ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 628818

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	BC Gneiting, Engineering Methods & Procedures, H6-35, 372-1663	[] Yes [X] No	04/08/97
	6. Project Title/No./Work Order No. HNF-SD-WM-TP-431, Rev. 3	7. Bldg./Sys./Fac. No. N/A	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-TP-431, Rev. 2	10. Related ECN No(s). N/A	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change

13b. Design Baseline Document? [] Yes [X] No

This document contains the actual test documentation to convert TWRS Technical Baseline data for RDD-100 upgrades. This revision covers the RDD-100 upgrade from Version 4.1 to Version 4.1.1.

14a. Justification (mark one)

Criteria Change	[]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[X]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

Document has newly inserted test results to allow use of RDD-100 Version 4.1.1.

15. Distribution (include name, MSIN, and no. of copies)

C. D. Acree	H6-35 (1)	A. K. Lee	H8-71 (1)
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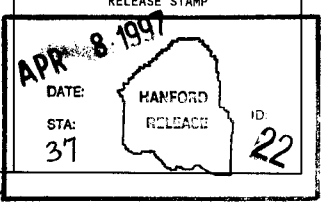
RELEASE STAMP



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ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 628818

16. Design Verification Required
[ ] Yes
[X] No

17. Cost Impact

	ENGINEERING		CONSTRUCTION	
Additional	[ ]	$	[ ]	$
Savings	[ ]	$	[ ]	$

18. Schedule Impact (days)
Improvement [ ]
Delay [ ]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[ ]	Seismic/Stress Analysis	[ ]	Tank Calibration Manual	[ ]
Functional Design Criteria	[ ]	Stress/Design Report	[ ]	Health Physics Procedure	[ ]
Operating Specification	[ ]	Interface Control Drawing	[ ]	Spares Multiple Unit Listing	[ ]
Criticality Specification	[ ]	Calibration Procedure	[ ]	Test Procedures/Specification	[ ]
Conceptual Design Report	[ ]	Installation Procedure	[ ]	Component Index	[ ]
Equipment Spec.	[ ]	Maintenance Procedure	[ ]	ASME Coded Item	[ ]
Const. Spec.	[ ]	Engineering Procedure	[ ]	Human Factor Consideration	[ ]
Procurement Spec.	[ ]	Operating Instruction	[ ]	Computer Software	[ ]
Vendor Information	[ ]	Operating Procedure	[ ]	Electric Circuit Schedule	[ ]
OM Manual	[ ]	Operational Safety Requirement	[ ]	ICRS Procedure	[ ]
FSAR/SAR	[ ]	IEFD Drawing	[ ]	Process Control Manual/Plan	[ ]
Safety Equipment List	[ ]	Cell Arrangement Drawing	[ ]	Process Flow Chart	[ ]
Radiation Work Permit	[ ]	Essential Material Specification	[ ]	Purchase Requisition	[ ]
Environmental Impact Statement	[ ]	Fac. Proc. Samp. Schedule	[ ]	Tickler File	[ ]
Environmental Report	[ ]	Inspection Plan	[ ]		[ ]
Environmental Permit	[ ]	Inventory Adjustment Request	[ ]		[ ]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

Signature	Date	Signature	Date
Design Authority		Design Agent	
Cog. Eng. B. C. Gneiting B.C. Gneiting	4/8/97	PE	
Cog. Mgr. W. E. Bryan W.E. Bryan	4/8/97	QA	
QA		Safety	
Safety		Design	
Environ.		Environ.	
Other		Other	
		DEPARTMENT OF ENERGY	
		Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

Test Documentation to Convert TWRS Baseline Data for RDD-100 Upgrades

B. C. Gneiting
J. C. Danley
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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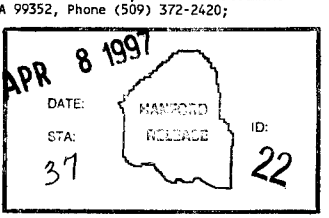
B&R Code: EW3120075 Total Pages: 55

Key Words: RDD-100, Test Plan, requirements management, database.

Abstract: This document describes the test documentation required for converting between different versions of the RDD-100 software application. The area of focus is the successful conversion of the master data set between different versions of the database tool and their corresponding data structures.



Chris Gillingham 4-8-97
Release Approval Date

Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-TP-431 Rev. 3	Page 1

(2) Title

Test Documentation to Convert TWRS Baseline Data for RDD-100 Upgrades.

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
1	(7) Replace WHC-SD-WM-TP-431 Rev. 0 with WHC-SD-WM-TP-431 Rev. 1 ECN-623906	BC Gneiting 05/02/96	NG Awadalla 05/02/96
2	Replace WHC-SD-WM-TP-431 Rev. 1 with WHC-SD-WM-TP-431 Rev. 2 ECN-623907	BC Gneiting 06/10/96	NG Awadalla 06/10/96
3 RS	Replace WHC-SD-WM-TP-431 Rev. 2 with HNF-SD-WM-TP-431 Rev. 3 ECN-628818	BC Gneiting 4/8/97	W.E. Bryan 4/8/97

TEST DOCUMENTATION TO CONVERT TWRS BASELINE DATA FOR RDD-100 UPGRADES

Brent C. Gneiting
Jack C. Danley
April 8, 1997

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1.0 INTRODUCTION

1.1 PURPOSE

A formal systems engineering approach has been adopted at Hanford for the development of major systems like the Tank Waste Remediation System (TWRS). This includes performing the activities of mission analysis, functional analysis, requirements analysis, parametric analysis, and alternative analysis. To manage complex sets of requirements, provide document traceability, and support a broad range of related systems engineering activities, a tool known within Westinghouse Hanford Company (WHC) as the Requirements Management and Assured Compliance System (RMACS) is used. The main software tool in the RMACS system is the RDD-100 software tool set developed by Ascent Logic Corporation (ALC). This tool set contains the systems engineering data describing the TWRS technical baseline. This document provides the test documentation required for the conversion between two versions of the RDD-100 software application, from Version 4.1 to Version 4.1.1. The testing performed specifically addresses the conversion of the data set between the two versions. The purpose of the test documentation is to verify that the data in the database has come through the conversion without becoming corrupted.

1.2 SCOPE

The testing is intended to confirm that the data converted and then stored in the new version of RDD-100 (Version 4.1.1) is identical to the data contained in the old version (Version 4.1). The RDD-100 application is a commercial off-the-shelf software package that has been in use at Hanford for about 4 years. The new version (4.1.1) has been extensively tested by the developer, been in use at Hanford for about one month, and has been in use by other companies. Only representative testing of the applications input and output capabilities will be performed to make sure it continues to function as expected. Reports previously developed with the older version (4.1) of the RDD-100 report writer were determined not to require formal conversion testing. The reports are always changing and are only used to query the data base and create specific views of the data to be printed in a report format. Also, any RDD-100 generated reports used to define a technical baseline are independently reviewed for correctness.

1.3 OVERVIEW

The U.S. Department of Energy (DOE) established the TWRS Program to safely manage and dispose of the tank waste stored at the Hanford Site. The scope of the TWRS Program and projects is to receive, safely store, maintain, treat, and dispose of tank waste. Tank waste includes the current contents of 149 Single-Shell Tanks (SSTs), 28 Double-Shell Tanks (DSTs), 47 miscellaneous tanks, new waste that may be added to these facilities, and all encapsulated cesium and strontium stored onsite and returned from offsite users.

The TWRS Program has adopted a systems engineering approach to integrate all activities necessary to build a system that achieves the tank waste remediation mission. The infrastructure framework being developed to enable effective deployment of systems engineering includes a set of computer-based tools to automate the process and manage information. The RMACS is one of the systems of computer-based tools being used to assist the TWRS management and engineers in the application of the systems engineering process to the TWRS domain. This system assists the systems

engineer in evaluating, analyzing, grouping, connecting, categorizing, storing, and communicating information and data that relate to the tank waste system. As mentioned above, the RDD-100 software application is the main component of RMACS.

Currently TWRS is using RDD-100 Version 4.1. To effectively utilize the investment in RDD-100, upgrading to the current version of RDD, Version 4.1.1, is recommended. The original requirements that led to selecting RDD-100 to support the systems engineering activity and store the technical baseline for TWRS have not changed and are still satisfied by Version 4.1.1. This new version of RDD-100 (4.1.1) is a minor upgrade with most of the changes being fixes to known problems. Many of the features fixed in this new release are being used by the TWRS program. Some of the improvements are: 1) fixes errors in Report Writer margins and borders, 2) fixes all decomposable element types with regard to date/time stamp updates on TimeFunctions, 3) fixes problems with change bars in reports, 4) updates the MEV "print View" operation, and 5) fixes reordering problems with Completion Criteria. The product of the conversion activity is to successfully take the current TWRS technical baseline data stored in Version 4.1 and move it over to Version 4.1.1 without creating or losing any data element definitions or relationships between the elements.

1.4 DEFINITIONS

ALC - Ascent Logic Corporation
DOE - U.S. Department of Energy
DST - Double-Shell Tank
HSTB - Hanford Site Technical Baseline
RDD - RDD-100/Requirements Driven Development
SST - Single-Shell Tank
TWRS - Tank Waste Remediation System

2.0 TEST PLAN

2.1 TEST ITEMS

The TWRS systems engineering data contained in the RDD-100 database, in the form of Elements, Relations, and Attributes, will be tested to confirm the completeness and accuracy after the data is transferred to the new software version.

2.2 FEATURES TO BE TESTED/NOT TO BE TESTED

Conversion Data:

After the data stored in the RDD-100 database is transferred to the new software version, it will be checked manually to ensure that the new version contains the proper numbers of elements of each type, along with their relationships and attributes. The data will also be sampled to compare the two data sets and verify that there are no differences.

RDD-100:

The RDD-100 Version 4.1.1 software application is a commercial product that was released about 4 months ago and has been used extensively by other companies. The product has been thoroughly tested and no further testing is required for this task. However, some representative testing of the software's input and output functions will be performed and reviewed as a result of the data conversion testing.

2.3 TEST DELIVERABLES

The test documentation will be contained in one document that defines the test plan, design, procedures, and results. The test results will include the following topics:

Test Logs
Test Incident Reports
Test Summary Reports
Test Output data

2.4 ACCEPTANCE CRITERIA

The individual pass/fail criteria described in Section 3.2 must all be satisfied in order for the conversion as a whole to be accepted.

2.5 TESTING TASKS

Side-by-Side Execution:

A set of updates to the RDD-100 data will be prepared for both versions.

Identical changes will be made to the data stored in both versions using the standard input interface.

The results will be compared manually based on the data collected automatically by the RDD-100 generated reports described below.

Data Count:

A profiling report that will produce and output detailed counting results is needed for both versions of RDD-100.

Profiles will be produced for the data sets stored in each version.

The profiles will be compared manually to make sure the number counts for each element and associated relationships are the same.

Detailed Sampling:

A database sampling report that will produce detailed output for a selected number (representative sample) of data items is needed for both versions of RDD-100.

The report will be run on both sets of data.

The output will be compared using the UNIX [1]"diff" utility, which will output a file of the differences between the two data sets.

2.6 ENVIRONMENTAL NEEDS

The new version of the RDD-100 application has already been installed on a UNIX Sun[2] server with the capability of checking out a license. At least one UNIX Sun station that runs the Solaris operating system is required to run the RDD-100 application and produce the reports. The UNIX station needs access to the Sun server over the Hanford Local Area Network (HLAN) to check out a license and to share data with other Sun stations on the network. There are no special security requirements.

2.7 RESPONSIBILITIES

Members of the TWRS Systems Application team and subcontractors are responsible for all areas of the testing.

2.8 STAFFING AND TRAINING NEEDS

- One project leader, in charge of the testing acceptance, timing, and task priorities.
- One test technician, to perform the tests and track progress on individual tests.
- One RDD-100 programmer, to generate the database profile reports for each version. The programmer could also perform the same duties as the test technician.
- These resources are available within the current RDD-100 user group.

2.9 SCHEDULE

The actual testing will take between one and four days, depending on the number and difficulty of the problems found with the converted data. It is expected, from preliminary tests that the difficulties will be few, minor, and easily resolved.

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[1] UNIX is a registered trademark of UNIX System Laboratories, Inc.

[2] Sun is a trademark of Sun Microsystems, Inc.

2.10 RISKS AND CONTINGENCIES

It is assumed that all of the data stored in the old version of RDD-100 will be converted to the new version without major difficulty. If difficulties are encountered, it is possible that the conversion effort will require a revision of the data storage structure, data, or some other modification. If this occurs, the old version of RDD-100 may still be used until the difficulties are resolved.

3.0 TEST DESIGN

3.1 APPROACH

The data stored in RDD-100 will be tested by running a database profile report for the data in both RDD versions. The profile report will contain counts of instances for each element type and their relationships.

For all element types populated:

Number of instances.
Number of times each attribute is populated.

For all relationships populated:

Number of times each relationship is populated.
Number of times each target of the relationship is used.

The data will also be tested by running a database sampler report on both sets of data. The output from the reports should be in the same format and should report on every element in the database. Then the output for the two sets will be compared using the UNIX "diff" utility.

A third test will round out the set by checking the input features, which are expected to function properly because they have been thoroughly tested by the vendor and other users. Changes will be made through the normal input function to identical data sets in both versions. The reports should yield results similar to those obtained for the first and second test case.

3.2 ITEM PASS/FAIL CRITERIA

The data transfer between versions will pass the test if the profile reports' output show that the two versions have identical profiles and the database sample reports have no differences as identified by the UNIX "diff" utility.

3.3 SUSPENSION CRITERIA AND RESUMPTION REQUIREMENTS

If the data stored in the new version of RDD are found to be different from that stored in the current version, the data testing will stop and will not resume until the reason for the difference is found. If necessary, a work-around path will be defined and testing resumed.

4.0 TEST CASES

The test case format shall consist of a test case identifier, an explanation of the items being tested, input and output specifications, environmental needs, and any special requirements specific to that test case.

4.1 TEST CASE IDENTIFIER

The test cases will be identified by a short description of the testing that is to be performed. Only three test cases are considered necessary at this time: Database Statistics, Database Content, and Database Activity.

4.2 TEST ITEMS

Database Statistics:

This test case will compare the number of instances of each data type for the same data set stored in each of the two versions of RDD-100. The count comparisons will be for: the number of instances of each element type, the number of targets for each relationship available to each element type, and the number of each attribute available for each element type.

Database Content:

This test case will compare selected instances of the elements to make sure they are in the same order in each version of RDD-100 and that the names, numbers, and descriptions of the instances are identical.

Database Activity:

This test case will utilize the normal input features of RDD-100 to make changes to the data set in each version. Next a check will be made to make sure the data was changed and stored correctly in the new version by comparing the database profile reports for the two versions. The changes made to the database supporting the most recent change request package will be made in the new version and a database profile report will be run the make the comparison. This test is performed to round out the test set and check that the input function performs as expected. Because the software has been thoroughly tested by ALC and other users throughout the country, the results of the test are expected to be positive.

4.3 INPUT SPECIFICATIONS

For the first two test cases, the entire RDD-100 data set will be checked without using the standard input features. A data set stored in the old version of RDD-100 will be converted and stored in the new version. The resulting data set will be checked to make sure the conversion was a success. For the Database Activity test case, the normal input functions will be used to make the changes requested in the most recent change request package.

4.4 OUTPUT SPECIFICATIONS

Database Statistics:

The output will be in the form of a table that provides a profile of the data set and sums the number of instances. The format is shown in the Appendix B, **DATABASE PROFILE**. The tables output by the two versions of RDD-100 will be compared to determine whether or not the statistics match.

Database Content:

The output will be in the form of an ASCII text file that consists of groupings of Name, Number, and Description for every instance of every element type in the data set. The files output by the two versions of RDD-100 will be compared by the UNIX "diff" utility to determine whether or not there are any differences.

Database Activity:

The output will be two **Database Profile** reports, which contain the changes to the data set that were requested by the most recent change request package. Data structure profiles will be created for both versions of RDD-100. These two reports will be compared to see if the results are the same. Also the reports created before entering the changes will be compared to make sure both sets of results are consistent.

4.5 SPECIAL REQUIREMENTS

Database Statistics:

No special requirements.

Database Content:

No special requirements.

Database Activity:

No special requirements.

4.6 INTERCASE DEPENDENCIES

There are no true dependencies between the first two cases. It is recommended, however, that the Database Statistics test case be performed first, because if it fails, the Database Content test case is guaranteed to fail. There are no dependencies between the second and third cases. The first case must be passed before the third case will have any meaning.

5.0 TEST PROCEDURES

Database Statistics:

1. Log: See Section 7.1, Test Log.
2. Setup: RDD-100 must be started in each version using the appropriate data set.
3. Start: N/A

4. Proceed: Print the **Database Profile**, (Appendix B) report in both versions of RDD-100 and compare the numbers to ensure that they match between the two data sets.
5. Measure: N/A
6. Shutdown: If it becomes necessary to suspend testing, there are no actions that are required to safely shut down.
7. Restart: Simply follow the Setup and Proceed procedures.
8. Stop: N/A
9. Contingencies: Any anomalous events will have to be evaluated before a response can be formulated. Anomalous events will be recorded on the test log and test incident reports (Section 7.2) will be generated to detail the event and its resolution.

Database Content:

1. Log: See attached Test Log.
2. Setup: RDD-100 must be started in each version using the appropriate data set.
3. Start: N/A
4. Proceed: Print the **Database Sampler** report in both versions of RDD-100 and compare the output using the UNIX "diff" utility.
5. Measure: N/A
6. Shutdown: If it becomes necessary to suspend testing, there are no actions that are required to safely shut down.
7. Restart: Simply follow the Setup and Proceed procedures.
8. Stop: N/A
9. Contingencies: Any anomalous events will have to be evaluated before a response can be formulated. Anomalous events will be recorded on the test log and test incident reports will be generated to detail the event and its resolution.

Database Activity:

1. Log: See attached Test Log.
2. Setup: RDD-100 must be started in each version using the appropriate data set.
3. Start: N/A
4. Proceed: Make changes to the data set stored in both versions of RDD-100 using the requested changes in the most recent change request package. Print the **Database Profile** report in both versions of RDD-100 and compare the numbers. The comparison results should be consistent with those obtained in the Database Statistics test case.
5. Measure: N/A
6. Shutdown: If it becomes necessary to suspend testing, there are no actions that are required to safely shut down.
7. Restart: Simply follow the Setup and Proceed procedures.
8. Stop: N/A
9. Contingencies: Any anomalous events will have to be evaluated before a response can be formulated. Anomalous events will be recorded on the test log and test incident reports will be generated to detail the event and its resolution.

6.0 TEST ITEM TRANSMITTAL LIST

6.1 TRANSMITTED ITEMS

The TWRS technical baseline data used to produce the TWRS Functions and Requirements Document, WHC-SD-WM-FRD-020, Rev. 1, is stored in Version 4.0.3 of the RDD-100 system engineering software system. The master data set of the TWRS technical baseline, Revision 1, is stored on a Sun SPARC Server named twrsse. The computer files containing this version of the technical baseline are detailed in the Supporting Document "Tank Waste Remediation Systems Technical Baseline Database," document number WHC-SD-WM-CSWD-079, Rev. 1. The master data set was converted to the new version of RDD-100 (4.1.1) and tested.

In June of 1996 testing to upgrade from RDD-100 Version 4.0.3 to Version 4.1 was completed and documented (Revision 2 of this document). Since that time both versions of the RDD-100 application have been used by the TWRS project. The purpose of this document is to test and document the upgrade from RDD-100 Version 4.1 to 4.1.1. Since the current TWRS master data set is stored in Version 4.0.3, an intermediate conversion of the data set was performed to Version 4.1. As in the original testing (Revision 2 of this document), no discrepancies were found in going from Version 4.0.3 to Version 4.1. The results of this intermediate conversion are covered by Revision 2 of this document and will not be repeated in this revision.

Two pending changes to the Rev. 1 technical baseline have been made using the 4.0.3 version of RDD-100. These change files (RDD-100 delta files) were used in the "database activity" testing. The delta files were obtained from the TWRS RDD-100 System Administrator. No conversion was necessary since Versions 4.0.3, 4.1, and 4.1.1 all have the same format.

The list of files used in the testing, their full path, and the computer system they reside on are contained in the next section.

6.2 LOCATION

All items used in testing the new version of RDD-100 are files stored on Sun workstations. The Sun workstations containing the original files and the files used in test work area are designated by name as follows:

Sun SPARC[3] Server 1000 - twrsse
Sun SPARC 10/41 - electro (Tester)
Sun SPARC 10/41 - tootsie (Tester)

The master image file containing the technical baseline:
(Version 4.0.3): twrsse:/export/rdd/conversion/41to411/TWRS-Rev1-Pending-093096.im
(Version 4.1): twrsse:/export/rdd/conversion/41to411/V41-TWRS-Rev1-Pending-093096.im

The RDD-100 Version 4.0.3/4.1/4.1.1 change files:
directory: twrsse:/export/rdd/conversion/41to411/
files: TWR-97-201.rdt TWR-97-202.rdt

[3] SPARC is a trademark of SPARC International, Inc.

The Revision 1 technical baseline converted to Version 4.1.1:
twrsse:/export/rdd/conversion/41to411/V411-TWRS-Rev1-Pending-093096.im

The reports used for the testing:

directory:	twrsse:/export/rdd/conversion/41to411/	
files:	V41-DatabaseProfile.rpt	DatabaseSampler.403.rpt
	V411-DatabaseProfile.rpt	

The output from the reports:

directory: twrsse:/export/rdd/conversion/41to411/

files:
V41-TWRS-Rev1-Pending-093096Database_Profile.ps
V41-TWRS-Rev1-Pending-093096+crsDatabase_Profile.ps
V41-TWRS-Rev1-Pending-093096Database_Sampler.asc
V41-TWRS-Rev1-Pending-093096+crsDatabase_Sampler.asc
V411-TWRS-Rev1-Pending-093096Database_Profile.ps
V411-TWRS-Rev1-Pending-093096+crsDatabase_Profile.ps
V411-TWRS-Rev1-Pending-093096Database_Sampler.asc
V411-TWRS-Rev1-Pending-093096+crsDatabase_Sampler.asc

6.3 STATUS

All of the items transmitted are configured as expected and do not result in any deviations to the test plan.

7.0 TEST RESULTS

The test results are separated into four main pieces.

1) A summary of the testing performed to verify that the upgrade to a new version of RDD-100 was successful is contained in Appendix A.

2) The database profile tables showing element and relationship counts for four separate images are contained in Appendix B.

3) The report showing database content differences is contained in Appendix C.

4) The test log and incident reports are contained in the sections below.

7.1 CONVERSION TEST LOG

This section summarizes any test anomalies that are written up in a test incident report. The summary is contained in a test log (Table 1). A test witness was not considered necessary for this testing activity and, therefore, was left out of the test log.

Table 1. Conversion to RDD-100 Version 4.1.1 Test Log

Test Case	Pass/Fail	Incident Number or Comment	Signature/Date:
1 Database Statistics	Pass	See Appendix B, Database Profile for images: V41-TWRS-Rev1-Pending-093096.im (p. B-2) V411-TWRS-Rev1-Pending-093096.im (p. B-12)	Test Performer: Jack C. Danley
2 Database Content	Pass	See Appendix C	Test Performer: Jack C. Danley
3 Database Activity	Pass	See Appendix B, Database Profile for images: V41-TWRS-Rev1-Pending-093096+crs.im (p. B-19) V411-TWRS-Rev1-Pending-093096+crs.im (p. B-29)	Test Performer: Jack C. Danley

7.2 TEST INCIDENT REPORTS

There were no incidents which occurred during the testing.

8.0 REFERENCES

The following documents were used as sources of information for the test plan.

ANSI/IEEE 829-1983, *Standard for Software Test Documentation*, IEEE, 1983.

ANSI/IEEE 1008-1987, *Standard for Software Unit Testing*, IEEE, 1987.

Walker, Kevin G, *Test Plan for the Integrated Dynamic Modeling and Management System (IDMMS)*, LATA, April 26, 1995.

WHC-CM-3-10, *Software Practices*, WHC, January 31, 1993

WHC-SD-WM-FRD-020, Rev. 1, *Tank Waste Remediation System Functions and Requirements Document*, WHC, September 30, 1996.

WHC-SD-WM-CSWD-079, Rev. 1, *Tank Waste Remediation Systems Technical Baseline Database*, WHC, October 9, 1996.

APPENDIX A

CONVERSION TEST SUMMARY

1.0 Summary

The testing confirmed that conversion of the TWRS technical baseline data from Version 4.1 to Version 4.1.1 of RDD-100 was successful. None of the three test cases showed any inconsistencies between the data in RDD-100 Version 4.1 and Version 4.1.1. The data was tested to be certain that the number of elements, relations and attributes of each type matched, that the name, number and description matched between the two versions, and to provide user confidence in the compatibility between the two versions. The testing was performed by Jack Danley on a SUN[4] SPARC 10 computer over the course of several days. The data files can be found, along with the reports and output from the reports as referenced in Section 6.2 above.

2.0 Variances

None

3.0 Comprehensive Assessment

The testing process was reasonably comprehensive, as it checks almost every aspect of the data transferred. Two aspects were not directly tested. First, some of the attributes were not tested to determine if they contain the correct data; however, the number of times the attributes were populated was checked. Secondly, only spot checks were made to determine if relationships were still associated with the correct elements. The extra effort of manually performing this check on all relationships was not considered necessary, since the count for each set of relationships and elements was correct and the conversion routines in RDD-100 Version 4.1.1 have had ample time to be thoroughly tested by the vendor and users.

4.0 Summary of Results

Results from the three test cases showed no differences between the two versions of RDD-100.

5.0 Evaluation

The test results show that the data conversion was a success and the new version of RDD-100 can be used to manage the TWRS technical baseline.

[4]SUN is a trademark of SUN Microsystems, Inc.

6.0 Summary of Activities

The major testing activities were running the database query reports and performing the documentation to support the conversion. Running the queries and resolving incidents took two days. Documenting the entire process took approximately two days. The total resource usage for the project was about one week of user and machine time, with the total time elapsed from start of the process to the end being two weeks because of other work intervening.

APPENDIX B

DATABASE PROFILES

DATABASE PROFILE

of

Facility: DOE

V41-TWRS-Rev1-Pending-093096.im

1:34:39 pm

Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
SystemRequirement	1660	traces to	Component 487
			CriticalIssue 5
			Decision 64
			Interface 28
			ItemLink 34
			RequiredAnalysis 1
			Source 4
			TimeFunction 5107
			TimeItem 2299
		primary is	Organization 139
		documented by	Source 1358
		annotated by	Comment 151
		invokes	Source 10
		categorized by	Category 2221
		incorporated by	SystemRequirement 1070
		incorporates	SystemRequirement 1070
		verified by	VerificationRequirement 27
		traced from	CriticalIssue 359
			Decision 98
TimeItem	898	output from	TimeFunction 939
		documented by	Source 1
		traced from	CriticalIssue 179

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Decision 1
			SystemRequirement 2299
		current decomposition	INet 182
		input to	TimeFunction 851
		carried by	ItemLink 68
		categorized by	Category 26
		traces to	CriticalIssue 1
		primary is	Organization 150
		refined by	INet 182
Comment	454	primary is	Organization 224
		secondary is	Organization 1
		annotates	CriticalIssue 73
			ItemLink 355
			Source 193
			SystemRequirement 151
		categorized by	Category 261
		traced from	CriticalIssue 1
Source	427	invoked by	SystemRequirement 10
		annotated by	Comment 193
		traced from	CriticalIssue 1
			SystemRequirement 4
		documents	CriticalIssue 2

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Decision 161
			RequiredAnalysis 7
			SystemRequirement 1358
			TimeItem 1
CriticalIssue	421	primary is	Organization 193
		documented by	Source 2
		annotated by	Comment 73
		analyzed by	RequiredAnalysis 292
		categorized by	Category 1
		traces to	Comment 1
			Component 8
			CriticalIssue 2
			Decision 2
			Interface 92
			RequiredAnalysis 1
			Source 1
			SystemRequirement 359
			TimeFunction 30
			TimeItem 179
		traced from	CriticalIssue 2
			Decision 113
			SystemRequirement 5
			TimeItem 1

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
		raised by	Component 6
			TimeFunction 6
RequiredAnalysis	364	documented by	Source 7
		primary is	Organization 186
		secondary is	Organization 4
		analyzes	CriticalIssue 292
			Decision 55
		traced from	CriticalIssue 1
			Decision 1
			SystemRequirement 1
TimeFunction	326	inputs	TimeItem 851
		outputs	TimeItem 939
		primary is	Organization 41
		current decomposition	FNet 77
		performed by	Component 18
			System 1
		decomposed by	FNet 78
		traced from	CriticalIssue 30
			SystemRequirement 5107
		raises	CriticalIssue 6
Decision	248	categorized by	Category 4
		traces to	Component 45

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			CriticalIssue 113
			RequiredAnalysis 1
			SystemRequirement 98
			TimeItem 1
		primary is	Organization 6
		analyzed by	RequiredAnalysis 55
		documented by	Source 161
		traced from	CriticalIssue 2
			SystemRequirement 64
Interface	37	traced from	CriticalIssue 92
			SystemRequirement 28
		contains	ItemLink 37
ItemLink	37	is contained by	Interface 37
		traced from	SystemRequirement 34
		carries	TimeItem 68
		annotated by	Comment 355
VerificationRequirement	28	has verification method of	VerificationMethod 54
		verifies	SystemRequirement 27
Component	24	built from	Component 23
		built in	Component 23
		raises	CriticalIssue 6
		traced from	CriticalIssue 8

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Decision 45
			SystemRequirement 487
		performs	TimeFunction 18
Organization	20	primary for	Comment 224
			CriticalIssue 193
			Decision 6
			RequiredAnalysis 186
			SystemRequirement 139
			TimeFunction 41
			TimeItem 150
		secondary for	Comment 1
			RequiredAnalysis 4
Category	16	categorizes	Comment 261
			CriticalIssue 1
			Decision 4
			SystemRequirement 2221
			TimeItem 26
VerificationMethod	5	verification method for	VerificationRequirement 54

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
SystemRequirement	1660	Number	1262
		Line Number	1
		Paragraph Title	64
		Status	Pending: 1
		Description	1585
TimeItem	898	Number	44
		Message Priority	898
		Description	882
		Size	898
		IDEF0 Type	input: 898
Comment	454	Description	454
		Number	98
Source	427	Description	327
		Abbreviation	1
		Number	40
		Source Type	Originating Requirements: 218
			Meeting Minutes: 1
			Trade-off Study Report: 4
			Project Memo: 6
			Standard: 3
CriticalIssue	421	Issue Type	Issue: 418
			Required Analysis: 3
		Due Date	148
		Priority	A (Very High): 13

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
		Actual Date	36
		Description	418
		Number	165
RequiredAnalysis	364	Description	357
		Number	174
TimeFunction	326	Description	316
		Number	324
		Debugging Mode	none: 326
		Execution Level	follow decomposition: 326
Decision	248	Alternatives	57
		Problem	2
		Choice	94
		Status	Open: 4
			Enabling Assumption: 38
			Resolved: 103
		Description	139
		Number	127
Interface	37	Description	22
		Number	37
ItemLink	37	Is Constrained	false: 37
		Number	37
		Abbreviation	37
VerificationRequirement	28		
Component	24	Component Type	System: 1

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
			System Segment: 18
		Description	24
		Number	24
Organization	20	Abbreviation	5
Category	16	Description	8
		Number	4
VerificationMethod	5		
* Element Types with no instances are not listed. Element types are sorted by the number of instances.			

DATABASE PROFILE

of

Facility: DOE

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1:18:39 pm

Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
SystemRequirement	1660	documented by	Source 1358
		verified by	VerificationRequirement 27
		annotated by	Comment 151
		primary is	Organization 139
		traced from	CriticalIssue 359
			Decision 98
		traces to	Component 487
			CriticalIssue 5
			Decision 64
			Interface 28
			ItemLink 34
			RequiredAnalysis 1
			Source 4
			TimeFunction 5107
			TimeItem 2265
		invokes	Source 10
		categorized by	Category 2221
		incorporated by	SystemRequirement 1070
		incorporates	SystemRequirement 1070
TimeItem	881	refined by	INet 181
		carried by	ItemLink 66
		primary is	Organization 150
		current decomposition	INet 181
		traces to	CriticalIssue 1
		documented by	Source 1
		output from	TimeFunction 921
		traced from	CriticalIssue 179
			Decision 1
			SystemRequirement 2265
		input to	TimeFunction 843
		categorized by	Category 26
Comment	454	annotates	CriticalIssue 73

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			ItemLink 355
			Source 193
			SystemRequirement 151
		secondary is	Organization 1
		primary is	Organization 224
		categorized by	Category 261
		traced from	CriticalIssue 1
Source	427	traced from	CriticalIssue 1
			SystemRequirement 4
		documents	CriticalIssue 2
			Decision 161
			RequiredAnalysis 7
			SystemRequirement 1358
			TimeItem 1
		annotated by	Comment 193
		invoked by	SystemRequirement 10
CriticalIssue	421	analyzed by	RequiredAnalysis 292
		documented by	Source 2
		annotated by	Comment 73
		raised by	Component 6
			TimeFunction 6
		primary is	Organization 193
		traced from	CriticalIssue 2
			Decision 113
			SystemRequirement 5
			TimeItem 1
		categorized by	Category 1
		traces to	Comment 1
			Component 8
			CriticalIssue 2
			Decision 2
			Interface 92
			RequiredAnalysis 1

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Source 1
			SystemRequirement 359
			TimeFunction 30
			TimeItem 179
RequiredAnalysis	364	secondary is	Organization 4
		documented by	Source 7
		traced from	CriticalIssue 1
			Decision 1
			SystemRequirement 1
		analyzes	CriticalIssue 292
			Decision 55
		primary is	Organization 186
TimeFunction	326	traced from	CriticalIssue 30
			SystemRequirement 5107
		outputs	TimeItem 921
		performed by	Component 18
			System 1
		decomposed by	FNet 78
		raises	CriticalIssue 6
		primary is	Organization 41
		inputs	TimeItem 843
		current decomposition	FNet 77
Decision	248	analyzed by	RequiredAnalysis 55
		categorized by	Category 4
		primary is	Organization 6
		traces to	Component 45
			CriticalIssue 113
			RequiredAnalysis 1
			SystemRequirement 98
			TimeItem 1
		documented by	Source 161
		traced from	CriticalIssue 2
			SystemRequirement 64

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
Interface	37	contains	ItemLink 37
		traced from	CriticalIssue 92
			SystemRequirement 28
ItemLink	37	carries	TimeItem 66
		is contained by	Interface 37
		annotated by	Comment 355
		traced from	SystemRequirement 34
VerificationRequirement	28	has verification method of	VerificationMethod 54
		verifies	SystemRequirement 27
Component	24	performs	TimeFunction 18
		traced from	CriticalIssue 8
			Decision 45
			SystemRequirement 487
		built from	Component 23
		built in	Component 23
		raises	CriticalIssue 6
Organization	20	primary for	Comment 224
			CriticalIssue 193
			Decision 6
			RequiredAnalysis 186
			SystemRequirement 139
			TimeFunction 41
			TimeItem 150
		secondary for	Comment 1
			RequiredAnalysis 4
Category	16	categorizes	Comment 261
			CriticalIssue 1
			Decision 4
			SystemRequirement 2221
			TimeItem 26
VerificationMethod	5	verification method for	VerificationRequirement 54

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
SystemRequirement	1660	Paragraph Title	64
		Status	Pending: 1
		Description	1585
		Number	1262
		Line Number	1
TimeItem	881	Description	865
		Message Priority	881
		Size	881
		Number	42
		IDEF0 Type	input: 881
Comment	454	Number	98
		Description	454
Source	427	Abbreviation	1
		Number	40
		Description	327
		Source Type	Originating Requirements: 218
			Meeting Minutes: 1
			Trade-off Study Report: 4
			Project Memo: 6
			Standard: 3
CriticalIssue	421	Priority	A (Very High): 13
		Description	418
		Actual Date	36
		Issue Type	Issue: 418
			Required Analysis: 3
		Due Date	148
		Number	165
RequiredAnalysis	364	Description	357
		Number	174
TimeFunction	326	Debugging Mode	none: 326
		Description	316
		Number	324
		Execution Level	follow decomposition: 326
Decision	248	Problem	2
		Description	139
		Choice	94

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
		Status	Open: 4
			Enabling Assumption: 38
			Resolved: 103
		Alternatives	57
		Number	127
Interface	37	Number	37
		Description	22
ItemLink	37	Number	37
		Is Constrained	false: 37
		Abbreviation	37
VerificationRequirement	28		
Component	24	Description	24
		Component Type	System: 1
			System Segment: 18
		Number	24
Organization	20	Abbreviation	5
Category	16	Number	4
		Description	8
VerificationMethod	5		

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

DATABASE PROFILE

of

Facility: DOE

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11:00:59 am

Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
SystemRequirement	1660	traces to	Component 487
			CriticalIssue 5
			Decision 64
			Interface 28
			ItemLink 34
			RequiredAnalysis 1
			Source 4
			TimeFunction 5107
			TimeItem 2265
		primary is	Organization 139
		documented by	Source 1358
		annotated by	Comment 151
		invokes	Source 10
		categorized by	Category 2221
		incorporated by	SystemRequirement 1070
		incorporates	SystemRequirement 1070
		verified by	VerificationRequirement 27
		traced from	CriticalIssue 359
			Decision 98
TimeItem	881	output from	TimeFunction 921
		documented by	Source 1
		traced from	CriticalIssue 179

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Decision 1
			SystemRequirement 2265
		current decomposition	INet 181
		input to	TimeFunction 843
		carried by	ItemLink 66
		categorized by	Category 26
		traces to	CriticalIssue 1
		primary is	Organization 150
		refined by	INet 181
Comment	454	primary is	Organization 224
		secondary is	Organization 1
		annotates	CriticalIssue 73
			ItemLink 355
			Source 193
			SystemRequirement 151
		categorized by	Category 261
		traced from	CriticalIssue 1
Source	427	invoked by	SystemRequirement 10
		annotated by	Comment 193
		traced from	CriticalIssue 1
			SystemRequirement 4
		documents	CriticalIssue 2

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Decision 161
			RequiredAnalysis 7
			SystemRequirement 1358
			TimeItem 1
CriticalIssue	421	primary is	Organization 193
		documented by	Source 2
		annotated by	Comment 73
		analyzed by	RequiredAnalysis 292
		categorized by	Category 1
		traces to	Comment 1
			Component 8
			CriticalIssue 2
			Decision 2
			Interface 92
			RequiredAnalysis 1
			Source 1
			SystemRequirement 359
			TimeFunction 30
			TimeItem 179
		traced from	CriticalIssue 2
			Decision 113
			SystemRequirement 5
			TimeItem 1

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
		raised by	Component 6
			TimeFunction 6
RequiredAnalysis	364	documented by	Source 7
		primary is	Organization 186
		secondary is	Organization 4
		analyzes	CriticalIssue 292
			Decision 55
		traced from	CriticalIssue 1
			Decision 1
			SystemRequirement 1
TimeFunction	326	inputs	TimeItem 843
		outputs	TimeItem 921
		primary is	Organization 41
		current decomposition	FNet 77
		performed by	Component 18
			System 1
		decomposed by	FNet 78
		traced from	CriticalIssue 30
			SystemRequirement 5107
		raises	CriticalIssue 6
Decision	248	categorized by	Category 4
		traces to	Component 45

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			CriticalIssue 113
			RequiredAnalysis 1
			SystemRequirement 98
			TimeItem 1
		primary is	Organization 6
		analyzed by	RequiredAnalysis 55
		documented by	Source 161
		traced from	CriticalIssue 2
			SystemRequirement 64
Interface	37	traced from	CriticalIssue 92
			SystemRequirement 28
		contains	ItemLink 37
ItemLink	37	is contained by	Interface 37
		traced from	SystemRequirement 34
		carries	TimeItem 66
		annotated by	Comment 355
VerificationRequirement	28	has verification method of	VerificationMethod 54
		verifies	SystemRequirement 27
Component	24	built from	Component 23
		built in	Component 23
		raises	CriticalIssue 6
		traced from	CriticalIssue 8

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Decision 45
			SystemRequirement 487
		performs	TimeFunction 18
Organization	20	primary for	Comment 224
			CriticalIssue 193
			Decision 6
			RequiredAnalysis 186
			SystemRequirement 139
			TimeFunction 41
			TimeItem 150
		secondary for	Comment 1
			RequiredAnalysis 4
Category	16	categorizes	Comment 261
			CriticalIssue 1
			Decision 4
			SystemRequirement 2221
			TimeItem 26
VerificationMethod	5	verification method for	VerificationRequirement 54
* Element Types with no instances are not listed. Element types are sorted by the number of instances.			

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
SystemRequirement	1660	Number	1262
		Line Number	1
		Paragraph Title	64
		Status	Pending: 1
		Description	1585
TimeItem	881	Number	42
		Message Priority	881
		Description	865
		Size	881
		IDEF0 Type	input: 881
Comment	454	Description	454
		Number	98
Source	427	Description	327
		Abbreviation	1
		Number	40
		Source Type	Originating Requirements: 218
			Meeting Minutes: 1
			Trade-off Study Report: 4
			Project Memo: 6
			Standard: 3
CriticalIssue	421	Issue Type	Issue: 418
			Required Analysis: 3
		Due Date	148
		Priority	A (Very High): 13

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
		Actual Date	36
		Description	418
		Number	165
RequiredAnalysis	364	Description	357
		Number	174
TimeFunction	326	Description	316
		Number	324
		Debugging Mode	none: 326
		Execution Level	follow decomposition: 326
Decision	248	Alternatives	57
		Problem	2
		Choice	94
		Status	Open: 4
			Enabling Assumption: 38
			Resolved: 103
		Description	139
		Number	127
Interface	37	Description	22
		Number	37
ItemLink	37	Is Constrained	false: 37
		Number	37
		Abbreviation	37
VerificationRequirement	28		
Component	24	Component Type	System: 1

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
			System Segment: 18
		Description	24
		Number	24
Organization	20	Abbreviation	5
Category	16	Description	8
		Number	4
VerificationMethod	5		
* Element Types with no instances are not listed. Element types are sorted by the number of instances.			

DATABASE PROFILE

of

Facility: DOE

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1:59:14 pm

Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
SystemRequirement	1660	documented by	Source 1358
		verified by	VerificationRequirement 27
		annotated by	Comment 151
		primary is	Organization 139
		traced from	CriticalIssue 359
			Decision 98
		traces to	Component 487
			CriticalIssue 5
			Decision 64
			Interface 28
			ItemLink 34
			RequiredAnalysis 1
			Source 4
			TimeFunction 5107
			TimeItem 2299
		invokes	Source 10
		categorized by	Category 2221
		incorporated by	SystemRequirement 1070
		incorporates	SystemRequirement 1070
TimeItem	898	refined by	INet 182
		carried by	ItemLink 68
		primary is	Organization 150
		current decomposition	INet 182
		traces to	CriticalIssue 1
		documented by	Source 1
		output from	TimeFunction 939
		traced from	CriticalIssue 179
			Decision 1
			SystemRequirement 2299
		input to	TimeFunction 851
		categorized by	Category 26
Comment	454	annotates	CriticalIssue 73

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			ItemLink 355
			Source 193
			SystemRequirement 151
		secondary is	Organization 1
		primary is	Organization 224
		categorized by	Category 261
		traced from	CriticalIssue 1
Source	427	traced from	CriticalIssue 1
			SystemRequirement 4
		documents	CriticalIssue 2
			Decision 161
			RequiredAnalysis 7
			SystemRequirement 1358
			TimeItem 1
		annotated by	Comment 193
		invoked by	SystemRequirement 10
CriticalIssue	421	analyzed by	RequiredAnalysis 292
		documented by	Source 2
		annotated by	Comment 73
		raised by	Component 6
			TimeFunction 6
		primary is	Organization 193
		traced from	CriticalIssue 2
			Decision 113
			SystemRequirement 5
			TimeItem 1
		categorized by	Category 1
		traces to	Comment 1
			Component 8
			CriticalIssue 2
			Decision 2
			Interface 92
			RequiredAnalysis 1

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			Source 1
			SystemRequirement 359
			TimeFunction 30
			TimeItem 179
RequiredAnalysis	364	secondary is	Organization 4
		documented by	Source 7
		traced from	CriticalIssue 1
			Decision 1
			SystemRequirement 1
		analyzes	CriticalIssue 292
			Decision 55
		primary is	Organization 186
TimeFunction	326	traced from	CriticalIssue 30
			SystemRequirement 5107
		outputs	TimeItem 939
		performed by	Component 18
			System 1
		decomposed by	FNet 78
		raises	CriticalIssue 6
		primary is	Organization 41
		inputs	TimeItem 851
		current decomposition	FNet 77
Decision	248	analyzed by	RequiredAnalysis 55
		categorized by	Category 4
		primary is	Organization 6
		traces to	Component 45
			CriticalIssue 113
			RequiredAnalysis 1
			SystemRequirement 98
			TimeItem 1
		documented by	Source 161
		traced from	CriticalIssue 2
			SystemRequirement 64

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
Interface	37	contains	ItemLink 37
		traced from	CriticalIssue 92
			SystemRequirement 28
ItemLink	37	carries	TimeItem 68
		is contained by	Interface 37
		annotated by	Comment 355
		traced from	SystemRequirement 34
VerificationRequirement	28	has verification method of	VerificationMethod 54
		verifies	SystemRequirement 27
Component	24	performs	TimeFunction 18
		traced from	CriticalIssue 8
			Decision 45
			SystemRequirement 487
		built from	Component 23
		built in	Component 23
		raises	CriticalIssue 6
Organization	20	primary for	Comment 224
			CriticalIssue 193
			Decision 6
			RequiredAnalysis 186
			SystemRequirement 139
			TimeFunction 41
			TimeItem 150
		secondary for	Comment 1
			RequiredAnalysis 4
Category	16	categorizes	Comment 261
			CriticalIssue 1
			Decision 4
			SystemRequirement 2221
			TimeItem 26
VerificationMethod	5	verification method for	VerificationRequirement 54

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
SystemRequirement	1660	Paragraph Title	64
		Status	Pending: 1
		Description	1585
		Number	1262
		Line Number	1
TimeItem	898	Description	882
		Message Priority	898
		Size	898
		Number	44
		IDEF0 Type	input: 898
Comment	454	Number	98
		Description	454
Source	427	Abbreviation	1
		Number	40
		Description	327
		Source Type	Originating Requirements: 218
			Meeting Minutes: 1
			Trade-off Study Report: 4
			Project Memo: 6
			Standard: 3
CriticalIssue	421	Priority	A (Very High): 13
		Description	418
		Actual Date	36
		Issue Type	Issue: 418
			Required Analysis: 3
		Due Date	148
		Number	165
RequiredAnalysis	364	Description	357
		Number	174
TimeFunction	326	Debugging Mode	none: 326
		Description	316
		Number	324
		Execution Level	follow decomposition: 326
Decision	248	Problem	2
		Description	139
		Choice	94

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
		Status	Open: 4
			Enabling Assumption: 38
			Resolved: 103
		Alternatives	57
		Number	127
Interface	37	Number	37
		Description	22
ItemLink	37	Number	37
		Is Constrained	false: 37
		Abbreviation	37
VerificationRequirement	28		
Component	24	Description	24
		Component Type	System: 1
			System Segment: 18
		Number	24
Organization	20	Abbreviation	5
Category	16	Number	4
		Description	8
VerificationMethod	5		

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

APPENDIX C

Database Content Differences

The UNIX "diff" utility found no differences between the two sets of data.