact person for a condition will see that the action plan is established and carried out. This person will usually be granted condition owner authority by proxy. Should this person change previous values will be stored allowing queries for an audit trail. Dimensions: Number of occurrences: one per condition Number of characters: 25 Annual rate of increase: 20%
RE01112	Condition is for Building	EN0112 SU03	A condition can be associated with zero to many buildings.

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Name	Alternate Name	Entities	Description
			<p>Integrity Rules: There will be no validation that a building belongs to a facility. Not required.</p> <p>Dimensions: Number of occurrences: Average .75 per condition Number of characters: 20 Annual rate of increase: 15%</p>
RE01113	History Log describe init docs	EN01110 EN0111	Text comments describing the progress made in resolving initiating documents.
RE01114	Condition references conditions	EN0112 EN0112	<p>Conditions can reference other conditions. This can be used for lessons learned. Or establish an association with conditions that share the same actions or have been consolidated.</p> <p>Integrity Rules: These conditions can be either Draft, Active or Closed.</p> <p>Dimensions: Number of occurrences: Average .33 per condition Number of characters : 20 Annual Rate of increase: 15%</p>
RE01115	Comment describes condition	EN0112 EN0119	Comments or History Logs are associated with one condition.
RE01116	Hist Log Describe Actions	EN0115 EN0110	History Log, or Comments text, are associated with only one action.
RE01117	Response Replies to Init Doc	EN0111 EN01116	A response document replies to only one initiating document.
RE01118	Action references work control	EN0115 SU06	<p>An action reference work packages or other actions in other work control systems, like AMS or JCS.</p> <p>Integrity Rules: Dimensions: Number of occurrences: Average .5 per condition Number of characters: 15 Annual rate of increase: 2%</p>
RE01119	Condition is for facility	EN0112 SU14	<p>A condition can be associated with zero or more facilities.</p> <p>Integrity Rules: Dimensions: Number of occurrences: Average .75 per condition Number of characters : 20 Annual rate of increase: 15%</p>
RE01120	Action is tracked by status code	EN0115 EN0116	<p>Actions have one status at any given time, but will have several throughout its lifecycle. We will store the status changes over time.</p> <p>Attributes: Date, person</p>
RE01121	Person owns an action	EN0115 SU02	<p>This person is responsible working the action. The action owner is assigned by the condition owner.</p> <p>This is a required field. The action owner may update the action status, comments and declare it complete. If the action owner changes</p>

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Name	Alternate Name	Entities	Description
			the previous value will be stored allowing a query to list the complete audit trail. Dimensions: Number of occurrences: Average 1.25 per action Number of characters: 25 Annual rate of increase: 20%
RE01122	Organization monitors condition	SU13 EN0112	This is the organization monitoring the condition. This an organization acting on behalf of the assessing organization, usually DOE. They are charged with seeing that the condition is acted on and closed. Integrity Rules: The organization of the monitoring person is the default value. This can be overridden and there is no validation that the person belongs to this org. Should the organization change the previous value will not be kept but can be viewed on a record copy of the document. This data is stored independently of the person, in the event the person leaves another can be reassigned from this organization. Dimensions: Number of occurrences: one per condition Number of characters: 25 Annual rate of increase: 20%
RE01123	Init doc references Init docs	EN0111 EN0111	Initiating docs can reference other init docs. Integrity Rules: Only valid initiating documents are allowed. Dimensions: Number of occurrences: Average .33 per initiating document Number of characters : 14 Annual rate of increase: 10%
RE01124	Init Doc has reference numbers	EN0111 EN0112	The initiating document has an association of other documents and alias numbers. Integrity Rules: Not required. Only one of each type is allowed, ie. one CCN number, one DOE source number etc. Dimensions: Number of occurrences: Average 2 per Init Doc Number of characters : 14 Annual rate of increase: 20%
RE01125	Doc Ref No. is of Doc Ref type	EN0112 EN0111	Every document reference number has one document reference type.
RE01126	Init doc has a rl-div/branch	EN0111, SU11	This is the rl-division of the originator and/or the rl-branch code corresponding to the lead assessor. Integrity Rules: it must be a valid division or branch. required for RL originated items. Dimensions: Number of occurrences: Average two per initiating document Number of characters: 15 Annual rate of increase: 20%
RE01127	Condition consolidates condition	EN0112 EN0112	A condition can be a consolidation of several other conditions.

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Name	Alternate Name	Entities	Description
			Integrity Rules: Conditions may be any non-draft status. A new initiating document must be entered along with the consolidating condition. The consolidated conditions will be statused as consolidated. The actions of the consolidated conditions will be statused as complete.
RE01128	Condition breaks into sub-cond	EN0112 EN0112	A condition can be divided into two or more sub-conditions. Integrity Rules: The conditions must be active. Sub-conditions cannot be divided into more sub-conditions. All actions must move to the sub-conditions.
RE01129	Condition is tracked by status	EN0112 EN0116	Condition are tracked by status codes. There is one status at any given time, but we will store them as they change over time.
RE01130	Person monitors a condition	SU02 EN0112	The person from the assessing organization, agency or contractor who must see that the condition is acted on and closed. Usually from DOE. Integrity Rules: The org code the monitor person belongs to is the default value for the monitor org. Previous values will not be kept. For RL originated items the person must be from rl. Dimensions: Number of occurrences: one per condition Number of characters: 25 Annual rate of increase: 20%
RE01131	Condition is for contractor	EN0112 SU16	A condition can be associated with zero or more contractors. Integrity Rules: This is required for all cams items. Default is from the init doc. contractor. Dimensions: Number of occurrences: Avg. one per condition Number of characters : 15 Annual rate of increase: 20%
RE01132	Condition has RL-Div	EN0112 SU11	A condition may be associated with zero or more rl divisions. This usually is the rl-branch of the lead assesor and rl-division of the monitor. Integrity Rules: Required for rl originated items and WHC HSADB items where PPG > 11. Dimensions: Number of occurrences: Avg one per condition Number of characters : 15 Annual rate of increase: 20%
RE01133	Condition has dist. list	EN0112 EN01136	A condition can be associated with one and only one distribution list.
RE01134	Type Categorizes Condition	EN01125 EN0112	Conditions are categorized as one of seceral types.
RE01135	Action has a dist. list	EN0115 EN01136	An action has one and only one distribution list.

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Name	Alternate Name	Entities	Description
RE01136	person verifies condition	SU02 EN0112	<p>A person from the assessed or assessor organization other than the owner, originator or closure authority who determines if completed actions have satisfactorily fixed the condition. This is done prior to closure. This is not required. If this person changes over time the previous values will be kept.</p> <p>Dimensions: Number of occurrences: Average .33 per condition Number of characters: 25 Annual rate of increase: 20%</p>
RE01137	Organization owns a condition	SU13 EN0112	<p>This is the organization that owns, or is responsible for fixing, a condition.</p> <p>Integrity Rules: This is stored independently of the condition owner in case the owner leaves another from this org can be assigned the condition. The default value is the condition owners organization but this can be overridden. There will be no validation that the condition owner belongs to this organization. If this organization changes no previous value will be stored but they can be viewed in archives or previously printed reports.</p> <p>Dimensions: Number of occurrences: one per condition Number of characters: 25 Annual rate of increase: 20%</p>
RE01138	org verifies condition	SU13 EN0112	<p>An organization other than the assessed or assessor organizations who determines if completed actions have satisfactorily fixed the condition. This is done prior to closure. This is not required. If this organization changes over time previous values will be kept.</p> <p>Dimensions: Number of occurrences: Average .33 per condition Number of characters: 25 Annual rate of increase: 20%</p>
RE01139	Init Doc Assesses Intang. Items	EN0111 EN01138	<p>An association between initiating documents and intangible items.</p> <p>Integrity Rules: Not required. No limit on the total.</p> <p>Dimensions: Number of occurrences: 35% of the total initiating documents Number of characters: 15 Annual rate of increase: 10%</p>
RE01140	Init doc Assesses facility	EN0111 SU14	<p>An initiating document can assess one or more facilities.</p> <p>Dimensions: Number of occurrences: Average one per initiating document Number of characters: 25 Annual rate of increase: 15%</p>
RE01141	condition has reference number	EN0112 EN01120	<p>The condition has an association with numbers that reference other documents or this a number other organizations have assigned the condition, an alias.</p> <p>Integrity Rules: Required for RL or WMC originated CAMS items. Not required for non-cams.</p>

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Name	Alternate Name	Entities	Description
			Dimensions: Number of occurrences: avg 1 per condition Number of characters: 14 Annual rate of increase: 20%
RE01143	Init Doc Assesses contractor	SU16 EN0111	An initiating document can assess one or more contractors. Dimensions: Number of occurrences: Average 1.25 per initiating document Number of characters: 15 Annual rate of increase: 20%
RE01144	resp doc replies to condition	EN0112 EN01116	Response documents reply to one and only one condition.
RE01145	action has reference number	EN0115 EN01122	An action may be associated with many reference numbers.
RE01146	Intang item is of Intang Type	EN01130 EN01139	Every intangible item has one intangible type. Usually program or activity.
RE01147	Init Doc has a Subject	EN0111 EN01114	An Init Doc is categorized into zero or many subjects. Integrity Rules: Not required Dimensions: Number of occurrences: Average 1.2 per initiating document Number of characters : 15 Annual rate of increase: 20%
RE01148	Init doc Driven by requirement	EN0111 EN01137	These are the associations between assessor identified requirements to be reviewed for compliance and the assessment results (initiating document). Dimensions: Number of occurrences: assuming on average 50% ID's have one. Number of characters : 15 Annual rate of increase: 10%
RE01149	is Lead Assessor for Init Doc	EN0111 SU02	The Lead Assessor person is in charge of performing the assessment. Integrity Rules: This is a required field. This will provide the default value for the condition identifier. The organization this person belongs to will be the default value for the Lead Assessor Organization. If this person changes the previous value will NOT be kept. However, the person can be identified by reading the original record copy of the initiating document.
RE01150	Person is responsible for in doc	EN0111 SU02	This is person who must respond to the originator for all the conditions of an initiating document. They will compile the response or action plan for all the conditions into one document. This provides the default value for the Condition Owner and Responsible organization. They can assign condition owners. They submit responses to the originator. If this person changes the previous value will be kept. Attributes: Date

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Name	Alternate Name	Entities	Description
			Dimensions: Number of occurrences: Average one per initiating document Number of characters: 25 Annual rate of increase: 20%
RE01151	person originates an init doc	EN0111 SU02	This is a person from the assessing organization, agency or contractor who signs the cover letter issueing the initiating document. This person receives repsonses from the assessment responsible person. Integrity Rules: This is required. Previous values will NOT be kept. But can be viewed from record copy documents. The organization is stored indepently. In case the person leaves another can be reassigned.
RE01152	Init doc has a dist list	EN01136 EN0111	There is only one distribution list for each init doc. This will apply to all the initiating document's notices.
RE01153	Org has authority to close a con	EN0112 SU13	People from this organization have authority to close the condition. It is required. The default value will be determined by the ppg as described in WMC-M-1-4, usually the monitor. The originator may override the default value and determine the closure authority organization. If it changes no previous values will be stored but they can be viewed in archives or previous reports.
RE01154	Organization owns an action	EN0115 SU13	This is the organization doing the action work. This is usually the action owners organization. A required field whose default value is the organization of the action owner. This value can be overridden. If the action org changes the previous value will be stored so the complete audit trail is available for query. Dimensions: Number of occurrences: one per action Number of characters: 20 Annual rate of increase: 20%
RE01155	Condition is for an organization	EN0112 SU13	A condition can be for zero to many organizations. Integrity Rules: Dimensions: Number of occurrences: Average .75 per condition Number of characters : 15 Annual rate of increase: 15%
RE01157	View groups conditions.	EN0112, EN0153	A condition can be grouped into a non-cams view. This means the cams required data elements and processes do not apply. Only those with access to the non-cams view can read or update the condition.
RE01158	Condition has RCA data	EN0112 EN01133	A condition is associated with only one root cause analysis.
RE01159	Condition has PPG data	EN0112 EN01134	A condition is associated with one set of ppg data at a time. But we will store the original and the latest.
RE01160	Condition Violates requirements	EN0112	Conditions can be associated with requirements.

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QUEST2: SYSTEM ARCHITECTURE DELIVERABLE SET
APPENDIX E

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Revision Number 0

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Relationship Definitions for the
CONDITION DATA Facet (FA011)

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Name	Alternate Name	Entities	Description
		EN0137	Dimensions: Number of occurrences: 50% of the conditions will have one Number of characters: 25 Annual rate of increase: 20%
RE01161	condition has subject	EN0112 EN01112	A condition is associated with one or more subjects. Integrity Rules: Not required Dimensions: Number of occurrences: Average .5 per condition Number of characters: 20 Annual rate of increase: 2%
RE01162	action ref number is of a type	EN01122 EN01123	An action reference number is associated with only one type.
RE01163	Dist List is made of person	EN01136 SU02	A distribution list is associated with people. Integrity Rules: None Dimensions: Number of occurrences: avg of 4 times Total Init docs or condition. Number of characters : 14 Annual rate of increase: 20%
RE01164	contractor performs action	EN0115 SU16	An action is performed by a contractor. On findings found against multiple contractors it is important to note which actions are performed by which contractors. Integrity Rules: it is required. The default value is the condition contractor. Dimensions: Number of occurrences: one per action. Number of characters: 15 Annual rate of increase: 20%
RE01165	condition is for room	EN0112 SU19	A condition can be associated with zero or more rooms. Integrity Rules: Not required. No validation of valid rooms. A building is required before a room can be added. Dimensions: Number of occurrences: Average .33 per condition Number of characters: 25 Annual rate of increase: 20%
RE01166	Init Doc contains Noteworthy Pra	EN0114 EN0111	An initiating document identifies zero to many noteworthy practices.
RE01168	Org Identifies Condition	SU13 EN0112	This is the organization which identified the condition. The default value is the organization of the identifying person. This is a required field. If the organization changes the previous values will not be stored but may be viewed on the record copy document.
RE01169	Contractor owns Init Doc	SU16 EN0111	This is the contractor that wrote the initiating document and identified its conditions.

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Relationship Definitions for the
CONDITION DATA Facet (FA011)

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Name	Alternate Name	Entities	Description
RE01170	Condition is for intangible	EN0112 EN0138,	A condition can be found with an intangible item, such as a program or activity. Integrity Rules: Not required Dimensions: Number of occurrences: Average .5 per condition Number of characters: 20 Annual rate of increase: 15%
RE01173	Init Doc is tracked by status	EN0111 EN0116	Initiating documents have one status at any give time, but may have several throughout its lifecycle. We will store the status changes over time. Attribute: Date Integrity Rules: Only certian statuses apply to initiating documents. Dimensions: Number of occurrences: Average 4 per initiating document Number of characters: 25 Annual rate of increase: 15%
RE01174	statuses sub define statuses	EN0116 EN0116	Status codes are defined in a hierarchy. A typical example, Active-Open-Delinquent. They will only go 3 levels deep.
RE01175	Person is POC for Init Doc	EN0111 SU02	The Point of Contact person for an Initiating Document will be assigned by the responsible person. This person may assign condition owners and works with the condition owners to provide a response document to the lead assessor or monitor. If the person changes the previous values will be kept. Dimensions: Number of occurrences: Average one per initiating document Number of characters: 25 Annual rate of increase: 20%
RE01177	Init Doc has corresp. control	EN0111 SU10	Each init doc is assigned a correspondence control number. This is an alias number for the init. doc and queries will be possible based on this number.
RE01178	Agency owns the init doc	EN0111 SU09	The agency that wrote the initiating document and identified its conditions.

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QUEST2: SYSTEM ARCHITECTURE
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Deliverables for the Facet "Analysis Data"

Definition of the Facet (170)

Definition of Entities (180)

Definition of Relationships (190)

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Entity Definitions for the ANALYSIS
DATA Facet (FA013)

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Name	Label	Description
EN01337	Trend	The Trend entity contains the data necessary to keep information related to trends that the user or system identifies and would like to track.
EN01338	PPG-Related Analysis Data	This entity contains any PPG-related data (such as PPG reference table values currently in the PPG matrix) that will eventually be used by the system to support the determination of a PPG score. (NOTE: This entity does not contain the PPG score fields or any other PPG data fields that are specifically related to instances of a condition--please see the Condition Data Facet for that PPG Entity.)
EN01339	RCA-Related Analysis Data	This entity contains data which will eventually assist in performing an RCA.

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Relationship Definitions for the
ANALYSIS DATA Facet (FA013)

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Name	Alternate Name	Entities	Description
RE0131	ppg determined by analysis data	EN01134 EN01338	PPG data for each condition is determined by PPG analysis data.
RE0132	trend groups condition	EN01337 EN0112	Trends group conditions when it identifies similar causes and problems among conditions.
RE0133	RCA determined by analysis data	EN01133 EN01339	The root cause codes for each condition are determined by root cause analysis data.
RE0134	Trend groups initiating document	EN0111 EN01337	Initiating documents are associated with found trends.

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Deliverables for the Facet "System Administration"

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Entity Definitions for the SYSTEM
ADMINISTRATION Facet (FA015)

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Name	Label	Description
EN0151	System User	A system user has been assigned a password but can't log onto quest2 until they are assigned a role and view. Dimensions: Number of occurrences: 150 Number of characters: 50 Annual rate of increase: 2%
EN01510	Validation Rules	These are edit and validation rules. They are table driven to allow changes in business rules without re-coding programs. Dimensions: Number of occurrences: 300 Number of characters : 300 Annual rate of increase: 1%
EN0152	User Role	Each user has a role in the system. Each role can perform specified functions within a data view. Integrity Rules: Dimensions: Number of occurrences: 7 Number of characters: 30 Annual rate of increase: 1%
EN0153	View	This will be used to partition data between directed and non-directed data (cams and non-cams). Examples might be: DOE employee concerns, PFP non cams, NCR's, CAMS. Integrity Rules: These are considered to be restricted systems meaning a user must be given specific access to view them. Dimensions: Number of occurrences: 10-20 Number of characters: 30 Annual rate of increase: 5%
EN0154	Query	Queries are created and deleted by one user but can be viewed and used by any system user. Integrity Rules: The system administrator would be the creator of quest2 canned queries. Dimensions: Number of occurrences: 50 Number of characters: 2k minimum Annual rate of increase: 20%
EN0155	Production Job	These are the scheduled production jobs. Data uploads, archiving, reporting, etc. Dimensions: Number of occurrences: 15 Number of characters: 50 Annual rate of increase: 1%
EN0156	Production Run Log	Each production job generates a log during run time. We will save the productions runs over time to maintain history. Dimensions: Number of occurrences: 100. Number of characters: 50 Annual rate of increase: 30%

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Entity Definitions for the SYSTEM
ADMINISTRATION Facet (FA015)

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Name	Label	Description
EN0157	Notification Data	This is the information in a cc mail notice. There are only 3 types of cc mail messages, New, Response Submitted, and Closed. Initiating documents, conditions and actions will searched and specific data will included in the cc mail message. Dimensions: Number of occurrences: 3 Number of characters: 300 Annual rate of increase: 1%
EN0158	System Messages	These are error messages or context help messages. Dimensions: Number of occurrences: 200 Number of characters: 100 Annual rate of increase: 1%
EN0159	Help Data	This on-line help information including the user guide, and other manuals like WHC-CM-1-4. This is a link to the Windows Help sub-system. Dimensions: Number of occurrences: 500+ Number of characters: many k Annual rate of increase: 2%

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Relationship Definitions for the
SYSTEM ADMINISTRATION Facet (FA015)

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Name	Alternate Name	Entities	Description
RE01501	has functionality	EN0151 EN0152 EN0153	Each user has role that has specific functionality defined for a given view. A user may have many rules and views. Dimensions: Number of occurrences: 125 Number of characters: 20 Annual rate of increase: 20%
RE01502	person can be a system user	SU02 EN0151	A Person may be a system user.
RE01504	User Creates Queries	EN0151 EN0154	A user can create, save and delete one or more queries.
RE01505	production run generates a log	EN0155 EN0156	A production run generates one run log.
RE01506	user is proxy for person	EN0151 SU02	A user may act on the behalf of one or more persons. A user may assign proxies themselves or have a dba set up proxies for them.
RE01507	notification data notifies cond	EN0112 EN0157	Notices must read condition data and include information about them. Attributes: Notice Type, Init Doc Id, Condition Id or Action Id Dimensions: Number of characters: 20 Number of occurrences: 30 Annual rate of increase: 5%
RE01508	Rules have system messages	EN01510 EN0158	Validation rules are associated with system messages.

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Deliverables for the Facet "Change Control"

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Entity Definitions for the CHANGE
CONTROL Facet (FA017)

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Name	Label	Description
EN0171	Change , Request	Change Requests are user gripes, complaints or other suggestions for QUEST2 system changes and improvements. Integrity Rules: Any system user may submit one. Dimensions: Number of occurrences: 50 Number of characters: 2k minimum Annual rate of increase: 10%

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Relationship Definitions for the
CHANGE CONTROL Facet (FA017)

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Name	Alternate Name	Entities	Description
RE0171	person submits change request	EN0171 SU02	A person submits zero to many change request.
RE0172	person approves change request	EN0171 SU02	A person approves zero to many change requests.

1.0 PURPOSE

This document defines the context and a high level definition of the processes included in QUEST2. These processes are defined from a user's perspective and include both the manual and automated processes required to do business.

2.0 FUNCTIONAL STANDARDS

This document is composed of three Productivity Plus deliverables. Starting with the QUEST2 System Context Diagram (140), each succeeding diagram is an exploded view of an element on the previous diagram.

- **QUEST2 System Context Diagram (140):** This model defines the functions and processes controlled by QUEST2. The organizations, people, or computer systems that provide or receive information from QUEST2, but are not users of QUEST2, are described by this diagram. This deliverable defines the scope of QUEST2 processes. For example, QUEST2 will control processes to track and correct conditions identified in an audit or assessment but NOT the processes to discover those conditions. Assessors are external to QUEST2. They will provide data to and receive information from the system.
- **Definition of the System (200):** This diagram illustrates a high level logical grouping of QUEST2 processes. These are called functions. These functions include, but are not limited to, Manage Conditions, Manage Actions and Perform Reporting and Utilities.

For each function described in the Definition of the System (200), there is the following model.

- **Definition of the Function (250):** Each function defined in the Definition of the System (200) diagram is divided into smaller logical groupings called unit processes. This diagram defines the triggers that start a process, the data it requires from a datastore and any outputs of information.
The diagram includes references to the conceptual data model defined in appendix E. The long narrow rectangles on these diagrams are called datastores. A datastore is a facet defined in the deliverable, Definition of the Facet (170), in appendix E. The lines drawn from a unit process to a datastore are dataflows. Dataflows are entities defined by the deliverable Definition of the Entities (180).

All of these models are provided as reports from the CASE tool used by the QUEST2 project and are included in this document as attachments.

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QUEST2 System Context Diagram (140)

QUEST2 System Context Diagram (140)

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Description of External Actors for the
QUEST2 Context Diagram (140)

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Name	Label	Description
AC02	People CORE	PeopleCore contains the employee IDs and other relevant data related to persons and organizations. This data will be controlled by PeopleCore and shared with QUEST2.
AC03	Facilities CORE	FacilitiesCore is responsible for controlling and maintaining data related to locations such as buildings, facilities, equipment, etc. QUEST2 will use this data as related to the assessments, conditions, and actions.
AC05	CAMB	<p>The Corrective Action Management Board (CAMB) governs procedures for defined in WHC-1-4 for CAMS data. The CAMB sets policy and procedures for the QUEST2 system.</p> <p>DOE-RL provides policy and guidelines in the form of procedures, strategic direction, policies, and requirements related to the site-wide recording and tracking of corrective action data. DOE-HQ policy and guideline is fed to QUEST2 via DOE-RL.</p>
AC07	Soft Reporting	Quest2 "canned reports" will be downloaded periodically to Soft Reporting. Users of the Quest2 system will access Soft Reporting for various reports that they will need to do their work on the Quest2 system.
AC10	WHC Upper Level Mgmt	WHC management requests ad-hoc queries and reports and receives these reports as required.
AC13	Assessor	<p>These are any other condition originators not listed on the 140 who are performing reviews, audits, etc. and generating "findings" reports. They are external because they have their own reporting/findings systems that they will use to generate their reports. They will provide the report to QUEST2 as input. These organizations tend to have a more formal "review/audit" function as opposed to various QUEST2 internal "assessors" that will use QUEST2 as a findings/report generator.</p> <p>This also includes various DOE-RL Divisions which will perform assessments and provide the information to QUEST2. They send and receive various updates so that the assessment and conditions can be tracked from inception to closure.</p>
AC18	AMS	QUEST2 will interface with AMS (Action Management System) by sharing action-related tasks that are further detailed and tracked in AMS.
AC26	CC Mail	CC:Mail will be used as the notification tool for advising the various QUEST2 users of a pre-defined event. QUEST2 will pass the notifications to CC:Mail for delivery to the appropriate persons.
AC28	SHARE	SHARE is a system which uses the TOPIC product which is a text search and retrieval program. QUEST2 will periodically download data into SHARE so that it can be analyzed and text searches can be performed against the QUEST2 data. Ad-hoc query results and any analysis result data from QUEST2 will be loadable into SHARE for further queries using the TOPIC search engine.
AC30	Any WHC Employee	WHC employees who are not users of the QUEST2 system may identify and report occurrences/conditions and Lessons Learned items.

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Description of External Actors for the
QUEST2 Context Diagram (140)

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Name	Label	Description
AC41	Current Quest System	A process will be built to extract the appropriate data from the current Quest system and load it into the QUEST2 system.
AC42	DOE Contractors	DOE contractors include PNL and HEHF. DOE and other assessors assess these contractors and provide Assessment Reports to them as well as status updates. The contractors provide periodic data and reports to DOE for use by the QUEST2 system. They will also provide status updates to DOE related to the assessments.
AC44	DOE-RL SCP	DOE-Richland SCP (Safety Concern Program) receives employee concern information from employees and will use Quest2 to track and report on this data.
AC45	DOE-RL Employee	Any DOE-RL employee can request and receive reports related to QUEST2 data.
AC46	DOE-HQ	DOE Headquarters receives an annual report of self-assessments compiled from data received from the various DOE sub-contractors.
AC47	Other Agencies (WDOE,	Other Agencies include Washington Dept. of Ecology, WA Dept. of Health, and any other agency that performs assessments of the site and nearby areas. These agencies find conditions, send assessment reports and related data necessary to track the condition from inception to closure. They also receive various status reports and information.
AC48	DNFSB	The Defense Nuclear Facilities Safety Board (DNFSB) is a Congressional Board which requests and receives queries and reports from QUEST2.
AC50	DOE-HQ Site Reps	DOE Headquarters has a Site Representation program where DOE-HQ site reps find conditions and send them to DOE-RL QUEST2 reps. They also receive reports and queries.
AC51	Lessons Learned Program	WHC Lessons Learned Program

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Definition of the System (200)

#200 Definition of the System

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Process Descriptions for Definition of
the System (200)

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Name	Label	Description
FUQST1	Manage Initiating Doc.	Create and update Initiating documents (audits, assessments, occurrence Identify individual conditions noted in these documents and any relate attributes (PPG, location, responsible person or recommened actions). Notify all interested parties of the status of the initiating document Get approval or concurrence before tracking when appropriate. Keep references to related documents including initiating documents, responses, closure, lessons learned etc. Provide the ability to query and view these documents when possible.
FUQST2	Manage Conditions	Establish the actions and assign an actionee for each. Update the conditions. Establish need for PPG, RCA and LLE and ensure they are done. Notify all interested parties of condition status. Create action plans and response documents. Notify actionee of assigned actions. Allow queries to related conditions and other documents. Get acceptance or approval for closure (verify completion of actions).
FUQST3	Conduct Analysis	Provide information and tools for the determination of PPG scores, identification of root cause and the performance of trend analysis.
FUQST4	Manage Actions	Update action information. Get approval for completion.
FUQST5	Convert Data	Convert the existing QUEST and the DOE's CICS data to the QUEST2 syste
FUQST6	Manage System	Keep user security information. Manage data control tables and information. Manage data transfers with other systems.
FUQST7	Perform reporting	This function (FUQST7) will generate pre-defined reports, support user preference settings, assign proxies, retrieve and display pending item perform queries inherent to 'navigation' , perform ad-hoc queries and request user access from the FUQST6 (System Admin) function.
FUQST8	Manage Change	This function will support the management of system change control.

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Definition of the Function (250)
"Manage Initiating Document"

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Unit Process Descriptions for Function
Manage Initiating Document (FUQST1)

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Name	Label		Mode	Description	
UPQST11	Update	document	C	<p>Purpose: The assessor adds the audit data compiled in the assemble document unit process. This will trigger mail notifications.</p> <p>Description: -Input the Initiating document, recommended actions text. -Create conditions, including ppg and rca data. -Acceptance and Rejection text and dates -Triggers entry of a distribution list -Allow the lead assessor to allow access to one other assessor (proxy).</p> <p>Triggers: New condition: a notification will be sent to the condition owner. Accept/ Reject Response: " Identify/ Update People: A menu choice to a screen allowing edits to a distribution list.</p> <p>Inputs: Audit data modifications, changes to audit data agreed on in an exit meeting. Accept/ Reject response, text explaining an assessor decision on a response letter.</p> <p>Outputs: Notification data, the data that will identify a notice to be sent. condition data, updates of initiating document, condition and action data.</p>	
UPQST110	Accept/	reject	response	M	<p>Purpose: To review the response letter and determine if the action plan for the conditions is a satisfactory response to the assessment?</p> <p>Description: Receive from the assessment owner a response letter which usually contains the action plan for all the conditions of an assessment. Send back to the assessment owner, condition owner, correspondence control, and DBA's, reasons why the action plan is rejected & any recommendations. Acceptance letters are sometimes sent.</p> <p>Triggers: None</p> <p>Inputs: A response letter from the assessment owner.</p> <p>Outputs: A text explanation of why an action is accepted or rejected, including the dates these take effect.</p>
UPQST111	Verify &	Close	Conditio	M	<p>Purpose: Verify that the actions have fixed the condition. (Performed by owner or assessor).</p> <p>Description: Manual process to</p> <ul style="list-style-type: none">- respond to request for closure- review actions that have in fact fixed a condition- update the system with the necessary reference to closure documents- send closure paperwork to appropriate people (owners, DBAs).
UPQST12	Build Distrib. List.		C	<p>Purpose: Allow the user to create/modify a list of people to be notified when predefined system events occur.</p> <p>Description: Create a list of names.</p>	

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Unit Process Descriptions for Function
Manage Initiating Document (FUQST1)

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Name	Label	Mode	Description
UPQST13	Input	C	<p>Purpose: to key in th prepared audit data.</p> <p>Description: The data entry of condition data. Create initiating documents and conditions, including ppg and rca data.</p>
UPQST14	Print	C	<p>Purpose: To print an initiating document (audit, assessment, surveillance) in draft or final form suitable for signatures.</p> <p>Description: -Output can be provided in several acceptable formats -Only people with read privileges can print. -Electronic output is provided to share system in share system format.</p> <p>Inputs: Condition data, the init doc.</p> <p>Output: A draft or final report that can be downloaded, printed or displayed.</p>
UPQST15	Collect & Prepare	M	<p>Purpose: To track down missing information after receiving hardcopy audit report.</p> <p>Description: Not all the information required is included on the hardcopy, ppg's, rl-line, org codes, etc. File the hardcopy. Try to identify individual conditions if they arenot enumerated in the audit. Notify the owners if items are close to delinquent and ask for last minute updates. Categorize conditions on subjects or topics.</p> <p>Inputs: The final audit report in hardcopy. Acceptance or Rejection letters from the assessors. Condition closure reports.</p> <p>Outputs: Prepared audit data has all information identified and ready for input to quest2.</p>
UPQST16	Review	M	<p>Purpose: The assessment owner reviews the validity of the assessment & may negotiate changes if it was originated within WHC. The condition owner is assigned.</p> <p>Description: Check existing conditions for similarities. review hardcopy report. File report, understand report. Receive and follow-up on the response letter - send to assessor Closure of the initiating document Assign condition owner.</p> <p>Triggers: Request Query</p> <p>Inputs: Occurences, New Audits in Hardcopy style. The acceptance or rejection of the response Query results, about related existing conditions.</p> <p>Outputs:</p>

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Unit Process Descriptions for Function
Manage Initiating Document (FUQST1)

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Name	Label	Mode	Description
			Final Audit Data, is the hardcopy audit passed to the dba. Response Acceptance or rejection data. Condition closure data.
UPQST17	Query	C	<p>Purpose: To query condition data to find related existing conditions. To identify problem areas before assessment.</p> <p>Description: A request to access a reporting facility or tool, by choosing a menu item, icon or hot key.</p>
UPQST18	Assemble	M	<p>Purpose: Provide background info & justification for the identified conditions & the overall assessment.</p> <p>Description: Organize the data, state the purpose of the assessment, identify conditions, provide recommendations, list the criteria of the assessment, define response requirements, convene an exit meeting, request ppg analysis.</p> <p>Triggers: Issue request for final report (then obtain the required signatures). The final report will flow from UPQST14 (Print Initiating Doc). Request PPG analysis, requests that a caeg group convene to determine ppg scores for the identified conditions. Request Query, the accessing of an online facility to get data related to an assessment or condition. Request Meeting, the assessor convening an exit meeting to discuss the results of an assessment.</p> <p>Inputs: Query Results, are data related to an assessment or condition. This is a response to the trigger Request Query.</p> <p>Outputs: Audit Data, the draft assessment information prior to entry into quest.</p>
UPQST19	Negotiate	M	<p>Purpose: This is an exit meeting between the assessor (lead assessor or originator) and the assessment owner where the validity of the assessment is agreed upon.</p> <p>Description: The assessment is discussed and negotiated, changes are agreed upon.</p> <p>Triggers: Request Meeting, The process is triggered by the assessor who has conducted an assessment. Request Query, A request to use a query tool to search for related existing assessments or conditions.</p> <p>Inputs: Draft report, A draft of the assessment document is discussed at the meeting.</p> <p>Query Results, Related existing conditions.</p> <p>Outputs: Modifications, agreed on modifications to the assessment. Condition data to be input by the assessor.</p>

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Definition of the Function (250)
"Manage Conditions"

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Unit Process Descriptions for Function
Manage Conditions (FUQST2)

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Name	Label	Mode	Description
UPQST21	Review Condition	M	<p>Purpose: Review and manage conditions.</p> <p>Description: This process incorporates a host of manual activity -</p> <ul style="list-style-type: none">- identify actions for a specific condition- receive hardcopy reports (probably prior to data entry)- identify condition owners and send notifications- request PPG evaluations- identify similar conditions for consolidation- identify sub-conditions- query database for similar conditions (to support the consolidation and sub-condition process)- receive condition owner acceptance/rejection- initiate condition data modifications
UPQST22	Create Sub-Condition	C	<p>Purpose: To modify the condition by creating sub-conditions.</p> <p>Description: This on-line process will</p> <ul style="list-style-type: none">- allow input of sub-conditions from UPQST21- assign unique identifier for sub-conditions- associate or tie sub-conditions to original conditions- records sub-condition data in the condition data facet.- existing actions will be re-assigned to the sub-conditions <p>Rules:</p> <p>The top condition cannot have actions, but will be statused on all actions on all sub-conditions. Sub-conditions cannot have sub-conditions.</p>
UPQST23	Consolidate Conditions	C	<p>Purpose: To consolidate several related conditions into one condition.</p> <p>Description: This on-line process will</p> <ul style="list-style-type: none">- receive ID's for conditions to be consolidated- tie consolidated conditions to common ID- request/receive consolidated condition owners name/ID- record consolidated condition data in condition data facet. <p>Rules:</p> <p>Will create new conditions and an assessment to consolidate other conditions.</p>
UPQST24	Generate/View response	C	<p>Purpose: Generate a response letter (which contains an Action Statement) for one condition or all the conditions of an assessment.</p> <p>Description: This on-line process will compile a draft or final response letter from condition data. This will allow for finalizing the report off-line (and the report can be sent manually). The cc:mail notification will be sent only when the owner finalizes the report on-line and requests notification to be sent. Only non-rejected actions are included in the report. The response letter will contain an Action Statement. The Action Statement may contain:</p> <ul style="list-style-type: none">- Assignment of responsible person and organization code- Definition of corrective actions- A planned completion date
UPQST25	Maintain Conditions	C	<p>Purpose: Provide data entry for modifications of condition data.</p> <p>Description: This on-line process will do several things</p> <ul style="list-style-type: none">- provide a distribution update trigger to UPQST12 (build dist list)- trigger the appropriate cc:mail notices for condition changes- allow for modifications of condition data which are identified in UPQST27 (track conditions) or UPQST21 (review conditions), including ppg, rca and trend tag data.

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TIME: 10:55

Unit Process Descriptions for Function
Manage Conditions (FUQST2)

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Name	Label	Mode	Description
UPQST26	Query/ Report	condit C	<p>Purpose: To provide query support for condition data.</p> <p>Description: This on-line process will</p> <ul style="list-style-type: none">- provide data from the condition data facet to allow for identification of similar conditions- provide data/reports on the status of conditions- help identify related conditions or actions for consolidation
UPQST27	Track Conditions	M	<p>Purpose: To retrieve and display the status of conditions.</p> <p>Description: Manual operation to obtain status of conditions. Types of information needed may be - open/closed, due dates, last change, action owners, is LLE done?, etc ...</p> <p>Besides requesting status information, other processes associated with this process are</p> <ul style="list-style-type: none">- request condition modification- request RCA for a condition- request LLE for a condition
UPQST28	Create Actions	C	<p>Purpose: Identify and assign ownership to the actions required for a condition.</p> <p>Description: This on-line process performs several functions</p> <ul style="list-style-type: none">- provide for action data input (data entry via screens)- trigger cc:mail notices to identified actionee- assign unique ID for action- associate or tie the action to a condition- capture input for a response letter- delete rejected actions
UPQST29	Generate status change	C	<p>Purpose: Create notices not generated by the on-line data entry processes.</p> <p>Description: This batch process will</p> <ul style="list-style-type: none">- identify delinquencies and create appropriate notices- if PPG > 11, RCA, LLE required notices, would be sent to condition owner with associated due dates- create and send notices of items coming due, e.g., RCA, LLE, PPG.

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QUEST2: SYSTEM ARCHITECTURE
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Definition of the Function (250)
"Manage Actions"

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Unit Process Descriptions for Function
Manage Actions (FUQST4)

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Name	Label	Mode	Description
UPQST41	Review & Monitor Actions	M	<p>Purpose: Manage, review, monitor new and existing actions. This manual process is generally performed by an interface person, rather than the person actually performing the corrective action.</p> <p>Description: What can happen -</p> <ul style="list-style-type: none">- Assign actions- Querying DB for action status or action related information on an individual action record- Request reports, which may be standard or ad hoc. These reports would typically display multiple action records- The person performing this manual process should be aware of and conform to the appropriate CAMS policies/procedures. <p>Triggers: The trigger to this manual process is a need to change some information with relation to a specific action. This process is all about determining what is to change and why. Remember, the actions are created in another function - Manage Condition.</p>
UPQST42	Query Conditions & Actions	C	<p>Purpose: Response to query requests and provide information on specific conditions or actions.</p> <p>Description: Upon request, retrieve condition/action data from the database for the purpose of obtaining current status information.</p>
UPQST43	Maintain Actions	C	<p>Purpose: To modify or update action data to reflect current situation (status).</p> <p>Description: This on-line process will modify/update action specific information e.g., dates, action owner, completion. Also, when a pre-determined system *event occurs, people will be notified via a distribution list. This process will also allow the user to modify a default distribution list.</p> <p>*Example of system event - if closure of an action completes all actions for a condition, notify condition owner to close the condition.</p> <p>Trigger: a change to action data.</p>
UPQST44	Action Reports	C	<p>Purpose: Provide reports on action data.</p> <p>Description: Provide status information for a set of actions (i.e., multiple action records on a report). Anticipated information on reports might be: dates, open, delinquent, description & owner. Reports may be used for single user or management in general. In summary, these reports will support action tracking.</p>

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Definition of the Function (250) "Manage System Administration"

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Unit Process Descriptions for Function
Manage System Administration (FUQST6)

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Name	Label	Mode	Description
UPQST60	Administer System	M	Purpose: Support System administration functions. Description: A manual process performed by the system administrator (under direction of the system manager) to maintain system help files, system reference tables and control user access. Triggers: a request to modify system values or behavior. A change in policy or guidelines.
UPQST61	Update Reference Tables	C	Purpose: To update system reference tables. Description: Process to support maintenance of system reference tables. For example, system error messages or allowable document types. Triggers: Request by system administrator to add/update. Inputs: Reference table adds/upds. Outputs: Updates values in System Admin, Analysis and Condition Data facets.
UPQST610	Archive Data	C	Purpose: Archive closed CAM items. Description: Batch process. At regular intervals, archive offline and remove from on-line disk storage closed CAM items.
UPQST612	Contractor Uploads	C	Purpose: Receive Tiger Team, HSADB and PAT data from PNL, HEHF and write it to the QUEST2 database.
UPQST62	Maintain System Help	C	Purpose: Maintain system help files. Description: A system administrator will have access to the files used as a basis for the system help function. These files will consist of user error messages, help for system functions and textual descriptions of CAMS procedures. Triggers: A request from the system administrator. Input: New and modified help messages Output: error message values, help text.
UPQST63	Add/Update System Users	C	Purpose: To add system users or to update user access information. Description: The system administrator will grant system access to new users or modify existing user access when necessary. Trigger: User adds/updates are approved Input: user add/update approval information Output: System user add/update notifications.
UPQST64	Download Reports to Soft	C	Purpose: Create formatted reports for distribution to Soft Reporting. Description: Batch process, probably weekly. This process will read Condition Data and create formatted reports for use in the on-line SOFT REPORTING facility. Trigger: Schedule driven (weekly). Outputs: Production run listing (to be reviewed by operations personnel) and various reports in electronic file format.
UPQST65	Process Notifications	C	Purpose: Identify and create notifications for certain system events. Description: Batch process, probably run nightly. This process will detect and create notifications for system events that are not covered by on-line interactive processing. Triggers: Schedule driven. Output: notification messages for cc:mail distribution.
UPQST66	Monitor System Interface	P M	Purpose: To monitor or desk-check the batch run listings. Description: This manual process will probably be performed under the

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Unit Process Descriptions for Function
Manage System Administration (FUQST6)

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Name	Label		Mode	Description
				direction of CADS system manager. Batch production listings (with all the batch run-time details) must be review to verify that the batch ran satisfactorily. Batch processes to review are: Soft Reporting download, PeopleCORE load, FacilityCORE load, and nightly cc:mail notifications.
UPQST67	Extract/	Load	Facility C C	Purpose: Obtain FacilitiesCORE data. Description: At regular intervals FacilityCORE data will be loaded to the QUEST2 system for reference table update. Batch process. Triggers: Schedule driven. Input: FacilityCORE download file. Output: Facility related data elements (Building, location, etc...)
UPQST68	Extract/	Load	People C C	Purpose: Obtain PeopleCORE data. Description: Batch process. At regular intervals PeopleCORE data elements will be loaded to QUEST2 reference tables. This process must accomidate changes to any or all of this information and maintain history where appropriate. Triggers: Schedule driven. Input: PeopleCORE download file. Output: Updates to data associated with persons (Org no, Employee ID, etc ...)
UPQST69	Download	Data to	SHARE C	Purpose: Move CAM item textual descriptions to SHARE text search and retrieval system. Description: Extract and format Initiating Document, Condition and Action information to the SHARE system. This information is then subject to a text search and retrieval engine which can support a broad range of trending requirements. Batch process. Triggers: Schedule driven. Input: Facet Condition data Output: CAM item text

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Definition of the Function (250) "Perform Reporting and Utilities"

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Unit Process Descriptions for Function
Perform Reporting and Utilities (FUQST7)

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Name	Label	Mode	Description
UPQST70	Request	User Update Access M	<p>Purpose: This manual unit process serves as a control point for system User access.</p> <p>Description: The process is comprised of managing who may have system access and at what level. Activities will include reviewing/evaluating access request forms.</p>
UPQST71	Perform	Reporting & Utilities M	<p>Purpose: A manual process a user goes through to decide on and select various reporting and utility functions.</p> <p>Description: A manual User evaluation/selection process.</p> <p>On-line processes to choose from are</p> <ul style="list-style-type: none">- initiate a pre-defined or 'canned' report- request ad hoc queries- request queries for 'navigation' purposes- review a list of pending items- delegate items to a proxy
UPQST72	Generate	Canned Reports C	<p>Purpose: Initiate a predefined reporting process.</p> <p>Description: This on-line process will accept a user report selection from a list of predefined system reports. The selection of a specific report will invoke a reporting program, which resultant output will be available on one or all of screen, printer or file.</p>
UPQST73	Process	User Preference C	<p>Purpose: Allow the user to customize his/her interface with the QUEST2 system.</p> <p>Description: This on-line process will allow each individual user to control preferences such as show/no-show a condition status screen at logon, turn on/off receipt of system generated cc:mail messages, limit the number of rows returned in any ad-hoc queries, etc ...</p>
UPQST74	Establish	Proxy List C	<p>Purpose: The authorize someone else to act in your behalf.</p> <p>Description: This on-line process will provide a method for a person to assign or delegate his/her responsibility to another. (Issuing a letter of authority and making sure the designee has proper system access will be part of the System Admin Function).</p>
UPQST75	Review	Pending Items C	<p>Purpose: This process will provide current status on items pending or outstanding items for a specific person.</p> <p>Description: This on-line process must be flexible enough to retrieve and display pending items (items waiting for action of some kind) for the current user AND for others (e.g., the user's manager). Pending items may be associated with Initiating Documents, with Condition and/or Action owners.</p>
UPQST76	Perform	System Navigation C	<p>Purpose: To allow the user the ability to retrieve and view information on any one of a) Initiating Documents b) Conditions c) Actions.</p> <p>Description: This on-line process will allow a user to move to any one of the three main screens (Initiating Documents, Conditions, Actions) from any other one of the three main screens.</p>
UPQST77	Perform Ad-hoc Queries	C	<p>Purpose: To provide a mechanism for answering questions asked of the database, questions not answered by the standard reports.</p> <p>Description: This on-line process for ad hoc user queries must be flexible. The queries could be for just about anything. Examples:</p> <ul style="list-style-type: none">- data for tracking and/or trending- preparation for audits

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Unit Process Descriptions for Function
Perform Reporting and Utilities (FUQST7)

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Name	Label	Mode	Description
			- managing conditions
			- These queries can be stored and added to a master query list for all users to use.

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Definition of the Function (250)
"Conduct Analysis"

FUNCTION: FUQST3 (250) Conduct Analysis

FUQST3 (250)
Function Name
Created by: stoner
Revised by: stoner

DATE: 11-MAY-94
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Unit Process Descriptions for Function
Conduct Analysis (FUQST3)

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Name	Label	Mode	Description
UPQST31	Conduct PPG Analysis	M	Purpose: To determine the PPG value of a condition. Description: A formal process is undertaken to consider all the appropriate factors related to a condition. Once evaluated, these factors combined provide a score or PPG value which indicates the severity and risk of a condition. Manual process. Refer to WHC-M-1-4. Triggers: A request from UPQST21 (review conditions) to conduct an analysis. Input: PPG score from UPQST38 (Assist PPG Analysis) Output: PPG data (for PPG document) UPQST33
UPQST310	Assist trending Analysis	C	
UPQST311	Tag Items for Trending	C	
UPQST312	Initiate LLE Request	M	Purpose: Perform a Lessons Learned Evaluation (LLE). Description: Refer to the CAMS WHC-CM-1-4 manual lessons learned section. A LLE is performed if the PPG score is high enough. (see page 2-21 of the WHC-CM-1-4 manual). Trigger: UPQST21 (review conditions), based upon PPG score.
UPQST32	Conduct RCA	M	Purpose: To conduct the RCA (root cause analysis). Description: A manual process to investigate and determine the root cause of a condition. Refer to WHC-M-1-4 for formal process. (see page 2-21) Triggers: A request from UPQST27 (Track Conditions) or UPQST21 (Review Conditions). If PPG score is greater than 11 a RCA is performed. Inputs: Outputs: RCA data for the RCA document (UPQST34).
UPQST33	Document PPG	C	Purpose: Create PPG documentation. Description: Formalize the PPG related information, document PPG related information. On-line process. The system will provide a screen (form) to allow data entry of factors and assumptions that were used to determine the PPG score. The User may enter a score only or all attributes of the score. Triggers: Input of PPG values. Input: PPG data Output: Updates to Condition data facet.
UPQST34	Document RCA	C	Purpose: To collect and store the RCA information related to a condition. Description: An on-line process that provides a data entry screen (or form) for Root Cause facts associated with a specific condition. Triggers: Input: RCA data. Output: Condition data facet updates.
UPQST35	Perform Trending Analysis	M	Purpose: To perform trending analysis. Description: A manual process of coordinating the process of trending analysis.
UPQST36	Generate Risk Evaluation Report	C	Purpose: Generate the Risk Evaluation report. Description: Trigger: report request Input: Condition Data facet information.

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Unit Process Descriptions for Function
Conduct Analysis (FUQST3)

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Name	Label	Mode	Description
			Output: A Risk Evaluation Report.
UPQST37	Generate RCA Report	C	Purpose: Generate a Root Cause Analysis report. Description: On-line process to create a standard RCA report. The report will display information primarily entered via UPQST34 (Document RCA). Triggers: a report request. Input: Condition data facet information. Output: RCA report.
UPQST38	Assist PPG Analysis	C	Purpose: To provide on-line support for the manual process UPQST31 (Conduct PPG Analysis). Description: Retrieve and display information in support of the Conduct PPG Analysis manual process. Triggers: request for PPG score.
UPQST39	Assist RCA (Reasons)	C	Purpose: To supply PPG data and assist in Conducting the RCA process (UPQST32). Description: Triggers: Query request. Input: PPG data, Analysis RCA Data Output: Query results.

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Definition of the Function (250)
"Manage Change Control"

FUNCTION: FUQST0 (250) Manage Change Control

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Unit Process Descriptions for Function
Manage Change Control (FUQST8)

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Name	Label	Mode	Description
UPQST80	Prepare Change Request	C	
UPQST81	Request System Change	C	
UPQST82	Analyze Request	C	
UPQST83	Prepare Release Specs & Track	C	
UPQST84	Update/ Display Change Request	C	
UPQST85	Estimate & Process Change	C	

1.0 PURPOSE

The purpose of this document is to describe the QUEST2 technical design alternatives, compare their respective advantages and disadvantages, and recommend the alternatives that best fit the system's basic concepts and objectives.

This document focuses on the technical merits of the alternatives discussed. The Analysis of Benefits and Cost (ABC) discusses the relative costs and benefits of the alternatives that appear to have technical merit.

2.0 GENERAL ALTERNATIVES

Besides continuation of the existing system (status quo), there are three general alternatives that could be considered for the QUEST2 project:

- adaptation of an existing DOE-site system,
- adaptation of a commercial system, or
- custom development by WHC.

The alternative chosen then implies further choices available for implementing the system on particular hardware and software platforms that can support that alternative.

3.0 REQUIREMENT CONSIDERATIONS

The alternative(s) selected must provide technical support to the QUEST2 system objectives and basic system concepts. These design requirements have been accommodated in a level of detail appropriate for System Architecture data and process models.

3.1 System Objectives

In conjunction with the Steering Committee and the User Group, the development team has prepared Deliverable #130, System Objectives. As explained in that document, the system objectives are:

Objective #	Objective Statement
#1	Provide a single and simple point of access for CAMS documents and data.
#2	Provide the user with tools that will facilitate analyses such as RCA, PPG, LLE, and Trend Analysis.

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TECHNICAL ALTERNATIVE (P+ DOCUMENT #260)		

- #3 Allow for the traceability of changes to the data.
- #4 Provide for automated interfaces with appropriate systems, minimizing manual interfaces where possible and cost effective.
- #5 Reduce yearly system maintenance costs by approximately 30%.
- #6 Reduce system user training and support costs per user by approximately 50%.
- #7 Reduce the time required to make a system software/hardware change by approximately 40-50%.
- #8 Support and allow for consistent applicable site data standards, data definitions and formats.
- #9 Allow users to create and generate their own on-line ad-hoc queries on relevant data.
- #10 Allow immediate user notification upon an appropriate system trigger (e.g., data and/or status changes that impact a user and/or organization).
- #11 Allow for an approximate 70-80% reduction in manual rekeying of CAMS data (i.e., DBA rekeying of data).
- #12 Put the corrective action operations and data at the appropriate organizational level of ownership.
- #13 Support non-CAMS information management by providing facilities with non-CAMS system support, as applicable.
- #14 Provide input tool & report generator that allows originators to collect & report on their assessments (i.e., findings, conditions, etc.)
- #15 Provide a mechanism to support system change control.
- #16 Replace the DOE-RL CICS system.

3.2 Basic System Concepts (Deliverable # 230/240)

Deliverable 230/240 is provided as Attachment A. It provides the basic system concepts with an explanation of each. This deliverable is intended to translate the system objectives into general technical and procedural solutions. Basic System Concepts are listed in that document as follows:

- The system must be "easy to use" and offer support to its users.
- Continuity of Service.
- User notification.
- Documents generation (output).
- Initiating Document preparation (input).
- Manual entry of initiating documents
- Support standard and user-generated ad hoc reports.
- User queries.
- Provide automated interfaces.
- Unique identifier for each person.
- Responsibility for conditions and actions will be assigned to persons.
- Delinquent due dates.
- Query at the Action level.
- Support system administration.
- Provide for DOE support for corrective action management.
- Support non-CAMS data storage and access.
- Navigation.

CONTROL CONCEPTS

- System access and security.
- Archiving.
- Performance monitoring.
- Reports and batch processing.
- Ensure data integrity.
- Electronic approval.

3.3 System Performance Metrics

System requirements include support for the following metrics:

SYSTEM PERFORMANCE METRICS	
STORAGE	
1. Average number of records	41000 Condition/29000 Action
2. Size of typical record (bytes)	1640 Condition/825 Action
TOTAL STORAGE	91M
NETWORK TRAFFIC	
1. Number of users	start with 25 and progress to 200 in the first year
2. Expected concurrent users	start with 15 and progress to a level of 25 - 50 in the first year
3. Weekly batch system interfaces and size (bytes) (these will be accomplished during non-peak operating hours, probably in the evening of specific work days)	download to SHARE (4.6M)
	upload from PEOPLE CORE (2.7M)
	upload from FACILITY CORE (200K)
4. Monthly batch system interfaces and size (bytes) (these will be accomplished during non-peak operating hours, probably in the evening of specific work days)	upload from PNL (2K)
	upload from HEHF (1K)

4.0 GENERAL ALTERNATIVES EVALUATION

4.1 Adaptation of an Existing DOE-Site System

Corrective Action Management (CAM) is required by DOE for all of its sites. This requirement is conveyed in existing procedures and regulations published by DOE to all of its contractors. In order to comply with this mandate, each of the DOE sites has implemented local procedures to establish a programmatic Corrective Action Management System (CAMS) adapted to their site environment. Many of these CAMS programs are supported by some kind of automated tracking and/or management system.

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4.1.a Overview of Previous Site Evaluation Analysis

As documented in the Site Evaluation deliverable (Appendix G, WHC-SD-GN-CSWD-30061), CAM support systems and business processes were evaluated for three DOE and two NRC sites. These included:

- DOE Site: Oakridge, Tennessee (system function and business process review)
- DOE Site: Savannah River, Georgia (system function review)
- NRC Site: Fulton Nuclear Power Plant, Calloway, Missouri (system function and business process review)
- NRC Site: PG&E Nuclear Power Plant, San Francisco, California (system function and business process review)
- DOE Site: Pacific Northwest Labs, Hanford, Washington (system function, business process, and low level system model analysis)

The conclusion was that none of these systems could be implemented without substantial rework at WHC for the following reasons:

4.1.a.1 Business Rule Differences

Each of the DOE sites is composed of a specific set of facilities that support site missions. These are also managed by differing contractors. While there is a great deal of overlap, the site specifics have created differing site management perspectives and priorities reflecting:

- differences in applicable compliance regulations,
- contractor organizational business mandates, and
- the independent nature of the contracts themselves as negotiated with DOE.

Differing business rules have evolved to reflect these management perspectives. The automated systems support these business rules for their respective sites.

The evaluators determined that importing any of the known systems would require one of two scenarios:

1. WHC would have to adapt its own business rules to the needs of the system. Since WHC has its own site-unique mix of facilities, compliance oversight, environmental cleanup issues, etc., it is not practical to expect any other set of business rules to be perfectly suited to WHC requirements.

4. The imported system would have to be adapted to the business rule requirements of WHC. At the least, this would be a significant redesign/rebuild process.

4.1.a.2 Hardware/Software Standards. WHC has a site-unique network structure and associated technology standards. It has established a strategic goal of migration to a client-server architecture. All of the existing sites have their own system environment definitions and their systems have been implemented in that context. None of the known systems match the physical system environment at WHC. Consequently, each would have to be redeveloped to compliment the WHC site or the site would have to accept an aberrant system into the system environment. Either course was considered prohibitive with a great potential for far exceeding the cost of a custom, site-complimenting system.

4.1.b Site Evaluation Conclusions. The site analysis effort was chosen to provide a representative sampling of typical CAM activities. Therefore, it was considered to provide representative conclusions that would be reached after visiting other sites.

The project team drew from the analysis conducted for the site evaluation and from their assessment of industry experience and WHC environment. It was a unanimous conclusion that it would not be desirable to attempt to adapt one of the other site systems to WHC. As a rule of thumb, it is not generally considered practical to adapt an existing system unless it provides at least an "80% match" to the target site's business rules and operating standards. None of the reviewed systems provided such a close match to the WHC environment. Also, during the course of their own system research, none of the reviewed system owners had found any indication that a universally adaptable CAM system existed. Consequently, this alternative has been discarded as impractical for QUEST2.

Pursuing this alternative with further detailed analysis was considered an ill-advised use of scarce resources when the outcome was very likely to be simple confirmation of the conclusion already reached. Instead, the project team decided to accept the conclusions of the reviewed sites as being reasonable for WHC and QUEST2.

4.2 Adaptation of Commercial System

4.4.a Commercial Package Availability. CAMS is a DOE-specific program. NRC sites also have a similar requirement. However, all known sites have independently developed custom systems. When asked about the availability of a commercial software, the unanimous response was that their research had not revealed the existence of any comprehensive CAM support systems in the commercial industry. Given the limited market and business rule-unique nature of such systems, this was not a surprising conclusion. Since the conclusion

appeared obvious, further expenditure of resources for extended market research was not considered desirable by the system owner.

Certain aspects of QUEST2 may be amenable to the use of generic package "shells". For example, commercial products are available for adapting executive information support, general decision support, and generic tracking capabilities to local business requirements. These tend to be costly packages which only provide a set of tools with a general development environment for local use. The actual adaptation and development to employ such a package approaches the effort of local custom development while introducing non-standard software into the site.

The QUEST2 requirements indicate that the system will require basic features that are well understood in the local ADP community. It is primarily a tracking system. The general construction environment for the system already exists in the Hanford site architecture using site standard software and hardware. Importing a new commercial environment and tool set simply to support such a system does not appear practical.

Some pre-packaged application software is probably suitable for QUEST2. The development team has examined commercial packages that support root cause analysis and statistical evaluations. Also, there is a need to use site standard word processing and text management software. However, these are focused applications that require the presence of a "core" system with accessible data. They do not address the general development of the central system itself.

4.4.b Commercial Package Conclusions. The cost and effort for procurement of generic "shell" packages will approximate that for custom development. Such a package would introduce a new development environment that does not match local site expertise. Meanwhile, it would replicate capability already attainable with local site software standards. Once the basic system is constructed, commercial packages for report generation, analysis support, word processing, and text management can be purchased and integrated into the system structure. Some of these packages are already available on site and will require little or no extra procurement in support of QUEST2.

4.3 Custom Development by WHC

The recommended development approach for QUEST2 is to construct the system as a custom development that integrates focused application packages for particular functional support.

This evaluation will discuss only hardware and software products which are already available on site. When life cycle support and operation considerations are applied, non-standard products should be used only if current standards are not adequate. In the case of QUEST2, the requirements

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do not indicate any technology or unusual system performance factors which can not be accommodated with the technology already on site. Such an approach takes advantage of the site environment and produces the site-unique management system required.

The remainder of this technical alternatives analysis provides a technical evaluation of the hardware and software to support the custom development.

5.0 HARDWARE AND SOFTWARE ALTERNATIVES

5.1 Software Alternatives

5.1.a Relational Data Base Management Systems (RDBMS)

The basic concepts indicate the need for a relational data base management system (RDBMS). Such a system provides industry standard support to the following basic system concepts:

- Support standard and user-generated ad hoc reports.
- User queries.
- Unique identifier for each person.
- Responsibility for conditions and actions will be assigned to persons.
- Delinquent due dates.
- Query at the Action level.
- Support system administration.
- Provide for DOE support for corrective action management.
- Support non-CAMS data storage and access.
- Navigation.
- System access and security.
- Archiving.
- Reports and batch processing.
- Ensure data integrity.

The Hanford site has several local RDBMS software alternative standards which can support the QUEST2 concepts and system metrics. These standards assure available development resources, maintenance resources, and compliance with the HLAN environment requirements. The primary RDBMS choices for the site for a system of this size and complexity are:

- NOMAD
- SYBASE
- DB2
- ORACLE

NOMAD. This is a mainframe-based RDBMS product. In fact, the current QUEST system is a NOMAD application.

There is currently little or no new NOMAD application development being done on site. This is a third generation software product that is manifesting itself with some undesirable traits:

- it is causing a large Central Processing Unit (CPU) and Direct Access Storage Device (DASD) utilization rate (current QUEST operation costs are approximately \$500K per year, as discussed further in the ABC analysis document);
- it uses a textual form interface which necessitates a very "busy" screen set that users find difficult to use;
- users can not generate their own ad hoc queries -- they must request that they be programmed by a trained NOMAD programmer;
- auditors and assessors cannot get the interactive text editor capability to create initiating documents.

NOMAD does not support the site strategic direction to parallel industry and move toward Structure Query Language (SQL) data base applications. An SQL Relational Data Base Management System (RDBMS) is particularly important to QUEST2 since there is a need to interface with PNL's CAMS tracking system. It has been recently implemented as a SQL data base.

For these reasons, NOMAD is not considered a viable alternative for development of new system with a reasonable life expectancy.

DB2. This is also a mainframe RDBMS product. It also has a reputation for requiring a large CPU and DASD utilization rate which leads to an assumption of high operating costs.

There is a need to interface with PeopleCORE and FacilityCORE which are both DB2 systems. This will be a requirement for routine batch extracts from both of these systems. However, this can be a single batch process run at

off-peak hours. Consequently, regular on-line interaction with either system is not necessary. Therefore, the need to extract data from these systems is not in itself a determining factor that creates a particular need to develop QUEST2 in DB2.

To support a Graphic User Interface (GUI) front end, there is a DB2 gateway (Micro Decision) being installed on site during the spring of 1994. It is not yet operating, but could be in place in time to support QUEST2. However, this gateway will add to the overhead of each SQL request, creating additional cost. In addition, it is only planned to be implemented for 125 concurrent users. As can be seen by the metrics, QUEST2 will start with 25 and quickly progress to a concurrent utilization of 50 to 100 users. The gateway is not a practical approach for QUEST2.

The alternative is to stay with a CICS access to a DB2 data base. This eliminates the GUI front end that has been a strongly stated customer preference through the entire requirements definition phase. A fundamental complaint with the current QUEST is that it is not "easy to use". There is a definite perception throughout the user community that a GUI front end, replicating the WINDOWS environment that they are used to, is the expected solution to the redesign.

DB2 is not considered a preferred solution for QUEST2.

SYBASE and ORACLE. These are site standard server-based RDBMS products.

The development team performed an on-site analysis of SYBASE and ORACLE as potential SQL RDBMS products. Both were found to be equivalent in cost and support to general technical features. A comparison of advantages and disadvantages revealed the following:

DESIRED FEATURES	COMPARISON	
	SYBASE	ORACLE
1. Client-Server application distribution.	strong	weak
4. GUI front end interaction.	strong	moderate
5. Interface with applicable systems.	strong	moderate
4. Local site expertise.	strong	strong
5. Other available site systems which can provide completed routine modules/procedures to the development.	strong	strong

DESIRED FEATURES	COMPARISON	
	SYBASE	ORACLE
6. Capable of supporting applicable basic system concepts.	strong	strong
7. Continued industry support.	strong	strong
8. Available CASE tool interaction.	moderate	strong
9. Compatibility with HLAN.	strong	strong

As can be seen, both ORACLE and SYBASE are nearly equal in their applicability to the QUEST2 project. However, two key features are of particular importance: these are the ability to interface with other systems and the ability to support GUI front end interaction (which is discussed in more detail in paragraph 5.1.b below).

External System Interface Considerations.

PeopleCORE and FacilityCORE are DB2 systems. There will be a requirement for routine batch extracts from both of these systems. The effort to design an interface with them is equivalent for both ORACLE and SYBASE.

SYBASE is rated slightly stronger for system interfacing because one of the primary interfacing systems is the CATS system from PNL. This interface will be required for the upload of PNL data to support DOE site information gathering. Since CATS is already a SYBASE system, the interface design is a relatively simple task using the same DDL.

The fact of a needed interface to another existing SYBASE data base (CATS) sways this factor in favor of SYBASE.

5.1.b Front End User Interface Software.

The basic system concepts indicate the need for a system that is "easy to use". In particular, the user front end for the system should enhance efficiency as the user accomplishes the following basic system concepts:

- Documents generation (output).
- Initiating Document preparation (input).
- Manual entry of initiating documents.
- Support standard and user-generated ad hoc reports.

- User queries.
- Query at the Action level.
- Support system administration.
- Provide for DOE support for corrective action management.
- Support non-CAMS data storage and access.
- Navigation.

While the term "easy to use" is generally ill-defined, in the context of QUEST2 the user groups have indicated a need for:

- uncluttered screens,
- pick lists to fill in queries and populate standard data fields,
- easily generated output,
- menu selections for system applications.

The software for the front end should provide validation of entered data, easy activation of reporting and query tools, and support easy to use help facilities. Since this helps cut down the transfer of "bad" data exchanges with the server, network traffic tends to be more complete and accurate data transfers.

These front end concepts can be addressed by a system using either ORACLE or SYBASE back ends. If ORACLE is used, the front end generally used on site is SQL*FORMS, probably at least partially because it is a seamless ORACLE product. The new FORMS version 4.0 can provide a Graphic User Interface (GUI) front end capability for ORACLE. It is especially useful as ORACLE-7 is introduced on site. The combination of ORACLE-7 and FORMS 4.0 will create a true client-server environment for ORACLE. However, this combination is only now becoming available. There will be a time lag as the technology is settled into the site and experience is gained. Meanwhile, the primary GUI expertise on site is with other GUI front ends such as POWER BUILDER and VISUAL BASIC.

SQL*FORMS provides for simple, uncluttered screens that are menu driven. Data validation checks and cross screen navigation techniques have been favorably received by users. Query and standard report output capability appears to be amenable to the general QUEST2 user ADP competence. There is a general expectation expressed by the user community for the system to have a true GUI front end. However, if the current forms interface for ORACLE was carefully developed, and user expectation was carefully managed, there is a

possibility that the front end interface provided would be adequate for QUEST2.

GUI front end software has been established on site and is well understood for SYBASE. In particular, VISUAL BASIC and POWER BUILDER applications are common on the Hanford site and in a multitude of other industry systems. Because a GUI solution is already available to match user preferences, and is well supported, SYBASE was rated slightly stronger for this feature in the above RDBMS discussion.

A GUI front end replicates a familiar "WINDOWS-like" environment. Since WINDOWS is a standard of the site "core" work station, users already have a certain "comfort" level with GUI front ends. This may be particularly important during implementation of a new system, since it will help overcome problems in adjusting to the new system operations. Pull down menus, buttons, and tools bars can guide users through the requirements to enter and retrieve data.

A synopsis of specific comparative factors for front end software is as follows:

DESIRED FEATURES	COMPARISON		
	VISUAL BASIC	POWER BUILDER	SQL-FORMS
1. Compatible with SYBASE.	strong	strong	none
2. Compatible with ORACLE.	moderate	moderate	strong
4. User-recognized tool bars, buttons, pull down menus.	strong	strong	weak
5. Potential to build uncluttered screens.	strong	strong	strong
4. Potential for pick lists to fill in queries and populate standard data fields.	strong	strong	strong
5. Easy to generate output.	strong	strong	strong
6. Menu selections for system applications.	strong	strong	strong
7. On line help facilities that are "context-specific".	strong	strong	moderate
8. Support multi-programming.	weak	strong	strong
9. "Self-contained": does not need additional "add-in" software tools.	weak	strong	strong

VISUAL BASIC was eliminated as a contending front end software selection. The strengths of SQL*FORMS and POWER BUILDER in supporting multi-programming environments make them preferable. It provides version control and "check out-check in" support for multiple programmers. This creates a gain in efficiency and consistency across the applications and screens developed.

VISUAL BASIC is more a WINDOWS programming tool that requires additional add-in software tools to accomplish the needed QUEST2 support. Besides adding cost, these add-in tools require their own lead times for procurement processing and their own maintenance requirements.

5.4.c Text Management Software

CAMS information is of two types: data and text. While the alternative RDBMSs will accommodate data, text management and access requires specialized software for complete support to the following basic system concepts:

- Documents generation (output).
- User queries.
- Provide automated interfaces.
- Provide for DOE support for corrective action management.
- Support non-CAMS data storage and access.
- Archiving.
- Reports and batch processing.

Certain text fields may be required for storage in the data base. Both of the RDBMSs selected permit use of 250+ character limited free-form text fields. These can be used for such requirements as comments fields. However, this is a resource-intensive system for storage of large text documents: for example, all SYBASE text pages are 2k bytes in size, even if they only store a few lines of text. Even if this alternative was acceptable, interactive search of such data is not supported. Consequently, the RDBMS is not considered the best choice for supporting storage of the large text reference documents that are required by CAMS.

Other site repositories hold text documents that are necessary for trend and general research access. In addition, once documents and QUEST2 records are archived, they must be available for research against the archive. A text management software capability is needed to access and retrieve the needed documents in support of ad hoc and standard queries. This text management software must be available to QUEST2 users as an activated application via

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their front end screens. Standard data base query can retrieve the needed document identification to be used in a text management query.

The TOPIC software is the only approved product in general production on the site for this kind of technology. It supports all of the applicable basic system concepts and general requirements. It provides a ready-made repository for archiving QUEST2 documents. A system application can be activated from the user screen to provide query support to the QUEST2 data base for retrieval of the text identification data. This same screen could activate the TOPIC application to access the archive.

The Search Hanford Accessable Records Electronically (SHARE) system already stores a TOPIC-indexed download of current QUEST records. It also stores other selected text repositories of interest to QUEST2 users. More repositories will be added to SHARE over time. The QUEST2 system will provide access to the SHARE system. Standard TOPIC queries will be available. TOPIC-proficient users will be able to construct their own ad hoc queries.

5.4.d Text Preparation Software

Preparation of initiating documents will require full text preparation and editing support. This feature supports:

- The system must be "easy to use" and offer support to its users.
- Documents generation (output).
- Initiating Document preparation (input).

The site standard for text is WORD PERFECT. The QUEST2 front end software must activate the current standard version of this software from the initiating document screens to support text preparation.

Resulting WORD PERFECT files will be stored with their control characters as data in the data base. When records are retrieved, the WORD PERFECT files will be available to import into WORD PERFECT. The system must transparently activate WORD PERFECT when these fields are needed.

5.4.e Prepackaged Application Software Tools

For trending, root cause analysis, and lessons learned analysis, the need to retrieve information from the system takes on the nature of specifically defined queries that follow explicit rules. Current identified software packages support root cause analysis and statistical trending analysis. There is also a potential for providing a PPG support tool. Other prepackaged products are possible in response to ongoing system requirement changes. These tools pertain to the basic system concepts:

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- Support standard and user-generated ad hoc reports.
- User queries.

These tools are considered "add-ons" for the basic system: they are applications which will work against the central data repositories. They will retrieve selected data and text into the application tool in support of the functional requirement being fulfilled. Final selection of such tools will be made in support of future releases. That selection activity will require a separate technical alternatives analysis to ensure that the applications selected support the intended functions while working seamlessly with the QUEST2 central system.

5.4.f Report Generator

Both of the preferred RDBMSs support standard SQL queries. These will be activated via screen selections for standard activities such as conditional searches, pick list-driven search criteria, and some standard management reports available via QUEST2 menus.

Other reporting capabilities require a user friendly report generator. This will support basic system concepts:

- Documents generation (output).
- Support standard and user-generated ad hoc reports.
- Query at the Action level.
- Provide for DOE support for corrective action management.
- Reports and batch processing.

"Third party" report generator packages are available on site to work with the RDBMSs discussed. In addition, the front end product alternatives have built in report generating capabilities. Most will provide the necessary support making the specific selection a factor of relatively minor impact on the system design.

POWER BUILDER also has its own reporting capability. Other software products have also been used, but contact with some of those development teams has uncovered dissatisfaction with their particular tools. In fact, the PAMM system which is also using SYBASE and POWER BUILDER, is migrating from their third party report generator to use of the latest POWER BUILDER version. In general, the reporting capabilities of the front end alternatives appear more than adequate for the requirements specified by the QUEST2 users. Consequently, it appears preferable to avoid third party report generators.

These will unnecessarily complicate a support feature available from the user front end selections.

5.3 Hardware Alternatives

Decisions for software alternatives have been driven through a need to accommodate the basic system concepts. Such software leads to considerations of hardware platforms best suited to support it. Three hardware environments are available in the current Hanford site environment:

- IBM 3090 mainframe,
- standard network server with the server providing all application and processing support,
- client-server with distributed applications and processing.

Factors pertaining to the HLAN requirements and local maintenance and operations requirements preclude inclusion of other possible hardware environments.

The choice of hardware must support a central data repository because of the central management view required for compatible data. It must also support a wide geographic dispersion of users while providing them with identical end user support at their work stations. End user stations must comply with the standard "core system" PC work station approved for the site.

An architecture which distributes data is not being considered. This configuration would require an unnecessarily complex distribution of central data while presenting a "logical" single data source to users. Such technology is still immature in industry.

5.5.a Use of the IBM 3090 Mainframe.

While there are some mini-computer systems on the Hanford site - in particular DEC and Hewlett Packard machines - these are not generally available for new application development. The site standard platform for central system development is the IBM 3090 running MVS.

The SYBASE alternative precludes use of the mainframe since it requires a UNIX or OS/2 environment product. ORACLE can operate on the mainframe, although it also commonly uses a smaller file server configuration. As stated in the "Hanford Architecture of the 1990s" document, current site strategy is to move new applications off of the mainframe environment and into server technology, with a particular interest in client-server.

The mainframe has been rejected as a contending platform environment.

5.5.b Use of a standard network server with the server providing all application and processing support.

Much of the current Hanford site application support is based on traditional central server technology. However, HLAN administrators and planners have expressed a strong desire to migrate to client-server technology. This permits a reduction in LAN traffic by locating some of the support processing on the client end of the architecture. Central network server architecture performs in a manner similar to the central mainframe approach: all data resides on the server. Applications also are stored there and are sometimes downloaded to the accessing user's work station.

A main operating difference between mainframe and network server tends to be the size of the data base. However, the network traffic difference is not significant.

If ORACLE is determined to be the preferred RDBMS, it would be developed for a network server environment.

5.5.c Client-server.

The client-server environment is a site migration direction. It has benefits in the potential for reduced network traffic. Data and data base management software can reside on the central server. This provides the benefits of central data storage and processing on mainframes and standard network servers. However, local user interface software is stored on the client end at the user's work station. This client software supports the data entry, editing and query construction operations. It also performs initial data validation activities. Interaction with the server tends to be with data that can be passed only once since it is "cleaner" and pre-processed. Queries to the server can be constructed at the client end and passed to the server in optimized form. The use of precompiled and optimized procedures on the server will reduce the server processing demands and network traffic.

5.5.d Server Hardware and Operating System

The server hardware and operating system selected must be flexible enough to support either the ORACLE/network server configuration or the SYBASE/client-server configuration.

Contact with SYBASE and POWER BUILDER vendors and local site experience indicates that the server platform selection should consider UNIX and IBM OS/2. SYBASE has produced versions for both of these environments and both are used on the HANFORD site. In addition, ORACLE users on site have used both UNIX and OS/2.

OS/2 expertise appears to be wider and more mature on site. This is probably due to the number of OS/2 stations on site at the work station level.

UNIX has a more limited pool of experienced users and developers. This appears to be due to the relatively new introduction of servers which use this operating system.

In contact with SYBASE, bench mark results were discussed. The SYBASE corporation has expressed a preference for UNIX as an operating system. They indicate that it better supports SYBASE and the client-server configuration in general, although they also indicate that OS/2 is acceptable. In fact, they develop their SYBASE product on SUN work stations.

In discussing hardware, it became clear that SYBASE on UNIX was a very superior combination. This configuration is also supportive of ORACLE operations. A SUN 1000-class machine is an example of the preferred platform. The QUEST2 system metrics indicate that use of such a hardware platform will be adequate for the foreseeable future. It is flexible enough to support continuing upgrades. It can add sufficient disk storage to support all foreseen disk requirements. It also is a well known performer as a file server.

The decision is further supported by a local site lease contract. Purchase of the hardware is a capital expense item which requires a three year budgeting lead time. While the budget planning and procurement actions have been initiated, lease is the most viable option to ensure delivery of the server without incurring a substantial project delay. The lease has already been competitively awarded and five vendors are available to provide a SUN 1000 or compatible UNIX machine.

A configuration for this hardware was selected in conjunction with SYBASE advice and local technical experts. It is the standard lease system described in Attachment B.

5.5.e Client Hardware and Operating System

Client hardware must replicate the accepted site "core" work station. This is configured with the site standards for software, memory, disk space, and processing speed. These work stations are already distributed throughout the site and an active site upgrade initiative continues to upgrade those systems not yet up to standard. The EUC support force on site is not equipped to support non-core stations.

The primary concern to the QUEST2 developers is to ascertain that the user interface software selection is compatible with the core station. Research and local site experience has shown that POWER BUILDER and ORACLE

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meet this requirement. Proof of this concept is available on site in the form of other developments and operating applications.

The core work station is described as follows:

386 CPU	DOS 5.0 or higher
8M RAM	WINDOWS 3.1 or higher
120M Hard Disk	Quarterdeck QEMM 6.02
33MHz operating speed	

5.5.f Network Protocol

TCP/IP is being installed as the site standard network protocol. It has a final implementation date of June of 1994. Even if this is delayed, it will be supportive of the expected QUEST2 implementation schedule starting in early 1995.

The described hardware and software selections are compatible with the TCP/IP protocol.

4.0 CONCLUSION

The preceding discussion indicates that standard features of the QUEST2 system include:

Server:	SUN 1000-class CPU
Operating System:	UNIX
Protocol:	TCP/IP
User Station:	Standard "core" station
Word Processor:	WORD PERFECT
Text Management:	TOPIC (SHARE)

As noted in the preceding discussion, two technical alternatives appear equally supportive for RDBMS and front end development. These alternatives are:

ALTERNATIVE 1

ORACLE
SQL*FORMS
network server architecture

ALTERNATIVE 2

SYBASE
POWER BUILDER
client-server architecture

Since these are so similar in their technical support potential, final selection of the recommended alternative should be made on the grounds of cost/benefit tradeoffs. That analysis is presented in the QUEST2 Analysis of Benefits and Cost (ABC) document.

1.0 PURPOSE

This document provides the implementation strategy for the QUEST2 project. It partitions the project into releases and describes the general scenarios which can be used to implement these releases.

2.0 BACKGROUND

During the Business Environment Analysis phase of the project, a Migration Plan (Appendix I of WHC-SD-GN-CSWD-30061) was prepared. It described, in general terms, the following steps required to migrate the existing support to a new application architecture:

1. Establish Computer Aided Software Engineering (CASE) tool support.
2. Preliminary Analysis/System Architecture
3. Reestablish current functionality
4. Create Corrective Action Management System (CAMS) InfoBase
5. Create analysis support applications
6. Establish external system interfaces
7. Modify CAMS InfoBase

These steps were a long-range projection, meant to convey the general requirements to evolve the entire application architecture over time. To date, the first step has been completed. The second step is being conducted: this document is one of the analytic deliverables contained in the Preliminary Analysis/System Architecture (PA/SA) phase of the project.

The remaining steps are discussed in this document. Their sequence and content can now be established in more detail based on the insights gained from the PA/SA activities.

3.0 PRIORITIES

3.1 Functional Considerations

During the PA/SA phase, the Process Model and Data Model have defined the necessary content of the system needed to support the business requirements. Interaction with the User Group, the Steering Committee and the System Owner indicates certain functions are of higher priority than others. The first release must incorporate at least the minimal unit processes for the most

essential of these functions. The result must be a working release that provides basic functionality. The affected functions include:

- FUQST1: Identify Conditions
- FUQST2: Manage Conditions
- FUQST4: Manage Actions
- FUQST5: Convert Data
- FUQST6: Manage System Administration
- FUQST7: Perform Reporting and Utilities
- FUQST8: Manage Change Control

FUQST3, Conduct Analysis, in its entirety has been given a lower priority. While its functions represent a significant value to WHC, the business rules pertaining to this function are not yet mature enough to define their development.

Each of the high priority functions is composed of unit processes. The release partitioning further incorporates priority considerations reflecting resource constraints and organizational sensitivities. In some cases, particular unit processes may be deferred to second or later releases. This must be done while still ensuring that the basic functionality of the higher priority functions is provided.

FUQST2, FUQST3, and FUQST7 are dependent on FUQST1 and FUQST5. FUQST3 is first dependent on the provision of a credible data source. It will be manifested in a set of generally independent applications. FUQST6 and FUQST8 are normal system management functions that presume the existence of an operating system in the first place.

3.2 Data Considerations

Functions FUQST1, FUQST2, FUQST3, FUQST4, and FUQST7 are extremely data dependent. Without a full implementation of the Condition, Action, and Initiating Document data entities, these functions can not be implemented.

3.3 Organizational Considerations

3.3.a Minimal Support

As noted in other deliverables and through User Group interaction, the first release will not be considered a success unless it provides complete, consistent data, easy access for data input and retrieval, ad hoc query support, and full reporting.

The organization is currently supported by a text-intensive user front end. It is accessing data from a data base that is not considered current or fully credible. Implementation of QUEST2 will replace this system with an entirely new system approach. Screens, report activation, data content, and

query will be perceived as completely new ADP support. Meanwhile, the system supports critical management tracking functions that can not be interrupted.

These considerations imply a requirement to introduce the system with minimal interruption of daily support while simultaneously introducing personnel to new system features.

3.3.b Cost and Schedule Impacts

The timing and amount of funds available place a constraint on system implementation schedules. The implementation strategy must place emphasis on the highest priority functions while deferring less critical Unit Processes to a later release in order to accommodate cost and schedule mandates. It is acceptable for the first release to provide some less-than-optimal support that will be streamlined in a later release. For example, in the first release, some unit processes may require manual screen selections by the user that a second release may activate automatically based on table driven triggers. This approach will be taken only if current fiscal year funding requires it. It would be done with the understanding that it creates a potential increase in subsequent fiscal year funding in order to redevelop any affected unit processes.

3.3.c Current System Usage

The current QUEST system has approximately 160 users. Of these, approximately 50 are considered daily, active users. The remainder tend to be casual users. The difficulty in using the current system is considered a large factor in its lack of appeal to the majority of users. The new system is expected to correct this problem. Therefore, a steady increase in active users is expected after initial system implementation. The early releases must incorporate an implementation strategy that supports a rapid demand for system access exceeding the current user population.

QUEST2 must replace the current DOE systems. This will also add a new user population. As a consequence of replacing the DOE systems, interfaces with PNL and HEHF for upload to DOE must be included in the first release.

The DOE systems are PARADOX data bases that must be converted into the new system. This work is currently required for completion by December 31st, 1994.

4.0 SCENARIOS

Cost and schedule constraints coupled with the sense of urgency for the new system preclude a implementation with only one release. The system complexity and available resources would require an unacceptable period of

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time to accomplish a one release scenario. Consequently, the following scenarios were under consideration:

- Implement the system in two releases. The first would establish the data base and priority functions with PNL/HEHF interface. The second would provide all other system architecture components to include analysis applications and establishment of an infobase with text management.
- Implement the system in four releases. The first would establish the data base and highest priority functions with PNL/HEHF interface. The second would provide PPG and RCA analysis applications, interface with PEOPLE CORE and FACILITY CORE and an interactive archive. The third would provide Trending analysis applications. The fourth would establish a site-wide infobase with text management.
- Implement the system in four releases. The first would establish the data base and highest priority unit processes, PNL/HEHF interface, and PEOPLE CORE/FACILITY CORE interfaces. The second would provide analytic applications for PPG and RCA analysis and second priority unit processes. The third would establish unit processes pertaining to Trending and an interactive archive. The fourth would establish a site-wide infobase with text management.

In addition to the size and content of the release, the implementation strategy must consider whether to implement the releases in phases with parallel operation of the current system, or to implement in one total, immediate system replacement.

4.1 MINIMAL CORE SYSTEM

Regardless of the scenario chosen, the first release must include a minimal set of data and processing capability or it will not have user acceptance as a successful system implementation. This minimal requirement is considered the "core" system. As confirmed with the System Owner, in all of the scenarios, the core system must be present in its entirety in the first release. The remainder of the scenario is then determined by which additional unit processes are added to first release or are planned for later releases.

The minimal core system is defined as:

- Complete data base structure for Initiating Documents, Condition, and Action data;
- The following FUQST1 (Identify Conditions) unit processes:
 - UPOST110 Accept/Reject Response
 - UPOST111 Verify and Close Conditions

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- UPQST13 Input Audit Reports
- UPQST15 Collect and Prepare Input
- UPQST16 Review
- The following FUQST2 (Manage Conditions) unit processes:
 - UPQST21 Review Conditions
 - UPQST22 Create Sub-Conditions
 - UPQST23 Consolidate Conditions
 - UPQST25 Maintain Conditions
 - UPQST26 Query/Report Condition Status
 - UPQST27 Track Conditions
 - UPQST28 Create Actions
- The following FUQST4 (Manage Actions) unit processes:
 - UPQST41 Review and Monitor Actions
 - UPQST42 Query Conditions and Actions
 - UPQST43 Maintain Actions
 - UPQST44 Action Reports
- All of FUQST5 Convert Data which will convert from the current QUEST, CICS, HEHF, and Kaiser;
- The following FUQST6 (Manage System Administration) unit processes:
 - UPQST60 Administer System
 - UPQST61 Update Reference Tables
 - UPQST612 Contractor Upload (PNL/HEHF)
 - UPQST63 Add/Update System Users
 - UPQST64 Download Reports to Soft Reporting
 - UPQST66 Monitor System Interface Processes
- The following FUQST7 (Perform Reporting and Utilities) unit processes:
 - UPQST70 Request User Access Update
 - UPQST71 Perform Reporting and Utilities
 - UPQST72 Generate Canned Reports
 - UPQST76 Perform System Navigation
 - UPQST77 Perform Ad Hoc Queries
- The FUQST8 Manage Change Control manual unit processes:
 - UPQST80 Prepare Change Request
 - UPQST82 Analyze Request
 - UPQST83 Prepare Release Specifications and Track
 - UPQST85 Estimate and Process Change

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4.2 SCENARIO #1. Develop the system in two releases.

Release 1 would include the core system plus:

- Remainder of FUQST1 (Identify Conditions):
 - UPQST11 Update Document
 - UPQST12 Build Distribution List
 - UPQST14 Print Initiating Document
 - UPQST17 Query Conditions
 - UPQST18 Assemble Document
 - UPQST19 Negotiate
- Remainder of FUQST2 (Manage Conditions):
 - UPQST24 Generate Response Letter
 - UPQST29 Generate Status Change Notices
- Remainder of FUQST6 (Manage System Administration):
 - UPQST610 Manage Archive
 - UPQST62 Maintain System Help
 - UPQST65 Process Notifications
 - UPQST67 Extract Load FACILITY CORE
 - UPQST68 Extract Load PEOPLE CORE
 - UPQST69 Download Data to SHARE
- Remainder of FUQST7 (Perform Reporting And Utilities):
 - UPQST73 Process User Preferences
 - UPQST74 Process Proxies
 - UPQST75 Review Pending Items
- Remainder of FUQST8 (Manage Change Request):
 - UPQST81 Request System Change
 - UPQST84 Update and Display Change Request

Release 2 would include:

- All of FUQST3 (Conduct Analysis)
- Establishment of access to a site-wide infobase.

4.3 SCENARIO #2. Develop the system in four releases.

Release 1 would include the core system plus:

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- Remainder of FUQST1 (Identify Conditions):
 - UPQST11 Update Document
 - UPQST12 Build Distribution List
 - UPQST14 Print Initiating Document
 - UPQST17 Query Conditions
 - UPQST18 Assemble Document
 - UPQST19 Negotiate
- Remaining Unit Process from FUQST2 (Manage Conditions):
 - UPQST24 Generate Response Letter
 - UPQST29 Generate Status Change Notices
- Additional Unit Processes from FUQST6 (Manage System Administration):
 - UPQST62 Maintain System Help
 - UPQST65 Process Notifications
 - UPQST69 Download to SHARE

Release 2 would include:

- The following FUQST3 (Conduct Analysis) Unit Processes:
 - UPQST30 Assist RCA
 - UPQST31 Conduct PPG Analysis
 - UPQST32 Conduct RCA
 - UPQST33 Document PPG
 - UPQST34 Document RCA
 - UPQST36 Generate Risk Evaluation
 - UPQST37 Generate RCA Report
 - UPQST38 Assist PPG Analysis
 - UPQST39 Query for PPG
 - UPQST312 Initiate LLE Request
- Remainder of FUQST6 (Manage System Administration):
 - UPQST610 Archive Data
 - UPQST67 Extract Load FACILITY CORE
 - UPQST68 Extract Load PEOPLE CORE
- The following Unit Process from FUQST7 (Perform Reporting And Utilities):
 - UPQST75 Review Pending Items

Release 3 would include:

- Remainder of FUQST3 (Conduct Analysis):

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- UPQST35 Perform Trending Analysis
- UPQST310 Assist Trending Analysis
- UPQST311 Tag Items for Trending
- Remainder of FUQST7 (Perform Reporting and Utilities):
 - UPQST73 Process User Preferences
 - UPQST74 Process Proxies
- Automation of FUQST8 Manage Change Control
 - UPQST81 Request System Change
 - UPQST84 Update and Display Change Request

Release 4 would include access to a site-wide document infobase

4.4 SCENARIO #3: Develop the system in four releases.

Release 1 would include the core system plus:

- Remainder of FUQST1 (Identify Conditions):
 - UPQST11 Update Document
 - UPQST12 Build Distribution List
 - UPQST14 Print Initiating Document
 - UPQST17 Query Conditions
 - UPQST18 Assemble Document
 - UPQST19 Negotiate
- Additional Unit Process from FUQST2 (Manage Conditions):
 - UPQST29 Generate Status Change Notices
- Additional Unit Process from FUQST6 (Manage System Administration):
 - UPQST62 Maintain System Help
 - UPQST65 Process Notifications
 - UPQST67 Extract Load FACILITY CORE
 - UPQST68 Extract Load PEOPLE CORE
 - UPQST69 Download to SHARE

Release 2 would include:

- Remaining Unit Process from FUQST2 (Manage Conditions):
 - UPQST24 Generate Response Letter

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- The following unit processes from FUQST3 (Conduct Analysis):

- UPQST30 Assist RCA
- UPQST31 Conduct PPG Analysis
- UPQST32 Conduct RCA
- UPQST33 Document PPG
- UPQST34 Document RCA
- UPQST36 Generate Risk Evaluation Report
- UPQST37 Generate RCA Report
- UPQST38 Assist PPG Analysis
- UPQST39 Query for PPG
- UPQST312 Initiate LLE Request

- Remainder of FUQST7 (Perform Reporting and Utilities):

- UPQST73 Process User Preferences
- UPQST74 Process Proxies

Release 3 would include:

- The remainder of FUQST3:

- UPQST35 Perform Trending Analysis
- UPQST310 Assist Trending Analysis
- UPQST311 Tag Items for Trending

- The following Unit Process from FUQST6 (Manage System Administration):

- UPQST610 Archive Data

- Automation of FUQST8 Manage Change Control:

- UPQST81 Request System Change
- UPQST84 Update and Display Change Request

Release 4 would include access to a site-wide document infobase.

4.5 FACETS

In developing the data base structure and tables, the four QUEST2 data facets must be accommodated. These have a manhour estimate requirement of their own.

The scenarios all call for facet development work to proceed as follows:

Release 1:

Condition Data Facet
System Administration Data Facet
Change Control Data Facet

Release 2:

Analysis Data Facet

5.0 BUSINESS PERSPECTIVE

The release scenarios were considered by the System Owner and System Manager. They concurred in the concept of a minimal core system as defined in this document. Additional business imperatives cause the following conclusions:

- Scenario 1 is rejected because of the size of the two releases. It is considered too risky in terms of the user impact and probable extended time to implement each of the two releases.
- Scenario 2 included UPQST29 (Generate Status Change Notices) and UPQST65 (Process Notifications) in the first release and UPQST67 (Extract Load from PEOPLE CORE) and UPQST68 (Extract Load from FACILITY CORE) in the second release. This sense of business priority appears to be reversed. For purposes of data integrity the extract loads are of higher importance than the automated notification of status changes.
- Scenario 3 was chosen as the preferred option due to pure business perspectives. The project manager was requested to provide an estimate of comparative cost on schedule based only on three approaches to scenario 3. These approaches pertained to the release scheduling of:
 - UPQST12 Build Distribution List
 - UPQST29 Generate Status Change
 - UPQST62 Maintain System Help
 - UPQST65 Process Notifications
 - UPQST67 Extract Load Facility CORE
 - UPQST68 Extract Load People CORE

All other unit processes were to remain in the releases as previously decided for Scenario 3. The four variations on Scenario 3 then became:

Scenario 3a: include all contended unit processes in the first release.

Scenario 3b: include UPQST12, UPQST29, UPQST62, and UPQST62 in the first release and UPQST67 and UPQST68 in the second release.

Scenario 3c: include UPQST67 and UPQST68 in the first release with UPQST12, UPQST29, UPQST62, and UPQST62 in the second release.

Scenario 3d: include all six of the contended unit processes in the second release.

Scenario 3d was considered to be a viable option only if cost and schedule benefits were substantial enough to override the impact of delaying these unit processes.

6.0 SCENARIO ESTIMATES

The following estimates are based on an estimating model that determined the manhours for project management, functional analyst, system architect, and programmer personnel for each affected deliverable in the releases. The tables in this document consolidate the total manhours associated with all of these persons and provides the totals as "BCSR" manhours. CADS manhours are provided for all manual processes and for interaction of users with the development of automated processes.

The cost and schedule estimates are based on a gross estimating formula:

total manhours divided by 160 manhours per month divided by 6.32
average FTEs for the first release and 5 FTEs for the second and third releases

This formula assumes the number of FTEs based on WHC decisions to incorporate extra resources for the first release at the time of this document preparation. If personnel resource numbers change, the time estimates could change accordingly. However, the costs for this level of estimate will remain in the usual SA level estimating window of +/- 15%. It should be noted that these estimates do not include hardware, software, or training.

6.1 Estimate for Core System

In this and all following tables, TYPE refers to whether the unit process is Manual (M), Batch (B), or Online (O/L). COMPLEX refers to the level of complexity expected for completion of the unit process: Simple (S), Very Simple (VS), Medium (M), Complex (C), or Very Complex (VC).

INCLUDED ELEMENTS FOR CORE SYSTEM	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
Establish Development Environment	N/A	N/A	376	1028

Complete data base structure for Initiating Documents, Condition, and Action data				
Condition Data Facet	RELATIONAL	C	9	249
System Administration Data Facet	RELATIONAL	C	9	249
Change Control Data Facet	RELATIONAL	S	2	64
The following FUQST1 (Identify Conditions) unit processes				
UPQST110 Accept/Reject Response	M	M	40	6

INCLUDED ELEMENTS FOR CORE SYSTEM	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
UPQST111 Verify and Close Conditions	M	S	25	4
UPQST13 Input Audit Reports	O/L	VC	99	591
UPQST15 Collect and Prepare Input	M	M	40	6
UPQST16 Review	M	S	25	4
The following FUQST2 (Manage Conditions) unit processes				
UPQST21 Review Conditions	M	M	40	6
UPQST22 Create Sub-Conditions	O/L	S	22	111
UPQST23 Consolidate Conditions	O/L	C	59	347
UPQST25 Maintain Conditions	O/L	M	33	192
UPQST26 Query/Report Condition Status	O/L	M	22	111
UPQST27 Track Conditions	M	S	25	4
UPQST28 Create Actions	O/L	M	33	192
The following FUQST4 (Manage Actions) unit processes				
UPQST41 Review and Monitor Actions	M	S	25	4
UPQST60 Administer System	M	S	25	4
UPQST61 Update Reference Tables	O/L	S	22	111

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UPQST612 Contractor Upload (PNL/HEHF)	B	M	34	197
UPQST63 Add/Update System Users	O/L	M	33	192
UPQST64 Download Reports to Soft Reporting	B	S	17	58
UPQST66 Monitor System Interface Processes	M	S	25	4
The following FUQST7 (Perform Reporting and Utilities) unit processes				
UPQST70 Request User Access Update	M	S	25	4
UPQST71 Perform Reporting and Utilities	M	M	40	6
INCLUDED ELEMENTS FOR CORE SYSTEM	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
UPQST72 Generate Canned Reports	B	VC	83	429
UPQST76 Perform System Navigation	O/L	M	33	192
UPQST77 Perform Ad Hoc Queries	O/L	M	33	192
The manual FUQST8 (Manage Change Control) unit processes				
UPQST80 Prepare Change Request	M	S	33	4
UPQST82 Analyze Request	M	S	25	4
UPQST83 Prepare Release Specifications and Track	M	S	25	4
UPQST85 Estimate and Process Change	M	S	25	4
TOTALS for CORE (Included in all first releases)			1560	5838

6.2 Estimate for decided Unit Processes in Scenario 3

DECIDED ELEMENTS IN SCENARIO 3	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
RELEASE 1				
Remainder of FUQST1 (Identify Conditions)				
UPOST11 Update Document	O/L	M	33	192

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UPQST14 Print Initiating Document	O/L	M	33	192
UPQST18 Assemble Document	M	S	25	4
UPQST19 Negotiate	M	S	25	4
Additional Unit Process from FUQST6 (Manage System Administration):				
UPQST69 Download Data to SHARE	B	S	17	58
RELEASE 2				
Development Environment (Miscellaneous Deliverables)	N/A	N/A	320	508
Analysis Data Facet	RELATIONAL	C	9	249

DECIDED ELEMENTS IN SCENARIO 3	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
Remaining Unit Process from FUQST1 (Identify Conditions)				
UPQST17 Query Conditions	O/L	C	59	347
Remaining Unit Process from FUQST2 (Manage Conditions)				
UPQST24 Generate Response Letter	O/L	M	33	192
The following unit processes from FUQST3 (Conduct Analysis)				
UPQST30 Assist RCA	O/L	M	33	192
UPQST32 Conduct RCA	M	S	25	4
UPQST33 Document PPG	O/L	S	22	111
UPQST34 Document RCA	O/L	S-M	27.5	151.5
UPQST36 Generate PPG Report	O/L	S-M	27.5	151.5
UPQST37 Generate RCA Report	O/L	S-M	27.5	151.5
UPQST38 Assist PPG Analysis	O/L	M	33	192
UPQST39 Query for PPG	O/L	S	22	111
UPQST312 Initiate LLE Request	M	S	25	4
Additional unit processes from FUQST6 (Manage System Administration)				
UPQST610 Archive Data	B	M	34	197

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RELEASE 3				
Development Environment (Miscellaneous Deliverables)	N/A	M/A	320	508
The remainder of FUQST3				
UPQST35 Perform Trending Analysis	M	C	58	10
UPQST310 Assist Trending Analysis	O/L	C	59	347
UPQST311 Tag Items for Trending	O/L	M	33	192
The following Unit Process from FUQST7 (Perform Reporting And Utilities)				
UPQST73 Process User Preferences	O/L	M	33	192
UPQST74 Process Proxies	O/L	S	22	111
UPQST75 Review Pending Items	O/L	C	59	347

DECIDED ELEMENTS IN SCENARIO 3	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
Automation of FUQST8 Manage Change Control:				
UPQST81 Request System Change	O/L	M	33	192
UPQST84 Update and Display Change Request	O/L	S	22	111
RELEASE 4				
access to a site-wide document infobase (TBD based on future site plans)				

TOTALS FOR ENTIRE SYSTEM (WITHOUT THE CONTESTED UNIT PROCESSES)	CADS	BCSR
TOTAL CORE MANHOURS	1560	5838
EXTRA MANHOURS FOR DECIDED RELEASE CONTENTS	1509.5	5027.5
TOTAL BASELINE MANHOURS FOR ENTIRE SYSTEM	3069.5	10865.5

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The four scenarios under consideration involve the following unit processes. These are distributed in varying combinations across the first and second releases.

UNDECIDED UNIT PROCESSES	TYPE	COMPLEX	M/H ESTIMATE	
			CADS	BCSR
The following Unit Process from FUQST1 (Identify Conditions)				
UPQST12 Build Distribution List	O/L	M	33	192
Remaining Unit Process from FUQST2 (Manage Conditions)				
UPQST29 Generate Status Change Notices	O/L	S-M	27.5	151.5
Additional Unit Processes from FUQST6 (Manage System Administration)				
UPQST62 Maintain System Help	O/L	M	33	192
UPQST65 Process Notifications	B	S	25.5	127.5
UPQST67 Extract Load FacilityCORE Data	B	S	16	58
UPQST68 Extract Load PeopleCORE Data	B	M	34	197
ADDITIONAL MANHOURS			169	918
BASELINE: CORE PLUS DECIDED MANHOURS			3069.5	10865.5
TOTAL SYSTEM MANHOURS (REGARDLESS OF RELEASE DISTRIBUTION)			3238.5	11783.5

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6.3 Estimate for Scenario 3a: In this scenario, all of the extra unit processes and their associated manhours would be added to the baseline for the Release 1. (The scheduled start and end dates are based on the assumption that BCSR and CADS manhours are being expended concurrently.)

RELEASE	MANHOURS		START DEVELOPMENT	END SYSTEM TEST	COST (BCSR LABOR)
	CADS	BCSR			
RELEASE 1					
Baseline Release 1	1693	6288	4/15/94	1/15/95	\$544,796
Extra Release 1	169	918			
Total for 3a Release 1	1862	7206			
RELEASE 2					
Baseline Release 2	737.5	2567.5	2/1/95	4/15/95	\$161,346
Extra Release 2	0	0			
Total for 3a Release 2	737.5	2567.5			
RELEASE 3					
Baseline Release 3 (No Change)	639	2010	5/1/95	7/15/95	\$133,778
Release 4 (no change)	TBD	TBD	TBD	TBD	TBD

6.4 Estimate for Scenario 3b: In this scenario, unit processes UPQST12, UPQST29, UPQST62, and UPQST62 would be added to the baseline for the first release. Unit processes UPQST67 and UPQST68 would be added to the baseline for the second release. This creates a manhour and schedule distribution as shown in the following table. (The scheduled start and end dates are based on the assumption that BCSR and CADS manhours are being expended concurrently.)

RELEASE	MANHOURS		START DEVELOPMENT	END SYSTEM TEST	COST (BCSR LABOR)
	CADS	BCSR			
RELEASE 1					
Baseline Release 1	1693	6288	4/15/94	12/1/94	\$493,058
Extra Release 1	119	663			
Total for 3a Release 1	1812	6951			
RELEASE 2					
Baseline Release 2	737.5	2567.5	1/1/95	3/15/95	\$201,573
Extra Release 2	50	255			
Total for 3a Release 2	787.5	2822.5			
RELEASE 3					
Baseline Release 3 (No Change)	639	2010	4/1/95	6/15/95	\$133,778
Release 4 (no change)	TBD	TBD	TBD	TBD	TBD

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6.5 Estimate for Scenario 3c: In this scenario, unit processes UPQST67 and UPQST68 would be added to the baseline for the first release. Unit processes UPQST12, UPQST29, UPQST62, and UPQST62 would be added to the baseline for the second release. This creates a manhour and schedule distribution as shown in the following table. (The scheduled start and end dates are based on the assumption that BCSR and CADS manhours are being expended concurrently.)

RELEASE	MANHOURS		START DEVELOPMENT	END SYSTEM TEST	COST (BCSR LABOR)
	CADS	BCSR			
RELEASE 1					
Baseline Release 1	1693	6288	4/15/94	11/1/94	\$505,054
Extra Release 1	50	255			
Total for 3a Release 1	1743	6543			
RELEASE 2					
Baseline Release 2	737.5	2567.5	11/15/95	3/15/95	\$210,173
Extra Release 2	119	663			
Total for 3a Release 2	856.5	3230.5			
RELEASE 3					
Baseline Release 3 (No Change)	639	2010	4/1/95	6/15/95	\$133,778
Release 4 (no change)	TBD	TBD	TBD	TBD	TBD

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6.6 Estimate for Scenario 3d: In this scenario, all of the extra unit processes and their associated manhours would be added to the baseline for the Release 2. (The scheduled start and end dates are based on the assumption that BCSR and CADS manhours are being expended concurrently.)

RELEASE	MANHOURS		START DEVELOPMENT	END SYSTEM TEST	
	CADS	BCSR			
RELEASE 1					
Baseline Release 1	1693	6288	4/15/94	10/15/94	\$464,827
Extra Release 1	0	0			
Total for 3a Release 1	1693	6288			
RELEASE 2					
Baseline Release 2	737.5	2567.5	11/1/94	3/15/95	\$237,985
Extra Release 2	169	9183			
Total for 3a Release 2	906.5	3485.5			
RELEASE 3					
Baseline Release 3 (No Change)	639	2010	4/1/95	6/15/95	\$133,778
Release 4 (no change)	TBD	TBD	TBD	TBD	TBD

7.0 COMPARISON

SCENARIO	ADVANTAGES	DISADVANTAGES
Scenario 3a	Provides extended functionality in the first release.	Delays the schedule and increases the cost of the first release.
Scenario 3b	Provides the user notification for the first release. Accelerates the schedule and reduces the cost of the first release.	Undercuts the ability to validate data against the standards for personnel and facilities. Increases the cost of the second release.
Scenario 3c	Enhances data integrity by supporting validation of data against the standards for personnel and facilities. Accelerates the schedule and reduces the cost of the first release.	Does not provide user notification until the second release. No online help in the first release. Increases the cost of the second release.
Scenario 3d	Accelerates the schedule and reduces the cost of the first release.	Delays some needed functionality until the second release. No online help in the first release. Increases the cost of the second release.

8.0 RECOMMENDATION

After reviewing the cost and schedule impacts, it was decided that the tradeoffs were minor for all of the Scenario 3 variations. Consequently, the decision was made to proceed with the most comprehensive system design and develop the system portrayed in Scenario 3a.

9.0 SCHEDULE ALTERNATIVES FOR IMPLEMENTING RELEASE 1

Two alternatives were considered as implementation approaches for the first release of the system.

9.1 Alternative 1: phase in the system. Provide the system conversion and training in phases. Each phase would convert specific data, train the affected group of users, and perhaps implement a growing suite of functions. Retain the old system in parallel until the new system is fully operational.

9.2 Alternative 2: convert the entire user population at one time. Convert all data, train all users, and then implement the new system. Upon implementation, close down and archive the old system.

9.3 Tradeoffs.

- Alternative 2 was considered too large an impact on the user base. It would be the fastest and cheapest for development.
- Alternative 1 was considered highly preferable from the perspective of user impact. However, it had a major disadvantage in attempting to keep two separate data bases current and synchronized: the user base would be split between old system users and new system users. The implication was that two sets of reports would be required: one from unconverted data in the old system and one from converted and new data in the new system. The data contents of both systems would be in constant change.

9.4 Selected Schedule.

The implementation schedule blends both alternatives. All of the data would be converted to the new system. Then a progressive set of users would be trained and added to the user base, starting with the central and most important users. This implementation would proceed according to the following set of steps:

PHASE 1

convert all current QUEST and CICS data to the new system

all new audits and updates go to DBAs as in the current system

DBAs accept manual input and enter data to NEW system

reports run out of new system

other users contact an extra staffed help desk operation for all canned reports and queries

soft reporting will get its regular reports

run the old system as a backup only for a week or two: stop when the new system is validated

as this phase approaches completion (2-4 weeks?), start training of CA "hands on" users

PHASE 2

bring the CA "hands on" users on line (note: through these phases, same person be a DBA and a general "hands on" CA user)

new entries now go via DBAs but editing/updates can be done by authorized CA users

CA users run their own new queries and reports: cut back the help desk staff as the demand decreases

as this phase approaches completion (2-4 weeks?), start training of auditors and assessors

PHASE 3

bring auditors and assessors on line

cut DBA entry back to only the part that needs to be manual

as this phase approaches completion (2-4 weeks?), start training of all other interested end users

PHASE 4

train any interested casual users and managers from WHC, DOE, and PNL starting with all known current casual users

The following basic concepts would apply to each of these phases:

- acceptance testers would become the first users in each phase
- "just in time" training
- need an active help desk established and ready
- through all phases, same person can start as a DBA and eventually have access to the growing number of functions