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Patent - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	S. W. Berglin	<i>[Signature]</i>	2/8/94
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Information conforms to all applicable requirements. The above information is certified to be correct.

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1. Total Pages 17

2. Title

System Concept Specification for the Baseline Analysis Matrix Version 3.1

3. Number

WHC-SD-EN-CDR-001

4. Rev No.

0

5. Key Words

Baseline Analysis Matrix

6. Author

Name: R. F. Cote'

*SE Bentley for RFC 2/7/94*  
Signature

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7. Abstract

This document contains the concept of the Baseline Analysis Matrix Version 3.1

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APPROVED FOR <sup>CW</sup> PUBLIC RELEASE 2/14/94

**SYSTEM CONCEPT SPECIFICATION  
FOR THE BASELINE ANALYSIS MATRIX  
VERSION 3.1**

Effective Date

Page 1 of 16  
January 26, 1994

Approved by

  
R.F. Cote', Manager  
ER Program Self-Assessment and Development**1.0 INTRODUCTION****1.1 PURPOSE**

Westinghouse Hanford Company (WHC) is a major participant in the Environmental Restoration program at the Hanford Site. WHC and other participating companies and their subcontractors must comply with multiple and sometimes overlapping requirements as part of their daily operations at the Hanford Site. To appropriately manage this regulatory compliance process, Environmental Restoration Requirements Baseline Documents (RBDs) are developed that identify which requirement source documents apply to a given functional area. These RBDs also synthesize requirements from multiple documents into a single, more concise requirement document for linking to participating companies' policies, plans, and procedures.

To assist in the management of the complex relationships between multiple requirements and pages of implementing procedures, WHC has developed the Baseline Analysis Matrix (BAM). The BAM is a set of software programs utilizing relational databases designed to assist management in the overall processing of documentation into an automated matrix for analyzing requirements. The BAM monitors, maintains, and tracks information relative to the appropriate requirements.

This document is intended to outline the visionary process to be applied to the BAM. The result of this process will become the BAM Version 3.1, and will incorporate the changes discussed herein. This document is intended for use by the BAM Project Manager and developers and should be retained as a historical record of the developmental process. This document has been produced in response to WHC-CM-3-10 Software Practices SP-3.1. Strict procedural adherence to the Environmental Restoration Commitment Management System Management Plan (WHC-IP-0952, Rev. 0) is observed during the development of BAM Version 3.1. While not specifically required, the format and content refer to WHC-CM-3-10 Software Practices Appendix A, ANSI/IEEE Std 830-1984 IEEE Guide to Software Requirements Specifications, ANSI/IEEE Std 1016-1987 IEEE Recommended Practice for Software Design Descriptions, and WHC-CM-3-6 Uniform Publications System. The document outline is adapted from WHC-CM-3-10 Software Practices Appendix A.

## 1.2 SCOPE

The BAM Version 3.1 is the next generation of BAM Version 3.0 software designed to incorporate the following upgrades:

1. The program will be written for a multi-user environment,
2. The front end of the program will split for:
  - a. development and tracking of RBDs, or
  - b. Standards Traceability System (STS) for compliance tracking without the use of an RBD
3. The reports will span across all document tiers, functional areas, and facilities within either RBDs or STS but will not span across different structures (i.e., reporting RBD and STS data in same report),
4. RBD and STS databases will contain a field for safety classification,
5. Capabilities for document (RBD, STS) revision will be built into the system (i.e., only revised documents will be added, remainder will stay the same),
6. A system query function will be built in for access by the System Administrator security level,
7. Automatic linking will be supplemented by manual linking,
8. The linking screens will be modified to make them easier to understand and use (two levels at a time will be displayed. The user will select on a menu which levels are of concern; only these will display),
9. The current search function (in use throughout the program) will be replaced with the use of side-by-side lists displaying documents and locations on the screen in use rather than using arrow buttons,
10. The element lists will be replaced by an outline (build as you go approach) thereby allowing a user-defined number of level designations,
11. A graphic representation of databases in use and their size (number of records) will be incorporated,
12. Field placement on certain screens will be adjusted (per comments by users group),
13. A data input program will be incorporated,

14. The RBD document will be generated within the BAM software and output for text editing,
15. Procedures will contain full text capability with program access to this text,
16. The Regulatory Compliance Report will be revised to exclude information currently shown on pages 3 and 4. This report will be accessed as a stand-alone and will also be printed as an index to the Commitment Report,
17. FAA and FAS numbers will be attached to technical documents as they are loaded into the Master Library and edits will not be allowed to these fields,
18. The Rack1 and Rack2 functions of BAM Version 3.0 will be combined into a sorting function to allow the user to assign the configuration outline at any time during the process, move documents in serial, and display reports in various sort order,
19. The document title field will be added to reports generated in the sorting function,
20. The "print to file function" will be removed and replaced by additional reports (i.e., SRP Checklist), and
21. Performance based and administrative assessment reports will be provided,
22. On-line help will be provided.

### 1.3 OVERVIEW

This document will include the appropriate implementations of a system concept specification for software upgrades.

### 2.0 CONCEPT DEFINITION

This section will outline the computer hardware and software requirements for BAM Version 3.1.

### 2.1 STATEMENT OF NEED

The upgrade to Version 3.1 of the BAM will be built on a FoxPro 2.5 for Windows<sup>1</sup> platform. This program upgrade will be multi-user for installation on networks. The number of regulations that must be stored and accessed

<sup>1</sup>Trademark of Microsoft Corporation

demands organization of both programs and databases that interact quickly and efficiently. This data is sensitive and must be carefully controlled. The software must be easy to maintain and the data virtually error free, which requires extensive program control over user input.

The concept of the BAM System is that of a "tool" to assist in the production of Requirements Baseline Documents and compliance tracking.

## 2.2 SCOPE OF NEED

The ER-CMS Management Plan (WHC-IP-0952, Revision 0) outlines the management of the ER Program commitments. The BAM Software maintains configuration control of those commitments throughout the ER Program's infrastructure. The BAM Software facilitates the process of RBD development and compliance tracking. The volume of information that must be stored and accessed in this process requires software that is fast and reliable. The need for compliance tracking through the STS has also become apparent. BAM 3.1 will fulfill the need for electronic storage and linking to implement the STS.

## 2.3 URGENCY OF NEED

Computer software to facilitate RBD development and compliance tracking is essential. BAM Version 3.1 provides the essential tools.

## 2.4 SOLUTION OBJECTIVES

BAM Version 3.1 provides the following tools for the RBD development process and compliance tracking through the STS:

- Networking capabilities,
- Storage for all applicable regulatory requirements documents,
- Input program to assist in breaking down electronic files of documents into impact vs. non-impact statements,
- Full-text storage,
- Complete editing capabilities,
- Sorting process to assist in assignment of the configuration outline to impact statements,
- Complex text search capabilities,
- Production of the ER-RBD document for output to a text editing program,

- Semiautomatic procedure loading into database format for use by the programs,
- Archival (backup and restore) function for compliance assessments,
- Linking at all document levels,
- Reporting, and
- Compliance tracking capabilities.

### **3.0 EXECUTIVE SUMMARY**

#### **3.1 SCHEDULES**

The system design phase is scheduled for approval in March of 1994. Project activities will commence thereafter. The schedule of proposed activities has been defined by the WHC Level IV Schedule which runs through September of 1994. A Beta test version of the software will be ready for release in mid-August 1994. Software user documentation will be completed by September of 1994. Training and presentations will be provided until the WHC scheduled finish date for this task. After September of 1994, the complete software package will be available for distribution.

#### **3.2 SPONSORING ORGANIZATIONS**

Westinghouse Hanford Company ER Program Self-Assessment and Development.

#### **3.3 COSTS**

Funding is currently available for this project. Westinghouse Hanford Company ER Program Self-Assessment and Development can provide detailed cost analysis.

#### **3.4 RISK ANALYSIS**

The obvious risks involved in this type of software application revolve around the reliability of data. These risks are minimized with appropriate software safeguards including, but not limited to: dialog boxes, user friendliness, and error trapping. Data integrity must be maintained especially with the contents of regulatory requirements. Network access control and data backup must be provided.

## 4.0 PROBLEM DEFINITION

### 4.1 USER'S NEEDS

Please refer to Section 2.2 of this document.

#### 4.1.1 Background

The ER Program began in 1989 to demonstrate compliance with the letter and spirit of all applicable codes, standards, and regulations. Multiple and overlapping requirements made the task of compliance tracking extremely time consuming. The original BAM Software prototype was developed to meet this need. Lessons learned through the development and implementation phases of the prototype set the design requirements for the current version of the software.

With the release of DNFSB Recommendation 90-2, a similar methodology and process was set forth for the development of an Environmental Restoration Requirements Baseline Document. This approach was already used in the development of the first prototype of the BAM Software. The DNFSB's recommendation made the development of a more powerful version of the BAM software imperative. BAM Version 3.0 was produced to meet this need in accordance with the Environmental Restoration Commitment Management System Management Plan (WHC-IP-0952, Rev. 0). The need for compliance tracking through the STS has also become apparent and will be accommodated in BAM Version 3.1.

The BAM System Version 3.1 will be written in FoxPro 2.5 for Windows. It will be available for use on PC platforms in a network environment. Access to the system can be provided to any facility over the local area network.

#### 4.1.2 User Identification

Codes, standards and regulations are available not only in hard copy but in electronic format as well. The BAM System allows users to import these electronic files into the appropriate BAM database with minimal effort by the user. Data integrity is maintained during this process. The databases can be accessed by users across the local area network. These electronic files and/or the BAM databases can easily be distributed for use at other sites, as appropriate.

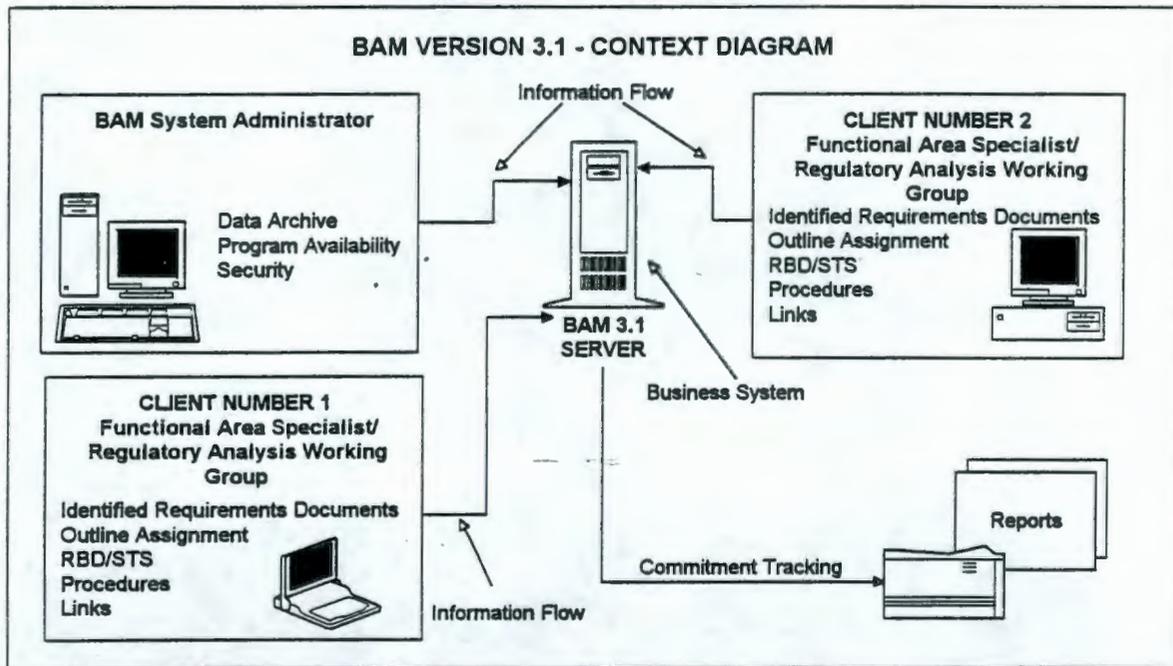
4.1.3 User Characteristic

Users need to acquire current regulatory requirement documents before developing their RBDs. Functional Area Specialists are needed for technical work in developing the RBD document. Any person knowledgeable in DOS operation and Microsoft Windows<sup>2</sup> would be capable of operating the system. A designated System Administrator is necessary for security control and specialized functions. This person should be knowledgeable in DOS operation, Microsoft Windows, PC computer security, and document control.

4.2 USER ENVIRONMENT

4.2.1 Context Diagram

FIGURE 4-1 CONTEXT DIAGRAM



Business System

The BAM System will contain two separate modules. One is for the development of ER Requirements Baseline Documents (RBDs) and compliance tracking through the RBD. The other is for compliance tracking through previously developed Safety Analysis Reports (SARs), Interim Safety Basis (ISBs), Management Plans (MPs), or other documents that lend themselves to the structure of the STS. Both are for use by multiple users in a network environment. The system will provide the means for entering requirements,

<sup>2</sup>Trademark of Microsoft Corporation

commitments (RBD module only), and procedures into database format for use by the programs. It will also provide the means of linking these components to facilitate compliance tracking. Various reporting functions will be available.

### External Entities

#### System Administrator

Responsibilities include all higher-level computer system controls.

#### Functional Area Specialist/Regulatory Analysis Working Group - RBD

Identify requirements documents, identify impact statements, assign configuration outline, prepare RBD and procedures, establish links.

#### Functional Area Specialist/Regulatory Analysis Working Group - STS

Identify requirements documents, identify impact statements, prepare procedures, and establish links.

### Information Flows

#### Document Information

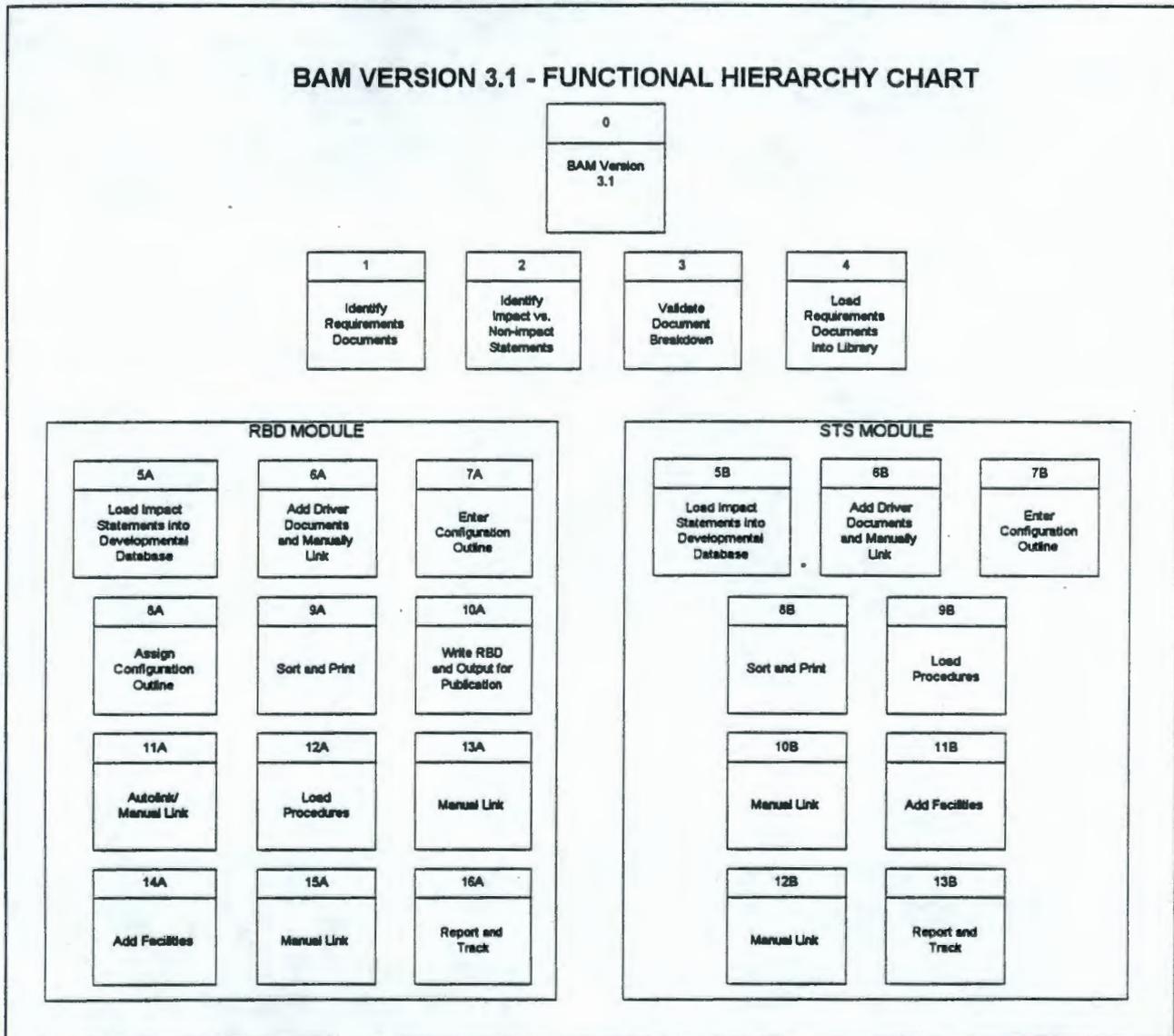
Information compilation regarding documents, such as impact statement identification, configuration outline assignment, and links.

#### Reports

Information for procedure tracking personnel and auditors confirming compliance/non-compliance with regulatory requirements.

4.2.2 Functional Model

FIGURE 4-2 FUNCTIONAL HIERARCHY CHART



Business Process

- |   |   |  |
|---|---|--|
| 1 | Identify Requirements Documents           | The Functional Area Specialist determines which documents apply to the RBD/STS.  |
| 2 | Identify Impact vs. Non-Impact Statements | The Regulatory Analysis Working Group identifies how the document must be split into impact vs. non-impact statements and electronically breaks down the document. |
| 3 | Validate Document Breakdown               | Functional Area Specialist validates the document breakdown.   |
| 4 | Load Requirements Documents into Library  | The Regulatory Analysis Working Group loads the identified and prepared documents into the system.   |

Business Process - RBD

- |    |  |  |
|----|--|--|
| 5A | Load Impact Statements into Developmental Database | The Regulatory Analysis Working Group loads the impact statements from these documents into the developmental database.  |
| 6A | Add Driver Documents and Manually Link             | The Regulatory Analysis Working Group adds driver documents from the Source Document Applicability Report and links to source documents or portions of source documents. |
| 7A | Enter Configuration Outline                        | The Regulatory Analysis Working Group enters the configuration outline into the system.  |
| 8A | Assign Configuration Outline                       | All impact statements are assigned according to the configuration outline. (Impact statements may be assigned a waiver, conflict, or exclusion/justification).           |

- |     |                                      |   |
|-----|--------------------------------------|---|
| 9A  | Sort and Print                       | All impact statements are sorted according to the configuration outline and printed out.  |
| 10A | Write RBD and Output for Publication | Functional Area Specialist writes the RBD commitment statements within the system. These commitment statements are consolidated from the multiple impact statements. The text of the RBD is output to a text file for technical publications. |
| 11A | Autolink/Manual Link                 | The system automatically links the commitment statements to the impact statements from which it was derived. Regulatory Analysis Working Group may want to use the manual linking in special cases.   |
| 12A | Load Procedures                      | Regulatory Analysis Working Group loads procedures for implementing the commitment statements of the RBD.   |
| 13A | Manual Link                          | Regulatory Analysis Working Group manually links the procedures that implement the commitment statements.   |
| 14A | Add Facilities                       | Add applicable facilities to database.  |
| 15A | Manual Link                          | Regulatory Analysis Working Group manually links the procedures to facilities.  |
| 16A | Report and Track                     | Regulatory Analysis Working Group creates reports for verification and compliance tracking.   |

Business Process - STS

5B	Load Impact Statements into Developmental Database	The Regulatory Analysis Working Group loads the impact statements from these documents into the developmental database.
6B	Add Driver Documents and Manually Link	The Regulatory Analysis Working Group adds driver documents from the Source Document Applicability Report and links to source documents or portions of source documents.
7B	Enter Configuration Outline	The Regulatory Analysis Working Group enters the configuration outline into the system.
8B	Sort and Print	All impact statements are sorted according to the configuration of the document.
9B	Load Procedures	Regulatory Analysis Working Group loads procedures for implementing the document.
10B	Manual Link	Regulatory Analysis Working Group manually links the procedures that implement the document.
11B	Add Facilities	Add applicable facilities to database.
12B	Manual Link	Regulatory Analysis Working Group manually links the procedures to facilities.
13B	Report and Track	Regulatory Analysis Working Group creates reports for verification and compliance tracking.

### 4.3 CONSTRAINTS

The BAM System is written for the PC network environment only. It is a Windows program. Therefore, the constraints of Windows apply to the BAM Software. This includes the following hardware requirements for network clients:

- 386 DX processor minimum
- VGA monitor
- RAM -- 4 mb. or better (developers have noticed memory problems that are workable with 4 mb. RAM, however, 8 is recommended).

Reports will print on a network printer (Laserjet II or better). Users of BAM Version 3.0 have noticed prohibitively slow print times with the Laserjet II, therefore, it is recommended that print time is taken into account.

There are no particular hard disk storage requirements for the network server. Hard disk requirements depend on the amount of data stored. Eighty (80) mb. of Hard disk storage is recommended.

#### 4.3.1 Regulations, Procedures and Policies

Many of the known inefficiencies in DOE operations noted by the DOE, Environmental Protection Agency, the State, and the public are driven by (1) overly conservative interpretations of DOE Orders and/or environmental regulations, and (2) functional redundancies and procedural duplication in the implementation of environmental regulations and DOE Orders. BAM Version 3.1 provides an automated vehicle to cost effectively demonstrate compliance to applicable codes, standards, and regulations and track how and where they are implemented throughout the ER infrastructure, and readily assess impact of changes thereto.

#### 4.3.2 Interfacing Functions

Regulatory requirement documents are updated at the rate of approximately thirty (30) per month. Therefore the assigned System Administrator must be cognizant that all recent revisions are in use.

BAM Version 3.1 is written as a network accessible program.

#### 4.3.3 Existing Limitations

There are no existing limitations imposed by other business functions or contractual obligations.

#### 4.3.4 Development, Operations and Maintenance

BAM Version 3.0 is operational at this time. Version 3.1 will be developed with Version 3.0 in use. The structures of some databases will change and the data contained in Version 3.0 databases will be downloaded to those used in Version 3.1.

Data that will be used in Version 3.1 includes:

- Codes, standards and regulations
- RBD text
- Procedures

Existing data will be downloaded to Version 3.1 databases on the server when the program is installed. Additional data will be added using the Input Module followed by the Load Documents Module of the BAM. The data will be extremely accurate when downloaded in this manner. Codes, standards and regulations are available in electronic copy from WHC ER Program Self-Assessment and Development Document Control. The procedures can be either downloaded or entered directly by keyboard. All data runs through a validation process by functional area analysts.

Data maintenance can be performed as needed. All databases are accessible by the Edit Module of the BAM. Links between document levels are made through the Linking Module of the BAM. This module allows viewing of both upper and lower tier documents. These links are also validated by functional area analysts.

#### 4.3.5 Acceptance Criteria

The software must be error free and the speed of operation must be within acceptable limits. User dialog boxes must be used at all points where the user may make an operational misjudgment thereby inadvertently corrupting data. All data must be protected from corruption by software and/or the operating system. There must be built-in backup and restore functions for all developmental databases. All software modules must be self-explanatory to users thereby minimizing user training and technical support. Software must be distributed to users in compiled format thereby protecting the integrity and ownership of the software. Whenever possible, databases will be distributed and stored in compressed format to minimize use of hard disk storage space. The use of passwords and access levels shall be maintained to protect data of the software.

Before final release of the software it shall undergo verification and validation testing in accordance with WHC-CM-3-10 Software Practices.

## 5.0 FEASIBILITY ANALYSIS

BAM Version 3.1 can be completed within the confines of the present WHC Level IV approved schedule.

### 5.1 IMPACT ANALYSIS

#### 5.1.1 User/System Impacts

Previous versions of the BAM Software have been distributed only to the Regulatory Analysis Working Group producing the Quality Assurance System Requirements document (DOE/RL 90-28, Rev. 2). All data produced by this working group will be transferred to the BAM Version 3.1 databases when the program is installed on the network. Please refer to Section 4.3.5 Acceptance Criteria.

#### 5.1.2 Input/Output Impacts

Version 3.1 will have a program interface for automatic document entry from ASCII or DOS text format files. The reporting module allows for output to the screen or printer.

#### 5.1.3 Conversions and Data Sharing

All data that is prepared for use within the BAM System can easily be exported (using FoxPro) out of the databases for import into other programs and/or platforms. Codes, standards and regulations are electronically input into the BAM System. This system of data exchange ensures integrity of all data.

#### 5.1.4 Compatibility

BAM Version 3.1 will be written specifically for use on a local area network and will be capable of data import/export. FoxPro 2.5, the developmental tool of BAM Version 3.1 is currently available on PCs and Macintosh and will soon be available for UNIX workstations. This allows the BAM System to run on those platforms as well. However, data may be downloaded to those platforms at any time.

#### 5.1.5 Reconciliation

BAM operations, procedures and RBD development structures have been previously presented to the Data Administration Council for review.

#### 5.1.6 Issues

None.

## 5.2 ALTERNATIVES

There are no other procedure supported software programs available at this time that will accomplish the necessary aim.

## 5.3 COST/BENEFIT ANALYSIS

Funding is currently available for this project. The software upgrade will provide use ability on local area networks. Please refer to Section 2.1 of this document for more information. Westinghouse Hanford Company ER Program Self-Assessment and Development can provide detailed cost analysis.

## 6.0 REFERENCES

ANSI/IEEE Std 830-1984 IEEE Guide to Software Requirements Specifications.

ANSI/IEEE Std 1016-1987 IEEE Recommended Practice for Software Design Descriptions.

Department of Energy's Implementation Plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 90-2, Revision 3.

Tri-Party Agreement Cost and Management Efficiency Initiative.

WHC-CM-2-6 Statement of Strategy.

WHC-CM-3-10 Software Practices SP-3.1.

WHC-CM-3-10 Software Practices Appendix A.

WHC-CM-3-6 Uniform Publications System.

WHC-IP-0952, Revision 0, Environmental Restoration Commitment Management System Management Plan.

# System Concept Specification for the Baseline Analysis Matrix Version 3.1



Prepared for the U.S. Department of Energy  
Office of Environmental Restoration  
and Waste Management



**Westinghouse**  
**Hanford Company** Richland, Washington

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