S

ENGINEERING CHANGE NOTICE

Page 1 of 3 ECN 10-13-99

1. ECN 638725

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental ○	T.V. Jensen-Otsu, FDNW, B4-47, 376-3093	◉ Yes ○ No	10/11/99
Direct Revision ◉			
Change ECN ○			
Temporary ○			
Standby ○			
Supersedure ○			
Cancel/Void ○			

6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
Hazard Analysis Database Report	RPP	SQD

9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
HNF-SD-WM-TI-764, Rev 1A	N/A	N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Completed	12d. Restored to Original Condition (Temp. or Standby ECNs only)
○ Yes (fill out Blk. 12b) ◉ 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 ◉ No

The document was extensively revised by deleting tables which are redundant to those in the FSAR hazard database. The document now contains only a description of the structure of the FSAR hazard database and illustrates this with two example appendices.

Revision of TI-764 was screened as required, and documented in USQD TF-99-0710, Rev. 0.

"S" and "Q" functional approval is recorded on the Tier I Safety Review Board Signoff for this document.

14a. Justification (mark one)	14b. Justification Details
Criteria Change ◉	Removal of redundant information from TI-764 will facilitate configuration management of the FSAR hazard database while maintaining TI-764 as part of the RPP Authorization Basis.
Design Improvement ○	
Environmental ○	
Facility Deactivation ○	
As-Found ○	Authorization for this change is contained in DOE letter 99-TSD-034, [M. A. Hunemuller, "Guidance for Preparations for Tank Waste Remediation System (TWRS) Final Safety Analysis Report (FSAR) Approval" (letter to R. D. Hanson, Fluor Daniel Hanford, Inc., February 2, 1999).
Facilitate Const. ○	
Const. Error/Omission ○	
Design Error/Omission ○	

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

See distribution list.

RELEASE STAMP

DATE: OCT 13 1999
STA: 4
HANFORD RELEASE
ID: 2

ENGINEERING CHANGE NOTICE

Page 2 of 3 ECN 10-13-99

1. ECN (use no. from pg. 1): 638725

16. Design Verification Required	17. Cost Impact		18. Schedule Impact (days)
	ENGINEERING	CONSTRUCTION	
○ Yes	Additional ○ $ _____	Additional ○ $ _____	Improvement ○ _____
◉ No	Savings ○ $ _____	Savings ○ $ _____	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	☐	None	☐
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
HNF-SD-WM-SAR-067, TWRS FSAR N/A		N/A

21. Approvals

	Signature	Date		Signature	Date
Design Authority	N/A		Design Agent		
Cog. Eng.	GW Gault	10/12/99	PE		
Cog. Mgr.	RJ Cash	10/12/99	QA		
QA	~~N/A~~ See page 3. ECN 10-13-99		Safety		
Safety	~~N/A~~ See page 3. ECN 10-13-99		Design		
Environ.	N/A		Environ.		
Other			Other		
RPP NS&L Nuc. Saf. Svcs RG Stickney		10/12/99			

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature: 99-TSD-034

ADDITIONAL

TIER I SAFETY REVIEW BOARD SIGNOFF

Subject HNF-SD-WM-TI-764, REV 2 HAZARDS ANALYSIS DATABASE REPORT	**Date** September 17, 1999

Description
This revision is a direct change to HNF-SD-WM-TI-764, REV 1 and will be placed in the approved Authorization Basis Document List included in HNF-IP-0842, Volume IV, Section 5.4, UNREVIEWED SAFETY QUESTIONS,. This revision is based on SAFETY EVALUATION REPORT-003 "Directed Change" implemented by RL letter 99-TSD-034 [M. A. Hunemuller, "Guidance for Preparations for Tank Waste Remediation System(TWRS) Final Safety Analysis Report (FSAR) Approval] The change removes tables which were redundant to the database from the TI-764 document and replaces them with "Example" appendices. This revision references the methods and procedure for database control (e.g., electronic, document, record of change).

Position	Name	Review Criteria[1]	Signature	Date
Manager, Nuclear Safety & Licensing	CE Leach	1	CE Leach	10/12/99
Manager, Nuclear Regulatory Compliance Support	KL Morris	2b	KL Morris	9/29/99
Manager, Radiological Control	NA	3	NA	NA
Design Authority(ies)	NA	4	NA	NA
Cognizant Engineer	GW Gault	4a, b	Gary W Gault	10/12/99
Project Manager	NA	6	NA	NA
Manager, Environmental	NA	7	NA	NA
Manager, Safety Services	WT Dixon	8a, c, d	Richard E Dobbs for	10/12/99
Manager, Quality Assurance	HL Budweg	9	John F. Bores for H.L. Budweg J.F. Bores	10/12/99
Emergency Management Lead	LM Livesey	10		9/30/99
Representative(s) from potentially affected facilities	NA	11	NA	NA
~~Representative from FDH Nuclear Safety & Work Controls~~	~~SN Maruvada~~	~~12~~	N/A	N/A

REVIEW INSTRUCTIONS: Please review the referenced document and provide comment by COB 9/21/99. Integration of this document change is key to FSAR transition on October 04, 1999.

[1] From HNF-IP-0842, Vol IV, Section 5.14, Attachment B.

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	E. C. Heubach, II	Date October 12, 1999
Project Title/Work Order		EDT No. N/A
HNF-SD-WM-TI-764, Rev. 2, Hazard Analysis Database Report		ECN No. 638725

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
M. L. Dexter	R1-51	X			
G. W. Gault (2)	R1-44	X			
W. G. Grams	R1-44	X			
T. V. Jensen-Otsu	B4-47	X			
M. V. Shultz, Jr.	B4-47	X			
A. E. Young	R1-10	X			
J. Young	R1-44	X			
Central Files (Original + 1)	A3-88	X			

S

Hazard Analysis Database Report

G. W. Gault
Lockheed Martin Hanford Corporation
Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-99RL14047

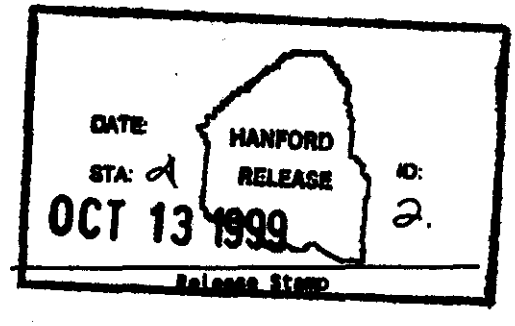
EDT/ECN: 638725 **UC:** 2030
Org Code: 74F00 **Charge Code:** 109310
B&R Code: N/A **Total Pages:** 53

Key Words: Hazard Analysis, Safety Analysis, Accident Analysis, Hazard Evaluation, HazOp, PHA, What-If Analysis, Relational Database, Database, FSAR.

Abstract: This document describes and defines the Hazard Analysis Database for the Tank Waste Remediation System Final Safety Analysis Report.

Revision 2 removed tables from this document which were redundant to the hazard analysis database. Example appendices have relaced the tables in this document. The text now includes a description of the methods and procedure for control of the database, whether in electronic or hard copy form.

Release Approval 10/13/99 Date



Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-TI-764	Page 1 of 1

(2) Title
Hazard Analysis Database Report

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Original issue (EDT #619625).	B. J. Niemi 11/18/96	G. W. Gault 11/18/96
1	Replace entire document (ECN #629254).	B. J. Niemi 08/04/97	G. W. Gault 08/04/97
1a	Revise page 5 to correct error (ECN 649130).	G. W. Ryan 06/26/98	G. W. Gault 06/26/98
2 RS	Replace entire document (ECN #638725). Tables in document which were redundant to the database were removed and replaced with example appendices.	G. W. Gault 10/13/99	R. J. Cash via telephone. 6/3/99

HAZARD ANALYSIS DATABASE REPORT

This page intentionally left blank.

CONTENTS

LIST OF TABLES

LIST OF TERMS

AA	Analyzed Accident
AB	Authorization Basis
ALC	air lift circulator
CCF	Common Cause Failures
CDP	Cribs, Ditches, and Ponds
COB	clean out box
CP	Cone Penetrometer
DCRT	double-contained receiver tank
DID	Defense-In-Depth
DSSF	double-shell slurry feed
DST	double-shell tank
EE	External Events
EPDM	Ethylene-Propylene Diene Monomer
FC	Facility Code
FIC	Food Instrument Corporation
FR	Flex Receiver
FSAR	Final Safety Analysis Report
HazOp	hazard and operability study
HEPA	high-efficiency particulate air filter
ID	Identification Code
IMUST	inactive miscellaneous underground storage tank
LDUA	Light Duty Utility Arm
LFL	lower flammability limit
MAR	material at risk
MISF	Miscellaneous Inactive Storage Facility
NC	No Controls
NCPLX	non-complexed waste
NP	Natural Phenomena
NS&L	Nuclear Safety and Licensing
OCC	Occupational Hazard
OGT	over ground transfer
PCBs	polychlorinated biphenyls
PFP	Plutonium Finishing Plant
PHA	preliminary hazards analysis
PUREX	Plutonium Uranium Extraction (Facility)
RCSTS	Replacement Cross Site Transfer System
RP	Radiation Protection
RPP	River Protection Project (previously TWRS)
SS	Safety Significant
SC	Safety Class
SSC	Structures, Systems, and Components
SST	single-shell tank
TOC	Total Organic Carbon

TRU	transuranic (waste)
TSR	Technical Safety Requirements
TWRS	Tank Waste Remediation System
USQ	Unreviewed Safety Question

1.0 INTRODUCTION AND PURPOSE

The Hazard Analysis Database was developed in conjunction with the hazard analysis activities conducted in accordance with DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*, for the Tank Waste Remediation System (TWRS) Final Safety Analysis Report (FSAR). The FSAR is part of the approved TWRS Authorization Basis (AB). This document describes, identifies, and defines the contents and structure of the TWRS FSAR Hazard Analysis Database and documents the configuration control changes made to the database.

The TWRS Hazard Analysis Database contains the collection of information generated during the initial hazard evaluations and the subsequent hazard and accident analysis activities. The database supports the preparation of Chapters 3, 4, and 5 of the TWRS FSAR and the USQ process and consists of two major, interrelated data sets:

1. Hazard Evaluation Database: Data from the results of the hazard evaluations

2. Hazard Topography Database: Data from the system familiarization and hazard identification.

2.0 DATA MANAGEMENT

The TWRS FSAR Hazard Analysis Database described in this report is maintained and managed by the TWRS Nuclear Safety and Licensing (NS&L) organization. The primary function of the database is the collation of all hazards analysis data in an easily accessible form for use in the hazards analysis and USQ processes. TWRS Nuclear Safety & Licensing has ownership and responsibility for configuration management of the hazard analysis database. The configuration management requirements, responsibilities, and procedures are described in HNF-2353, Section 4.5, *Hazard Analysis Database Management*. The following sections define the current content and structure of the database and the current database software package.

2.1 SOFTWARE DESCRIPTION

The software selected for management of the TWRS FSAR Hazard Analysis Database is Paradox® 5.0 for Windows from Borland® International, Inc., Copyright © 1994. Paradox® is a full-featured relational database management system, that can be used as a stand alone system or as a multiuser system on a network. For the purpose of the TWRS FSAR Hazard Analysis activities, Paradox is being used as a stand alone system.

In a relational database, data are organized into small, easily managed tables that contain fields of data, repeated for each item. These tables can be linked together by querying a common field across many tables to generate multi-table forms and reports. For example, the Hazard Analysis Database is used to generate Hazard Analysis Results Tables for the TWRS FSAR.

2.2 CONFIGURATION MANAGEMENT PLAN

The database configuration management is accomplished according to a Configuration Management Plan. The configuration management requirements, responsibilities, and procedures are described in HNF-2353, Section 4.5. In addition to the configuration management plan mentioned previously, Table 2-1 contains a listing of the hazard evaluations currently in the Authorization Basis. This table will be updated as new hazard evaluations are conducted. Any changes to the database of this document must also be documented in Table 2-2.

The Database was created to support the hazard analysis process for the TWRS AB and subsequently maintain the large volume of information which was produced as a result. The Database is used primarily to support the Final Safety Analysis Report (FSAR), Reference 2.1, AB clarifications, safety analysis activities, and the USQ process. The Database is to be maintained and controlled by the Nuclear Safety and Licensing Group.

The quality, integrity, and accuracy of the data have been and will be ensured by the safety analysis development process which is conducted in accordance with DOE guidelines. This process includes internal reviews, peer reviews, and Tier 1 reviews of the actual reported data. Internal consistency within the Database will be verified periodically by analysts working with the Database. The Database will be updated when either existing data or analyses are revised or new data or analyses are developed to support the AB. Changes and additions to the Database are strictly controlled by the procedures specified herein.

3.0 HAZARD EVALUATION DATABASE TABLES AND FIELD DESCRIPTIONS

The TWRS Hazard Evaluation Database is composed of the data tables shown in Table 3-1 and organized using the following tables and described fields. Appendices A and B of this document contain only the first page of each table to show the database structure and an example of the information contained in the tables. The fields in the tables are filled only with applicable information and therefore some fields are blank. Access to database information is managed in accordance with HNF-2353, Section 4.5.

3.1 MASTER CODE TABLE (Appendix A, Tables A-1 and A-2)

This table contains the coded alphanumeric information associated with each Hazardous Condition and is used primarily to organize the hazards analysis information as required for linking, sorting, and reporting. The following is a description of the Master Code Table fields:

- ID—This field contains a unique alpha/numeric identification code for each Hazardous Condition identified during the TWRS hazard evaluations activities. In general, these codes, typically assigned from the name of the evaluation and the node numbering used in the evaluation, can be used to identify which analysis was used to derive the specific hazardous condition.

- **Initial Safety Cons NC**—Initial Safety Consequence No Controls - The resultant effect on individuals impacted by a release or exposure associated with a specific Hazardous Condition assuming no controls are present. (Code definitions in Table 4-1)

- **Initial Freq NC**—Initial Frequency No Controls - The frequency of Hazardous Condition occurrence assuming no controls are present for a specific Hazardous Condition. (Code definitions in Table 4-2)

- **Env Cons**—Environmental Consequence - The resultant effect to the environment of a release associated with a specific Hazardous Condition assuming no controls are present. (Code definitions in Table 4-3)

- **BIN**—A code that describes the release attributes for a specific type of Hazardous Condition. This code identifies the initial location, form, and energy level of the release or the code identifies an occupational safety or radiation protection condition. (Code definitions in Table 4-4)

- **Initial Risk Factor NC**—Initial Risk Factor No Controls - A numeric value assigned to a Hazardous Condition based on a pre-established matrix that relates the Initial Frequency NC and the Initial Safety Consequence NC. (Code definitions in Table 4-5)

- **Failed Cntrl Risk Factor**—Failed Controls Risk Factor - A numeric value assigned to a Hazardous Condition from a pre-established matrix that relates the Accident Analysis Failed Control Frequency and Accident Analysis Failed Control Consequence. (Code definitions in Table 4-5)

- **AA Risk Factor NC**-Analyzed Accident Risk Factor No Controls - A numeric value assigned to a Hazardous Condition from a pre-established matrix that relates the Analyzed Accident Risk Factor No Controls Frequency and Analyzed Accident Risk Factor No Controls Consequence. (Code definitions in Table 4-5)

- **Facility Code**—A unique alpha/numeric identifier that is used to relate the Hazardous Condition to the general Hazards Topography Database and the TWRS facility. (Code definitions in Table 4-6)

- **Cause Grp**—Cause Group - An alpha/numeric code used to sort data by type of Cause of a Hazardous Condition. (Code definitions in Table 4-7)

- **Rep Acc**—Representative Accident - An alpha/numeric code used to specify the analyzed accident by which the specified Hazardous Condition is represented. The code is used in the Database in two forms, alpha/numeric with and without an X. The X identifies that the hazardous condition is represented by the analyzed

accident. Hazardous conditions that were chosen as the analyzed accident have no X designator. (Code definitions in Table 4-8)

- **AA Safety Cons NC**—Analyzed Accident Safety Consequence No Controls - The resultant safety effect of a release or exposure associated with a specific Analyzed Accident assuming no controls are present. (Code definitions in Table 4-1)

- **AA Freq NC**—Analyzed Accident Frequency No Controls - The frequency of occurrence for a specific Analyzed Accident assuming no controls are present. (Code definitions in Table 4-2)

- **App Cntrl Safety Cons**—Applied Control Safety Consequence - The resultant safety effect of a release or exposure associated with a specific Hazardous Condition assuming controls are present and work correctly. (Code definitions in Table 4-1)

- **App Cntrl Freq**—Applied Control Frequency - The frequency of occurrence of the resultant safety effect of a release or exposure associated with a specific Hazardous Condition assuming controls are present and work correctly. (Code definitions in Table 4-2)

- **Failed Cntrl Safety Cons**—Failed Controls Safety Consequence - The resultant safety effect of a release or exposure associated with a specific Hazardous Condition assuming controls are present but fail to work correctly. (Code definitions in Table 4-1)

- **Failed Cntrl Freq**—Failed Control Frequency - The frequency of occurrence of the combined controls failure. (Code definitions in Table 4-2)

- **Cntrl Failure MEMO**—This field is used to document the logic of the development of the control failure frequency. (Failed Con Freq)

- **Change MEMO**— This field is used to document dates and reasons for changes to the database and the person who made the changes.

3.2 MASTER CONTROLS TABLE (Appendix A, Tables A-3 and A-4)

This table contains information important to define the controls associated with specified Hazardous Conditions. In Appendix A, this table is divided into two tables to make the information easier to read. In the database, the Master Control Table is one table. The following is a description of the Master Controls Table fields:

- **ID**—This field contains a unique alpha/numeric identification code for each Hazardous Condition identified during the TWRS hazard evaluations activities. In general, these codes, typically assigned from the name of the evaluation and the node

numbering used in the evaluation, can be used to identify what analysis was used to derive the specific hazardous condition.

- **Prev SSC**—Preventive Safety Structures, Systems, and Components (SSCs) - Preventive Controls mandated by the TWRS FSAR. These Safety SSCs are identified to prevent the occurrence of Hazardous Conditions.

- **Prev TSR**—Preventive Technical Safety Requirements (TSRs) - Preventive Administrative Controls identified by the TWRS FSAR. These controls include actions to be taken or operability limits that reduce the frequency of occurrence of the Hazardous Condition.

- **Mit SSC**—Mitigative Safety Structures, Systems, and Components (SSCs) - Mitigative Controls mandated by the TWRS FSAR. These Safety SSCs are identified to reduce the severity of the consequence of the Hazardous Condition.

- **Mit TSR**—Mitigative Technical Safety Requirements (TSRs) - Mitigative Administrative Controls identified by the TWRS FSAR. These controls include actions to be taken or operability limits that reduce the severity of the consequence of the Hazardous Condition.

3.3 CONTROL MEMO TABLE (Appendix A, A-5)

This table contains information regarding the changes made to the Preventive or Mitigative SSCs and the logic used for control allocation.

- **ID**—This field contains a unique alpha/numeric identification code for each Hazardous Condition identified during the TWRS hazard evaluations activities. In general, these codes, typically assigned from the name of the evaluation and the node numbering used in the evaluation, can be used to identify what analysis was used to derive the specific hazardous condition.

- **Prev SSC MEMO**—Historic information used to support control allocations and does not necessarily reflect the current controls. Current SSC allocation is documented in the Master Control Table. For an example of the information in the Master Control Table see Appendix A Tables A-3 and A-4.

- **Mit SSC MEMO**—Historic information used to support control allocations and does not necessarily reflect the current controls. Current SSC allocation is documented in the Master Control Table. For an example of the information in the Master Control Table see Appendix A Tables A-3 and A-4.

- **Control MEMO**—Memo field contains a memo explaining the selection of the controls for the Hazardous Condition.

3.4 MASTER HAZARDS TABLE (Appendix A, Table A-6)

This table contains information important to the definition of Hazardous Conditions. The following is a description of the Master Hazards Table fields:

- **ID**—This field contains a unique alpha/numeric identification code for each Hazardous Condition identified during the TWRS hazard evaluations activities. In general, these codes, typically assigned from the name of the evaluation and the node numbering used in the evaluation, can be used to identify what analysis was used to derive the specific hazardous condition.

- **Material at Risk**—A description of the type and quantity of material that may be affected by the occurrence of a Hazardous Condition.

- **Hazardous Condition**—A description of the Hazardous Condition associated with the unique ID code. In general, Hazardous Conditions are related to uncontrolled releases of hazardous or radioactive material, however there are occurrences of Hazardous Conditions listed that are not specific to release events that can be identified by the BIN code.

- **Cause**—A description of the factors that could cause the identified Hazardous Condition.

- **Consequence**—A description of the consequence of an uncontrolled release related to a specific hazardous condition.

3.5 MASTER DEFENSE-IN-DEPTH CONTROLS TABLE (Appendix A, Table A-7)

This table contains information important to define the Defense-in-Depth controls associated with specified Hazardous Conditions. The following is a description of the Master Defense-in-Depth Controls Table fields:

- **ID**—This field contains a unique alpha/numeric identification code for each Hazardous Condition identified during the TWRS hazard evaluations activities. In general, these codes, typically assigned from the name of the evaluation and the node numbering used in the evaluation, can be used to identify what analysis was used to derive the specific hazardous condition.

- **DID Preventive**—Defense-in-Depth Preventive - Identified Defense-in-Depth Controls to prevent the occurrence of Hazardous Conditions.

- **DID Mitigative**—Defense-in-Depth Mitigative - Identified Defense-in-Depth Controls to reduce the severity of the consequences of the Hazardous Conditions.

3.6 PROCESS HISTORY TABLE (Appendix A, Tables A-8 and A-9)

This table contains historical information relating to various changes that have occurred to the Hazards Analysis Database during the development process. It can be used to verify the integrity of the data tables and provide a readily accessible tracking mechanism for those changes. Much of the information in the tables has been revised or is obsolete and is retained for the purpose of tracking the history and evolution of the database. The following is a description of the Process History Table fields:

- **ID**—This field contains a unique alpha/numeric identification code for each Hazardous Condition identified during the TWRS hazard evaluations activities. In general, these codes, typically assigned from the name of the evaluation and the node numbering used in the evaluation, can be used to identify what analysis was used to derive the specific hazardous condition.

- **MEMO NC**—This field contains a memo explaining the application and/or any changes to the Safety Consequence NC and Frequency NC.

- **Re-binned Safety**—This field contains the safety consequence changes made after a re-binning effort due to application of new risk evaluation guidelines. (Code definitions in Table 4-1)

- **Re-binned Frequency**—This field contains the frequency changes made after a re-binning effort due to application of new risk evaluation guidelines. (Code definitions in Table 4-2)

- **Re-binned MEMO**—This field contains a memo stating what changes were made during a re-binning effort due to application of new risk evaluation guidelines.

- **Orig Freq**—This field contains the original frequency of occurrence for a specified Hazardous Condition, assuming that controls are in place, assigned during the initial hazard analysis activities. (Code definitions in Table 4-2)

- **Orig Freq NC**—This field contains the original frequency of occurrence for a specified Hazardous Condition, assuming that no controls are in place, assigned during the initial hazard analysis activities. (Code definitions in Table 4-2)

- **Orig Safety**—This field contains the original safety consequence assigned during the initial hazard analysis activities. (Code definitions in Table 4-1)

- **Orig Grp**—This field contains a cause group code that was originally developed for the database. These codes are now obsolete and are retained for historical reference.

- **Re-grp MEMO**—This field contains a memo related to changes made during the development of the current cause group code system.

- **Orig Facility Code**—This field contains the facility code from the initial hazard analysis activities. (Code definitions in Table 4-6)

- **FC MEMO**—This field contains a memo related to changes made to the facility code system.

- **Facility Code 2**—This field contains facility code information from the second generation of facility coding. (Code definitions in Table 4-6)

- **Remarks**—Miscellaneous remarks gathered during initial hazard analysis activities.

4.0 KEY TO CODES IN HAZARD EVALUATION DATABASE

The following tables define the codes used in the Hazards Analysis Database.

- Table 4-1 - Safety Consequence Categories (Cons Code)
- Table 4-2 - Frequency Categories (Freq Code)
- Table 4-3 - Environmental Consequence Categories (Env Code)
- Table 4-4 - Accident Release Attributes (Bin Code)
- Table 4-5 - Risk Factor Codes (Risk Matrix)
- Table 4-6 - Alpha/Numeric Designator (Facility Codes)
- Table 4-7 - Cause Group (Cause Grp Code)
- Table 4-8 - Representative Accident (Rep Acc Code)

These codes are used primarily to sort the data and may be used alone or in combination.

5.0 HAZARD TOPOGRAPHY DATABASE TABLES AND FIELD DESCRIPTIONS

The TWRS Hazard Topography Database is used to organize data from the system familiarization and hazard identification process to demonstrate the comprehensive coverage of material at risk, phenomena, configurations, operations, and facilities. This information is historical data and no revisions have been made from its initial release. The hazard topography is specifically used to accomplish the following:

1. Identify the types of TWRS facility situations that are directly analyzed by a hazard evaluation (e.g., identify the specific representative analyses).

2. Map the representative hazard evaluation results to each TWRS facility in the FSAR Scope.

3. Store the results of the hazard identification effort for each TWRS facility in the FSAR Scope.

The Hazard Topography Database is composed of the data tables shown in Table 5-1 and organized using the following described fields.

5.1 FACILITY CODE TABLE (Appendix B, Table B-1)

This table contains a list of all facility codes appearing in the Topography database using the following fields:

- **Facility Code**—A unique alpha/numeric identifier that is used to connect the Hazardous Condition to the general Hazards Topography Database and the TWRS facility.
- **Farm** - Tank Farm where facility is located.
- **Facility Name**—Facility designation.
- **Field Name**—Name of Facility used for the field verification process.
- **Type**—This field identifies the type of facility.

5.2 TOPOGRAPHY TABLE (Appendix B, Table B-2)

This table contains a list of all major tank farm facilities. The following is a description of the Topography Table fields:

- **Facility Name**—Facility designation.
- **Type**—This field identifies the type of facility.
- **Applicable Hazard Eval.**—This field contains information about the Hazard Evaluation Study (PHA, HAZOP, WHAT IF) results that are applicable to a particular facility. (Authorization Basis Hazard Evaluations in Table 2-1)

5.3 MATERIAL AT RISK DATA TABLE (Appendix B, Table B-3)

This table contains information about the Facility Materials Inventory and uses the following fields:

- **Field Name**—Name of Facility used, by the facility workers, for the field verification process.
- **MAR-Subject**—Material at risk subject.

- **MAR-Description**—Material at risk description.
- **MAR-Classification**—Material at risk classification.
- **Capacity**—Material capacity of facility.
- **Material Type**—The type of material in the facility.
- **Physical Form**—The physical form of the material in the facility.
- **Volume or Activity**—The volume or activity of the material present in the facility.
- **Transient**—Transient nature of the particular type of material stored at the facility.
- **Quantity**—Number of drums, pits, boxes, bottles, Clean Out Boxes (COBs), etc.
- **Comments**—Comments about the material at risk.

5.4 UNIQUE PHENOMENA DATA TABLE (Appendix B, Tables B-4 and B-5)

This table contains a Unique Phenomena Checklist for the Facilities. In Appendix B, this table is divided into two tables due to the large quantity of information. In the database, the Unique Phenomena Data Table is one table. The following is a description of the Unique Phenomena Data Table fields:

- **Field Name**—Name of Facility used, by the facility workers, for the field verification process.
- **Type**—This field identifies the type of facility.
- **Flammable Gas**—This field contains the answer to the following question: "Does the flammable gas hazard exist in this facility (yes/no) and provide reference?"
- **Ferrocyanide**—This field contains the answer to the following question: "Does the ferrocyanide hazard exist in this facility (yes/no) and provide reference?"
- **Organics Separable Phase**—This field contains the answer to the following question: "Does an organic separable phase exist in this facility (yes/no) and provide reference?"
- **TOC in Liquids**—This field contains the answer to the following question: "Does organic carbon in the liquid phase exist in this facility (yes/no) and provide reference?"

- **TOC in Solids**—This field contains the answer to the following question: "Does organic carbon in the solid phase exist in this facility (yes/no) and provide reference?"

- **High Heat**—This field contains the answer to the following question: "Is the heat load of the waste in this facility greater than 26,000 Btu/hr (yes/no) and provide reference?"

- **Pyrophorics**—This field contains the answer to the following question: "Does a pyrophoric condition exist at this facility (yes/no) and provide reference?"

- **Syphoning**—This field contains the answer to the following question: "Does a potential syphoning condition exist at this facility (yes/no) and provide reference?"

- **Criticality**—This field contains the answer to the following question: "Does a potential criticality condition exist at this facility (yes/no) and provide reference?"

- **Corrosivity**—This field contains the answer to the following question: "Does a potential corrosive condition exist at this facility (yes/no) and provide reference?"

- **Other**—Other hazardous conditions and related documents.

- **Comments**—Unique phenomena conditional comments.

- **LOC**—Location number used for sorting.

- **NUM**—Record number used for sorting.

5.5 FACILITY CONFIGURATION DATA TABLE (Appendix B, Table B-6)

This table contains information about facility configuration and uses the following fields:

- **Field Name**—Name of Facility used for the field verification process.

- **Type**—This field identifies the type of facility.

- **Ventilation**—This field contains the answer to the following question: "What type of ventilation is used in the specified waste tank (passive or active)?"

- **Comment V**—Ventilation system comments.

- **ALC**—This field contains the answer to the following question: "Are there air lift circulators active in the waste tank (yes/no)?"

- **Comment ALC**—Air lift circulator comments.

- **Steam Coils**—This field contains the answer to the following question: "Are there steam coils active in the waste tank (yes/no)?"

- **Comment SC**—Steam coil comments.

- **Mixer/Transfer/Feed Pump**—This field contains the answer to the following question: "Is there a pump associated with the waste tank (yes/no)?"

- **Comments**—Mixer/transfer/feed pump comments.

6.0 KEY TO CODES IN HAZARD TOPOGRAPHY DATABASE

The Hazard Topography Database primarily contains descriptive information: However, two fields are comprised of codes with alpha/numeric designators. The Facility Code descriptions are found in Table 4-6, which is the common field between Hazard Topography Database and the Hazard Evaluation Database. Authorization Basis Hazard Evaluations descriptions are found in Table 2-1.

7.0 REFERENCES

Borland® Paradox® for Windows, 1994, *User's Guide*, Borland International, Inc., Scotts Valley, California.

DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*, U.S. Department of Energy, Washington, D.C.

HNF-2353, 1999, *Nuclear Safety and Licensing Desk Instruction*, Section 4.5, "Hazard Analysis Database Management," Rev. 0, Lockheed Martin Hanford Corp., Richland, Washington.

WHC-SD-WM-TI-773, 1996, *Hazards Analysis Results Report*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Table 2-1. Authorization Basis Hazard Evaluations. (2 Pages)

Hazard Evaluation Identifier	Definition
HAZOP	**Hazards and Operability Study**
204-AR	204-AR Transfer Facility - Lab waste, transfer of waste by vehicle
222-S	222-S Laboratory - Interface with TWRS facilities
242-A	242-A Evaporator - Interface with TWRS facilities
242-S	242-S Evaporator - Interface with TWRS facilities
242-T	242-T Evaporator - Interface with TWRS facilities
244-AR	244-AR Vault - Storage for liquid waste
AN-107	Double-shelled tanks, caustic addition
AW-102	Double-shelled tanks, evaporator interface, active ventilation
B-PLANT	B-Plant - Interface with TWRS facilities
C-106	Single-shelled tanks, high heat, active ventilation
LDUA	Light Duty Utility Arm
OGT	Overground transfer system
PFP	Plutonium Finishing Plant - Interface with TWRS facilities
PUREX	PUREX - Interface with TWRS facilities
RCSTS	Replacement Cross Site Transfer System
S-102	Single-shelled Tanks, flammable gas, organics, passive ventilation
SX-114	Single-shelled Tanks, dry crust, high heat, active ventilation
T-PLANT	T-Plant - Interface with TWRS facilities
U-PLANT	U -Plant - Interface with TWRS facilities
W058/XS	Cross site transfer lines
W151	Tank 241-AZ-101 Mixer Pump Test
PHA	**Preliminary hazards analysis**
90D	209-E Storage Area (90-Day Storage Pad)
213 W	213 Compactor - Equipment decontamination activities
2727W	2727 W Sodium Storage Building
BND	Bonding activities
CDP	Cribs, Ditches, and Ponds - Disposal of liquid waste
COB	Cleanout Boxes - Interface with waste transfer system

Table 2-1. Authorization Basis Hazard Evaluations. (2 Pages)

Hazard Evaluation Identifier	Definition
CP	Cone Penetrometer
CRN	Crane activities in the tank farms
CVR	Cover block activities in the tank farms
DCN	Decontamination activities
FR	Flex Receivers - Removal of in-tank equipment
GRN	Greenhouse activities
Identifier ends in -I, e.g., CRN-05-I	Inactive miscellaneous underground storage tanks and other inactive facilities - Various types and forms of radioactive and hazardous material
ITK	In-tank activities
PB	Package Boiler
RAD	Radiation protection
RSR	Riser activities
SFF	Siphoning - Various types and forms of radioactive and hazardous material
VEH	Vehicle activities in or around tank farms
VSU	Vertical Storage Units - Storage of solid low-level waste
W030	Tank Farm 241-AZ Ventilation Upgrade
W320	Tank 241-C-106 Sluicing
WhatIf	What If Analysis
CCF	Common Cause Failures- Events with potential impact on multiple TWRS facilities
EE	External Events - Events with potential impact on multiple TWRS facilities
NP	Natural Phenomena - Events with potential impact on multiple TWRS facilities

PUREX = Plutonium Uranium Extraction (Facility).
TWRS = Tank Waste Remediation System.

Table 2-2. Document History: Hazard Analysis Database Report.

Date	Rev #	ECN#	Description of Change	Remarks
9/30/99	2	638725	Rewrote document to reflect structure and contents of the database and removed the actual tables. Removed original description of configuration management and referenced new configuration management plan in HNF-2353 Section 4.5, Nuclear Safety & Licensing Desk Instruction. Renamed Table 6-1 to Table 2-1 and moved table to section 2. Added Table 2-2, Document History.	Report updated to be consistent with current FSAR revision.

Table 3-1. Hazard Evaluation Database Structure.

Master Code Table		
Field Name*	Type	Size
ID	A	50
Initial Safety Cons NC	A	5
Initial Freq NC	A	5
Env Cons	A	5
BIN	A	10
Initial Risk Factor NC	N	
Failed Con Risk Factor	N	
AA Risk Factor NC	N	
Facility Code	A	15
Cause Grp	A	5
Rep Acc	A	10
AA Safety Cons NC	A	5
AA Freq NC	A	5
App Cntrl Safety	A	5
App Cntrl Freq	A	5
Failed Cntrl Safety Cons	A	5
Failed Cntrl Freq	A	5
Cntrl Failure MEMO	M	240
Change MEMO	M	240

Master Controls Table		
Field Name*	Type	Size
ID	A	50
Prev SSCs	A	255
Prev TSRs	A	255
Mit SSCs	A	255
Mit TSRs	A	255

Control MEMO Table		
ID	A	50
Prev SSC MEMO	M	240
Mit SSC MEMO	M	240
Control MEMO	M	240

Master Hazards Table		
Field Name*	Type	Size
ID	A	50
Material at Risk	A	255
Hazardous Condition	A	255
Cause	A	255
Consequence	A	255

Master Defense In Depth Table		
Field Name*	Type	Size
ID	A	50
DID - Prev	A	255
DID - Mit	A	255

Process History Table		
Field Name*	Type	Size
ID	A	50
MEMO NC	M	240
Re-binned Safety	A	5
Re-binned Frequency	A	5
Re-binned MEMO	M	240
Orig Freq	A	5
Orig Freq NC	A	5
Orig Safety	A	5
Orig Grp	A	5
Re-Grp MEMO	M	240
Orig Facility Code	A	15
FC MEMO	M	240
Facility Code 2	A	15
Remarks	A	255

*Fields shown in italics are common to multiple tables
Field type designators:
A = Alphanumeric.
N = Numeric.
M = Memo Field.
Size = Field Character Length.

Table 4-1. Safety Consequence Categories - (Cons Code).

Category	Definition
S3	Significant radiological or chemical exposure to the public
S2	Significant radiological or chemical exposure to onsite worker
S1	Significant radiation or chemical exposure to facility worker
S0	No significant effect outside facility systems/No consequences for facility workers, onsite workers, or public
Prevented	No effect - Accident Prevented

Table 4-2. Frequency Categories (Freq Code).

Category	Definition
F3 (>.01)	**Anticipated events**: Frequency greater than once in 100 operating years
F2 (10^{-2} to 10^{-4})	**Unlikely**: Frequency between once in 100 years and once in 10,000 operating years
F1 (10^{-4} to 10^{-6})	**Extremely unlikely**: Frequency between once in 10,000 years and once in 1 million operating years
F0 ($< 10^{-6}$)	**Beyond extremely unlikely**: Frequency of less than once in 1 million operating years

Table 4-3. Environmental Consequence Categories - (Env Code).

Category	Definition
E3	Offsite discharge OR discharge to groundwater
E2	Significant discharge onsite
E1	Localized discharge of hazardous material
E0	No significant environmental consequence

Table 4-4. Accident Release Attributes - (Bin Code).

Accident release attributes		
Initial energy level	Initial release location	Initial release form
A. High	1. Atmosphere	a. Vapor/gas/aerosol
B. Moderate	2. Ground surface	b. Liquid/slurry
C. Low	3. Subsurface	c. Solid/sludge
OCC - Occupational Hazard		
RP - Radiation Protection		

Table 4-5. Risk Matrix - (Risk Factor Codes).

	Safety Consequences (CONS)			
Likelihood (FREQ)	**S0**	**S1**	**S2**	**S3**
F3	*7*	*11*	*14*	*16*
F2	*4*	*8*	*12*	*15*
F1	*2*	*5*	*9*	*13*
F0	*1*	*3*	*6*	*10*

Risk Factor — Considered for Identification of Safety Structures, Systems, and Components and Technical Safety Requirements.

Risk Factor — Requires Identification of Safety Structures, Systems, and Components and Technical Safety Requirements

Table 4-6. Alpha/Numeric Designator (Facility Code).

Effluent Retention	
ER	Cribs, ditches, ponds
Facilities	
F204	204-AR Unloading Facility
F213	213-W Compactor Building
F244	244-AR Vault
27W	2727-W Sodium Storage
RCSTS	Replacement Cross Site Transfer System
Multiple	
M	Multiple facilities (e.g., as in the case of a common cause event)
Other	
A	Abandoned or inactive TWRS equipment
G	General
O	Other (interfacing facilities/equipment)
OM	Miscellaneous Inactive Storage Facility
Pipes	
PA	Above ground pipe
PC	Contained pipe (e.g. cross-site line)
PD	Double encased pipe
PS	Single encased pipe (direct buried)
Storage Facilities	
S90	90-Day Storage Pad, Intermediate Holding Area, Satellite Accumulation Area
SS	2727 W Sodium Storage
SV	Vertical Storage

Tanks[a] (See Example Section Below)		
T	Tanks, non-specific (Add any appropriate tank type designators. If applicable to all tanks, do not add any tank type designator.)	
CD	DCRT (244-TX, 244-U, etc.)	
CN	Non-DCRT catch tank, drainage type (vent and lift station, aging waste vent)	
DS	Double Shelled Tanks non-specific (Add any appropriate characteristic designators.)	
	A	Air lift circulators (aging waste tanks)
	C	Caustic addition tank (e.g. 107-AN)
	E	Evaporator feed tank
	H	Flammable gas tanks (hydrogen)
	O	Organic tanks
	P	Active transfer/mixer pumps (e.g., 102-SY)
	V	Active ventilation
SS	Single Shelled Tanks non-specific (Add any appropriate characteristic designators.)	
	D	Dry crust tank (114-SX)
	H	Flammable gas tanks (hydrogen)
	L	High heat load (>26,000 Btu/hr)[b]
	O	Organic tanks
	P	Active transfer/mixer pumps (e.g., 102-SY)
	V	Active ventilation
SD	Double Shelled Tanks or Single Shelled Tanks (Add any appropriate Characteristic designators. - See DS and SS)	
Pits Boxes and Caissons		
WB	Clean out box, sluice transfer box	
WD	Diversion box, diverter station, pump pit, valve pit	
WF	Flush pit, service pit, caisson, leak detection pit	
WV	Vent Station	

[a]Example of facility type code for tanks: The letter T indicates that the facility is a tank of some kind. Each additional designator separated by periods will supply additional information as indicated in the column under the Tank section of the table.

T.DS.A.H = Flammable gas (hydrogen), double shelled tank with air lift circulators.
T.SD.L.V = High Heat load tank, either single shelled or double shelled with active ventilation.
T.SS.D = Dry crust, single shelled tank.
T.CD.V = DCRT with active ventilation.

[b]High heat load based on Steam Bump Event concern.

Table 4-7. Cause Group Designators - (Cause Grp Code).

Cause description	Criticality	Fire/ Explosion	Tank Dome Collapse	Release	Human Error Release	Non-release/ Occupational
Addition of aggravating materials/ exothermic reaction	A01	B01	C01	D01	E01	F01
Internal aggravating causes	A02	B02	NA	D02	E02	NA
Over concentration	A03	NA	NA	NA	E03	F03
Intrusive activity	A04	B04	NA	D04	E04	F04
Non-specific/multiple external events or phenomena/other	A05	NA	C05	D05	E05	F05
Error in transfer/backflow/overflow/ filling DST annulus	A06	B06	NA	D06	E06	F06
Ventilation failure	NA	B07	C07	D07	E07	F07
Internal buildup of flammable gas/ internal ignition source	NA	B08	NA	NA	NA	F08
External fire/external ignition source	NA	B09	NA	D09	NA	F09
Excess weight/dropping/heavy snow	NA	NA	C10	D10	E10	F10
Vacuum	NA	NA	C11	D11	NA	NA
Structural degradation/leak	NA	B12	C12	D12	NA	F12
Over rated equipment	NA	NA	C13	NA	E13	NA
Confinement failure	NA	NA	NA	D14	E14	F14
Excess agitation	NA	NA	NA	D15	E15	NA
Corrosion	NA	NA	NA	D16	NA	NA
Water hammer	NA	NA	NA	D17	NA	NA
Seismic event/volcanic activity	NA	B18	NA	D18	NA	NA
Flooding, pipe failure	NA	NA	C19	D19	NA	NA
High winds/tornados/hail	NA	B20	NA	D20	NA	F20
Lightning	NA	B21	NA	D21	NA	NA
Excavation	NA	NA	NA	D22	NA	F22
Aircraft crash	NA	B23	NA	D23	NA	NA
Low temperature/freezing	NA	NA	NA	D24	NA	NA
Vehicle accidents	NA	B25	NA	D25	E25	F25
Structural damage	NA	B26	C26	D26	E26	F26

DST = double-shell tank.
NA = not applicable.

Table 4-8. Representative Accident - (Rep Acc Code).

#	Representative Accident Description
1	Nuclear Criticality
2	In-Tank Fuel Fire/Deflagration
3	Mixing of Incompatible Material - Tank Pressurization
4	Flammable Gas Deflagrations - DST
5	Flammable Gas Deflagrations - SST
6	HEPA Filter Failure - Exposure to High Temperature or Pressure
7	Fire in Contaminated Area
8	Waste Transport Vehicle Accident
9	Organic Solvent Fire/Organic Salt-Nitrate Reaction
10	Natural Phenomena - High Wind[a]
11	Natural Phenomena - Lightning
12	Tank Failure Due to Excessive Loads
13	Tank Failure Due to Vacuum or Degradation
14	Natural Phenomena - Seismic
15	Spray Leak in Structure or from Over ground Waste Transfer Lines
16	Spray Leak from Underground Waste Transfer Lines
17	Caustic Spray Leak
18A	Tank Bump
18b	Unfiltered Release
21	Subsurface Leak Resulting in a Pool
22	Evaporator Dump
23	Mixing of Incompatible Material - Toxic Vapor Generation
25	Leak from Rail Car/Tank Trailer
26	Surface Leak Resulting Pool
28	Unplanned Excavation/Drilling in Pond/Crib/Ditch
29	Subsurface Leak Remaining Subsurface
30	Sodium Fire
31	Above Ground Structure Failure[b]
32	Steam Intrusion from Interfacing Systems

Note: A code followed by an X identifies that the Hazardous Condition is being represented by the selected accident.
[a]High Wind events associated with Crane activities.
[b]Above Ground Structure Failure includes Flex Receivers.

Table 5-1. Hazard Topography Database Structure.

Facility Code Table		
Field Name[a]	Type	Size
Facility Code	A	15
Facility Name	A	50
Field Name	A	50
Type	A	50

Topography Table		
Field Name[a]	Type	Size
Facility Name	A	50
Type	A	50
Applicable Hazard Eval	A	255

Material at Risk Table		
Field Name[a]	Type	Size
Field Name	A	50
Mar-Subject	A	255
Mar-Description	A	255
MAR-Classification	A	255
Capacity	A	255
Material Type	A	15
Physical Form	A	15
Volume or Activity	A	50
Transient	A	255
Quantity	A	255
Comments	A	255

Unique Phenomena Table		
Field Name[a]	Type	Size
Field Name	A	50
Type	A	50
Flammable Gas	A	255
Ferrocyanide	A	255
Organics Separable Phase	A	255
TOC in Liquids	A	255
TOC in Solids	A	255
High Heat[b]	A	255
Pyrophorics	A	255
Syphoning	M	255
Criticality	A	255
Corrosivity	A	255
Other	M	240
Comments	A	255
LOC	A	5
NUM	A	2

Facility Configuration Table		
Field Name[a]	Type	Size
Field Name	A	50
Type	A	50
Ventilation	A	10
Comment V	A	240
ALC	A	15
Comment ALC	A	240
Steam Coils	A	15
Comment SC	A	240
Mixer/Transfer/Feed Pump	A	15
Comment MP	A	240

[a]Fields shown in italics are common to multiple tables.
[b]High Heat based on >26,000 BTU/hr for Tank Bump.
Field type designators:
A = Alphanumeric.
N = Numeric.
M = Memo Field.
Size = Field Character Length.

APPENDIX A

HAZARD EVALUATION DATABASE EXAMPLE TABLES

This page intentionally left blank.

LIST OF TABLES

This page intentionally left blank.

Table A-1. Master Code Table - Part 1.

ID	Initial Safety Cons NC	Initial Freq NC	Env Cons	BIN	Initial Risk Factor NC	Failed Cntrl Risk Factor	AA Risk Factor NC	Facility Code	Cause Grp	Rep Acc	AA Safety Cons NC	AA Freq NC	App Cntrl Safety	App Cntrl Freq	Failed Cntrl Safety Cons	Failed Cntrl Freq
102AW-01-FLOW 102AW-02-PRES	S3	F0	E3	A-1-a	10	6	6	T	B06	05X	S2	F0	Prevented	Prevented	S2	F0
102AW-01-FLOW 102AW-04-PRES	S3	F3	E2	B-1-a	16	15	16	PD	D01	15X			S2	F3	S3	F2
102AW-01-FLOW01	S3	F2	E2	B-1-a	15	15	16	PD	D01	15X	S3	F3	S2	F3	S3	F2
102AW-01-FLOW02	S2	F3	E2	B-2-b	14	13	16	PD	D22	21X	S3	F3	Prevented	Prevented	S3	F1
102AW-01-FLOW03	S2	F3	E2	B-3-b	14	15	16	PD	D16	21X	S3	F3	S1	F3	S3	F1
102AW-01-FLOW04	S2	F1	E2	B-3-b	14	10	16	PD	D10	21X	S3	F3	S3	F0	S3	F0
102AW-01-FLOW05	S2	F2	E2	B-3-b	12	15	16	PD	D18	21X	S3	F3	S1	F2	S3	F1
102AW-01-FLOW06	S2	F3	E2	B-3-b	14	15	16	PD	D12	21X	S3	F3	S1	F3	S3	F1
102AW-01-FLOW07	S2	F3	E2	B-3-b	14	15	16	PD	D17	21X	S3	F3	S1	F3	S3	F1
102AW-01-FLOW10	S2	F2	E2	C-2-b	12	13	16	T	E06	26X	S3	F3	S1	F3	S3	F1
102AW-01-FLOW11	S2	F3	E2	C-2-b	14	13	16	T	E06	26X	S3	F3	Prevented	Prevented	S3	F1
102AW-01-TEMP	S3	F1	E3	B-1-a	13	13	16	PD	D01	16X	S3	F3	Prevented	Prevented	S3	F1
102AW-01-TEMP01	S2	F2	E2	C-2-b	12	13	16	WD	D01	26X	S3	F3	S1	F3	S3	F1
102AW-01-TEMP01A	S2	F2	E2	C-2-b	12	13	16	WD	D01	26X	S3	F3	S1	F3	S3	F1
102AW-01-TEMP02	S2	F2	E2	C-2-b	12	13	16	WD	D01	26X	S3	F3	S1	F3	S3	F1
102AW-02-LEVE	S1	F3	E1	C-1-a	11	5		T.DS	D12						S1	F1
102AW-02-LEVE01	S2	F1	E1	C-1-a	9	11	5	T	D02	23X	S1	F1	S1	F3		
102AW-02-LEVE02	S1	F1	E3	C-1-a	5			T.DS	D12							
102AW-02-LEVE02A	S1	F3	E1	C-1-a	11	5		T.DS	E06						S1	F1
102AW-02-LEVE03	S2	F3	E2	C-2-b	14	13	16	T.DS	E06	26X	S3	F3	Prevented	Prevented	S3	F1

Table A-2. Master Code Table - Part 2.

ID	Ctrl Failure MEMO	Change MEMO
102AW-01-FLOW 102AW-02-PRES		GAC - 6/29/96 - Changed Rep Acc because accident analysis shows dome collapse is not credible for this hazardous condition.
102AW-01-FLOW 102AW-04-PRES	If the cover block on during transfer control fails and the consequence of concern is S3 (as for "AA Freq NC"), the frequency falls to F2 from F3 (probability of procedure failure ~1E-4 per demand (multiple independent procedural failures). Cover blocks are on all boxes where possible physical connections could result in a mistransfer.	GAC - 6/27/96 - Changed Rep Acc due to consistency check. TJO 9/30/99 - Changes made as a result of current FSAR revision.
102AW-01-FLOW01	If the cover block on during transfer control fails and the consequence of concern is S3 (as for "AA Freq NC"), the frequency falls to F2 from F3 (probability of procedure failure ~1E-4 per demand (multiple independent procedural failures). Cover blocks are on all boxes where possible physical connections could result in a mistransfer.	GAC - 6/27/96 - Changed Rep Acc due to consistency check. TJO 9/30/99 - Changes made as a result of current FSAR revision.
102AW-01-FLOW02	If the excavation controls fail and the consequence of concern is S3 (as for "AA Freq NC"), the frequency falls to F1 from F3 (probability of digging in the wrong place, 1E-2, when the line is in use, 1E-2). If excavation controls work, F0. Same as for EE-16.	GAC 4/3/96 - As a result of accident binning reconciliation meeting, changed REP ACC
102AW-01-FLOW03	*Analysis needs more work because the "no controls" frequency should start at F2 not F3 (F3 assumes encasement is already failed). If the controls fail and the consequence of concern is S3 (as for "AA Freq NC"), the frequency falls to F1 from F3 (probability of encasement leak detector failure for double encased pipe or failure of 30 minute walkdown for direct buried pipe ~1E-2). **Based on non-specifics for emergency planning. Same as for XS-07-FLOW02.	TJO 9/30/99 - Changes made as a result of current FSAR revision.
102AW-01-FLOW04	Based on Bob Marusich's analysis that shows that you can't break an encasement and the primary pipe with surface loading.	TJO 9/30/99 - Changed Freq to F1.
102AW-01-FLOW05	Consequences are related to XS-07-FLOW02. Frequency is related to seismic initiator frequency.	
102AW-01-FLOW06	*Analysis needs more work because the "no controls" frequency should start at F2 not F3 (F3 assumes encasement is already failed). If the controls fail and the consequence of concern is S3 (as for "AA Freq NC"), the frequency falls to F1 from F3 (probability of encasement leak detector failure for double encased pipe or failure of 30 minute walkdown for direct buried pipe ~1E-2). **Based on non-specifics for emergency planning. Same as for XS-07-FLOW02.	TJO 9/30/99 - Changes made as a result of current FSAR revision.

Table A-3. Master Control Table - Part 1.

ID	Prev SSC	Prev TSR
102AW-01-FLOW 102AW-02-PRES	None required	None required
102AW-01-FLOW 102AW-04-PRES	None required	None required
102AW-01-FLOW01	None required	None required
102AW-01-FLOW02	None required	AC: Excavation Cntrls
102AW-01-FLOW03	None required	AC: Trans Cntrls (Pool) AC: Encas Seal Loop Cntrls AC: Trans Pump Admin Lock Cntrls
102AW-01-FLOW04	None required	None required
102AW-01-FLOW05	None required	None required
102AW-01-FLOW06	None required	AC: Trans Cntrls (Pool) AC: Encas Seal Loop Cntrls
102AW-01-FLOW07	None required	AC: Trans Cntrls (Pool) AC: Encas Seal Loop Cntrls AC: Trans Pump Admin Lock Cntrls
102AW-01-FLOW10	SC: Trans Leak Detect Sys SC: Abovegrade Portions - Process Pits (Integrity) SS: Tank Level Detect Sys	LCO: Trans Leak Detect Sys AC: Trans Cntrls (Pool)
102AW-01-FLOW11	SC: Primary Tank Leak Detect Sys SC: Trans Leak Detect Sys SC: Pressure Switch Intrlk/Alarm Sys (Service Water Lines) SC: Abovegrade Portions - Process Pits (Integrity) SS: Tank Level Detect Sys	LCO: Trans Leak Detect Sys LCO: Service Water Pressure Detect Sys LCO: Primary Tank Leak Detect Sys AC: Trans Cntrls (Pool) AC: Trans Pump Admin Lock Cntrls
102AW-01-TEMP	None required	None required
102AW-01-TEMP01	SC: Trans Leak Detect Sys SC: Abovegrade Portions - Process Pits (Integrity) SS: Tank Level Detect Sys	LCO: Trans Leak Detect Sys AC: Trans Cntrls (Pool) AC: Trans Pump Admin Lock Cntrls
102AW-01-TEMP01A	SC: Trans Leak Detect Sys SC: Abovegrade Portions - Process Pits (Integrity) SS: Tank Level Detect Sys	LCO: Trans Leak Detect Sys AC: Trans Cntrls (Pool) AC: Trans Pump Admin Lock Cntrls

Table A-4. Master Control Table - Part 2.

ID	Mit SSC	Mit TSR
102AW-01-FLOW 102AW-02-PRES	None required	None required
102AW-01-FLOW 102AW-04-PRES	SC: Trans Sys Covers SC: Abovegrade Portions - Vault Pits (Integrity)	LCO: Trans Sys Covers AC: Trans Sys Cover Removal Cntrls AC: Emergency Prep (Waste Leak)
102AW-01-FLOW01	SC: Trans Sys Covers SC: Abovegrade Portions - Vault Pits (Integrity)	LCO: Trans Sys Covers AC: Trans Sys Cover Removal Cntrls AC: Emergency Prep (Waste Leak)
102AW-01-FLOW02	None required	AC: Excavation Cntrls
102AW-01-FLOW03	SC: Trans Leak Detect Syss SS: Tank Level Detect Syss SS: Salt Well Flow Totalizers SS: Trans Sys Covers SS: Abovegrade Portions - Process Pits (Splash and Splatter)	LCO: Trans Sys Covers LCO: Trans Leak Detect Syss AC: Emergency Prep (Waste Leak) AC: Trans Sys Cover Removal Cntrls AC: Trans Cntrls (Pool)
102AW-01-FLOW04	None required	None required
102AW-01-FLOW05	None required	AC: Emergency Prep (Seismic)
102AW-01-FLOW06	SC: Trans Leak Detect Syss SS: Tank Level Detect Syss SS: Salt Well Flow Totalizers SS: Trans Sys Covers SS: Abovegrade Portions - Process Pits (Splash and Splatter)	LCO: Trans Sys Covers LCO: Trans Leak Detect Syss AC: Emergency Prep (Waste Leak) AC: Trans Sys Cover Removal Cntrls AC: Trans Cntrls (Pool)
102AW-01-FLOW07	SC: Trans Leak Detect Syss SS: Tank Level Detect Syss SS: Salt Well Flow Totalizers SS: Trans Sys Covers SS: Abovegrade Portions - Process Pits (Splash and Splatter)	LCO: Trans Sys Covers LCO: Trans Leak Detect Syss AC: Emergency Prep (Waste Leak) AC: Trans Sys Cover Removal Cntrls AC: Trans Cntrls (Pool)
102AW-01-FLOW10	SC: Trans Leak Detect Syss SC: Primary Tank Leak Detect Syss SS: Abovegrade Portions - Process Pits (Splash and Splatter) SS: Tank Level Detect Syss SS: Trans Sys Covers	LCO: Trans Sys Covers LCO: Trans Leak Detect Syss LCO: Primary Tank Leak Detect Syss AC: Emergency Prep (Waste Leak) AC: Trans Sys Cover Removal Cntrls AC: Trans Cntrls (Pool)
XS-26-PRES XS-26-TEMP	None required	None required

Table A-5. Control Memo Table.

ID	Prev SSC MEMO	Mit SSC MEMO	Control MEMO
102AW-01-FLOW 102AW-02-PRES			*No controls required based on low accident frequency.*
102AW-01-FLOW 102AW-04-PRES		The above grade portions of the following structs are designated SC with regard to physical integrity: - Process Pits - Diversion Boxes - Vault Pits - COBs	Controls based on accident analysis (Spray Leak in Structure or from Overground Waste Transfer Lines).
102AW-01-FLOW01		The above grade portions of the following structs are designated SC with regard to physical integrity: - Process Pits - Diversion Boxes - Vault Pits - COBs	Controls based on accident analysis (Spray Leak in Structure or from Overground Waste Transfer Lines).
102AW-01-FLOW02			Controls based on accident analysis (Spray Leak from Underground Waste Transfer Lines).
102AW-01-FLOW03		The above grade portions of the following structs are designated SS with regard to the function of reducing releases from splash and splatter within them: - Process Pits - Diversion Boxes - Vault Pits - COBs	Controls based on accident analysis (Subsurface Leak Resulting in Pool).
102AW-01-FLOW04			No controls required based on low accident frequency. Physical ground surface loading resulting in failure of waste transfer piping is considered extremely unlikely (F1).

Table A-6. Master Hazards Table.

ID	Material at Risk	Hazardous Condition	Cause	Consequence
102AW-01-FLOW 102AW-02-PRES	DST tank contents	Release of liquids, solids and/or vapors from Tank 241-AW-102 due to dome collapse caused by chemical reaction of incompatible wastes	Misrouting to destination other than intended creates chemical incompatibility	Release of solids, liquids and aerosols
102AW-01-FLOW 102AW-04-PRES	Liquid radioactive waste being transferred to DST from DCRT	Release of radioactive aerosol from transfer pipe which runs from DCRT to Tank 241-AW-102 due to spray leak into open underground structure	Piping leak due to thermal stress of transferring hot solution in cold pipe	Release of liquid waste aerosol
102AW-01-FLOW01	Liquid radioactive waste being transferred to DST from DCRT	Release of liquid radioactive waste aerosols from transfer pipe to Tank 241-AW-102 due to spray leak into open underground structure	Piping leak due to corrosion caused by transferring high temperature waste	Release of liquid waste aerosol
102AW-01-FLOW02	Liquid radioactive waste being transferred to DST	Release of radioactive waste to soil from transfer piping which runs to Tank 241-AW-102 due to leak from primary pipe and encasement	Excavation accident fails primary pipe and encasement	Release of liquid radioactive waste to soil
102AW-01-FLOW03	Liquid radioactive waste being transferred to DST	Release of radioactive waste to soil from transfer pipe to Tank 241-AW-102 due to leak of radioactive waste from primary pipe and encasement	Corrosion of inner and outer pipe cause failure of primary pipe and encasement	Release of liquid radioactive waste to soil
102AW-01-FLOW04	Liquid radioactive waste being transferred to DST	Release of radioactive waste to soil from transfer pipe to Tank 241-AW-102 due to leak of radioactive waste from primary pipe and encasement	High structural loading from traffic or cranes fails primary pipe and encasement	Release of liquid radioactive waste to soil
102AW-01-FLOW05	Liquid radioactive waste being transferred to DST	Release of radioactive waste to soil from transfer piping to Tank 241-AW-102 due to leak from primary pipe and encasement	Seismic event fails primary pipe and encasement	Release of liquid radioactive waste to soil
102AW-01-FLOW06	Liquid radioactive waste being transferred to DST	Release of radioactive waste to soil from transfer pipe to Tank 241-AW-102 due to leak of radioactive waste from primary pipe and encasement	Undermining due to leak of nearby pipes cause failure of primary pipe and encasement	Release of liquid radioactive waste to soil
102AW-01-FLOW07	Liquid radioactive waste being transferred to DST	Release of radioactive waste to soil from transfer pipe to Tank 241-AW-102 due to leak of radioactive waste from primary pipe and encasement	Water hammer cause failure of primary pipe and encasement	Release of liquid radioactive waste to soil
102AW-01-FLOW10	Liquid radioactive waste involved in transfer	Release of liquid radioactive waste from Tank 241-AW-102 due to overflow	Misrouting of waste from reverse flow caused by the combination of an incorrectly wired pump and a full transfer pipe	Environmental release of liquid waste to ground surface
102AW-01-FLOW11	Liquid radioactive waste involved in transfer	Release of liquid radioactive waste to the ground surface from Tank 241-AW-102 due to overflow of Tank 241-AW-102 or underground structure	Misrouting to destination other than intended causes overflow	Environmental release of liquid waste to ground surface

Table A-7. Master Defense In Depth Table.

ID	DID-Preventive	DID-Mitigative
102AW-01-FLOW 102AW-02-PRES	Flammable gas monitor Leak detectors, material balances and tank level monitoring	None
102AW-01-FLOW 102AW-04-PRES	Leak testing of jumpers	Leak detection systems (transfer and encasement leak detection) Material balance calculations during waste transfers Tank level monitoring during transfer Ground level radiation surveys
102AW-01-FLOW01	Leak testing of jumpers	Leak detection systems (transfer and encasement leak detection) Material balance calculations during waste transfers Tank level monitoring during transfer Ground level radiation surveys
102AW-01-FLOW02	None	Encasement leak detectors Test risers provided on long transfer lines
102AW-01-FLOW03	None	Encasement leak detectors Test risers provided on long transfer lines
102AW-01-FLOW04	None	Encasement leak detectors Test risers provided on long transfer lines
102AW-01-FLOW05	None	Encasement leak detectors Test risers provided on long transfer lines
102AW-01-FLOW06	None	Encasement leak detectors Test risers provided on long transfer lines
102AW-01-FLOW07	None	Encasement leak detectors Test risers provided on long transfer lines
102AW-01-FLOW10	Drains in waste transfer system structures Encasement leak detection systems	Visual survey of tank farms at least once a day Ground level radiation surveys
102AW-01-FLOW11	Drains in waste transfer system structures Encasement leak detection systems	DCRT catch tank vault leak detection systems Visual survey of tank farms at least once a day Ground level radiation surveys
102AW-01-TEMP	None	Material balance calculations during waste transfers
102AW-01-TEMP01	Drains in waste transfer system structures Encasement leak detection systems	DCRT catch tank vault leak detection systems Visual survey of tank farms at least once a day Ground level radiation surveys

Table A-8. Process History Table - Part 1.

ID	MEMO NC	Re-binned Safety	Re-binned Freq	Re-binned MEMO	Orig Freq	Orig Freq NC	Orig Safety
102AW-01-FLOW 102AW-02-PRES	A chemical or incompatible waste is added to the tank which results in high temperatures and a collapsing of the tank dome. This was assigned to the frequency category of F2 since these activities are administratively controlled and it would take an extremely large amount of chemicals or material being misrouted to the waste tank in order for this to occur. This accident was assigned to the consequence category S3 since this accident results in the release of material to the offsite public. If the mitigative/preventative features are removed then chemicals could be added to the waste tanks without controls. It would still require large amounts of chemicals or incompatible waste transfer to be added to the waste tank in order for this accident to occur. With no controls or mitigative features the expected frequency of this accident would still be in the F2 frequency category.				F2	F2	S3
102AW-01-FLOW 102AW-04-PRES	This spray leak event, which does not occur in box or pit, was assigned an F2 and S2. This event assumes the failure of the procedural requirement to preheat piping. A piping leak due to thermal stress caused by transferring hot solution in a cold pipe could mechanically impact the encasement pipe. This could defeat the detection of liquid that would normally be collected by the encasement piping. The soil over the pipe could eventually erode away, but the combination of the soil and the encasement (how-be-it broken) piping make the chance of a finely divided spray unlikely, hence the S2 consequence. Accordingly, if the mitigative/preventive features were assumed to be failed the expected accident frequency (leading to an S2) would be increased. Assuming the chance of a procedural error is 1/100, and no leak detection or monitoring exists then frequency without safeguards would be F3.	S3		MVS -5/24/96 - Revised due to application of new risk acceptance guidelines. Description of Hazardous condition changed per review with analyst.	F2	F3	S2
102AW-01-FLOW01	This spray leak event, which does occur in pit or box, was assigned an F1 and S2. This event is initiated by a leak in the primary piping due to corrosion caused by transferring hot liquid. The hot liquid would then have to find an opening in the encasement piping which is not normally leak tested and could contain a preexisting hole. Existence of a leak would normally be detected with encasement or pit leak detection. The soil over the pipe might be eventually eroded away from the leak. The secondary leak would have to occur in the same location or the encasement become pressurized for a spray leak to occur. This in combination the soil over the pipe (how-be-it eroded) make the chance of a finely divided spray unlikely, hence the S2 consequence. Accordingly, if the mitigative/preventive features were assumed to be failed the expected accident frequency (leading to an S2) would be increased somewhat, but still F2. If no leak detection or monitoring exists then pressurization of the encasement is more likely.	S3		MVS -5/24/96 - Revised due to application of new risk acceptance guidelines. Description of Hazardous condition changed per review with analyst.	F1	F2	S2

Table A-9. Process History Table - Part 2.

ID	Orig Grp	Re-Grp MEMO	Orig Facility Code	FC MEMO	Facility Code 2	Remarks
102AW-01-FLOW 102AW-02-PRES	2.2	GAC - 6/18/96 - New Cause Group code developed.	TD	PS - 6/25/96 - Revised facility code based on 6/24 meeting on facility code list to clarify and consistently apply the facility code.	TB	
102AW-01-FLOW 102AW-04-PRES	6.4	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW01	6.4	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW02	5.1	GAC - 6/18/96 - New Cause Group code developed.	TD	PS - 6/25/96 - Revised facility code based on 6/24 meeting on facility code list to clarify and consistently apply the facility code.	PD	
102AW-01-FLOW03	6.5	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW04	5.3	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW05	4.1	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW06	5.2	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW07	6.5	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-FLOW10	9.2	GAC - 6/18/96 - New Cause Group code developed.	TD	PS - 6/25/96 - Revised facility code based on 6/24 meeting on facility code list to clarify and consistently apply the facility code.	TB	
102AW-01-FLOW11	9.2	GAC - 6/18/96 - New Cause Group code developed.	TD	PS - 6/25/96 - Revised facility code based on 6/24 meeting on facility code list to clarify and consistently apply the facility code.	TB	
102AW-01-TEMP	7.2	GAC - 6/18/96 - New Cause Group code developed.	PD		PD	
102AW-01-TEMP01	8.4	GAC - 6/18/96 - New Cause Group code developed.	WP	PS - 6/25/96 - Revised facility code based on 6/24 meeting on facility code list to clarify and consistently apply the facility code.	WD	
102AW-01-TEMP01A	8.4	GAC - 6/18/96 - New Cause Group code developed.	WP	PS - 6/25/96 - Revised facility code based on 6/24 meeting on facility code list to clarify and consistently apply the facility code.	WD	
LDUA/EREE 1-30						

APPENDIX B

HAZARD TOPOGRAPHY DATABASE EXAMPLE TABLES

This page is intentionally left blank.

LIST OF TABLES

This page intentionally left blank.

Table B-1. Facility Code Table.

Facility Code	Farm	Facility Name	Field Name	Type
ER	A FARM	216-A-08C	216-A-08C	Crib
WF	A FARM	216-A-08S	216-A-08S	Sample pit
ER	A FARM	216-A-28	216-A-28	Crib
ER	A FARM	216-A-30	216-A-30	Crib
ER	A FARM	216-A-36A	216-A-36A	Crib
ER	A FARM	216-A-36B	216-A-36B	Crib
ER	A FARM	216-A-37-1	216-A-37-1	Crib
ER	A FARM	216-A-37-2	216-A-37-2	Crib
ER	A FARM	216-A-39	216-A-39	Crib
ER	A FARM	216-A-45	216-A-45	Crib
T.SS.H.O	A FARM	241-A-101	241-A-101	Single shell tank, flammable gas, organics
T.SS	A FARM	241-A-102	241-A-102	Single shell tank
T.SS	A FARM	241-A-103	241-A-103	Single shell tank
T.SS.L	A FARM	241-A-104	241-A-104	Single shell tank, high heat load
T.SS.L	A FARM	241-A-105	241-A-105	Single shell tank, high heat load
T.SS.L	A FARM	241-A-106	241-A-106	Single shell tank, high heat load
WD	A FARM	241-A-151	241-A-151	Diversion box
WD	A FARM	241-A-152	241-A-152	Diversion box
Z	A FARM	241-A-271	241-A-271	A/AY/AZ/AX tank farm control bldg
T.CN	A FARM	241-A-302-A	241-A-302-A	Catch tank
T.CD	A FARM	241-A-350	241-A-350	DCRT catch tank
T.CN	A FARM	241-A-350	241-A-350	Drainage lift station: catch tank
WD	A FARM	241-A-401	241-A-401	Diverter caisson

Table B-2. Topography Table.

Facility Name	Type	Applicable Hazard Eval.
209-E	90 day storage pad	PHA: 209E
213 Compactor Bldg	Compactor 583 ft2	PHA: 2727W
216-A-08C	Crib	PHA: CDP
216-A-08S	Sample pit	HAZOP: AW-102, SY-102
216-A-28	Crib	PHA: CDP
216-A-30	Crib	PHA: CDP
216-A-36A	Crib	PHA: CDP
216-A-36B	Crib	PHA: CDP
216-A-37-1	Crib	PHA: CDP
216-A-37-2	Crib	PHA: CDP
216-A-39	Crib	PHA: CDP
216-A-45	Crib	PHA: CDP
216-B-3	Pond (B pond)	PHA: CDP
216-B-55	Crib	PHA: CDP
216-B-62	Crib	PHA: CDP
216-B-63	Ditch	PHA: CDP
216-BY-201	IMUST rad contaminated	PHA: MISF
216-S-25	Crib	PHA: CDP
216-S-26	Crib	PHA: CDP
216-T-1	Ditch	PHA: CDP
216-T-32	Crib	PHA: CDP
216-T-4-2	Ditch	PHA: CDP
216-T-7	Crib	PHA: CDP

Table B-3. Material at Risk Table.

Field Name	MAR-Subject	MAR-Description	MAR-Classification	Capacity	Material Type	Physical Form	Volume or Activity	Transient	Quantity	Comments
2727-WA-M	Tank Contents	None	NA	NA	NA	NA	NA	NA	NA	No tanks associated with 2727-WA
2727-WA-M	Tank Headspace	None	NA		NA	NA	NA	NA	NA	No tanks associated with 2727-WA
2727-WA	Rail or Truck Tanker Contents	Tanker truck heel	NA	5000 gal estimated	NA	Liquid/ Residual	Heel of liquid	Yes	NA	An abandoned truck tankers is parked within the fenced area near 2727-WA. Inside has been rinsed out, radioactive heel expected to remain
2727-WA	Contamination on Vehicle	Tanker truck Noted above	NA	NA	NA	Residual	One spot about 1 mr/hr	Yes	NA	Contaminated tanker truck stored near 2727-WA.
2727-WA-M	Contamination on Equipment or Tools	None	NA	NA	NA	NA	NA	NA	NA	2727-WA is a clean storage area with the exception of the truck tanker Noted above and a buffer area with possibly contaminated wood pallets.
2727-WA-M	Ventilation Filter Contents	None	NA	NA	NA	NA	NA	NA	NA	No ventilation associated with 2727-WA.
2727-WA-M	Contamination In Ventilation System	De-entrainers	NA	NA	NA	NA	NA	NA	NA	No de-entrainers.
2727-WA-M	Contamination In Ventilation System	Seal loop	NA	NA	NA	NA	NA	NA	NA	No seal loops.

Table B-4. Unique Phenomena Table - Part 1.

Field Name	Type	Flammable Gas	Ferrocyanide	Organics Separable Phase	TOC in Liquids	TOC in Solids	High Heat
				Separable Phase	TOC in liquids (>10 g/L)	TOC in solids >4.5 wt% (dry basis)	Heat generation rate >26, 000 BTU
Legend Boxes-->		Does it exist? (yes/no) Provide reference.	Does it exist? (yes/no) Provide reference.	Does it exist? (yes/no) Provide reference.	Does it exist? (yes/no) Provide reference.	Does it exist? (yes/no) Provide reference.	Does it exist? (yes/no) Provide reference.
A FARM							
241-A-101	Single shell tank	Facility Group 2 GRE - Yes Small Spontaneous Large Induced Steady State - Yes HNF-SD-WM-SAR-067, App K	No, Meacham, 1996, WHC-SD-WM-SARR-038, Rev 1.	No, PNNL Letter, from Huckaby to Meacham OT: 073096.	Unknown or currently undocumented	No, Webb, 1996, WHC-SD-WM-SARR-033, Rev 1	No, Kummerer, 1995, WHC-SD-WM-SARR-010, Rev 1.
241-A-102	Single shell tank	Facility Group 3 GRE - Yes Small Induced Steady State - Yes HNF-SD-WM-SAR-067, App K	No, Meacham, 1996, WHC-SD-WM-SARR-038, Rev 1.	No, PNNL Letter, from Huckaby to Meacham OT: 073096.	No, Jo, 1995 WHC-SD-WM-DP-136, Rev. 0	No, Webb, 1996, WHC-SD-WM-SARR-033, Rev 1	No, Kummerer, 1995, WHC-SD-WM-SARR-010, Rev 1.
241-A-103	Single shell tank	Facility Group 2 GRE - Yes Small Spontaneous Large Induced Steady State - Yes HNF-SD-WM-SAR-067, App K	No, Meacham, 1996, WHC-SD-WM-SARR-038, Rev 1.	No, PNNL Letter, from Huckaby to Meacham OT: 073096.	Unknown or currently undocumented	No, Webb, 1996, WHC-SD-WM-SARR-033, Rev 1	No, Kummerer, 1995, WHC-SD-WM-SARR-010, Rev 1.
241-A-104	Single shell tank	Facility Group 3 GRE - Yes Small Induced Steady State - Yes HNF-SD-WM-SAR-067, App K	No, Meacham, 1996, WHC-SD-WM-SARR-038, Rev 1.	Yes, PNNL Letter, from Huckaby to Meacham OT: 073096.	Unknown or currently undocumented	Unknown or currently undocumented	Yes, Kummerer, 1995, WHC-SD-WM-SARR-010, Rev 1.
241-A-105	Single shell tank	Facility Group 3 GRE - Yes Small Induced Steady State - Yes HNF-SD-WM-SAR-067, App K	No, Meacham, 1996, WHC-SD-WM-SARR-038, Rev 1.	Yes, PNNL Letter, from Huckaby to Meacham OT: 073096.	No, Hodgson 1995 74A30-95-018	Unknown or currently undocumented	Yes, Kummerer, 1995, WHC-SD-WM-SARR-010, Rev 1.

Table B-5. Unique Phenomena Table - Part 2.

Field Name	Pyrophorics	Syphoning	Criticality	Corrosivity	Other	Comments	LOC	NUM
Legend Boxes-->	Does it exist? (yes/no) Provide reference.	Does potential exist? Provide reference.	Does potential exist? Provide reference.	Does potential exist? Provide reference.	List documented discounted events. Provide references.	Notes	A	
A FARM							A	0
241-A-101	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	No, Anantatmula 1994 WHC-EP-0772	NA	Currently on organic & hydrogen watch lists	A	1
241-A-102	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	No, Anantatmula 1994 WHC-EP-0772	NA	NA	A	2
241-A-103	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	No, Anantatmula 1994 WHC-EP-0772	NA	Tank failed the flammable gas watchlist criteria (WHC-EP-0702 Rev. 0). Treated with watch list controls pending further direction from DOE (OSD-T-151-00030, B-20)	A	3
241-A-104	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	No, Anantatmula 1994 WHC-EP-0772	NA	NA	A	4
241-A-105	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	No, Anantatmula 1994 WHC-EP-0772	NA	NA	A	5
241-A-106	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	No, Anantatmula 1994 WHC-EP-0772	NA	NA	A	6
244-A	No, SAIC, 1996, WHC-SD-WM-HIE-007, Rev. 0	No, Syphoning PHA, 1996, WHC-SD-WM-TI-759, Rev. 0	No, Bratzel 1996, WHC-SD-WM-TI-725	Unknown or currently undocumented			A	7

Table B-6. Facility Configuration Table.

Field Name	Type	Ventilation	Comment V	ALC	Comment ALC	Steam Coils	Comment SC	Mixer/Transfer/Feed Pumps	Comments MP
241-A-101	Single shell tank	Passive	One breather filter with one seal loop	No		No		No	
241-A-102	Single shell tank	Passive	One breather filter with one seal loop	No		No		No	
241-A-103	Single shell tank	Passive	One breather filter with one seal loop	No		No		No	
241-A-104	Single shell tank	Passive	One breather filter with one seal loop	No		No		No	
241-A-105	Single shell tank	Passive	One breather filter with one seal loop	No		No		No	
241-A-106	Single shell tank	Passive	One breather filter with one seal loop	No		No		No	
241-AN-101	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AN-102	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AN-103	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AN-104	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AN-105	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AN-106	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AN-107	Double shell tank	Active	Annulus has filtered inlet, K1 primary tank ventilation system, K2 annulus ventilation system	Yes		No		No	
241-AP-101	Double shell tank	Active	K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AP-102	Double shell tank	Active	K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AP-103	Double shell tank	Active	K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	
241-AP-104	Double shell tank	Active	K1 primary tank ventilation system, K2 annulus ventilation system	No		No		No	