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Hanford Facility Dangerous Waste Permit Application, General Information Portion

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Foreword

HANFORD FACILITY
DANGEROUS WASTE PERMIT APPLICATION,
GENERAL INFORMATION PORTION

FOREWORD

The Hanford Facility, located in southeastern Washington State, is owned by the U.S. Government and operated by the U.S. Department of Energy, Richland Operations Office. Dangerous waste and mixed waste (containing both dangerous and radioactive components) are produced and managed on the Hanford Facility. Waste components are regulated in accordance with the *Resource Conservation and Recovery Act of 1976*, the *Hazardous and Solid Waste Amendments of 1984*, and/or the *State of Washington Hazardous Waste Management Act of 1976* (as administered through the Washington State Department of Ecology *Dangerous Waste Regulations*, Washington Administrative Code 173-303); or the *Atomic Energy Act of 1954*.

The permitting framework for the Hanford Facility was established by the original 1989 *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1996). The original document addressed the Hanford Facility as a single *Resource Conservation and Recovery Act* facility (U.S. Environmental Protection Agency/State Identification Number WA7890008967) consisting of over 60 treatment, storage, and/or disposal units. Approximately 25 percent of these units are, or are anticipated to be, 'operating'; approximately 50 percent are 'undergoing closure'; and approximately 25 percent are, or are anticipated to be, 'dispositioned through other options' under the *Hanford Federal Facility Agreement and Consent Order*.

The original *Hanford Federal Facility Agreement and Consent Order* also established a stepwise permitting process that provided for the issuance of an initial *Resource Conservation and Recovery Act* permit for less than the entire Hanford Facility. Any treatment, storage, and/or disposal units not included in the initial permit were to be incorporated through a permit modification. Treatment, storage, and/or disposal units not yet incorporated into the *Resource Conservation and Recovery Act* permit were to continue to operate under interim status. Subsequent amendments of the *Hanford Federal Facility Agreement and Consent Order* have retained the *Resource Conservation and Recovery Act* permitting framework established by the original 1989 document.

The initial *Hanford Facility Resource Conservation and Recovery Act Permit* became effective in September 1994, and is comprised of two portions, a Dangerous Waste Portion, issued by Ecology, and a Hazardous and Solid Waste Amendments Portion, issued by the U.S. Environmental Protection Agency, Region 10. The Dangerous Waste Portion is issued to four Permittees: the U.S. Department of Energy, Richland Operations Office, as the owner/operator, and to three of its contractors, as co-operators. The Hazardous and Solid Waste Amendments Portion is issued to the U.S. Department of Energy, Richland Operations Office, as the owner/operator.

For purposes of the *Hanford Facility Dangerous Waste Permit Application*, the U.S. Department of Energy's contractors are identified as 'co-operators' and sign in that capacity (refer to Condition I.A.2. of the Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit). Any identification of these contractors as an 'operator' elsewhere in the application is not meant to conflict with the contractors' designation as co-operators but rather is based on the contractors' contractual status with the U.S. Department of Energy, Richland Operations Office.

The Dangerous Waste Portion of the initial *Hanford Facility Resource Conservation and Recovery Act Permit*, which incorporated five treatment, storage, and/or disposal units, was based on information submitted in the *Hanford Facility Dangerous Waste Permit Application* and in closure plan and closure/postclosure plan documentation. During 1995, the Dangerous Waste Portion was modified twice to incorporate another eight treatment, storage, and/or disposal units. The permit modification process will be used at least annually to incorporate additional treatment, storage, and/or disposal units as permitting documentation for these units is finalized. The units to be included in annual modifications are specified in a schedule contained in the Dangerous Waste Portion of the *Hanford Facility Resource Conservation and Recovery Act Permit*. Treatment, storage, and/or disposal units will remain in interim status until incorporated into the Permit.

The *Hanford Facility Dangerous Waste Permit Application* is considered to be a single application organized into a General Information Portion (this document, DOE/RL-91-28) and a Unit-Specific Portion. The scope of the Unit-Specific Portion is limited to individual 'operating' treatment, storage, and/or disposal units for which Part B permit application documentation has been, or is anticipated to be, submitted. Documentation for treatment, storage, and/or disposal units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with the provisions of the *Hanford Federal Facility Agreement and Consent Order*. However, the scope of the General Information Portion includes information that could be used to discuss 'operating' units, units 'undergoing closure', or units being 'dispositioned through other options'.

Both the General Information and Unit-Specific portions of the *Hanford Facility Dangerous Waste Permit Application* address the contents of the Part B permit application guidance documentation prepared by the Washington State Department of Ecology (Ecology 1987 and 1995) and the U.S. Environmental Protection Agency (40 Code of Federal Regulations 270), with additional information needs defined by revisions of Washington Administrative Code 173-303 and by the *Hazardous and Solid Waste Amendments*. For ease of reference, the alpha-numeric section identifiers from the Washington State Department of Ecology's permit application guidance documentation follow, in brackets, the chapter headings and subheadings. Documentation contained in the General Information Portion is broader in nature and could be used by multiple treatment, storage, and/or disposal units (i.e., either 'operating' units, units 'undergoing closure', or units being 'dispositioned through other options'). A checklist indicating where information is contained in the

General Information Portion, in relation to the Washington State Department of Ecology guidance documentation, is located in the Contents Section.

The intent of the General Information Portion is: (1) to provide an overview of the Hanford Facility; and (2) to assist in streamlining efforts associated with treatment, storage, and/or disposal unit-specific Part B permit application, preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation development, and the *Hanford Facility Resource Conservation and Recovery Act Permit* modification process. Wherever appropriate, the Unit-Specific Portion of the application, as well as preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation, will make cross-reference to the General Information Portion, rather than duplicating text. Thus, *Hanford Facility Resource Conservation and Recovery Act Permit* modifications involving general information will require updating only the General Information Portion instead of each unit-specific document.

'Dangerous Waste', as used in the title of the *Hanford Facility Dangerous Waste Permit Application*, refers to waste subject to Washington Administrative Code 173-303 requirements and to requirements of the *Hazardous and Solid Waste Amendments*, including those for which the state of Washington has not yet been granted authority by the U.S. Environmental Protection Agency. Throughout the *Hanford Facility Dangerous Waste Permit Application*, 'mixed waste' refers to waste containing both dangerous and radioactive components. The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under the *Resource Conservation and Recovery Act* and Washington Administrative Code 173-303. It is the position of the U.S. Department of Energy that any procedures, methods, data, or information contained in the *Hanford Facility Dangerous Waste Permit Application* that relate solely to the radioactive component of mixed waste are outside the scope of the permit application and the *Hanford Facility Resource Conservation and Recovery Act Permit*, but are included for the sake of completeness. It is the position of the Washington State Department of Ecology that the radioactive component influences safe management of mixed waste and therefore information about this component is necessary to ensure compliance with Washington Administrative Code 173-303 and the *Hanford Facility Resource Conservation and Recovery Act Permit*. Both agencies acknowledge the other's position, but to avoid a conflict on the issue, the U.S. Department of Energy, Richland Operations Office has agreed to provide information on radioactive constituents without agreeing with the Washington State Department of Ecology's position. The Washington State Department of Ecology has agreed to accept the information in this context without giving up its position.

Revision 2 of the General Information Portion of the *Hanford Facility Dangerous Waste Permit Application* contains information current as of May 1, 1996. This document is a complete submittal and supersedes Revision 1.

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APPENDICES

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Application Checklist

In accordance with the Washington State Department of Ecology's *Dangerous Waste Permit Application Requirements* (Ecology 1995), an application checklist has been completed by providing the facility name and indicating where the listed material has been placed in the application. This is particularly important when the General Information Portion does not closely follow the outline of the checklist and guidance or to designate where information is more appropriately placed in the Unit-Specific Portion. The completed checklist is contained within this section of this Dangerous Waste Permit application documentation.

As noted in the Introduction of the Washington State Department of Ecology's 1995 guidance document (Ecology 1995), this document only includes a detailed discussion of requirements for treatment and storage in tanks and containers. Requirements for land-based and incinerator units are in a document entitled *Dangerous Waste Management Facility Permit Application: Additional Requirements for Facilities Which Dispose of Dangerous Wastes or Manage Them in Land-based Units* (Ecology 1987). The 1995 guidance document advises that when preparing an application for a facility that has incinerator and/or land-based units, to use both guidance documents in conjunction. To provide continuity in numbering, the major outline headings for land-based and incinerator units have been provided by the Washington State Department of Ecology in the application checklist included in its 1995 guidance document.

The application checklist provided by the Washington State Department of Ecology has been modified to include citations for Chapter 173-303 Washington Administrative Code and for 40 Code of Federal Regulations Parts 264 and 270. In addition, the title of the checklist has been modified to indicate that the checklist contents do not just refer to "Treatment and Storage in Tanks and Containers".

Facility Name Hanford Facility Dangerous Waste Permit Application, General Information Portion

Date Application Received 07/96

State of Washington
Part B Permit Application Review Checklist

		Technically Adequate?	Location in Application
Citations for the Chapter 173-303 Washington Administrative Code (WAC) are followed by those for 40 Code of Federal Regulations (CFR) Parts 264 and 270. The federal citations are always in brackets. For example: "806(2)[270.10(d)]" refers to WAC 173-303-806(2) and 40 CFR 270.10(d).			
A.	**Part A Form** 806(2), 810(12)(a), 810(13) [270.10(d), 270.11(a) and (d), 270.13]		Chapter 1.0
B.	**Facility Description and General Provisions** 806(4)(a)(i),(x),(xi),(xviii) [270.14(b)(1),(10),(19)]		Chapter 2.0
B-1	General Description 806(4)(a)(i) [270.14(b)(1)]		2.1
B-1(a)	Facility Description		2.1.1
B-1(b)	Construction Schedule		2.1.2
B-2	Topographic Map		2.2
B-2a	General Requirements 806(4)(a)(xviii) [270.14(b)(19)]		2.2.1
B-2b	Additional Requirements for Land Disposal Facilities		2.2.2
B-3	Seismic Consideration 806(4)(a)(xi) [270.14(b)(11)(i) and (ii), 264.18(a)]		2.3
B-4	Traffic Information 806(4)(a)(x) [270.14(b)(10)]		2.4

		Technically Adequate?	Location in Application
C.	**Waste Analysis** 806(4)(a)(ii) and (iii), 300 [270.14(3), 264.13(b) and (c)]		Chapter 3.0
C-1	Chemical, Biological and Physical Analyses 806(4)(a)(ii), 806(4)(b)(ii) and (v); 806(4)(c)(x); 140; 300; 395; 630(7)(c) and (9); 640(1)(b), (2)(c), (3)(a), and (10) [270.14(b)(2), 264.13(a), 268.7, 268.9]		3.1
C-1a C-1b C-1c	Waste In Piles Landfilled Wastes Wastes Incinerated and Wastes Used in Performance Tests		3.1.3 3.1.4 3.1.5
C-2	Waste Analysis Plan 806(4)(a)(iii), 140, 300(5) and (6) [270.14(b)(3), 264.13(b) and (c), 268.7 and 268.9]		3.2
C-2a	Detailed Chemical, Physical, and/or Biological Analysis		3.2
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C-2a(2)	Analytical Methods 110, 300(5)(b) [264.13(b)(2) and (8), Part 264 Subparts AA, BB, and CC] - Washington State has not adopted the CC requirements yet.		3.2
C-2a(3)	Generator-Supplied Analyses 300(3), (5)(g), and (e) [264.13(b)(5)]		3.2

		Technically Adequate?	Location in Application
C-2b	Additional Requirements for Wastes Generated Off-site 806(4)(a)(iii), 300(6) [264.13(c)]		3.2
C-2b(1)	Parameters and Rationale to Confirm Identity of Off-site Waste 300(3), (5)(a), and 5(g) [264.13(a)(4) and (b)(1)]		3.2
C-2b(2)	Analytical Methods to Confirm Identity of Off-site Waste 300(3) and (5)(b) [264.13(b)(2)]		3.2
C-2b(3)	Representative Sampling of Incoming Off-site Wastes 300(3) and (5)(c), 110(2) [264.13(b)(3), Part 261, Appendix I]		3.2
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		Technically Adequate?	Location in Application
C-3c(1)	Non-acceptance of Undamaged Shipment 370(5)(b)		3.3.3.1
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D-1a	Description of Containers 630(4) [264.172]		Unit-Specific Portion
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D-1c	Container Labelling 806(4)(b)(iii), 395(6), 630(3)		Unit-Specific Portion
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D-1d(1)	Secondary Containment System Design 806(4)(b)(i) and (iv), 630(7) [270.15(a); 264.175(a), (b), and (d)]		Unit-Specific Portion
D-1d(1)(a)	System Design 806(4)(b)(i), 630(7) (a) and (d) [270.15(a), 264.175(b)]		Unit-Specific Portion
D-1d(1)(b)	Structural Integrity of Base 806(4)(b)(i), 630(7)(a) [270.15(a), 264.175(b)]		Unit-Specific Portion

		Technically Adequate?	Location in Application
D-1d(1)(c)	Containment System Capacity 806(4)(b)(i)(A) and (C), 630(7)(a) [270.15(a)(3), 264.175(b)(3)]		Unit-Specific Portion
D-1d(1)(d)	Control of Run-on 806(4)(b)(i)(D), 630(7)(b) [270.15(a)(4), 264.175(b)(4)]		Unit-Specific Portion
D-1d(2)	Removal of Liquids from Containment System 806(4)(b)(i)(E), 630(7)(a)(ii) [270.15(a)(5), 264.175(b)(5)]		Unit-Specific Portion
D-1e	Demonstration that Containment Is Not Required Because Containers Do Not Contain Free Liquids, Wastes That Exhibit Ignitability or Reactivity, or Wastes Designated F020 - 023, F026, or F027 806(4)(b)(ii), 630(7)(c) [270.15(b)(2), 264.175(c)]		Unit-Specific Portion
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D-1f(1)	Management of Certain Reactive Wastes in Containers 806(4)(b)(iv), 630(8)(a) [270.15(c), 264.176]		Unit-Specific Portion
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		Technically Adequate?	Location in Application
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D-2a	Design, Installation and Assessment of Tanks Systems 806(4)(c)(i),(ii),(v), and (vi), 640(2) and (3) [270.16(a), (b), (e), and (f), 264.191, 264.192]		Unit-Specific Portion
D-2a(1)	Design Requirements 640(2)(c), (3)(a) [264.191(b), 264.192(a)]		Unit-Specific Portion
D-2a(2)	Integrity Assessments 640(2)(a),(c) and (e); (3)(a),(b) and (g) [264.191(a) and (b) 264.192(a),(b), and (g)]		Unit-Specific Portion
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		Technically Adequate?	Location in Application
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D-2b(2)(b)	Double-walled Tanks 640(4)(e)(iii) [264.193(e)(3)]		Unit-Specific Portion
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D-2c	Variances from Secondary Containment Requirements 640(4)(g) and (h), 640(1)(b) and 806(c)(viii) [270.16(h), 264.193(g) and (h), 264.190(a)]		Unit-Specific Portion
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		Technically Adequate?	Location in Application
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	Technically Adequate?	Location in Application
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D-8b(1)(b) Re-evaluating Applicability of Subpart BB Standards 110, 691(1) [264.1063(d) - (g), 264.1064(k)]		4.10.2
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		Technically Adequate?	Location in Application
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		Technically Adequate?	Location in Application
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		Technically Adequate?	Location in Application
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F-2d(4)	Air Emissions Control and Detection - Inspections, Monitoring, and Corrective Actions (806(4)(a)(v) [270.14(b)(5), 264.1033 (e) - (k); 264.1035; 264.1052; 264.1053; 264.1058; 264.1064; 264.1067, 264.1088, 264.1091]		Unit-Specific Portion
F-2d(4)(a)	Process Vents 806(4)(a)(v) [264.1033; 264.1034(b) and (c); 264.1035(b)(3), (b)(4), and (c)]		Unit-Specific Portion
F-2d(4)(b)	Equipment Leaks 806(4)(a)(v) [264.1052 - 264.1064]		Unit-Specific Portion
F-2d(4)(c)	Tanks and Containers [270.14(b)(5), 270.27((a)(6), 264.1088, 264.1091] Department of Ecology has not yet adopted the CC requirements.		Unit-Specific Portion

		Technically Adequate?	Location in Application
F-2d(5) F-2d(6) F-2d(7) F-2d(8) F-2d(9)	Waste Pile Inspection Surface Impoundment Inspection Incinerator Inspection Landfill Inspection Land Treatment Facility Inspection		Unit-Specific Portion
F-3	Preparedness and Prevention Requirements 806(4)(a)(vi), 340 [270.14(b)(6), Part 264 Subpart C]		6.3
F-3a	Equipment Requirements 340(1) and (2) [264.32, 264.34]		6.3.1 and Unit-Specific Portion
F-3b	Aisle Space Requirement 340(3) [264.35]		6.3.2
F-4	Preventive Procedures, Structures, and Equipment 806(4)(a)(viii) [270.14(b)(8)]		6.4
F-5	Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Wastes 806(4)(a)(ix),(b)(v), and (c)(x); 395(1)(a),(b) and (c); 630(9)(a) and (b); 640(9)(10) [270.14(b)(9), 264.17(a) and (b), 264.177(a) and (b)]		6.5 and Unit-Specific Portion
F-5a	Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste 806(4)(a)(ix), 395(1)(a) and (c) [270.14(b)(9), 264.17(a)]		Unit-Specific Portion
F-5b	Precautions for Handling Ignitable or Reactive Waste and Mixing Incompatible Wastes 806(4)(a)(ix), (b)(v), and (c)(x); 395(1)(b) and (c); 630(9)(a) and (b); 640(9) and (10) [270.14(b)(9), 264.17(b), 264.177(a) and (b)]		Unit-Specific Portion

		Technically Adequate?	Location in Application
F-5b(1)	Ignitable or Reactive Wastes In Tanks 806(4)(c)(x), 640(9) [270.16(j), 264.198]		Unit-Specific Portion
F-5b(2)	Incompatible Wastes In Containers or Tanks 806(4)(b)(v) and (4)(c)(x), 630(9) (a) and (b), 640(10) [270.15(d), 270.16(j) 264.17(b) and (c), 264.177(a) and (b), 264.199]		Unit-Specific Portion
G.	**Contingency Plan** 806(4)(a)(vii), 340, 350, 360, 640(7), 650(5), 660(6) [270.14(b)(7), 264.50 through 264.56]		Chapter 7.0
G-1	General Information		Appendix 7A
G-2	Emergency Coordinators 350(3)(d), 360(1) [264.52(d), 264.55]		Appendix 7A and Unit-Specific Portion
G-3	Circumstances Prompting Implementation 350(1) and (2), 360(2) [264.51, 264.52(a), 264.56(a) and (b)]		Appendix 7A and Unit-Specific Portion
G-4	Emergency Response Procedures 350(3)(a) and (b), 360(2)(a),(b), and (c) [264.52(a), 264.56]		Appendix 7A and Unit-specific Portion
G-4a	Notification 360(2)(a) [264.56(a)] Note that the facility must also notify under WAC 173-303-145.		Appendix 7A and Unit-Specific Portion
G-4b	Identification of Dangerous Materials 360(2)(b) [264.56(b)]		Appendix 7A and Unit-Specific Portion
G-4c	Hazard Assessment and Report 360(2)(c),(d), and (e) [264.56(c) and (d)]		Appendix 7A and Unit-Specific Portion

		Technically Adequate?	Location in Application
G-4d	Prevention of Recurrence or Spread of Fires, Explosions, or Releases 360(2)(f) and (g), 630(2), 640(7) [264.56(e) and (f), 264.171, 264.196]		Appendix 7A and Unit-Specific Portion
G-4f	Post-Emergency Actions 360(2)(h),(i),(j), and (k); 640(7) [264.56(g) and (h)]		Appendix 7A and Unit-Specific Portion
G-5	Emergency Equipment 350(3)(e) [264.52(e)]		Appendix 7A and Unit-specific Portion
G-6	Coordination Agreements 350(3)(c), 340(4) [264.52(c), 264.37]		Appendix 7A
G-7	Evacuation Plan 350(3)(f), 355 [264.52(f)]		Appendix 7A and Unit-Specific Portion
G-8	Required Reports, Recordkeeping, and Certifications 360(2)(k), 640(7)(d)(iii), 640(7)(f) [264.56(j)]		Appendix 7A and Unit-Specific Portion
G-8(1)	General Requirements		Appendix 7A and Unit-Specific Portion
G-8(2)	Requirements for Tank Systems		Appendix 7A and Unit-Specific Portion
H.	**Personnel Training** 806(4)(a)(xii), 330 [270.14(b)(12), 264.16]		Chapter 8.0
H-1	Job Title/Job Description 330(2)(a) [264.16(d)(1) and (2)]		Unit-Specific Portion
H-2	Outline of Training Program 806(4)(a)(xii), 330(1) and (2)(b) [270.14(b)(12); 264.16(a)(1),(c), and (d)(3)]		Unit-Specific Portion

		Technically Adequate?	Location in Application
H-3	Implementation of Training Program 330(1)(c), 330(2)(c), 330(3) [264.16(b)]		Unit-Specific Portion
I.	**Closure and Financial Assurance** 806(4)(a)(xiii), 610, 620 [270.14(b)(15), 264.142, 264.143, 264.151]		Chapter 11.0
I-1	Closure Plan/Financial Assurance for Closure 806(4)(a)(xiii), 610(2) - (6) [270.14(b)(13), 264.111, 264.112]		11.1
I-1a	Closure Performance Standard 610(2)(b) [264.111]		11.1.1
I-1b	Closure Activities 610(3)(a)(i) through (vi); 610(5); 630(10); 640(5) [264.112(b)(1), 264.112(b)(4), 264.114, 264.178, 264.197]		11.1.2
I-1b(1)	Maximum Extent of Operation		11.1.2.1
I-1b(2)	Removing Dangerous Wastes		11.1.2.2
I-1b(3)	Decontaminating Structures, Equipment, and Soil		11.1.2.3
I-1b(4)	Sampling and Analysis to Identify Extent of Decontamination/ Removal and to Verify Achievement of Closure Standard		11.1.2.4
I-1b(4)(a)	Sampling to Confirm Decontamination of Structures and Soils		11.1.2.4
I-1b(5)	Other Activities 610(3)(vi)		

		Technically Adequate?	Location in Application
I-1c	Maximum Waste Inventory 610(3)(a)(iii) [264.112(b)(3)]		11.1.3
I-1d	Closure of Waste Piles, Surface Impoundments, Incinerators, Land Treatment, and Miscellaneous Units		11.1.4
I-1e	Closure of Landfill Units		11.1.5
I-1f	Schedule for Closure 610(3)(a)(vii) [264.112(b)(6)]		11.1.6
I-1g	Extension for Closure Time 610(4)(a), 610(4)(b) [264.113(a), 264.113(b)]		11.1.7
I-1h	Closure Cost Estimate 806(4)(a)(xv), 620(3) [270.14(b)(15), 264.142]		11.1.8
I-1i	Financial Assurance Mechanism for Closure 806(4)(a)(xv), 620(4) and (10) [270.14(b)(15), 264.143, 264.151]		11.1.9
I-2	Notice in Deed of Already Closed Disposal Units 806(4)(a)(xiv), 610(10) [270.14(b)(14), 264.120, 264.117(c), 264.119]		11.2
I-3	Post-Closure Plan		11.3
I-4	Liability Requirements 806(4)(a)(xvii), 620(8), 620(10) [270.14(b)(17), 264.147, 264.151]		11.4
I-4a	Coverage for Sudden Accidental Occurrences 620(8)(a) [264.147(a),(f)]		11.4
I-4b	Coverage for Nonsudden Accidental Occurrences		11.4

		Technically Adequate?	Location in Application
I-4c	Request for Variance 620(8)(c) [264.147(c)]		11.4
J.	**Other Federal and State Laws** 806(4)(a)(xix) [270.14(b)(20), 270.3]		Chapter 13.0
a.	Federal laws -- the Wild and Scenic Rivers Act, National Historic Preservation Act of 1966, Endangered Species Act, Coastal Zone Management Act, Clean Water Act, Toxic Substances Control Act (for PCBs), Fish and Wildlife Coordination Act, and Atomic Energy Act (National Regulatory Commission licenses for "mixed waste");		
b.	State Laws -- Chapter 90.48 Revised Code of Washington (RCW) Water Pollution Control, Chapter 70.94 RCW Washington Clean Air Act, Chapter 90.58 RCW Shoreline Management Act of 1971, Chapter 70.95 Solid Waste Management, and Chapter 70.95C RCW Hazardous Waste Reduction		
K.	**Part B Certification** 806(4)(a), 810(12) and (13) [270.11]		Chapter 14.0

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Chapter 1.0

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TABLE

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1.0 PART A [A]

This chapter addresses Section A of the Washington State Department of Ecology's (Ecology) *Dangerous Waste Permit Application Requirements* (permit application guidance) (Ecology 1987 and 1995). This permit application guidance calls for a discussion of the Part A forms for the Hanford Facility.

The Hanford Facility is a single *Resource Conservation and Recovery Act* (RCRA) *of 1976* facility, and as such has been issued a single identification number by the U.S. Environmental Protection Agency (EPA) and Ecology (EPA/State Identification Number WA7890008967). The Hanford Facility consists of over 60 treatment, storage, and/or disposal (TSD) units (listed in Table 1-1 and located on maps discussed in Appendix 2A). These TSD units include, but are not limited to, tank systems, surface impoundments, container storage areas, containment buildings, landfills, and miscellaneous units.

The current *Hanford Facility Dangerous Waste Part A Permit Application* (HF Part A) (DOE/RL-88-21) consists of three "Dangerous Waste Permit General Information, Form 1s" (submitted at the facility level for each co-operator); a single "Notice of Dangerous Waste Activities, Form 2" (submitted at the facility level); and over 60 "Dangerous Waste Permit Application, Form 3s" (submitted at the unit level). The HF Part A consolidates into a single controlled document the current revisions of all Part A permit application forms. Thus, the contents of this document have not been reproduced for inclusion in the Part A chapter of the *Hanford Facility Dangerous Waste Permit Application, General Information Portion*.

The HF Part A is designed to facilitate the insertion of new or revised material and is updated quarterly. All revisions to Part A, Form 3s for interim status TSD units are carried out in accordance with the requirements of the *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303-805(7). All revisions to Part A, Form 3s for final status TSD units are carried out in accordance with Condition I.C.3. of the Hanford Facility RCRA Permit (HF RCRA Permit), Dangerous Waste Portion (DW Portion). These revisions include those for TSD units that have been clean closed (refer to Chapter 11.0, Section 11.1.1.1 and 11.5). The Part A, Form 3s for clean-closed TSD units are revised to include the word "CLOSED" across the front of the form and the date the closure certification was accepted by Ecology.

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 1 of 8)

Unit name and type[1]	Document[2] type	Classification[3]	Waste type[4]	Location[5]	Co-Op[6]	Project[7]
'Operating' Treatment, Storage, and/or Disposal Units						
Double-Shell Tank System (TS)	B	3,4	M	200EW	WHC	TWRS
204-AR Waste Unloading Station (T)	B	4	M	200E	WHC	TWRS
242-A Evaporator (TS)	B	3,4	M	200E	WHC	TWRS
222-S Laboratory Complex (TS)	B	1,2,3,4	M	200W	WHC	WM
200 Area Effluent Treatment Facility (TS)	B	1,3,4	M	200E	WHC	WM
Liquid Effluent Retention Facility (TS)	B	6,7	M	200E	WHC	WM
Central Waste Complex (TS)	B	1,2	M	200W	WHC	WM
Waste Receiving and Processing (TS)	B	1,2	M	200W	WHC	WM
Low-Level Burial Grounds (D)	B	11	M	200EW	WHC	WM
224-T Transuranic Waste Storage and Assay Facility (S)	B	1	M	200W	WHC	WM
T Plant Complex (TS)	B	1,2,3,4,10,13	M	200W	WHC	WM
616 Nonradioactive Dangerous Waste Storage Facility (S)	B	1	H	600	WHC	WM
PUREX Storage Tunnels (S)	B	12	M	200E	WHC	FT
325 Hazardous Waste Treatment Units (TS)	B	1,2,3,4	M	300	PNL	TD
305-B Storage Unit (S)	B	1	M	300	PNL	TD

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 2 of 8)

Unit name and type[1]	Document[2] type	Classification[3]	Waste type[4]	Location[5]	Co-Op[6]	Project[7]
Treatment, Storage, and/or Disposal Units 'Undergoing Closure'						
207-A South Retention Basin (S)	U	6	M	200E	WHC	TWRS
216-B-3 Expansion Ponds (TD)	C	7,8,15	M	200E	WHC	TWRS
216-B-63 Trench (TD)	C/PC	7,8	M	200E	WHC	TWRS
200 West Area Ash Pit Demolition Site (T)	C	13,15	H	200W	WHC	WM
218-E-8 Borrow Pit Demolition Site (T)	C	13,15	H	200E	WHC	WM
Hanford Patrol Academy Demolition Sites (T)	C	13,15	H	600	WHC	WM
2727-S Storage Facility (S)	C	1,15	H	200W	WHC	WM
4843 Alkali Metal Storage Facility (S)	C	1	M	400	WHC	WM
105-DR Large Sodium Fire Facility (TS)	C	1,13	H	100	WHC	FT
3718-F Alkali Metal Treatment and Storage Area (TS)	C	1,4,13	M	300	WHC	FT
304 Concretion Facility (TS)	C	1,2,15	M	300	WHC	FT
300 Area Solvent Evaporator (TS)	C	1,4,15	M	300	WHC	FT
300 Area Waste Acid Treatment System (TS)	C	3,4,13	M	300	WHC	FT
303-M Oxide Facility (T)	C	9	M	300	WHC	FT
303-K Storage Unit (S)	C	1	M	300	WHC	FT
2101-M Pond (D)	C/PC	8,15	H	200E	WHC	BWIP
Hexone Storage and Treatment Facility (TS)	C	1,3,4	M	200W	BHI	ER
241-CX Tank System (S)	U	3	M	200E	BHI	ER

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 3 of 8)

Unit name and type[1]	Document[2] type	Classification[3]	Waste type[4]	Location[5]	Co-Op[6]	Project[7]
183-H Solar Evaporation Basins (TS)	C/PC	3,4	M	100	BHI	ER
1324-N Surface Impoundment (T)	C/PC	7	H	100	BHI	ER
1301-N Liquid Waste Disposal Facility (D)	C/PC	11	M	100	BHI	ER
1325-N Liquid Waste Disposal Facility (D)	C/PC	11	M	100	BHI	ER
1324-NA Percolation Pond (TD)	C/PC	8,13	H	100	BHI	ER
100-D Ponds (TD)	C/PC	8,13	H	100	BHI	ER
216-S-10 Pond and Ditch (D)	C/PC	8	M	200W	BHI	ER
216-A-29 Ditch (TD)	C/PC	8,13	M	200E	BHI	ER
216-B-3 Main Pond (TD)	C/PC	7,8	M	200E	BHI	ER
216-A-10 Crib (D)	C/PC	11	M	200E	BHI	ER
216-U-12 Crib (D)	C/PC	11	M	200W	BHI	ER
216-A-36B Crib (D)	C/PC	11	M	200E	BHI	ER
216-A-37-1 Crib (D)	C/PC	11	M	200E	BHI	ER
300 Area Process Trenches (D)	C/PC	8	M	300	BHI	ER
Nonradioactive Dangerous Waste Landfill (D)	C/PC	11	H	600	BHI	ER
Simulated High-Level Waste Slurry Treatment/Storage (TS)	C	1,2,15	M	3000	PNL	TD

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 4 of 8)

Unit name and type[1]	Document type[2]	Classification[3]	Waste type[4]	Location[5]	Co-Op[6]	Project[7]
Treatment, Storage, and/or Disposal Units which are, or are Anticipated to be, 'Dispositioned through Other Options'						
PUREX Plant (TS)	O[a]	3,4,10	M	200E	WHC	FT
241-Z Treatment and Storage Tanks (TS)	O[a]	3,4	M	200W	WHC	FT
B Plant Complex (TS)	O[a]	1,3,4,10	M	200E	WHC	FT
1706-KE Waste Treatment System (TS)	O[b]	3,13	M	100	WHC	FT
221-T Containment Systems Test Facility (T)	O[b]	13	H	200W	WHC	FT
2727-WA Sodium Reactor Experiment Sodium Storage Building (S)	O[b]	1	M	200W	WHC	TWRS
437 Maintenance and Storage Facility (T)	O[b]	4	M	400	WHC	FT
324 Pilot Plant (T)	O[b]	4	M	300	PNL	TD
Biological Treatment Test Facilities (T)	O[b]	13	M	300	PNL	TD
Physical and Chemical Treatment Test Facilities (TS)	O[b]	1,13	M	300	PNL	TD
Thermal Treatment Test Facilities (T)	O[b]	13	M	300	PNL	TD
332 Storage Facility (S)	O[b]	1	M	300	PNL	TD
Sodium Storage Facility and Sodium Reaction Facility (TS)	O[c]	3,4	M	400	WHC	FT
600 Area Purgewater Storage and Treatment Facility (TS)	O[d]	12,13	M	600	WHC	ER
Single-Shell Tank System (TS)	O[e]	3,4,5	M	200EW	WHC	TWRS

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 5 of 8)

Unit name and type[1]	Document[2] type	Classification[3]	Waste type[4]	Location[5]	Co-Op[6]	Project[7]
Grout Treatment Facility (TSD)	0[f]	3,4,7,11	M	200E	WHC	TWRS
Hanford Waste Vitrification Plant (TS)	0[g]	1,3,4,12,13	M	200E	WHC	TWRS

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 6 of 8)

KEY:

[1] UNIT NAME AND TYPE — Name of Hanford Facility TSD unit and type (in parentheses). The letters designate the unit type as follows:

T -- Treatment
S -- Storage
D -- Disposal.

[2] DOCUMENT TYPE — Type of documentation submitted, and/or anticipated to be submitted, to support disposition:

B -- Part B
C -- Closure plan
PC -- Postclosure plan
W -- Closure work plan
U -- Undetermined
O -- Other options:

[a] TSD unit being closed, or anticipated to be closed, under Section 8.0 of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)

[b] Procedural closure in accordance with Section 6.3.3 of the Tri-Party Agreement or in response to withdrawal requests submitted in fulfillment of Tri-Party Agreement Milestone M-20-45

[c] To be designated as a TSD unit if the Fast Flux Test Facility sodium is determined to have no beneficial use

[d] Interim status TSD unit to be closed in accordance with the *Purgewater Management Plan* [Attachment 5 of the HF RCRA Permit (DW Portion)]

[e] TSD unit subject to the closure work plan/closure plan process in accordance with Tri-Party Agreement Milestone M-45-06

[f] Interim status TSD unit in a standby mode; unit is to be superseded by a low-level waste immobilization facility

[g] Interim status TSD unit is to be superseded by a high-level waste immobilization facility.

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 7 of 8)

KEY (cont):

[3] CLASSIFICATION

1 -- Container - Storage
2 -- Container - Treatment
3 -- Tank - Storage
4 -- Tank - Treatment
5 -- Waste pile
6 -- Surface impoundment - Storage
7 -- Surface impoundment - Treatment
8 -- Surface impoundment - Disposal
9 -- Incinerator
10 -- Containment Building
11 -- Landfill
12 -- Miscellaneous - Storage
13 -- Miscellaneous - Treatment
14 -- Land treatment
15 -- Certified clean closure; regulatory acceptance letter received.

[4] WASTE TYPE

M -- TSD unit manages, managed, or is/was anticipated to manage mixed waste and dangerous waste.
H -- TSD unit manages, managed, or is/was anticipated to manage dangerous waste.

[5] LOCATION

The area of the Hanford Facility in which the TSD unit is located:

100 -- 100 Area
200E -- 200 East Area
200W -- 200 West Area
200EW -- Parts of a TSD unit are located in both the 200 East and the 200 West Areas
300 -- 300 Area
400 -- 400 Area
600 -- 600 Area
3000 -- 3000 Area.

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Table 1-1. Hanford Facility Treatment, Storage, and/or Disposal Units. (sheet 8 of 8)

KEY (cont):

[6] CO-OP	Co-operator with the U.S. Department of Energy, Richland Operations Office as the owner/operator: BHI -- Bechtel Hanford, Inc. PNNL -- Pacific Northwest National Laboratory WHC -- Westinghouse Hanford Company.
[7] PROJECT	Hanford Projects are as follows: TWRS -- Tank Waste Remediation System WM -- Waste Management FT -- Facility Transition ER -- Environmental Restoration TD -- Technology Development.

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CONTENTS

APPENDICES

FIGURES

2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B AND E]

This chapter describes the Hanford Site and Hanford Facility and addresses general provisions and information needs identified in Sections B and E of Ecology's permit application guidance (Ecology 1987 and 1995). Topics discussed include the following:

- General description
- Topography
- Location information
- Seismic consideration
- Traffic information
- Waste management units.

Provisions included in Standard Conditions of the HF RCRA Permit (Part I of the DW Portion) also are addressed.

The information contained in Chapter 2.0 need not be duplicated in the Unit-Specific Portion of the *Hanford Facility Dangerous Waste Permit Application* or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation, but will be cross-referenced as appropriate (including the Glossary contained in Appendix 2B of the General Information Portion).

2.1 GENERAL DESCRIPTION [B-1]

The Hanford Facility is owned by the U.S. Government and operated by the U.S. Department of Energy, Richland Operations Office (DOE-RL). Dangerous waste and mixed waste (containing both dangerous and radioactive components) are produced and managed on the Hanford Facility. Waste components are regulated in accordance with the RCRA, the *Hazardous and Solid Waste Amendments* (HSWA) *of 1984*, and/or the *State of Washington Hazardous Waste Management Act of 1976* (as administered through Ecology's *Dangerous Waste Regulations*, WAC 173-303); or the *Atomic Energy Act of 1954*.

The permitting framework for the Hanford Facility was established by the original 1989 Tri-Party Agreement. The original document addressed the Hanford Facility as a single RCRA facility (EPA/State Identification Number WA7890008967) consisting of over 60 TSD units. Approximately 25 percent of these units are, or are anticipated to be, 'operating'; approximately 50 percent are 'undergoing closure'; and approximately 25 percent are, or are anticipated to be, 'dispositioned through other options' under the Tri-Party Agreement (refer to Chapter 1.0, Table 1-1).

The original Tri-Party Agreement also established a stepwise permitting process that provided for the issuance of an initial RCRA permit for less than the entire Hanford Facility. Any TSD units not included in the initial permit were to be incorporated through a permit modification. The TSD units not yet incorporated into the RCRA permit were to continue to operate under interim status. Subsequent amendments of the Tri-Party Agreement have retained the RCRA permitting approach established by the original 1989 document.

The initial HF RCRA Permit became effective in September 1994, and is comprised of two portions, a DW Portion, issued by Ecology, and a HSWA Portion, issued by the EPA, Region 10. The DW Portion is issued to four Permittees: DOE-RL, as the owner/operator, and to three of its contractors, as co-operators. The HSWA Portion is issued to DOE-RL, as the owner/operator.

For purposes of the *Hanford Facility Dangerous Waste Permit Application*, the U.S. Department of Energy's contractors are identified as 'co-operators' and sign in that capacity (refer to Condition I.A.2. of the HF RCRA Permit [DW Portion]). Any identification of these contractors as an 'operator' elsewhere in the application is not meant to conflict with the contractors' designation as co-operators but rather is based on the contractors' contractual status with the U.S. Department of Energy, Richland Operations Office.

The initial HF RCRA Permit (DW Portion), which incorporated five TSD units, was based on information submitted in the *Hanford Facility Dangerous Waste Permit Application* and in closure plan and closure/postclosure plan documentation. During 1995, the DW Portion was modified twice to incorporate another eight TSD units. The permit modification process will be used at least annually to incorporate additional TSD units as permitting documentation for these units is finalized. The units to be included in annual modifications are specified in a schedule contained as Attachment 27 of the HF RCRA Permit (DW Portion). Hanford Facility TSD units will remain in interim status until incorporated into the HF RCRA Permit. Reference to the HF RCRA Permit in the remainder of this document refers to the most recent revision, unless otherwise specified.

The *Hanford Facility Dangerous Waste Permit Application* is considered to be a single application organized into a General Information Portion (this document, DOE/RL-91-28) and a Unit-Specific Portion. The scope of the Unit-Specific Portion is limited to individual, 'operating' TSD units for which Part B permit application documentation has been, or is anticipated to be, submitted (refer to Chapter 1.0, Table 1-1). Documentation for TSD units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with the provisions of the Tri-Party Agreement. However, the scope of the General Information Portion includes information that could be used to discuss 'operating' units, units 'undergoing closure', or units being 'dispositioned through other options'. Alternatives for addressing Hanford Facility TSD units are identified as follows:

- 'Operating' TSD unit (submittal of Part B permit application documentation)

- TSD unit 'undergoing closure'

  - Clean closure (submittal of closure plan documentation)

  - Modified closure (submittal of closure/postclosure plan and postclosure permit application documentation)

  - Closure as a land disposal unit (submittal of closure/postclosure plan and postclosure permit application documentation)

  - Closure in conjunction with an operable unit (in accordance with Section 6.1 of the Tri-Party Agreement).

- TSD unit 'dispositioned through other options'

  - Procedural closure (in accordance with Section 6.3.3 of the Tri-Party Agreement or in response to withdrawal requests submitted in fulfillment of Tri-Party Agreement Milestone M-20-45)

  - Facility decommissioning process (in accordance with Section 8.0 of the Tri-Party Agreement)

  - TSD unit operating under interim status in accordance with a specific agreement between DOE-RL and the regulators [e.g., *Purgewater Management Plan* (Attachment 5 of the HF RCRA Permit)]

  - TSD unit subject to the closure work plan/closure plan process in accordance with Tri-Party Agreement Milestone M-45-06 [e.g., Single-Shell Tank Closure Work Plan (DOE/RL-89-16)].

Further discussion of these alternatives is included in Sections 2.1.1.3 and 2.5.

The intent of the General Information Portion is: (1) to provide an overview of the Hanford Facility; and (2) to assist in streamlining efforts associated with TSD unit-specific Part B permit application, preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation development and the HF RCRA Permit modification process. Wherever appropriate, the Unit-Specific Portion of the application, as well as preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation, will make cross-reference to the General Information Portion, rather than duplicating text. Thus, HF RCRA Permit modifications involving general information will require updating only the General Information Portion instead of each unit-specific document.

2.1.1 Facility Description [B-1a]

This section includes a general description and/or discussion of the following:

- Hanford Site
- Hanford Facility
- Hanford Facility permitting
- Hanford Mission
- Description of dangerous waste management operations and processes
- Other processes regulated under WAC 173-303
- Other environmental permits.

2.1.1.1 Hanford Site. The Hanford Site covers approximately 1,450 square kilometers of semiarid land that is owned by the U.S. Government and managed by the DOE-RL (Figure 2-1). The city of Richland adjoins the southeastern most portion of the Hanford Site boundary and is the nearest population center.

In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for plutonium production for national defense. For over 20 years, activities were primarily dedicated to the continuation of plutonium production and managing the waste generated. In later years, activities became increasingly diverse, involving research and development for advanced reactors and renewable energy technologies. The end of the Cold War brought the shutdown of most of the Hanford Site's plutonium production and management facilities. The current Hanford Mission is to clean up the Hanford Site, provide scientific and technological excellence to meet global needs, and to partner in the economic diversification of the region (DOE/RL-93-102).

The Hanford Site is divided into numerically designated areas (Drawing H-6-958 in Appendix 2A). These areas served as the location for reactor, chemical separation, and related activities for the production and purification of special nuclear materials (Appendix 2B) and other nuclear activities. The reactors are located along the Columbia River in the 100 Areas. The reactor fuel reprocessing units are in the 200 Areas, which are on a plateau approximately 11 kilometers from the Columbia River. The 300 Area, located adjacent to and north of Richland, contains the reactor fuel manufacturing plants and the research and development laboratories. The 400 Area, 8 kilometers northwest of the 300 Area, contains the Fast Flux Test Facility designed for testing liquid metal reactor systems. The 600 Area covers all locations not specifically given an area designation. Adjacent to and north of Richland, the 1100 Area contains offices associated with administration, maintenance, transportation, and materials procurement and distribution. The 3000 Area, between the 1100 Area and 300 Area, contains offices and the Environmental and Molecular Sciences Laboratory. Offices also are located in the 700 Area, which is in downtown Richland.

Where general information for the Hanford Site is discussed in this permit application portion, such information also applies to the Hanford Facility, unless otherwise designated.

2.1.1.2 Hanford Facility. The Hanford Facility currently contains over 60 TSD units (refer to Chapter 1.0, Table 1-1) described in the HF Part A. The boundary of the Hanford Facility, as defined in Attachment 2 of the HF RCRA Permit (DW Portion), is shown in Figure 2-1. As noted in Figure 2-1, this facility definition only excludes land owned by Washington State.

However, a Permit Applicability Matrix contained as Attachment 3 of the HF RCRA Permit (DW Portion) does indicate that Permit conditions do not apply to lands north and east of the Columbia River, unless TSD activities are initiated there or corrective action activities need to be undertaken there (Figure 2-2).

The Permittees, in their comments on the second draft of the HF RCRA Permit (DW Portion) issued by Ecology for public review in 1994 (DOE-RL et al. 1994), defined the Hanford Facility as consisting of the contiguous portion of the Hanford Site that contains TSD units and, for the purposes of RCRA, is owned by the U.S. Government and operated by the DOE-RL (excluding lands north and east of the Columbia River, river islands, lands under the exclusive jurisdiction or control by the Bonneville Power Administration, lands leased to the Washington Public Power Supply System, and lands owned by or leased to Washington State) (Figure 2-3).

Exclusion of the noted lands by the Permittees is based on the following rationale. The lands north and east of the Columbia River contain no TSD units. These lands are under consideration for non-U.S. Department of Energy use and for ownership transfer (DOE 1996). In addition, the DOE-RL has no control over Bonneville Power Administration lands or lands that are owned by or leased to Washington State (e.g., US Ecology site). The U.S. Department of Energy lands leased to the Washington Public Power Supply System are to be covered by a separate dangerous waste permit and, therefore, are not included in the HF RCRA Permit. The legal description of the Hanford Facility, set forth by the Permittees in Appendix 2C, is based on this rationale and is consistent with the facility definition provided to Ecology in 1994 (DOE-RL et al. 1994), with one exception. This exception covers the addition of land now occupied by the Environmental and Molecular Sciences Laboratory. The physical description of the Hanford Facility (including structures, appurtenances, and improvements) is included in Appendix 2A.

Depending on context, the term 'facility', as used in the *Hanford Facility Dangerous Waste Permit Application*, also could refer to building nomenclature (Appendix 2B). In this context, the term 'facility' either remains uncapitalized or as part of the title for various TSD units [e.g., 616 Nonradioactive Dangerous Waste Storage Facility (616 NRDWSF)].

2.1.1.3 Hanford Facility Permitting. This section describes the permitting approach for the Hanford Facility. This approach accommodates requirements established by applicable regulations and authorities, the Tri-Party Agreement, the HF RCRA Permit, and the *Hanford Facility Dangerous Waste Permit Application*. As noted in the Introduction and Definition Sections of the HF RCRA Permit (DW Portion), the Permit is intended to be consistent with the terms and conditions of the Tri-Party Agreement. Coordination with the Tri-Party Agreement is addressed in Condition I.A.3. of the HF RCRA Permit (DW Portion).

2.1.1.3.1 Applicable Regulations and Authorities. The requirements of RCRA and the *State of Washington Hazardous Waste Management Act* (as administered through WAC 173-303) pertain to all Hanford Facility units that were used to treat, store, and/or dispose of hazardous waste after

November 19, 1980; State-only dangerous waste after March 12, 1982; mixed waste since 1987; and units at which such waste will be treated, stored, and/or disposed in the future, except as provided by WAC 173-303-200 and WAC 173-303-802.

Until 1994, none of EPA's RCRA authorizations to Washington State included delegation for HSWA provisions. On January 12, 1994, Washington State submitted a program revision application for additional program approvals related to the corrective action provisions of HSWA. On March 30, 1994, the EPA published a proposal to approve this application in accordance with 40 CFR 271.21(b)(4). On November 4, 1994, the EPA made a final decision that Washington State's hazardous waste program revision satisfies all of the requirements necessary to qualify for final authorization. This decision was based on Washington State's amendment of the *Dangerous Waste Regulations* to include corrective action requirements. Washington State also can rely on existing 'superfund-like' cleanup authority under the *Model Toxics Control Act* (MTCA) (as implemented through WAC 173-340, *Model Toxics Control Act Cleanup Regulation*) (59 FR 55322).

'Dangerous waste' means hazardous, dangerous, or extremely hazardous waste as defined by RCRA and/or WAC 173-303 (refer to Appendix 2B of this document). 'Mixed waste' means waste that contains both dangerous and radioactive components (Appendix 2B). The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under RCRA and WAC 173-303. It is the position of the U.S. Department of Energy that any procedures, methods, data, or information contained in the *Hanford Facility Dangerous Waste Permit Application* that relate solely to the radioactive component of mixed waste are outside the scope of the permit application and the HF RCRA Permit, but are included for the sake of completeness. It is the position of Ecology that the radioactive component influences safe management of mixed waste and therefore information about this component is necessary to ensure compliance with WAC 173-303 and the HF RCRA Permit. Both agencies acknowledge the other's position, but to avoid a conflict on the issue, the DOE-RL has agreed to provide information on radioactive constituents without agreeing with Ecology's position. Ecology has agreed to accept the information in this context without giving up its position.

The Hanford Facility 'operating' TSD units include, but are not limited to, tank systems, surface impoundments, container storage areas, containment buildings, landfills, and miscellaneous units (refer to Chapter 1.0, Table 1-1) that were, are, or are anticipated to be, involved in dangerous and/or mixed waste activities. The scope of the Unit-Specific Portion is limited to individual 'operating' TSD units for which Part B permit application documentation has been, or is anticipated to be, submitted. However, the scope of the General Information Portion includes information that could be used to discuss 'operating' units, units 'undergoing closure', or units being 'dispositioned through other options'. Unit-specific documentation for TSD units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with the provisions of the Tri-Party Agreement.

In accordance with the stepwise RCRA permitting process defined for the Hanford Facility in the Tri-Party Agreement, those TSD units that are not yet incorporated into the HF RCRA Permit (DW Portion) will continue to operate under interim status. Interim status capacity expansion of the Hanford Facility is still possible in accordance with the provisions of WAC-173-303-281, as applicable, and WAC 173-303-805(7).

Dangerous waste and the dangerous waste component of mixed waste on the Hanford Facility are subject to land disposal restrictions (LDR) (40 CFR 268 and WAC 173-140). Ecology has not yet received authorization from the EPA to administer all of the LDR provisions of RCRA pursuant to Section 3006 (refer to Section 6.1 of the Tri-Party Agreement Action Plan). When this authorization is received, Ecology will review applicable LDR requirements for purposes of requirements administration.

2.1.1.3.2 Hanford Federal Facility Agreement and Consent Order. The Tri-Party Agreement, as initially established in 1989 and subsequently amended, is a legal document covering Hanford Site environmental compliance and restoration and remediation activities. Reference to the Tri-Party Agreement in the *Hanford Facility Dangerous Waste Permit Application* refers to the most recent amendment of the document, unless specified otherwise. The Tri-Party Agreement is divided into two parts, the Agreement and Consent Order and the Action Plan.

Purposes of the Tri-Party Agreement as related to RCRA permitting include the following:

- To provide a framework for permitting TSD units and to promote an orderly, effective investigation and cleanup of contamination on the Hanford Site

- To ensure compliance with the RCRA and the *State of Washington Hazardous Waste Management Act* for TSD units, including requirements covering permitting, compliance, closure, and postclosure care

- To establish a procedural framework and schedule for developing, prioritizing, implementing, and monitoring appropriate response actions on the Hanford Site in accordance with the CERCLA, the National Contingency Plan, the Superfund guidance and policy, RCRA, and RCRA guidance and policy

- To identify TSD units that require permits; to establish schedules to achieve compliance with interim and final status requirements and to complete Part B permit application documentation for such units in accordance with the Tri-Party Agreement Action Plan; to identify TSD units that will undergo closure; to close such units in accordance with applicable laws and regulations; to require postclosure care where necessary; and to coordinate closure with any inter-connected remedial action on the Hanford Site

- To minimize the duplication of analysis and documentation.

The Tri-Party Agreement Action Plan, an enforceable part of the Tri-Party Agreement, establishes methods, procedures, and plans for (1) compliance, permitting, and closure under the RCRA and the *State of Washington Hazardous Waste Management Act* and (2) cleanup of the Hanford Site under CERCLA and RCRA corrective action provisions. The Tri-Party Agreement Action Plan also specifies which regulatory agency (i.e., either Ecology or EPA) has lead responsibility.

Appendix B of the Tri-Party Agreement Action Plan contains a listing of Hanford Facility TSD units. In accordance with Section 5.3 of the Tri-Party Agreement Action Plan, any additional TSD units that are identified are to be added to Appendix B. Within the Tri-Party Agreement Action Plan, Section 2.4 and Appendix D include the identification of major milestones established to achieve compliance with RCRA and WAC 173-303 TSD requirements. Such milestones (M) include those for submittal of Part B permit application, closure plan, closure/postclosure plan, and withdrawal request documentation (M-20-00), submittal of preclosure work plan and closure work plan (M-45-06) documentation, installation of RCRA groundwater monitoring wells (M-24-00), and RCRA past-practice site investigations and remedial actions.

In Section 6.2 of the Tri-Party Agreement Action Plan, the permitting process for the over 60 TSD units that comprise the Hanford Facility is described. Figure 2-4, taken from Section 6.2 of the Tri-Party Agreement Action Plan, depicts a flowchart for processing all dangerous waste permitting documentation for 'operating' TSD units by the Permittees. This process applies to existing TSD units, units subject to interim status capacity expansion, and new units (i.e., units that do not have interim status and must have a permit before construction). The process for TSD units 'undergoing closure' is addressed in more detail in Section 2.5. Figure 2-5, taken from Section 6.3 of the Tri-Party Agreement Action Plan, depicts a flowchart for processing closure plan documentation.

The review of each submittal to the regulator is to be conducted in accordance with a process supported by the development of working drafts, project manager meetings, and workshops. In accordance with Section 4.1 of the Tri-Party Agreement Action Plan, project manager meetings are held to discuss progress, address issues, and review plans pertaining to a specific TSD unit. These meetings are held monthly, unless the project managers for the three parties (DOE-RL, Ecology, and the EPA) agree that a meeting is not appropriate. Workshops also are held between the Permittees and the regulators, on an as-needed basis, to address and resolve comments associated with the working drafts.

At the end of the review and comment response process, final documentation is readied for an 'operating' TSD unit and serves as the basis for incorporation of that unit into the HF RCRA Permit (DW Portion). For example, for finalized, TSD unit-specific Part B permit application documentation submitted by the Permittees, a final permit decision will be made by Ecology pursuant to WAC 173-303-840. Specific conditions for this TSD unit will be incorporated into Part III of the HF RCRA Permit (DW Portion) during the next annual Class 3 permit modification (refer to Section 2.1.1.3.3). A process flowchart for modification of the HF RCRA Permit is included as Figure 2-6.

A similar documentation finalization process is in place for TSD units 'undergoing closure' (Figure 2-5), and is discussed in more detail in Section 2.5. Chapter 1.0, Table 1-1, identifies Hanford Facility TSD units that are 'undergoing closure'. Preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation is to be developed for most of these TSD units in accordance with Sections 2.4, 5.3, 6.3, and 8.0 and Appendix D of the Tri-Party Agreement Action Plan.

Chapter 1.0, Table 1-1 also identifies a number of Hanford Facility TSD units for which procedural closure will be sought in accordance with Section 6.3 of the Tri-Party Agreement Action Plan or in response to withdrawal requests submitted in fulfillment of Tri-Party Agreement Milestone M-20-45. Procedural closure is used for those units that were classified as being TSD units, but actually were never used to treat, store, or dispose of hazardous waste after November 19, 1980; State-only dangerous waste after March 12, 1982; and mixed waste since 1987, except as provided by WAC 173-303-200 or WAC 173-303-802 (Tri-Party Agreement). Procedural closure is discussed in more detail in Section 2.5.1.3.

2.1.1.3.3 Hanford Facility Resource Conservation and Recovery Act Permit. The initial HF RCRA Permit became effective in September 1994, and is comprised of two portions, a DW Portion and a HSWA Portion.

The HF RCRA Permit (DW Portion) is divided as follows:

<u>Part I: Standard Conditions.</u> Part I contains conditions that are similar to those appearing in all dangerous waste permits issued by Ecology.

<u>Part II: General Facility Conditions.</u> Part II combines typical DW Portion conditions with those conditions intended to address issues specific to the Hanford Facility. Where appropriate, the General Facility Conditions apply to all final status dangerous waste management activities on the Hanford Facility. Where appropriate, the General Facility Conditions also address dangerous waste management activities that might not be directly associated with distinct TSD units or that could be associated with many TSD units (i.e., spill reporting, training, contingency planning, etc.).

<u>Part III: Unit-Specific Conditions for Operating TSD Units.</u> Part III contains those permit requirements that apply to each individual TSD unit operating under final status. Conditions for each TSD unit are found in a permit chapter dedicated to that TSD unit. These unit-specific permit chapters contain references to Standard and General Facility Conditions (Parts I and II), as well as additional requirements that are intended to ensure that each TSD unit is operated in an efficient and environmentally

protective manner. The Unit-Specific Portion of the *Hanford Facility Dangerous Waste Permit Application* provides Part B permit application documentation that serves as the basis for Part III chapters of the HF RCRA Permit (DW Portion).

Part IV: Corrective Actions for Past-Practices Activities. Part IV references the HSWA Portion.

Part III of the HSWA Portion, Corrective Action, contains these requirements that apply to the identification of SWMUs on the Hanford Facility and conduct of investigations and remediations at such SWMUs. Further discussion of SWMUs is contained in Section 2.5. The corrective action for DOE-RL activities on the Hanford Facility will be satisfied as specified in the Tri-Party Agreement. For those SWMUs not covered by the Tri-Party Agreement, RCRA corrective requirements will be addressed by Part III of the HSWA Portion. Thus, the applicability of Part III of the HSWA Portion primarily pertains to those portions of the Hanford Facility where activities are conducted by a lessee or other entity not contractually connected to, and not under the direction of, the DOE-RL.

Subsequent to the issuance of the initial HF RCRA Permit, the EPA delegated HSWA authority for corrective action provisions to Ecology (i.e., on November 4, 1994; refer to Section 2.1.1.3.1). However, all permits issued by the EPA prior to final authorization of Washington State for corrective action will continue to be administered by the EPA until the issuance, or reissuance after modification, of a state RCRA permit (59 FR 55322). Thus, the EPA will continue to administer the corrective action provisions for the Hanford Facility through the HF RCRA Permit (HSWA Portion) until a future modification incorporates these provisions into the DW Portion. At that time, those EPA-issued permit provisions for which Washington State is authorized will expire; provisions for which Washington State is not authorized will continue in effect under the HSWA Portion.

The HF RCRA Permit modification incorporating corrective action requirements into the DW Portion is anticipated to occur in 1997.

Part V: Unit-Specific Conditions for TSD Units Undergoing Closure. Part V contains those requirements that apply to specific TSD units undergoing closure. Requirements for each TSD unit undergoing closure are found in a permit chapter dedicated to that TSD unit. These unit-specific permit chapters could contain references to Standard Conditions (Part I) and General Facility Conditions (Part II), and additional requirements that are intended to ensure that each TSD unit is closed in an efficient and environmentally protective manner. Further discussion of the permitting process for TSD units 'undergoing closure' is contained in Section 2.5.

Part VI: Unit-Specific Conditions for Postclosure Units (Proposed). Ecology has proposed that a Part VI be added to the HF RCRA Permit to include chapters for TSD units requiring postclosure care. It is anticipated that this part will be added during the permit modification scheduled for 1997.

The conditions of the HF RCRA Permit (DW Portion) are applied to the Hanford Facility as defined by a Permit Applicability Matrix (Attachment 3, DW Portion) referenced in Condition I.A.1.b. As noted in Condition I.E.2., compliance with the DW Portion constitutes compliance at those areas subject to the HF RCRA Permit for the purpose of enforcement with WAC 173-303-140, -180, -280 through -395, -600 through -680, -810, and -830.

The HF RCRA Permit (DW Portion) is organized to allow a stepwise permitting process as defined in the Tri-Party Agreement. As TSD unit-specific Part B permit application, closure plan, closure/postclosure plan, and postclosure permit application documentation is finalized by the Permittees, and approved by Ecology, additional Unit-Specific Conditions are incorporated into the HF RCRA Permit through the permit modification process. For example, during 1995, the DW Portion was modified twice to incorporate eight TSD units.

Modifications to incorporate additional TSD units into the HF RCRA Permit (DW Portion) are conducted in accordance with the Class 3 permit modification procedure specified in WAC 173-303-830 or -840. Except for minor modifications (i.e., Class 1 and Class ^{1}1), proposed modifications (i.e., Class 2 and 3) are subject to public comment. Condition I.C.3. of the HF RCRA Permit (DW Portion) incorporates a Class 3 Permit Modification Schedule into the HF RCRA Permit (DW Portion) (i.e., Attachment 27). This schedule identifies, for an 8-year period, which TSD units have been, or are to be, incorporated into the HF RCRA Permit (DW Portion) during each annual Class 3 permit modification cycle. Provision of such a schedule supports the planning needs of the Permittees and regulators who process permitting documentation. This schedule also supports the planning needs of the public and affected Indian Tribes who review and comment on this documentation. In summary, the M-20-00 Milestones found in Appendix D of the Tri-Party Agreement Action Plan are complemented by the Class 3 Permit Modification Schedule (Attachment 27) of the HF RCRA Permit (DW Portion). The former specifies when the permitting documentation process for a TSD unit is to be initiated, while the latter specifies when this process is to be finalized.

The permit modification process is outlined in Figure 2-6. A permit modification does not affect the 10-year term of the HF RCRA Permit [Condition I.C.1. of the HF RCRA Permit (DW Portion)], unless the Permit is revoked and reissued under WAC 173-303-830(3), or terminated under WAC 173-303-830(5), or continued in accordance with WAC 173-303-806(7). In accordance with the stepwise permitting process, only those portions of the HF RCRA Permit (DW Portion) newly proposed for incorporation would be open to public comment. Revocation and reissuance means the existing permit is revoked and an entirely new permit is issued, to include all TSD units permitted as of that date. In this case, all conditions of the permit to be reissued would be open to public comment and a new term would be specified for the reissued permit.

2.1.1.3.4 Hanford Facility Dangerous Waste Permit Application. The *Hanford Facility Dangerous Waste Permit Application* is considered to be a single application organized into a General Information Portion (this document, DOE/RL-91-28) and a Unit-Specific Portion. The scope of the

Unit-Specific Portion is limited to individual, 'operating' TSD units for which Part B permit application documentation has been, or is anticipated to be, submitted. Documentation for TSD units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with the provisions of the Tri-Party Agreement. 'Dangerous waste', as used in the title of the application, refers to waste subject to WAC 173-303 requirements and to requirements of the HSWA, including those for which Ecology has not yet been granted authority by the EPA.

Both the General Information and Unit-Specific portions of the *Hanford Facility Dangerous Waste Permit Application* address the contents of the Part B permit application guidance documentation prepared by Ecology (Ecology 1987 and 1995) and the EPA (40 CFR 270), with additional information needs defined by revisions of WAC 173-303 and by the HSWA. For ease of reference, the alpha-numeric section identifiers from Ecology's permit application guidance documentation follow, in brackets, the chapter headings and subheadings. Both the General Information and the Unit-Specific portions are organized as follows:

- Foreword
- Contents
- Chapter 1.0: Part A [A]
- Chapter 2.0: Facility Description and General Provisions [B and E]
- Chapter 3.0: Waste Analysis [C]
- Chapter 4.0: Process Information [D-1 through D-8]
- Chapter 5.0: Groundwater Monitoring for Land-Based Units [D-10]
- Chapter 6.0: Procedures to Prevent Hazards [F]
- Chapter 7.0: Contingency Plan [G]
- Chapter 8.0: Personnel Training [H]
- Chapter 9.0: Exposure Information Report
- Chapter 10.0: Waste Minimization [D-9]
- Chapter 11.0: Closure and Financial Assurance [I]
- Chapter 12.0: Reporting and Recordkeeping
- Chapter 13.0: Other Federal and State Laws [J]
- Chapter 14.0: Part B Certification [K]
- Chapter 15.0: References.

A checklist indicating where information is included in either the General Information Portion or the Unit-Specific Portion, in relation to Ecology's permit application guidance documentation, is located in the Contents Section.

Documentation contained in the General Information Portion is broader in nature and generally applies to multiple TSD units included in the Unit-Specific Portion. Where appropriate, the Unit-Specific Portion makes cross-reference to the General Information Portion, rather than duplicating text. Thus, the General Information Portion could be used by the regulators as a source for both Unit-Specific and General Facility Permit Conditions. It is anticipated that the General Information Portion will be included in its entirety in the "List of Attachments" of the HF RCRA Permit (DW Portion). However, only portions of this attachment will be enforceable. As noted in the Permit, "[O]nly those portions of the Attachments specified in Parts I through V are enforceable Conditions of this Permit and subject to the Permit modification requirements of Condition I.C.3." The intent of the General Information Portion is: (1) to provide an overview of the Hanford Facility; and (2) to assist in streamlining efforts associated with TSD unit-specific Part B permit application, preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation development, and the HF RCRA Permit modification process.

2.1.1.4 Hanford Mission. The current Mission is to clean up the Hanford Site, provide scientific and technological excellence to meet global needs, and to partner in the economic diversification of the region (DOE/RL-93-102). To facilitate achievement of the Hanford Mission, work generally is organized into one of the following projects:

- Tank Waste Remediation System
- Waste Management
- Facility Transition
- Environmental Restoration
- Technology Development.

A brief discussion of the mission of these projects follows. The TSD units associated with these projects are identified in Chapter 1.0, Table 1-1. 'Operating' TSD units, and their relationship to the Hanford Mission and project missions, are described further in Chapter 4.0. The TSD units 'undergoing closure' or being 'dispositioned through other options' are described briefly in Section 2.5.

2.1.1.4.1 Tank Waste Remediation System. The Tank Waste Remediation System project mission is to store, treat, and immobilize mixed waste (including current and future tank waste) in an environmentally sound, safe, secure, and cost-effective manner. The project's material management responsibilities include mixed waste stored in the Single-Shell Tank (SST) System and the Double-Shell Tank (DST) System. The primary project disposition responsibilities center on retrieval of both SST and DST waste. Once retrieved, the waste will be immobilized to stable, high-level and low-level forms (Appendix 2B) suitable for disposal.

2.1.1.4.2 Waste Management. The Waste Management Project addresses the handling of solid waste, liquid effluents, and spent nuclear fuel. Two subprojects, Solid Waste and Liquid Waste, currently manage dangerous and mixed waste.

Solid Waste Subproject. The mission of the Solid Waste subproject is to treat, store, and dispose of a wide variety of solid materials that fall into multiple radioactive, dangerous, and mixed waste classes. Material management responsibilities for the Solid Waste subproject consist of managing solid waste stored or buried in burial grounds (including retrievable transuranic waste, Appendix 2B) or stored in designated solid waste storage and/or treatment units. The Solid Waste subproject also is responsible for managing receipt of newly generated solid waste from onsite generating units and from offsite generators.

Liquid Waste Subproject. The mission of the Liquid Waste subproject is to manage current and future Hanford Site liquid effluent streams. The underlying purpose of this subproject is to achieve the goal of no longer using the soil column to treat contaminated liquid effluent discharges.

2.1.1.4.3 Facility Transition. The Facility Transition Project mission is to manage facilities such as the PUREX Plant, UO_3 Plant, Plutonium Finishing Plant, Fast Flux Text Facility, B Plant, and the former 300 Area Fuel Supply Facility to transition to a deactivated condition. The project will disposition stored nuclear materials. As stored material is dispositioned, the project facilities will be deactivated and transferred to the Environmental Restoration Project for disposition. The project material management responsibilities include managing storage of residual special nuclear material stored in the Plutonium Finishing Plant, irradiated fuel stored in the PUREX Plant until transferred to consolidated storage, and stored unirradiated uranium. Management of this material includes responsibility for the facilities used for storage. Many of the activities of the Facility Transition Project are addressed by Section 8.0 of the Tri-Party Agreement Action Plan (refer to Section 2.5.2.1).

2.1.1.4.4 Environmental Restoration. The Environmental Restoration Project is divided into four subprojects: (1) D&D, (2) Remedial Action and Waste Disposal, (3) Groundwater Management, and (4) N Area.

The D&D Subproject. The D&D subproject is responsible for the disposition of surplus facilities and closure of TSD units under this project. The material management responsibilities of the D&D subproject include the management of existing surplus facilities, including several types of facilities that are no longer in use. The D&D subproject also will be responsible for ultimately receiving additional facilities from all Hanford Site projects to consolidate D&D activities. This responsibility includes establishing the criteria for transferring additional facilities between the D&D portion and the remaining Hanford Site projects. Hence, a key interface exists between the Environmental Restoration Project and Facility Transition Project.

Remedial Action and Waste Disposal Subproject. The Remedial Action and Waste Disposal subproject is responsible for managing and dispositioning environmental contamination from source areas, including contaminated soils and debris and solid waste contained in land-based TSD units undergoing closure and RCRA and CERCLA past-practice units (refer to Sections 2.5.1.1 and 2.5.1.2, respectively). The major material management responsibilities of this subproject are focused on managing materials contained in these sites. The land-based TSD units 'undergoing closure' (refer to Chapter 1.0, Table 1-1) are briefly described in Section 2.5.1.1. This subproject is responsible for the design, construction, and operation of the Environmental Restoration Disposal Facility (ERDF), a land disposal facility for waste dispositioned under CERCLA authority. The ERDF is not a RCRA-permitted facility, but is compliant with the substantive requirements of RCRA and WAC 173-303.

Groundwater Management Subproject. The Groundwater Management subproject is responsible for managing and dispositioning groundwater contamination. This contamination has resulted from activities at RCRA and CERCLA past-practice units and activities at inactive TSD units. In addition, all groundwater monitoring programs (RCRA, CERCLA, and other environmental programs) are coordinated under this subproject.

The N Area Subproject. The N Area subproject is a pilot project for coordinating the management and remediation of the 100-N Area. The subproject includes the closure of the 1301-N, 1324-N/NA, and 1325-N TSD units, the remediation of RCRA past-practice units, the remediation of groundwater, and deactivation and decommissioning of facilities in the 100-N Area. All TSD units in the 100-N Area are 'undergoing closure' and are described briefly in Section 2.5.1.1.

2.1.1.4.5 Technology Development. The Technology Development Project covers a broad spectrum of activities supporting science and technology development. The project responsibilities for management and disposition of materials are limited to quantities associated with past, current, and future development activities.

2.1.1.5 Description of Dangerous Waste Management Operations and Processes. A brief description of dangerous waste management operations and processes for Hanford Facility TSD units is contained in Section 2.5 (for units 'undergoing closure' or being 'dispositioned through other options') and in Chapter 4.0, Section 4.1 (for 'operating' units). Additional detail for 'operating' TSD units is contained in the Unit-Specific Portion.

2.1.1.6 Other Processes Regulated Under the Dangerous Waste Regulations. Other Hanford Site processes or activities regulated under Ecology's *Dangerous Waste Regulations* include recycling (e.g., WAC 173-303-017, -120, -500), generator activities [e.g., WAC 173-303-170), treatment-by-generator (WAC 173-303-170(3)(b)], transport (e.g., WAC 173-303-240), permits by rule (e.g., WAC 173-303-802), and research, development, and demonstration (RD&D) permits (WAC 173-303-809). The activities in this section are not included within the scope of this permit application documentation or of the HF RCRA Permit (DW Portion), except where specific language has been included in the Permit.

2.1.1.7 Other Environmental Permits. Other environmental permits that are, or could be, required by the Hanford Facility are addressed in Chapter 13.0.

2.1.2 Construction Schedule [B-1b]

This section addresses the scheduling of construction of new TSD units, or the remodeling of existing units, and the timing of associated permitting activities. Discussions in this section are general, and are based primarily on information contained in WAC 173-303-335, the Tri-Party Agreement, and in U.S. Department of Energy Orders addressing design and construction processes. Additional discussion of construction activities relating to 'operating' TSD units is included in Chapter 4.0.

Existing provisions of the Tri-Party Agreement serve as a means for the timely dissemination to the regulators of construction and associated permitting information that can be used for scheduling purposes. Articles XL and XLVIII of the Tri-Party Agreement outline provisions for DOE-RL to provide cost, schedule, and scope planning and reporting information to Ecology and the EPA. Such information identifies construction activities and schedules related to existing or planned TSD units. In some cases, as outlined in Sections 2.0 and 11.0 and Appendix D of the Tri-Party Agreement Action Plan, construction commitments are associated with Tri-Party Agreement milestones and are tracked as part of milestone statusing activities. Project manager meetings also are used to discuss planned construction, permitting activities, and required timeframes.

Several U.S. Department of Energy Orders establish requirements for the planning and scheduling of construction activities. Requirements to be addressed depend on several factors, including the cost and function of a proposed project. Figure 2-7 provides a generic project schedule keyed to the project process outlined in U.S. Department of Energy Orders. This schedule also illustrates general timeframes for associated permitting documentation. Figure 2-7 illustrates that detailed design information, sufficient to fulfill Part B documentation needs, might not be available until 1 to 2 years before the start of construction. In general, the final status permitting process for a TSD unit of moderate complexity takes at least 3 years. Thus, if a final status permit is required before the initiation of construction, construction delays could be incurred. If such construction is associated with TSD units that are not yet incorporated into the HF RCRA Permit (DW Portion), delays could be avoided by proceeding with construction under interim status or interim status capacity expansion (WAC 173-303-281, -805; refer to Section 2.1.1.3.1). The granting of interim status capacity expansion will be considered on a case-by-case basis, in accordance with WAC 173-303-281, as applicable, and WAC 173-303-805(7).

The generic project schedule shown in Figure 2-7 might not be applicable to TSD units on the Hanford Facility subject to privatization. A discussion of privatization is contained in Section 2.5.1.5.

2.2 TOPOGRAPHIC MAP [B-2]

This section addresses general topographic map requirements for the Hanford Facility and additional requirements for land disposal facilities.

2.2.1 General Requirements [B-2a]

This section provides topographic and locational information for the Hanford Facility and 'operating' TSD units included in the Unit-Specific Portion. In addition, information on prevailing wind directions and floodplain area is provided.

2.2.1.1 Hanford Facility. Drawing H-6-958 in Appendix 2A provides a general overview of the Hanford Site and surrounding area. The drawing illustrates the following:

- Boundary of the Hanford Site (for area shown)
- Contours (at 6.1-meter intervals) sufficient to show surface water flow
- Fire control services
- Access roads, internal roads, railroads, perimeter gates, and barricades
- Longitudes and latitudes.

2.2.1.2 Treatment, Storage, and Disposal Units. General locational maps for Hanford Facility TSD units (refer to Chapter 1.0, Table 1-1) are discussed in Appendix 2A. The specific locations of these TSD units are included in the HF Part A. Specific locational information for 'operating' TSD units is contained in topographic maps provided in the Unit-Specific Portion. These maps show a distance of at least 305 meters around the TSD unit, and are often drawn at a scale of 1 centimeter equal to 20 meters (1:2,000). The contour interval (0.5 meter) clearly shows the pattern of surface water flow in the vicinity of each TSD unit. In addition, the following information is included on one or more maps contingent upon scale:

- Map scale
- Date
- Prevailing wind direction
- A north arrow
- Surrounding land use
- Location of the unit
- Access road location
- Access control
- Groundwater monitoring wells (if applicable).
- 100-year floodplain area
- Surrounding land uses
- Location of access control
- Well locations
- Buildings
- Structures (e.g., sewers, loading and unloading areas).

2.2.1.3 Prevailing Wind Directions. Prevailing wind directions across the Hanford Site are presented in Figure 2-8. Prevailing wind directions in the 200 East and 200 West Areas (located approximately in the center of the Hanford Site) are from the northwest in all months of the year. Secondary maxima occur for southwesterly winds.

Monthly average wind speeds are lowest during the winter months, averaging 9.7 to 11.3 kilometers per hour, and highest during the summer, averaging 14.5 to 16.1 kilometers per hour. Wind speeds that are well above average usually are associated with southwesterly winds. However, the summertime drainage winds generally are northwesterly and frequently reach 50 kilometers per hour. Estimates of wind extremes have been summarized by Stone et al. (1983). Information on the likelihood and frequency of strong winds and tornados in the region have been summarized in a final environmental impact statement (DOE 1987), the Hanford Meteorological Station climatological summary (Stone et al. 1983), and reports from the National Severe Storms Forecast Center.

2.2.1.4 Floodplain Area. Three sources of potential flooding of the Hanford Facility are considered: (1) the Columbia River, (2) the Yakima River, and (3) storm-induced run-off in ephemeral streams draining the Hanford Facility. No perennial streams occur in the central part of the Hanford Facility.

The Federal Emergency Management Agency has not prepared floodplain maps for the Columbia River through the Hanford Site. The flow of the Columbia River is largely controlled by several upstream dams that are designed to reduce major flood flows. Based on a U.S. Army Corps of Engineers study of the flooding potential of the Columbia River that considered historic data and water storage capacity of the dams on the Columbia River (COE 1969), the U.S. Department of Energy (ERDA 1976) has estimated the probable maximum flood (Figure 2-9). The estimated probable maximum flood would have a larger floodplain than either the 100- or 500-year floods.

The 100-year floodplain for the Yakima River, as determined by the Federal Emergency Management Agency (FEMA 1980), is shown in Figure 2-10.

The only other potential source of flooding of the Hanford Facility is run-off from a large precipitation event in the Cold Creek watershed. This event could result in flooding of the ephemeral Cold Creek. Skaggs and Walters (1981) have given an estimate of the probable maximum flood using conservative values of precipitation, infiltration, surface roughness, and topographic features. The 100-year flood is less than the probable maximum flood as shown in Figures 2-9 and 2-10.

The location of individual 'operating' TSD units with respect to the identified floodplains is addressed in the Unit-Specific Portion of the *Hanford Facility Dangerous Waste Permit Application*.

2.2.2 Additional Requirements for Land Disposal Facilities [B-2b]

For land disposal units, the topographic map or maps (contingent upon scale) indicate the following:

- TSD unit boundaries
- Property boundaries
- Proposed point of compliance
- Proposed groundwater monitoring well locations.

References are provided to publications with maps showing:

- Locations of the uppermost aquifer and aquifers hydraulically interconnected beneath the unit (including flow direction and rate)
- If present, the extent of the plume of contamination that has entered the groundwater from a regulated unit.

Only one Hanford Facility 'operating' TSD unit is classified as a land disposal unit, LLBG (refer to Chapter 1.0, Table 1-1). The additional requirements for this TSD unit will be provided through a combination of information contained in the General Information Portion (e.g., in Chapter 5.0) and in the Unit-Specific Portion [e.g., LLBG Part B permit application documentation (DOE/RL-88-20)] of the *Hanford Facility Dangerous Waste Permit Application*.

2.3 SEISMIC CONSIDERATION [B-3]

The Hanford Facility is located in Zone 2B as identified in the *Uniform Building Code* (ICBO 1991). For a proposed TSD unit or an expansion of an existing unit, a demonstration that the unit is designed to withstand the maximum horizontal acceleration of the "design earthquake" for Zone 2B will be made in the Unit-Specific Portion. *Hanford Plant Standards* (ICF KH 1993) document seismic load criteria specific to the Hanford Facility.

No active faults, or evidence of a fault that has had displacement during Holocene times, have been found on the Hanford Facility (DOE 1988). The youngest faults recognized on the Hanford Facility occur on Gable Mountain, approximately 1.6 kilometers north of the 200 East Area, and 7.2 kilometers northeast of the 200 West Area. These faults are of Quaternary age and are considered 'capable' by the U.S. Nuclear Regulatory Commission (NRC 1982).

2.4 TRAFFIC INFORMATION [B-4]

The regional public highway network traversing the Hanford Site (Washington State Highways 24 and 240), nonrestricted access roadways (Route 10, and portions of Route 4S located south of the Wye Barricade), and restricted access roadways are shown in Figure 2-11.

Roadways east of the Yakima Barricade and north of the Wye Barricade, and within the 300 and 400 Areas, are restricted to authorized personnel only. Other U.S. Department of Energy roadways are subject to such restrictions or closure as the U.S. Department of Energy might require. All roads on the Hanford Site operate with a traffic volume that represents a Level of Service "C" or better, except Route 4S during shift change. Route 4S between the Wye Barricade and the 200 East Area operates at a Level of Service "E" and "F" during shift change.

2.4.1 Hanford Site Roadways

Figure 2-11 shows the major roads throughout the Hanford Site. These roads are classified as either primary or secondary routes. The primary routes include Routes 4S, 10, 2S, 3, 6, and 11A, as well as various avenues within each area. The primary routes are constructed of bituminous asphalt (usually 5-centimeters thick, but the thickness of the asphalt layer will vary with each road) with an underlying aggregate base in accordance with U.S. Department of Transportation requirements. The secondary routes are constructed of layers of an oil and rock mixture with an underlying aggregate base. The aggregate base consists of various types and sizes of rock found onsite. The present load-bearing capacities of these roads are unknown; however, loads as large as 9.8 kilograms per square centimeter have been transported without observable damage to road surfaces. All roads originally were constructed to meet the requirements for the American Association of State Highway and Transportation Officials HS-20-44 load rating (AASHTO 1983). An HS-20-44 loading represents a two-axle tractor (front axle loading of 3,630 kilograms and rear axle loading of 14,500 kilograms) plus a single-axle trailer with a 14,500-kilogram axle loading.

2.4.2 Traffic Control Signs, Signals, and Procedures

Standard traffic control signs are used throughout the Hanford Site (e.g., octagonal stop signs, triangular yield signs). Speed limits are posted throughout the Hanford Site, and the maximum posted speed is 88 kilometers per hour on major thoroughfares. Inside the various areas, posted speeds are reduced to a maximum of 56 kilometers per hour and held to speeds as low as 24 kilometers per hour.

2.4.3 Hanford Site Railroad System

Some dangerous and mixed waste is transported to and/or from TSD units (e.g., DST System, LLBG) in railroad cars. The general location of rail lines can be found on Figure 2-12 and on Drawing H-6-958 in Appendix 2A. Typically, waste transfers are made during periods of low traffic activity (i.e., between 9:00 a.m. and 3:00 p.m., on weekends, or during off-peak traffic hours). All roads that cross the waste route are barricaded by the Hanford Patrol during waste transfers to prevent motor vehicle accidents. All rail transfers are onsite transfers north of the 1100 Area (Figure 2-12). Based on evaluation of risk, railroad transfers are prohibited during periods of low visibility, when there are winds in excess of 25 kilometers per hour, and during heavy rain, snow storms, or icy conditions.

All railroad track, track beds, and related equipment are maintained to the requirements of Federal Railroad Association track safety standards for Class III track as detailed in 49 CFR 213. Class III track is sufficient for the loads and train speeds on the Hanford Site.

2.5 WASTE MANAGEMENT UNITS

This section addresses waste management units (Appendix 2B), including provisions in Section E of Ecology's permit application guidance; Part IV of the HF RCRA Permit (DW Portion); and the HF RCRA Permit (HSWA Portion). The Tri-Party Agreement classifies and outlines the approach for addressing approximately 1,600 waste management units on the Hanford Site. These waste management units are identified in the *Hanford Site Waste Management Units Report* (DOE/RL-88-30) (Units Report). The Units Report is updated annually if determined necessary per the Tri-Party Agreement. Because of the comprehensive nature of the Units Report, the list of waste management units is more extensive than that required by Section 3004(u) of HSWA. The classification of Hanford Site waste management units is illustrated in Figure 2-13 and includes the following:

- Solid waste management units

  - 'Operating' TSD units

  - TSD units 'undergoing closure'
    - Non-land disposal TSD units
    - Land disposal TSD units

  - Past-practice units
    - RCRA past-practice
    - CERCLA past-practice

  - Other SWMUs

- Other waste management units
  - Facilities subject to decommissioning
  - Miscellaneous waste management units.

The remainder of this section briefly addresses these classes of waste management units, with the exception of 'operating' TSD units. 'Operating' TSD units are addressed in Chapter 4.0, Section 4.1.

2.5.1 Solid Waste Management Units [E]

A SWMU (Appendix 2B) is "any discernable unit at which solid waste has been placed at any time, irrespective of whether the unit was intended for management of solid or hazardous waste. Such units include any area at a facility at which solid waste routinely and systematically has been released [40 CFR 264.501 (proposed)]." The requirements to address SWMUs at a RCRA facility were enacted as part of HSWA [under Section 3004(u), "Continuing Releases at Permitted Facilities"]. The Hanford Site contains approximately 1,100 SWMUs. The remainder of this section, as well as Appendix 2D, provides an overview of Hanford Site SWMUs, with the exception of 'operating' TSD units. An overview of 'operating' TSD units is provided in Chapter 4.0, Section 4.1.

2.5.1.1 Treatment, Storage, and/or Disposal Units 'Undergoing Closure'. This section contains an overview of the documentation process for TSD units 'undergoing closure', as well as a brief description of these units.

2.5.1.1.1 Overview of Treatment, Storage, and/or Disposal Units 'Undergoing Closure'. The Tri-Party Agreement Action Plan defines a TSD as:

> "a RCRA term referring to the treatment, storage, or [and/or] disposal of hazardous waste. Under RCRA, TSD activity can occur only at units which received or stored hazardous waste after November 19, 1980, the effective date of the RCRA regulations" (refer to Section 2.1.1.3.1).

Furthermore, the Tri-Party Agreement Action Plan defines a TSD unit as:

> "a unit used for treatment, storage, or [and/or] disposal of hazardous waste and is required to be permitted and/or closed pursuant to RCRA requirements as determined in this Action Plan."

Chapter 1.0, Table 1-1, identifies Hanford Facility TSD units that are 'undergoing closure', i.e., TSD units that are no longer active but handled hazardous waste after November 19, 1980; State-only dangerous waste after March 12, 1982; mixed waste since 1987; and treated, stored, and/or disposed of such waste, except as provided by WAC 173-303-200 or WAC 173-303-802. Preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation is to be developed for most of these TSD units in accordance with Sections 2.4, 5.3, 6.3, and 8.0 and Appendix D of the Tri-Party Agreement Action Plan. Figure 2-5 depicts a flowchart for processing closure documentation. In accordance with Section 5.3 of the Tri-Party Agreement Action Plan, all TSD units that undergo closure, irrespective of permit status, will be closed in accordance with WAC 173-303-610. Conditions for TSD units undergoing closure are contained in Part V of the HF RCRA Permit (DW Portion) (and potentially in Part VI, upon incorporation of this part into the DW Portion; refer to Section 2.1.1.3.3).

For some TSD units 'undergoing closure', it will be possible to remove dangerous waste and waste constituents to Hanford Site background levels (DOE/RL-92-23 and DOE/RL-92-24), as approved by Ecology, or health-based levels defined in accordance with WAC 173-303-610(2)(b), and thereby achieve 'clean closure'. If the waste constituents are at or below agreed to cleanup levels, the TSD unit is considered closed and no further dangerous waste activities are required. For the most part, non-land disposal TSD units (Figure 2-5) will be dispositioned in this manner.

If dangerous waste constituents present at the TSD unit are above MTCA (WAC 173-340) Method B levels, but below MTCA Method C levels, then a 'modified' closure option could be used (refer to Chapter 11.0, Section 11.1.1.2). Requirements for a modified closure are specified in Condition II.K.3 of the HF RCRA Permit (DW Portion).

If levels of dangerous waste constituents are left in place above MTCA Method C levels, TSD units 'undergoing closure' are closed as a landfill (Figure 2-5). Land disposal unit closures are addressed in Section 5.5 and

6.3 of the Tri-Party Agreement Action Plan and WAC 173-303-610. In accordance with Section 6.3.2 of the Tri-Party Agreement Action Plan, units closing as a landfill or under modified closure will require the submittal of a postclosure permit application (i.e., for units "closed as a landfill" Figure 2-5 'transitions' to Figure 2-4, the Permitting Process Flowchart). Where applicable, a postclosure permit application will contain a description of modified closure institutional controls, a description of the landfill final cover, cover maintenance and inspection, groundwater monitoring, and corrective actions if required, that could occur during the postclosure period. Land disposal units 'undergoing closure' most likely will be addressed using the approach discussed in Section 2.5.1.2.

2.5.1.1.2 Description of Specific Treatment, Storage, and/or Disposal Units 'Undergoing Closure'. This section contains a brief description of the TSD units 'undergoing closure'. Information presented in this section has been compiled from existing documents with the primary sources of information as follows: HF Part A, the Tri-Party Agreement, the *Hanford Mission Plan* (DOE/RL-93-102), and the Hanford Site Environmental Permitting Status Report. The locations of these TSD units, as well as any operable units cited, are discussed in Appendix 2A. A discussion of 'operable units' is found in Section 2.5.1.2.

2.5.1.1.2.1 207-A South Retention Basin. The 207-A South Retention Basin, located in the 200 East Area, provided interim storage of 242-A Evaporator process condensate before the condensate was discharged to the 216-A-37-1 Crib. The basin consists of three coated, concrete cells with a total capacity of 794,934 liters. The closure plan will be coordinated with the past-practice documentation for the 200-PO-5 operable unit.

2.5.1.1.2.2 216-B-3 Expansion Ponds. The 216-B-3 Expansion Ponds, located in the 200 East Area, consist of three interconnected percolation ponds: 216-B-3A, -3B, and -3C. These ponds received cooling water and steam condensate from various 200 East Area buildings. The process design capacity was 105,839,784 liters per day. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 8) and has been clean closed.

2.5.1.1.2.3 216-B-63 Trench. The 216-B-63 Trench, located in the 200 East Area, received mixed waste effluents from the B Plant chemical sewer. The trench also received corrosive dangerous waste from the regeneration of demineralizer columns at B Plant. Treatment of waste occurred by the sequential discharges of acidic and caustic effluents. The process capacity for treatment and disposal was 473,175 liters per day. The closure/postclosure plan will be coordinated with the past-practice documentation for the 200-BP-11 operable unit.

2.5.1.1.2.4 200 West Area Ash Pit Demolition Site. The 200 West Area Ash Pit Demolition Site was used to detonate explosive, ignitable, shock-sensitive, and/or reactive discarded chemical product. The process design capacity for treatment was 568 liters. This TSD unit has been included in the HF RCRA Permit (DW Portion, Part V, Chapter 6) and has been clean closed.

2.5.1.1.2.5 218-E-8 Borrow Pit Demolition Site. The 218-E-8 Borrow Pit Demolition Site, located in the 200 East Area, was used to detonate explosive, ignitable, shock-sensitive, and/or reactive discarded chemical product. The process design capacity for treatment was 568 liters. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 5) and has been clean closed.

2.5.1.1.2.6 Hanford Patrol Academy Demolition Sites. The Hanford Patrol Academy Demolition Sites, located in the 600 Area, were used to detonate explosive, ignitable, shock-sensitive, and/or reactive discarded chemical product. The process design capacity for treatment was 568 liters. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 9) and has been clean closed.

2.5.1.1.2.7 2727-S Storage Facility. The 2727-S Storage Facility, located in the 200 West Area, stored dangerous waste for eventual shipment offsite. The maximum storage capacity was 102,206 liters. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 3) and has been clean closed.

2.5.1.1.2.8 4843 Alkali Metal Storage Facility. The 4843 Alkali Metal Storage Facility, located in the 400 Area, stored mixed alkali metal waste generated from the Fast Flux Test Facility and various other operations. The maximum design storage capacity was 83,279 liters. This unit is no longer storing dangerous waste.

2.5.1.1.2.9 105-DR Large Sodium Fire Facility. The 105-DR Large Sodium Fire Facility, located in the 100 Areas, was a research laboratory located in the 105-DR Reactor Building. This TSD unit was used to study the behavior of nonradioactive molten alkali metal and fires and treated up to 100 liters per day of alkali metal. Treatment consisted of heating the alkali metals to the point of oxidation. This TSD unit had the capacity to store up to 20,000 liters of dangerous waste. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 10) and is planned to be clean closed.

2.5.1.1.2.10 3718-F Alkali Metal Treatment and Storage Area. The 3718-F Alkali Metal Treatment and Storage Area, located in the 300 Area, was used to treat and store alkali metal waste from the Fast Flux Test Facility and various laboratories. The alkali metal was treated in a burn shed that oxidized the metal. Used equipment was treated in chemical reaction tanks by dissolving the waste in either water or alcohol. The treatment capacity was 100 liters per day and had a storage capacity of 2,000 liters. This TSD unit is no longer storing or treating dangerous waste.

2.5.1.1.2.11 304 Concretion Facility. The 304 Concretion Facility, located in the 300 Area, treated and stored pyrophoric waste from the 300 Area fuel fabrication processes. The waste was treated by encapsulation in solid concrete blocks at a rate of 2,082 liters per day. The storage capacity was 4,164 liters. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 11) and has been clean closed.

2.5.1.1.2.12 300 Area Solvent Evaporator. The 300 Area Solvent Evaporator was a treatment tank used to treat mixed waste spent solvents. Containers of spent solvent were stored on a concrete pad adjacent to the evaporator. The treatment capacity for this unit was 833 liters per day, with a storage capacity of 833 liters. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 2) and has been clean closed.

2.5.1.1.2.13 300 Area Waste Acid Treatment System. The 300 Area Waste Acid Treatment System was used for the storage and treatment of mixed waste generated during the fuel fabrication operations in the 300 Area. The system also was used for disposing of used and/or unneeded chemicals. This system operated in various buildings and tanks throughout the 300 Area. Two treatment process were used. One treatment process, tank neutralization, had a capacity of 14,006 liters per day. The other treatment process was used to separate the solids from the liquids in the waste. The initial separation process, performed using a centrifuge, had a capacity of 11,356 liters per day; the final separation process, performed using a filter press, had a capacity of 4,542 liters per day. Existing storage capacity was 16,504 liters.

2.5.1.1.2.14 303-M Oxide Facility. The 303-M Oxide Facility, located in the 300 Area, was proposed to be used to treat mixed waste from the 300 Area fuel fabrication process. The waste that was to be treated was pyrophoric chips and fines.

2.5.1.1.2.15 303-K Storage Facility. The 303-K Storage Facility, located in the 300 Area, was used for the storage of mixed waste. Both liquid and solid mixed waste was stored in the unit. The liquid waste was stored within a portion of the 303-K Building. The solid waste was stored outside on an asphalt, concrete, and gravel pad. The storage capacity of this unit was 41,639 liters.

2.5.1.1.2.16 2101-M Pond. The 2101-M Pond, located in the 200 East Area, received effluents from drains in the 2101-M Laboratory and cooling and heating effluents from the 2101-M Building. The process design capacity was 70,976 liters per day. This TSD unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 7) and has been clean closed.

2.5.1.1.2.17 Hexone Storage and Treatment Facility. The Hexone Storage and Treatment Facility, located in the 200 West Area, received mixed waste effluents from the REDOX Plant. The mixed waste was stored in two 90,850-liter belowgrade tanks. The waste was treated in a distillation system at a rate of 11,356 liters per day that separated the radioactive component of the waste from the dangerous waste component. The treatment process used railroad cars that had a storage capacity of 151,416 liters.

2.5.1.1.2.18 241-CX Tank System. The 241-CX Tank System, located in the 200 East Area, consists of three tanks (241-CX-70, -71, -72) that stored various mixed wasted streams from the operation of the Hot Semiworks Complex. The combined storage capacity for these tanks is 126,205 liters. The closure plan will be coordinated with the past-practice documentation for the 200-SO-1 operable unit.

2.5.1.1.2.19 183-H Solar Evaporation Basins. The 183-H Solar Evaporation Basins, located in the 100 Areas, were used for the treatment and storage of mixed waste generated by fuels fabrication facilities in the 300 Area. In addition, nonradioactive dangerous waste also was discharged to the basins on a nonroutine basis. The four basins had the capacity of treating 2,650 liters of waste per day by evaporation and capacity to store up to 8,202,962 liters in all four basins. This unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 1).

2.5.1.1.2.20 1324-N Surface Impoundment. The 1324-N Surface Impoundment, located in the 100 Areas, was a lined pond with a capacity of 1,514,160 liters. The unit was used to treat nonradioactive waste effluents from the regeneration of demineralizer columns. Acidic and caustic waste was sequentially added to the pond, which served to neutralize the waste. The closure/postclosure plan for the 1324-N Surface Impoundment will be coordinated with the corrective measures study (CMS) for the 100-NR-1 operable unit.

2.5.1.1.2.21 1301-N Liquid Waste Disposal Facility. The 1301-N Liquid Waste Disposal Facility, located in the 100 Areas, was a percolation unit designed to dispose of liquid waste via the soil column. This TSD unit received radioactive process and cooling waste effluents from N Reactor for disposal. The unit also received nonroutine dangerous waste generated from laboratory tests, spills, and leaks within the reactor building via the radioactive drain lines. The maximum design capacity of the unit was 16,352,928 liters per day. The closure/postclosure plan for the 1301-N Liquid Waste Disposal Facility will be coordinated with the CMS for the 100-NR-1 operable unit.

2.5.1.1.2.22 1325-N Liquid Waste Disposal Facility. The 1325-N Liquid Waste Disposal Facility, located in the 100 Areas, was a percolation unit designed to dispose of liquid waste via the soil column. This TSD unit received radioactive process and cooling waste effluents from N Reactor for disposal. The unit also received nonroutine dangerous waste generated from laboratory tests, spills, and leaks within the reactor building via the radioactive drain lines. The maximum design capacity of the unit was 16,352,928 liters per day. The closure/postclosure plan for the 1325-N Liquid Waste Disposal Facility will be coordinated with the CMS for the 100-NR-1 operable unit.

2.5.1.1.2.23 1324-NA Percolation Pond. The 1324-NA Percolation Pond, located in the 100 Areas, received corrosive dangerous waste from the regeneration of demineralizer columns. Acidic and caustic waste was sequentially added to the pond, which served to neutralize the waste. The maximum amount of water discharged to this TSD unit was 3,785,400 liters per day. The closure/postclosure plan for the 1324-NA Percolation Pond will be coordinated with the CMS for the 100-NR-1 operable unit.

2.5.1.1.2.24 100-D Ponds. The 100-D Ponds, a percolation unit located in the 100 Areas, were designed to dispose of liquid waste via the soil column. Approximately 170,343 liters per day were treated. The unit received corrosive dangerous waste from the regeneration of three ion exchange columns and from process water generated from the 183-D Filter Water Plant. Acidic and caustic waste was sequentially added to the pond, which served to neutralize the waste in the pond.

2.5.1.1.2.25 216-S-10 Pond and Ditch. The 216-S-10 Pond and Ditch, a percolation unit located in the 200 West Area, was designed to dispose of liquid waste via the soil column. This TSD unit received waste effluents that consisted of water tower overflow, cooling water, and rainwater. In addition, discharges of dangerous waste to the pond and ditch consisted of simulated DST slurry. This unit was designed to percolate 567,810 liters per day of waste effluents. The closure plan will be coordinated with the past-practice documentation for the 200-RO-1 operable unit.

2.5.1.1.2.26 216-A-29 Ditch. The 216-A-29 Ditch, located in the 200 East Area, was a percolation unit designed to dispose of liquid waste via the soil column. The unit received process and cooling mixed waste effluents from the PUREX Plant and corrosive dangerous waste from the regeneration of demineralizer columns in the PUREX Plant. The process design capacity was 22,712,400 liters per day. The closure plan will be coordinated with the past-practice documentation for the 200-BP-11 operable unit.

2.5.1.1.2.27 216-B-3 Main Pond. The 216-B-3 Main Pond, a percolation unit located in the 200 East Area, was designed to dispose of liquid waste via the soil column. This TSD unit consisted of the 213-B-3 Main Pond and a portion of the 216-B-3-3 Ditch. The unit received effluents from various 200 East Area operations, including PUREX Plant, B Plant Complex, 242-A Evaporator, and other units. The types of effluent included process and cooling effluents, chemical sewer effluents, and corrosive dangerous waste from the regeneration of demineralizer columns in the PUREX Plant. Treatment of waste occurred by the sequential discharges of acidic and caustic effluents. The capacity for treatment and disposal for this unit was 3,179,736 liters per day. The closure plan will be coordinated with the past-practice documentation for the 200-BP-11 operable unit.

2.5.1.1.2.28 216-A-10 Crib. The 216-A-10 Crib, located in the 200 East Area, was a percolation unit designed to dispose of liquid waste via the soil column. This TSD unit received process distillate mixed waste effluents from the PUREX Plant. The unit disposed of 272,549 liters per day of waste effluent. The closure plan will be coordinated with the past-practice documentation for the 200-PO-2 operable unit.

2.5.1.1.2.29 216-U-12 Crib. The 216-U-12 Crib, located in the 200 West Area, was a percolation unit designed to dispose of liquid waste via the soil column. This TSD unit received process condensate mixed effluents from the UO_3 Plant. The unit disposed of 189,270 liters per day of waste effluents. The closure plan will be coordinated with the past-practice documentation for the 200-UP-2 operable unit.

2.5.1.1.2.30 216-A-36B Crib. The 216-A-36B Crib, located in the 200 East Area, was a percolation unit designed to dispose of liquid waste via the soil column. This TSD unit received mixed waste effluents from the PUREX Plant. The unit disposed of 439,106 liters per day of waste effluents. The closure plan will be coordinated with the past-practice documentation for the 200-PO-2 operable unit.

2.5.1.1.2.31 216-A-37-1 Crib. The 216-A-37-1 Crib, located in the 200 East Area, was a percolation unit designed to dispose of liquid waste via the soil column. This TSD unit received process condensate mixed waste effluents from the 242-A Evaporator. The unit disposed of 327,059 liters per day of waste effluents. The closure plan will be coordinated with the past-practice documentation for the 200-PO-4 operable unit.

2.5.1.1.2.32 300 Area Process Trenches. The 300 Area Process Trenches, a percolation unit, was designed to dispose of liquid waste via the soil column. This TSD unit received process and cooling water from operations in the 300 Area. The unit also received dangerous waste from several research and development laboratories and from the fuel fabrication process. The process trenches were designed to dispose of 11,356,200 liters per day. The closure/postclosure plan has been coordinated with the 300-FF-1 CERCLA remedial investigation/feasibility study documentation.

2.5.1.1.2.33 Nonradioactive Dangerous Waste Landfill. The Nonradioactive Dangerous Waste Landfill, located in the 600 Area, was used for the disposal of nonradioactive dangerous waste. This TSD unit consisted of 19 unlined trenches of which six trenches were used to dispose of dangerous waste, nine trenches were used to dispose of asbestos waste, and one trench was used to dispose of nonhazardous waste. The total design capacity was 6,167 cubic meters. The closure/postclosure plan for the Nonradioactive Dangerous Waste Landfill will be coordinated with the CMS for the 200-IU-3 operable unit.

2.5.1.1.2.34 Simulated High-Level Waste Slurry Treatment/Storage. The Simulated High-Level Waste Slurry Treatment/Storage unit treated and stored a simulated high-level waste slurry. The treatment process consisted of neutralization and immobilization using grout. The unit had a treatment capacity of 757 liters per day and a storage capacity of 75,708 liters. This unit is included in the HF RCRA Permit (DW Portion, Part V, Chapter 4) and has been clean closed.

2.5.1.2 Past-Practice Units. Section 3.3 of the Tri-Party Agreement Action Plan defines a 'past-practice unit' as a waste management unit where waste or substances (intentionally or unintentionally) have been disposed and that is not subject to regulation as a TSD unit (Appendix 2B) (Figure 2-13). Because of the relatively large number of past-practice units on the Hanford Site, a process has been established for organizing these units into groups called 'operable units' (Appendix 2A). The concept of operable units is to group the numerous units (primarily by type and geographic area) into manageable components for investigation and remedial action and to prioritize the cleanup work to be done on the Hanford Site. Each of the operable units is to be subject to an investigation in the form of either a CERCLA or a RCRA past-practice process as described in Section 7.3 and 7.4, respectively, of the Tri-Party Agreement Action Plan.

As noted in Article III, Article IV, Article XXIV, and Article XXXII of the Tri-Party Agreement, and Sections 3.3, 5.5, and 6.1 of the Tri-Party Agreement Action Plan, some TSD units 'undergoing closure', primarily land disposal units, will be investigated and managed in conjunction with past-practice units; these units have been assigned to appropriate operable units. Those TSD units not assigned to an operable unit are typically treatment or storage units that are likely to be 'clean closed' rather than closed as a land disposal unit (refer to Section 2.5.1.1 and Chapter 11.0). The information necessary for performing RCRA closures within an operable unit will be provided in coordination with various RCRA facility investigation (RFI)/CMS documents (Appendix 2B). These documents will include a coordinated past-practice site investigation/RCRA closure/RCRA corrective action approach in order to efficiently implement applicable regulations. Coordination of the remediation of past-practice operable units with TSD closures will enable RCRA TSD units located within past-practice operable units to have the same cleanup standards. This coordination will minimize the possibility of having different cleanup standards for coincident or adjacent parcels of land.

The coordination approach spelled out in the Tri-Party Agreement Action Plan also is supported by Condition II.K. of the DW Portion of the HF RCRA Permit, "Soil and Groundwater Performance Standards." Condition II.K.7. of the HF RCRA Permit (DW Portion) is particularly relevant. This condition specifies that, when agreed to by Ecology, integration of other statutorily or regulatory mandated cleanups could be accommodated by the HF RCRA Permit (DW Portion). Results from other cleanup investigation activities could be used whenever possible to supplement and/or replace TSD unit closure investigation activities. All, or appropriate parts of, multipurpose cleanup and closure documents could be incorporated into the HF RCRA Permit (DW Portion) through the permit modification process. Cleanup and closures conducted under any statutory authority with oversight by either Ecology or EPA, which meets the equivalent of the technical requirements of Condition II.K. of the HF RCRA Permit (DW Portion), could be considered as satisfying the requirements of the HF RCRA Permit (DW Portion). Further discussion of Condition II.K. of the HF RCRA Permit (DW Portion) is contained in Chapters 5.0 and 11.0 of this permit application.

The Tri-Party Agreement requires that the HF RCRA Permit (DW Portion) be the vehicle for the public to become involved in the RCRA past-practice remediation process. Section 7.4 of the Tri-Party Agreement Action Plan contains the information on how the documentation for RCRA past-practice remediation process will be conducted. The milestones to provide the joint documentation of closure/postclosure plans for land disposal units and past-practice operable unit work plans are contained in Appendix D of the Tri-Party Agreement Action Plan. The mechanism for addressing the RCRA past-practice process will be included in a future HF RCRA Permit modification.

2.5.1.3 Procedural Closure. Chapter 1.0, Table 1-1, identifies a number of Hanford Facility TSD units for which procedural closure will be sought in accordance with Section 6.3 of the Tri-Party Agreement Action Plan or in response to withdrawal requests submitted in fulfillment of Tri-Party Agreement Milestone M-20-45. Procedural closure is used for those units that were classified as being TSD units, but never actually were used to treat, store, or dispose of hazardous waste after November 19, 1980; State-only dangerous waste after March 12, 1982; and mixed waste since 1987, except as provided by WAC 173-303-200 or WAC 173-303-802. Because another option is being pursued for these units, these units are not included within the scope of the *Hanford Facility Dangerous Waste Permit Application*. A brief description of the TSD units being considered for procedural closure follows. The locations of these units are discussed in Appendix 2A.

2.5.1.3.1 1706-KE Waste Treatment System. The 1706-KE Waste Treatment System, located in the 100 Area, was proposed to treat mixed waste generated in the laboratories at the 1706-KE Building. Proposed waste treatment consisted of waste accumulation, mixed-bed resin ion exchange, evaporation, and condensate collection.

2.5.1.3.2 221-T Containment Systems Test Facility. The 221-T Containment Systems Test Facility, located in the 200 West Area, was proposed as a research laboratory to be used to perform experiments with alkali metal compounds. Proposed treatment consisted of heating alkali metal waste in a tank equipped with an offgas system.

2.5.1.3.3 2727-WA Sodium Reactor Experiment Sodium Storage Building. The 2727-WA Sodium Reactor Experiment Sodium Storage Building, located in the 200 West Area, was proposed for storage of 208-liter containers of mixed waste sodium. The sodium to be stored, in metallic form, was used as a primary coolant in a sodium cooled nuclear reactor. This unit was included in the withdrawal request submitted in fulfillment of Tri-Party Agreement Milestone M-20-45. Although the withdrawal request for this unit was approved by Ecology, the public review process has yet to be completed.

2.5.1.3.4 437 Maintenance and Storage Facility. The 437 Maintenance and Storage Facility, located in the 400 Area, was proposed for maintenance and repair of equipment from the Fast Flux Test Facility. Treatment of dangerous waste was to be conducted by removing residual sodium from waste materials. The process was to consist of placing sodium contaminated material in a tank and reacting surface sodium contamination with water.

2.5.1.3.5 324 Pilot Plant. The 324 Pilot Plant, located in the 300 Area, was proposed for treatment of radioactive alkali metals, including sodium, lithium, and sodium-potassium alloy.

2.5.1.3.6 Biological Treatment Test Facilities. The Biological Treatment Test Facilities, located in the 300 Area, were proposed for treatment of mixed waste via biological treatment R&D processes. Waste constituents in soil, effluent, and groundwater, through the use of microorganisms, can be treated for various chemical constituents, such as organics, nitrates, chromium, and cyanide.

2.5.1.3.7 Physical and Chemical Treatment Test Facilities. The Physical and Chemical Treatment Test Facilities, located in the 300 Area, were proposed to test various treatment technologies based on guidance received from EPA and Ecology. Treatment technologies include the following:

- pH adjustment

- Ion exchange for selective removal of contaminants from waste solutions

- Waste concentration by evaporation

- Waste dissolution such as waste retrieval from storage tanks by pH adjustment or fusion

- Precipitation/filtration and solvent extraction from solutions, slurries, and sludges

- Solids washing for separation of contaminants from sludges

- Catalytic destruction methods; for example: electrolytic generation of oxidants such as silver, cerium, and other electrochemically-enhanced processes for decontaminating metals and oxidizing non-metals

- Grouting.

Procedural closure of this TSD unit is scheduled to become effective in mid-May 1996.

2.5.1.3.8 Thermal Treatment Test Facilities. The Thermal Treatment Test Facilities, located in the 300 Area, were proposed for treatment of mixed waste via thermal treatment R&D processes. The primary thermal treatment processes are in situ vitrification and waste vitrification. Other thermal processes include the following:

- Plasma arc pyrolysis

- In situ heating of soils and sludges for removal of organics

- Metal melting for volume reduction and immobilization of contaminated metals

- Gamma induced oxidation of organic chemicals

- Thermal treatment for the drying and decomposition of liquid slurries

- In can melting of soil waste and liquid slurries

- Microwave heating to dry and immobilize liquid and solid waste.

Procedural closure of this TSD unit is scheduled to become effective in mid-May 1996.

2.5.1.3.9 332 Storage Facility. The 332 Storage Facility, located in the 300 Area, was proposed for the storage of small quantities of mixed and dangerous waste and waste samples in various sized containers from 3.8 to 321.8 liters. The facility is designed to store small quantities of flammables and meets all appropriate codes, including WAC 173-303 spill prevention and control requirements. This unit was included in the withdrawal request submitted in fulfillment of Tri-Party Agreement Milestone M-20-45. Although the withdrawal request for this unit was approved by Ecology, the public review process has yet to be completed.

2.5.1.4 Units with Other Dispositions. This section addresses dispositions for the Fast Flux Test Facility, the 600 Area Purgewater Facility, and the Single-Shell Tank System. The locations of these units are discussed in Appendix 2A.

2.5.1.4.1 Sodium Storage Facility and Sodium Reaction Facility. The 400 Area was developed for the experimentation of breeder reactor technologies, development of isotopes for medical uses, and development and testing of equipment and materials under high radiation fields. The Fast Flux Test Facility (FFTF) was the main reactor used in this experimentation. In 1993, the U.S. Department of Energy announced its decision to shutdown the FFTF. Shutdown began in December 1993 (DOE/RL-93-102) and is estimated to take about 5 years to place FFTF in an industrially and radiologically safe condition. The only potential 'operating' TSD unit within the 400 Area is the Sodium Storage Facility and Sodium Reaction Facility.

A study to determine if liquid sodium coolant removed from the FFTF has any beneficial use is to be completed in 1998. It is anticipated that one beneficial use for this sodium will be in support of the Tank Waste Remediation System Project. In the event that a beneficial use cannot be found, the Sodium Storage Facility and Sodium Reaction Facility will be relied upon to process the sodium for disposal. This TSD unit is being designed and constructed as a RCRA-compliant unit, in the event that the FFTF sodium is determined to be a waste. Additional information on the Sodium Storage Facility and Sodium Reaction Facility is contained in the HF Part A.

Construction of the Sodium Storage Facility and Sodium Reaction Facility under interim status began in June 1995. A decision will not be made until at least 1998 as to whether final status for this treatment and storage unit will be sought. When future plans for the Sodium Storage Facility and Sodium Reaction Facility become more definitive, these facilities may be identified as a TSD unit to be added to the HF RCRA Permit (DW Portion) Class 3 Permit Modification Schedule (refer to Chapter 2.0, Section 2.1.1.3.3).

2.5.1.4.2 600 Area Purgewater Storage and Treatment Facility. The 600 Area Purgewater Storage and Treatment Facility is a miscellaneous treatment and storage unit located northeast of the 200 East Area (Appendix 2A). This TSD unit manages waste in accordance with the *Purgewater Management Plan* [Attachment 5 of the HF RCRA Permit (DW Portion)] and is used for treatment and storage of purgewater generated from groundwater monitoring wells located throughout the Hanford Facility. The purgewater is generated when a groundwater monitoring well is developed or groundwater samples are obtained (refer to Chapter 5.0, Sections 5.2.2.5, 5.5.4.1.2, and 5.6.2). The purgewater from a groundwater monitoring well is transported by tank truck and pumped directly into the 600 Area Purgewater Storage and Treatment Facility, currently consisting of two aboveground tanks. Treatment of purgewater consists of solar evaporation.

The 600 Area Purgewater Storage and Treatment Facility currently is managed in accordance with the *Purgewater Management Plan*. The continued use of this TSD unit is under evaluation. For example, purgewater could be transported directly to the 200 Area ETF for processing (refer to Chapter 4.0, Section 4.1.2.5). Until a decision is made regarding future use, the 600 Area Purgewater Storage and Treatment Facility will continue to operate under interim status. It is likely that closure plan documentation, rather than Part B permit application documentation, will be prepared for this TSD unit. The 600 Area Purgewater Storage and Treatment Facility is not included in the Class 3 Permit Modification Schedule (refer to Chapter 2.0, Section 2.1.1.3.3).

2.5.1.4.3 Single-Shell Tank System. The SST System, located in both the 200 East Area and 200 West Area, was built to store and treat mixed waste. There are 149 tanks that range in capacity from 208,197 to 3,785,400 liters with a total storage design capacity of 347,802,552 liters. Treatment in the system occurs when solids, interstitial liquids, or cooling liquids are removed from the tanks. The treatment design rate is 2,271,240 liters per day.

In accordance with Milestone M-45-06 of the Tri-Party Agreement Action Plan, the current estimate for completion of closure of the SST System is September 30, 2024. The first closure plan for a SST operable unit or tank farm is scheduled to be submitted to Ecology on November 30, 2004. In the interim period before a closure plan is submitted, a closure work plan was submitted to Ecology (DOE/RL-89-16). This closure work plan will be used by Ecology as a roadmap for the eventual closure of the SST System. The closure work plan contains an integration process and the status of the process on achieving closure. Known issues, and how these issues are being addressed, are included in the work plan. Because of the uncertainties on the resolution of these issues and the closure process, the work plan will evolve and be updated as these uncertainties are resolved. Eventually, the closure work plan will develop into the closure plan. The format of the closure work plan is similar to a closure plan. The areas covered by in the work plan include waste retrieval, operable unit characterization, technology development to support closure, and the regulatory pathway and strategy for achieving closure.

2.5.1.5 Privatization. This section addresses privatization associated with TSD units. The term 'privatization' (Appendix 2B) refers to vendors, under contract with the U.S. Department of Energy, using private funding to design, permit, construct, operate, decontaminate, and decommission their own equipment and facilities to treat tank waste. Currently, development of low-level and high-level waste immobilization facilities are identified as being subject to privatization. These facilities are proposed to supersede the Grout Treatment Facility and the Hanford Waste Vitrification Plant. Thus, work to proceed with the Grout Treatment Facility and the Hanford Waste Vitrification Plant has been suspended. The locations of these units are discussed in Appendix 2A.

2.5.1.5.1 Grout Treatment Facility. The GTF, located in the 200 East Area, is classified as a tank treatment and storage, a surface impoundment, a miscellaneous treatment, and a land disposal unit. Per Amendment Four of the Tri-Party Agreement, the GTF has been placed in a standby mode until other alternatives for processing DST System waste are studied. The GTF was to treat DST System waste by combining this waste with grout-forming solids and, if necessary, chemical additives. The treatment process forms a cementious slurry that was to be pumped to lined concrete disposal vaults. The disposal vaults were to be managed as surface impoundments when the grout slurry was liquid and closed as landfills after the grout slurry hardened. Part B documentation for the GTF is contained in the Unit-Specific Portion of this permit application (DOE/RL-88-27). The GTF will remain under interim status as long as this TSD unit is in a standby mode. Further work on Part B documentation for the GTF has been suspended while this TSD unit is in a standby mode.

Low-level waste immobilization facilities have been proposed to supersede the GTF. Development of low-level waste immobilization facilities currently is being managed under the Tank Waste Remediation System Project. When future plans for the low-level waste immobilization facilities become more definitive, these units could be identified as TSD unit(s) to be added to the HF RCRA Permit (DW Portion).

2.5.1.5.2 Hanford Waste Vitrification Plant. Under milestones set in the original Tri-Party Agreement, construction of the HWVP was to begin in 1992 and to be completed in 1998. The HWVP, designed to meet the original Tri-Party Agreement milestones, is classified as a tank treatment and storage, a container storage, and a miscellaneous unit. Per Amendment Four of the Tri-Party Agreement, construction of a high-level waste vitrification plant, such as the HWVP, was delayed until 2002 to accommodate changes in waste management planning and prioritization. Hot startup of a high-level waste vitrification plant has been delayed until 2009 (per Tri-Party Agreement Milestone M-51-03).

The HWVP was to be constructed in the 200 East Area (Appendix 2A). Mixed waste, received from a pretreatment unit, was to be treated at the HWVP in a series of tanks and a melter, classified as a miscellaneous unit. Treatment was to include concentration by evaporation, adjustment with chemicals and glass forming materials, and immobilization in borosilicate glass (vitrification). Part B documentation for the HWVP is contained in the Unit-Specific Portion of this permit application (DOE/RL-89-02). Further work on this documentation has been suspended. Current plans call for a high-level waste immobilization facility.

Development of a high-level waste immobilization facility currently is being managed under the Tank Waste Remediation System Project. When plans become more definitive, this high-level waste immobilization facility could be identified as a TSD unit to be added to the HF RCRA Permit (DW Portion).

2.5.1.6 Other Solid Waste Management Units. The HF RCRA Permit (HSWA Portion) addresses both SWMUs that are located on the DOE-RL-managed property of the Hanford Facility as well as SWMUs that are not located on

DOE-RL-managed property. In accordance with the HF RCRA Permit (HSWA Portion), any SWMUs located on DOE-RL-managed property are, or will be, included in the Tri-Party Agreement and assigned to operable units. The processes and procedures to be followed, and the schedules of compliance for investigation and subsequent remediation, will be contained in the Tri-Party Agreement. An example of a type of 'other SWMU' is inactive miscellaneous underground storage tanks.

The SWMUs not located on DOE-RL-managed property will undergo investigations and remediations, as necessary, in accordance with the requirements and schedules identified in the HF RCRA Permit (HSWA Portion). Additional information on Hanford Site SWMUs is contained in Appendix 2D.

2.5.2 Other Waste Management Units

Of the approximately 1,600 Hanford Site waste management units, approximately 470 are classified as 'other waste management units', rather than SWMUs (DOE/RL-88-30). These 'other waste management units' are comprised mainly of one-time spills to the environment, sanitary waste disposal facilities (i.e., septic tanks), and facilities managed or addressed by the Facility Transition or Environmental Restoration Projects.

2.5.2.1 Facilities Subject to Decommissioning. This section addresses waste management units that could be handled under Section 8.0 of the Tri-Party Agreement Action Plan, "Facility Decommissioning Process," or under the HF RCRA Permit (DW Portion). Section 8.0 defines an additional process for the identification and decommissioning of key Hanford facilities (e.g., PUREX Plant, Plutonium Finishing Plant, B Plant, Fast Flux Test Facility) (Appendix 2A). Facilities that are fully dispositioned under the TSD unit closure process, or dispositioned in conjunction with an operable unit cleanup, are not addressed under Section 8.0. The TSD units subject to Section 8.0 have physical closure actions that need to be done in conjunction with the physical disposition actions in the facility (e.g., removal of structural components).

Section 8.0 of the Tri-Party Agreement Action Plan enables DOE-RL and the regulators to enter into negotiations for transition or disposition of key facilities within 3 months of a shutdown notice or decision to proceed with disposition, respectively. Provisions of this section enable the conduct of regulated and nonregulated work in an orderly sequence to ensure coordination with other cleanup actions. Within Section 8.0, the processes and key planning documents associated with the decommissioning phases of transition, surveillance and maintenance, and disposition are defined.

The nature of the decommissioning process has led DOE-RL and the regulators to evaluate the timing of RCRA closure at key facilities. The phased decommissioning process, combined with other requirements, often makes completion of RCRA closure activities during the transition or surveillance and maintenance phases impracticable. In cases where timely completion of TSD unit closure is practicable, a complete closure plan will be prepared for implementation during the transition phase. In cases where physical conditions and/or unknowns prevent timely completion of closure, a preclosure work plan will be prepared for implementation during the transition phase. The preclosure work plan will detail actions to be completed during the transition phase to facilitate full RCRA closure in the future.

Hanford Facility TSD units that are, or are anticipated to be, subject to Section 8.0 of the Tri-Party Agreement Action Plan are identified in Chapter 1.0, Table 1-1. In these cases, TSD unit-specific conditions within Parts III and V of the HF RCRA Permit (DW Portion) will need to be crafted to address Section 8.0 considerations. The SST System will not follow Section 8.0 of the Tri-Party Agreement Action Plan, but will instead be addressed in accordance with the *Single-Shell Tank Closure Work Plan* (DOE/RL-89-16).

2.5.2.1.1 PUREX Plant. The PUREX Facility, located in the 200 East Area, consists of two separate TSD units, the PUREX Plant (202-A Building) and the PUREX Storage Tunnels (refer to Chapter 4.0, Section 4.1.2.11). The PUREX Plant is a canyon building that was used for the recovery of uranium and plutonium from irradiated reactor fuel. Liquid-liquid processes were used to separate the plutonium and uranium from fission products and to separate the plutonium from the uranium.

In 1991, the PUREX Plant ceased operations and was placed in a standby mode. In December 1992, the U.S. Department of Energy notified DOE-RL that the PUREX Plant would no longer operate and directed the PUREX Plant to transition into deactivation. In accordance with Section 8.0 of the Tri-Party Agreement Action Plan, a preclosure work plan is being prepared to address those components of the PUREX Plant contained in the Part A, Form 3 permit application documentation for this unit. The PUREX Storage Tunnels will continue to store mixed waste for an undetermined number of years, and are classified as an 'operating' unit (refer to Chapter 4.0, Section 4.1.2.11).

2.5.2.1.2 241-Z Treatment and Storage Tanks. The 241-Z is a tank treatment and storage unit located in the 241-Z Building in the 200 West Area. Mixed waste generated at the Plutonium Finishing Plant is transferred into the 241-Z treatment and storage tanks. In the treatment tanks, chemicals are added to adjust the pH of the waste to meet the corrosion protection requirements of the DST System, to ensure aluminum compounds remain solubilized, and to provide the appropriate percentage of stable solids. Following treatment, the waste is pumped to a collection tank and transferred to the DST System for storage.

The 241-Z currently is managed under the Facility Transition Project. Permitting documentation for this TSD unit could be handled in accordance with Section 8.0 of the Tri-Party Agreement Action Plan. The 241-Z will continue to operate under interim status. It is possible that closure plan documentation, rather than Part B permit application documentation, will be prepared for this TSD unit.

2.5.2.1.3 B Plant Complex. The B Plant Complex is a tank treatment and storage, container storage, and containment building unit located in the 200 East Area. The B Plant Complex current activities include storage of organic waste, low-level mixed waste, and containerized non-liquid mixed waste. Solid mixed waste is stored on the canyon deck. A low-level waste concentrator currently is inactive with no intention of resuming operations. Solid mixed waste stored on the canyon decks consists of radioactively contaminated failed process equipment and jumpers (or isolated components thereof) containing lead used as weights, counterweights, or radiation shielding. The solid mixed waste also could be contaminated with residues from waste processing of tank waste.

The B Plant Complex also supports the activities of the Waste Encapsulation and Storage Facility by providing container storage of mixed waste (i.e., filters, rags, etc.). The Waste Encapsulation and Storage Facility was used to encapsulate cesium and strontium by-products from fuel reprocessing. The capsules have been used by private industry as a radiation source. Currently the cesium and strontium capsules are being stored under water in the Waste Encapsulation and Storage Facility.

The B Plant Complex currently is managed under the Facility Transition Project. Permitting documentation for this TSD unit will be handled in accordance with Section 8.0 of the Tri-Party Agreement Action Plan.

2.5.2.1.4 Fast Flux Test Facility. Pending permitting considerations associated with the Fast Flux Test Facility are addressed in Section 2.5.1.4.1.

2.5.2.2 Miscellaneous Waste Management Units. Examples of miscellaneous waste management units are one-time spills to the environment and sanitary waste disposal facilities (i.e., septic tanks). All such known units are identified in the Units Report (DOE/RL-88-30). The term "miscellaneous waste management unit" used in this context is different from that defined in WAC 173-303-040 for a "miscellaneous TSD unit" (refer to Appendix 2B of this document).

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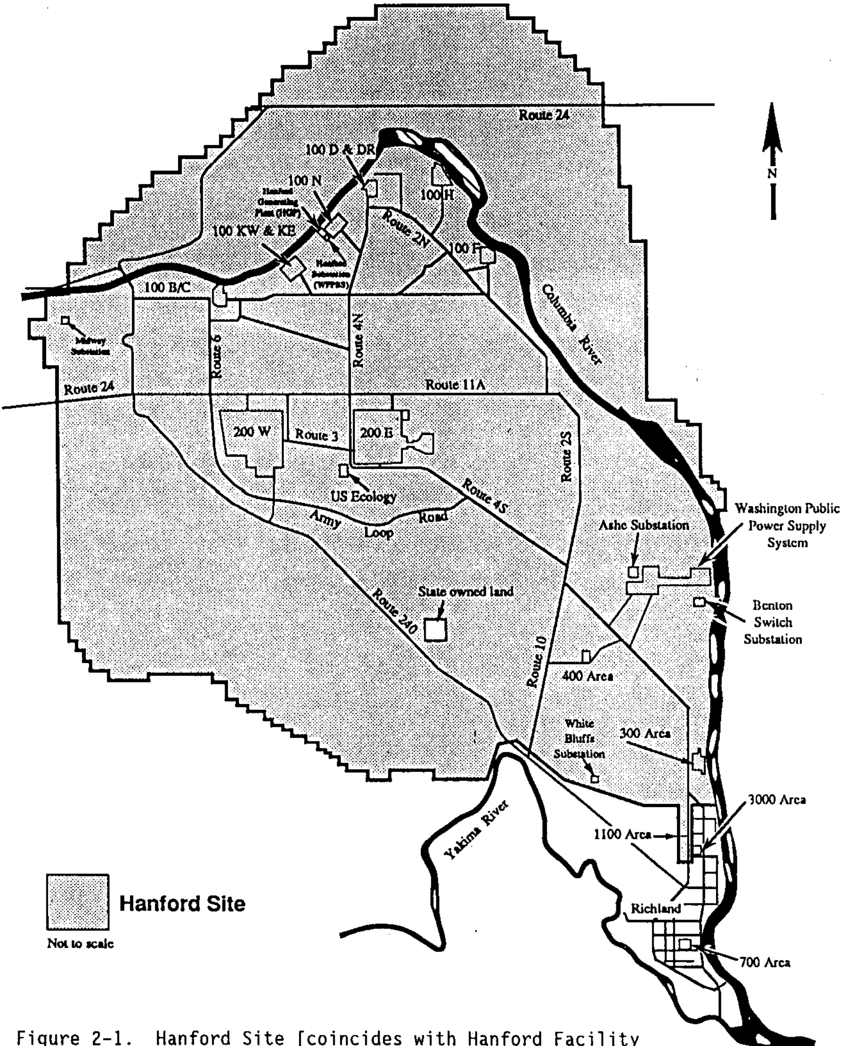

Figure 2-1. Hanford Site [coincides with Hanford Facility boundary as defined in the HF RCRA Permit (DW Portion), Attachment 2].

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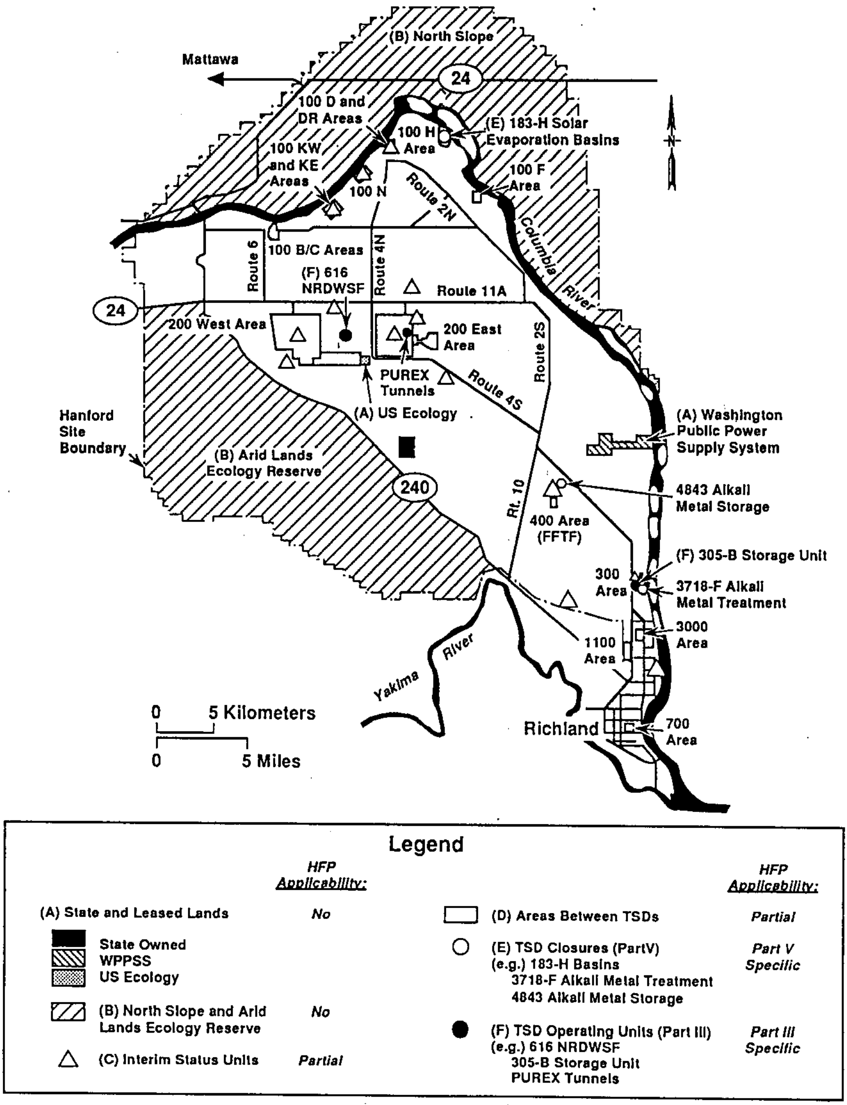

Figure 2-2. Permit Applicability Matrix Coverage.

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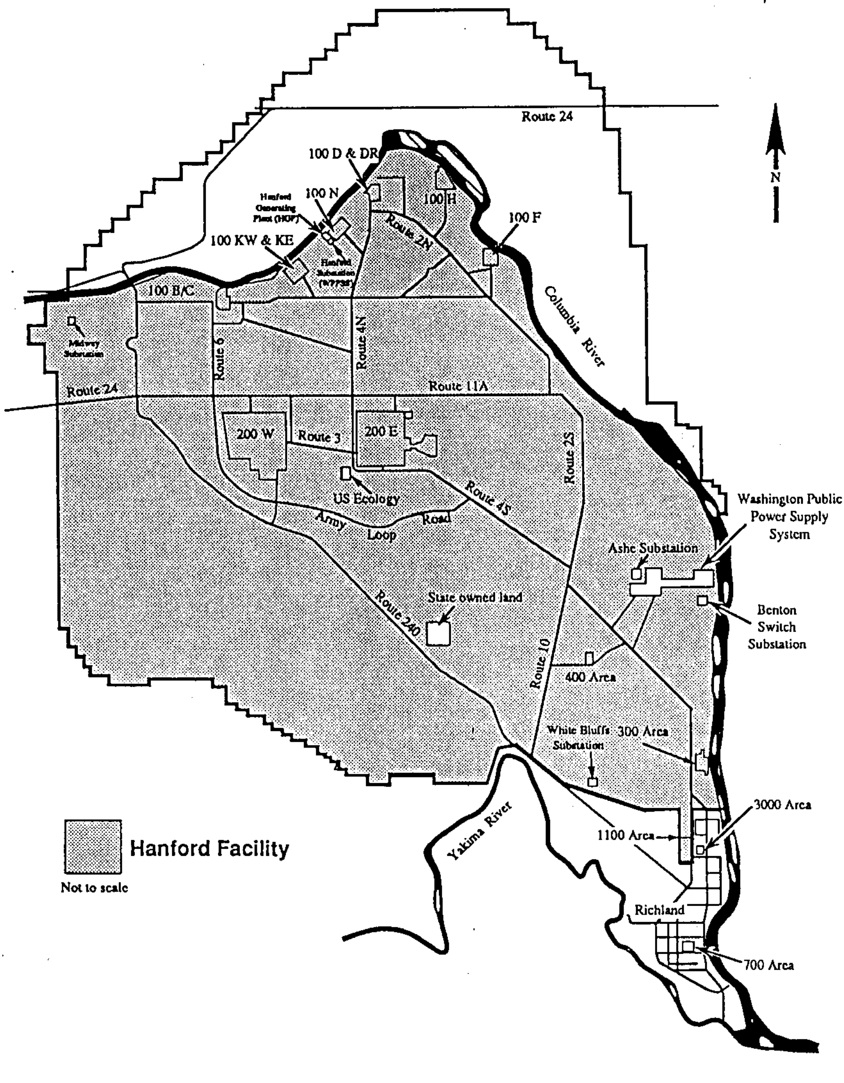

Figure 2-3. Hanford Facility Boundary (as defined in Appendix 2C, Legal Description).

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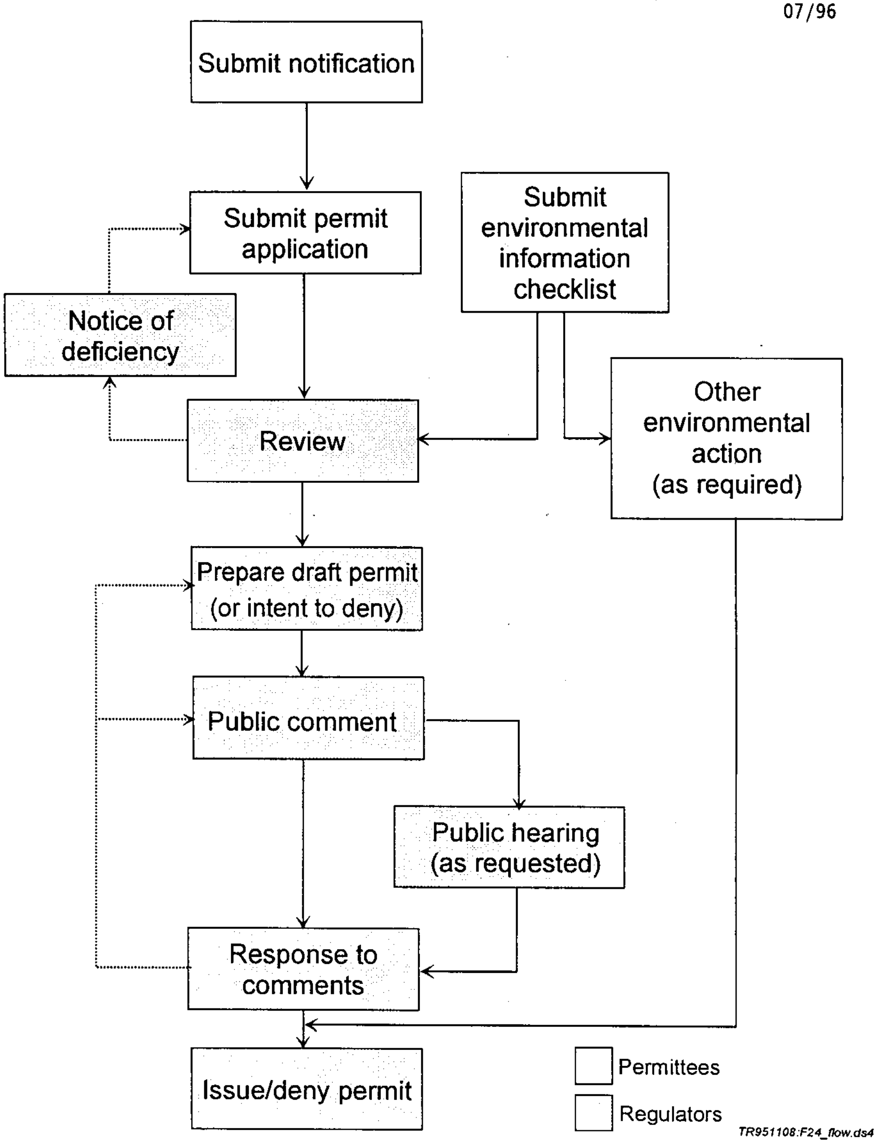

Figure 2-4. Permitting Process Flowchart (adapted from Tri-Party Agreement).

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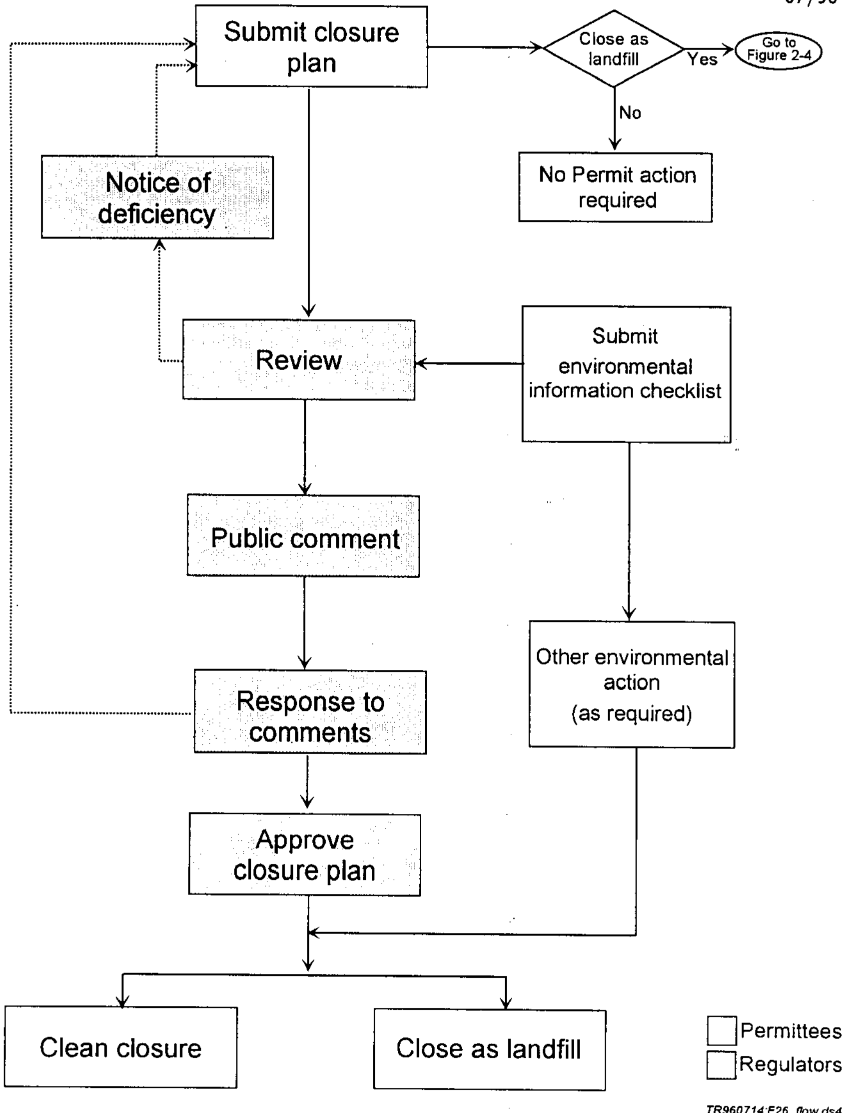

Figure 2-5. Closure Process Flowchart (adapted from Tri-Party Agreement)

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RCRA Permitting Flow Chart

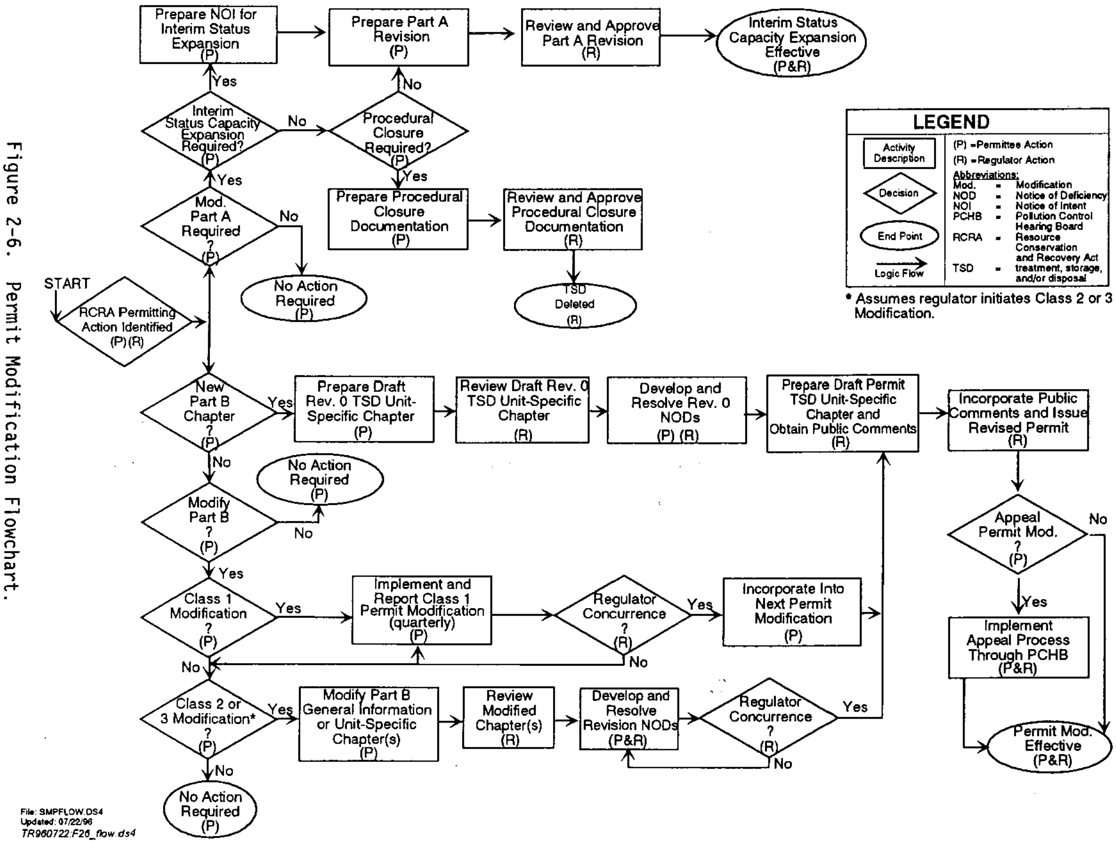

Figure 2-6. Permit Modification Flowchart.

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Regulatory Requirements for Generic Project Schedule

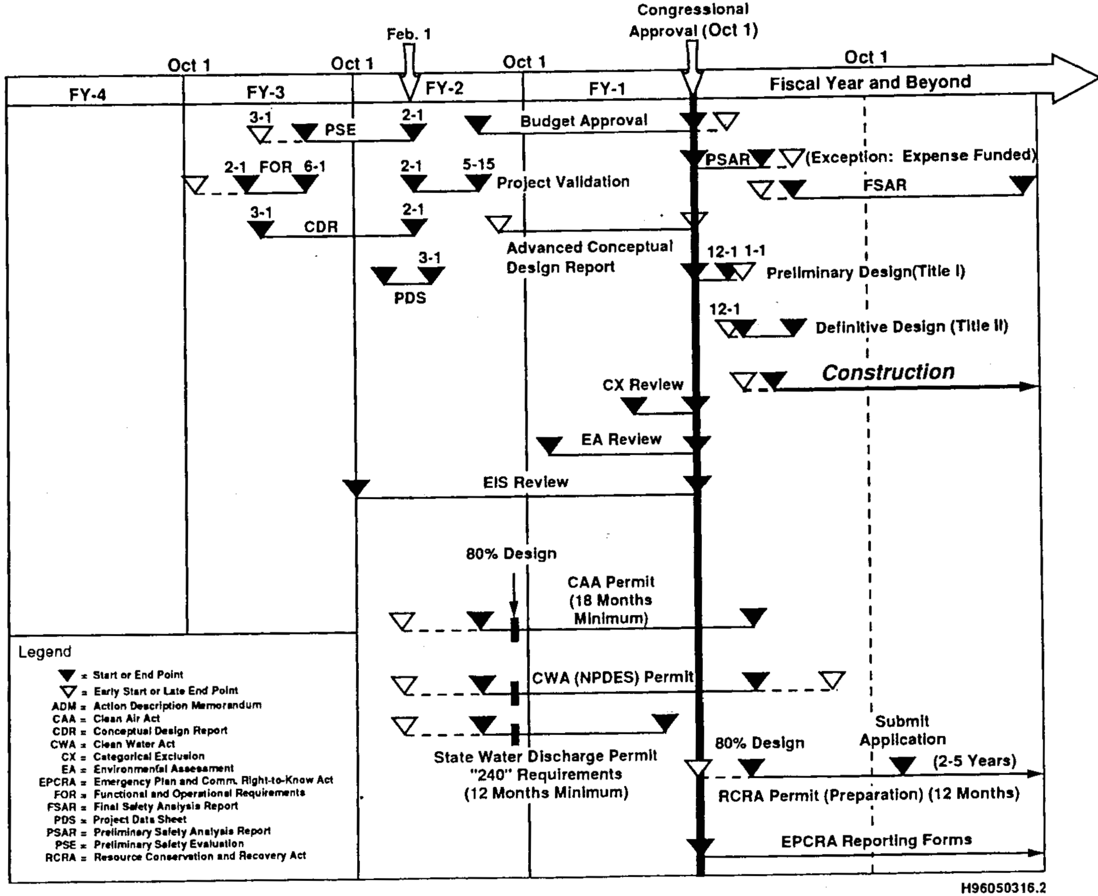

Figure 2-7. Generic Project Schedule.

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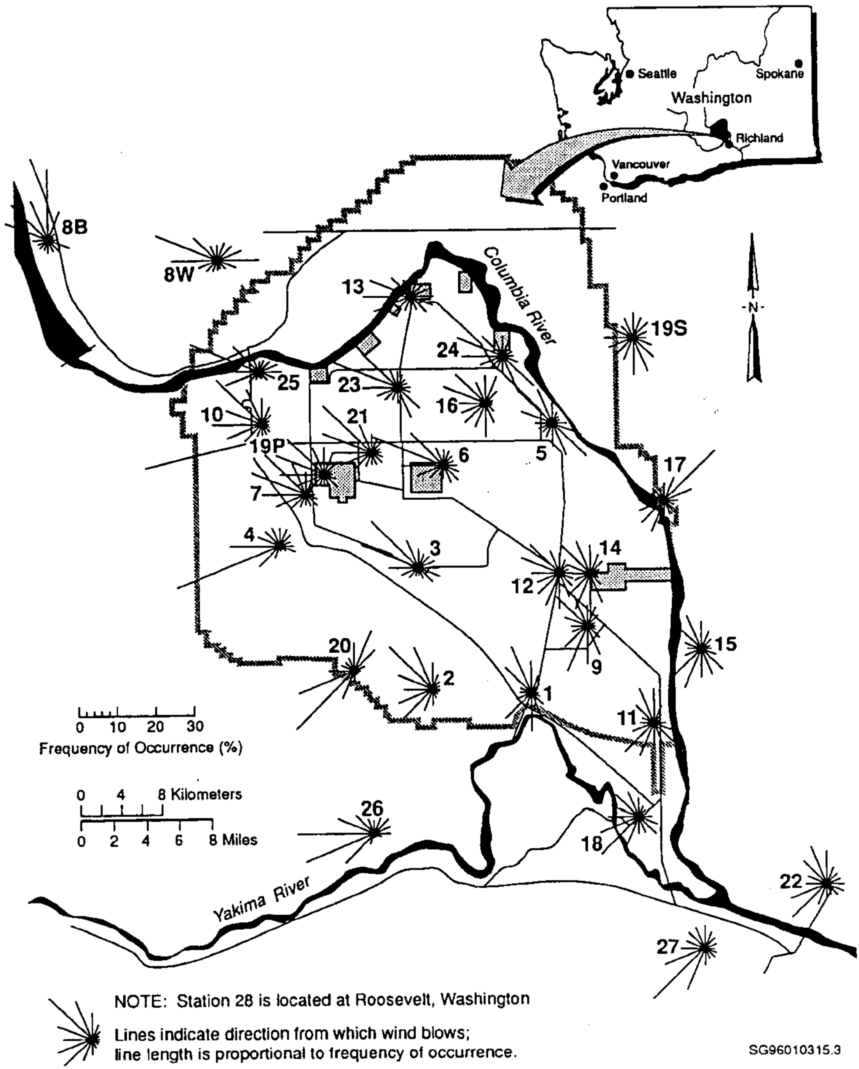

Figure 2-8. Prevailing Wind Direction for the Hanford Site (adapted from PNNL 1996).

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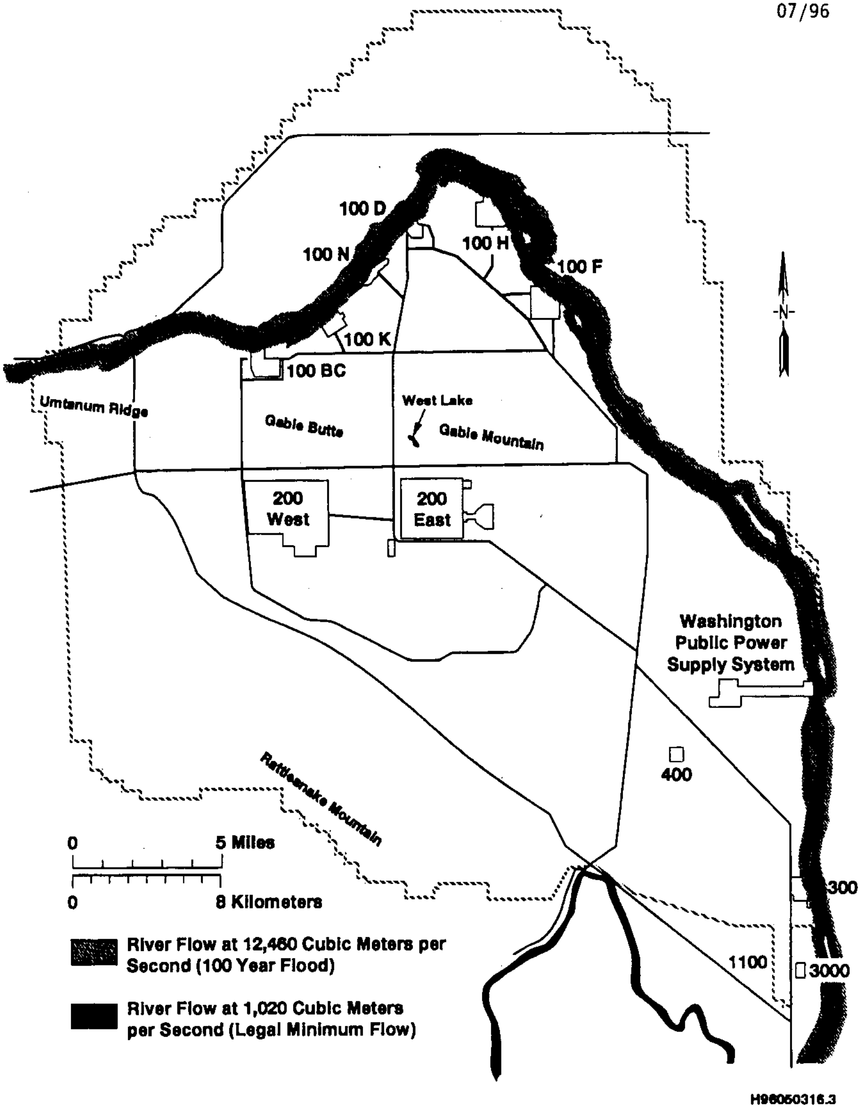

Figure 2-9. Columbia River Floodplain (probable maximum flood) (adapted from DOE 1996).

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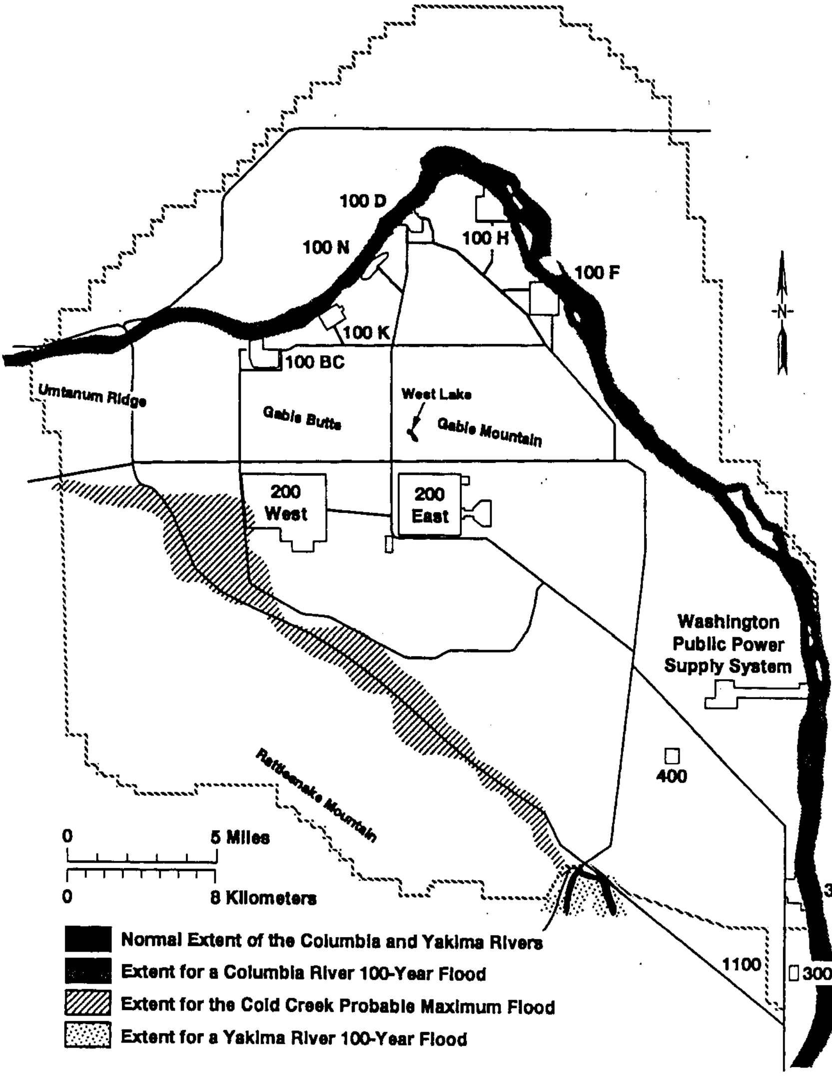

Figure 2-10. 100-Year Floodplain of the Columbia River and Yakima River and the Cold Creek Probable Maximum Flood (adapted from DOE 1996).

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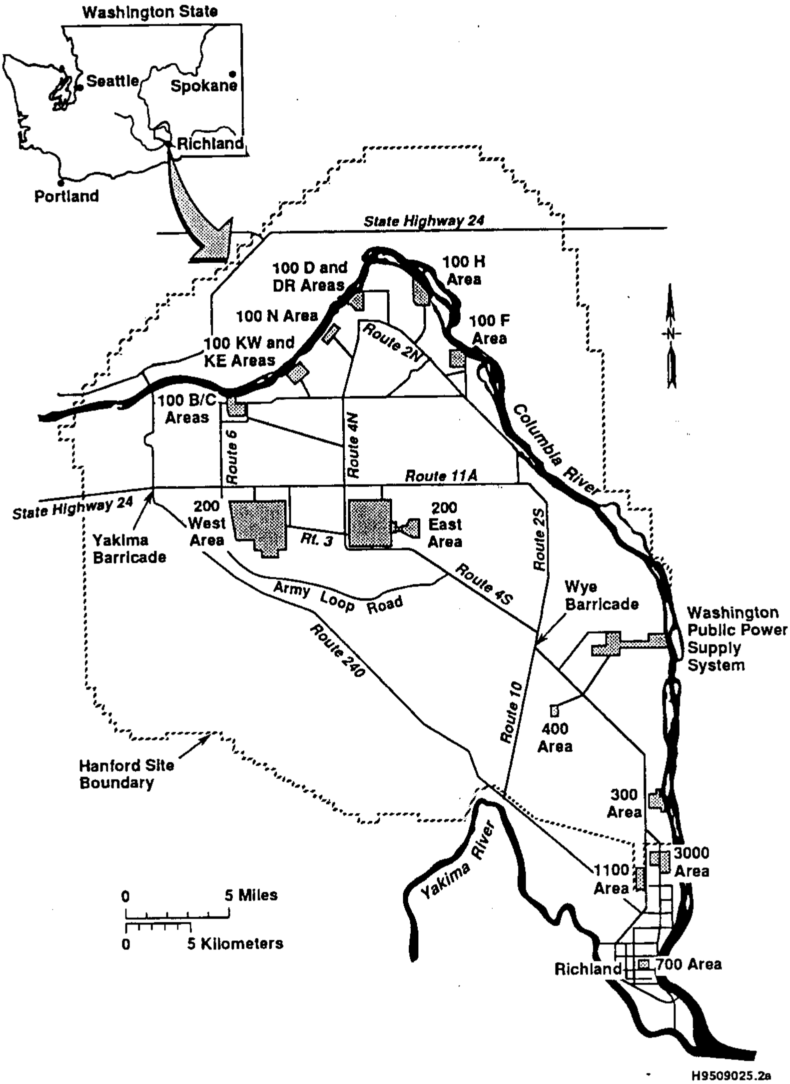

Figure 2-11. Hanford Site Roadways (adapted from DOE 1996).

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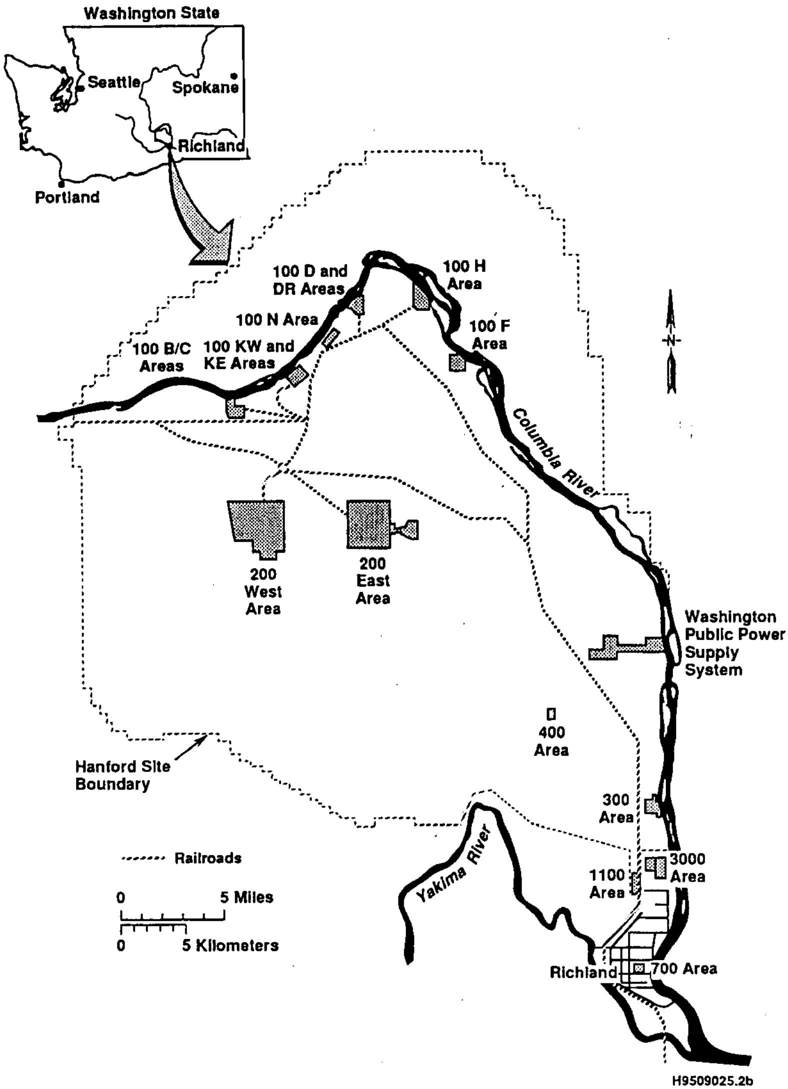

Figure 2-12. Hanford Site Railroad System (adapted from DOE 1996).

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Classifications of Waste Management Units

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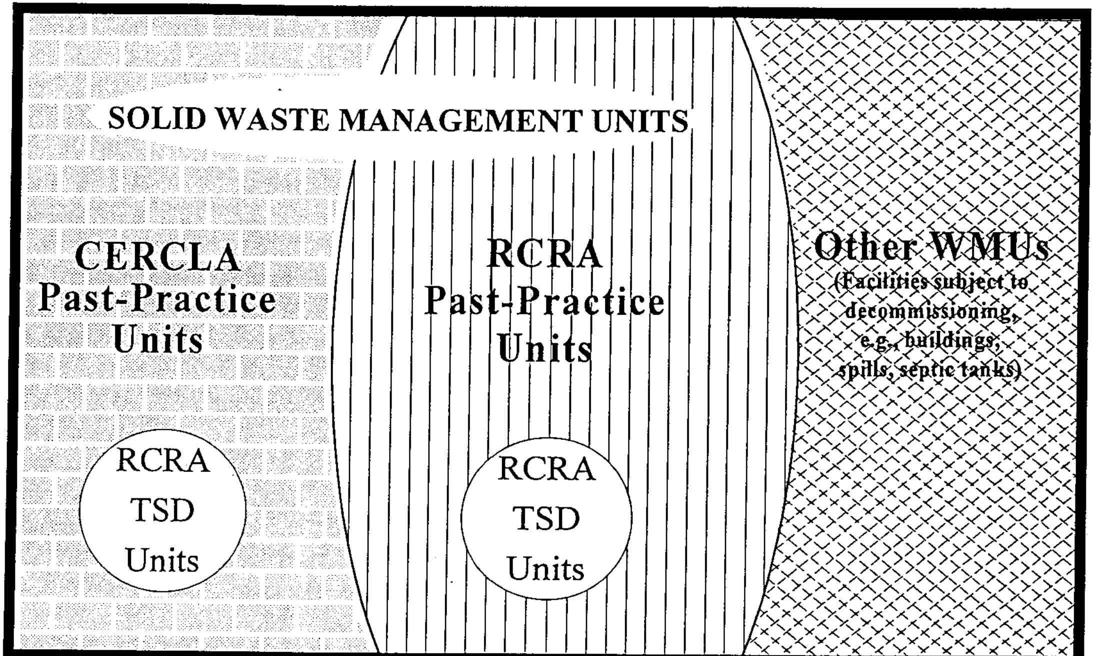

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act*
RCRA = *Resource Conservation and Recovery Act*
TSD = treatment, storage, and/or disposal units either operating, undergoing closure, or being dispositioned through other options
WMU = waste management unit

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Figure 2-13. Waste Management Units.

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3.0 WASTE ANALYSIS [C]

This chapter provides general information, specified in Section C of Ecology's permit application guidance (Ecology 1987 and 1995), on the analysis and handling of waste treated, stored, and/or disposed on the Hanford Facility. Topics discussed include the following:

- Chemical, biological, and physical analyses
- Waste analysis plan
- Manifest system
- Tracking system
- Other waste analysis documentation.

Provisions contained in Conditions I.E. (Duties and Requirements), II.A. (Facility Contingency Plan), II.D. (Waste Analysis), II.E. (Quality Assurance/Quality Control), II.N. (Receipt of Dangerous Wastes Generated Offsite), II.P. (Manifest System), and II.Q. (On-Site Transportation) of the HF RCRA Permit (DW Portion) also are discussed.

Detailed information on the characteristics of the waste treated, stored, and/or disposed at individual 'operating' TSD units is contained in the Unit-Specific Portion of this permit application. Detailed information on waste treated, stored, and/or disposed at individual TSD units 'undergoing closure' or being 'dispositioned through other options' has been, or is anticipated to be, submitted in accordance with the provisions of the Tri-Party Agreement.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS [C-1]

The Hanford Facility treats, stores, and/or disposes of dangerous and/or mixed waste designated as: (1) characteristic dangerous waste (ignitable, corrosive, toxic, reactive); (2) toxic and persistent (by WAC 173-303 criteria); and (3) listed (due to the presence of spent solvents and discarded pure chemical products). The waste form ranges from liquid to hard crystalline material (e.g., salt cake stored in the DST System), as well as contaminated equipment, paper, rags, etc. A general overview of waste characteristics and process information for each 'operating' TSD unit (as of May 1, 1996) is contained in Chapter 4.0. Such an overview for TSD units 'undergoing closure' or being 'dispositioned through other options' is found in Chapter 2.0, Section 2.5).

Specific information on the type (i.e., DW numbers) and volume of waste that could be managed by each TSD unit is contained in the HF Part A. Part A permit application information is based primarily on process information with additional information provided by waste sampling and analysis programs.

3.1.1 Land Disposal Restrictions

Dangerous waste and the dangerous waste component of mixed waste on the Hanford Facility are subject to LDR requirements contained in 40 CFR 268, WAC 173-303-140, Condition II.G of the HF RCRA Permit (HSWA Portion), and in Section 6.1 and Milestone M-26-00 of the Tri-Party Agreement Action Plan. Under the regulations, waste is prohibited from land disposal unless the waste meets treatment standards specified in 40 CFR 268, Subpart D or meets requirements for a treatability variance. In addition, certain hazardous debris that have been contaminated with a listed hazardous waste may be excluded if managed pursuant to 40 CFR 261.3(f) and WAC 173-303-070(2)(c). Other environmental media, such as soils contaminated with listed waste, may be excluded from regulation if a determination is made by Ecology that the soil no longer contains a hazardous waste (i.e., contained-in determination).

The specified technologies for treatment of LDR waste are identified in the regulations for some waste in lieu of meeting a specific concentration requirement. While treatment capability generally exists for the dangerous waste subject to LDR, treatment currently is not available for the mixed waste subject to LDR that requires storage on the Hanford Facility. Provisions in the Tri-Party Agreement and in the *Federal Facility Compliance Act of 1992* (refer to Chapter 13.0, Section 13.1.1.2) allow for storage of land disposal restricted waste until treatment and disposal capability is available. A brief summary of LDR provisions, described in Section 6.1 of the Tri-Party Agreement Action Plan, follows.

In fulfillment of Section 6.1 and Milestone M-26-00 of the Tri-Party Agreement Action Plan, the DOE-RL submitted to Ecology and the EPA in October 1990 the *Hanford Land Disposal Restrictions Plan for Mixed Wastes* (LDR Plan) (DOE/RL-90-41). This plan described a process for managing mixed waste subject to LDR and identified actions to be taken by the DOE-RL to achieve full compliance with LDR requirements. These actions are to be in accordance with approved schedules specified in the LDR Plan and in the work schedule found in Appendix D of the Tri-Party Agreement Action Plan. The DOE-RL submits annual reports (e.g., DOE/RL-95-15) updating the LDR Plan and any prior annual reports, including plans and schedules (refer to Chapter 12.0, Section 12.1.39). The annual report also describes activities taken to achieve compliance and describes the activities to be taken in the next year toward achieving full compliance.

Should it become necessary to seek an exemption from a disposal prohibition pursuant to 40 CFR 268.6; an extension to the effective date of any land disposal restriction pursuant to 40 CFR 268.5; a variance from a treatment standard pursuant to 40 CFR 268.44; an equivalent technology pursuant to 40 CFR 268.42(c); and/or an exemption pursuant to WAC 173-303-140(6), the records documenting the quantities and date each waste was placed under such exemption, extension, or variance will be maintained as required by 40 CFR 264.73(10).

The TSD units will follow the provisions of their waste analysis plans (refer to Section 3.2) to determine which, if any, LDR apply to their waste.

Waste analysis plan provisions for 'operating' TSD units are found in the Unit-Specific Portion of this permit application.

3.1.2 Organic Air Emissions

Organic air emissions from the Hanford Facility are required to be addressed under RCRA (40 CFR 264 Subpart AA, BB, and CC). Information pertaining to these requirements is included in Chapter 4.0, Section 4.10.

3.1.3 Waste in Piles [C-1a]

Waste piles and containment buildings associated with TSD units 'undergoing closure' and with units being 'dispositioned through other options' are shown in Chapter 1.0, Table 1-1.

3.1.4 Landfilled Wastes [C-1b]

Currently only one 'operating' TSD unit, the LLBG, is classified as a landfill. Information for this unit, currently operating under interim status, is found in the HF Part A, in Chapter 4.0 of the General Information Portion (refer to Section 4.1.2.8), and in the Unit-Specific Portion (DOE/RL-88-20). Landfills associated with TSD units 'undergoing closure' and with units being 'dispositioned through other options' are shown in Chapter 1.0, Table 1-1, and briefly described in Chapter 2.0, Section 2.5, and in Chapter 4.0, Section 4.1.2.8.

3.1.5 Wastes Incinerated and Wastes Used in Performance Tests [C-1c]

No incinerator units currently are found on the Hanford Facility. If incinerator units are established in the future, and if waste is used in performance tests, information for each unit will be entered into the HF Part A and into the Unit-Specific Portion of this permit application.

3.2 WASTE ANALYSIS PLAN [C-2]

This section contains a discussion of waste analysis plans and related quality assurance information. The TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) will address waste analysis and quality assurance in accordance with Conditions II.D. and II.E. of the HF RCRA Permit (DW Portion), respectively, and/or in accordance with any unit-specific conditions.

The WAC 173-303-300 requires a facility owner or operator to confirm the knowledge about a dangerous waste before this waste is treated, stored, and/or disposed. The purpose for such knowledge is to ensure that this dangerous waste is managed properly. Waste analysis plans contained in the Unit-Specific Portion of this permit application address the requirements of

WAC 173-303-300(5). For TSD units that receive waste from offsite sources, the waste analysis plan includes measures for confirming that each dangerous waste received matches the identity of the waste specified on the accompanying manifest or shipping paper in accordance with WAC 173-303-300(5)(g).

Development and/or revision of TSD unit-specific waste analysis plans generally are carried out using guidance provided by the EPA (EPA 1994b). The data quality objective (DQO) process developed by the EPA (EPA 1994a) is a key tool in determining the type, quantity, and quality of data needed to support waste analysis. For Hanford Facility TSD units, DQOs are developed jointly between unit-specific representatives and the regulators in DQO workshops. The DQOs identify data needed for proper waste handling and treatment along with any data needed to ensure protection of the environment. After identification of the data needed, the appropriate parameters, sampling and analytical methods, and quality assurance levels are selected. Where possible, sampling and analytical methods will be conducted in accordance with SW-846 (EPA 1986b) or WAC 173-303-110. However, because of the radioactive nature of the mixed waste, sampling and analytical methods could be modified, from those published by EPA and Ecology, to accommodate the special handling needs of mixed waste samples; the intent of EPA's and Ecology's methodologies will be attained where feasible and appropriate.

As noted in Condition II.E.5. of the HF RCRA Permit (DW Portion), the DQO process can be used to determine the level of quality assurance and quality control for the collection, preservation, transportation, and analysis of each sample that is required for the implementation of the HF RCRA Permit. The DQOs are approved by Ecology, in writing, or through incorporation of the TSD unit waste analysis plans into Part III of the HF RCRA Permit (DW Portion).

Additional information on the quality assurance and quality control for individual TSD units can be found in the Unit-Specific Portion of this permit application. The information is integrated, as appropriate, with the quality assurance and control program discussed in Article XXXI of the Tri-Party Agreement and Sections 6.5 and 7.8 and Appendix F of the Tri-Party Agreement Action Plan. The Tri-Party Agreement reiterates the commitment to the DQO process as a means of specifying the appropriate levels of quality assurance and quality control.

Specific activities for each 'operating' TSD unit are governed by procedures. In accordance with WAC 173-303-806, a description of procedures pertinent to dangerous waste management activities could be incorporated into the HF RCRA Permit (DW Portion) (e.g., Attachment 10 of the DW Portion pertaining to the 616 NRDWSF).

Conditions II.F. and II.K. of the HF RCRA Permit (DW Portion) address groundwater monitoring and closure performance standards, respectively. Of particular relevance to the quality assurance and quality control of these activities are environmental investigation instructions. The environmental investigation instructions applicable to each 'operating' TSD unit are briefly described in the Unit-Specific Portion of this permit application. Current copies of these instructions are maintained on file and can be located by accessing the 'Records Contacts' identified in Chapter 12.0, Section 12.1.

3.3 MANIFEST SYSTEM [C-3]

The Hanford Facility manages dangerous and/or mixed waste from both onsite and offsite sources. Management of waste received from, or sent to, offsite sources is addressed in this section; managing of waste from onsite sources is addressed in Section 3.4.

Offsite shipments of dangerous and/or mixed waste to and from the Hanford Facility are subject to the manifest system requirements specified in WAC 173-303-370 and -180, respectively. The TSD units incorporated into Part III or Part V of the HF RCRA Permit (DW Portion) will address manifest system requirements in accordance with Conditions I.E.17., I.E.18., II.N., and II.P. of the HF RCRA Permit (DW Portion) and/or in accordance with any unit-specific conditions.

Additional manifest system information specific to individual TSD units can be found in the Unit-Specific Portion of this permit application. Manifest system records for TSD units incorporated into Part III or Part V of the HF RCRA Permit (DW Portion) are maintained on file (refer to Chapter 12.0, Section 12.1) and can be located by accessing the 'Records Contacts' identified in Chapter 12.0, Section 12.1.

3.3.1 Procedures for Receiving Shipments [C-3a]

The Hanford Facility receives dangerous and mixed waste from offsite (including foreign) sources. Such waste is subject to the manifest system requirements specified in WAC 173-303-370 and to the reporting requirements specified in WAC 173-303-390(1) and WAC 173-303-390(2). The TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) will receive offsite waste in accordance with Condition II.N. of the HF RCRA Permit (DW Portion) and/or in accordance with any unit-specific conditions.

Notification for foreign waste receipt is made in accordance with WAC 173-303-290. Notification of subsequent shipments of the same waste from the same foreign source in the same calendar year is not required.

3.3.2 Response to Significant Discrepancies [C-3b]

Appendix 2B contains a definition of 'Significant Discrepancy' taken from the HF RCRA Permit (DW Portion). The TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) will respond to significant discrepancies in accordance with WAC 173-303-370(4) and WAC 173-303-390(1), Conditions I.E.17. and I.E.18. of the HF RCRA Permit (DW Portion), and/or in accordance with any unit-specific conditions.

3.3.3 Provisions for Non-acceptance of Shipment [C-3c]

This section addresses non-acceptance of undamaged shipments and activation of the contingency plan for damaged shipments.

3.3.3.1 Non-acceptance of Undamaged Shipment [C-3c(1)]. Provisions for non-acceptance of shipments are contained in WAC 173-303-370(5). The TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) will address these provisions in accordance with WAC 173-303-370(5) and WAC 173-303-390(1), Conditions I.E.17., I.E. 18., and II.P.1. of the HF RCRA Permit (DW Portion), and/or in accordance with any unit-specific conditions. Additional discussion of waste acceptance criteria for 'operating' TSD units is contained in the Unit-Specific Portion of this permit application.

3.3.3.2 Activation of Contingency Plan for Damaged Shipment [C-3c(2). Appendix 7A contains the *Hanford Facility Contingency Plan* (DOE/RL-93-75). As specified in Condition II.A. and Attachment 3 of the HF RCRA Permit (DW Portion), this Plan applies to all areas of the Hanford Facility between TSD unit boundaries. Sections 5.6 and 5.7 of the *Hanford Facility Contingency Plan* address criteria for plan activation in instances that could be associated with damaged shipments.

The *Hanford Facility Contingency Plan* contains reference to the unit-specific contingency plans included in the Unit-Specific Portion of this permit application. Those TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) will address damaged shipment response in accordance with the contingency plan developed for each TSD unit.

3.4 TRACKING SYSTEM [C-4]

The Hanford Facility has one EPA/State identification number and is considered to be a single RCRA facility. The boundaries of the Hanford Facility, as defined in Attachment 2 of the HF RCRA Permit (DW Portion), are shown in Chapter 2.0, Figure 2-1; roadways on the Hanford Facility are shown in Chapter 2.0, Figure 2-11. With the exception of conditions specified in Condition II.P.2 of the HF RCRA Permit (DW Portion), transportation along these roadways is considered to be onsite. Condition II.P.2. of the HF RCRA Permit (DW Portion) defines transportation of dangerous waste along State Highways 240, 24, and 243, and Route 4 South (Stevens Drive) (Chapter 2.0, Figure 2-11) to be offsite shipments requiring manifesting, unless such routes are closed to general public access at the time of the shipment.

Onsite transfers of dangerous or mixed waste are not subject to the manifesting requirements specified in WAC 173-303-370 and -180. However, all onsite waste transfers are conducted in a manner to ensure protection of human health and the environment. Waste tracking forms for the transfer of waste onsite are used. These waste tracking forms effectively track waste inventories from generation through treatment, storage, and/or disposal.

The TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) will address onsite transportation in accordance with

Conditions II.Q. of the HF RCRA Permit (DW Portion) and/or in accordance with any unit-specific conditions. Condition II.Q. of the HF RCRA Permit (DW Portion) specifies that documentation must accompany any onsite dangerous waste that is transported to or from any TSD unit subject to the HF RCRA Permit through or within the 600 Area (Chapter 2.0, Figure 2-11), unless the roadway is closed to general public access at the time of shipment. Waste transported by rail or by pipeline is exempt from Condition II.Q. of the HF RCRA Permit (DW Portion). Onsite waste tracking records for TSD units incorporated into Part III of the HF RCRA Permit (DW Portion) are maintained on file and can be located by accessing the 'Records Contacts' identified in Chapter 12.0, Section 12.1.

3.5 OTHER WASTE ANALYSIS DOCUMENTATION

Part of the activities associated with closure implementation for a TSD unit is to perform a DQO process (refer to Section 3.2 and Chapter 11.0, Section 11.1.2). This process assists in determining the data needs for closure. The results of the DQO process are documented in a signed DQO agreement or in a sampling and analysis plan (SAP). Sampling and analysis activities are carried out in accordance with the SAP. Once the sampling activities are completed, and the analytical data validated, a report is prepared that evaluates the data. The report contains a recommendation on whether or not clean closure can be achieved. Condition II.D.1. of the HF RCRA Permit (DW Portion) addresses the need for a SAP for TSD units included in Part V.

3.5.1 Sampling and Analysis Plan

A SAP is prepared to document the DQO strategy developed to support closure of a TSD unit. The SAP describes the type of media that will be sampled, i.e., soil, concrete, gravel, or asphalt. The sample locations, number of samples per location, and the constituents that will be analyzed for also are discussed. In addition, the procedures that will be used to take the samples and prepare the samples for shipment to the laboratory are identified. The types of analytical methods that will be used by the laboratory are listed. Various tables and figures are included in the plan that support discussions on where samples will be taken, what constituents will be analyzed, and the number of samples.

3.5.2 Data Evaluation Report

A data evaluation report is prepared once the data have been analyzed and the results have been validated. This report discusses the sampling activities undertaken and the analytical results from the media sampled to support the closure of a TSD unit. The sample collection methods and field quality assurance and control methods are reviewed. Any field deviations from the SAP that occurred are documented in the report. The previously agreed upon closure performance standards or cleanup levels are identified. Results of the data validation for each sample analyte are discussed. The analytical data are evaluated and organized into categories; for example, organics, metals, and/or anions. Finally, a conclusion section is prepared that states the results of comparing the analytical data with the closure performance standards or cleanup levels. This comparison serves as the basis for a decision on whether or not clean closure can be achieved. Various tables also are included that contain information on the analytical results for each sample, data validation qualifiers for each sample, and a comparison of the data for each sample to the associated closure performance standards or cleanup levels.

CONTENTS

CONTENTS (cont)

4.0 PROCESS INFORMATION [D]

This chapter provides general process information on the management of dangerous waste and mixed waste for Hanford Facility TSD units and addresses the provisions identified in Section D of Ecology's permit application guidance (Ecology 1987 and 1995). Also addressed are provisions contained in Conditions II.L., II.R., II.U., and II.V. of the HF RCRA Permit (DW Portion).

A brief description of process information for 'operating' TSD units is provided. A brief description of process information for TSD units 'undergoing closure' and for units being 'dispositioned through other options' is found in Chapter 2.0, Section 2.5.

Also included is a discussion of the processes used to control design and operational information, and the method for transmitting design and operational changes to the regulators. In addition, a discussion of certification is included, as it pertains to supporting certain RCRA and dangerous waste permitting activities. Furthermore, mapping and marking activities conducted to meet HF RCRA Permit (DW Portion) requirements are summarized.

Activities conducted on the Hanford Facility that involve only the management of radioactive waste are not considered by the DOE-RL to be regulated under the RCRA or WAC 173-303 and, therefore, are not fully addressed in this chapter (refer to Chapter 2.0, Section 2.1.1.3.1). References to such activities are included for informational purposes only.

4.1 OVERVIEW

The Hanford Facility treats, stores, and/or disposes of dangerous and mixed waste generated on the Hanford Facility. Mixed waste generated offsite also is managed within certain TSD units. The Hanford Facility 'operating' TSD units are located in the 200, 300, 400, and 600 Areas (refer to Chapter 1.0, Table 1-1 and Appendix 2A). These TSD units are described briefly, by area, in the remainder of this section. For each of the 'operating' TSD units, the following information is provided: the classification of the TSD unit (e.g., surface impoundment, container storage unit, etc.); the type of waste processed at the TSD unit (dangerous and/or mixed waste); and a brief description of the waste management process or processes conducted at the TSD unit. Information presented in this chapter has been compiled from existing documents with the primary sources of information as follows: the HF Part A, the Tri-Party Agreement, the *Hanford Mission Plan* (DOE/RL-93-102), and the *Hanford Site Environmental Permitting Status Report*.

More detailed process information for 'operating' TSD units is presented in the HF Part A, Form 3s (refer to Chapter 1.0). These Form 3s contain an identification of specific dangerous waste numbers, process design capacities, and estimated annual quantities of waste handled.

Management of 'operating' TSD units is conducted in accordance with the current Hanford Mission (refer to Chapter 2.0, Section 2.1.1.4): to clean up the Hanford Site, provide scientific and technological excellence to meet global needs, and to partner in the economic diversification of the region (DOE/RL-93-102). To facilitate achievement of the Hanford Mission, work generally is organized into one of the following projects:

- Tank Waste Remediation System
- Waste Management
- Facility Transition
- Environmental Restoration
- Technology Development.

The relationship of 'operating' TSD units to the Hanford Mission and to onsite projects also is described. All TSD units discussed, except where noted, will operate under interim status until incorporated into the HF RCRA Permit (DW Portion) in accordance with the Class 3 Permit Modification Schedule (refer to Chapter 2.0, Section 2.1.1.3.3).

4.1.1 100 Areas

The 100 Areas contain no 'operating' TSD units.

4.1.2 200 Areas

The 200 East and 200 West Areas encompass the chemical separations plants used for the reprocessing of nuclear materials. These reprocessing plants generated various dangerous and mixed waste that was discharged to the soil column or stored in underground storage tanks (referred to as tank farms). The original mission for the plants in the 200 Areas was in support of nuclear weapons development and production related to national defense. The end of the Cold War prompted the shutdown of chemical separations activities supporting this original mission.

Most of the 'operating' TSD units are located in the 200 East and/or 200 West Areas (refer to Chapter 2.0, Figure 2-1 and Appendix 2A). A brief description of the 'operating' TSD units located in the 200 Areas is provided in the following sections.

4.1.2.1 Double-Shell Tank System. Mixed waste is managed in the DST System, a tank treatment and storage unit located in the 200 Areas. The DST System includes 28 tanks of approximately 4,000,000 liter capacity, four smaller tanks in concrete vaults, ancillary equipment such as diversion boxes and waste transfer pipelines, and the 204-AR Waste Unloading Station (204-AR) (refer to Section 4.1.2.2). The DST System waste is treated by the addition of chemicals to control corrosion and could be treated by evaporation in four of the aging waste tanks (Appendix 2B). However, there are no future plans to perform evaporation in these tanks. The waste eventually will be retrieved, treated as necessary, and disposed (DOE/RL-93-102; Tri-Party Agreement).

The DST System currently is managed under the Tank Waste Remediation System Project. Part B documentation for the DST System is contained in the Unit-Specific Portion of this permit application (DOE/RL-90-39).

4.1.2.2 204-AR Waste Unloading Station. The 204-AR is a miscellaneous treatment unit located in the 200 East Area. This unit is used for the unloading and treatment of liquid mixed waste received from railroad tank cars, tanker trucks, and from other transport devices. The waste is generated from a variety of activities conducted in the 100, 200, 300, and 400 Areas. During unloading operations, the pH of the waste could be adjusted chemically in-line during pumpout to meet the corrosion protection requirements of the DST System.

The 204-AR currently is managed under the Tank Waste Remediation System Project. The 204-AR will be addressed in Part B permit application documentation for the DST System (DOE/RL-90-39).

4.1.2.3 242-A Evaporator. The 242-A Evaporator is a tank treatment and storage unit located in the 200 East Area. The 242-A Evaporator consists of process vessels and support systems for heating, evaporating, and condensing waste stored in the DST System. Thus, processing of waste through the 242-A Evaporator enables additional tank volume to become available to support such site activities as surplus facility decontamination, waste retrieval from DST and SST tanks, and waste vitrification. The 242-A Evaporator receives a mixed waste stream from the DST System that contains radionuclides, inorganic, and trace organic constituents. Treatment of the waste at the 242-A Evaporator results in two mixed waste streams. One mixed waste stream (slurry) contains the majority of the radionuclides and inorganic constituents and the nonvolatile organics. The other mixed waste stream (process condensate) contains greatly reduced concentrations of radionuclides and volatile organics. The slurry is routed back to the DST System for storage pending further treatment. The process condensate is routed to the LERF (refer to Section 4.1.2.4) for interim storage and treatment until transferred to the 200 Area ETF (refer to Section 4.1.2.5) for final treatment.

The 242-A Evaporator currently is managed under the Tank Waste Remediation System Project. Part B documentation for the 242-A Evaporator is contained in the Unit-Specific Portion of this permit application (DOE/RL-90-42).

4.1.2.4 Liquid Effluent Retention Facility. The LERF, located in the 200 East Area, is classified as a surface impoundment. The LERF provides interim treatment and storage of mixed waste effluent (process condensate) received from the 242-A Evaporator or from other onsite sources (as either mixed waste or nondangerous waste). Treatment is performed by equalization of the waste to control pH to improve 200 Area ETF performance. The mixed waste is stored and treated until transferred to the 200 Area ETF for treatment. The LERF is a retention facility consisting of three basins (surface impoundments). Each basin is constructed with two liners, a leachate collection system between the liners, and a floating cover.

The LERF is currently managed under the Waste Management Project (Liquid Effluents subproject). Part B documentation for the LERF is contained in the Unit-Specific Portion of this permit application (DOE/RL-90-43).

4.1.2.5 200 Area Effluent Treatment Facility. The 200 Area ETF is a tank treatment and storage and container storage unit located in the 200 East Area. This TSD unit treats process condensate from the 242-A Evaporator and will treat and store waste waters from future site remediation efforts. The 200 Area ETF contains a series of systems to reduce the concentration of organic, inorganic, and radioactive constituents (except tritium).

The 200 Area ETF process involves two treatment trains. The waste water enters the primary treatment train where the inorganic and radioactive constituents are removed, and organic constituents are destroyed. The components of the primary treatment train include, but are not limited to, filtration, pH adjustments, ultraviolet light oxidation, reverse osmosis, and ion exchange. Treated effluent is collected in tanks, sampled to verify that discharge requirements have been met, and discharged to an approved disposal site. Once the discharge requirements have been met, the treated effluent is considered delisted and is no longer managed as a dangerous waste (60 FR 31115). The solids that are removed from the waste water enter the secondary treatment train where the solids are dried and packaged for storage and/or disposal.

The 200 Area ETF currently is managed under the Waste Management Project (Liquid Effluents subproject). Part B documentation for the 200 Area ETF is contained in the Unit-Specific Portion of this permit application (DOE/RL-93-03).

4.1.2.6 Central Waste Complex. The CWC is located in the 200 West Area. This storage and treatment unit consists of multiple storage structures (e.g., storage modules, buildings, and storage pads). Treatment includes absorption and solidification of free liquids and the neutralization of corrosive materials. The CWC provides the capacity to store both onsite and offsite mixed waste, low-level waste, and transuranic waste. A phased construction schedule is used to accommodate any changes in the mixed waste, low-level waste, and transuranic waste production rate.

The CWC currently is managed under the Waste Management Project (Solid Waste subproject). Part B documentation for the CWC is contained in the Unit-Specific Portion of this permit application (DOE/RL-91-17).

4.1.2.7 Waste Receiving and Processing. The WRAP will treat and store mixed waste, low-level waste, and transuranic waste (Appendix 2B). This TSD unit, located in the 200 West Area directly north of the CWC, will have the capability to change the physical form of the radioactive and/or mixed waste through compaction (volume reduction), repackaging, stabilization, solidification of liquids, neutralization, etc. The treated transuranic waste eventually will be transported for disposal at the Waste Isolation Pilot Plant in New Mexico (when this plant becomes operational) or to another transuranic waste disposal site.

The WRAP is currently managed under the Waste Management Project (Solid Waste subproject). Part B documentation for the WRAP is contained in the Unit-Specific Portion of this permit application (DOE/RL-91-16).

4.1.2.8 Low-Level Burial Grounds. The LLBG are a land-based unit consisting of eight burial grounds located in the 200 East Area and 200 West Area. Only four of the eight burial grounds (218-E-12B, 218-W-4C, 218-W-5, and 218-W-6) are, or will be, used for the disposal of mixed waste and are subject to WAC 173-303. Current plans call for designating four of the burial grounds (218-E-10, 218-W-3A, 218-W-3AE, and 218-W-4B), and portions of burial grounds 218-E-12B, 218-W-5, and 218-W-4C, as SWMUs (Appendix 2A). These areas received solid waste prior to enactment of HSWA as described in Chapter 2.0, Section 2.5.1, but have not received solid waste since November 1987. The SWMU portions of the LLBG will continue to accept for disposal low-level (radioactive) waste only.

The LLBG consist of both lined and unlined trenches of various sizes and depths. Mixed waste is disposed in lined trenches or in unlined trenches for which an exemption from the liner/leachate collection system requirements is sought. The unlined trenches that are not exempt from liner/leachate collection system requirements are used for radioactive waste disposal and are not subject to RCRA or WAC 173-303 regulations.

The LLBG currently is managed under the Waste Management Project (Solid Waste subproject). Part B documentation for the LLBG is contained in the Unit-Specific Portion of this permit application (DOE/RL-88-20).

4.1.2.9 224-T Transuranic Waste Storage and Assay Facility. The 224-T TRUSAF is a container storage unit located in the 200 West Area. The 224-T TRUSAF provides a centralized unit for storage of transuranic, transuranic mixed, low-level, and mixed waste (Appendix 2B) from various Hanford Facility operations and from other U.S. Department of Energy and U.S. Department of Defense facilities. The transuranic mixed waste eventually will be transported for disposal at the Waste Isolation Pilot Plant in New Mexico (when this plant becomes operational) or to another approved waste disposal site. The 224-T TRUSAF also will store retrieved containers of transuranic waste from the LLBG. The LLBG transuranic waste will be characterized and reprocessed at WRAP. Assays of the waste at the 224-T TRUSAF consist of nondestructive testing to ensure that the waste meets waste acceptance criteria for the unit and for offsite disposal.

The 224-T TRUSAF currently is managed under the Waste Management Project (Solid Waste subproject). Part B documentation for the WRAP is contained in the Unit-Specific Portion of this permit application (DOE/RL-91-51).

4.1.2.10 T Plant Complex. The T Plant Complex consists of two main structures: the 221-T Building and the 2706-T Building and various support structures and storage units. The 221-T and 2706-T buildings are used for storage (tank, container, and miscellaneous equipment) and treatment (tank, container, and decontamination activities) of mixed and dangerous waste before transfer to an onsite TSD unit or an offsite TSD facility. Types of waste processing at these buildings and various support structures or units could include identification, verification, assay, sampling and analysis, repackaging, and various treatments. Waste equipment or useable equipment could be stored temporarily, and treatment or decontamination of equipment could be performed at various facilities at the T Plant Complex.

The tank systems housed in the 221-T building are used to manage dangerous and/or mixed waste. The tank systems are used to store and treat waste generated by equipment decontamination activities in the 221-T and 2706-T Buildings. The 2706-T Building waste is transferred to the 221-T Building via the 211-T collection sump. The liquid waste is pumped from the tanks to a railroad tank car and transferred to a long-term storage unit when a sufficient quantity is collected. The liquid mixed waste also could be transferred from storage tanks by underground pipelines to the DST System.

The T Plant Complex currently is managed under the Waste Management Project (Solid Waste subproject). Part B documentation for the T Plant Complex is contained in the Unit-Specific Portion of this permit application (DOE/RL-95-36).

4.1.2.11 PUREX Storage Tunnels. The PUREX Facility, located in the 200 East Area, consists of two separate TSD units, the PUREX Plant (202-A Building) (refer to Chapter 2.0, Section 2.5.2.1.1) and the PUREX Storage Tunnels. The PUREX Storage Tunnels, a miscellaneous storage unit, are located next to the PUREX Plant in the 200 East Area. The PUREX Storage Tunnels include two underground railroad storage tunnels used for the long-term storage of material removed from the PUREX Plant and from other onsite activities. Tunnel number 1 provides storage space for eight railroad cars. Between June 1960 and January 1965, all eight railroad car positions were filled and the tunnel subsequently sealed. Tunnel Number 2 provides storage space for 40 railroad cars. The first railroad car was placed in Tunnel Number 2 in December 1967. Space for additional railroad cars is still available in Tunnel Number 2.

The PUREX Storage Tunnels currently are managed under the Facility Transition Project. Part B documentation for the PUREX Storage Tunnels is contained in the Unit-Specific Portion of this permit application (DOE/RL-90-24).

4.1.2.12 222-S Laboratory Complex. The 222-S Laboratory Complex is a tank storage and treatment and container storage and treatment unit located in the 200 West Area. The 222-S Laboratory Complex provides analytical support services for the Hanford Site and includes the storage and treatment of dangerous and/or mixed waste generated during analytical operations. The 222-S Laboratory Complex consists of two areas: the 219-S Waste Handling Facility and the 222-S Dangerous and Mixed Waste Storage Area.

The 219-S Waste Handling Facility is located northeast of the 222-S Analytical Laboratory building and consists of a primary storage/treatment tank and two backup storage tanks. The liquid mixed waste generated from the laboratory is gravity flowed to the 219-S Waste Handling Facility tanks where the waste is treated to adjust the pH before transfer to the DST System.

The 222-S Dangerous and Mixed Waste Storage Area is located on the north side of the 222-S Analytical Laboratory building. The 222-S Dangerous and Mixed Waste Storage Area consists of two metal storage structures resting on a concrete pad. The 222-S Dangerous and Mixed Waste Storage Area provides storage for various sized containers or other packages and overpacks of mixed waste and dangerous waste. The containers are stored at the 222-S Dangerous and Mixed Waste Storage Area.

The 222-S Laboratory Complex currently is managed under the Waste Management Project. Part B documentation for the 222-S Laboratory Complex is contained in the Unit-Specific Portion of this permit application (DOE/RL-91-27).

4.1.3 300 Area

The 300 Area historically was used for the fabrication of the 100 Areas reactor fuels and for the main RD&D activities. Fuel fabrication activities ceased when N Reactor was placed in standby and shutdown. Current activities include RD&D supporting the waste management and environmental restoration and remediation mission, including the development of new technologies for the treatment and disposal of the waste accumulated throughout the life of the Hanford Site. A brief description of the two 'operating' TSD units located in the 300 Area follows.

4.1.3.1 325 Hazardous Waste Treatment Units. The 325 HWTUs are located in the 325 Building within the 300 Area. The 325 HWTUs consist of the following treatment and storage areas: Hazardous Waste Treatment Unit, Shielded Analytical Laboratory, and the 325 Collection/Loadout Station Tank.

The Hazardous Waste Treatment Unit is located in the northeast corner of the 325 Building. The Hazardous Waste Treatment Unit provides treatment and storage of mixed waste and/or dangerous waste in approved containers.

The Shielded Analytical Laboratory is located in the west side of the 325 Building. The Shielded Analytical Laboratory provides analytical chemistry services within six interconnected hot cells to prepare and analyze samples of mixed waste. The Shielded Analytical Laboratory also provides storage and treatment of mixed waste in approved containers and in the 325 Shielded Analytical Laboratory tank.

The 325 Collection/Loadout Station Tank is located in the southeast corner of the basement of the 325 Building. The 325 Collection/Loadout Station Tank stores and treats mixed waste from various laboratory activities throughout the 325 Building.

The 325 HWTUs currently are managed under the Technology Development Project. Part B documentation for the 325 HWTUs is contained in the Unit-Specific Portion of this permit application (DOE/RL-92-35).

4.1.3.2 305-B Storage Unit. The 305-B is a container storage unit in the 300 Area. This unit is used to receive, store, and prepare dangerous and mixed waste for shipment. Waste managed at the 305-B is generated primarily in support of RD&D activities. Waste is characterized by the generating unit as required for designation and transported to the 305-B by truck or light utility vehicle. On receipt at the 305-B, the waste is placed into the proper storage area depending on the waste type and quantity. When a sufficient quantity of waste has been accumulated, the waste is inspected for shipment, and transported to an onsite TSD unit (for mixed waste, e.g., CWC; refer to Section 4.1.2.6) or an offsite TSD facility (for dangerous waste).

The 305-B currently is managed under the Technology Development Project. The 305-B (based on documentation contained in DOE/RL-90-01) was incorporated into the initial HF RCRA Permit (DW Portion) and is operating under final status provisions contained in Chapter 2 of Part III of the HF RCRA Permit (DW Portion).

4.1.4 400 Area

The 400 Area contains no 'operating' TSD units.

4.1.5 600 Area

The 600 Area includes everything within the Hanford Facility boundary that is not within any other specific area (Chapter 2.0, Figure 2-3). A brief description of the one 'operating' TSD unit located in the 600 Area follows.

The 616 NRDWSF is a container storage unit, located between the 200 East and 200 West Areas. The 616 NRDWSF provides a centralized unit to receive, store, and prepare nonradioactive dangerous waste for offsite shipment. Before receipt of dangerous waste at the TSD unit, the generating unit characterizes the waste, assigns waste numbers according to WAC 173-303, and packages the waste according to U.S. Department of Transportation regulations. The waste is transferred to the 616 NRDWSF by truck. Once a waste transfer is accepted from the transporter, an appropriate storage cell for each container is selected, depending on the dangerous waste designation. Periodically during the year, depending on the rate of waste accumulation, containers are remanifested, inspected for offsite shipment, and transported to an offsite TSD facility.

The 616 NRDWSF is currently managed under the Waste Management Project (Solid Waste subproject). The 616 NRDWSF (based on documentation contained in DOE/RL-89-03) was incorporated into the initial HF RCRA Permit (DW Portion) and currently is operating under final status provisions contained in Chapter 1 of Part III of the HF RCRA Permit.

4.2 CONTAINERS [D-1]

The following Hanford Facility 'operating' TSD units with container handling capabilities (refer to Chapter 1.0, Table 1-1) include the following:

- 200 Area ETF
- CWC
- WRAP
- 224-T TRUSAF
- T Plant Complex
- 222-S Laboratory Complex
- 325 HWTUs
- 305-B
- 616 NRDWSF.

The T Plant Complex also includes a containment building.

4.3 TANK SYSTEMS [D-2]

The following Hanford Facility 'operating' TSD units with tank systems (refer to Chapter 1.0, Table 1-1) include the following:

- DST System
- 242-A Evaporator
- 200 Area ETF
- T Plant Complex
- 222-S Laboratory Complex
- 325 HWTUs.

4.4 WASTE PILES [D-3]

No Hanford Facility 'operating' TSD units currently are classified as waste piles.

4.5 SURFACE IMPOUNDMENTS [D-4]

The LERF is the only Hanford Facility 'operating' TSD unit classified as a surface impoundment (refer to Chapter 1.0, Table 1-1).

4.6 INCINERATORS [D-5]

No Hanford Facility 'operating' TSD units currently are classified as incinerators.

4.7 LANDFILLS [D-6]

The LLBG are the only Hanford Facility 'operating' TSD unit classified as a landfill (Chapter 1.0, Table 1-1).

4.8 LAND TREATMENT [D-7]

No Hanford Facility 'operating' TSD units currently are classified as land treatment units.

4.9 MISCELLANEOUS UNITS

The PUREX Storage Tunnels are the only Hanford Facility 'operating' TSD unit classified as a miscellaneous unit (refer to Chapter 1.0, Table 1-1).

4.10 AIR EMISSIONS CONTROL [D-8]

Air emissions released from certain or applicable Hanford Facility TSD units are regulated under RCRA (40 CFR 264 Subpart AA, BB, and effective October 6, 1996, CC). The following sections discuss air emissions on the Hanford Facility.

4.10.1 Process Vents [D8-8a]

The organic air emissions released from Hanford Facility process vents are regulated under RCRA (40 CFR 264 Subpart AA). These regulations apply to process vents associated with specific separation processes, identified in 40 CFR 264.1030(b), that are used to manage hazardous waste with organic concentrations of at least 10 parts per million by weight. Threshold limits that require emission controls apply to the summation of all applicable emission sources for the entire Hanford Facility.

To determine whether the threshold limits are exceeded, thereby requiring emission controls, the applicable processes were identified first for each TSD unit. The TSD units that had the potential processes identified in the regulations, at the time of the evaluation, are as follows:

- B Plant Complex
- 242-A Evaporator
- DST System
- Maintenance and Storage Facility.

Of these TSD units, only the 242-A Evaporator currently operates a process that contributes to the Hanford Facility organic emissions release rate. Estimates for a 1995 campaign (Campaign 95-1) yielded a maximum discharge rate of 0.316 kilogram per hour and a 212-kilogram total release (WHC 1996). This release rate is well below the threshold of 1.4 kilograms per hour or 2,800 kilograms per year. Future plans are to operate an average of two campaigns per year with organic emission similar to Campaign 95-1. Before each campaign, organic release estimates specific for the waste to be processed will be reviewed to check compliance with Subpart AA.

In summary, the process vents on the Hanford Facility currently do not exceed the threshold limits triggering process controls under the regulations.

However, the amount of organic emissions could change as TSD units are brought online or are deactivated. The organic air emissions summation will be reevaluated periodically as conditions warrant. Further details regarding process vents are discussed in the applicable Unit-Specific Portion of this permit application.

4.10.2 Equipment Leaks [D-8b]

The organic air emissions released from Hanford Facility equipment leaks are regulated under RCRA (40 CFR 264 Subpart BB and 40 CFR 265 Subpart BB). These regulations apply to equipment that manages hazardous waste with organic concentrations of at least 10 percent by weight. Individual TSD units managing waste with organic concentrations of at least 10 percent by weight include special precautions and equipment to mitigate air emissions from leakage. Further details specific to individual TSD units can be found in the Unit-Specific Portion of this permit application.

4.10.3 Tanks, Containers, and Surface Impoundments [D-8c]

Certain organic air emissions released from Hanford Facility hazardous waste tanks, containers, and surface impoundments are regulated under RCRA (40 CFR 264 Subpart CC) effective October 6, 1996. These regulations apply to tanks, containers, and surface impoundments used to manage certain organic-containing hazardous waste. Mixed waste has been deferred from the proposed regulations under Subpart CC. Therefore, only individual TSD units at the Hanford Facility that manage hazardous waste (not mixed waste) will address Subpart CC. Further details specific to individual TSD units can be found in the Unit-Specific Portion of this permit application.

4.11 WASTE MINIMIZATION [D-9]

Waste minimization information is presented in Chapter 10.0.

4.12 GROUNDWATER MONITORING FOR LAND-BASED UNITS [D-10]

Groundwater monitoring for land-based units is presented in Chapter 5.0.

4.13 DESIGN AND OPERATIONAL INFORMATION

This section presents a discussion of the processes used to control design and operational information, and the method for transmitting design and operational changes to the regulators in accordance with the HF RCRA Permit (DW Portion). In addition, a discussion of certification is included, as it pertains to supporting certain RCRA and dangerous waste permitting activities. Furthermore, mapping and marking activities conducted to meet HF RCRA Permit (DW Portion) requirements are summarized.

4.13.1 Transmittal of Design Information to Regulatory Agencies

Design of TSD units on the Hanford Facility is controlled in accordance with an established engineering control system. This system serves as the basis for meeting HF RCRA Permit (DW Portion) design information requirements. Standard engineering practices ensure that uniform methods are in place to control tasks such as design review, configuration control, change control, specification preparation, and review and approval requirements. These practices are used on all engineering, development, and project work on the Hanford Facility that result in a documented design or deliverable hardware end item.

Development of, and changes to, design specifications and drawings related to TSD units on the Hanford Facility are carried out in accordance with the engineering practices of the contractor responsible for the activity. Although there is some variation among contractors, no work affecting design (excluding emergency response activities that will be conducted in accordance with contingency plans) is allowed to be performed at a TSD unit until an approved design drawing or appropriate engineering design directive has been issued. This process ensures that components and materials selected meet system requirements while providing a means for configuration control.

Condition II.L. of the HF RCRA Permit (DW Portion) establishes general requirements for design and operation of TSD units incorporated into Part III of the HF RCRA Permit, particularly those related to 'critical systems'. 'Critical systems' are defined in the Definitions section of the HF RCRA Permit (DW Portion) as follows:

> "The term Critical Systems as applied to determining whether a permit modification is required means those specific portions of a TSD unit's structure or equipment whose failure could lead to the release of dangerous waste into the environment and/or systems which include processes which treat, transfer, store or dispose of regulated wastes."

Critical systems will be defined for each 'operating' TSD unit within the Unit-Specific Portion of this permit application.

Condition II.L.1. of the HF RCRA Permit (DW Portion) addresses the need for proper design, construction, maintenance, and operational controls to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous substances that could threaten human health or the environment. Existing Hanford Site design standards [e.g., Hanford Plant Standards (ICF KH 1993)] generally address these requirements and are factored into Hanford Facility design and construction activities.

Condition II.L.2 of the HF RCRA Permit (DW Portion) establishes general requirements for design changes, nonconformance, and as-built drawings. Condition II.L.2.b. of the HF RCRA Permit (DW Portion) requires that during construction of a project subject to the HF RCRA Permit, changes to the approved design, plans, and specifications be documented with an engineering change notice (ECN). Condition II.L.2.b. of the HF RCRA Permit (DW Portion) further requires:

- All ECNs be maintained in the TSD unit-specific portion of the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.35) and be available to Ecology upon request or during the course of an inspection

- Copies of ECNs affecting any critical system be provided to Ecology within 5 working days of initiating the ECN

- Ecology to review an ECN modifying a critical system and inform the Permittees within 2 working days in writing whether the proposed ECN, when issued, will require a Class 1, 2, or 3 permit modification. If after 2 working days Ecology has not responded, it will be deemed as acceptance of the ECN by Ecology.

Condition II.L.2.c. of the HF RCRA Permit (DW Portion) requires that during construction of a project subject to the HF RCRA Permit, any work completed that does not meet or exceed the standards of the approved design, plans and specifications be documented with a nonconformance report (NCR). Condition II.L.2.c. of the HF RCRA Permit (DW Portion) further requires:

- All NCRs be maintained in the TSD unit-specific portion of the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.35) and be available to Ecology upon request or during the course of an inspection

- Copies of NCRs affecting any critical system be provided to Ecology within 5 working days after identification of the nonconformance

- Ecology to review an NCR affecting a critical system and inform the Permittees within 2 working days in writing whether a permit modification is required of any nonconformance and whether prior approval is required from Ecology before work proceeds that affects the nonconforming item. If after 2 working days Ecology has not responded, it will be deemed as acceptance and no permit modification is required.

Condition II.L.2.d. of the HF RCRA Permit (DW Portion) requires that upon completion of a construction project subject to the HF RCRA Permit, as-built drawings be prepared. These as-built drawings are to incorporate the design and construction modifications resulting from all project ECNs and NCRs as well as modifications made pursuant to WAC 173-303-830. Completed as-built drawings are to be placed within the TSD unit-specific portion of the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.36) within 12 months of completing construction, or within an alternate period of time specified in Part III of the HF RCRA Permit (DW Portion).

On an ongoing basis, a tabulation of design changes [for those TSD units incorporated into Part III of the HF RCRA Permit (DW Portion)] can be located by accessing the 'Records Contact' identified in Chapter 12.0, Section 12.1.

4.13.2 Utilization of Aperture Cards

Design drawings included as part of unit-specific documentation normally will be provided in an 27.9-centimeter by 43.2-centimeter format. Drawings provided in this format, for the most part, will exhibit a sufficient degree of legibility to support document review. In selected cases, it could be necessary to enlarge certain portions of drawings to enhance legibility. To support this need, drawings included as part of unit-specific documentation also will be provided in an aperture card format.

4.13.3 Replacement or Upgrading With Functionally Equivalent Components

All maintenance on the Hanford Facility is controlled and performed in accordance with an established work control system. The work control system ensures that the proper documentation is prepared for the activity, and also provides a means to track work from initiation to completion. The work control system also addresses replacement or upgrading with functionally equivalent materials. This system serves as the basis for meeting HF RCRA Permit (DW Portion) equivalent component requirements.

Condition II.R. of the HF RCRA Permit (DW Portion) establishes general requirements for the substitution of an equivalent or superior product for any equipment or materials specified in the HF RCRA Permit. Use of these products are not considered a permit modification. However, a substitution will not be considered equivalent unless it is at least as effective as the original equipment or materials in protecting human health and the environment.

Condition II.R. of the HF RCRA Permit (DW Portion) also requires substitution documentation to be placed in the TSD unit-specific portion of the Hanford Facility Operating Record within 7 days after the change is put into effect. The substitution documentation is to be accompanied by a narrative explanation, and the date the substitution became effective. The location of substitution documentation for TSD units incorporated into Part III the HF RCRA Permit (DW Portion) can be determined by accessing the 'Records Contact' identified in Chapter 12.0, Section 12.1.

4.13.4 Professional Engineer Certification

Certifications in accordance with WAC 173-303-810(13)(a) by an independent registered professional engineer/registered professional engineer are required to support certain RCRA and dangerous waste permitting activities on the Hanford Facility (e.g., tank integrity assessments, closures, etc.). Certifications will be performed in accordance with practices used by TSD facilities throughout the rest of Washington State. Multiple certifications by the same individual will not nullify the individual's independent status.

4.13.5 Mapping and Marking of Underground Pipelines

Conditions II.U. and II.V. of the HF RCRA Permit (DW Portion) specify requirements for the mapping and marking of underground pipelines, respectively. These conditions apply to dangerous waste underground pipelines, including active, inactive, and abandoned pipelines that contain or contained dangerous waste subject to the provisions of WAC 173-303. The requirements associated with these mapping and marking conditions were further clarified and refined through a value engineering study conducted in May 1995 (ICF KH 1995). Participants in this value engineering study included representatives from the Permittees and the regulators, as well as an outside expert.

Condition II.U. of the HF RCRA Permit (DW Portion) specifies a time-phased approach be taken for the mapping of underground pipelines, involving the following:

- Condition II.U.1. of the HF RCRA Permit (DW Portion) requires the Permittees to complete a methodology report within 24 months of the effective date of the HF RCRA Permit (i.e., by September 27, 1996). This report will describe the methods used to generate information required by Conditions II.U.2., II.U.3., and II.U.4. of the HF RCRA Permit (DW Portion). Information to be contained in this report also is specified in Condition II.U.1. of the HF RCRA Permit (DW Portion).

- Condition II.U.2. of the HF RCRA Permit (DW Portion) requires the Permittees to complete an initial submittal within 36 months of the effective date of the HF RCRA Permit (i.e., by September 27, 1997). This submittal is to consist of maps showing the location of dangerous waste underground pipelines that are located outside of the fences enclosing the 200 East, 200 West, 300, 400, 100N, and 100K Areas. Information that is to accompany these maps also is specified in Condition II.U.2. of the HF RCRA Permit (DW Portion). These maps are to be maintained in the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.40) and updated annually after the initial submittal.

- Condition II.U.3. of the HF RCRA Permit (DW Portion) requires the Permittees to complete an initial submittal within 48 months of the effective date of the HF RCRA Permit (i.e., by September 27, 1998). This submittal is to consist of pipeline schematics for dangerous waste underground pipelines within the 200 East, 200 West, 300, 400, 100N, and 100K Areas. Information that is to accompany these schematics also is specified in Condition II.U.3. of the HF RCRA Permit (DW Portion). These schematics are to be maintained in the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.40) and updated annually after the initial submittal. The results of the value engineering study (ICF KH 1995) determined that the information required by Condition II.U.3. of the HF RCRA Permit (DW Portion) (i.e., pipeline attributes, pipeline status, and direction of flow) can be incorporated into the Condition II.U.4. of the HF RCRA Permit (DW Portion) submittal. Thus, the enhanced

Condition II.U.4. of the HF RCRA Permit (DW Portion) submittal also will satisfy Condition II.U.3. of the HF RCRA Permit (DW Portion), as both are due within 48 months.

- Condition II.U.4. of the HF RCRA Permit (DW Portion) requires the Permittees to complete an initial submittal within 48 months of the effective date of the HF RCRA Permit (i.e., by September 27, 1998). This submittal is to consist of maps showing the location of dangerous waste underground pipelines within the 200 East, 200 West, 300, 400, 100N, and 100K Areas. Information that is to accompany these maps also is specified in Condition II.U.4. of the HF RCRA Permit (DW Portion). These maps are to be maintained in the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.40) and updated annually after the initial submittal.

Condition II.V. of the HF RCRA Permit (DW Portion) specifies that within 36 months of the effective date of the HF RCRA Permit (DW Portion) (i.e., by September 27, 1997), the pipelines specified in Condition II.U.2. of the HF RCRA Permit (DW Portion) are to be marked. These pipelines are to be marked at the point the pipelines pass beneath a fence enclosing the 200 East, 200 West, 300, 400, 100N, or 100K Areas, at the origin and destination, at any point the pipelines cross an improved road, and every 100 meters along the pipeline corridor where practicable. The markers are to be labeled with a sign that reads "Buried Dangerous Waste Pipeline" and visible from a distance of 15 meters. The value engineering study (ICF KH 1995) concluded that equivalent worded signs, already in place, could be used to meet this condition. However, a permit modification could be required to allow this approach to be taken.

In addition to the value engineering study (ICF KH 1995), ways will continue to be pursued to meet the mapping and marking conditions of the HF RCRA Permit (DW Portion) as cost-effectively as possible in accordance with the *Cost and Management Efficiency Initiative* signed by DOE-RL, Ecology, and EPA in 1994 (Ecology et al. 1994).

CONTENTS

CONTENTS (cont)

FIGURES

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5.0 GROUNDWATER MONITORING FOR LAND-BASED UNITS [D-10]

This chapter describes the groundwater monitoring activities for land-based TSD units (i.e., dangerous waste surface impoundment, land treatment, or landfill units) by addressing the provisions identified in Section D-10 of Ecology's permit application guidance (Ecology 1987 and 1995). Furthermore, the chapter discusses groundwater monitoring provisions contained in Condition II.F. of the HF RCRA Permit (DW Portion). The general groundwater monitoring information contained in this chapter (e.g., Section 5.3, "Aquifer Identification") and in Appendix 2B need not be duplicated in the Unit-Specific Portion of the *Hanford Facility Dangerous Waste Permit Application*, but can be cross-referenced as appropriate. Pertinent information also can be cross-referenced in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation (refer to Chapter 2.0, Section 2.5).

Currently, Hanford Facility RCRA groundwater monitoring activities are structured to provide groundwater monitoring systems for individual, land-based TSD units. This approach was outlined in the original Tri-Party Agreement and largely has been retained throughout subsequent amendments of the Tri-Party Agreement and throughout interactions with the regulators. This chapter primarily addresses this TSD unit-specific groundwater monitoring approach. However, as cleanup has progressed, a need to more fully integrate Hanford Site groundwater monitoring activities has become increasingly evident. Such integration also would support the *Cost and Management Efficiency Initiative* (Ecology et al. 1994). It is suggested that a collaborative effort to develop a more integrated groundwater monitoring approach be made over the next year, and that the results of this effort be documented through the provision of a revised *Hanford Site Ground Water Protection Management Plan* (DOE/RL-89-12).

A summary of RCRA groundwater monitoring activities on the Hanford Facility is contained in the *Operational Environmental Monitoring Annual Report* (WHC 1995b). This report summarizes monitoring information for two land-based 'operating' TSD units, LERF and LLBG (refer to Chapter 4.0, Sections 4.1.2.4 and 4.1.2.8, respectively). A more detailed description of the groundwater programs for these units is contained in the Unit-Specific Portion of this permit application [i.e., DOE/RL-90-43 (LERF) and DOE/RL-88-20 (LLBG)]. The *Operational Environmental Monitoring Annual Report* also summarizes monitoring information for land-based TSD units 'undergoing closure' (refer to Chapter 2.0, Section 2.5). For certain of these TSD units, more detailed information is contained in closure plan/postclosure plan documentation. The content of this chapter focuses on groundwater monitoring for 'operating' TSD units. However, this information also is relevant to TSD units 'undergoing closure'.

Unit-specific groundwater monitoring programs are designed to comply with regulations for TSD units operating under both interim status (WAC 173-303-400) and final status (WAC 173-303-645 and WAC 173-303-806). The following is a generalized discussion of the RCRA groundwater monitoring requirements for a TSD unit. This discussion provides background information relevant to subsequent, more specific groundwater monitoring discussions. In these discussions, the term 'RCRA' refers to both federal and state groundwater monitoring regulations as appropriate.

The RCRA groundwater monitoring programs are implemented under two types of groundwater monitoring regulations: interim status and final status. A land-based TSD unit operating under interim status must have implemented a monitoring program to determine the impact of the TSD unit on groundwater quality in the uppermost aquifer beneath the TSD unit. The interim status program can take the form of either detection monitoring or assessment monitoring. 'Detection-level' monitoring also is referred to as 'indicator-level' monitoring in the regulations for interim status facilities; 'detection-level' is used throughout this chapter to refer to this type of monitoring for both interim status and final status TSD units. At a minimum, a detection monitoring system must include one upgradient and three downgradient groundwater monitoring wells. A generalized configuration for such a system is shown in Figure 5-1. The LLBG and LERF currently are monitored under interim status regulations. Final status groundwater requirements will take effect when these TSD units are incorporated into the HF RCRA Permit (DW Portion) in accordance with the Class 3 Permit Modification Schedule (refer to Chapter 2.0, Section 2.1.1.3.3).

Before the installation of a detection monitoring system, a groundwater monitoring plan must be developed and followed. This plan details well locations, procedures, requirements for vadose zone and aquifer characterization, and well installation; sample collection, preservation, and transportation; and sample analysis. Chain-of-custody control must be developed and followed. Additionally, relevant components of the DQO process (EPA 1994a) are specified in a site-specific groundwater monitoring plan and a quality assurance project plan (QAPjP). Methods to be used to interpret groundwater monitoring data also are specified.

Under interim status, the detection monitoring system is used to establish background groundwater quality through quarterly sampling and analysis of several water quality parameters (as specified in 40 CFR 265.92) for 1 year. After the first year, sampling and analysis must be conducted annually for the parameters related to groundwater quality, and semiannually for the indicator parameters related to groundwater contamination (e.g., pH, specific conductance, total organic carbon, and total organic halogen).

If statistically significant evidence of contamination in the groundwater exists, the regulatory agency is notified and a groundwater quality assessment monitoring program developed. The objective of assessment monitoring is to determine if dangerous waste constituents have entered the groundwater and, if so, the concentration, rate, and extent of migration of the constituents. This determination is achieved through quarterly sampling and could require the installation of additional wells and/or additional sampling of existing wells. Monitoring must continue at the TSD unit through the postclosure care period unless the TSD unit is to be clean closed.

For final status TSD units, there could be a three-stage groundwater monitoring program that involves detection, compliance, and corrective action, as warranted (EPA 1989b). A final status detection monitoring system must include both background (generally upgradient) and compliance (generally downgradient) wells (Figure 5-1). Wells installed to support interim status could be used as final status monitoring wells. A groundwater monitoring plan is developed to address each final status monitoring stage, using the DQO process (EPA 1994a). Also specified in each plan are methods to be used to conduct and interpret groundwater monitoring data. The choice of an appropriate statistical method depends on the monitoring stage and the nature of the data. A flow chart that guides the selection of the appropriate method to be used for data interpretation is presented in Figure 5-2.

In a final status detection monitoring program, the monitoring objective is to detect the impact of the TSD unit on groundwater quality in the uppermost aquifer beneath the TSD unit. This is achieved by establishing appropriate background concentrations and statistically comparing the compliance well data to the background well data (Figure 5-1). If there is statistically significant evidence of contamination, a compliance monitoring program might be initiated. A compliance monitoring program must be initiated after the owner and/or operator cannot successfully demonstrate that a source other than the regulated TSD unit has caused the contamination or that the increase resulted from an error in sampling, analysis, or evaluation.

In a compliance monitoring program, the monitoring objective is to determine whether groundwater protection standards have been exceeded. This is accomplished by comparing the concentration of a constituent of concern to groundwater protection standards, such as an alternate concentration limit, maximum concentration limit, background, health-based standards, or any other standards that constitute applicable, relevant, and appropriate requirements. Monitoring must continue at the TSD unit through the postclosure care period.

A third stage, a corrective action program, is initiated if a groundwater protection standard is exceeded. Exceeded is defined as statistically significant evidence of increased contamination. Corrective action could consist of additional vadose zone and aquifer characterization and the removal or treatment in place of the dangerous constituents, or a request for an alternate concentration limit.

The remainder of this chapter includes a more specific discussion of the implementation of Hanford Facility groundwater monitoring activities.

5.1 EXEMPTION FROM GROUNDWATER PROTECTION REQUIREMENTS [D-10a]

An exemption from the groundwater monitoring requirements as allowed under WAC 173-303-645(1)(b)(i), (ii), and (iv) is not requested at this time.

5.2 INTERIM STATUS PERIOD GROUNDWATER MONITORING DATA [D-10b]

In 1986, interim status groundwater monitoring for four Hanford Facility TSD units was implemented through a *Consent Agreement and Compliance Order* (Ecology 1986). Three of these TSD units are undergoing closure and are currently in interim status. The fourth TSD unit, the LLBG, is an 'operating' unit. As specified in the Tri-Party Agreement, permit application documentation for the LLBG was submitted in 1989 (DOE/RL-88-20); in accordance with the Class 3 Permit Modification Schedule (refer to Chapter 2.0, Section 2.1.1.3.3), the status of this TSD unit is anticipated to change from interim to final in 1997. Final status is sought for at least one other 'operating' TSD unit requiring a groundwater monitoring system, the LERF (DOE/RL-90-43). The initial permit application documentation for the LERF was submitted in June 1991; in accordance with the Class 3 Permit Modification Schedule (refer to Chapter 2.0, Section 2.1.1.3.3), the status of this TSD unit also is anticipated to change from interim to final in 1997. With the exception of the 183-H Solar Evaporation Basins and the 300 Area Process Trenches (refer to Chapter 2.0, Section 2.5.1.1.2), other land-based TSD units 'undergoing closure' (refer to Chapter 1.0, Table 1-1 and Chapter 2.0, Section 2.5) are not scheduled to be entered into the HF RCRA Permit (DW Portion) until 1998.

The interim status groundwater monitoring program implemented for a TSD unit is summarized in the following sections. The information presented includes a (1) summary of the existing hydrogeologic data, (2) description of the general well design, (3) discussion of the groundwater monitoring system design, (4) summary of the interim status groundwater sampling and analysis plan for monitoring wells, and (5) preliminary description of the statistical procedures used to assess water quality results. In addition, a summary is presented on the techniques and methods used to characterize the uppermost aquifer beneath the Hanford Site in support of the monitoring well system design.

5.2.1 Interim Status Groundwater Monitoring Approach

A specific investigative approach is taken to support the design of each TSD unit groundwater monitoring system in the interim status period. This approach consists of the following two elements.

- Establish an initial groundwater monitoring well system from which stratigraphic, hydrogeologic, and background water quality information can be obtained for the uppermost aquifer. Data from this initial system are used to determine the need for additional monitoring wells.

- Provide hydrogeologic properties of the uppermost aquifer system beneath the TSD unit using data collected from the monitoring well system and from previously collected or published data.

Groundwater monitoring plans are developed for each TSD unit to address these elements. These groundwater monitoring plans contain specific details regarding characterization needs and details regarding the monitoring system design. The groundwater monitoring plans also contain a sampling and analysis plan.

Groundwater monitoring plans were developed for the two 'operating' TSD units: LLBG (WHC 1989b) and LERF (WHC 1991c). Two assessment monitoring plans also have been prepared for the LLBG (WHC 1990b, 1990c). In each case, the assessment monitoring indicated that the detection was a 'false positive', and the LLBG resumed detection monitoring. Interim status groundwater monitoring plans also have been developed for land-based TSD units 'undergoing closure' (refer to Chapter 1.0, Table 1-1 and Chapter 2.0, Section 2.5).

As part of groundwater monitoring system installation, subsurface sediment samples usually are collected during drilling at each well location. These samples, if collected, are described and classified in the field. 'Grab samples' (Appendix 2B) taken during drilling are considered adequate for general geologic and some physical/chemical analysis. Selected samples are submitted to a laboratory for analyses to determine various physical and chemical properties. At least one 'split-spoon' sample (Appendix 2B) is taken at total depth of a well, for purposes of screen selection.

Data collected from installation of the monitoring system and from previously collected or published data are summarized in a characterization report. Characterization reports have been completed for both land-based 'operating' TSD units for which final status is sought and are summarized in the respective Part B permit application documentation [i.e., DOE/RL-88-20 (LLBG) and DOE/RL-90-43 (LERF)]. Groundwater monitoring information for land-based TSD units 'undergoing closure' is summarized in 'borehole completion data packages' (Appendix 2B), operational environmental monitoring annual reports, and in the RCRA annual reports.

Groundwater is collected and analyzed from monitoring wells under the interim status programs. During the first year of monitoring, samples are collected quarterly to establish background water quality for each well. Statistical evaluations of subsequent data are compared with these background concentrations to provide an indication of whether dangerous constituents from the TSD unit are significantly affecting the groundwater quality.

The annual RCRA groundwater monitoring report provides an interpretation of the data obtained through the sampling programs for the interim status groundwater projects, including such information for the LLBG, LERF, and other RCRA units. Groundwater monitoring results have been, and will continue to be, reported in the annual RCRA groundwater monitoring report released by March 1 of each calendar year.

5.2.2 Investigative Methods

The techniques and methods used to assess the hydrogeologic properties of the uppermost aquifer beneath the Hanford Site are summarized in this section.

5.2.2.1 Existing Hanford Site Hydrogeologic Information. Hydrogeologic information has been collected since activities began on the Hanford Site in the mid-1940s. Much of the information on subsurface geology is derived from the analyses and interpretations of boreholes and wells completed in and around the Hanford Site. These data are available in formal borehole packages and in the well file library (refer to Chapter 12.0, Section 12.1.26). Some of the historical data have been entered into the Hanford Environmental

Information System (HEIS). Data used in the Unit-Specific Portion are documented in groundwater monitoring plans, reports, and in unit-specific Part B permit application documentation.

There are numerous reports that provide interpretations of raw data. Much of what is known about the geology, hydrology, climatology, and meteorology of the Hanford Site has been compiled in the Consultation Draft Site Characterization Plan (DOE 1988, volumes 1, 2, and 3). Hanford Site studies include a summary of groundwater quality (WHC 1989a) and a compilation of semiannual water table elevation maps (WHC 1991b).

5.2.2.2 General Well Design. As required by WAC 173-303-400(3)(a) and 40 CFR 265.91, the interim status groundwater monitoring system includes the completion of monitoring wells to obtain representative groundwater samples from the uppermost aquifer beneath each of the land-based TSD units. Wells are designed to meet the requirements of WAC 173-160.

In some circumstances, wells that existed before implementing the RCRA groundwater monitoring requirements are used as part of the monitoring network. Authorization and criteria for using groundwater wells that existed before the lists of the RCRA parameters were established are provided in a letter from Ecology and the EPA dated July 16, 1990 (EPA and Ecology 1990). No pre-RCRA wells currently are used for RCRA monitoring at the LLBG or the LERF.

Details on the individual well completion methods are provided in the TSD unit-specific groundwater monitoring plans. Specifications for well designs (e.g., WHC 1990a) and procedures for performing the well installations are contained in contractor procedure manuals.

5.2.2.3 Well Locations. The locations of the interim status monitoring wells for the individual TSD units are documented in the TSD unit-specific groundwater monitoring plans and in the Unit-Specific Portion of this permit application.

5.2.2.4 Downgradient and Upgradient Interim Status Wells. At least one monitoring well is installed hydraulically upgradient from each TSD unit. The number, location(s), and depth(s) must be sufficient to yield groundwater samples that are representative of the background groundwater quality in the uppermost aquifer beneath the TSD unit and not impacted by the TSD unit.

There must be at least three groundwater monitoring wells located hydraulically downgradient of the TSD boundary (e.g., point of compliance) (Figure 5-1). The number, locations, and depths of the wells are designed for the detection of any statistically significant amount of dangerous waste constituents that might migrate from the TSD unit to the uppermost aquifer.

The upgradient and downgradient well locations for each TSD unit are selected on the basis of water table elevations and any other applicable information available at the time of well installation. The well locations for TSD units are found in the interim status groundwater monitoring plans and in the Unit-Specific Portion of this permit application.

5.2.2.5 General Hydrogeologic Investigative Techniques. Characterization of the hydrogeologic properties of land-based TSD units could be based on information gained from borehole sediment samples, geophysical logging, aquifer testing, water level measurements, and other pertinent sources of information (EPA 1986c). The unit-specific permit application documentation contains details regarding sample collection intervals and tests performed.

Limited hydraulic properties have been obtained from field determinations as well as permeameter testing in the laboratory. Aquifer testing (constant-discharge production and recovery phases) was performed primarily before 1989. Increased restrictions on purgewater disposal resulted in the use of alternative testing methods from 1989 through September 15, 1991. During this period, slug testing was the preferred method used to obtain field information on the aquifer properties. Descriptions of the test method used to obtain hydraulic property information are provided in unit-specific permit application documentation.

5.2.3 Interim Status Data

Groundwater monitoring activities performed during the interim status period are summarized in this section.

5.2.3.1 Sampling and Analysis Plan. Sampling and analysis plans are found in the unit-specific groundwater monitoring plans. The aspects of the groundwater sampling and analysis plans that have been used, and currently are being used for the interim status program monitoring wells, are described in this section. Representative groundwater samples from the uppermost aquifer beneath the Hanford Facility are obtained and analyzed for the purpose of detecting potential contaminant releases from TSD units. All interim status sampling activities on the Hanford Facility currently are performed in accordance with SW-846 protocol or an EPA-approved method (EPA 1986b).

The following sections describe the general methods used in the acquisition of groundwater samples.

5.2.3.1.1 Static Water-Level Measurements. The static water level is measured, recorded, and remeasured until reproducible results are obtained before purging or sampling monitoring wells. Procedures for water level measurements are found in contractor procedure manuals.

5.2.3.1.2 Well Purging. Monitoring wells are purged before sample collection to obtain groundwater samples that are representative of groundwater. Most monitoring wells are purged until a minimum of three casing volumes of water have been removed from the wells; the wells could be sampled after field parameters stabilize (Section 5.2.3.1.4).

5.2.3.1.3 Sample Withdrawal. After the monitoring well has been purged, the pumping rate is reduced and samples are withdrawn. Multiple groundwater samples are obtained for laboratory analyses during the sampling event. Samples typically are collected and bottled in the following order:

- Bottles with septum caps (volatiles)
- Unfiltered samples (major-ions, cyanide, semivolatiles, metals)
- Filtered samples (metals).

5.2.3.1.4 Field Analyses. Temperature, pH, turbidity, and specific conductivity are measured and recorded during well purging and sample withdrawal. Groundwater samples for laboratory analysis are not collected until each of these parameters has stabilized.

5.2.3.1.5 Chain of Custody. Chain-of-custody procedures are followed in collecting interim status data to ensure the compositional integrity of groundwater samples from the time of collection through laboratory analysis and data reporting.

5.2.3.1.6 Quality Assurance and Quality Control Procedures. Quality assurance and quality control procedures are applied to both field and laboratory data to ensure the reliability and validity of the data. The Tri-Party Agreement (Article XXXI, Paragraph 105, and Sections 6.5 and 7.8 of the Tri-Party Agreement Action Plan) also specifies quality assurance and quality control requirements that are to be implemented.

5.2.3.2 Analytical Data. Analytical data on the interim status groundwater program are presented in the following sections.

5.2.3.2.1 Groundwater Elevations. Groundwater elevation data have been obtained for the interim status wells since RCRA groundwater monitoring began. Water levels also are available for existing wells prior to the RCRA groundwater monitoring program. Water level data are compiled into the HEIS database. Hanford sitewide groundwater maps are produced semiannually. Site-specific water level data for RCRA units are documented quarterly and groundwater elevation maps are produced annually (refer to quarterly and annual reports for RCRA groundwater monitoring).

5.2.3.2.2 Results of Water Quality Analyses. Quarterly samples are collected for the first year to establish background water quality. Constituents analyzed for are specified by 40 CFR 265.92 (b)(1)(2)(3). Specific analytical parameters are specified in unit-specific permit application documentation. After the first year, the wells are monitored for 40 CFR 265.92 (b)(2) groundwater quality parameters annually and 40 CFR 265.92 (b)(3) indicator parameters and site-specific parameters semiannually. The TSD units in assessment-level monitoring require sampling quarterly. The constituents analyzed for are detailed in unit-specific permit application documentation.

All groundwater quality data from the monitoring well network are entered into the HEIS database for permanent storage and are published in quarterly groundwater monitoring reports.

5.2.3.2.3 Statistical Results. Statistical analyses of the sampling results for indicator parameters (including pH, specific conductivity, total organic carbon, and total organic halogens) are discussed in unit-specific permit application documentation. Detailed statistical analysis methods have been documented (WHC 1991d). Results of statistical analyses are presented in a RCRA groundwater monitoring annual report (e.g., DOE/RL-91-03).

5.3 AQUIFER IDENTIFICATION [D-10c]

The characteristics of the uppermost aquifer beneath the Hanford Site and regional hydrogeologic factors influencing this aquifer are summarized in the following section. This summary begins with a brief description of the regional physiographic and geomorphic setting of the Hanford Site. The climate and meteorology of the region also are summarized to address aquifer recharge potential from precipitation. An overview of the regional geologic framework follows, as this framework provides a major influence on aquifer characteristics. A description of the physical characteristics of the uppermost aquifer and a summary of contaminant travel time determinations comprise the remainder of this section. Hydrogeologic terms used in this discussion are defined in the glossary contained in Appendix 2B. A brief parenthetical explanation follows the initial use of these terms within the text.

The hydrogeologic information discussed for the Hanford Site also applies to the Hanford Facility, unless otherwise designated.

5.3.1 Physiographic and Geomorphic Setting

This section addresses the physiographic and geomorphic setting of the Hanford Site, or a description of the nature and origin of landforms. The Hanford Site is situated within the Pasco Basin of south-central Washington (Figure 5-3). The Pasco Basin is bounded on the north by the Saddle Mountains, on the west by Umtanum Ridge, Yakima Ridge, and the Rattlesnake Hills, and on the south by Rattlesnake Mountain, all anticlinal folds of the Yakima Fold Belt (a physiographic subdivision of the Columbia Plateau characterized by anticlinal upwarps and synclinal downwarps of the underlying bedrock). The Pasco Basin is bounded on the east by the Palouse slope, a monocline (broad fold) that inclines to the east (Figure 5-3).

Surface topography seen at the Hanford Site is the result of: (1) anticlinal ridges, (2) Pleistocene cataclysmic flooding (flooding resulting from glacial activity occurring north of the Hanford Site 13,000 to 10,000 years ago), (3) Holocene eolian activity (relatively recent wind activity), and (4) landsliding. Since the end of the Pleistocene, winds have locally reworked the flood sediments, depositing dune sands in the lower elevations and loess (windblown silt) around the margins of the Pasco Basin. Sand dunes have largely stabilized except where these dunes have been reactivated because of the disturbance of anchoring vegetation (WHC 1991a).

5.3.2 Climate and Meteorology

The Hanford Site is located in a semiarid desert area. The climate in the vicinity of the Hanford Site is largely influenced by the rain-shadow effect of the Cascade Range located in western Washington. This effect results in cold air drainage across the region that largely controls the wind regime of the Hanford Site.

Climatological data have been collected at the Hanford Meteorological Station, located between the 200 Areas, since 1945 (PNL 1988a). Temperature and precipitation data also are available from nearby locations for the period 1912 through 1943. A summary of these data through 1980 has been published by Stone et al. (1983). Data from the Hanford Meteorological Station are representative of the general climatic conditions for the region and describe the specific climate of the 200 Areas Plateau.

5.3.2.1 **Wind**. Prevailing wind directions on the 200 Areas Plateau are from the northwest in all months of the year (refer to Chapter 2.0, Figure 2-8). Secondary maxima occur for southwesterly winds.

Monthly average wind speeds are lowest during the winter months, averaging 10 to 11 kilometers per hour, and highest during the summer, averaging 15 to 16 kilometers per hour. Wind speeds that are well above average usually are associated with southwesterly winds. However, the summertime drainage winds generally are northwesterly and frequently reach 50 kilometers per hour. Estimates of wind extremes have been summarized by Stone et al. (1983). Information on the likelihood and frequency of strong winds and tornados in the region have been summarized in a final environmental impact statement (DOE 1987), the Hanford Meteorological Station climatological summary (Stone et al. 1983), and by the National Severe Storms Forecast Center.

5.3.2.2 **Temperature and Humidity**. Ranges of daily temperatures vary from normal maxima of 1.6°C in early January to 35°C in late July. The record maximum temperature is 46°C, and the record minimum temperature is -32.7°C.

The annual average relative humidity at the Hanford Meteorological Station is 54 percent. It is highest during the winter months, averaging approximately 75 percent, and lowest during the summer months, averaging approximately 35 percent.

5.3.2.3 **Precipitation**. Precipitation measurements have been made at the Hanford Meteorological Station since 1945. Average annual precipitation at the Hanford Meteorological Station is 16 centimeters per year. Most of the precipitation occurs during the winter, with nearly half of the annual amount occurring in the months of November through February. Days with greater than 1.3 centimeter precipitation occur less than 1 percent of the year. Rainfall intensities of 0.5 inch (1.3 centimeter) per hour persisting for 1 hour are expected once every 10 years. Rainfall intensities of 2.54 centimeter per hour for 1 hour are expected only once every 500 years. Winter monthly average snowfall ranges from 0.76 centimeter in March to 13.5 centimeter in January. The record snowfall of 61.9 centimeters occurred in February 1916. Snowfall accounts for approximately 38 percent of all precipitation during the months of December through February.

5.3.3 Regional Geology

The regional geology provides the framework for understanding the stratigraphic (rock layers) and structural (rock deformation) controls on the aquifers beneath the Hanford Site. An overview of the regional geology and a description of the primary stratigraphic units that comprise these aquifers are provided in this section.

The Hanford Site lies in the Pasco Basin near the eastern limit of the Yakima Fold Belt. The Pasco Basin is divided by the Gable Mountain anticline into the Wahluke syncline to the north and the Cold Creek syncline to the south. The Pasco Basin is underlain by Miocene-aged (approximately 17 to 8.5 million years before present) volcanic (molten rock) flows of the Columbia River Basalt Group and late Miocene- to Pleistocene-aged sediments (approximately 10.5 million to 12,000 years before present) that overlie the basalts. The basalts and sediments thicken into the Pasco Basin and generally reach maximum thicknesses in the Cold Creek syncline in the vicinity of the 200 Areas. Hanford Site structure and stratigraphy are illustrated in Figures 5-3 and 5-4, respectively, and described in *Geology and Hydrology of the Hanford Site* (WHC 1991a, pp. 2-1 through 2-19). A brief review of this information follows.

The Columbia River Basalt Group is greater than 3,658-meters thick beneath the Pasco Basin. The sequence of volcanic flows within the Pasco Basin can be divided into the Grande Ronde, Wanapum, and Saddle Mountains formations (major rock divisions) (listed from oldest to youngest). The youngest formation of the Group, the Saddle Mountain Basalt, is characterized by a sequence of volcanic flows and intercalated sedimentary units called interbeds.

Late Miocene to Quaternary sediments overly the basalts. Most of this sedimentary sequence can be divided into two main units: the Ringold Formation of late Miocene to middle-Pliocene age (approximately 10.5 million to 3 million years before present) and the Hanford formation of Pleistocene to Recent age (approximately 1 million to 12,000 years before present).

The Ringold Formation was formed by fluvial-lacustrine (stream-lake) processes. This formation comprises the basal part of the sedimentary sequence above the basalt. The Ringold Formation is up to 185-meters thick at the Hanford Site in the deepest part of the Cold Creek syncline south of the 200 West Area, and up to 170-meters thick in the western Wahluke syncline. The Ringold Formation pinches out against Gable Mountain, Yakima Ridge, Saddle Mountains, and Rattlesnake Mountain anticlines. The Ringold Formation is largely absent in the northern and northeastern parts of the 200 East Area and adjacent areas to the north in the vicinity of West Lake, located south of Gable Mountain. The Ringold Formation is composed of unindurated to semi-indurated (loose to semi-hardened) clay, silt, fine to coarse-grained sand, or granule to cobble gravel that can be divided into five facies (lateral subdivisions of a rock type) (WHC 1991f). The five facies include: (1) fluvial gravel (generally with a fine to medium sand matrix); (2) fluvial sand; (3) overbank deposits (sediments deposited beyond the natural levee of a stream or river during a flooding event) and paleosols (ancient soils) composed of silty sand to clay; (4) lacustrine sandy silts to clays; and (5) basaltic alluvium or fanglomerate deposited at the foot of ridges (anticlines).

The distribution of facies associations within the Ringold Formation forms the basis for three stratigraphic subdivisions (WHC 1991f). The first of these subdivisions forms the lower half of the formation and is characterized by intervals dominated by fluvial gravel and sand (facies 1 and 2) that interfinger with intervals containing fine-grained deposits (facies 3 and 4). Interstratified deposits typical of the fluvial sand (facies 2) and overbank-paleosol facies (facies 3) associations dominate the second subdivision. The third and uppermost subdivision is dominated by the lacustrine facies association (facies 4). Facies 5 is mainly found in the vicinity of the anticlinal ridges to the west and north of the Hanford Site.

Other less extensive stratigraphic units within the Pasco Basin overlie the Ringold Formation and underlie the Hanford formation. These units include a laterally discontinuous Plio-Pleistocene unit and pre-Missoula gravels. The pre-Missoula gravels are approximately equivalent in age to the Plio-Pleistocene unit.

The Hanford formation was formed by glaciofluvial processes. During Pleistocene glaciation, eastern Washington was subjected to a number of cataclysmic floods that resulted from the breakup of ice dams impounding glacial lakes in Idaho, Montana, and northeastern Washington. The Hanford formation generally can be divided into two main facies: coarse-grained or gravelly deposits and fine-grained or sandy and silt deposits. The Hanford formation also is commonly divided into two informal members: the Pasco gravels and the Touchet beds (DOE 1988, volume 1, pp. 1.2-132). The Pasco gravels generally correspond to the gravelly facies, and the Touchet beds correspond to the sandy to silty facies. The Hanford formation is thickest in the Cold Creek bar in the vicinity of the 200 West and 200 East Areas where the formation is up to 64 meters thick. Hanford formation deposits are absent on ridges approximately 360 meters above sea level.

Holocene surficial deposits consist of silt, sand, and gravel that form a thin (less than 4.9-meter) veneer across much of the Pasco Basin. These sediments were deposited by a mix of eolian and alluvial processes during the past 10,000 years.

5.3.4 Regional and Hanford Site Hydrology

The regional and Hanford Site surface and groundwater hydrology are discussed in the following sections. Primary surface-water features associated with the Hanford Site and region are the Columbia River and its major tributaries, the Yakima, Snake, and Walla Walla Rivers. With regard to groundwater hydrology, the uppermost aquifer is primarily in the Ringold Formation and the vadose zone (unsaturated zone above the water table) is primarily in the Hanford formation. The Hanford formation comprises the upper 9 to 91 meters of the vadose zone throughout most of the Hanford Site, but extends below the regional water table in parts of the 200 East Area and eastward towards the Columbia River.

5.3.4.1 Surface Hydrology. Surface drainage enters the Pasco Basin from several other surrounding basins. Within the Pasco Basin, the Columbia River is joined by major tributaries including the Yakima, Snake, and Walla Walla Rivers. Two intermittent streams traverse through the Hanford Site: Cold Creek and Dry Creek (refer to Chapter 2.0, Section 2.2.1.4). Water drains through these creeks during the wetter winter and spring months. No perennial streams originate within the Pasco Basin.

Total estimated precipitation over the Pasco Basin averages 16 centimeters per year (Section 5.3.2.3). Mean annual run-off from the Pasco Basin is estimated to be less than 3.1×10^7 cubic meters per year, or approximately 3 percent of the total precipitation. The remaining precipitation is assumed to be lost through evapotranspiration with a small component (perhaps less than 1 percent) contributing to recharging of the groundwater system (DOE 1988, volume 2, p. 3.1-6).

Within the vicinity of the Hanford Site, primary surface-water features are the Columbia and Yakima Rivers. West Lake, about 4 hectares in size and less than 0.9-meter deep, is the only natural lake within the Hanford Site. Waste water ponds, cribs, and ditches associated with waste management activities also are present on the Hanford Site.

5.3.4.2 Groundwater. Confined and semiconfined aquifer systems occur beneath the Hanford Site in the basalt flow tops, flow bottom zones, and sedimentary interbeds (DOE 1988, volume 2, pp. 3.6-1). These deeper aquifers are intercalated with aquitards consisting of basalt flow interiors. Vertical flow across the aquitards within the basalt aquifer system is inferred from water level or potentiometric surface data, but the leakage is not quantified and direct measurements are not available (DOE 1988, volume 2, p. 3.6-17). The multiaquifer system within the Pasco Basin has been conceptualized as consisting of four primary hydrogeologic units: (1) Hanford and Ringold formation sediments, (2) Saddle Mountain Basalt, (3) Wanapum Basalt, and (4) Grande Ronde Basalt. The discussion in the following sections focuses on the uppermost aquifer systems within the Ringold and Hanford formations and within the Saddle Mountains Basalt, the aquifer comprised of the Rattlesnake Ridge interbed.

5.3.5 Uppermost Aquifer

The unconfined to semiconfined aquifer associated with the sedimentary units stratigraphically above the basalts is the uppermost regionally extensive aquifer beneath the Hanford Site. The water table ranges in depth from 0 meter at West Lake and the Columbia and Yakima Rivers, to greater than 106.7 meters near the center of the Hanford Site. Groundwater within this aquifer system is contained within the glaciofluvial sands and gravels of the Hanford formation and the fluvial-lacustrine sediments of the Ringold Formation. The position of the water table beneath the western portion of the Hanford Site is generally within the coarse-grained gravel units of the

Ringold Formation (WHC 1991f). In the northern and eastern portions of the Hanford Site, the water table is generally within the Hanford formation. Hydraulic conductivities for the Hanford formation (610 to 3,048 meters per day) are much greater than those of the coarse-grained gravel units of the Ringold Formation (186 to 930 meters per day) (Law et al. 1987; WHC 1991f). Stratigraphic divisions of these units and their hydrologic properties are discussed in detail in the geology and hydrology of the Hanford Site (WHC 1991a, pp. 2-5 to 2-16; pp. 3-4 to 3-26).

This aquifer system is approximately 152-meters thick near the center of the Pasco Basin. Laterally, the aquifer system is bounded by anticlinal basalt ridges that extend above the water table. A generalized east-west geologic cross-section showing the position of the water table and major stratigraphic units beneath the Hanford Site is presented in Figure 5-5.

The base of the uppermost aquifer generally is regarded as the basalt surface. On a local scale where the Ringold Formation is present, the silts and clays of the Formation's lower mud unit and the Formation's fine-grained units (WHC 1991f) form a confining layer. Thus, in the strict sense, the groundwater is unconfined above this layer and semiconfined below this layer.

Water levels in the uppermost aquifer have risen because of artificial recharge mechanisms. Waste water ponds on the Hanford Site have artificially recharged the uppermost aquifer below the 200 East and 200 West Areas. Recharge from the 200 Areas waste water disposal units is estimated to be approximately 10 times the natural recharge on the Hanford Site (Graham 1981). The increase in water table elevations was most rapid from 1950 to 1960 and apparently stabilized between 1970 and 1980, when only small increases in water table elevations occurred. Waste water discharges from the 200 West Area were reduced in 1984 and the water levels there are now slowly declining. A similar situation is expected to occur in the 200 East Area when effluent is no longer discharged to the 216-B-3 Expansion Ponds. Other artificial recharge mechanisms include excessive application of imported irrigation water or impoundment of streams.

The general direction of groundwater flow is primarily from natural recharge areas west of the Hanford Site to discharge areas toward the Columbia River. The general west-to-east flow pattern is interrupted locally by the groundwater mounds in the 200 Areas. From the 200 Areas, there is also a component of groundwater flow to the north, between Gable Mountain and Gable Butte. Figure 5-6 illustrates the water table conditions beneath the Hanford Site.

Details of the hydrology for 'operating' TSD units for which final status is sought are provided in the unit-specific groundwater monitoring plans and permit application documentation.

5.3.6 Uppermost Confined Aquifer

The Rattlesnake Ridge aquifer is the uppermost fully-confined aquifer system that occurs beneath the Hanford Site. As discussed previously, Ringold

Formation sediments are semiconfined in some areas. The Rattlesnake Ridge aquifer consists of the flow bottom of the Elephant Mountain Basalt member, the flow top of the Pomona basalt, and the Rattlesnake Ridge interbed. The thickness of the Rattlesnake Ridge interbed, which is the principal transmissive zone within the aquifer, ranges from 15 to 25 meters beneath the 200 Areas and generally thickens toward the west (Graham 1981; Graham et al. 1984). Erosional windows (gaps in the rock) in the Elephant Mountain basalt confining layer exist locally. This could allow hydraulic communication between the Rattlesnake Ridge aquifer and the overlying unconfined aquifer (Graham et al. 1984).

Natural recharge to the Rattlesnake Ridge aquifer occurs in the higher elevations surrounding the Pasco Basin to the west, north, and northeast. The flow of groundwater generally is toward the northeast beneath the 200 West Area and possibly east to north beneath the 200 East Area. The aquifer is heterogeneous in composition because the aquifer consists of a basalt flow top and flow bottom, a clayey basalt conglomerate, an epiclastic fluvial-floodplain unit, an air-fall tuff, and a volcaniclastic unit derived from fluvial reworking of the tuff and detrital sediments (Graham et al. 1984). This heterogeneity produces variability of groundwater flow through the aquifer (Graham et al. 1984).

5.3.7 Contaminant Travel Times

The travel time of a contaminant from the Hanford Site to the Columbia River is the sum of the time required for the contaminant to travel through the vadose zone to reach the water table and the time required for the contaminant to travel in the groundwater to the Columbia River. Travel time determinations can be based on small- or large-scale field measurements of transport rates or on calculations supported by laboratory scale measurements of the transport parameters. Further discussion of contaminant travel time is contained in Chapter 9.0.

The parameters that affect the travel time in the unconfined aquifer are the following:

- Distance
- Permeability (or hydraulic conductivity)
- Porosity
- Hydraulic gradient
- Dispersivity
- Retardation
- Heterogeneity (geologic structure).

In addition to these parameters, the vadose zone travel times are further affected by the relative permeability, the moisture content, and the recharge rate. Because of the variability of the sediments, the calculation of travel times based on laboratory derived parameters is considered less accurate than the large scale field measurements. The following sections summarizes the work that has been done in determining travel times in the vadose zone and unconfined aquifer.

5.3.7.1 Vadose Zone. The travel time through the vadose zone depends on the moisture content, which in turn depends on the recharge rate. In the cases of artificial recharge where near saturated conditions have been maintained down to the water table (e.g., 216-B-3 Expansion Ponds), the flow velocity is nearly equal to the saturated hydraulic conductivity of the soil column. This implies a travel time on the order of days. For other cases where the natural recharge is the driving force, the travel time becomes highly uncertain. Several calculations have been done (DOE 1987) for natural recharge in the 200 East Area ranging from 0.5 centimeter per year to 5.0 centimeters per year. These values were chosen to reflect current and possibly future wetter conditions. The computational results indicated travel times on the order of 900 years to 100 years, respectively, for conservative contaminants. An estimate of travel time as a function of recharge in a 60-meter deep vadose zone has been provided by Gee (Gee et al. 1992).

5.3.7.2 Saturated Zone. More than 20 estimates of travel times from the 200 East and 200 West Areas to the Columbia River have been made by investigators using a number of different methodologies and assumptions. A review of the various travel time estimates has been made over the past 40 years (PNL 1988b). These estimates can be classified as being based on one of the following methods: (1) extrapolation of local groundwater velocity measurements, (2) mathematical methods, and (3) monitoring the movement of contaminant plumes.

The rate and direction of groundwater flow in the vicinity of the 100 Areas are greatly influenced by the level of the Columbia River. This can severely alter the groundwater gradient and even cause flow to be reversed up to 305 meters inland during periods of high water. A similar effect occurs in the 300 Area (DOE-RL 1991a, p. 16-10).

5.4 CONTAMINANT PLUME DESCRIPTION [D-10d]

Ecology regulations [WAC 173-303-806(4)(a)(xx)(D)] require "A description of any plume of contamination that has entered the groundwater from a regulated unit at the time that the application was submitted..." This section contains a description of contaminant plumes identified in the aquifers beneath the Hanford Site. Information provided in this section is relevant to SWMU discussions contained in Chapter 2.0, Section 2.5 and Appendix 2D.

Groundwater contamination currently is monitored under a sitewide groundwater surveillance program and an operational environmental monitoring program. The results of the monitoring program along with isopleth maps are prepared and published annually (e.g., WHC 1993b). Contaminant plumes are primarily delineated using isopleth maps (i.e., maps with lines connecting points of equal concentration or values).

5.4.1 Radionuclide Contamination

Isopleth maps are prepared routinely to show radioactive tritium and gross beta radiation in the unconfined groundwater flow system beneath the Hanford Site. Although these constituents are not considered to be subject to RCRA and WAC 173-303, a study of these plumes can be used to provide an early indication of the rate and direction of contaminant movement. An example of an isopleth map delineating a contamination plume is shown in Figure 5-7 (PNNL 1996). This figure depicts the distribution of tritium concentrations in the unconfined aquifer in 1989. Tritium is the most widespread radionuclide in the unconfined aquifer (PNNL 1996).

5.4.2 Nonradioactive Contamination

The most common nonradioactive inorganic contaminants that have been observed in groundwater are nitrate, cyanide, fluoride, and hexavalent chromium. Among the nonradioactive organic contaminants routinely observed in the groundwater samples are carbon tetrachloride, 1,1,1-trichloromethane, trichloroethylene, perchlorethylene, 1,1-dichloroethane, 1,2-dichloroethene, and chloroform (PNL 1995).

Nitrate, like tritium, can be used to define the extent of contamination because nitrate is present in many waste streams at the Hanford Site and is mobile in the groundwater (PNL 1995). Isopleth maps are prepared routinely that show levels of nitrate concentrations in the groundwater. The configuration of the nitrate plumes is similar to that shown for tritium in Figure 5-7. Additional information on nonradioactive contamination is found in groundwater status reports (e.g., WHC 1993b).

It should be noted that the present extent of detectable contamination is primarily the result of past liquid waste discharges to the ground.

5.5 DETECTION MONITORING PROGRAM [D-10e]

The final status detection monitoring program is designed to detect the impact of the land-based TSD unit on groundwater quality in the uppermost unconfined aquifer beneath the unit. The final status detection monitoring plan contains details regarding the following:

- Design of the monitoring well network (number and locations of monitoring wells, well construction)
- Frequency of groundwater monitoring
- Type and behavior of chemical parameters that will be used to indicate the presence of groundwater contamination
- Sampling, analysis, and statistical procedures that will be used

- Methods by which regular determinations of the groundwater flow rate and direction will be determined.

A description of unit-specific monitoring networks is found in the Unit-Specific Portion of this permit application. Final status requirements are applicable to land-based TSD units on incorporation into the HF RCRA Permit (DW Portion).

The following sections provide the necessary data and information to support the implementation of a final status detection monitoring program at land-based TSD units.

5.5.1 Indicator Parameters, Waste Constituents, Reaction Products to be Monitored [D-10e(1)]

The monitoring parameters are selected on the basis of suitability to groundwater monitoring at land-based TSD units, and do not necessarily apply to the entire Hanford Facility. The following criteria are considered in the selection of monitoring parameters for each land-based TSD unit:

- Process knowledge and/or use of the TSD unit
- Present in significant quantity within the waste that has been disposed
- Relative mobility and low retardation with respect to groundwater flow, and the stability and persistence in the environment
- Lack of significant natural presence of the parameters in the groundwater
- Ease of detection and minimal sampling and analytical interferences (detectability)
- Usefulness as indicators of other potential contaminants
- Lack of data interpretation problems caused by common laboratory and field contaminants.

5.5.1.1 Dangerous Waste Characterization [D-10e(1)(a)]. A list of the dangerous waste numbers that could be disposed in each land-based TSD unit is included in the HF Part A and in unit-specific permit application, preclosure work plan, closure work plan, closure plan, and closure/postclosure plan documentation. These sources include, to the degree possible, compositions, quantities, and dates of waste disposal, and have, or will, form the basis for the selection of the unit-specific monitoring parameters and constituents.

5.5.1.2 Behavior of Constituents [D-10e(1)(b)]. The mobility, stability, and persistence of waste constituents and their reaction products that have been disposed at a TSD unit are of prime importance in determining the proper unit-specific monitoring parameters and constituents. Constituents that generally are mobile and persistent through the soil zone and into the saturated zone are useful indicators of chemical migration from a waste disposal site.

Parameters such as distribution or sorption coefficients for inorganic (e.g., Freeze and Cherry 1979, pp. 402-408) and organic constituents (Lyman et al. 1982) and chemical solubilities are used in these evaluations. Other important properties that are considered for organic constituents are vapor pressure and the Henry's Law constant (used to evaluate to what degree compounds will be partitioned into the aqueous phase and to what degree this phase is likely to migrate as a vapor).

5.5.1.3 Detectability [D-10e(1)(c)]. The detectabilities of the groundwater sampling parameters for each land-based TSD unit are to be given in terms of practical quantification limits for each of the constituents listed. The practical quantification limits represent the lowest concentrations of analytes in groundwater that can be reliably determined within specified limits of precision and accuracy by the standard analytical methods under routine laboratory operating conditions. Specific requirements are addressed in the unit-specific groundwater monitoring plans.

5.5.2 Groundwater Monitoring Program [D-10(e)(2)]

This section describes a comprehensive program of monitoring wells to be used during the final status detection monitoring program. The final status detection monitoring system is designed to detect the migration of chemical releases within the uppermost unconfined aquifer at compliance points immediately downgradient from potential leak sources. The groundwater will be monitored as required during the compliance period.

Groundwater monitoring requirements are contained in Condition II.F. of the HF RCRA Permit (DW Portion). For 'operating' TSD units, these requirements apply only to those land-based TSD units incorporated into Part III of the HF RCRA Permit (DW Portion).

5.5.2.1 Description of Wells [D-10e(2)(a)]. The basis for locating the monitoring wells around individual land-based TSD units, and the well locations selected to achieve the desired coverage with the minimum number of wells, are discussed in the following sections.

5.5.2.1.1 Background. Groundwater monitoring wells that are required to be installed will be in compliance with the detection-level monitoring requirements of WAC 173-303-645(8). These wells will yield groundwater samples from the uppermost unconfined aquifer that are representative of the quality of background water immediately upgradient of the unit and the quality of water passing beneath the unit.

5.5.2.1.2 Design Approach for Monitoring Wells. Tentative locations for monitoring wells are identified along the downgradient sides (point of compliance) of the TSD unit. Initial well locations are determined based on consideration of the interpreted direction of groundwater flow crossing the unit.

The groundwater monitoring system must be capable of yielding groundwater samples for analysis and must consist of the following:

- Monitoring wells installed hydraulically upgradient from the limit of the TSD unit. The number, location, and depths of the wells must be sufficient to yield groundwater samples that are (1) representative of groundwater quality in the uppermost aquifer near the unit and (2) not affected by leakage from the unit

- Monitoring wells installed hydraulically downgradient at the boundary of the TSD unit. The number, location, and depth of the wells must allow for the detection of dangerous waste or dangerous waste constituents that migrate from the TSD unit to the uppermost aquifer

- All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must allow collection of representative groundwater samples and prevent contamination of the samples or the aquifer.

Existing wells might be used as part of the monitoring network provided the wells are in compliance with WAC 173-160. The reasoning behind the location of the individual wells is, or will be, included in unit-specific permit application documentation. Well remediation and abandonment will be accomplished in accordance with WAC 173-160 and the requirements of Condition II.F.2. of the HF RCRA Permit (DW Portion).

5.5.2.1.3 Well Maintenance and Remediation. Monitoring well maintenance, remediation, and abandonment will be performed in accordance with the *Hanford Well Remediation and Decommissioning Plan* [Attachment 6 of the HF RCRA Permit (DW Portion)], WAC 173-160, the Tri-Party Agreement, and the HF RCRA Permit (DW Portion). Condition II.F.2. of the HF RCRA Permit (DW Portion) specifically addresses requirements for well remediation and abandonment, involving the following:

- Development of a well inspection plan involving inspection of wells at least once every 5 years; placement of inspection documentation in the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.26)

- Evaluation of wells in accordance with Sections 4.2 through 4.8.3 of the *Hanford Well Remediation and Decommissioning Plan* [Attachment 6 of the HF RCRA Permit (DW Portion)] and the *Policy on Remediation of Existing Wells and Acceptance Criteria for RCRA and CERCLA* [Attachment 7 of the HF RCRA Permit (DW Portion)]

- Provision of written notice to Ecology at least 72 hours before the Permittees remediate (excluding maintenance activities) or abandon any well subject to the HF RCRA Permit

* Construction of wells pursuant to the HF RCRA Permit in compliance with WAC 173-160.

5.5.2.1.4 Monitoring Well Locations and Design. To comply with groundwater monitoring requirements, monitoring wells at land-based units are located at intervals along "the hydraulically downgradient limit of the waste management area..." [WAC 173-303-645(6)(a)]. The waste management area is defined as "the limit projected in the horizontal plane of the area on which waste will be placed during the active life of the regulated unit" [WAC 173-303-645(6)(b)]. These regulations, therefore, require that monitoring wells be placed as close as reasonably possible to the edge of the regulated unit (i.e., unit boundary). Installation of monitoring wells will be based on the following criteria:

* Satisfy the regulatory requirements for a groundwater monitoring system that consists of a sufficient number of wells installed at appropriate locations and depths to yield groundwater samples that:

  (1) represent the composition of groundwater that has not been impacted by a TSD unit

  (2) represent the composition of groundwater passing the point of compliance.

* Location of monitoring wells should ensure a high level of confidence that dangerous waste migrating from a regulated unit would be reliably detected.

* Wells should provide background hydrochemical information for areas that have not been affected by leakage from a regulated unit.

* Wells should be placed in locations that will afford the collection of hydrogeologic information.

5.5.2.2 Equipment Decontamination [D-10e(2)(b)]. All field equipment decontamination and sampling activities will comply with aspects of a health and safety plan and procedures manuals. The procedures are intended to prevent cross-contamination between boreholes during drilling activities. Field equipment decontamination activities will be reported in field documentation.

5.5.3 Background Values [D-10e(3)]

Background values are defined as the concentrations of chemical, physical, biological, or radiological constituents, or other characteristics in or of groundwater at a particular point in time and upgradient of a unit, that have not been affected by that unit. Background groundwater quality for detection monitoring can be based on sampling of wells that are not upgradient from the unit if (1) hydrogeologic conditions do not allow the owner or operator to determine what wells are upgradient or (2) sampling at other wells will provide a better indication of background groundwater composition that is as or more representative than that obtained from samples from upgradient wells [WAC 173-303-645(8)(a)(i) and (b) and 40 CFR 264.97(a)(1)].

Background levels will be determined for final status detection-level groundwater monitoring parameters. These include general contamination indicator parameters such as specific conductance, pH, total organic carbon, total organic halogen, or heavy metals and site-specific parameters (waste constituents or reaction products) that will provide a reliable indication of the presence of dangerous constituents in groundwater. The site-specific parameters (described in unit-specific permit application documentation) will be selected based on (1) the types, quantities, and concentrations of waste constituents present; (2) the mobility, stability, and persistence of the waste constituents; (3) the detectability of the parameters; and (4) existing data.

Background values address two objectives: (1) to provide information concerning the baseline values for waste constituents of concern and (2) to determine whether there is any evidence of contamination in the compliance wells (downgradient) that could result from a release from a TSD unit. To address the first objective, baseline values will be established for the final status indicator parameters (specified in unit-specific permit application documentation) from a minimum of 1 year of quarterly sampling and analysis of upgradient wells. These baseline values can be used as concentration limits in compliance monitoring [WAC 173-303-645(5)(a)(i) and WAC 173-303-645(5)(b)]. Four independent samples will be obtained at each background well during each sampling interval. The downgradient wells also will be sampled and analyzed at the same frequency during this time. For a detection monitoring program, a statistical evaluation is required to address the second objective. Requirements for sampling frequency are discussed in Section 5.5.4.5.1. Statistical analyses are presented in Section 5.5.4.7.

Background data subsequently will be reviewed for seasonal variations, trends, and significant differences among the wells. The background statistics and/or statistical methodology might be modified, if required, to address temporal or spatial variation. Background data also will be reevaluated if changes in groundwater flow directions result in changes in definition of upgradient wells.

5.5.4 Sampling, Analysis, and Statistical Procedures [D-10e(4)]

This section provides information on the groundwater sampling, analysis, and statistical evaluation procedures that are proposed for use with the monitoring well system. The choice of an appropriate statistical test depends on the type of monitoring (i.e., detection or compliance) and the nature of the data (e.g., the proportion of values in the data set that are below detection limit) (Figure 5-2). Statistical procedures under final detection or compliance monitoring program status are discussed in Section 5.5.4.7 and Section 5.6.7.4, respectively. As the postclosure monitoring program will be implemented at least 30 years in the future, actual protocols and procedures likely will be equivalent to those cited in this section.

5.5.4.1 Sample Collection [D-10e(4)(a)]. The groundwater monitoring system proposed for use on the Hanford Facility is designed to provide representative groundwater quality data from the uppermost aquifer beneath each land-based TSD unit. Procedures to be followed during the collection of groundwater samples from the network have been developed and will be available to all onsite personnel and to the regulators. These procedures will be consistent with those listed in SW-846.

5.5.4.1.1 Static Water Level Measurements. Before purging or sampling the monitoring well, the static water elevation will be measured, recorded, and remeasured until reproducible results are obtained. The measurements will be taken as depth-to-water from the top of the well casing and the values will be subtracted from the surveyed elevation of the casing to obtain the elevation of the water table. Graduated steel measuring tapes or other approved devices will be used for the measurements. Measurements will be reported to the nearest 0.3 centimeter.

5.5.4.1.2 Well Purging. Monitoring wells will be purged using a dedicated pump before samples are collected. This action will be taken to obtain groundwater samples that are representative of the formation water, rather than of the stagnant water from the well casing. Groundwater that has occupied the well casing for a long duration often is oxidized and might not be indicative of true formation water.

As a guideline, high-yielding monitoring wells will be purged until a minimum of three casing volumes have been removed. However, a well will not be considered ready for sample collection until concurrent measurements of pH, specific conductivity, and water temperature have stabilized to at least plus or minus 10 percent over two well volumes pumped (Barcelona et al. 1985). Wells with excessively long purge times could be considered adequately purged when the parameters listed previously have stabilized. Purging of low-yielding monitoring wells (i.e., those that are pumped dry) will consist of removing all standing water.

The pumping rate at each well will be chosen to minimize turbidity and aquifer stress. Generally, the rate of pumping during sampling will be kept below the rate used during well development (Barcelona et al. 1985).

Water levels, pumping rates, and values of sampling parameters (i.e., pH, specific conductivity, and temperature) will be recorded in field logbooks and transferred to a sample groundwater field record form.

Requirements for purgewater management are specified in Condition II.F.1. of the HF RCRA Permit (DW Portion). This condition specifies that purgewater be handled in accordance with requirements of the *Purgewater Management Plan* [Attachment 5 of the HF RCRA Permit (DW Portion)].

5.5.4.1.3 Field Analysis. During well purging and sample withdrawal, field determinations of temperature, pH, and specific conductivity will be measured and recorded. The stabilization of these parameters will be an indication that well water has been purged and formation water is being sampled. Other methods of determining the presence of formation water (e.g., measuring the concentration of specific ionic species during the well purging process) might be proposed at a future time.

5.5.4.1.4 Sample Withdrawal. After the monitoring well has been purged, water samples will be withdrawn from the well using a dedicated pump. The sample withdrawal rate will be kept to approximately 1 liter per minute as recommended for groundwater sampling when volatile organic compounds are involved (Barcelona et al. 1985).

Samples will be collected and containerized in the order of volatilization sensitivity of the parameters to be analyzed. Samples to be analyzed for volatile organic compounds or other organics will not be filtered.

5.5.4.2 Sample Preservation and Shipment [D-10e(4)(b)]. Sample container and preservation methods that will be used during the groundwater monitoring program are in accordance with SW-846 (EPA 1986b). Measurements of pH and specific conductivity will be taken in the field on unpreserved samples.

Precleaned and prelabeled sample containers will be supplied for each monitoring well and will include the appropriate preservatives. To ensure zero head space, the containers for samples analyzed for volatile organic compounds will be filled to slightly more than full before being capped. Samples typically are collected in the following order:

- Bottles with septum caps (volatiles)
- Unfiltered samples (major-ions, cyanide, semivolatiles)
- Filtered samples (metals).

Immediately after collection, the sample containers will be placed in sealed, insulated coolers packed with ice to cool the ambient temperature to approximately 4°C. The samples will be transported to the laboratory for arrival within sufficient time to meet holding time requirements. Field parameter record forms and approved sample analysis request forms will be attached to the sealed containers.

5.5.4.3 Analytical Procedures [D-10e(4)(c)]. The laboratory approved for the groundwater monitoring program will use standard laboratory procedures as listed in SW-846 or an alternate equivalent. Alternate procedures, when used, will meet the guidelines of SW-846, Chapter 1.0 (EPA 1986b).

Quality control samples, e.g., field duplicates, blanks, and spiked samples, will be collected and analyzed to assess the performance of the sampling program and the analytical laboratories. Quality control requirements are described in contractor procedure manuals.

5.5.4.4 Chain of Custody [D-10e(4)(d)]. Chain-of-custody procedures will be followed to ensure the integrity of groundwater samples and to trace the possession and handling of the individual samples from the time of collection through laboratory analyses and data reporting. Requirements for chain-of-custody are described in contractor procedure manuals.

Additional quality assurance and quality control procedures include sample labels, sample seals, field logbooks, sample analysis request sheets, and laboratory notebooks.

5.5.4.5 Additional Requirements for Compliance Point Monitoring [D-10e(4)(d)]. The following sections discuss additional requirements for compliance point (downgradient) monitoring.

5.5.4.5.1 Sample Frequency [D-10e(4)(e)(i)]. In compliance with regulations, all wells (compliance and background) will be sampled at least semiannually during detection monitoring [WAC 173-303-645(9)(d) and 40 CFR 264.98(d)] and during the active and postclosure period of each land-based TSD unit. A sequence of four samples will be taken from each well during each sampling interval [WAC 173-303-645(8)(g)(i) and 40 CFR 264.97(g)(1)]. These four samples will be taken at an interval that ensures, to the greatest extent technically feasible, that an independent sample is obtained. This requirement could be accomplished by reference to the uppermost aquifer's effective porosity, hydraulic conductivity, and hydraulic gradient, and the fate and transport characteristics of the potential contaminants. In hydrogeologic environments where the groundwater velocity prohibits one from obtaining four independent samples on a semiannual basis, an alternate sampling procedure approved by Ecology could be used [WAC 173-303-656(8)(g)(ii) and 40 CFR 264.97(g)(2)]. Specific sampling intervals will be presented in unit-specific permit application documentation.

5.5.4.5.2 Compliance Point Groundwater Quality Values [D-10e(4)(e)(ii)]. The groundwater quality data obtained from the compliance point monitoring wells will be documented in a form that expresses each groundwater sampling parameter, the analytical value of the concentration in groundwater from the most recent sampling event, the analytical detection limit, and the background concentration limit for each parameter. Summary statistics, if needed, include the mean and variance of the sampling sequence (based on a minimum of four independent samples), the number of less-than-detection-limit values, the median, coefficient of variation, and minimum and maximum values.

5.5.4.6 Annual Determination [D-10e(4)(f)]. Groundwater flow rates and flow direction within the uppermost aquifer will be determined annually for those land-based TSD units being monitored. Average horizontal flow rates and directions could be determined in several ways, e.g.: (1) movement of groundwater plumes over time; (2) in situ measurement devices (e.g., downhole flow meter); or (3) calculated from the groundwater gradient and aquifer properties using the Darcian flow theory:

$$v_h = K_h i_h / n_e$$

where

v_h = the horizontal groundwater velocity
K_h = the horizontal hydraulic conductivity
i_h = the horizontal hydraulic gradient
n_e = the effective porosity.

The value of K_h will be determined from hydraulic property investigations performed on monitoring wells. The average value of i_h at the location of each monitoring well will be calculated from the water table elevations. Effective porosities range between 10 percent and 30 percent (Graham 1981, p. 3-12). These data will enable the groundwater flow velocity to be determined in the vicinity of each monitoring well.

5.5.4.7 Statistical Determination for Detection Monitoring Program [D-10e(4)(g)]. The concentrations of constituents of concern in compliance point wells will be compared with data from the background wells semiannually to determine whether there is statistically significant evidence of contamination. Statistical methods appropriate for a final status detection monitoring program will include analysis of variance, tolerance intervals, predication intervals, control charts, test of proportions, or other statistical methods approved by Ecology [WAC 173-303-645(8)(h)]. The type of monitoring, the nature of the data, the proportions of nondetects, and temporal variation are important factors to consider when selecting appropriate statistical methods. The statistical evaluation procedures chosen will be based on the EPA guidance document, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities - Interim Final Guidance* and its addendum (EPA 1989d and EPA 1992). Specifics will be addressed in unit-specific permit application documentation.

5.5.4.8 Reporting. The results of the statistical evaluation will be reported to Ecology in the RCRA annual groundwater monitoring reports. The statistical results could include a list of groundwater parameters analyzed, detection limits and background values for each parameter, and the quantified laboratory results. For a particular TSD unit, if statistically significant evidence of contamination is obtained, the following steps will be taken.

- Ecology will be notified in writing within 7 days of the finding with a report indicating which indicator parameters and or constituents have shown a statistically significant increase over the background values. Ecology will be notified in writing in 7 days if the owner/operator intends to demonstrate that increases are caused from sources other than the regulated unit, or from sampling errors, analyses, and/or evaluations.

- All monitoring wells will be sampled immediately and analyzed for all constituents listed in 40 CFR 264, Appendix IX, and for any other specific dangerous constituents as determined by any additional information regarding the waste managed in that TSD unit.

- Following review and validation of the Appendix IX analytical data, the compliance wells will be resampled within 1 month and reanalyzed for all of the compounds detected [WAC 173-303-645(9)(g)(iii)].

- Following review and validation of the reanalyzed data, these confirmed constituents will form the basis for compliance monitoring.

- Within 90 days, a plan will be submitted to Ecology to establish a compliance monitoring program meeting the requirements of

WAC 173-303-645(10) or 40 CFR 264.99, or the data necessary to justify that a compliance monitoring program is not required [WAC 173-303-645(9)(g)(iv)].

Groundwater monitoring records will be retained in the Hanford Facility Operating Record as discussed in Chapter 12.0, Section 12.1.26.

5.6 COMPLIANCE MONITORING PROGRAM [D-10f]

A compliance monitoring program will be established for a land-based TSD unit if groundwater sampling during detection-level monitoring reveals statistically significant evidence of contamination at the point of compliance. In a compliance monitoring program, the monitoring objective is to determine whether groundwater protection standards have been exceeded. This is accomplished by comparing the concentration of a constituent of concern to groundwater protection standards such as maximum concentration limit and alternate concentration limit; background; or applicable, relevant, and appropriate requirements.

5.6.1 Waste Description [D-10f(1)]

Waste that could be managed by TSD units is included in the HF Part A. If required, additional information will be provided on (1) the results of any direct sampling of the waste, (2) a list of expected waste constituents, and (3) an estimate of the composition and physical properties of any immiscible fluids that could be expected to have been derived from the waste.

5.6.2 Characterization of Contaminated Groundwater [D-10f(2)]

If a compliance-level monitoring program at a given TSD unit is considered necessary, a complete characterization of groundwater will be provided in which an increase in dangerous chemicals above appropriate reference levels is indicated. In general, the characterization of groundwater will include (1) concentrations of each constituent detected in 40 CFR 264, Appendix IX, (2) concentrations of major anions and cations, and (3) concentrations of any other appropriate constituents [e.g., Table I of WAC 173-303-645(5)]. However, specific requirements will be proposed in unit-specific permit application documentation. Disposal of purgewater is determined by analytical results of the groundwater. If the analytical results exceed the criteria established in the *Purgewater Management Plan* [Attachment 5 of the HF RCRA Permit (DW Portion)], the purgewater is contained. All other purgewater is returned to the ground or as specified in Attachment 5 of the HF RCRA Permit (DW Portion) and complies with Permit Condition II.f.

5.6.3 Dangerous Constituents to be Monitored [D-10f(3)]

If compliance monitoring is required, the DQO process will be used to guide the selection of constituents of concern, statistical methods, etc. If other groundwater constituents indicative of migrating waste products are identified, the list of groundwater parameters will be revised to include such constituents.

5.6.4 Concentration Limits [D-10f(4)]

With enactment of compliance-level monitoring, maximum concentration limits will be identified for each of the groundwater monitoring parameters listed in Table 1 of WAC 173-303-645. Alternate concentration limits will be proposed after considering the observed concentrations of chemical constituents in the groundwater that might have been derived from the regulated unit in question. The background, and other standards that are applicable, relevant, and appropriate requirements, will be considered when proposing an alternate concentration limit. Concentration limits will be proposed in unit-specific permit application documentation.

If, during compliance-level monitoring, the reference concentration limits for a given groundwater parameter or parameters are significantly exceeded, a corrective action program will be implemented (Section 5.7).

5.6.5 Groundwater Monitoring System [D-10f(6)]

The compliance-level groundwater monitoring system will be designed to determine whether groundwater protection standards have been exceeded. Thus, the compliance-level groundwater monitoring system will comply with the intent of WAC 173-303-645(10) for a compliance monitoring program.

5.6.5.1 Description of Wells [D-10f(6)(a)]. The system design will consist of those wells installed under the detection-level monitoring program and any additional wells that are determined to be required after assessing the detection efficiency of the present well network.

5.6.5.2 Representative Samples [D-10f(6)(b)]. The compliance monitoring system will be designed to provide groundwater samples that are representative of groundwater composition at the point of compliance.

5.6.5.3 Location of Background Monitoring Wells that Are Not Upgradient [D-10f(6)(c)]. Background groundwater composition could be based on samples from wells that are not upgradient from the TSD unit. The justification of well locations for unit background water quality is addressed in unit-specific permit application documentation.

5.6.6 Background Values [D-10f(7)]

Background concentration values will be proposed for each groundwater monitoring parameter identified for the compliance-level monitoring program. The exact sampling periods, frequencies, and statistical methods used to establish the background values will be presented in unit-specific permit application documentation. Background values will be established in conjunction with the Hanford Sitewide background study (DOE/RL-92-23). Background will be established for additional constituents identified in the Appendix IX analysis, if necessary. It is anticipated that those procedures and techniques used to establish background conditions under the final status detection-level monitoring program will be applied.

5.6.7 Sampling, Analysis, and Statistical Procedures [D-10f(8)]

A proposed sampling and analysis plan, including procedures for sample collection, sample preservation and shipment, analytical methods, and chain-of-custody controls, will be prepared if compliance-level monitoring becomes necessary. The basic information for sample collection, sample preservation and shipment, analytical methods, and chain-of-custody procedures will not change from the proposed plans submitted under the detection-level monitoring program (Section 5.5). To comply with WAC 173-303-645(10)(f), the compliance-level monitoring wells will be sampled at least semiannually for the specified groundwater parameters and waste constituents. If verified groundwater monitoring results indicate that appropriate groundwater protection standards (e.g., maximum concentration limit or alternate concentration limit; or applicable, relevant, and appropriate requirements) are exceeded at any monitoring well along the line of compliance, written notification will be made to Ecology within 7 days of the finding. An application for a permit modification to establish a corrective action program (Section 5.7) will be submitted within 90 days [WAC 173-303-645(10)(g)(i)(ii)]. In the case of a false positive claim, the owner/operator will notify Ecology within 7 days in accordance with WAC 173-303-645(10)(i)(i).

5.6.7.1 Sample Collection [D-10f(8)(a)]. This information will not change from the proposed plans submitted under the detection-level monitoring program (Section 5.5.4).

5.6.7.2 Additional Requirements for Compliance Point Monitoring [D-10f(8)(e)]. Under compliance monitoring, additional activities will be conducted to provide a more protective monitoring program.

5.6.7.2.1 Sample Frequency [D-10f(8)(e)(i))]. Under compliance monitoring, downgradient compliance wells will be sampled semiannually [WAC 173-303-645(10)(f)].

5.6.7.2.2 Compliance Point Groundwater Quality Values [D-10f(8)(e)(iii)]. Analytical groundwater quality data will be prepared in an appropriate form for full statistical analysis. These data will exist primarily in tabular form and will consist of raw data from each independent sample obtained during each sampling event. The presentation of the statistical evaluation of the data will depend on the exact nature of the compliance limits (Section 5.6.4).

5.6.7.3 Annual Determination of Hydraulic Gradient [D-10f(8)(f)]. Under compliance monitoring, the hydraulic gradient will be determined annually and the efficiency of the monitoring well network will be addressed. If warranted, additional monitoring wells will be installed.

5.6.7.4 Statistical Determination for Compliance Monitoring Program [D-10f(8)(g)]. Statistical evaluation of groundwater monitoring data will comply with requirements set forth in the WAC 173-303-645 (8)(h) final status regulations. Procedures outlined in the following EPA technical guidance documents will be followed:

- *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Interim Final Guidance* (EPA 1989d)

- *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Draft Addendum to Interim Final Guidance* (EPA 1992).

For a compliance-level groundwater monitoring program, the choice of an appropriate statistical method depends on the type of groundwater concentration limit. For health-based concentration values, the tolerance interval approach is recommended (EPA 1992, page 50). The appropriate statistical method is to determine whether the fixed standard has been exceeded. However, if the concentration limit is determined from the background concentrations, the statistical method is chosen from those that compare background well data to compliance well data (EPA 1989d, page 4-2). The tolerance interval approach is the proposed statistical method in both cases. However, in background/compliance well comparisons the tolerance limit is computed from background (upgradient) data and compared to individual compliance point samples.

Groundwater monitoring records will be retained in the Hanford Facility Operating Record as discussed in Chapter 12.0, Section 12.1.26.

5.7 CORRECTIVE ACTION PROGRAM [D-10g]

If, at the point of compliance, dangerous constituents are measured in the groundwater at concentrations that exceed accepted groundwater protection standards, sufficient data, supporting information, and analyses will be provided to establish a corrective action program.

A description of the groundwater monitoring plan that will be used to assess the effectiveness of the corrective action measures will be submitted. This groundwater monitoring plan will be similar in scope to a compliance-level monitoring program developed under Section 5.6 and will include all relevant information pertaining to the location and description of monitoring wells, groundwater sampling and analysis plans, statistical methods, and quality assurance and quality control procedures [WAC 173-303-645(11)(d)].

The concentrations established in the Hanford Sitewide background study, in conjunction with background concentrations, will determine groundwater protection standards for each land-based TSD unit. This will reduce the time and costs currently being expended for drilling and sampling unit-specific background wells, and will further benefit cleanup efforts by the uniform application of cleanup standards across the Hanford Site. The Hanford Sitewide groundwater background study is discussed in *Hanford Site Groundwater Background* (DOE/RL-92-23).

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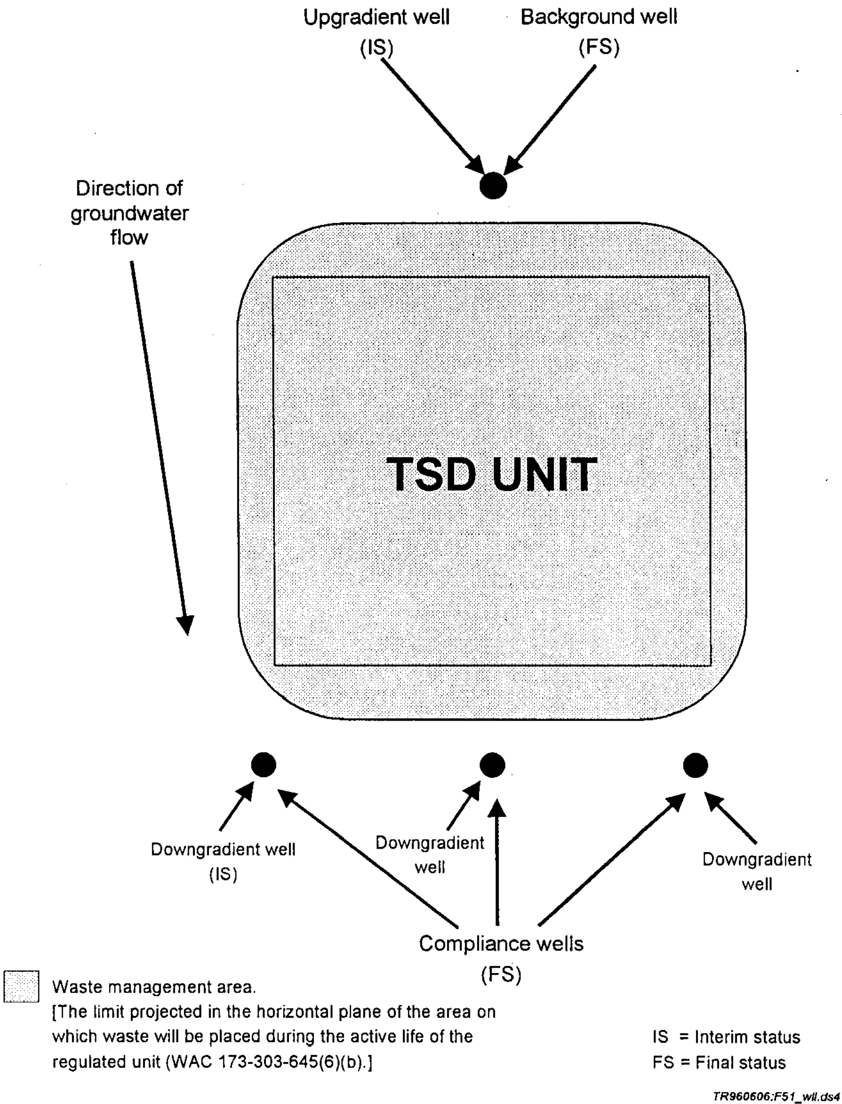

Figure 5-1. Generalized Configuration for a Detection Monitoring Groundwater Well System.

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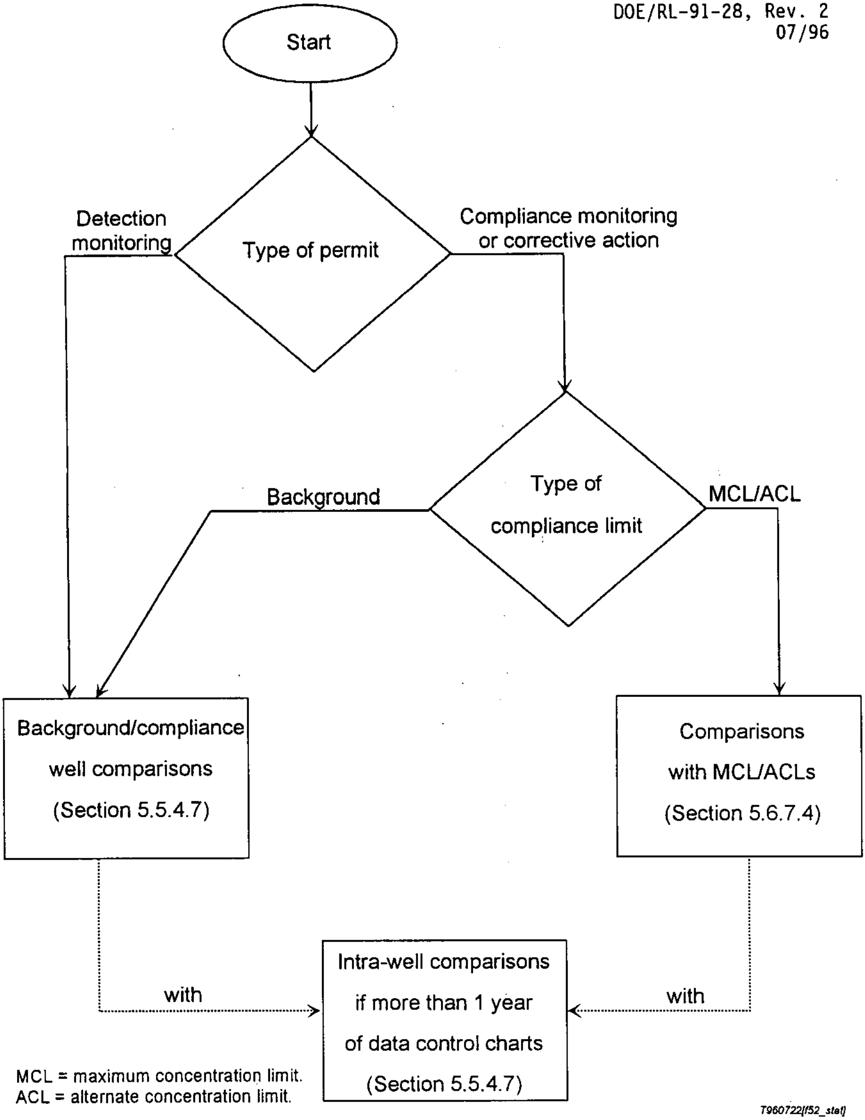

Figure 5-2. Flow Chart for Selection of Appropriate Statistical Method Used for Data Interpretation.

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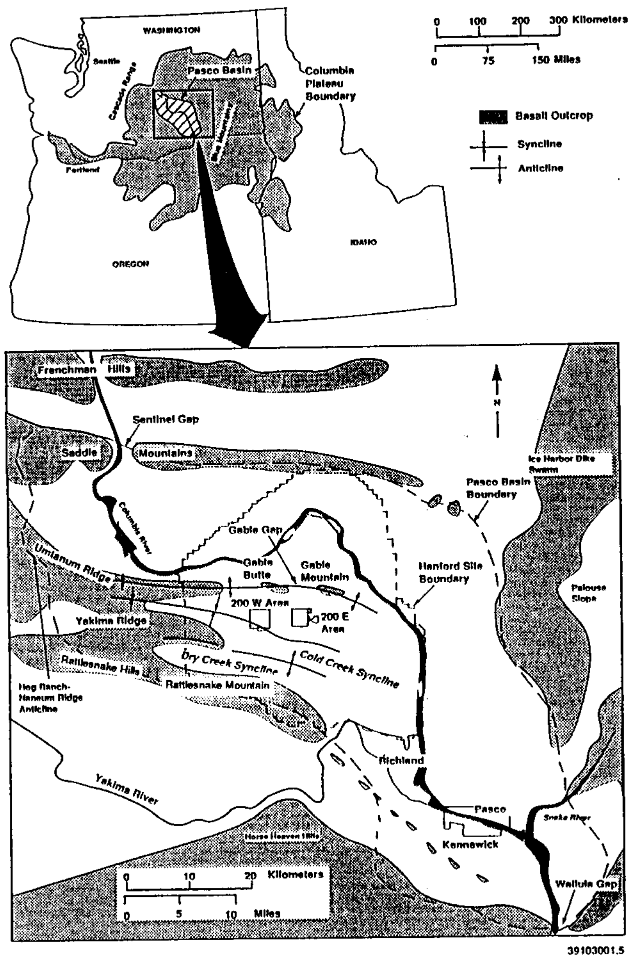

Figure 5-3. Location of Bounding Structures of the Pasco Basin.

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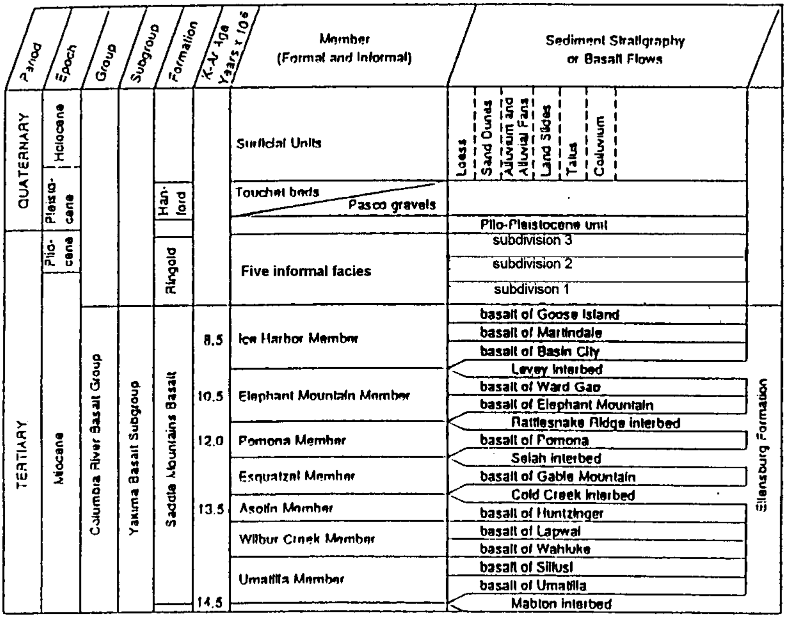

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Figure 5-4. Generalized Stratigraphic Column of Formations at the Hanford Site.

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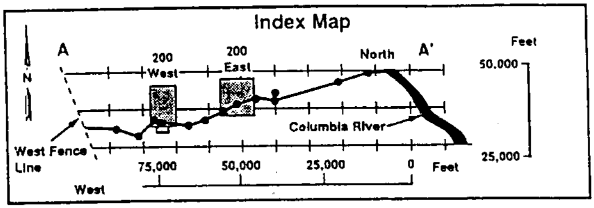

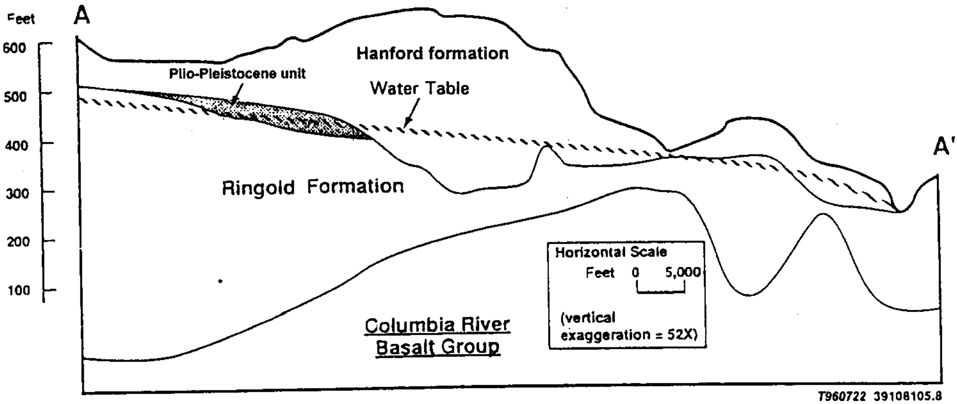

Figure 5-5. Generalized Geologic Cross-Section Through the Hanford Site (after Tallman et al. 1979, p. 20).

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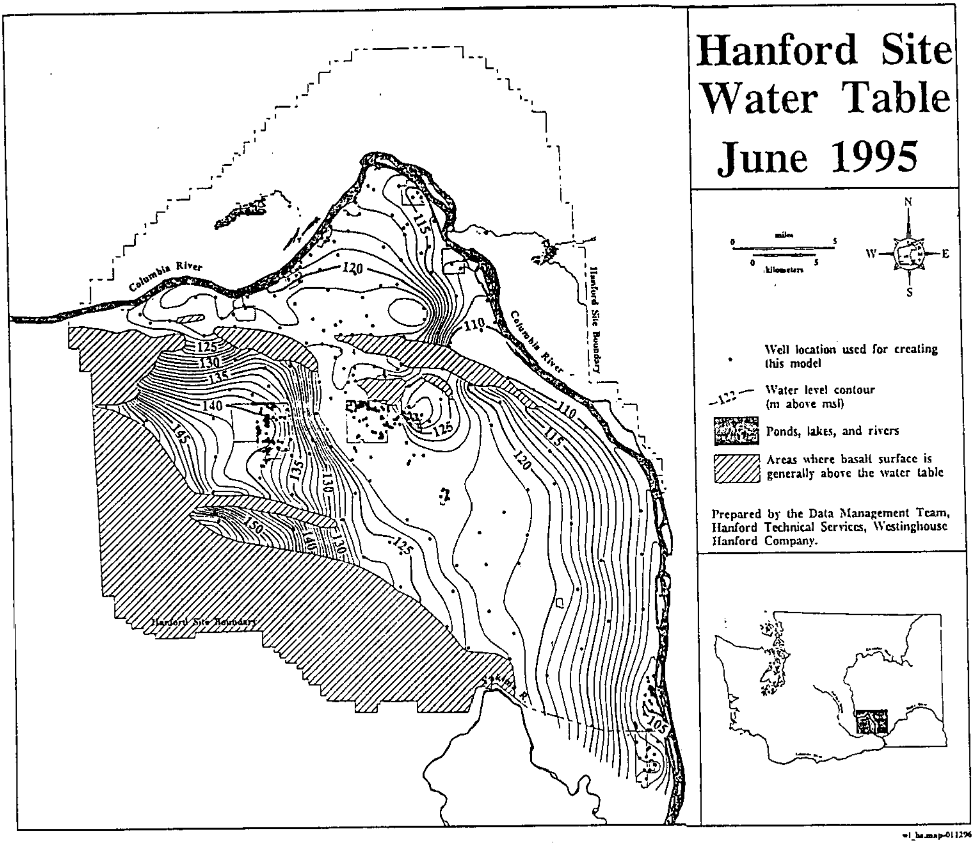

Figure 5-6. Water Table Map of the Hanford Site.

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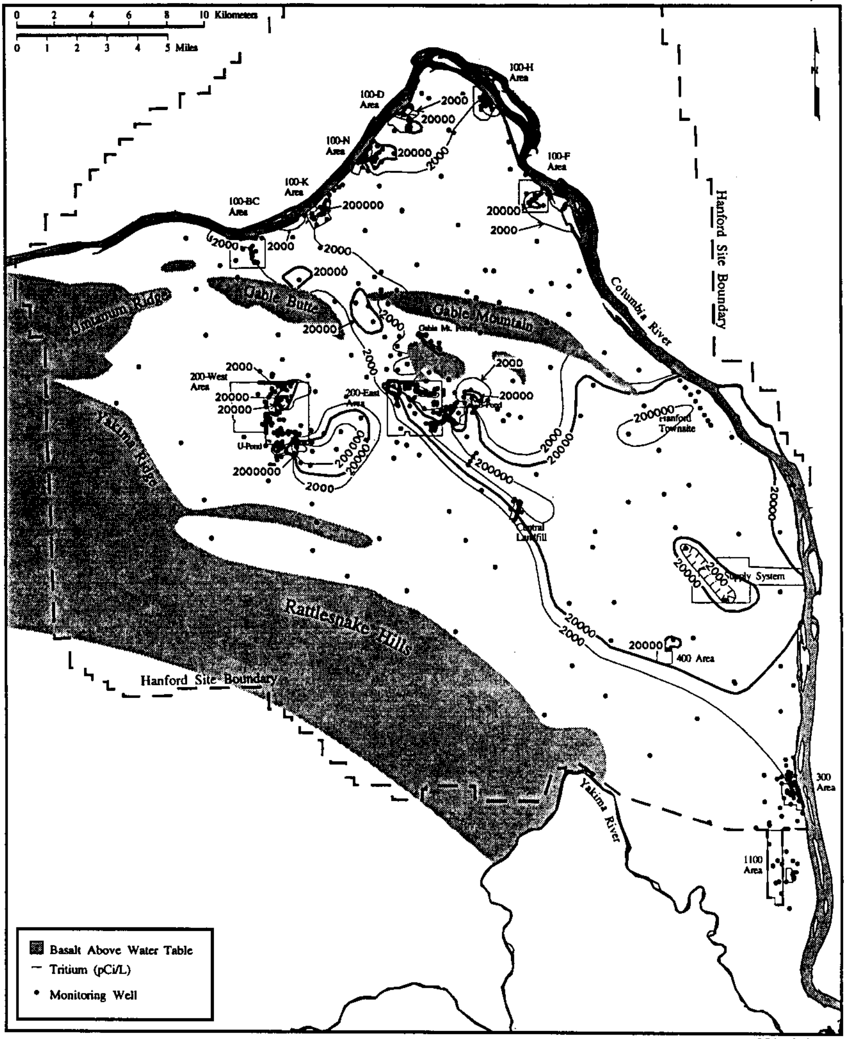

Tritium at Hanford.

Figure 5-7. Distribution of Tritium on the Hanford Site (PNNL 1996).

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

This chapter addresses the provisions of Section F of Ecology's permit application guidance (Ecology 1987 and 1995), and includes a discussion of the following topics:

- Security
- Inspection schedule
- Preparedness and prevention requirements
- Preventive procedures, structures, and equipment
- Prevention of reaction of ignitable, reactive, and/or incompatible wastes.

Also addressed are provisions contained in Conditions II.M. (Security) and II.O. (General Inspection Requirements) of the HF RCRA Permit (DW Portion).

Procedures to prevent hazards for individual TSD units are included in the Unit-Specific Portion of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

6.1 SECURITY [F-1]

The following sections describe the security measures, equipment, and warning signs used to control entry to the Hanford Facility and to meet Condition II.M. of the HF RCRA Permit (DW Portion). Security information for individual TSD units is provided in the Unit-Specific Portion of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

6.1.1 Security Procedures and Equipment [F-1a]

The section describes the 24-hour surveillance system, warning signs, and barriers used to provide security and control access to the Hanford Facility. The entire Hanford Facility is a controlled access area. The Hanford Facility maintains around-the-clock surveillance for protection of government property, classified information, and special nuclear materials. The Hanford Patrol maintains a continuous presence of protective force personnel to provide additional security.

The majority of TSD units are located within, or in the vicinity of, the 200 Areas (refer to Chapter 1.0, Table 1-1, Appendix 2A). Manned barricades are maintained around the clock at checkpoints on vehicular access roads leading to these areas (Yakima, Wye, and Rattlesnake Barricades; Drawing

H-6-958 in Appendix 2A). All personnel accessing locations on the Hanford Site (except for publicly accessible locations) must have a U.S. Department of Energy-issued security identification badge indicating the appropriate authorization. Personnel also could be subject to a random search of items carried into or out of the Hanford Site. Additional means to bar entry or control access (e.g., fences, locked entry doors) are discussed in the Unit-Specific Portion of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

Signs are, or will be, posted at area boundaries within the Hanford Site stating "NO TRESPASSING. SECURITY BADGES REQUIRED BEYOND THIS POINT. AUTHORIZED VEHICLES ONLY. PUBLIC ACCESS PROHIBITED" (or an equivalent legend). In addition, warning signs stating "DANGER--UNAUTHORIZED PERSONNEL KEEP OUT" (or an equivalent legend) are, or will be, posted at TSD units within the Hanford Facility. These signs are, or will be, written in English, legible from a distance of 7.6 meters, and visible from all angles of approach.

6.1.2 Waiver [F-1b]

Waivers of the security procedures and equipment requirements for the Hanford Facility currently are not requested.

6.2 INSPECTION SCHEDULE [F-2]

This section addresses the general inspection requirements for the Hanford Facility. The TSD unit-specific inspection activities are addressed in the Unit-Specific Portion of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

6.2.1 General Inspection Requirements [F-2a]

General inspection requirements for the Hanford Facility are specified in Condition II.O. of the HF RCRA Permit (DW Portion). This condition requires the following:

- Facility inspections to be conducted in accordance with the provisions of WAC 173-303-320(2)

- Inspections of the 100, 200 East, 200 West, 300, 400, and 1100 Areas to be conducted annually

- Inspection of the banks of the Columbia River, contained within the Hanford Facility boundary, to be conducted two times per year (i.e., one at the low water mark of the year, and one at a time chosen by the Permittees)

- Visual inspection for malfunctions, deterioration, operator errors, and discharges that might cause or lead to the release of dangerous waste constituents to the environment or that threaten human health

- Notification to Ecology at least 7 days before conducting these inspections to allow Ecology representatives to be present during the inspection

- Remedial action to be taken, if required, in accordance with a schedule agreed to by Ecology.

6.2.2 Inspection Log [F-2b]

Documentation of the inspections conducted in accordance with Condition II.O. of the HF RCRA Permit (DW Portion) is placed in the Hanford Facility Operating Record, General Information File (refer to Chapter 12.0, Section 12.1.30).

6.2.3 Schedule for Remedial Action for Problems Revealed [F-2c]

In accordance with Condition II.O of the HF RCRA Permit (DW Portion), remedial action schedules will be developed for any problems discovered during a Hanford Facility inspection. These schedules will be agreed to by Ecology.

6.2.4 Specific Process or Waste Type Inspection Requirements [F-2d]

As noted in Chapter 1.0, Table 1-1, the Hanford Facility includes TSD units with container handling capabilities, tank systems, surface impoundments, containment buildings, landfills, waste piles, and miscellaneous units. Inspections requirements for each of the TSD units are addressed in the Unit-Specific Portion of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

The emergency preparedness and prevention measures taken for the Hanford Facility are described in this section. Most of the Hanford Facility 'operating' TSD units are equipped with internal communication systems to relay emergency or other information to unit personnel. The internal communication systems include telephones, various alarm systems, and hand-held or vehicle two-way radios. Alarm systems exist at various locations throughout the Hanford Facility to allow personnel to respond appropriately to various emergency situations, including the following: building evacuations, take-cover events, and fire and/or explosion. Telephones are located throughout the Hanford Facility and provide both internal and external communication. In addition, the following external communication systems are available for notifying persons assigned to emergency response organizations:

- Fire alarm pull boxes and fire sprinkler flow monitoring devices--connected to a system monitored around the clock by the Hanford Fire Department

- Emergency telephone numbers 911 (or 375-2400 for PNNL facilities)--on notification, the Hanford Patrol Operations Center notifies and/or dispatches required emergency responders

- Crash alarm telephone system--consists of selected telephones that are disassociated from the regular system and are connected automatically to control stations

- Two-way radio system--consists of hand-held or vehicle radios; the system accesses the Hanford Facility emergency network and can summon the Hanford Fire Department, Hanford Patrol, and/or any other assistance needed to deal with emergencies.

6.3.1 Equipment Requirements [F-3a]

Equipment requirements are listed in the *Hanford Facility Contingency Plan* (Appendix 7A).

6.3.2 Aisle Space Requirement [F-3b]

Aisle space requirements for 'operating' TSD units are addressed in the Unit-Specific Portion of this permit application.

6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [F-4]

Preventive procedures are in place to ensure that unloading activities are conducted in a safe manner and that run-off of liquid, if spilled during waste unloading operations, is contained and disposed of properly. In those areas of TSD units where significant risk of exposure to dangerous and/or mixed waste exists, personnel are required to wear protective suits and/or respiratory devices, depending on the specific hazard. Provisions are in place at specific TSD units to ensure that backup power is provided for equipment critical to operations. Preventive measures information specific to TSD units is contained in the Unit-Specific Portion of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

Response measures designed to control and mitigate effects to human health and the environment for any spill or release between TSD unit boundaries (e.g., onsite transportation) are described in Appendix 7A.

6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTES [F-5]

Procedures and precautions to prevent the reaction of ignitable, reactive, and incompatible waste at 'operating' TSD units are described in the Unit-Specific Portion of this permit application.

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APPENDIX

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7.0 CONTINGENCY PLAN [G]

This chapter addresses the provisions identified in Section G of Ecology's permit application guidance (Ecology 1987 and 1995). The WAC 173-303 requirements for a contingency plan are satisfied by the *Hanford Facility Contingency Plan* (Appendix 7A), together with each TSD unit-specific contingency plan contained in the Unit-Specific Portion of this permit application. Contingency information, if appropriate, also could be contained in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

Appendix 7A includes response discussions pertaining to releases of hazardous substances as defined in WAC 173-303-040. Releases of hazardous substances that threaten human health and the environment are subject to the HF RCRA Permit (DW Portion) (refer to Condition II.A. and to Permit Attachment 3, the Permit Applicability Matrix).

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8.0 PERSONNEL TRAINING [H]

This chapter addresses the provisions identified in Section H of Ecology's permit application guidance (Ecology 1987 and 1995). This chapter focuses on a description of the training programs implemented to meet the requirements of Condition II.C. (Personnel Training) of the HF RCRA Permit (DW Portion).

The general facility training information contained in this chapter need not be duplicated in the Unit-Specific Portion of the *Hanford Facility Dangerous Waste Permit Application*, but will be cross-referenced, as appropriate. Pertinent information also can be cross-referenced, if appropriate, in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

8.1 GENERAL FACILITY TRAINING

Condition II.C.2. of the HF RCRA Permit (DW Portion) requires Hanford Facility personnel to receive general facility training within 6 months of hire. This training provides an orientation on dangerous waste management activities being conducted on the Hanford Facility and includes the following:

- Description of emergency signals and appropriate personnel response
- Identification of contacts for information regarding dangerous waste management activities
- Introduction to waste minimization concepts
- Identification of contact(s) for emergencies involving dangerous waste
- Familiarization with the *Hanford Facility Contingency Plan* (Appendix 7A).

Each Permittee has access to a general facility training module that meets the requirements listed for Condition II.C.2. of the HF RCRA Permit (DW Portion).

Condition II.C.4. of the HF RCRA Permit (DW Portion) requires the Permittees to provide the necessary training to non-Facility personnel (i.e., visitors, subcontractors) as appropriate for the locations and activities undertaken. At a minimum, this training describes dangerous waste management hazards on the Hanford Facility.

8.2 TREATMENT, STORAGE, AND/OR DISPOSAL UNIT-SPECIFIC TRAINING

The training programs for individual TSD units can be found in the Unit-Specific Portion of this permit application or, if appropriate, in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation. These programs ensure that personnel training is conducted as required by WAC 173-303-330, as specified in Condition II.C.1. of the HF RCRA Permit (DW Portion). The training programs contribute to the assurance that TSD units are operated and maintained in accordance with requirements of the EPA, Ecology, and DOE-RL.

The training programs are overseen by the DOE-RL and prepare employees to operate and maintain Hanford Facility TSD units in a safe, efficient, and environmentally sound manner. In addition to preparing employees to operate and maintain the TSD units under normal conditions, the programs ensure that employees are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with emergency responses outlined in the *Hanford Facility Contingency Plan* (Appendix 7A) and in TSD unit-specific contingency plans contained in the Unit-Specific Portion of this permit application or, if appropriate, in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

The Hanford Site contractors are responsible for developing and administering the courses required by the training programs, and for establishing formal retraining dates for these courses. The TSD unit management is responsible for identifying TSD unit- and job-specific training requirements for TSD unit employees and for ensuring that employees complete the appropriate training.

In administering certain training courses, a retraining date could be set by TSD unit management. The formal retraining date is a date (day/month/year) counting from the most recent initial training date or another baseline date established for the training. The formal retraining date remains the same each year regardless of when retraining is completed. Retraining is to occur within 30 days of the formal retraining date. While it is preferable to complete retraining within the 30 days prior to the formal retraining date, managers have the ability to authorize employees for 30 days beyond the formal retraining date, thus allowing a 60-day window in which to satisfy the retraining requirements.

8.3 TRAINING RECORDS

As specified in Condition II.C.1. of the HF RCRA Permit (DW Portion), each Hanford Facility Permittee maintains documentation in accordance with WAC 173-303-330(2) and (3). Training records could be maintained in hard copy form or by using electronic data storage. At a minimum, training records will consist of course attendance rosters correlating the training received with the employees who were in attendance. Training records are maintained in accordance with the requirements of the *Privacy Act of 1974*. The training records on individual employees are available for inspection purposes through 59 FR 17091, which gives federal, state, and local government officers 'routine use' access to training records where a regulatory program being implemented is applicable to a DOE-RL or contractor program. Further discussion of the maintenance of Hanford Facility and TSD unit-specific personnel training records is included in Chapter 12.0, Section 12.1.20.

8.4 TRAINING DIRECTOR

One person does not function as the training director on the Hanford Facility. A TSD unit manager has overall responsibility for all training required by WAC 173-303-330 and Condition II.C. of the HF RCRA Permit (DW Portion) at the TSD unit under this manager's control. To meet requirements of a training director in WAC 173-303-330(1)(a), the position is shared among TSD unit personnel, central training organization personnel, and other support organization personnel. A TSD unit manager can access training resources and experts from many different areas on a variety of subject matters rather than relying on the knowledge of a limited number of persons. This shared responsibility ensures the identification of the appropriate training requirements and that the Hanford Facility dangerous waste training programs for each Permittee meets all applicable dangerous waste management requirements.

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CONTENTS

FIGURES

TABLE

9.0 EXPOSURE INFORMATION REPORT

This chapter discusses exposure information for the Hanford Facility. Requirements for submittal of exposure information, administered by EPA, are contained in 40 CFR 270.10(j). Such information only is required for dangerous waste constituents in Part B permit application documentation pertaining to a surface impoundment or a landfill. Guidance for preparing an exposure information report is contained in EPA's *Permit Applicants' Guidance Manual for Exposure Information Requirements under RCRA Section 3019* (Guidance Manual) (EPA 1986a). This Guidance Manual states that the information provided must address, at a minimum, the following three areas:

- Reasonably foreseeable potential releases from both normal operations and accidents, including releases associated with transportation to or from the facility

- The potential pathways of human exposure to dangerous wastes or constituents resulting from these releases

- The potential magnitude and nature of the human exposure resulting from such releases.

The Guidance Manual further states that the "EPA does not expect applicants to develop major, expensive new pieces of information..." to address these three areas.

This chapter is intended to provide an overview of available information regarding the potential for exposure to dangerous and/or mixed waste present at, or released from, 'operating' surface impoundment or landfill units on the Hanford Facility. These 'operating' TSD units currently include the LLBG and the LERF. Part B documentation for both of these units is contained in the Unit-Specific Portion of this permit application (i.e., DOE/RL-88-20 and DOE/RL-93-03, respectively).

The LLBG and LERF are located within, or near, the 200 Areas of the Hanford Facility (Appendix 2A). Thus, the focus of this chapter is to address reasonably foreseeable potential releases from both normal operations and accidents within the 200 Areas. This information includes releases associated with potential environmental transport pathways and routes of human exposure to dangerous and/or mixed waste. The information contained in this chapter need not be duplicated in the Unit-Specific Portion of this permit application, but will be cross-referenced, as appropriate. Information in this chapter also could be cross-referenced by preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation, as appropriate. Most of the land-based TSD units 'undergoing closure' are located within the 200 Areas. In general, the exposure information discussed in this chapter would be the same information used to conduct an analysis of most TSD units in the 200 Areas.

9.1 GENERAL INFORMATION

This section provides general information for the Hanford Facility and for the LLBG and LERF. Also provided is a checklist (Table 9-1) that identifies sections of the *Hanford Facility Dangerous Waste Permit Application* where information relevant to Chapter 9.0 discussions can be found.

9.1.1 Risk Assessment Reports and Information

This section summarizes health and risk assessment reports and other relevant information for the Hanford Facility and for the LLBG and LERF. The discussion is limited to dangerous waste constituents.

9.1.1.1 Hanford Facility. A description of the Hanford Site and Hanford Facility is contained in Chapter 2.0. The Hanford Site maintains a sitewide environmental surveillance program to assess onsite and offsite environmental impacts and offsite human health exposures. This program monitors air, surface water, sediment, agricultural products, vegetation, soil, and wildlife. A description of this program is contained in the *Hanford Site Environmental Monitoring Plan* (Monitoring Plan) (DOE/RL-91-50).

Exposure information resulting from the Hanford Site environmental monitoring program is prepared and issued annually [e.g., *Hanford Site Environmental Report* (Environmental Report) (PNNL 1996)]. The Environmental Report provides a summary of environmental data that are collected to characterize Hanford Site environmental management activities. This information is used to assess the exposure that results from the release of all effluents, from both ongoing and past operations, based on the contaminants that continue to reside in the soil and groundwater pathway.

A risk-based cleanup strategy has recently been prepared for the Hanford Site (PNL 1995). This study concluded that existing land use and access restrictions protect public health and safety. The current airborne, groundwater, and surface water exposures to the general public are much below background and are anticipated to be lower in the future. The study concluded that over the near-term (current through the remediation phase of Hanford Site cleanup), the primary exposure pathway of concern is through the air. Although the consequences associated with inhalation are large, the probability of occurrence is low. Over the long-term (post remediation phase), the study concluded that the exposure pathway of primary concern is groundwater. With regard to hazardous chemicals, the potential ingestion of carbon tetrachloride was found to be the single largest contributor of carcinogenic risk over the long-term. Similarly, nitrates were found to be the single largest contributor of noncarcinogenic risk.

The content of this chapter is based on information contained in the Monitoring Plan (DOE/RL-91-50), the Environmental Report (PNNL 1996), a risk-based cleanup strategy (PNL 1995), and the *Final Environmental Impact Statement, Disposal of Hanford Defense High-Level, Transuranic Wastes* (Final Environmental Impact Statement) (DOE 1987), as well as a number of other general and specific documents that are cited throughout the text.

9.1.1.2 Surface Impoundment and/or Landfill TSD Units. This section summarizes risk assessment reports and information specific to the LLBG and LERF that addresses dangerous waste constituents (i.e., radiological studies are not included).

The LLBG, classified as a land-based unit, are located in the 200 Areas (refer to Appendix 2A). Three of the four operational burial grounds comprising this TSD unit are located in the 200 West Area; the remaining burial ground is located in the 200 East Area (refer to Chapter 4.0, Section 4.1.2.8 and DOE/RL-88-20).

Reports containing exposure information relevant to the LLBG include:

- *Estimation of the Release and Transport of Lead through the Soils and Groundwater at the Hanford Site 218-E-12B Burial Ground* (PNL 1992)

- *Estimation of the Release and Transport of Nickel through the Soils and Groundwater at the Hanford Site 218-E-12B Burial Ground* (PNL 1994)

- *Extrapolation of Migration Modeling for Large Metal Components Containing Lead and Nickel Alloys at the 218-E-12B Burial Ground* (USN 1995a)

- *Draft Environmental Impact Statement on the Disposal of Decommissioned, Defueled Cruiser, Ohio Class, and Los Angeles Class Naval Reactor Plants* (USN 1995b).

- Solid Waste Burial Ground Interim Safety Basis (WHC 1995c).

These reports evaluate the release and transport potential of metals from the disposal of defueled reactor components.

The LERF, located in the 200 East Area (refer to Appendix 2A), is classified as a surface impoundment. The LERF provides interim treatment and storage of mixed effluent (process condensate) received from the 242-A Evaporator and other onsite sources (refer to Chapter 4.0, Section 4.1.2.4.). A baseline environmental survey has been performed on LERF that provided an assessment of potential impacts to the environment from operating LERF. In addition, the final safety analysis report examined the risk to human health associated with the release of ammonia (WHC 1991e).

9.1.2 Land Use and Zoning Maps

The Hanford Site is federally owned and covers approximately 1,450 square kilometers (refer to Chapter 2.0, Figure 2-1). Figure 9-1 depicts the current land uses in and adjacent to the Hanford Site. As discussed later in this section, changes in Hanford Site land use and custodianship will need to be factored into future evaluations of exposure information.

Currently, the Hanford Site primarily is dedicated to U.S. Department of Energy-controlled operations, with limited exceptions. However, the future use of the Hanford Site is currently being evaluated (DOE 1996). In particular, the lands north and east of the Columbia River are under consideration for non-U.S. Department of Energy use and for ownership transfer. The portion of the Hanford Site that is located on the north and east sides of the Columbia River currently is used for wildlife refuge or wildlife recreation land. The stretch of the Columbia River within the Hanford Site boundary currently is being considered for addition to the National Wild and Scenic Rivers System (refer to Chapter 13.0, Section 13.1.1.10). The southwest portion of the Hanford Site is the Arid Lands Ecology Reserve. The portion of the Hanford Site south and west of the Columbia River is where reactor, fuel reprocessing, and TSD units are located. Additional information on this central area, which is most relevant to the discussions contained in Chapter 9.0, can be found in Chapter 2.0. This central area (i.e., the 200 Areas) contains the LLBG and LERF.

Also located within the boundaries of the Hanford Site are the Washington Public Power Supply System reactor and generating complex, and the US Ecology, Inc. waste disposal facility, located southwest of the 200 East Area. Seimens Nuclear Power is located just north of Richland, Washington, adjacent to the Hanford Site boundary. The eastern boundary of the nearest military installation, the Yakima Firing Center, is 22 kilometers west-northwest of the Hanford Site.

Outside the Hanford Site are privately owned farms and the urban and suburban areas of Richland and West Richland, Washington.

On December 21, 1994, the Secretary of Energy issued a new land- and facility-use policy for the U.S. Department of Energy, which makes the following statement:

> "It is Department of Energy policy to manage all of its land and facilities as valuable national resources. Our stewardship will be based on the principles of ecosystem management and sustainable development. We will integrate mission, economic, ecologic, social, and cultural factors in a comprehensive plan for each site that will guide land and facility use decisions. Each comprehensive plan will consider the site's larger regional context and be developed with stakeholder participation. This policy will result in land and facility uses which support the Department's critical missions, stimulate the economy, and protect the environment."

The DOE-RL has initiated a comprehensive land use planning process to evaluate specific and potential use of the different areas of the Hanford Site. To support this process, the DOE-RL is developing a comprehensive land use plan, which will be released to the public during the summer of 1996 for review and comment as part of the draft Hanford Remedial Action Environmental Impact Statement (DOE 1996).

The purpose of this Plan is to:

- Guide onsite land- and facility-use decisions through the integration of natural, cultural, and socioeconomic factors

- Designate existing and future land uses that are appropriate for the Hanford Site based on an analysis of land use suitability, with appropriate consideration of the following:
  - The U.S. Department of Energy's responsibilities, authorities, and constraints dictated by organic legislation and applicable laws
  - Land use values of other federal agencies, Tribes, and state and local governments
  - Business, labor, environmental, and other groups and organizations concerned with or affected by the Hanford Site and participating in the future land-use planning process
  - Specific characteristics of the natural and built landscape within the Hanford Site.

The Hanford Advisory Board was created in 1994 to monitor progress and help Tri-Party Agreement agencies proceed with safe, credible, cost-effective, and environmentally sound remediation. Values to which the Hanford Advisory Board subscribes represent a broad cross-section of interests in the states of Washington and Oregon. Consistent with those values, the Hanford Advisory Board strives to be independent and fair-minded in advising the U.S. Department of Energy and DOE-RL on aspects of Hanford Site programs, activities, and remediation. The DOE-RL is committed to working with the Hanford Advisory Board to provide timely responses and briefings when requested.

9.1.3 Aerial Photographs

A composite aerial photograph of the Hanford Facility is included in Appendix 2A. Large-scale maps and aerial photographs of the LLBG and LERF are included in the Unit-Specific Portion of this permit application.

9.1.4 Summary of Waste Analysis Data

The HF Part A provides waste characteristics information for TSD units (refer to Chapter 1.0). Process knowledge documentation and results of analyses have been, and will be, maintained with other TSD unit records (refer to Chapter 12.0, Section 12.1.16) and will be provided to Ecology and the EPA as required by applicable regulations. Waste analysis data for the LLBG and LERF are discussed in the Unit-Specific Portion of this permit application.

9.1.5 Amount of Waste

Currently, over 1,600 waste management units have been identified on the Hanford Site, the majority of which are identified as SWMUs in accordance with RCRA (DOE/RL-88-30) (refer to Appendix 2D, Section 1.2). Chapter 2.0, Section 2.5 and Appendix 2D, contain information on these waste management units. The Waste Information Data System (WIDS) is an electronic database that identifies known and reported SWMUs and other waste management units located on the Hanford Site (refer to Appendix 2D, Section 1.1). The WIDS includes the type and location of the unit, when the unit was operated, general dimensions and description of the unit, and general descriptions of waste placed in the unit (including estimated quantities of radionuclides and chemicals contained in some units). The WIDS database is accessible to regulatory agency personnel. Information specific to LLBG and LERF is contained in the WIDS and in the Unit-Specific Portion of this permit application.

9.1.6 Records Produced by Environmental or Health Agencies

A summary of Notice of Compliance Violations and the associated responses is maintained in the Hanford Facility Operating Record, General Information File (refer to Chapter 12.0, Section 12.1). This summary can be accessed by contacting the following:

Public Access Room H6-08
Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352
(509) 372-3411.

The EPA inspected the Hanford Facility in 1986, 1987, and 1988. Copies of the inspection reports for 1987 and 1988 have been provided to Ecology.

A 1986 *Consent Agreement and Compliance Order* (Ecology 1986) between the DOE-RL and Ecology provided that a RCRA groundwater monitoring system would be installed around portions of the LLBG that are used for mixed waste. One requirement of the order was that 35 wells would be installed around the LLBG to provide a detection-level groundwater monitoring network. These 35 wells have been installed. An additional 46 wells have been drilled to complete the groundwater monitoring network for a total of 81 wells as of 1994. At the present time, 67 of the 81 wells are monitored routinely. The 14 wells that currently are not being monitored are associated with the 218-W-6 Burial Ground that has yet to receive mixed waste (refer to Appendix 2A of this document and DOE/RL-88-20, Chapter 5.0).

At this time, no records have been produced by environmental or health agencies for the LERF.

9.2 PATHWAY-SPECIFIC INFORMATION

This section provides information on potential contaminant release pathways. Potential pathways discussed include the following:

- Groundwater pathway
- Surface water pathway
- Air pathway

- Subsurface gas pathway
- Contaminated soil pathway
- Transportation information.

Information also is provided on transportation and management practices.

9.2.1 Groundwater Pathway

General information concerning the hydrogeology of the Hanford Site, and the groundwater monitoring program at the Hanford Facility, is provided in Chapter 5.0. Information concerning the RCRA groundwater monitoring program specific to the LLBG and LERF is contained in the Unit-Specific Portion of this permit application.

The aquifers beneath the Hanford Site include the unconfined aquifer in sediments of the Hanford and Ringold Formations and a series of confined aquifers in interbed layers of the Columbia River Basalt Group. Generally, the suprabasalt aquifer is hydraulically separated from the interbed aquifers by basalt flows. North of the 200 East Area, the uppermost basalt layer has been eroded away, allowing a connection between the suprabasalt aquifer and the interbed aquifers. Other areas of interconnection by erosion have been hypothesized, but have not been confirmed.

Over 3,400 wells are located on the Hanford Site for vadose zone characterization, groundwater monitoring, drinking water supply, and groundwater cleanup (pump and treat). Over 200 of the groundwater monitoring wells are located near or within the 200 Areas. Three wells, located in the 200 East Area, provide backup process water supply. These wells are not used to provide drinking water. The locations of these wells are discussed in Appendix 2A. Most water used at the 200 Areas is obtained from the Columbia River.

Several drinking water supply wells are located on the Hanford Facility. None of these wells are within 4.8 kilometers of the 200 Areas. The nearest water supply wells are the Yakima Barricade well, located about 5.2 kilometers west of the 200 West Area; the Rattlesnake Spring well, located about 6.4 kilometers southwest of the 200 West Area; and the Hanford Patrol Training Academy well, located about 24 kilometers southwest of the 200 Areas. The Rattlesnake Spring well is no longer in service because of lack of demand. Three wells, located at the Fast Flux Test Facility, supply drinking water to the 400 Area (refer to Chapter 2.0, Section 2.5.2.1) and are located approximately 19.3 kilometers downgradient from the 200 Areas.

No agricultural irrigation or commercial food preparation occurs on the Hanford Facility.

9.2.1.1 Known Release Information. The following sections provide a brief discussion of known release information for the Hanford Facility and for the LLBG and LERF.

9.2.1.1.1 Hanford Facility. Known release information for the Hanford Facility is maintained by the WIDS (refer to Section 9.1.5 and Appendix 2D, Section 1.1). In addition, groundwater monitoring results and contaminant plume maps are provided annually in such documents as the Environmental Report (e.g., PNNL 1996) and annual groundwater monitoring reports (e.g., DOE/RL-91-03).

9.2.1.1.2 Surface Impoundment and/or Landfill TSD Units. Following the installation of a RCRA groundwater monitoring network in 1987, no known release of waste via the groundwater pathway has been reported for the LLBG.

The possibility of groundwater contamination is mitigated by the environmentally protective design and construction of the LERF, which is engineered to minimize the potential for release of contaminants, and by the site stratigraphy. Because the basins are constructed with double liners and leak detection systems, failure of the containment system would be detected before a release could migrate through the unsaturated zone to the aquifer. Following the installation of a RCRA groundwater monitoring network in 1991, no known release of waste via the groundwater pathway has been reported for the LERF.

9.2.1.2 Potential for Human Exposure via the Groundwater Pathway. The following sections provide a brief discussion of the potential for human exposure via the groundwater pathway for the Hanford Facility and for the LLBG and LERF.

9.2.1.2.1 Hanford Facility. Groundwater maps in annual groundwater monitoring reports show the distribution of radiological (e.g., tritium) and hazardous chemical (e.g., carbon tetrachloride) contaminant plumes. Studies of these data, such as a recent risk-based cleanup strategy (PNL 1995), have shown that the potential exposure to these levels of groundwater contamination are below acceptable thresholds. The existing levels of groundwater contamination are anticipated to be lower in the future. However, this risk-based cleanup strategy did conclude that the route of primary concern from long-term exposure is the groundwater pathway. With regard to hazardous chemicals, carbon tetrachloride was found to be the single largest contributor of carcinogenic risk in the groundwater from the chemical constituents that were analyzed, and nitrates were found to be the single largest contributor of noncarcinogenic risk. Hanford Site groundwater remediation efforts will focus on mitigating the impact of these contaminants on the Columbia River (DOE/RL-94-95).

Given the low usage of the several drinking water wells on the Hanford Site (refer to Section 9.2.1), and the size of population these serve, the potential for human exposure is low. All drinking water wells are considered public water supply wells and are handled, monitored, sampled, and tracked for performance in accordance with WAC 246-290. Samples are submitted to Washington State certified laboratories for analysis. In September 1995, a draft Hanford Site wellhead protection plan was prepared and submitted to Ecology for review.

Information available for the Hanford Facility is used to provide a general evaluation of the potential for exposure via:

- Release of waste from the 200 Areas
- Migration through the vadose zone
- Groundwater transport to the Columbia River without detection
- Human exposure via the Columbia River.

Release of Waste from the 200 Areas. Most of the Hanford Facility TSD units are located within the 200 Areas. For human exposure via the groundwater pathway to occur, waste must first move beyond these TSD units. Systems in place, or planned, for 'operating' TSD units are designed to prevent movement of waste from the TSD unit. The disposal of unpermitted liquid effluents in land-based TSD units has ceased. Therefore, it is unlikely that 'operating' TSD units, or TSD units 'undergoing closure', would contribute to a release of waste to, or from, the 200 Areas that is not already attributable to earlier waste disposal practices.

Migration Through the Vadose Zone. The low precipitation amounts and high evapotranspiration rates on the Hanford Site reduce the possibility that chemical constituents from the waste could reach the water table (refer to Chapter 5.0, Sections 5.3.1 and 5.3.2). For chemical constituents from the waste to reach the groundwater, these constituents must be transported through the vadose zone sediments. This column of sediments is approximately 56.4- to 86.9-meters thick beneath the 200 Areas.

Groundwater Transport to the Columbia River Without Detection. Assuming that waste had breached a containment system and migrated through the soil to the water table, the contamination would have to move beyond the source areas without first being detected by operations personnel or the existing RCRA groundwater monitoring well systems. An extensive groundwater monitoring network is in place at the Hanford Facility and should be able to detect any changes of significance.

Human Exposure via the Columbia River. Several factors reduce the possibility for human exposure via the Columbia River and include (1) containment systems, (2) warning systems, (3) low infiltration rates from the various TSD units, and (4) generally thick sequences of vadose zone sediments. If contaminants from the waste do reach the groundwater, the groundwater monitoring systems should detect the release, and a compliance and/or corrective action program would be initiated. The distance between the 200 Areas and public drinking water supply wells provides additional protection as described in the draft Hanford Site wellhead protection plan. Finally, if contamination should reach the Columbia River, dilution would reduce concentrations by at least several orders of magnitude compared to groundwater concentrations.

In summary, it is unlikely that managing dangerous or mixed waste at TSD units within the 200 Areas would result in unacceptable exposure to humans via the groundwater pathway. For human exposure to occur, contaminants from the waste must first breach containment systems without detection, migrate to the water table, and migrate to the Columbia River. Unit-specific information that supports this conclusion is discussed in the next section.

9.2.1.2.2 Surface Impoundment and/or Landfill TSD Units. The LERF, because of its design, is an unlikely contaminant source. However, mixed waste has been disposed of in unlined trenches in the LLBG. Therefore, the discussion in the remainder of this section will focus on the potential for human exposure via the groundwater pathway from the LLBG.

As noted in Section 9.2.1.2.1, given the low usage of drinking water wells on the Hanford Site, and the applied wellhead protection standards required by WAC 246-290, the potential for human exposure from LLBG contaminants is low. The potential for human exposure via the groundwater pathway to the Columbia River is more significant, and will be the focus of the following analysis for the LLBG. Discussion of the groundwater pathway will be subdivided into the following:

- Release of waste from containment
- Migration through the vadose zone
- Groundwater transport to the Columbia River without detection
- Human exposure via the Columbia River.

Release of Waste from Containment. The containment system for the two newly constructed lined trenches in the LLBG (refer to Chapter 4.0, Section 4.1.2.8) is described in the Unit-Specific Portion of this permit application. The design for these trenches consists of a leachate liner system that will prevent migration of mixed waste out of the landfill. Leachate from this system will be collected, treated, and disposed.

Lack of records and well-defined disposal procedures make it difficult to predict the potential for release into the soil of chemicals from waste disposed of in the past. It is certain that dangerous waste disposed of in the past was not contained as well as is planned for future waste disposal. However, as discussed in Section 9.2.1.1.2, no known release of contaminants has been reported for the LLBG since 1987, the year groundwater monitoring was initiated. Assessment actions have shown that groundwater contamination is attributable to nearby, inactive liquid waste disposal sites.

Migration Through the Vadose Zone. The low precipitation and high evapotranspiration on the Hanford Facility reduce the possibility that chemicals from the waste could reach the water table. Between 56.4 to 86.9 meters of unsaturated sediments separate the water table from the ground surface in the LLBG. For chemicals from the waste to reach groundwater, the chemicals must be transported through this column of sediments. Several scenarios for vadose zone migration are considered; all of the scenarios require that waste has escaped from the containment system.

The first scenario is that enough liquid waste is released to exceed the specific retention through a depth of sediments greater than 54.9 meters. Specific retention is the saturation value below which no flow is possible. Although specific retention depends to some extent on characteristics of the liquid, specific retention depends primarily on the pore size of the sediments. Given the low recharge rate, the specific retention for water in soil near the LLBG is probably similar to the lowest moisture content measured in nearby soil samples. Data indicate that the lowest moisture content in borings performed for the detection-level monitoring network was about 1.0 to 2.0 percent (refer to DOE/RL-88-20, Appendix 11A).

Using some conservative assumptions, it is possible to examine the feasibility of a liquid release reaching the water table. For example, assume a release of 100 liters of liquid waste and a specific retention of 0.005. Since 1987, no free liquid has been accepted in the LLBG. Given these assumptions, the liquid only could penetrate a volume of 21.5 cubic meters before the flow stopped. The layered sediments in the Hanford formation (refer to Chapter 5.0, Section 5.3) likely would cause significant horizontal migration. Assuming the liquid spreads into a cylinder with a diameter of 3 meters, the liquid would only reach a depth of 2.7 meters. This analysis suggests that it is unlikely that the waste would reach the water table via this mechanism.

The second scenario is that infiltrating precipitation comes into contact with the waste and transports chemical constituents to the water table. The closure and postclosure plans call for a vegetated cover over the LLBG that is designed to minimize infiltration, erosion, and differential settling. In regions with vegetated, fine-grained soils, recharge has been observed to be less than 0.1 centimeter per year (refer to Chapter 5.0, Section 5.3). It is likely that a soil cover designed and maintained to minimize infiltration would perform equally well. It is conceivable that cracks or settling could disrupt the integrity of the cover and allow some infiltration to reach the waste. Although frequent inspections would minimize the impact of such an event, it is difficult to predict how much infiltration would reach the waste in the event of a failed cover. At a recharge rate of 0.1 centimeter per year, the estimated contaminant travel time to the groundwater beneath the 200 Areas is greater than several thousand years (Gee et al. 1992) (refer to Chapter 5.0, Section 5.3.7.1 for additional information on contaminant travel times).

A third scenario is that artificial recharge migrates horizontally to the waste buried in the LLBG, becomes contaminated, and flows vertically to the water table. Although several waste water disposal units are located near the LLBG (Appendix 2A), the practice of discharging process waste water to the soil column has been discontinued on the Hanford Site.

The final scenario is that volatile organic constituents reach the water table by vapor diffusion through the soil. Very little research has been performed on this phenomena. Numerical solutions of a hypothetical site (Silka 1988) suggest that vapor diffusion could be a significant vadose zone transport mechanism. However, the distance to the water table is greater than 56.4 meters, and the distance to the surface is less than 15.2 meters. Vapor diffusion would occur radially and would be expected to reach the surface before the vapor reached the water table. When the vapor plume reaches the surface, concentration gradients would favor upward movement over downward movement. Because of the expected preferential upward movement and the small quantity of waste to disperse, the quantity of dangerous waste that could reach the water table would unlikely be sufficient to raise the contaminant concentrations above the regulatory standards.

Groundwater Transport to the Columbia River Without Detection. Assuming that chemicals from the waste had breached the containment system and migrated to the water table, the contamination would have to move beyond the LLBG before being detected in a groundwater monitoring well. The groundwater monitoring system has been designed to detect any plumes before the plumes migrate more than 152.4 meters beyond the LLBG. Given the variability of velocity and direction of groundwater beneath the 200 East Area, it would be important to quickly implement a remediation scheme once a release is detected. The shortest distance between the LLBG and the Columbia River is 8 kilometers. The total distance is controlled by the DOE-RL and is not inhabited; thus, a buffer zone surrounds the LLBG. The contaminant travel time to the Columbia River from the LLBG in the 200 West Area is estimated at more than 80 years. From the LLBG in the 200 East Area, contaminant travel time is estimated to be more than 10 to 20 years (refer to DOE/RL-88-20, Chapter 5.0).

Human Exposure via the Columbia River. If chemicals from the LLBG were to reach the Columbia River, these chemicals would be diluted by several orders of magnitude because of the large flow rate. Assuming that the Columbia River is at its lowest recorded flow of 123 cubic meters per second (DOE-RL 1987), the cross-section of the groundwater plume is 298.7 meters by 49.7 meters, and the Darcy flux into the Columbia River is 2 meters per day, the dilution factor in the Columbia River would be 0.0015. The Darcy flux of 1.0 meter per day is actually greater than would be expected near the Columbia River. Based on published data (Gephart et al. 1979, Plate III-4), the hydraulic gradient is typically 0.001 or greater. Under a gradient of 0.001, a Darcy flux of 1.0 meter per day would require a hydraulic conductivity of 1,005.8 meters per day. Hydraulic conductivities in the vicinity of the river (Gephart 1979, Plate III-5) range from about 6.1 to 152.5 meters per day. A lower conductivity would result in a lower Darcy flux; thus the flux value of 1.0 meters per day conservatively overestimates the discharge to the river and underestimates the amount of dilution occurring. This dilution factor means that the concentration in the Columbia River would be almost three orders of magnitude less than the concentration in groundwater. Because the average flow in the Columbia River is 3,600 cubic meters per second, this estimate is conservative. The dilution factor of the Columbia River would result in much lower exposures to anyone using the water downstream than the assumed value of 0.0015.

In summary, it is unlikely that future disposal of mixed waste at the LLBG will result in unacceptable exposure for humans via the groundwater pathway. For human exposure to occur, chemicals from the waste must first breach the containment system without detection and migrate to the water table. Several factors reduce the possibility of this occurring, including (1) the containment system, (2) the vegetated cover design, (3) the low infiltration rate at the LLBG, and (4) the thick sequence of vadose zone sediments. If chemicals from the waste do reach the groundwater, the detection-level groundwater monitoring system should detect the release and a remediation program would be initiated. Finally, if contamination should reach the Columbia River, dilution would reduce concentrations by at least several orders of magnitude compared to groundwater concentrations. A detection-level groundwater monitoring system has been installed and sampling is ongoing. The results of this sampling program should determine if waste from the LLBG has reached the water table and is migrating beyond the LLBG. After 8 years of monitoring, no contamination attributed to the LLBG has been detected.

9.2.2 Surface Water Pathway

This section provides a brief discussion of surface water pathways for the Hanford Facility and for the LLBG and LERF.

The only natural surface water bodies on the Hanford Site are the Columbia and Yakima Rivers, Cold Creek drainage, and West Lake. The locations of these water bodies are shown in Chapter 2.0, Figures 2-9, and 2-10, and discussed in Appendix 2A. The Cold Creek drainage is an ephemeral and discontinuous stream (refer to Chapter 2.0, Section 2.2.1.4). The only permanent surface water body within 4.8 kilometers of the 200 Areas is West Lake. This lake is not used by humans for any commercial, agricultural, or recreational activity. The lake is, however, frequented by birds and other wildlife. A prominent surface water body in the past, the 216-B-3 Main Pond (refer to Appendix 2A), has been stabilized and no longer is in service. In addition, the adjacent 216-B-3 Expansion Ponds (refer to Appendix 2A) have been clean closed.

The 100-year floodplain for the Yakima and Columbia Rivers does not extend to the 200 Areas (refer to Chapter 2.0, Section 2.2.1.4). During periods of heavy precipitation, flooding could occur in the Cold Creek Valley, located along the west side of the Hanford Site. As shown in Chapter 2.0, the probable maximum flood in the Cold Creek watershed would reach only the western edge of the 200 West Area. The 100-year flood would be less than the probable maximum flood.

9.2.2.1 Known Release Information. The following sections provide a brief discussion of known release information for the Hanford Facility and for the LLBG and LERF.

9.2.2.1.1 Hanford Facility. Known release information for the Hanford Facility is maintained in the WIDS. In addition, monitoring data for areas within the vicinity of the surface water bodies discussed in Section 9.2.2 are contained in the Environmental Report (PNL 1995). These data indicate that releases from these surface water bodies are below concentrations of concern. These data also indicate that there was no indication during 1994 of any deterioration in the water quality along the Hanford Reach of the Columbia River resulting from Hanford Site operations. Potential sources of pollutants not associated with Hanford Site operations include irrigation return and direct runoff from agricultural activities located along the north and east sides of the Columbia River.

9.2.2.1.2. Surface Impoundment and/or Landfill TSD Units. No known release of mixed waste via the surface water pathway has been reported at the LLBG since 1984 (the year back to which data were reviewed for this chapter).

No know release of mixed waste via the surface water pathway has been reported from the LERF since this TSD unit became operational in 1994.

9.2.2.2 Potential for Human Exposure via the Surface Water Pathway. The following sections provide a brief discussion of the potential for human exposure via the surface water pathway for the Hanford Facility and for the LLBG and LERF.

9.2.2.2.1 Hanford Facility. Because of its location near the center of the Hanford Site, there is very limited potential for humans to be exposed to contaminants originating from the 200 Areas via the surface water pathway. For there to be even a possibility of this occurring, a large scale release of dangerous waste would need to occur simultaneously with a major precipitation or flooding event.

Two principal scenarios have been considered in assessing the potential for human exposure via surface water pathways. The first is surface run-off of precipitation that is contaminated with waste. The second is flooding of a surface water body into a TSD unit(s).

The first scenario requires a large enough precipitation event to result in significant overland flow. Large precipitation events are infrequent in the Pasco Basin (refer to Chapter 5.0, Sections 5.3.1 and 5.3.2). Days with greater than 1.3 centimeters of precipitation occur less than 1 percent of the year, and rainfall intensity of 2.5 centimeters in 1 hour are estimated to have a recurrence interval of 500 years (DOE 1987). Furthermore, given the flat topography and gravelly/sandy soils at the Hanford Site, significant overland flow rarely occurs (refer to Chapter 2.0, Section 2.2.1.4).

The second scenario involves flooding of a surface body of water into a TSD unit(s). The TSD units located in the 200 Areas are above the maximum flood levels of either the Columbia or Yakima Rivers and the Cold Creek drainage (refer to Chapter 2.0, Section 2.2.1.4). Thus, this scenario is considered unlikely.

Given the elevated, but flat, topography of the 200 Areas, the low precipitation, and the lack of nearby surface water bodies, the potential for human exposure to surface water that has been contaminated with dangerous and/or mixed waste is low.

9.2.2.2.2 Surface Impoundment and/or Landfill TSD Units. For the LLBG and LERF, the two major scenarios to be considered when assessing the potential for human exposure via surface water pathways, involve surface run-off of precipitation that is contaminated with waste, and flooding of a surface water body into either of these TSD units. Because of the factors mentioned for the Hanford Facility (refer to Section 9.2.2.2.1), it is unlikely that such conditions would exist within the 200 Areas where the LLBG and LERF are located.

9.2.3 Air Pathway

The 200 Areas of the Hanford Facility are located approximately 32 kilometers from Richland, Washington, the nearest population center. Protection of the general public is afforded by limited access to the 200 Areas.

Climatological data have been collected since 1945 at the Hanford Meteorological Station, located between the 200 Areas (refer to Chapter 2.0, Section 2.2.1.3; Chapter 5.0, Sections 5.3.1 and 5.3.2). Prevailing wind directions in the 200 Areas are from the northwest in all months of the year; secondary maxima occur for southwesterly winds. High winds that cause dust storms are usually from the southwest. High winds also are associated with afternoon drainage winds from the northwest, frequently reaching velocities of 50 kilometers per hour. Wind roses for several locations within the Hanford Site are shown in Figure 9-2.

High winds from the northwest are associated with thunderstorms. The average occurrence of thunderstorms is 10 per year, typically occurring in the summer months, although thunderstorms have occurred in all months.

The Final Hanford Defense Waste Environmental Impact Statement (DOE 1987) lists no violent tornadoes for the region surrounding the Hanford Site. Predictions cited in this environmental impact statement (PNL 1988a) estimate the probability of a tornado striking a point on the Hanford Site as 9.6×10^{-6} per year.

9.2.3.1 Known Release Information. The following sections provide a brief discussion of known release information for the Hanford Facility and for the LLBG and the LERF.

9.2.3.1.1 Hanford Facility. Data from the airborne monitoring program (DOE/RL-91-50; PNNL 1996) for the Hanford Facility indicate that releases via the air pathway are below concentrations of concern. A map showing population centers in the vicinity of the Hanford Facility is provided as Figure 9-3. No member of the public resides within 11 kilometers of the 200 Areas.

9.2.3.1.2 Surface Impoundment and/or Landfill TSD Unit. No known release of waste via the air pathway has been reported for the LLBG since 1984 (the year back to which data were reviewed for this chapter).

No known accidental release of waste via the air pathway has been reported for the LERF since this TSD unit began operation in 1994.

9.2.3.2 Potential for Human Exposure via the Air Pathway. The following sections provide a brief discussion of the potential for human exposure via the air pathway for the Hanford Facility and for the LLBG and LERF.

9.2.3.2.1 Hanford Facility. An important factor that reduces the risk of human exposure via the air pathway is the large uninhabited buffer zone that separates the 200 Areas from surrounding areas. The nearest major population center is Richland, Washington, located approximately 32 kilometers southeast of the 200 Areas (Figure 9-3). Because of the remote location and the management practices implemented within the 200 Areas, the potential for human exposure via the air pathway is considered low.

Atmospheric releases of radioactive and nonradioactive materials from the Hanford Site have been monitored for decades both onsite and offsite. As part of the environmental surveillance, air sampling for volatile organic compounds and polychlorinated biphenyl (PCB) compounds is performed routinely both onsite and offsite. All measured air concentrations of these compounds remain well below applicable maximum concentration standards for air contaminants (PNNL 1996).

The Hanford Site continues to operate under a Prevention of Significant Deterioration permit issued by the EPA (refer to Chapter 13.0, Sections 13.1.1.3 and 13.1.2.1). The permit sets limits for the release of nitrogen oxides from operating facilities. During 1995, the Hanford Site complied with the conditions of this permit (PNNL 1996).

As stated in the Environmental Report (PNNL 1996), with the exception of PCBs, all sampling of onsite nonradiological constituents remained below the detection level of 50 nanograms per sample component, which yields air concentrations of less than 0.03 to 0.1 nanograms per cubic meter. The measured PCB concentrations range from 0.25 to 3.9 nanograms per cubic meter and were well below the Occupational Safety and Health limit of 1,000 nanograms per cubic meter.

As a point of information, sampling of radiological constituents also continues. The site perimeter measurement of all radiological constituents remained at extremely low concentrations. Generally speaking, these concentrations were found to be less than 0.001 percent of the derived concentration guidelines (a calculated concentration that would result in an annual dose of 100 mrem) (Appendix 2B) for all radionuclides except uranium. For uranium isotopes, the measured concentrations were calculated to be 0.06 percent of derived concentration guidelines.

9.2.3.2.2 Surface Impoundment and/or Landfill TSD Units. For human exposure via the air pathway to occur at the LLBG, the waste would have to be released to the environment during transport or loading/unloading, or after burial. Varied methods are used to prevent wind dispersal of dangerous waste, depending on the waste form. Methods to prevent wind dispersal include containerization, stabilization, grouting, spray fixitants, and backfill. Sometimes the natural form of the waste precludes the need for wind dispersal protection (i.e., scrap piping and other solid debris). In other instances, practices include implementation of a wind speed restriction and immediately backfilling the waste to prevent wind dispersal.

An important factor that reduces the risk of human exposure via the air pathway is the large uninhabited buffer zone that surrounds the LLBG. The shortest distance between the LLBG and the Hanford Site boundaries is about 11 kilometers. As shown in Figure 9-3, the nearest major population center is

Richland, located approximately 32 kilometers southeast of the 200 Areas. For this reason, the potential for human exposure via the air pathway is low.

The LERF evaluation does not include consideration of a rupture of the pipeline from the treatment units to the storage basins because the pipeline is double contained. The potential for exposure to humans and the surrounding environment, therefore, would be limited to evaporation, emissions from basin overfill, or from spills of effluent stored in the basins. The LERF design addresses these potentials for release.

The LERF basins are designed with floating geomembrane covers (DOE/RL-93-03, Chapter 4.0) stretched over each basin above the primary and secondary liners. The covers are equipped with tensioning systems to prevent winds from blowing the covers off the basins. The covers are made of materials resistant to atmospheric degradation and are equipped with activated charcoal filtered breathers for ventilation of the basins. These vents allow the escape of gases while filtering out the organic components from the gases. The covers are anchored in concrete footings at the perimeter of the impoundments and are held in place with tension cables to prevent wind damage.

Various means of accidental release of ammonia from the 242-A Evaporator and the LERF were evaluated (WHC 1991e). Three credible confinement breaches (a spill, a spray leak from the LERF, and loss of the LERF basin cover) were examined. The maximum exposure to an individual from the accidental release of ammonia through a spill was calculated to be 1.3 E-03 milligrams per cubic meter to an offsite individual and 4.3 milligrams per cubic meter to an onsite individual located 100 meters from the point of release. The maximum exposure to an individual from the accidental release of ammonia via spray was calculated to be <0.136 milligrams per cubic meter to an onsite individual. The maximum exposure to an offsite individual resulting from a torn basin cover was calculated to be 0.12 milligram per cubic meter. All of the calculated exposures are unmitigated. Onsite and offsite radiological and toxicological consequences are well below the limiting risk/acceptance values. Accordingly, no significant onsite or offsite toxicological consequences were found to exist from the release of ammonia (WHC 1991e).

9.2.4 Subsurface Gas Pathway

Gas generation from the decomposition of municipal waste is a major concern in subsurface gas pathway assessment. No municipal waste disposal is carried out within the 200 Areas; therefore, no gas generation from biologic degradation is anticipated. Minor amounts of gas potentially could result from the vaporization of volatile constituents or from chemical reaction. However, the design of 200 Areas TSD units allows for the venting of such gases.

9.2.4.1 Known Release Information. The following sections provide a brief discussion of known release information for the Hanford Facility and for the LLBG and the LERF.

9.2.4.1.1 Hanford Facility. No specific data are available to determine if releases have occurred from the Hanford Facility via the subsurface gas pathways. However, because of knowledge of disposal practices on the Hanford Site, the generation of such gas is considered to be remote.

9.2.4.1.2 Surface Impoundment and/or Landfill TSD Unit. No known release of waste via the subsurface gas pathway has been reported for the LLBG since 1984 (the year back to which data were reviewed for this chapter).

No known release of waste via the subsurface gas pathway has been reported for the LERF since this TSD unit began operation in 1994.

9.2.4.2 Potential for Human Exposure via the Subsurface Gas Pathway. The following sections provide a brief discussion of the potential for human exposure via the subsurface gas pathway for the Hanford Facility and for the LLBG and LERF.

9.2.4.2.1 Hanford Facility. As previously discussed, a major concern in subsurface gas pathway assessment is gaseous decomposition products resulting from municipal waste. As no municipal waste is disposed of within the 200 Areas, it is unlikely that significant amounts of gas would be produced. Thus, the design of Hanford Facility TSD units, and the absence of municipal waste, minimize the potential for human exposure from the subsurface gas pathway.

9.2.4.2.2 Surface Impoundment and/or Landfill TSD Units. As no municipal waste is disposed of at the LLBG, it is unlikely that significant amounts of gas would be produced. Small amounts of gas potentially could result from evaporation of volatile constituents, or chemical reaction, or decomposition of animal carcasses. The few carcasses that are disposed in the LLBG are widely distributed and are treated with slaked lime for disposal. Preliminary testing for radiolytic gas generation indicated that gas generation was not of concern.

Another transport mechanism could be gas migration along buried pipelines. Of the identified burial grounds, three burial grounds are within 30.5 meters of a buried pipeline. Given the porous nature of the native material in the area, and the common practice of backfilling pipe trenches with native material, the potential for gas migration along pipelines is judged to be minimal. The contrast between the surrounding soil porosity and the backfill porosity is thought not to be sufficient to concentrate the gas flow. Furthermore, the increased porosity of the backfill would tend to disperse gas to the surface rather than concentrate the gas along the pipeline.

The LERF containment system is designed to limit significant releases of gas to the environment if gas production did occur. Although a number of buildings and pipelines are located in the 200 East Area, west and north of the LERF, this situation should not be a problem considering the low potential for the accidental release of ammonia.

9.2.5 Contaminated Soil Pathway

One transport mechanism of contaminants is the slow diffusion and advection through the soil column by soil water in the vadose zone. Beneath the 200 Areas this is expected to be a slow process, unless the transport process is aided by introducing a liquid that locally saturates the soil column. While a contaminant resides in the soil column, the vectors that influence exposure are: dermal, ingestion of soil, inhalation of soil, and consumption of crops. For the Hanford Site, this pathway and associated vectors are considered to be of secondary importance. No food chain crops are grown on the Hanford Site and game, that could concentrate contaminants through grazing, is controlled.

9.2.5.1 Known Release Information. The following sections provide a brief discussion of known release information for the Hanford Facility and for the LLBG and the LERF.

9.2.5.1.1 Hanford Facility. Data from the airborne monitoring program for the Hanford Site (DOE/RL-91-50; PNNL 1996) indicate that releases via the contaminated soil pathway are below concentrations of concern.

9.2.5.1.2 Surface Impoundment and/or Landfill TSD Unit. No known release of waste via the contaminated soil pathway has been reported for the LLBG via the soil pathway since 1984 (the year back to which data were reviewed for this chapter).

No known release of waste via the contaminated soil pathway has been reported for the LERF since this TSD unit began operation in 1994.

9.2.5.2 Potential for Human Exposure via the Contaminated Soil Pathway. The following sections provide a brief discussion of the potential for human exposure via the contaminated soil pathway for the Hanford Facility and for the LLBG and LERF.

9.2.5.2.1 Hanford Facility. Factors that reduce the risk of human exposure via the soil pathway are the limited public access to the Hanford Facility and the lack of nearby residential or agricultural areas. No food-chain crops currently are raised on the Hanford Site. Administrative control of the Hanford Site by the DOE-RL will preclude contact through food chain crops as long as that control is maintained. Therefore, the risk for human exposure via the soil pathway is low.

9.2.5.2.2 Surface Impoundment and/or Landfill TSD Units. The potential for human exposure from chemical and gas releases to the soil at the LLBG is minimized by operational controls. All mixed waste destined for LLBG must meet LDR requirements. The mixed waste can be either in containers or in bulk. If in bulk, the use of dust suppression or fixatives will be employed to minimize dust generation. In addition, at the end of an operating day, bulk waste will be covered with a fixative agent or other approved covers. If a release were to occur from the LLBG, the Hanford Facility has adequate resources for emergency response and dangerous waste cleanup (refer to Chapter 7.0 and Appendix 7A). The LLBG protocols for emergency response, evacuation, and cleanup activities are outlined in the Unit-Specific Portion of this permit application (DOE/RL-88-20, Chapter 7.0 and Appendix 7A).

The LERF is designed, in accordance with WAC 173-303-650, to minimize the potential for releases of dangerous chemicals to the soil. Double liners, with a leachate detection, collection, and removal system, are used in each of the surface impoundments. Therefore, the potential for contaminant migration via the soil pathway is low.

9.2.6 Transportation Information

Packaging, inspection, and transportation of dangerous and mixed waste on the Hanford Facility are conducted in accordance with applicable regulations and follow strict procedures. Special attention is given to notifying personnel, when appropriate, of waste transfers requiring special precautions. For example, onsite transportation routes could be isolated through the use of barriers. In addition, the transporting of all extremely dangerous or hazardous material does not occur when the wind speed is greater than 16 kilometers per hour.

Transportation routes and traffic information for the Hanford Facility are discussed in Chapter 2.0, Section 2.4. Further information on manifesting and waste tracking for waste transported offsite and onsite is discussed in Chapter 3.0, Sections 3.3 and 3.4. Procedures for cleanup of spills or leaks occurring during transport or loading/unloading activities on the Hanford Facility are discussed in Chapter 7.0, Appendix 7A. Specific transportation information for the LLBG and LERF is contained in the Unit-Specific Portion of this permit application.

9.2.6.1 Known Release Information. The following sections provide a brief discussion of known release information for the Hanford Facility and for the LLBG and the LERF.

9.2.6.1.1 Hanford Facility. No significant releases of dangerous or mixed waste due to transportation incidents have been reported for the Hanford Facility.

9.2.6.1.2 Surface Impoundment and/or Landfill TSD Unit. No known significant releases of waste due to transportation incidents have been reported for the LLBG since 1984 (the year back to which data were reviewed for this chapter).

No known releases of waste due to transportation incidents have been reported for the LERF since this TSD unit began operation in 1994.

9.2.6.2 Potential for Human Exposure from Transportation-Related Releases. The following sections provide a brief discussion of the potential for human exposure via transportation incidents for the Hanford Facility and for the LLBG and LERF.

9.2.6.2.1 Hanford Facility. Because transportation is conducted on the Hanford Facility under strict controls, the likelihood of human exposure due to a transportation incident is considered to be low. All offsite transportation of dangerous waste is performed by certified shippers in accordance with U.S. Department of Transportation requirements.

9.2.6.2.2 Surface Impoundment and/or Landfill TSD Units. Most of the waste for the LLBG originates onsite. Trucks or railroad cars are used to transport waste to the LLBG. Particularly dangerous shipments could be limited to speeds of 24.1 kilometers per hour, and roads could be barricaded if the risk of radiation and/or chemical exposure warrants it (refer to Chapter 2.0, Section 2.4; Chapter 3.0, Sections 3.3 and 3.4). Waste shipments received from offsite are inspected at the 1100 Area before being transported to the LLBG.

Given that most waste is generated and transported onsite, and given the low population density surrounding the Hanford Site and the precautions taken with dangerous and/or mixed waste, the risk of human exposure during transport is considered to be low.

Offsite transportation of waste from the LERF is not conducted; LERF effluents do not leave the 200 Areas. Onsite transportation of the effluent is facilitated by an underground piping system from the 242-A Evaporator directly to the LERF (refer to Chapter 4.0, Sections 4.1.2.3 and 4.1.2.4) and by strict transportation methods.

9.2.7 Management Practices Information

Management practices such as inspections, monitors, alarms, double-containment systems, and operating procedures are designed to limit the effects on human health and the environment from Hanford Facility operations. Measures to minimize exposure (refer to Chapter 6.0, General Information and Unit-Specific Portions) and contingency plans (refer to Chapter 7.0, General Information and Unit-Specific Portions) are designed to ensure that exposure to both workers and offsite individuals is minimized.

9.3 CONCLUSIONS ON EXPOSURE POTENTIAL

This section contains a brief discussion of the conclusions on exposure potential for the Hanford Facility and for the LLBG and LERF.

9.3.1 Hanford Facility

A recently developed risk-based cleanup strategy prepared for the Hanford Site (PNL 1995) concluded that existing land use and access restrictions protect public health and safety. The current airborne, groundwater, and surface water exposures to the general public that result from the normal operation of surface impoundments and landfills are a small fraction of normal background and well within acceptable limits. Furthermore, all exposures are anticipated to be lower in the future. The study determined that the route of primary concern from long-term (post remediation phase) exposure is the groundwater pathway. With regard to hazardous chemicals, carbon tetrachloride was found to be the single largest contributor of carcinogenic risk in the groundwater from the chemical constituents that were analyzed, and nitrates were found to be the single largest contributor of noncarcinogenic risk. Hanford Site groundwater remediation efforts will focus on mitigating the impact of these contaminants on the Columbia River (DOE/RL-94-95).

9.3.2 Surface Impoundment and/or Landfill TSD Units

The potential for exposure to dangerous and/or mixed waste is minimized by (1) the relative isolation of the LLBG and the LERF from population centers; (2) the large distance through the soil column that a contaminant would have to travel to the groundwater should a release occur and; (3) the highly unlikely event of overland flow. Therefore, potential exposure via the air pathways, soil, and surface water, is low. Present and proposed management practices appear to be effective and are not a cause for concern.

Releases from the groundwater pathway appears to be the most likely pathway for human exposure should a release from a TSD unit occur. For human exposure to waste to occur from the groundwater, waste has to first breach containment systems and be of sufficient volume to overcome soil depth and retention factors to reach the groundwater. On reaching the groundwater, the contaminants must then migrate to the Columbia River. In addition, the contaminants would have to overcome the dilution factor of the Columbia River. Therefore, the potential for human exposure from LLBG and LERF operations, via the groundwater pathway, is low.

Strict transportation methods limit the risk of human exposure associated with the transportation of waste to the LLBG, offsite and onsite. Because no waste is transported offsite from the LERF, the risk is nil.

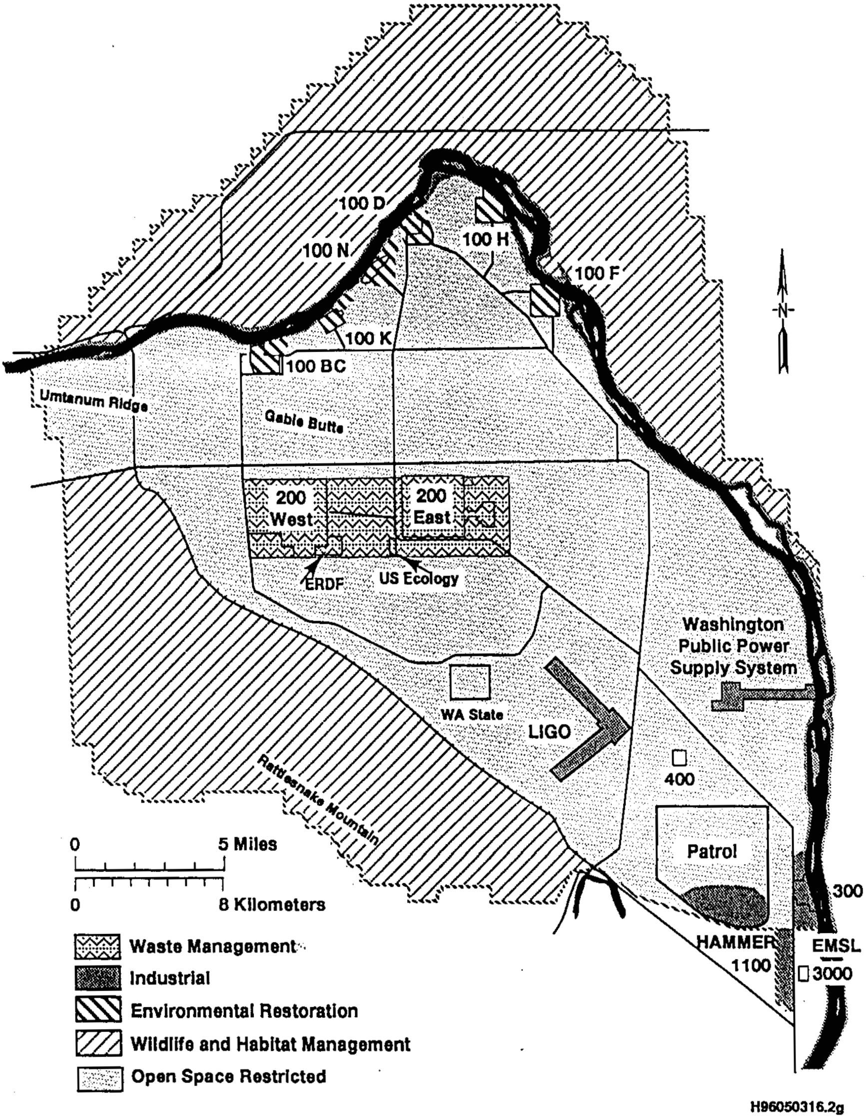

Figure 9-1. Land Uses at the Hanford Site (adapted from DOE 1996).

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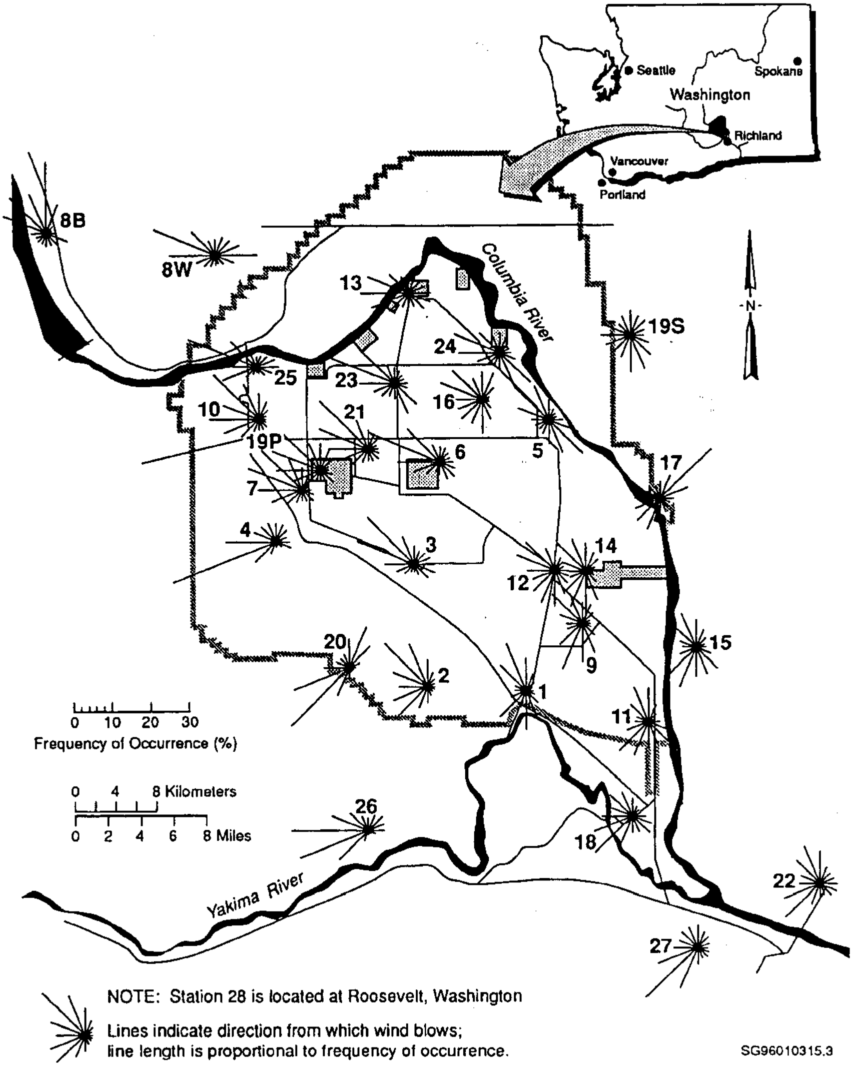

Figure 9-2. Wind Roses on the Hanford Site (adapted from PNNL 1996).

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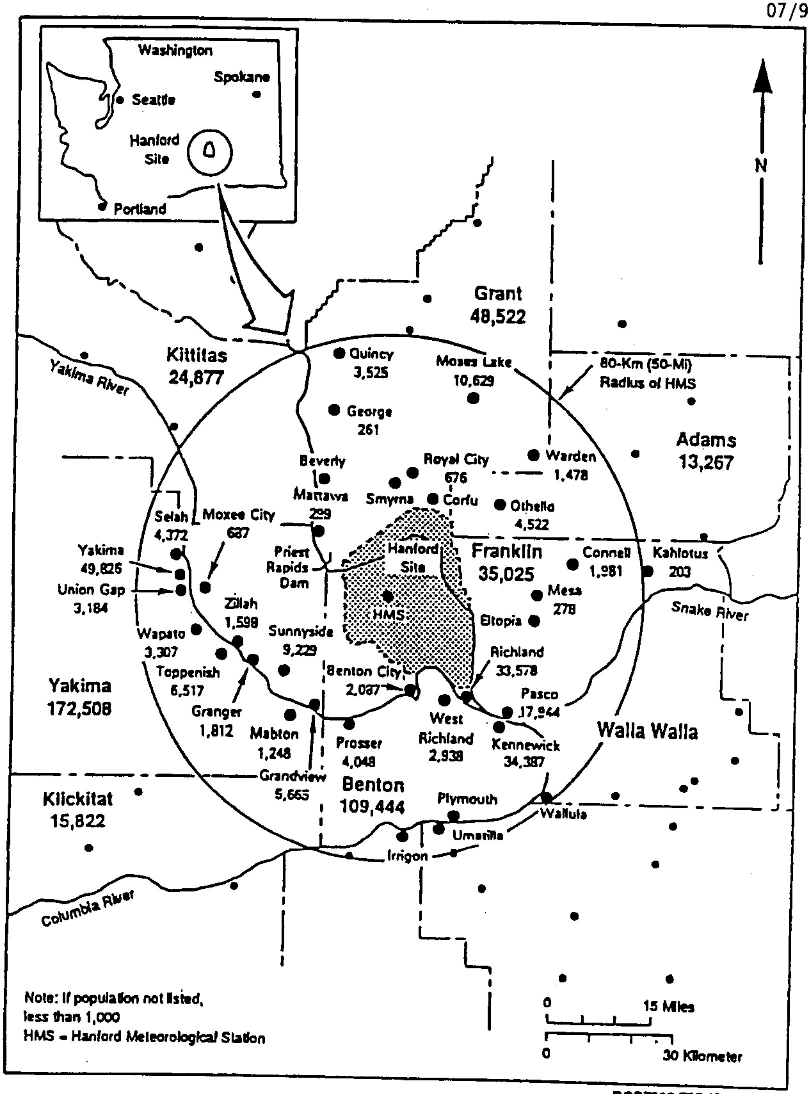

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Figure 9-3. Population in the Vicinity of the Hanford Site.

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Table 9-1. Information Requirements Checklist. (sheet 1 of 11)

1. <u>General Information</u> Reg. cited	Description	Location in permit application[a]	Other/ comments
270.14(b) (1)	General description of facility	2.0	
270.14(b) (2) and (3)	Chemical and physical analyses of wastes	3.0	
270.14(b)(4)	Access control and security description of active portion	6.0	
270.14(b)(5), 270.17(d), and 270.21(d)	General inspection schedule and procedures	6.0	
270.14(b)(6)	Preparedness and prevention documentation	6.0	
270.14(b)(7)	Contingency plan	7.0 Appendix 7A	
270.14(b)(8)	Preventive procedures	Appendix 7A	
270.14(b)(11) (i) and (ii)	Facility location information	2.0	
270.14(b)(13)	Closure plan	11.0	

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Table 9-1. Information Requirements Checklist. (sheet 2 of 11)

1. General Information (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
270.14(b)(13)	Postclosure care plan	11.0	
270.14(b)(17)	Documentation of insurance	N/A[b]	
270.14(b)(19)	Topographic map (site plotted on U.S. Geological Survey quadrangle maps)	Appendix 2A	
270.21(a) and 270.17(a)	List of waste placed or to be placed in each unit	1.0	
Additional Information			
	Existing risk assessment reports and information, including liability insurance analyses, claims, and settlements	9.0	
	Land use and zoning map(s) for an area of four miles around the unit	9.0	
	Existing aerial photographs of the facility	Appendix 2A	

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Table 9-1. Information Requirements Checklist. (sheet 3 of 11)

Reg. cited	Description	Location in permit application[a]	Other/ comments
1. General Information (continued)			
Additional Information (continued)			
	Identify and summarize any waste analysis data not already submitted; provide additional data as discussed in text	3.0	
	Current estimate of annual amount of waste received and description of any pretreatment process used	1.0 3.0 4.0	
	Identification of any federal, state, or local inspection or compliance records related to environmental and health programs, include descriptions of any major violations	9.0 12.0	
2. Groundwater Pathway			
270.14(c)(1)	Interim status groundwater monitoring results	5.0	
270.14.(c)(2)	Identification of uppermost aquifer, including flow rate and direction	5.0	

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Table 9-1. Information Requirements Checklist. (sheet 4 of 11)

2. <u>Groundwater Pathway</u> (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
270.14(c)(3) and 270.14(b)(19)	Topographic maps related to groundwater protection (well location, water table elevation contours, etc.)	5.0 Appendix 2A	
270.14(c)(4) (i) and (ii)	Description of existing contamination	5.0	
270.14(c)(5)	Detailed plans for groundwater monitoring program	5.0	
270.14(c)(6)	Description of detection monitoring program (if applicable)	5.0	
270.14(c)(7) and (c)(7)(ii)	Description of compliance monitoring program and characterization of contaminated groundwater (if applicable)		N/A
270.14(c)(7)(iv)	Alternate concentration limits demonstration (if any)		N/A
270.14(c)(8)	Corrective action program (if applicable)		N/A
270.17(b)(1) 270.21(b)(1)	Description of liner and leachate collection systems (if applicable)	4.0	

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Table 9-1. Information Requirements Checklist. (sheet 5 of 11)

2. <u>Groundwater Pathway</u> (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
<u>Additional Information</u>			
	Existing map showing location of all known wells within 3 miles; number and location of drinking water wells	Appendix 2A	
	Discussion of groundwater uses within 3 miles of unit	5.0 9.0	
	Regional map showing areas of groundwater recharge and discharge	5.0	
	Net precipitation using net seasonal rainfall or other available data	2.0 5.0 9.0	
	Unless otherwise reported to EPA, available well data indicating a release, and information on any affected public or private water supplies, including populations served		None
	Any known food chain contamination resulting from prior release from the unit to groundwater		None

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Table 9-1. Information Requirements Checklist. (sheet 6 of 11)

3. Surface Water Pathway Reg. cited	Description	Location in permit application[a]	Other/ comments
270.14(b)(11) (iii) through (v)	Location information related to 100-year floodplain including variance demonstrations	2.0	
270.21(b)(2)	System for control of run-on from each peak discharge of 25-year storm	2.0 4.0	
270.21(b)(3)	System for control of run-off from 24-hour, 25-year storm	2.0 4.0	
270.17(b)(2)	Procedures/equipment to prevent overtopping	2.0 4.0	
270.17(b)(3)	Structural integrity of dikes	2.0 4.0	
Additional Information			
	Discussion of surface-water uses within 3 miles of the unit, including a map showing the location of all surface-water bodies and downstream drinking water intakes	5.0 9.0 Appendix 2A	
	Velocities of streams and rivers passing through and adjacent to the property		None

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Table 9-1. Information Requirements Checklist. (sheet 7 of 11)

3. Surface Water Pathway (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
Additional Information (continued)			
	Description of any system used to monitor surface-water quality, and a summary of the data	9.0	
	Description of known releases to surface water; the extent of contamination; remedial action, if any; and if known, severity of impact	9.0	
	Any known food chain contamination resulting from prior release from the unit to surface water		None
4. Air Pathway			
270.14(b)(9), 270.21(f) and (g), 270.21(h) and (i)	Documentation of procedures to prevent accidental ignition or reaction	4.0 6.0 7.0	
270.21(b)(5)	Plans to control wind dispersal of particulate matter at landfills	4.0 11.0	

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Table 9-1. Information Requirements Checklist. (sheet 8 of 11)

4. Air Pathway (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
270.14(b)(19)(v)	A wind rose showing prevailing wind speed and direction	2.0 9.0	
Additional Information			
	Summary of air monitoring data and a description of current monitoring system if any	9.0	
	Population within a 4-mile radius of the unit	9.0	
	Describe any known release to air; the extent of contamination; remedial action, if any; and severity of impact, if known	9.0	
5. Subsurface Gas Pathway			
	None in addition to General Information Requirements	9.0	

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Table 9-1. Information Requirements Checklist. (sheet 9 of 11)

5. Subsurface Gas Pathway (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
Additional Information			
	Any past disposal of municipal-type wastes in the unit; approximate quantities and dates of disposal, if known		None
	Map location of any underground conduits within the site and known underground conduits within 1,000 feet of property boundary	Appendix 2A	
	Descriptions of any monitoring or control mechanisms for subsurface gas release; summarize resulting data		None
	Description of any known releases; extent of contamination; remedial action taken, if any; and the severity of impact, if known		None
6. Contaminated Soil Pathway			
	None in addition to General Information Requirements	9.0	

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Table 9-1. Information Requirements Checklist. (sheet 10 of 11)

6. Contaminated Soil Pathway (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
Additional Information			
	If soil sampling has been done, a map showing areas of soil contamination, and a summary of analytical results		None
	Description of the types of major releases that resulted in soil contamination, and any cleanup action		None
	Any known food chain contamination resulting from the use of contaminated soils for raising crops		None
7. Transportation Information			
270.14(b)(10)	Traffic pattern, volume, and controls; access road characteristics	2.0	
Additional Information			
	Description of the types and capacities of vehicles used to transport waste	2.0	

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Table 9-1. Information Requirements Checklist. (sheet 11 of 11)

7. Transportation Information (continued) Reg. cited	Description	Location in permit application[a]	Other/ comments
___ Additional Information (continued)			
	Identification of normal transport routes for hazardous waste into the site and within 1 mile of the facility entries	2.0	
	Description of procedures for cleanup of transportation-related spills or leaks	7.0 Appendix 7A	
	Descriptions of any transportation accidents releasing hazardous wastes onsite, or in the immediate vicinity		None
8. Management Practices Information			
270.14(b)(12) 264.16	Outline of programs to train employees to safely operate and maintain facility, including emergency response activities	8.0	

[a] Location in Hanford Facility Dangerous Waste Permit Application (i.e., DOE/RL-91-28, and/or DOE/RL-88-20, and/or DOE/RL-93-03).

[b] N/A--Not Applicable.

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10.0 WASTE MINIMIZATION [D-9]

This chapter addresses the provisions identified in Section D-9 of Ecology's permit application guidance (Ecology 1987 and 1995). This chapter also addresses Condition II.F. (Waste Minimization) of the HF RCRA Permit (HSWA Portion). To fulfill the requirements of 40 CFR 264.73(b)(9), and Condition II.F. of the HF RCRA Permit (HSWA Portion), onsite generating units complete a waste minimization/pollution prevention certification form annually certifying that a waste minimization/pollution pervention program is in place. A copy of the form is maintained in the Hanford Facility Operating Record, Unit-Specific file (refer to Chapter 12.0, Section 12.1.43).

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Chapter 11.0

CONTENTS

CONTENTS (cont)

FIGURE

11.0 CLOSURE AND FINANCIAL ASSURANCE [I]

This chapter addresses the provisions contained in Section I of Ecology's permit application guidance (Ecology 1987 and 1995) and in Conditions II.J. (Facility Closure) and II.K. (Soil/Groundwater Closure Performance Standards) of the HF RCRA Permit (DW Portion). Although the content of this chapter focuses on 'operating units', most of the information also is applicable to TSD units 'undergoing closure'. Detailed information on closure activities associated with TSD units 'undergoing closure' is addressed in unit-specific preclosure work plans, closure work plans, closure plans, closure/postclosure plans, or postclosure permit application documentation. Additional information applicable to TSD units 'undergoing closure', particularly information that pertains to RCRA/CERCLA integration, is contained in Chapter 2.0, Section 2.5. Cross-reference is made to Chapter 2.0, Section 2.5, where portions of this section also could be applicable to 'operating' TSD units.

When a TSD unit is no longer used to treat, store, and/or dispose of dangerous or mixed waste, this TSD unit will be closed. Closure will be accomplished in a manner that is protective of human health and the environment, and will be conducted in accordance with current regulations. The term 'RCRA closure', as used in this chapter, refers to consideration of both federal and state regulations as applicable.

11.1 CLOSURE PLAN/FINANCIAL ASSURANCE FOR CLOSURE [I-1]

As specified in Condition II.K. of the HF RCRA Permit (DW Portion), there are three RCRA closure options: clean closure, modified closure, and landfill closure. Specific closure activities and objectives for any one TSD unit will be included in the Unit-Specific Portion of this permit application or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation. Figure 11-1 shows a general closure flow chart addressing the three RCRA closure options.

11.1.1 Closure Performance Standard [I-1a]

The following sections address the three closure options cited in Condition II.K. of the HF RCRA Permit (DW Portion): clean closure, modified closure, and landfill closure. Modified closure and landfill closure options also can be used to accommodate RCRA/CERCLA integration needs. As noted in Chapter 2.0, Section 2.5, nearly all TSD units are located within a RCRA or CERCLA operable unit.

11.1.1.1 Clean Closure. Clean closure is accomplished when cleanup levels as prescribed in WAC 173-303-610(2)(b) have been achieved. Conditions II.K.1. and II.K.2. of the HF RCRA Permit (DW Portion) specifically address clean closure. Clean closure is accomplished by verifying that the potentially dangerous constituents treated, stored, and/or disposed at the TSD unit being closed are not present above cleanup levels for those potential contaminants.

As required by WAC 173-303-610(2)(b), cleanup levels will be based on equations and exposure assumptions presented in WAC 173-340, MTCA for residential exposure (Method B). For noncarcinogens, the principal variable relating human health to cleanup levels will be the oral reference dose (Appendix 2B). For carcinogens, the cancer slope factor will be the basis for determining human health effects and is a measurement of risk per unit dose. The oral reference dose and cancer slope factor are chemical specific and are obtained from the *Integrated Risk Information System* (IRIS) database (EPA 1989a). Cleanup levels will be based on values that are current at the time of approval of closure documentation.

Protection of human health and the environment will be accomplished by removing or treating all dangerous waste constituents at a TSD unit to concentration levels that are not a threat to human health and the environment. However, remediation will not be below background levels, as approved by Ecology, if these background levels are above MTCA Method B levels.

11.1.1.2 Modified Closure. If dangerous waste constituents present at the TSD unit are above MTCA Method B levels, but below MTCA Method C levels (industrial-based scenario), then a 'modified' closure option could be used (refer to Chapter 2.0, Section 2.5). Requirements for a modified closure are specified in Condition II.K.3 of the HF RCRA Permit (DW Portion). These requirements include the following:

- Provision of institutional controls in accordance with WAC 173-303-440 for a minimum of 5 years

- Conduct of periodic assessments of the TSD unit to determine the effectiveness of the closure

- Development of a postclosure permit application, including final status postclosure groundwater monitoring

- Selection of a clean-up option with consideration of the potential future site use for that TSD unit/area.

11.1.1.3 Landfill Closure. A landfill closure occurs when dangerous waste constituents are left at the TSD unit in concentrations that are above MTCA Method C levels (refer to Chapter 2.0, Section 2.5). When waste or contamination is left in place, the submittal of postclosure documentation is required. This documentation would contain a RCRA-compliant landfill cover design and a postclosure monitoring plan. The postclosure monitoring plan would describe how the covered TSD unit would be monitored and maintained to ensure protection of human health and the environment. Regulations require monitoring and maintenance for at least 30 years unless a shorter time is approved by Ecology (the shorter time must be shown to be sufficient to protect human health and the environment). Requirements for a landfill closure are contained in WAC 173-303-610 and Condition II.K.4. of the HF RCRA Permit (DW Portion).

Condition II.K.6. of the HF RCRA Permit (DW Portion) allows deviations from a TSD unit closure plan required by unforseen circumstances encountered during closure activities that do not impact the overall closure strategy. These deviations must provide equivalent results and are to be documented in the Hanford Facility Operating Record, Unit-Specific File.

Condition II.K.7. of the HF RCRA Permit (DW Portion) allows, when agreed to by Ecology, integration of other statutorily or regulatory mandated cleanups. The results from other cleanup investigation activities could be used whenever possible to supplement and/or replace TSD unit closure investigation activities. All, or appropriate parts of, multipurpose cleanup and closure documents could be incorporated into the HF RCRA Permit (DW Portion) through the permit modification process. Cleanup and closures conducted under any statutory authority with oversight by either Ecology or EPA, which meets the equivalent of the technical requirements of Condition II.K. of the HF RCRA Permit (DW Portion), could be considered as satisfying the requirements of the HF RCRA Permit (DW Portion). Thus, Condition II.K.7. of the HF RCRA Permit (DW Portion) is particularly key in promoting RCRA/CERCLA integration on the Hanford Facility, as discussed in Chapter 2.0, Section 2.5.

11.1.1.4 Standards. The following sections address closure performance standards and waste removal and decontamination standards.

All plans will be developed to close TSD units in a manner that meets the closure performance standards of WAC 173-303-610(2):

"(a)(i) Minimizes the need for further maintenance;

(ii) Controls, minimizes or eliminates to the extent necessary to protect human health and the environment, postclosure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, or dangerous waste decomposition products to the ground, surface water, ground water, or the atmosphere; and

(iii) Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity."

11.1.1.4.1 Minimizing the Need for Future Maintenance. Minimizing the need for future maintenance will be accomplished by clean closing (at or below health-based standards) TSD units whenever possible. Clean closure will eliminate the need for future maintenance. In areas where clean closure cannot be achieved, future maintenance needs will be addressed in unit-specific postclosure documentation.

11.1.1.4.2 Protection of Human Health and the Environment. Protection of human health and the environment will be accomplished by removing or treating all dangerous waste constituents at a TSD unit to concentration levels that are not a threat to human health and the environment. If dangerous waste constituents cannot be removed or treated to levels that are protective of human health and the environment and must be left in place, a

RCRA-compliant landfill cover will be installed. Regulations require monitoring and maintenance for at least 30 years unless a shorter time is approved by Ecology (the shorter time must be shown to be sufficient to protect human health and the environment).

Cleanup levels will be established using guidance such as WAC 173-340, the IRIS database (EPA 1989a), *Risk Assessment Guidance for Superfund: Human Health Evaluation Manual* (EPA 1989c), the *Hanford Site Baseline Risk Assessment Methodology* (DOE/RL-91-45), and other appropriate information.

11.1.1.4.3 Return Land to the Appearance and Use of Surrounding Land. Closure plans will include, to the extent practicable, consideration of returning the TSD units to an appearance compatible with surrounding structures and/or the semi-desert terrain of the area.

11.1.2 Closure Activities [I-1b]

The activities undertaken or planned to perform closure for a TSD unit are identified in the Unit-Specific Portion of this permit application or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation. General closure activity information is discussed in the following sections. Of particular relevance in the definition of closure activities is the use of the DQO process (refer to Chapter 3.0, Section 3.2).

11.1.2.1 Maximum Extent of Operation [I-1b(1)]. During the waste investigations to determine the maximum extent of operations, the TSD unit-specific closure plans will ensure that the waste is characterized properly in terms of presence, location, concentration, and volume of each contaminant. Research of process records, drawings, and photographs will shape the initial sampling strategy. As field information and laboratory results become available, the sampling strategy could specify more sampling until the waste contaminants can be reliably located and quantified. Information specific to any one TSD unit is included in the Unit-Specific Portion of this permit application or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

11.1.2.2 Removing Dangerous Waste [I-1b(2)]. Before a non-land-based TSD unit can be closed, the dangerous waste will be removed and sent to a permitted TSD unit. Removal of the dangerous waste will be completed within 90 days after the last waste receipt at the unit unless a longer period is specified in the closure plan.

11.1.2.3 Decontamination Structures, Equipment, and Soil [I-1b(3)]. The remediation process for a TSD unit will be agreed upon with the appropriate regulatory agency(s) using one of the three closure options discussed in Sections 11.1.1.1, 11.1.1.2, and 11.1.1.3. The agreed upon closure option will include sampling to determine if clean closure is achievable unless landfill closure is selected. If some remediation is undertaken, the sampling results will be used to determine when the remediation effort has been completed. Information specific to any one TSD unit is included in the Unit-Specific Portion of this permit application or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

11.1.2.4 Sampling and Analysis to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard [I-1b(4)]. Most sampling will be accomplished according to information contained in established environmental regulations and guidelines using the DQO process. This information has been used in developing protocols set forth in contractor procedures and in SW-846 (EPA 1986b). These protocols will be followed in obtaining and handling all samples. Field duplicate, equipment blank, and trip blank samples (Appendix 2B) will be taken as appropriate and analyzed as a check on field sampling procedures, cross-contamination of samples, contamination from sample handling, and laboratory contamination. Samples usually will be taken on intervals down to 0.91 meter for non-land disposal units. Sampling and analysis information is provided in the SAP for a particular TSD unit. Discussion of the manner by which a SAP supports closure plan or closure/postclosure plan activities is contained in Chapter 3.0, Section 3.5.1.

The analytical data obtained from the sampling of each TSD unit will be validated to a level agreed upon in the DQO process. The resulting concentration levels of the identified constituents will be compared with the corresponding MTCA Method B levels as agreed to by Ecology. If this comparison supports the conclusion that the area does not contain greater concentrations than cleanup levels for each constituent, the area will be cleaned closed. If sample results from a particular TSD unit do not meet the closure criteria, the particular waste constituents that exceed the cleanup levels will be identified, and further evaluations of the potential success of additional decontamination/removal efforts will be limited to these constituents. This information is documented in a data evaluation report. Discussion of the manner by which a data evaluation report supports closure plan or closure/postclosure plan activities is contained in Chapter 3.0, Section 3.5.2.

Sampling and analysis of materials that are not covered by SW-846 will be achieved using protocols, procedures, and methods approved by the appropriate regulatory agency(s) before conducting the sampling or analytical work. A description of procedures currently used to support closure activities, as well as the specific sampling plan, are included in the Unit-Specific Portion of this permit application or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

11.1.3 Maximum Waste Inventory [I-1c]

An estimate of the maximum inventory of dangerous and/or mixed waste ever in storage and in treatment at any time during the active life of the TSD unit will be provided in the Unit-Specific Portion of this permit application or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation.

11.1.4 Closure of Waste Piles, Surface Impoundments, Incinerators, Land Treatment, and Miscellaneous Units [I-1d]

Each unit-specific closure plan is uniquely designed for closure of that unit. Any additional closure criteria that are necessary because of the type of TSD unit, i.e., containment building, surface impoundment, land treatment, or miscellaneous unit, will be incorporated into the closure plan. The closure plan will be implemented when approval is received from Ecology and the EPA, and after the final waste receipt by the TSD unit.

The closure plan will contain information on closure performance standards, decontamination, waste inventory removal, sampling and analysis, schedule, and closure certification. Where possible, the closure plan will be prepared using clean closure as the basis for closing the TSD unit.

11.1.5 Closure of Landfill Units [I-1e]

Landfill units generally will be closed with waste left in-place, which precludes clean closure. Besides the closure information specified in Section 11.1.4, additional information will be provided in the following areas:

- Disposal Impoundments [I-e(1)]
- Elimination of Liquids [I-e(1)(a)]
- Waste Stabilization [I-e(1)(b)]
- Cover Design [I-1e(2)]
- Minimization of Liquid Migration [I-1e(3)]
- Maintenance Needs [I-1e(4)]
- Drainage and Erosion [I-1e(5)]
- Settlement and Subsidence [I-1e(6)]
- Cover Permeability [I-1e(7)]
- Freeze/Thaw Effects [I-1e(8)].

A barrier or cover usually is installed over a landfill to protect human health and the environment from the waste left in-place.

11.1.6 Closure Schedule [I-1f]

In accordance with regulations, closure activities will commence following the final receipt of waste. The TSD unit-specific schedule for closure will be provided in the closure plan. The activities to complete closure will be scheduled within 180 days unless a modified schedule is presented and agreed upon in the closure plan.

11.1.7 Extension for Closure Time [I-1g]

If closure activities will exceed the approved closure plan schedule, closure time extensions will be requested. All extension requests will include the justification for the extension and details for the remaining activities to achieve closure.

11.1.8 Closure Cost Estimate [I-1h]

Condition II.H.3. of the HF RCRA Permit (DW Portion) specifies that the "Permittees are exempt from the requirements of WAC 173-303-620." However, the Permittees have agreed to provide, annually, projections of anticipated costs for closure and postclosure for TSD units incorporated into Parts III or V of the HF RCRA Permit (DW Portion) (refer to Chapter 12.0, Section 12.1.22). Submittal of this annual report will take place on October 31 of each year, as described in Condition II.H.1. of the HF RCRA Permit (DW Portion).

11.1.9 Financial Assurance Mechanism of Closure [I-1i]

Federal facilities, and government contractors at such facilities, are not required to comply with WAC 173-303-620 as stated in the regulation and as described in Condition II.H.3. of the HF RCRA Permit (DW Portion).

11.1.10 Amendments to Closure Plan

Should changes be required to the approved closure plan, an amended plan will be prepared and submitted to the proper regulatory agency(s) for approval in accordance with 40 CFR 264.112(c) and WAC 173-303-610(3)(b).

11.1.11 Certification of Closure

Within 60 days of final closure of any TSD unit, the DOE-RL will submit a certification of closure to the proper regulatory agency(s) in accordance with 40 CFR 264.115 and WAC 173-303-610(6). This certification will be signed by both the Permittees and by an independent professional engineer, and will state that the TSD unit has been closed in accordance with the approved closure plan. The certification will be submitted by registered mail or an equivalent delivery service. Documentation supporting the closure certification will be retained and will be furnished upon request to the proper regulatory agency(s). This documentation will be maintained by the DOE-RL contact (or the successor) identified in Section 11.6; a record also will be maintained in the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.32). According to condition II.J. of the HF RCRA Permit, final closure of the Hanford Facility will be achieved when closure activities for all TSD units have been completed, as specified in Parts III, IV, or V of this Permit. Completion of these activities will be documented using either certifications of closure, in accordance with WAC 173-303-610(6), or certifications of completion of postclosure care, in accordance with WAC 173-303-610(11).

11.1.12 Survey Plat

On submission of the closure certification for a land disposal unit, a survey plat indicating the location and dimensions of the unit will be submitted to the following:

- Benton County Land Planning Department
- The EPA and Ecology.

The survey plat will be prepared and certified by a professional land surveyor. The plat will contain a note that states the DOE-RL's obligation to restrict disturbance of the TSD unit. This submission will satisfy the requirements of 40 CFR 264.119(a) and WAC 173-303-610(9).

11.1.13 Notice to Local Land Authorities

To the extent that residual dangerous waste contamination (waste left-in-place) exceeds limits for protection of human health and the environment, the local land authority (county-specific land zoning board and engineer; refer to Chapter 12.0, Section 12.1.29) will be provided a certified legal description of the contaminant location and contaminant inventory.

11.2 NOTICE IN DEED OF ALREADY CLOSED DISPOSAL UNITS [I-2]

For those TSD units that cannot be clean closed, the following action will be taken in accordance with 40 CFR 264.119 and WAC 173-303-610(1)(b). Within 60 days of the certification of closure, the DOE-RL will sign, notarize, and file for recording the following notice. The notice will be sent to the Auditor of Benton County, P.O. Box 470, Prosser, Washington, with instructions to record this notice in the deed book.

TO WHOM IT MAY CONCERN

The United States Department of Energy, Richland Operations Office, an operations office of the United States Department of Energy, which is a department of the United States government, the undersigned, whose local address is the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby gives the following notice as required by 40 CFR 264.119 and WAC 173-303-610(10) (whichever is applicable):

(a) The United States of America is, and since April 1943, has been in possession in fee simple of the following described lands: (legal description of the TSD unit).

(b) The United States Department of Energy, Richland Operations Office, by operation of the (name of TSD unit), has disposed of hazardous and/or dangerous waste under the terms of regulations promulgated by the United States Environmental Protection Agency and the Washington State Department of Ecology (whichever is applicable) at the above described land.

(c) The future use of the above described land is restricted under terms of 40 CFR 264.117(c) and WAC 173-303-610(7)(d) (whichever is applicable).

(d) Any and all future purchasers of this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of wastes disposed on the above described property.

(e) The United States Department of Energy, Richland Operations Office, has filed a survey plat with the Benton County Planning Department and with the United States Environmental Protection Agency, Region 10, and the Washington State Department of Ecology (whichever are applicable) showing the location and dimensions of the (name of the TSD unit) and a record of the type, location, and quantity of waste treated.

11.3 POSTCLOSURE PLAN [I-3]

A postclosure plan will be submitted with the closure plan for land disposal TSD units (i.e., closure with dangerous waste constituents left in place above MTCA Level B cleanup levels). As discussed in Chapter 2.0, Section 2.5, documentation for these TSD units will be developed in accordance with Sections 5.5 and 6.3 of the Tri-Party Agreement Action Plan. These Tri-Party Agreement Action Plan sections require the submittal of a postclosure permit application. This postclosure permit application will contain much of the same information as supplied in the postclosure plan, the contents of which are to be discussed in the remainder of Section 11.3. Conditions resulting from the submittal of postclosure permit application documentation are proposed by Ecology to be incorporated into a new section of the HF RCRA Permit (DW Portion), Part VI (refer to Chapter 2.0, Section 2.1.1.3.3).

11.3.1 Inspection Plan [I-3a]

The inspection plan will describe inspections to be conducted during the postclosure period, the frequency of inspections, the inspection procedures, and the logs to be kept. The inspection plan will contain information on the following items, as applicable: security control devices; erosion damage; cover settlement, subsidence, and displacement; vegetative cover condition;

integrity of run-on and run-off control measures; cover drainage system; gas venting system; well condition; and benchmark integrity.

11.3.2 Monitoring Plan [I-3b]

The monitoring plan will describe activities associated with groundwater monitoring during the postclosure period. The groundwater monitoring plan will contain the following information, as applicable: interim status period groundwater monitoring data, aquifer identification, contaminant plume description, detection monitoring program, compliance monitoring program, and corrective action program.

11.3.3 Maintenance Plan [I-3c]

The maintenance plan will describe the preventative and corrective maintenance procedures, equipment, and material needs. The plan will contain the following information, as applicable: repair of security control devices; erosion damage repair; correction of settlement, subsidence, and displacement; mowing, fertilization, and other vegetative cover maintenance; repair of run-on and run-off control structures; and well replacement.

11.3.4 Land Treatment [I-3d]

Land treatment information is concerned with the operations, inspections, and maintenance programs to be used at a TSD unit after closure. Of particular relevance at the Hanford Facility, will be programs and procedures implemented to maintain a vegetative cover and keep out deep-rooted plants and burrowing animals; minimize the damage due to wind erosion; and run-on and run-off management systems.

11.3.5 Postclosure Cost Estimate [I-3e]

Condition II.H.3. of the HF RCRA Permit (DW Portion) specifies that the "Permittees are exempt from the requirements of WAC 173-303-620." However, the Permittees have agreed to provide, annually, projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance for TSD units incorporated into Parts III and V of the HF RCRA Permit (DW Portion) (refer to Chapter 12.0, Section 12.1.22). Submittal of this annual report will take place on October 31 of each year, as described in Condition II.H.1. of the HF RCRA Permit (DW Portion).

11.3.6 Financial Assurance Mechanism for Postclosure Care [I-3f]

Federal facilities, and government contractors at such facilities, are not required to comply with WAC 173-303-620 as stated in the regulation and as described in Condition II.H.3. of the HF RCRA Permit (DW Portion).

11.3.7 Provisions to Amend Postclosure Plan

Should changes be required to approved postclosure plan documentation, amended documentation will be prepared and submitted to the proper regulatory agency(s) for approval in accordance with 40 CFR 264.112(c) and WAC 173-303-610(3)(b).

11.3.8 Certification of Completion of Postclosure Care

Within 60 days after completion of the established postclosure care period for each land disposal unit, the DOE-RL will submit to Ecology, by registered mail, a certification that the postclosure care period for the unit was completed in accordance with the approved postclosure plan. This certification will be signed by a representative of the DOE-RL and by an independent registered professional engineer. A record of this certification will be maintained in the Hanford Facility Operating Record (refer to Chapter 12.0, Section 12.1.32).

11.4 LIABILITY REQUIREMENTS [I-4]

Federal facilities, and government contractors at such facilities, are not required to comply with WAC 173-303-620 as stated in the regulation and as described in Condition II.H.3. of the HF RCRA Permit (DW Portion).

11.5 CLOSURE OF THE HANFORD FACILITY

Final closure of the Hanford Facility will be achieved when closure activities for all TSD units have been completed, as specified in either closure plan, closure/postclosure plan, or postclosure permit application documentation. Completion of these activities will be documented using either certifications of closure, in accordance with WAC 173-303-610(6), or certifications of completion of postclosure care, in accordance with WAC 173-303-610(11) as described in Condition II.J.1. of the Hanford RCRA Facility Permit (DW Portion). A discussion of the disposition of the Part A, Form 3 for a specific TSD unit that undergoes clean closure is included in Chapter 1.0.

11.6 CLOSURE CONTACTS

The following office (or its successor) is the official closure contact:

Environmental Assurance, Permits,
  and Policy Division
U.S. Department of Energy,
Richland Operations Office
P.O. Box 550
Richland, Washington 99352
(509) 376-5441.

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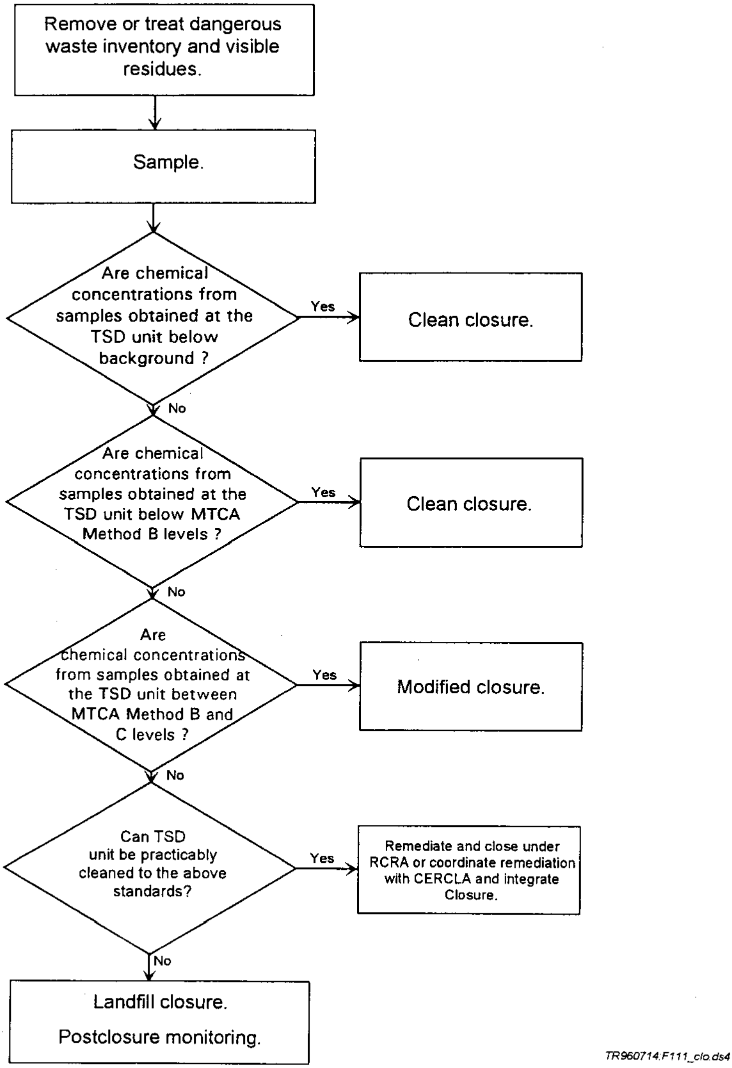

Figure 11-1. General Closure Flow Chart.

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TABLE

12.0 REPORTING AND RECORDKEEPING

This chapter discusses reporting and recordkeeping requirements as detailed in Condition II.I. (Facility Operating Record) (DW Portion), Condition I.L. (Monitoring and Records) (HSWA Portion), and other conditions of the HF RCRA Permit. Much of this discussion focuses on the organization and content of the Hanford Facility Operating Record and describes how records are managed and maintained. Certification and immediate reporting requirements also are discussed.

For purposes of maintaining records designated for the "Hanford Facility", the 700 Area and north to, and including, the Hanford Site is considered to meet the intent of WAC 173-303, even though the 700 Area is not located within the Hanford Facility boundary (Chapter 2.0, Figure 2-1). Because of the limitation of space, records could be archived, as appropriate, at the Federal Records Center, 6125 Sand Point Way, Seattle, Washington, 98115, or other federal government archive centers in Washington State. Records located on the Hanford Facility, and stored at government archive centers, can be accessed by contacting the Environmental Data Management Center (509) 376-1418. The current approach is to retain records until 10 years after postclosure or corrective action is complete and certified for the Hanford Facility, whichever is later (Condition I.E.10.b. and I.E.10.c of the HF RCRA Permit [DW Portion]). As specified in the HF RCRA Permit (DW Portion), some records could be kept in an electronic, rather than a hard copy, format (Conditions I.E.10.b., I.E.10.c., and II.C.1.).

12.1 DESCRIPTION OF RECORDS AND REPORTS

Records and reports required by the HF RCRA Permit and associated WAC 173-303 and Title 40, Code of Federal Regulations are summarized briefly in this section. These summaries are keyed to Table 12-1, which lists Permit conditions and the associated records and/or reports, where located, and the mechanisms by which these records and/or reports are submitted to the regulators. For implementation of any of the record and/or report conditions summarized in this section, the actual wording of the Permit should be referred to, rather than the summaries.

Table 12-1 is a comprehensive listing of records and reports that could be applicable to the Hanford Facility; the Unit-Specific Portion of this permit application only need list those applicable to a particular TSD unit. The information contained in this chapter need not be duplicated in the Unit-Specific Portion or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation, but could be cross-referenced, as appropriate.

Condition II.I. of the HF RCRA Permit (DW Portion) contains a specific discussion of the contents of the Facility Operating Record, including direction for the inclusion of all other reports, as required by the Permit (Condition II.I.1.t.). The Hanford Facility Operating Record consists of two files, a General Information file and a Unit-Specific file. The General

Information file contains a current list of 'Records Contacts' for both the General Information and Unit-Specific files and can be accessed by calling (509) 373-9327. Unit-Specific file records are maintained by the individual TSD units and also can be accessed by contacting the TSD unit 'Records Contact'. Unit-Specific file records could be maintained at locations other than the TSD unit. Table 12-1 designates which records and/or reports are contained in the General Information and/or Unit-Specific files.

12.1.1 Quarterly Notification of Class 1 Modifications

Notifications of modifications not otherwise addressed in the HF RCRA Permit (DW Portion) are submitted in accordance with Condition I.C.3. of the Permit, which allows for Class 1 (minor) modifications to be entered into the Hanford Facility Operating Record and submitted to Ecology quarterly (refer to Chapter 2.0, Section 2.1.1.3.3). Any Class 1 modifications made during a quarter are consolidated and submitted in a report within 10 days after the end of that quarter. Quarters end on December 31, March 31, June 30, and September 30.

12.1.2 Monitoring and Records

Records of monitoring information are to be kept for TSD units in accordance with Condition I.E.10.b. of the HF RCRA Permit (DW Portion). The monitoring information includes calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of reports and records required by the Permit, and records of data used to complete the application for the Permit.

Condition I.E.10.c. of the HF RCRA Permit (DW Portion) pertains to the keeping of records not associated with a particular TSD unit. These records include monitoring and maintenance information, copies of reports and records required by the Permit, and records of data used to complete the application for the Permit.

Monitoring records also are addressed by Condition II.I.1.n. of the HF RCRA Permit (DW Portion).

Records specific to groundwater monitoring are discussed in Section 12.1.26.

12.1.3 Reporting Planned Changes

In accordance with Condition I.E.11. of the HF RCRA Permit (DW Portion), Ecology is to be notified as soon as possible of any planned physical alterations or additions to the Hanford Facility that have an impact on TSD units or non-TSD unit areas subject to the Permit.

12.1.4 Certification of Construction or Modifications

In accordance with Condition I.E.12. of the HF RCRA Permit (DW Portion), notification is to be made that construction or modification of a TSD unit has been accomplished in compliance with the conditions of the Permit. This notification is to be made by a letter signed by the Permittees and a registered professional engineer.

12.1.5 Anticipated Noncompliance

In accordance with Condition I.E.13. of the HF RCRA Permit (DW Portion), notification is to be supplied at least 30 days in advance of any planned changes or activities that could result in a noncompliance with the Permit. If the 30-day advance notice is not possible, the Permittees are to supply notice immediately after becoming aware of the anticipated noncompliance.

12.1.6 Transfer of Permits

Before transferring ownership or operation of the Hanford Facility during its operating life, the Permittees are to notify the new owner or operator in writing of the requirements of WAC 173-303-600, WAC 173-303-806, and the HF RCRA Permit (DW Portion). This notification is to be conducted in accordance with Condition I.E.14. of the Permit. The Permit may be transferred to a new co-operator in accordance with the provisions of WAC 173-303-830(2).

12.1.7 Immediate Reporting

Upon awareness of the circumstances, the Permittees are to immediately report to Ecology any release of dangerous waste or hazardous substances, or any noncompliance with the HF RCRA Permit (DW Portion) that could endanger human health or the environment. This report is to be made in accordance with Condition I.E.15.a. of the Permit.

Upon awareness of the circumstances, the Permittees are to immediately report any information on the release or unpermitted discharge of dangerous waste or hazardous substances that could cause an endangerment to drinking water supplies or ground or surface waters, or of a release or discharge of dangerous waste or hazardous substances, or of a fire or explosion at the Facility that could threaten human health or the environment. This report is to be made in accordance with Condition I.E.15.c. of the HF RCRA Permit (DW Portion).

12.1.8 Release or Noncompliance Not Requiring Immediate Reporting

For any release or noncompliance not required to be reported immediately, a brief account must be entered within 2 days into the Facility Operating Record for TSD units, or into the Facility Operating Record, inspection log or separate spill log, for non-TSD units. This action is to be taken in accordance with Condition I.E.15.d. of the HF RCRA Permit (DW Portion).

12.1.9 Written Reporting

Within 15 days of awareness of the circumstances of any noncompliance with the HF RCRA Permit (DW Portion) that could endanger human health or the environment, the Permittees are to provide a written report in accordance with Condition I.E.16. of the Permit.

12.1.10 Manifest Discrepancy Report

Condition I.E.17.a. of the HF RCRA Permit (DW Portion) addresses reporting associated with discovery of a significant discrepancy (Appendix 2B) in a manifest for dangerous waste received from outside the Hanford Facility. If not reconciled within 15 days of discovery, the Permittees are to submit a letter report to Ecology in accordance with WAC 173-303-370(4), including a copy of the applicable manifest or shipping paper.

12.1.11 Waste Tracking Form Discrepancy Report

Condition I.E.17.b. of the HF RCRA Permit (DW Portion) addresses reporting associated with discovery of a significant discrepancy (Appendix 2B) in waste tracking forms for dangerous waste transported within the Hanford Facility. If not reconciled within 15 days of discovery, the Permittees are to note the discrepancy in the receiving TSD unit's operating record.

12.1.12 Other Information

Condition I.E.20. of the HF RCRA Permit (DW Portion) addresses situations where the Permittees become aware that they have failed to submit any relevant facts in a permit application, closure plan, or postclosure plan, or submitted incorrect information in a permit application, closure plan, or postclosure plan, or in any report to Ecology. In accordance with this condition, the Permittees are to promptly submit such facts or corrected information.

12.1.13 Permit-Related Documentation

Records of HF RCRA Permit-related documentation are to be kept and maintained for 10 years after postclosure care or corrective action of the Hanford Site has been certified as complete, whichever is later. The following documents, and amendments, revisions, and modifications to these documents, are to be retained: the HF RCRA Permit and all attachments; all dangerous waste Part B permit applications, postclosure permit applications, and closure plans; and the Facility Operating Record. Retention of this documentation fulfills Condition I.H. of the Permit.

12.1.14 Notification of Permit-Related Information

Condition II.E.4. of the HF RCRA Permit (DW Portion) pertains to the provision of a notification of availability to Ecology of data obtained pursuant to the Permit within 30 days of receipt by the Permittees, or after completion of quality assurance/quality control activities, if applicable. If data are obtained routinely, the Permittees only need to provide notification of data availability within 30 days of first availability along with a statement as to expected frequency of future data. If routine data are not acquired at the stated expected frequency, the Permittees are to notify Ecology within 30 days with an explanation and revision, if applicable.

12.1.15 Waste Location

Systems to identify and map the locations of SWMUs are documented and maintained within the Hanford Facility Operating Record, in accordance with Condition II.I.1.a. of the HF RCRA Permit (DW Portion). These systems include the Hanford Geographic Information System (HGIS) database and the WIDS database. A list identifying active 90-day waste storage areas and dangerous waste satellite accumulation areas and their locations also is maintained.

12.1.16 Waste Analysis

Waste analysis and other waste designation records for each TSD unit are generated in accordance with Condition II.D. (refer to Chapter 3.0, Section 3.2), and maintained in accordance with Condition II.I.1.b. of the HF RCRA Permit (DW Portion). These records include waste analysis and/or other waste designation for waste resulting from an unidentifiable spill or leak, or waste generated at a TSD unit during decontamination or maintenance activities if required.

12.1.17 Occurrence Reports

The system to generate occurrence reports is described in operating practices documentation maintained by the Permittees. The Occurrence Notification Center (ONC) is staffed 14 hours a day, and has personnel on call 24 hours a day. For the 10 hours a day the ONC is not staffed, a recorded message directs the caller to either the ONC personnel on call, or to the Patrol Operations Center. This arrangement conforms to the requirements of Condition II.I.1.c. of the HF RCRA Permit (DW Portion).

12.1.18 Unmanifested Waste Reports

The Hanford Facility uses waste manifests for tracking offsite waste shipments. The completed waste manifests are the source of two possible reports, the manifest discrepancy report and the unmanifested waste report as cited in Condition I.E.18 of the HF RCRA Permit (DW Portion). Records documenting unmanifested waste shipments are retained by the receiving TSD unit in accordance with Condition II.I.1.d. of the Permit.

12.1.19 Hanford Facility Contingency Plan and Incident Records

Records documenting the details of any incidents requiring the implementation of the *Hanford Facility Contingency Plan* (Appendix 7A) are maintained in the Hanford Facility Operating Record, General Information file as required by Conditions II.A. and II.I.1.e. of the HF RCRA Permit (DW Portion). The contingency plan incident records are maintained by the Hanford Fire Department as part of the Hanford Facility Operating Record, General Information file. Occurrence reports also are generated to document incidents judged too minor to require the implementation of the contingency plan (e.g., incidents identified as abnormal events, unusual occurrences, or emergencies).

12.1.20 Personnel Training Records

Training records are kept by the individual TSD units, as required by Conditions II.C. and II.I.1.f. of the HF RCRA Permit (DW Portion). Typically, each contractor maintains official training records in a centralized location. These records could be maintained in a hard copy form or by using electronic data storage. At a minimum, training records will consist of course attendance rosters correlating the training received with the employees who were in attendance (refer to Chapter 8.0, Section 8.3). Training records are maintained in accordance with the requirements of the *Privacy Act*. The training records of individual employees are available for inspection purposes through 59 FR 17091, which gives federal, state, and local government officers 'routine use' access to training records where a regulatory program being implemented is applicable to the DOE-RL or contractor program.

12.1.21 Preparedness and Prevention Arrangements

The Hanford Facility Operating Record, General Information file, in accordance with Condition II.B.4. of the HF RCRA Permit (DW Portion), contains the Hanford Emergency Response Plan, DOE/RL-94-02; specifically Section 3.7, "Memoranda of Understanding", which details the preparedness and prevention arrangements made with other agencies and governing entities. The memoranda can be viewed in Appendix B of hardcopies of DOE/RL-94-02. In accordance with Condition II.I.1.g. of the Permit, these arrangements, as amended, are considered a part of the Hanford Facility Operating Record, General Information file.

12.1.22 Projections of Anticipated Costs for Closure and Postclosure and Postclosure Monitoring and Maintenance

An annual report of projections of anticipated costs for closure for TSD units included in Parts III and V of the HF RCRA Permit (DW Portion) is made in accordance with Conditions II.H.1. and II.I.1.i. (refer to Chapter 11.0, Section 11.1.8). An annual report of projections of anticipated costs for postclosure monitoring and maintenance for TSD units incorporated into Parts III and V of the HF RCRA Permit (DW Portion) is made in accordance with Conditions II.H.2. and II.I.1.i. (refer to Chapter 11.0, Section 11.3.5). Annual reports of these cost projections are submitted to Ecology on October 31 of each year, with information updated as of September 30.

12.1.23 Onsite Transportation Documentation

Condition II.Q. of the HF RCRA Permit (DW Portion) requires documentation to accompany any onsite dangerous waste that is transported to or from any TSD unit subject to the Permit through or within the 600 Area unless the roadway is closed to general public access at the time of shipment (refer to Chapter 2.0, Sections 2.1.1.1 and 2.4; Figure 2-1). Waste transported by rail or by pipeline is exempt from this condition. To meet the provisions of Condition II.I.1.j. of the Permit, this documentation is maintained in the receiving TSD unit's Hanford Facility Operating Record, Unit-Specific file.

12.1.24 Cross-Reference of Waste Location to Waste Manifest Numbers

In accordance with Condition II.I.1.k. of the HF RCRA Permit (DW Portion), a solid waste information and tracking system contains information concerning containerized waste, including the waste location, quantity, and other manifest data. A description of this system is maintained in the Hanford Facility Operating Record, General Information file.

12.1.25 Required Annual Reports

In accordance with Conditions I.E.19. and I.E.22. of the HF RCRA Permit (DW Portion), annual reports are generated and submitted to Ecology. In accordance with Condition II.I.1.m. of the Permit, annual report information is maintained in the Hanford Facility Operating Record, General Information file. The individual TSD units maintain their respective annual report information within the Unit-Specific file. Reports include the following:

- Annual noncompliance report
- Annual dangerous waste report
- Annual Hanford Site environmental permitting report
- Annual report on Hanford Site LDR for mixed waste [Condition II.S. (DW Portion); Condition II.G (HSWA Portion)]
- Annual report of projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance.

The annual report of projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance is discussed in Section 12.1.22.

The annual noncompliance report is a compilation of all instances of noncompliance not otherwise required to be reported elsewhere, and is submitted at the time the annual dangerous waste report is submitted, in accordance with Condition I.E.19. of the HF RCRA Permit (DW Portion). Currently, the submittal date is March 1 of each year.

Washington State, pursuant to WAC 173-303-390, requires an overall annual report for each facility that holds an active EPA/State identification number. This WAC 173-303 requirement is consistent with provisions of Condition I.E.22. of the HF RCRA Permit (DW Portion), and fulfills the EPA's requirement for a HSWA Biennial Report under 40 CFR 264.75, in accordance with a September 29, 1995, letter received from EPA Region 10 by DOE-RL. The report is due to Ecology on March 1 of each year and is referred to as the 'annual dangerous waste report'. The contents of the Hanford Facility annual dangerous waste report include the following:

- The EPA/State identification number
- Name and address of the Hanford Facility
- Calendar year covered by the report
- Description and quantity of waste managed
- TSD methods
- Waste minimization
- Certification statement signed by an authorized representative.

The Washington State report forms in the "Dangerous Waste Annual Report, Book 1, Forms and Instructions for Treatment, Storage, Disposal, and Recycling Facilities" are completed for this report.

The *Annual Hanford Site Environmental Permitting Status Report* contains the status of all required environmental permits and notices of construction approvals (refer to Chapter 13.0). This status report is placed in the Hanford Facility Operating Record, General Information file by October 1 of each year.

A discussion of the annual LDR report is contained in Chapter 3.0, Section 3.1.1.

12.1.26 Groundwater Monitoring Records

Groundwater monitoring records, addressed by Condition II.F. of the HF RCRA Permit (DW Portion), are specified for TSD units in Parts III and V of the Permit. Further discussion of these records is contained in Chapter 5.0, Section 5.2.2.1.

In accordance with Condition II.F.2.a. of the HF RCRA Permit (DW Portion), inspections of active resource protection wells subject to the Permit are to be conducted at least once every 5 years in accordance with

WAC 173-160-030. The inspections are to be recorded in the Hanford Facility Operating Record, Unit-Specific file.

In accordance with Condition II.F.2.c. of the HF RCRA Permit (DW Portion), written notice is to be furnished to Ecology at least 72 hours in advance of remediation (excluding maintenance activities) or abandonment of any well subject to the Permit.

As discussed in Sections 12.1.2, other monitoring records could be maintained in the Hanford Facility Operating Record, in accordance with Conditions I.E.10.b. and I.E.10.c. of the Permit.

12.1.27 Groundwater Corrective Action

Part IV of the HF RCRA Permit (DW Portion) and Part III of the HF RCRA Permit (HSWA Portion) address corrective action for past-practice units (refer to Chapter 2.0, Sections 2.1.1.3.3 and 2.5). In accordance with Condition II.I.1.p. of the HF RCRA Permit (DW Portion), summaries of all records of groundwater corrective action required by WAC 173-303-645 are included in the Hanford Facility Operating Record, General Information file.

12.1.28 Permit Condition Compliance Evaluation System

In accordance with Condition II.I.1.q. of the HF RCRA Permit (DW Portion), an automated database system currently is one of several tools used to track compliance with the Standard and General Facility conditions of the HF RCRA Permit. Each TSD unit incorporated into Parts III or V of the Permit is responsible for compliance and describing the compliance evaluation system used.

12.1.29 Deed Notifications

For those TSD units that cannot be clean closed, a notice in deed must be filed with the county auditor (refer to Chapter 11.0, Section 11.2) in accordance with Condition II.I.1.r. of the HF RCRA Permit (DW Portion). The DOE-RL will certify to Ecology that the information has been duly recorded and will provide Ecology with a copy of the document in which the record was placed.

12.1.30 Inspection Records

In accordance with Condition II.O. of the HF RCRA Permit (DW Portion), general facility inspections are conducted according to the provisions in WAC 173-303-320(2) and as described in Chapter 6.0, Section 6.2.1. Notification is made to Ecology at least 7 days prior to conducting these inspections. A copy of each annual inspection report is maintained in the Hanford Facility Operating Record, General Information file.

Records of TSD unit-specific inspections, required by Condition II.I.1.s. of the Permit, are maintained for a period of at least 5 years from the inspection date as part of the Hanford Facility Operating Record, Unit-Specific file.

12.1.31 Descriptions of Systems/Reports

In accordance with Condition II.I.2. of the HF RCRA Permit (DW Portion), descriptions of systems and/or reports are maintained in the Hanford Facility Operating Record, General Information file. The descriptions required involve the following:

- Condition II.I.1.a. of the Permit (DW Portion): waste location (refer to Section 12.1.15)
- Condition II.I.1.c. of the Permit (DW Portion): occurrence reports (refer to Section 12.1.17)
- Condition II.I.1.f. of the Permit (DW Portion): personnel training records (refer to Section 12.1.20)
- Condition II.I.1.i. of the Permit (DW Portion): projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance (refer to Section 12.1.22)
- Condition II.I.1.k. of the Permit (DW Portion): cross-reference of waste location to waste manifest numbers (refer to Section 12.1.24)
- Condition II.I.1.n. of the Permit (DW Portion): monitoring and records (refer to Sections 12.1.2 and 12.1.26)
- Condition II.I.1.q. of the Permit (DW Portion): Permit condition compliance evaluation system (refer to Section 12.1.28).

12.1.32 Closure Certification

Final closure of the Hanford Facility will be achieved when documentation indicates completion of closure activities for all TSD units. Documentation of closure of TSD units is to be accomplished by providing either certifications of closure or certifications of completion of postclosure care, in accordance with Condition II.J.1. of the HF RCRA Permit (DW Portion).

12.1.33 Notification of, or Request for, a Permit Modification

Written notification of, or request for, a permit modification is to be submitted whenever there is a change in operating plans, facility design, or the approved closure plan. A copy of the amended closure plan is to accompany the notification request. This action is to be taken in accordance with Condition II.J.3. of the HF RCRA Permit (DW Portion).

12.1.34 Closure Plan Deviation

Deviations from a TSD unit closure plan required by unforseen circumstances encountered during closure activities are to be documented in the Facility Operating Record, Unit-Specific file and made available to Ecology upon request or during the course of an inspection. These deviations are limited to those that do not impact the overall closure strategy but provide equivalent results. Such action is in accordance with Condition II.K.6. of the HF RCRA Permit (DW Portion).

12.1.35 Engineering Change Notices and Nonconformance Reports

The ECNs or NCRs that could affect specifically designated critical systems are submitted in accordance with Conditions II.L.2.b. and II.L.2.c. of the HF RCRA Permit (DW Portion) (refer to Chapter 4.0, Sections 4.13.1 and 4.13.4, and to Appendix 2B). All other ECNs or NCRs will be available for inspection.

12.1.36 As-Built Drawings

As-built drawings incorporating design and construction modifications for a construction project subject to the HF RCRA Permit (DW Portion) is to be placed into the Facility Operating Record, Unit-Specific File within 12 months of construction completion, or within an alternate approved time period. This action is to be taken in accordance with Condition II.L.2.d. of the Permit.

12.1.37 Receipt of Wastes Generated Offsite

Notification of receipt of offsite-generated waste is to be supplied annually and in writing at least 4 weeks in advance of the first shipment. The Permittees are to notify the generator in writing that they have the appropriate permits for, and will accept, the waste. A copy of this written notice is to be a part of the Facility Operating Record, Unit-Specific file, in accordance with Conditions II.N.2. and II.N.3 of the HF RCRA Permit (DW Portion).

12.1.38 Equivalent Materials

Condition II.R. of the HF RCRA Permit (DW Portion) establishes general requirements for the substitution of an equivalent or superior product for any equipment or materials specified in Parts III and V (refer to Chapter 4.0, Section 4.13.3). This condition also requires substitution documentation to be placed in the Hanford Facility Operating Record, Unit-Specific file.

12.1.39 Land Disposal Restrictions Records

Condition II.S. (DW Portion) and II.G (HSWA Portion) of the HF RCRA Permit addresses LDR. Onsite waste tracking documents the transfer of waste subject to LDR (refer to Chapter 3.0, Section 3.1.1). Other applicable LDR recordkeeping requirements are identified in WAC 173-303-380 and 40 CFR 268.

12.1.40 Mapping Methodology Report and Underground Pipline Maps

In accordance with Condition II.U. of the HF RCRA Permit (DW Portion), and with the mapping methodology report submitted in fulfillment of Condition II.U.1., the methodology report and underground pipeline maps will be located in the Hanford Facility Operating Record, General Information file (refer to Chapter 4.0, Section 4.13.5).

12.1.41 Other Permit Compliance Documentation

Condition II.W.1. of the HF RCRA Permit (DW Portion) requires copies of all documents relating to actions taken, pursuant to obtaining all other applicable federal, state, and local permits authorizing the development and operation of the Hanford Facility, to be kept in the Facility Operating Record.

12.1.42 Schedule Extensions

Written notification of any deviations or expected deviations from Permit-related schedules is to be supplied to Ecology as soon as possible in accordance with Condition X.1. of the HF RCRA Permit (DW Portion). The notification is to include all supporting information that 'best efforts' have been made to meet the required schedules. Copies of all correspondence regarding schedule extensions is to be kept in the Facility Operating Record.

12.1.43 Waste Minimization/Pollution Prevention

In accordance with Conditions II.F. of the HF RCRA Permit (HSWA Portion), onsite generating units complete a waste minimization/pollution prevention certification form annually certifying that a waste minimization/pollution prevention program is in place (refer to Chapter 10.0). A copy of the form is maintained in the Hanford Facility Operating Record, Unit-Specific file.

12.2 TYPE OF SUBMITTAL

Table 12-1 denotes the protocol for submitting reports. Three options exist: immediate verbal reporting; information submitted via transmittal letters signed by Permittee representatives; and packages certified by the Permittees in accordance with WAC 173-303-810(12) and (13) and/or by a registered professional engineer [e.g., in accordance with

WAC 173-303-810(14)(a)(i) (refer to Chapter 4.0, Section 4.13.4)]. The protocol for submitting reports also is based on a teleconference held with Ecology on March 3, 1995.

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Table 12-1. Reports and Records. (sheet 1 of 6)

HF RCRA Permit condition[1]	Records and/or Reports (Chapter 12.0 section containing description)		Hanford Facility Operating Record: General information file[2]	Hanford Facility Operating Record: Unit-specific file[3]	Type of submittal: Verbal[4]	Type of submittal: Transmittal letter[5]	Type of submittal: Certified package
I.C.3.	Quarterly Notification of Class 1 Modification notification (12.1.1)	Unit		✓		✓	
		Facility	✓				
I.E.10.b. I.E.10.c. II.I.1.n.	Monitoring and records (12.1.2)	Unit		✓			
		Facility	✓				
I.E.11.	Reporting planned changes [7] (12.1.3)	Unit		✓	✓		
		Facility	✓				
I.E.12.i.	Certification of construction or modifications[7] (12.1.4)	Unit		✓			✓[8]
I.E.13.	Anticipated noncompliance[7] (12.1.5)	Unit		✓	✓	✓	
		Facility	✓				
I.E.14.	Transfer of permits[7] (12.1.6)	Facility	✓			✓	
I.E.15.a. I.E.15.c.	Immediate reporting (12.1.7)	Unit		✓	✓		
		Facility	✓				
I.E.15.d.	Release or noncompliance not requiring immediate reporting (12.1.8)	Unit		✓			
		Facility	✓				
I.E.16.	Written reporting (12.1.9)	Unit		✓		✓	
		Facility	✓				
I.E.17.a.	Manifest discrepancy report (12.1.10)	Unit		✓		✓	
		Facility	✓				
I.E.17.b.	Waste tracking form discrepancy report (12.1.11)	Unit		✓			

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Table 12-1. Reports and Records. (sheet 2 of 6)

HF RCRA Permit condition[1]	Records and/or Reports (Chapter 12.0 section containing description)		Hanford Facility Operating Record: General information file[2]	Hanford Facility Operating Record: Unit-specific file[3]	Type of submittal: Verbal[4]	Type of submittal: Transmittal letter[5]	Type of submittal: Certified package
1 I.E.20.	Other information (12.1.12)	Unit		✓	✓	✓	
		Facility	✓				
2 I.H.	Permit-related documentation: HF RCRA Permit and all attachments and modifications (12.1.13)	Facility	✓				
3	Permit-related documentation: Part B permit application, closure plan, closure/postclosure plan, postclosure permit application documentation (12.1.13)	Unit		✓			
4 II.E.4.	Notification of Permit-related information (12.1.14)	Unit		✓		✓	
		Facility	✓				
5 II.I.1.a.	Waste location (12.1.15, 12.1.31)	Unit		✓			
		Facility	✓				
6 II.I.1.b. 7 II.D.	Waste analysis (12.1.16)	Unit		✓			
		Facility	✓				
8 II.I.1.c.	Occurrence reports (12.1.17, 12.1.31)	Unit		✓			
		Facility	✓				
9 II.I.1.d. 10 I.E.18.	Unmanifested waste reports (12.1.18)	Unit		✓		✓	
		Facility	✓				

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Table 12-1. Reports and Records. (sheet 3 of 6)

HF RCRA Permit condition[1]	Records and/or Reports (Chapter 12.0 section containing description)		Hanford Facility Operating Record		Type of submittal		
			General information file[2]	Unit-specific file[3]	Verbal[4]	Transmittal letter[5]	Certified package
II.I.1.e. II.A. (all)	Hanford Facility Contingency Plan and incident records (12.1.19)	Unit		✓	✓	✓	✓[6] (II.A.1. only)
		Facility	✓				
II.I.1.f. II.C.	Personnel training records (12.1.20, 12.1.31)	Unit		✓			
		Facility	✓				
II.I.1.g. II.B.4.	Preparedness and prevention arrangements (12.1.21)	Facility	✓				
II.I.1.i. II.H.	Projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance (12.1.22, 12.1.25, and 12.1.31)	Unit		✓			✓[6]
		Facility	✓				
II.I.1.j.	Onsite transportation documentation (12.1.23)	Unit		✓			
II.I.1.k.	Cross-reference of waste location to waste manifest numbers (12.1.24, 12.1.31)	Unit		✓			
		Facility	✓				

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Table 12-1. Reports and Records. (sheet 4 of 6)

HF RCRA Permit condition[1]	Records and/or Reports (Chapter 12.0 section containing description)		Hanford Facility Operating Record		Type of submittal		
			General information file[2]	Unit-specific file[3]	Verbal[4]	Transmittal letter[5]	Certified package
1 II.I.1.m.	Annual reports (12.1.25)	Facility	✓				
2 I.E.19.	Annual Noncompliance Report					✓	
3 I.E.22.	Annual Dangerous Waste Report						✓[6]
4	Annual Hanford Site Environmental Permitting Status Report						
5 II.S. 6 II.G. (HSWA 7 Portion)	Annual Land Disposal Restrictions Report					✓	
8 II.F.2.a. 9 II.F.2.c.	Groundwater monitoring records (12.1.26, 12.1.31)	Unit		✓		✓	
		Facility	✓				
10 II.I.1.p.	Groundwater corrective action (12.1.27)	Facility	✓				
11 II.I.1.q.	Permit condition compliance evaluation system (12.1.28, 12.1.31)	Unit		✓			
		Facility	✓				
12 II.I.1.r.	Deed notification (reference only)[7] (12.1.29)	Unit		✓			✓[6]
13 II.I.1.s. 14 II.O.	Inspection records (12.1.30)	Unit		✓			
		Facility	✓			✓	
15 II.I.2.	Description of systems/reports (12.1.31)	Facility	✓				
16 II.J.1.	Closure certification[7] (12.1.32)	Unit		✓			✓[9]

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Table 12-1. Reports and Records. (sheet 5 of 6)

HF RCRA Permit condition[1]	Records and/or Reports (Chapter 12.0 section containing description)		Hanford Facility Operating Record		Type of submittal		
			General information file[2]	Unit-specific file[3]	Verbal[4]	Transmittal letter[5]	Certified package
II.J.3.	Notification of, or request for, a permit modification[7] (12.1.33)	Unit		✓		✓	✓[6]
		Facility	✓				
II.K.6.	Closure plan deviation[7] (12.1.34)	Unit		✓			
II.I.1.t. II.L.2.b. II.L.2.c.	Engineering change notices and nonconformance reports (12.1.35)	Unit		✓			✓[8]
II.L.2.d.	As-built drawings[7] (12.1.36)	Unit		✓			
II.N.2. II.N.3.	Receipt of wastes generated offsite[7] (12.1.37)	Unit		✓		✓	
II.R.	Equivalent materials[7] (12.1.38)	Unit		✓			
II.S. II.G (HSWA Portion)	Land disposal restrictions records (12.1.39)	Unit		✓		✓	
II.U.	Mapping methodology report and underground pipeline maps (12.1.40)	Facility	✓			✓	
II.W.1.	Other permit compliance documentation[7] (12.1.41)	Unit		✓			
		Facility	✓				

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Table 12-1. Reports and Records. (sheet 6 of 6)

HF RCRA Permit condition[1]	Records and/or Reports (Chapter 12.0 section containing description)		Hanford Facility Operating Record		Type of submittal		
			General information file[2]	Unit-specific file[3]	Verbal[4]	Transmittal letter[5]	Certified package
II.X.1.	Schedule extensions[7] (12.1.42)	Unit		✓		✓	
		Facility	✓				
II.F (HSWA Portion)	Waste minimization/pollution prevention (12.1.43)	Unit		✓			

1 HF RCRA Permit (DW Portion) Condition, unless otherwise noted.
2 Hanford Facility Operating Record, General Information file.
3 Hanford Facility Operating Record, Unit-Specific file.
4 Verbal reporting in accordance with timeframes noted in the specified conditions.
5 Not certified; submittal by transmittal letter.
6 Certified by Permittees in accordance with WAC 173-303-810(12).
7 Miscellaneous support records and reports.
8 Certified by a registered professional engineer [e.g., in accordance with WAC 173-303-810(14)(a)(i) (refer to Chapter 4.0, Section 4.13.4)].
9 Certified by a registered professional engineer [e.g., in accordance with WAC 173-303-610(6) or WAC 173-303-610(11).

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TABLE

13.0 OTHER FEDERAL AND STATE LAWS [J]

This chapter discusses environmental permits and approvals required for the Hanford Facility as specified by other federal and state laws and local requirements. This chapter addresses the provisions of Section J of Ecology's permit application guidance (Ecology 1987 and 1995). Much of the information requested in Section J is included in the *Annual Hanford Site Environmental Permitting Status Report* (Annual Status Report), issued on October 1. This report contains a listing and status of all required environmental permits and approvals and construction approvals. A copy of the current Annual Status Report will be maintained in the Hanford Facility Operating Record, General Information file (refer to Chapter 12.0, Section 12.1.25).

The information contained in, and/or referenced in, this chapter also addresses the *State Environmental Policy Act* (SEPA) *of 1971* and Condition II.W. (Other Permits and/or Approvals) of the HF RCRA Permit (DW Portion). Condition II.W of the Permit specifies that the Permittees will be responsible for obtaining all other applicable federal, state, and local permits authorizing the development and operation of the Hanford Facility. Condition II.W. of the Permit further specifies that the Permittees are to use their best efforts to obtain such permits. For the purposes of this permit application, 'best efforts' mean submittal of documentation and/or approval(s) in accordance with schedules specified in applicable regulations, or as determined through negotiations with the applicable regulatory agencies.

The remainder of this chapter contains a brief description of federal and state laws and local requirements that could be applicable to the Hanford Facility; the Unit-Specific Portion of this permit application only need list those applicable to a particular TSD unit. The information contained in this chapter need not be duplicated in the Unit-Specific Portion or in preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation, but can be cross-referenced, as appropriate.

13.1 ENVIRONMENTAL PERMITS AND APPROVALS

This section contains a brief description of the federal and state laws and local requirements that could be applicable to the Hanford Facility. The appropriate regulatory agency(s) administering these laws and requirements also is noted. Permits and approvals prepared in response to these laws and requirements are identified in the Annual Status Report.

13.1.1 Federal Laws

This section contains a brief description of federal laws that could be applicable to the Hanford Facility.

13.1.1.1 Atomic Energy Act of 1954. The *Atomic Energy Act* provides that the U.S. Atomic Energy Commission (succeeded by the U.S. Department of Energy for conducting nuclear defense, waste management, environmental restoration and remediation, and RD&D activities on the Hanford Site) is authorized to develop and implement regulations to govern activities related to the design, location, and operation of U.S. Department of Energy sites, to protect health, and to minimize danger to life or property. The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under the RCRA and WAC 173-303 (refer to Chapter 2.0, Section 2.1.1.3.1).

The U.S. Department of Energy has adopted regulations to govern the activities of its sites and to manage the health protection aspects of mixed waste. These regulations provide for a consistent approach to managing radioactive materials that result from U.S. Department of Energy activities. The regulations set radiation exposure limits and concentration guidelines to minimize exposure to radiation. All Hanford Facility operations are conducted in accordance with these regulations.

13.1.1.2 Federal Facility Compliance Act of 1992. The *Federal Facility Compliance Act* provides for the express waiver of immunity otherwise applicable to the United States with respect to substantive and procedural requirements of the RCRA.

13.1.1.3 Clean Air Act of 1977. The *Clean Air Act* establishes a federal and state cooperative scheme to control the airborne emissions of pollutants to enhance air quality and prevent further deterioration. This control is accomplished by achieving and setting standards for abating air pollution, and by maintaining the federally-mandated National Ambient Air Quality Standards (42 USC 7401 et seq.). Air standards are implemented and enforced primarily by state and local air quality authorities. Amendments to the *Clean Air Act* in 1990 significantly expanded the scope of regulation particularly in the area of hazardous air pollutants. These amendments require EPA to promulgate dozens of regulations under state authority to meet the schedule of the federal amendments. The *State of Washington Clean Air Act* regulations (refer to Section 13.1.2.1) address control of nearly 700 air pollutants, including air toxins, hazardous air pollutants (including radioactive airborne emissions), ozone-depleting substances, and pollutants suspected of causing global warming. Compliance with these regulations requires specific actions before construction, startup, and normal operations of facilities (e.g., notices of construction, source registration, annual reporting, air operating permit applications, etc.). The regulations require prior approval by one or more air quality authority(ies) before any construction or modification can begin that could supply any significant increase in air emissions.

The Hanford Site is located within an airshed that meets all federal and state ambient air quality standards, and thus has been declared an "attainment area". Therefore, for the Hanford Site, the Prevention of Significant Deterioration *Clean Air Act* requirements apply to emissions of pollutants traditionally released from fossil fueled power plants or other large industrial sources; i.e., pollutants such as carbon monoxide, nitrogen oxides, sulfur oxides, particulate matter, ozone, lead, asbestos, mercury, etc., commonly referred to as the "criteria pollutants" (Appendix 2B). The

Prevention of Significant Deterioration regulations are intended to protect the regional air quality while allowing a margin for future industrial growth. As such, the regulations require prior construction approval, and best available control technology for any large new source of air emissions or any source modifications involving significant increases in criteria pollutant emissions. The Hanford Site is considered a major Prevention of Significant Deterioration source because of pollutant emissions from various coal and oil fired steam generating plants onsite (i.e., nitrogen oxides). In addition, air toxics are regulated under the National Emission Standards for Hazardous Air Pollutants. This program applies without regard to attainment status. Applicable federal requirements to control and abate air pollution include the following:

- *New Source Performance Standards* (40 CFR 60)
- *National Emission Standards for Hazardous Air Pollutants* (40 CFR 61)
- *National Emission Standard for Radionuclide Emissions* from U.S. Department of Energy Facilities (40 CFR 61, Subpart H).

13.1.1.4 Clean Water Act of 1977. The *Clean Water Act* establishes national ambient water quality standards and sets standards for abating water pollution and preventing further deterioration of the water quality. This Act also provides for the protection of wet lands. The *Clean Water Act* requires permits for discharges of liquid effluents to surface waters and for dredge and fill activities in "waters of the United States". These standards are implemented and enforced primarily by state and local authorities (refer to Section 13.1.2.2). However, the EPA has authority for National Pollution Discharge Elimination System (NPDES) permitting at federal facilities. Potentially applicable or relevant regulations relating to water pollution and water quality include the following:

- *U.S. Army Corps of Engineers Permit Regulations for Structures* (33 CFR 322)
- *U.S. Army Corps of Engineers National Permit Program Regulations* (33 CFR 330)
- *National Pollutant Discharge Elimination System* (40 CFR 121 to 125).

Portions of the *Clean Water Act* regulations are administered on the Hanford Site by the EPA, the U.S. Coast Guard, or the U.S. Army Corps of Engineers.

13.1.1.5 Safe Drinking Water Act of 1974. The *Safe Drinking Water Act* provides for protection of human health by setting standards for water supplied for public consumption and by protecting public drinking water sources. This Act sets drinking water standards, protects groundwater, and regulates underground injection wells. Drinking water systems at the Hanford Facility are in compliance with these standards. *Safe Drinking Water Act* regulations are administered by the Washington State Department of Health and Ecology (refer to Section 13.1.2.2).

13.1.1.6 Comprehensive Environmental Response, Compensation, and Liability Act of 1980. The CERCLA, as amended in 1986 by the *Superfund Amendments and Reauthorization Act*, establishes a process for undertaking remedial action at inactive waste sites that contain hazardous substances, and establishes reporting requirements for releases of hazardous substances. The CERCLA remedial process has been initiated on the Hanford Site in response to identification on the National Priorities List. The Tri-Party Agreement addresses how RCRA corrective actions and CERCLA remedial actions are to be integrated on the Hanford Facility. The CERCLA regulations are administered by the EPA.

13.1.1.7 Emergency Planning and Community Right-to-Know Act of 1986. The *Emergency Planning and Community Right-to-Know Act* is a freestanding provision of the *Superfund Amendments and Reauthorization Act*. This Act establishes the framework for state and local emergency planning and provides a mechanism for community awareness of hazardous chemicals present in a locality. Release notification, community right-to-know reporting, and toxic chemical release and inventory reporting are made in response to this Act. The *Emergency Planning and Community Right-to-Know Act* regulations are administered by the EPA.

13.1.1.8 Toxic Substances Control Act of 1976. The *Toxic Substances Control Act* provides for protection of human health and the environment from exposure to certain hazardous and toxic chemical substances and mixtures (e.g., PCBs and newly manufactured chemicals). The Hanford Facility has in place a program for the cleanup, treatment, and disposal of materials regulated by the *Toxic Substances Control Act*. The regulations derived from the act are administered by the EPA.

13.1.1.9 Wild and Scenic Rivers Act of 1968. The Hanford Facility does not affect any rivers presently designated under the *Wild and Scenic Rivers Act*. However, this act could apply, depending on the outcome of a study conducted in response to Public Law 100-605 (refer to Section 13.1.1.10).

13.1.1.10 Public Law 100-605 of 1988. Public Law 100-605, which is commonly referred to as the *Hanford Reach Study Act*, directs the Secretary of the Interior to prepare a study on the Hanford Reach of the Columbia River to consider the addition of the Hanford Reach to the National Wild and Scenic Rivers System. During the 8-year study period ending in 1996, activities undertaken from river miles 396 to 345 and within a quarter-mile of the Columbia River mean high-level mark must be conducted in consultation and coordination with the U.S. Department of Interior-National Park Service, acting for the Secretary of the Interior. Hanford Site activities undertaken within the Hanford Reach are conducted in compliance with the *Hanford Reach Study Act*.

13.1.1.11 Rivers and Harbors Act of 1899. The *Rivers and Harbors Act*, sometimes referred to as the *Refuse Act*, is an 1899 statute that was designed to protect navigation, and had provisions to permit the discharge of refuse into the navigable waters of the United States. The refuse portion of the act was superseded in 1972 by the *Federal Water Pollution Control Act*, which has become known as the *Clean Water Act*. The U.S. Army Corps of Engineers administers the portion of the *Rivers and Harbors Act* related to construction of obstructions in U.S. navigable waters and requires permits before construction of such obstructions.

13.1.1.12 National Historic Preservation Act of 1966. The *National Historic Preservation Act* establishes national policy to preserve historic places, which include sites, structures, and objects significant in American history, archeology, or culture. The Hanford Facility has in place requirements for the preservation of historical sites and cultural resources. During any future construction activity for a TSD unit, the site will be monitored for the presence of archaeological resources in accordance with regulations issued pursuant to, or other requirements of, the *American Antiquities Preservation Act of 1906*; the *Historic Sites, Buildings and Antiquities Act of 1935*; the *Archaeological and Historic Preservation Act of 1960*; the *Archeological Resources Protection Act of 1979*; and the *American Indian Religious Freedom Act of 1978*. Regulations derived from these acts are administered by the U.S. Department of Interior's Advisory Council on Historic Preservation and the Fish and Wildlife Services.

13.1.1.13 Endangered Species Act of 1973. The *Endangered Species Act* establishes a program for conserving endangered species and their ecosystems. Most activities on the Hanford Facility take place in areas that have been extensively developed during past construction. It is not expected that any listed or proposed endangered or threatened species or their habitats will be affected by Hanford Facility TSD unit activities. However, activities outside extensively developed areas will be reviewed for applicability and compliance. In the event that such species or habitats must be disturbed as a part of Hanford Facility operating or restoration and remediation activities, mitigative measures will be taken in accordance with applicable requirements. The *Endangered Species Act* regulations are administered by the U.S. Department of Interior-Fish and Wildlife Service.

13.1.1.14 Fish and Wildlife Coordination Act of 1934. The *Fish and Wildlife Coordination Act* authorizes the U.S. Secretary of the Interior to assist and cooperate with public and private organizations to protect fish and wildlife. Activities at the Hanford Facility impacted by the *Fish and Wildlife Coordination Act*, such as the building or demolition of an outfall, will be handled in accordance with an agreement between the U.S. Department of Energy and the Washington State Department of Fisheries. Other Acts with regulations relevant to wildlife that could impact activities on the Hanford Facility include the *Migratory Bird and Treaty Act of 1918* and the *Bald and Golden Eagle Protection Act of 1940*. Regulations derived from both Acts are administered by the U.S. Department of Interior-Fish and Wildlife Service.

13.1.1.15 Federal Insecticide, Fungicide, and Rodenticide Act of 1975. The *Federal Insecticide, Fungicide, and Rodenticide Act* establishes a program to regulate the manufacture, sale, and use of pesticides and disposal of pesticides and containers. The use of all pesticides on the Hanford Facility is done in compliance with the *Federal Insecticide, Fungicide, and Rodenticide Act*. Regulations derived from this Act are administered by the EPA.

13.1.1.16 Hazardous Materials Transportation Act of 1975. The *Hazardous Materials Transportation Act* regulates the transport of hazardous materials and hazardous waste to and from the Hanford Site. Regulations promulgated pursuant to this Act are administered by the U.S. Department of Transportation and are set forth in 49 CFR Parts 100 to 177.

13.1.1.17 Dam Safety Act of 1986. The *Dam Safety Act* applies to the inspection of dams to ensure the integrity of structures. Dam safety at the Hanford Site is administered in accordance with the Washington State dam safety regulations (refer to Section 13.1.2.11).

13.1.1.18 National Environmental Policy Act of 1969. The *National Environmental Policy Act* (NEPA) establishes a broad national policy for protection of environmental quality and provides the means for implementing that policy early on in the decision-making process. Activities at the Hanford Site are subject to review for compliance with NEPA requirements. The U.S. Department of Energy is responsible for implementing NEPA requirements pursuant to its regulations (10 CFR 1021), which are based on the Council of Environmental Quality regulations (40 CFR 1500). For cleanup and closure activities, the requirements of NEPA (including cumulative impacts and environmental justice) will be integrated with the CERCLA response action and RCRA corrective action processes.

13.1.2 State Laws

This section contains a brief description of state laws that could be applicable to the Hanford Facility. Where appropriate, these descriptions cross-reference information presented in the previous section on federal laws. Permits and approvals prepared in response to these laws are identified in the Annual Status Report.

13.1.2.1 Washington Clean Air Act of 1967. The *Washington Clean Air Act* implements, at the state level, provisions of the federal *Clean Air Act* (refer to Section 13.1.1.3). Under the authority of this Act, Ecology establishes standards and rules in WAC 173-400 that generally are applicable to the control and/or prevention of air pollution from air contaminant sources. Under the provisions of Chapter 70.98 RCW, the Washington State Department of Health has sole responsibility for implementing the radiation protection provisions of the WAC 246-247. The Washington State Department of Health regulates sources that emit radionuclides to the air. In addition, the Washington State Department of Health and Ecology have established a memorandum of understanding that defines the roles and responsibilities of each department regarding administration of radiation control in the Washington State and on the Hanford Site in particular. Regulations relating to the *Washington Clean Air Act* include the following:

- General Regulations for Air Pollution Sources (WAC 173-400)

- Open Burning (WAC 173-425)

- Air Operating Permit Regulation (WAC 173-401)

* Controls for New Sources of Toxic Air Pollutants (WAC 173-460)

* Ambient Air Quality Standards and Emission Limits for Radionuclides (WAC 173-480)

* Emission Standards and Controls for Sources Emitting Gasoline Vapors (WAC 173-491)

* Radiation Protection - Air Emissions (WAC 246-247).

13.1.2.2 Washington Water Pollution Control Act of 1945. The *Washington Water Pollution Control Act* applies to surface and groundwaters of the State and implements, at the state level, provisions of the federal *Clean Water Act* (refer to Section 13.1.1.4). This Act requires the development of State Waste Discharge Permits and Onsite Sewage Disposal System Approvals and is administered by Ecology and the Washington State Department of Health. Regulations relating to water pollution and water quality include the following:

* *Washington State Waste Discharge Permitting Program* (WAC 173-216)

* *Underground Injection Control Program* (WAC 173-218)

* *Water Quality Standards for Ground Waters of the State of Washington* (WAC 173-200)

* *Water Quality Standards for Surface Waters of the State of Washington* (WAC 173-201)

* *On-Site Sewage System* (WAC 246-272).

13.1.2.3 Solid Waste Management Act of 1969. The *Solid Waste Management Act* serves to protect public health, to prevent land, air, and water pollution, and to conserve the state's natural, economic, and energy resources through the requirements set forth in WAC 173-304. The regulations in WAC 173-304 established the minimum standards that municipalities, regional agencies, state, and local governments must follow to provide a state-wide consistency and expectation as to the level at which solid waste must be managed. The *Solid Waste Management Act* provisions are administered by Ecology.

13.1.2.4 Hazardous Waste Reduction Act of 1988. The *Hazardous Waste Reduction Act* encourages voluntary efforts to redesign industrial, commercial, production, and other processes to result in the reduction or elimination of hazardous waste by-products and to maximize the in-process reuse or reclamation of valuable spent material. The Act establishes a legislative policy to encourage reduction in the use of hazardous substances and reduction in the generation of hazardous waste whenever economically and technically practicable. The provisions of the Act are administered by Ecology in accordance with the requirements set forth in WAC 173-307.

13.1.2.5 Washington Pesticide Control Act of 1971. The *Washington Pesticide Control Act* requires registration of pesticide applicators. This Act implements, at the state level, the *Federal Insecticide, Fungicide, and Rodenticide Act* (refer to Section 13.1.1.15). Regulations derived from this act are administered by the Washington State Department of Agriculture.

13.1.2.6 Washington Underground Storage Tank Law of 1989. The *Washington Underground Storage Tank Law* and the *Washington Underground Petroleum Storage Tank Law* regulate underground storage tanks, and set performance standards, operational and maintenance requirements, and tank closure requirements. The provisions of this law are administered by Ecology in accordance with the requirements set forth in WAC 173-360. This law implements, at the state level, Subchapter IX of RCRA, 42 USC § 6991 et seq.

13.1.2.7 Aquatic Lands Leases. Aquatic land activities that interfere with the general public's use of state-owned tidelands, shorelands, and beds of navigable waters, require authorization before construction from the Washington State Department of Natural Resources by way of agreement, lease, permit, or other instrument(s).

13.1.2.8 Hydraulic Projects Permits. Any construction or other work that will change the natural flow of a river, including the addition of treated effluent waste water that will increase the natural flow, is required to obtain a hydraulic project approval from the Washington State Department of Fisheries.

13.1.2.9 New Source Construction Permits. Before a new or modified source of regulated air emissions is constructed, installed, or established, Ecology (for nonradioactive emissions) or the Washington State Department of Health (for radioactive emissions) must review plans, specifications, associated information, and Notice of Construction (NOC) related to the new or modified source. A NOC is a written application to permit construction of a new source or modification of an existing source. The application describes the proposed design, assesses potential impacts to the public and environment, and provides an assessment of best available control technology. A NOC for air emissions could be required because of requirements of the following regulations: WAC 173-400 (including 40 CFR 60 and 61), WAC 173-460, and WAC 246-247.

13.1.2.10 Septic System Approvals/Permits. Plans and specifications for construction of a new sanitary sewer system or modification of an existing system are submitted and approved by the Washington State Department of Health before construction or entering into a contract for construction. Septic systems with design capacities greater than 54,888 liters per day are governed by State Waste Discharge Permits (WAC 173-216) and the engineering report, plan, and specification approval process described in WAC 173-240.

13.1.2.11 Dam Safety Regulations. The Dam Safety regulations contained in WAC 173-175 are administrated by Ecology. The regulations are applicable to dams that can impound a volume of 1.23 hectare-meters or more of water as measured at the dam crest elevation. For the Hanford Site, the regulations potentially could apply to disposal basins, retention basins, lined lagoons, etc., if DOE constructs dams and fails to develop a dam safety program for periodic inspection of completed projects. The 1.23 hectare-meters threshold applies to dams that can impound water on either an intermittent or permanent basis.

13.1.3 Local Requirements

This section contains a brief description of local requirements (e.g., those administered by Benton County or the city of Richland) that could be applicable to the Hanford Facility. Permits and approvals prepared in response to these requirements are identified in the Annual Status Report.

13.1.3.1 Building Permit. Local building permits are not required for construction on the Hanford Site. New construction on the Hanford Site is designed and constructed in accordance with the requirements set forth in U.S. Department of Energy Order 6430.1A.

13.1.3.2 Grading Permit. Local grading permits are not required on the Hanford Site. Excavation permits are issued internally in accordance with the requirements set forth in U.S. Department of Energy Order 5400.1.

13.1.3.3 Waste Water Pretreatment Discharge Authorization. A permit application could be required before discharging sewage, industrial waste, or other waste to the city of Richland's sewage treatment plant. The need for a permit application depends on whether the activity is considered a Significant Industrial Discharge by the city or fits a national pretreatment category. Permits applications are not required for discharges that fall within one of the national pretreatment categories.

13.1.3.4 Washington Shoreline Management Act of 1971. The *Washington Shoreline Management Act* regulates development or construction affecting the shorelines of the State. A permit for developing the shoreline is required before construction for shorelines not federally owned, but under lease, easement, license, or other similar federal property rights short of fee ownership. The *Washington Shoreline Management Act* provisions are administered by the Benton County Planning Commission.

13.1.3.5 Benton Clean Air Authority Regulation 1. Regulation 1 of the Benton Clean Air Authority is divided into various sections termed articles that address odors, dust, open burning, and asbestos regulations. Ecology has delegated authority to the Benton Clean Air Authority to enforce the state regulations governing open burning and asbestos.

13.2 STATE ENVIRONMENTAL POLICY ACT

A SEPA determination is used by Washington State regulatory agencies to decide whether a proposed action is likely to have significant or nonsignificant adverse environmental impact. A SEPA Environmental Checklist for the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28) was prepared in accordance with WAC 197-11-960 and submitted with the application in October 1991. On January 21, 1992, Ecology issued a letter (Ecology 1992) documenting that a determination of nonsignificance was made for the issuance of a dangerous waste management permit for the Hanford Facility. Therefore, the SEPA Environmental Checklist requirements noted in Section J of Ecology's permit application requirements have been fulfilled for the General Information Portion of the permit application. The SEPA Environmental Checklists for individual TSD units either are contained, or referenced, in the Unit-Specific Portion of this permit application or in closure plan, closure/postclosure plan, or postclosure permit application documentation.

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Table 13-1. Summary of Other Federal and State Laws and Local Requirements That Could Be Applicable to the Hanford Facility. (sheet 1 of 6)

Chapter section	Law/requirement	Agency	Regulated media, activity
13.1.1.1	*Atomic Energy Act of 1954*	U.S. Department of Energy	Radioactive waste disposal.
13.1.1.2	*Federal Facility Compliance Act of 1992*	U.S. Environmental Protection Agency	Waives sovereign immunity from RCRA for federal facilities.
13.1.1.3	*Clean Air Act of 1977* (CAA)	U.S. Environmental Protection Agency	Air emissions, ambient air quality, and asbestos; requires permits for air pollution sources.
13.1.1.4	*Clean Water Act of 1977* (CWA)	U.S. Environmental Protection Agency	Water quality of surface waters; requires permits for discharge of liquid effluents to surface waters and for dredge or fill activities in "waters of the United States"; provides for protection of wet lands.
13.1.1.4	*Clean Water Act of 1977*	U.S. Army Corps of Engineers	Dredge and fill permits; wet lands protection.
13.1.1.5	*Safe Drinking Water Act of 1974* (SDWA)	U.S. Environmental Protection Agency	Sets drinking water standards and protects groundwater; regulates underground injection wells.
13.1.1.6	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA)	U.S. Environmental Protection Agency	Requires reporting of spills, releases; requires cleanup of historic disposal of hazardous wastes or substances.
13.1.1.6	CERCLA	U.S. Department of Interior	Establish criteria for the natural resource damage assessment process.
13.1.1.6	*Superfund Amendments and Reauthorization Act of 1986*	U.S. Environmental Protection Agency	Updates and amends CERCLA.

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Table 13-1. Summary of Other Federal and State Laws and Local Requirements That Could Be Applicable to the Hanford Facility. (sheet 2 of 6)

	Chapter section	Law/requirement	Agency	Regulated media, activity
1	13.1.1.7	*Emergency Planning and Community Right-to-Know Act of 1986* (EPCRA)	U.S. Environmental Protection Agency	Requires emergency planning, emergency release notification, community right-to-know reporting, and toxic chemical release and inventory reporting.
2	13.1.1.8	*Toxic Substances Control Act of 1976*	EPA	Polychlorinated biphenyls (PCBs) and newly manufactured chemicals.
3	13.1.1.9	*Wild and Scenic Rivers Act of 1968*	U.S. Department of Interior	Activity impact to Wild and Scenic Rivers.
4	13.1.1.10	Public Law 100-605 of 1988 (Hanford Reach Study Act, Comprehensive River Conservation Study)	U.S. Department of Interior-National Park Service	Hanford Reach of the Columbia River.
5	13.1.1.11	*Rivers and Harbors Act of 1899*	U.S. Army Corps of Engineers	Construction of river obstructions.
6	13.1.1.12	*National Historic Preservation Act of 1966*	U.S. Department of Interior-Advisory Council on Historic Preservation	Historical sites, buildings, and areas.
7	13.1.1.12	*National Historic Preservation Act of 1966*	Washington Department of Community Development	Consultation of federal agency projects/activities that may impact historic buildings, etc.
8	13.1.1.12	*American Antiquities Act of 1906*	U.S. Department of Interior-Advisory Council on Historic Preservation	Historical antiquities.
9	13.1.1.12	*Historic Sites, Buildings and Antiquities Act of 1935*	U.S. Department of Interior-Advisory Council on Historic Preservation	Historical sites, buildings, and antiquities.

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Table 13-1. Summary of Other Federal and State Laws and Local Requirements That Could Be Applicable to the Hanford Facility. (sheet 3 of 6)

	Chapter section	Law/requirement	Agency	Regulated media, activity
1	13.1.1.12	*Archaeological and Historic Preservation Act of 1960*	U.S. Department of Interior-Advisory Council on Historic Preservation	Archaeological resources.
2	13.1.1.12	*Archeological Resources Protection Act of 1979*	U.S. Department of Interior-Advisory Council on Historic Preservation	Archeological resources.
3	13.1.1.12	*American Indian Religious Freedom Act of 1978*	U.S. Department of Interior-Advisory Council on Historic Preservation	American indian religious activities and areas.
4	13.1.1.13	*Endangered Species Act of 1973*	U.S. Department of Interior-Advisory Council on Historic Preservation	All species of plants and animals listed as endangered and their habitats.
5	13.1.1.14	*Fish and Wildlife Coordination Act of 1934*	U.S. Department of Interior-Fish and Wildlife Service	Fish and wildlife resources and habitats.
6	13.1.1.14	*Migratory Bird and Treaty Act of 1918*	U.S. Department of Interior-Fish and Wildlife Service	All migratory birds and habitats.
7	13.1.1.14	*Bald and Golden Eagle Protection Act of 1940*	U.S. Department of Interior-Fish and Wildlife Service	Bald and golden eagles and habitats.
8	13.1.1.15	*Federal Insecticide, Fungicide and Rodenticide Act of 1975*	U.S. Environmental Protection Agency	Regulates the manufacture, sale, and use of pesticides and disposal of pesticides and containers.
9	13.1.1.16	*Hazardous Materials Transportation Act of 1975*	U.S. Department of Transportation	All hazardous materials being transported.

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Table 13-1. Summary of Other Federal and State Laws and Local Requirements That Could Be Applicable to the Hanford Facility. (sheet 4 of 6)

	Chapter section	Law/requirement	Agency	Regulated media, activity
1	13.1.1.17	*Dam Safety Act of 1986*	Washington State Department of Ecology	Integrity of dam structures.
2	13.1.1.18	*National Environmental Policy Act of 1969*	Council on Environmental Quality	Requires federal agencies to consider potential environmental impacts of actions early on in the decision making process and to prepare appropriate documentation identifying those impacts.
3	13.1.2.1	*Washington Clean Air Act of 1967*	Washington State Department of Ecology	Controls air pollution in Washington; requires notifications of construction for new or modified sources and facility air operating permits.
4	13.1.2.1	*Washington Clean Air Act of 1967*	Washington State Department of Health	Radioactive air emissions; requires permits for air pollution sources that emit radioactive air pollutants.
5	13.1.2.2	*Washington Water Pollution Control Act of 1945*	Washington State Department of Ecology	Surface and groundwaters in the State; requires State waste discharge permits, onsite sewage disposal system approvals.
6	13.1.2.3	*Solid Waste Management Act of 1969*	Washington State Department of Ecology	Addresses requirements of disposal of nonhazardous solid wastes.
7	13.1.2.4	*Hazardous Waste Reduction Act of 1988*	Washington State Department of Ecology	Policy to encourage reductions in hazardous waste generation.
8	13.1.2.5	*Washington Pesticide Control Act of 1971*	Washington State Department of Agriculture	Requires registration of pesticide applicators.

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Table 13-1. Summary of Other Federal and State Laws and Local Requirements That Could Be Applicable to the Hanford Facility. (sheet 5 of 6)

	Chapter section	Law/requirement	Agency	Regulated media, activity
1	13.1.2.6	Washington Underground Storage Tank Law and Washington Underground Petroleum Storage Tank Law of 1989	Washington State Department of Ecology	Regulates underground storage tanks; sets performance standards, operational and maintenance requirements, and tank closure requirements.
2	13.1.2.7	Aquatic Land Leases	Washington State Department of Natural Resources	Impacts activities that interfere with state-owned tidelands, shorelands, and beds of navigable waters.
3	13.1.2.8	Hydraulic Projects Permits	Washington State Department of Fisheries	Impacts construction or activity that will change natural flow of a river.
4	13.1.2.9	New Source Construction Permits	Washington State Department of Ecology (nonradioactive emissions) and Washington State Department of Health (radioactive emissions)	Impacts new and modified sources of regulated air emissions.
5	13.1.2.10	Septic System Approvals/Permits	Washington State Department of Health (less than or equal to 54,888 liters per day) Washington State Department of Ecology (greater than 54,888 liters per day)	Requires submittal and approval for plans and specifications for construction and/or modification of sewage systems.
6	13.1.2.11	Dam Safety Regulations	Washington State Department of Ecology	Could affect Hanford if U.S. Department of Energy constructs dams and fails to develop a dam safety program.
7	13.1.3.1	Building Permit	U.S. Department of Energy	Requires Hanford construction in accordance with U.S. Department of Energy requirements.

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Table 13-1. Summary of Other Federal and State Laws and Local Requirements That Could Be Applicable to the Hanford Facility. (sheet 6 of 6)

Chapter section	Law/requirement	Agency	Regulated media, activity
13.1.3.2	Grading Permit	U.S. Department of Energy	Requires excavation activities at Hanford to comply with U.S. Department of Energy requirements.
13.1.3.3	Waste Water Pretreatment Discharge Authorization	Washington State Department of Ecology	Requires certain conditions be met for waste water discharges to publicly owned treatment works.
13.1.3.4	*Washington Shoreline Management Act of 1971*	Benton County Planning Commission	Regulates development or construction affecting the shorelines of the State.
13.1.3.5	Benton Clean Air Authority Regulation 1	Benton Clean Air Authority	Imposes restrictions on odors, dust, open burning, and asbestos management.
	Many federal and state laws require consultation with other agencies on a variety of issues and requirements which result in additional regulatory requirements.	Other federal and state agencies	Examples include consultations with state and other federal agencies on CERCLA actions to determine applicable, relevant, and appropriate regulatory requirements for cleanup activities and the CERCLA requirement that DOE notify and coordinate with other natural resource trustees on potential damages.

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14.0 CERTIFICATION [K]

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John D. Wagoner — 7/26/96

Owner/Operator — Date
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

7/17/96

Co-operator* — Date
A. LaMar Trego, President
Westinghouse Hanford Company

* Westinghouse Hanford Company has responsibilities for the following treatment, storage, and/or disposal units on the Hanford Facility and is signing for the purpose of these units only: Double-Shell Tank System, 204-AR Waste Unloading Station, 242-A Evaporator, 222-S Laboratory Complex, 200 Area Effluent Treatment Facility, Liquid Effluent Retention Facility, Central Waste Complex, Waste Receiving and Processing, Low-Level Burial Grounds, 224-T Transuranic Waste Storage and Assay Facility, T Plant Complex, 616 Nonradioactive Dangerous Waste Storage Facility, PUREX Storage Tunnels, 207-A South Retention Basin, 216-B-63 Trench, 4843 Alkali Metal Storage Facility, 105-DR Large Sodium Fire Facility, 3718-F Alkali Metal Treatment and Storage Area, 300 Area Waste Acid Treatment System, 303-M Oxide Facility, 303-K Storage Unit, PUREX Plant, 241-Z Treatment and Storage Tanks, B Plant Complex, 1706-KE Waste Treatment System, 221-T Containment Systems Test Facility, 2727-WA Sodium Reactor Experiment Sodium Storage Building, 437 Maintenance and Storage Facility, Sodium Storage Facility and Sodium Reaction Facility, 600 Area Purgewater Storage and Treatment Facility, Single-Shell Tank System, Grout Treatment Facility, and the Hanford Waste Vitrification Plant.

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I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John D. Wagoner 7/26/96

Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

Date

18 July 1996

Co-operator*
William J. Madia, Director
Pacific Northwest National Laboratory

Date

* Pacific Northwest National Laboratory has responsibilities for the following treatment, storage, and/or disposal units on the Hanford Facility and is signing for the purpose of these units only: 325 Hazardous Waste Treatment Units, 305-B Storage Unit, 324 Pilot Plant, Biological Treatment Test Facilities, and the 332 Storage Facility.

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14.0 CERTIFICATION [K]

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John D. Wagoner — 7/26/96

Owner/Operator — Date
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

Joseph F. Nemec — 7/18/96

Co-operator* — Date
Joseph F. Nemec, President
Bechtel Hanford, Inc.

* Bechtel Hanford, Inc. has responsibilities for the following treatment, storage, and/or disposal units on the Hanford Facility and is signing for the purpose of these units only: *Hexone Storage and Treatment Facility*, 241-CX Tank System, 183-H Solar Evaporation Basins, 1324-N Surface Impoundment, 1301-N Liquid Waste Disposal Facility, 1325-N Liquid Waste Disposal Facility, 1324-NA Percolation Pond, 100-D Ponds, 216-S-10 Pond and Ditch, 216-A-29 Ditch, 216-B-3 Main Pond, 216-A-10 Crib, 216-U-12 Crib, 216-A-36B Crib, 216-A-37-1 Crib, 300 Area Process Trenches, and the Nonradioactive Dangerous Waste Landfill.

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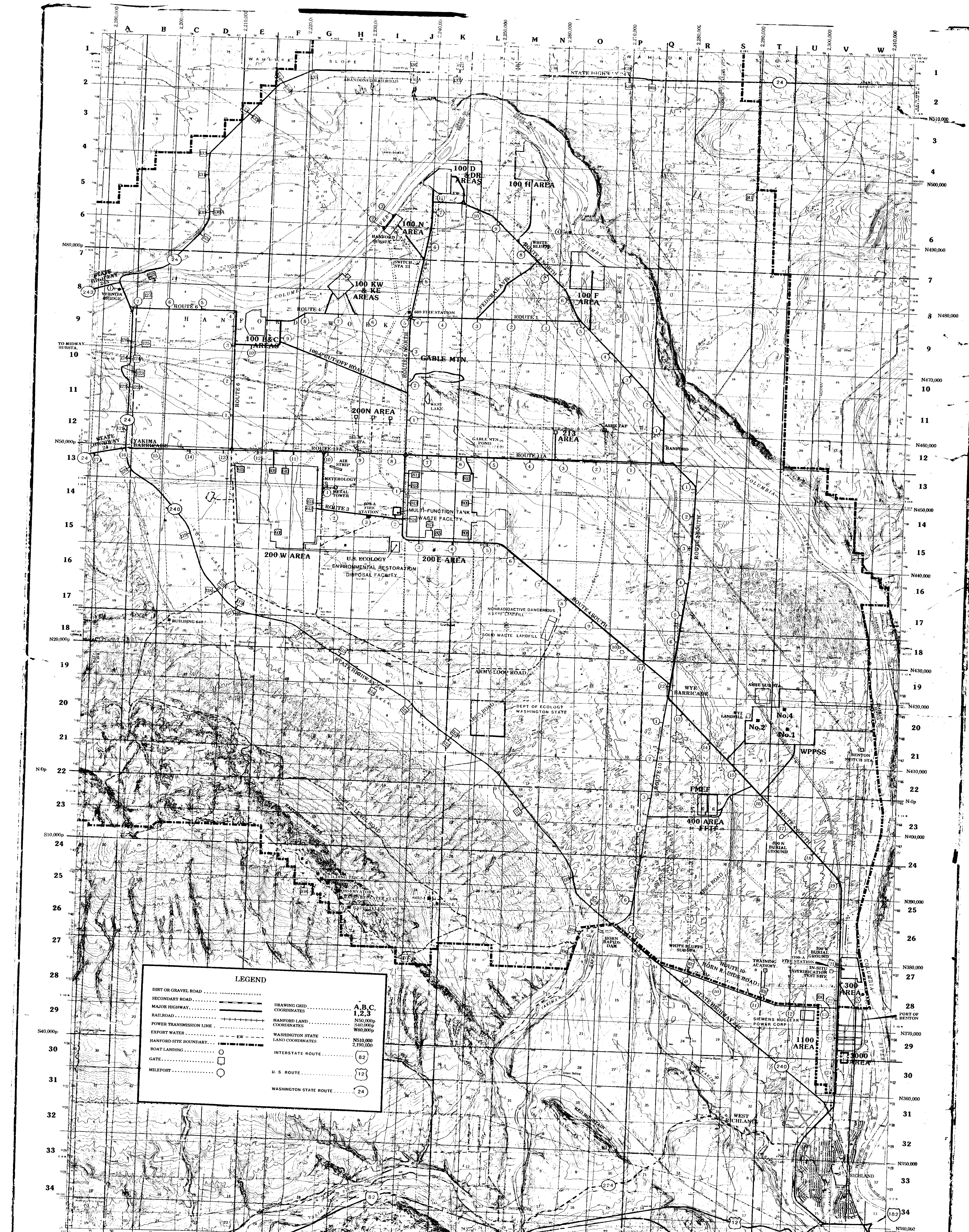

SITE PLAN

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		Westinghouse Hanford Company
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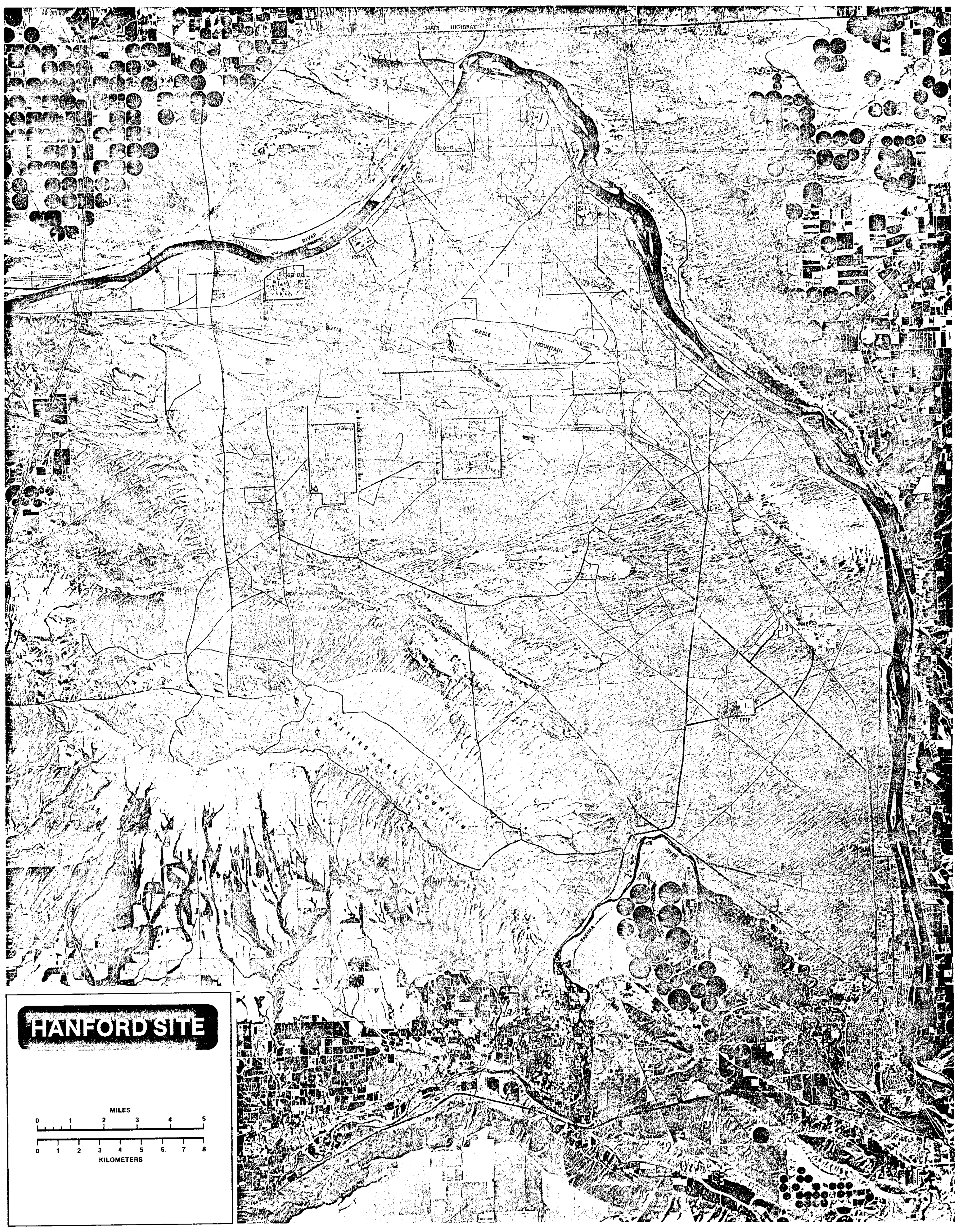
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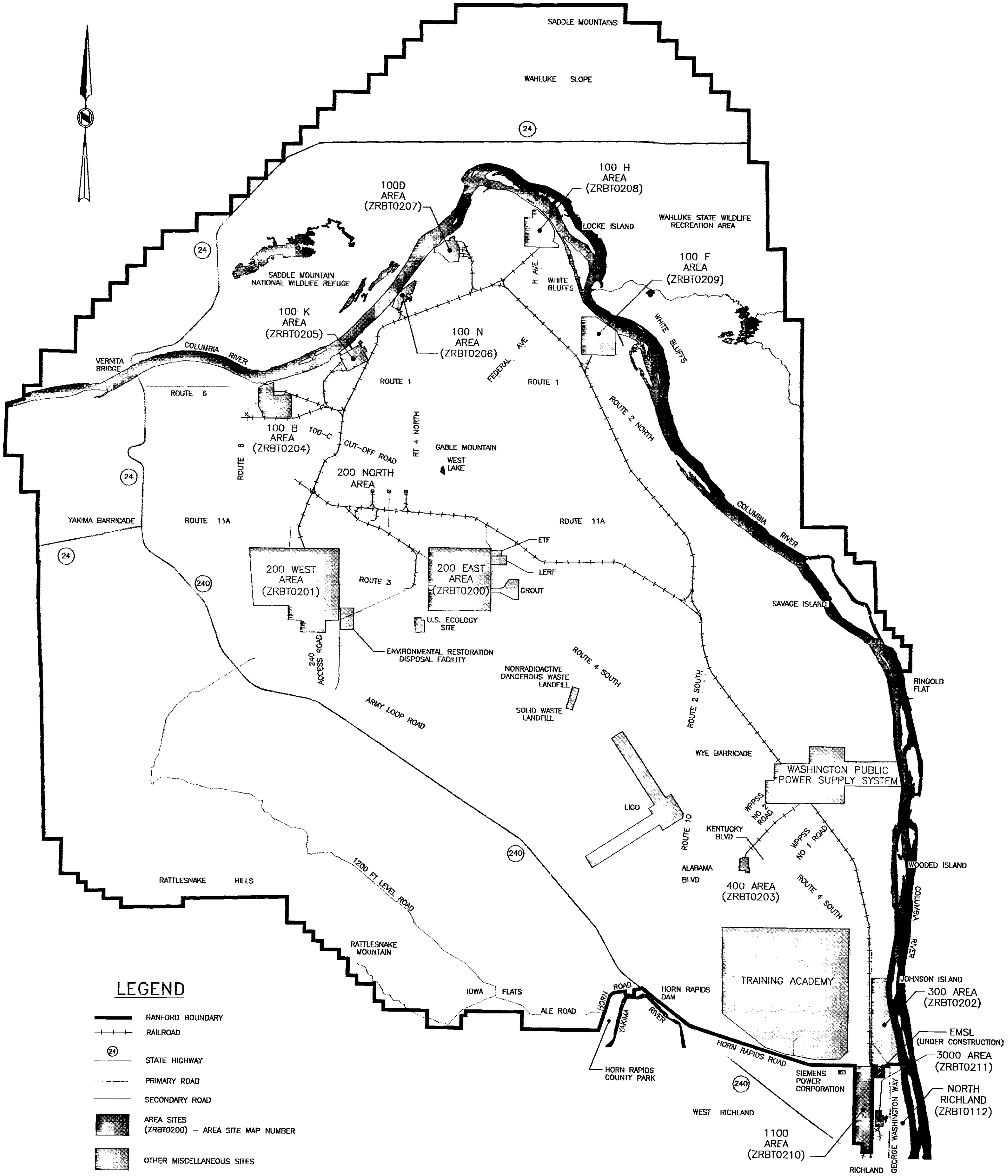

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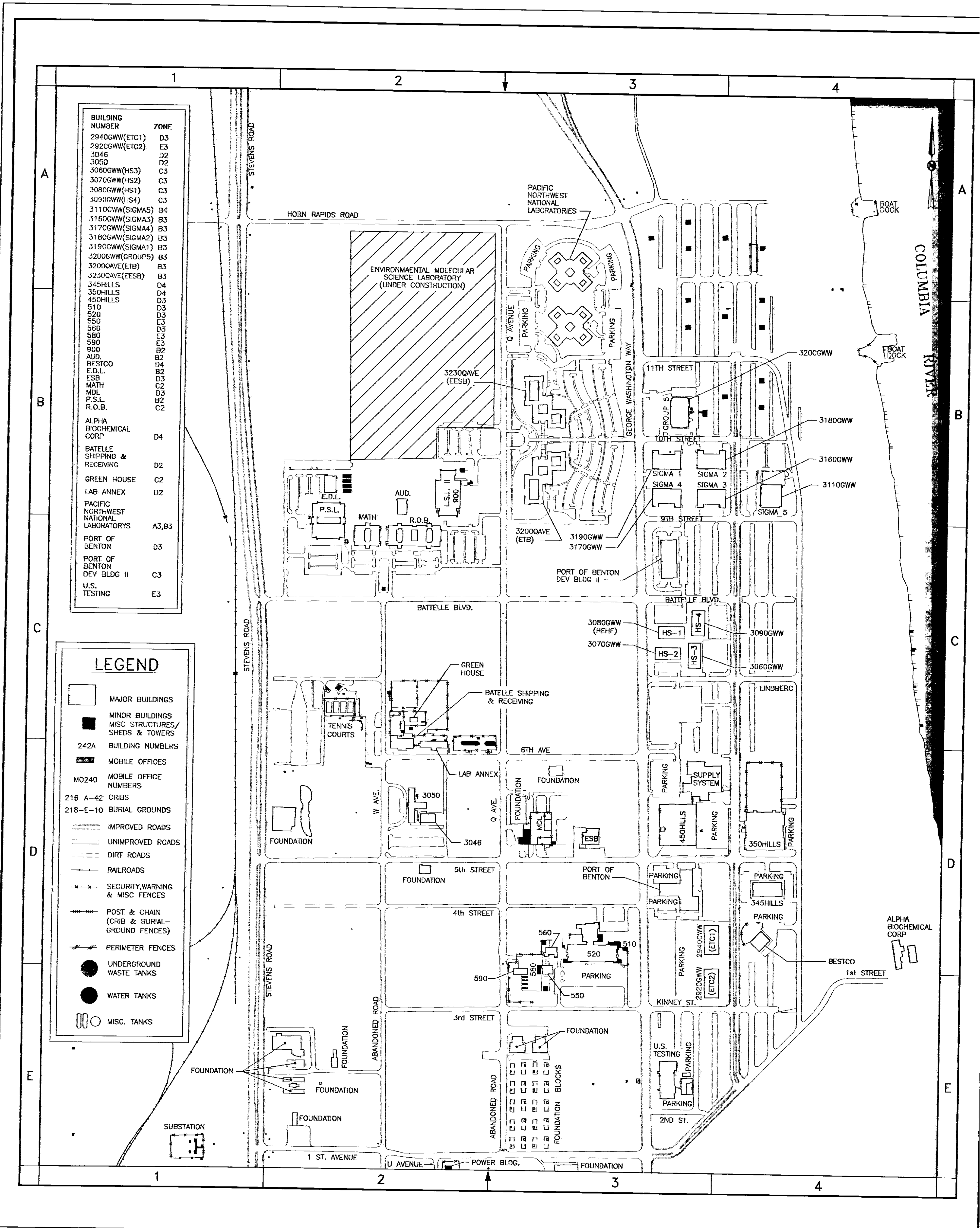

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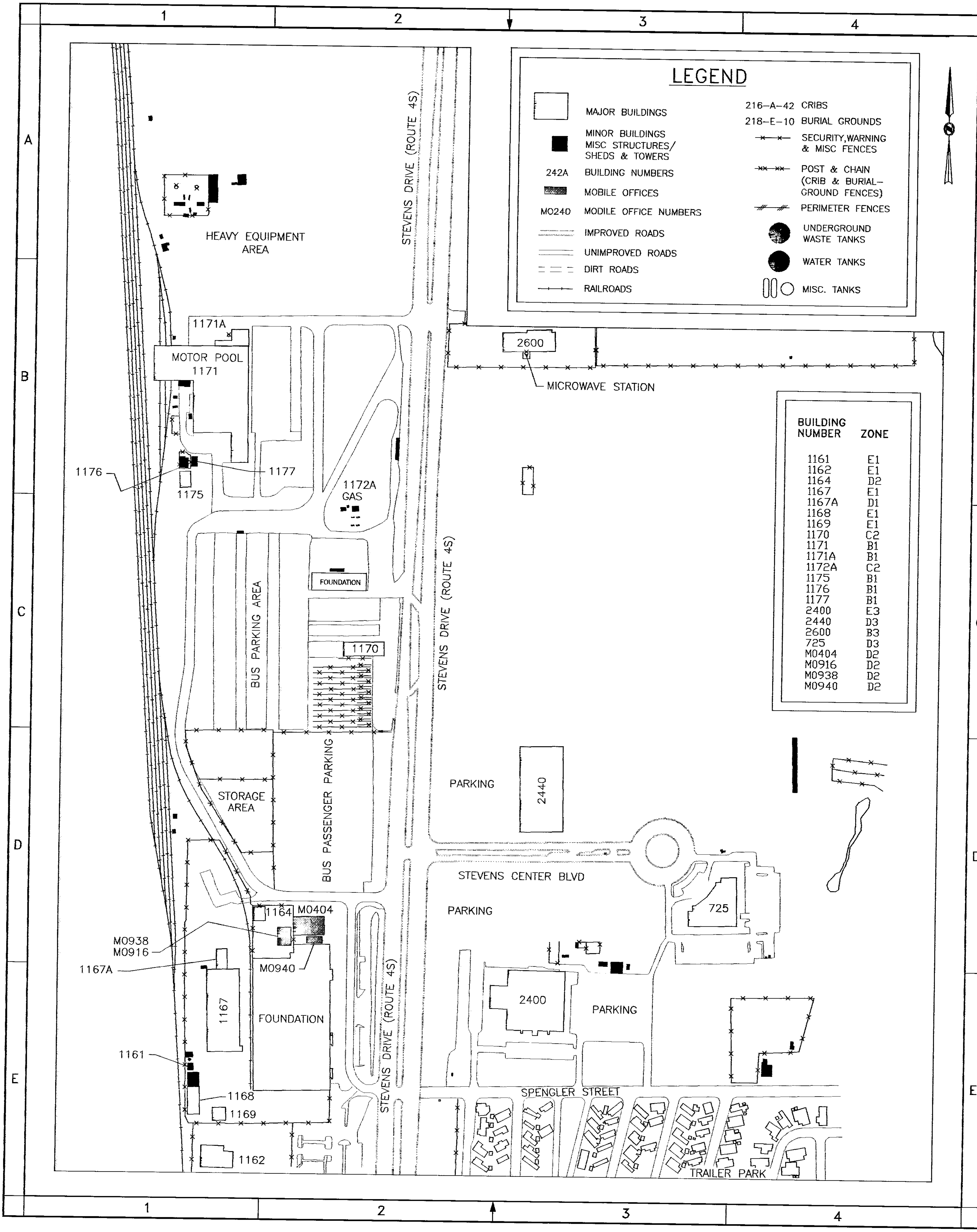

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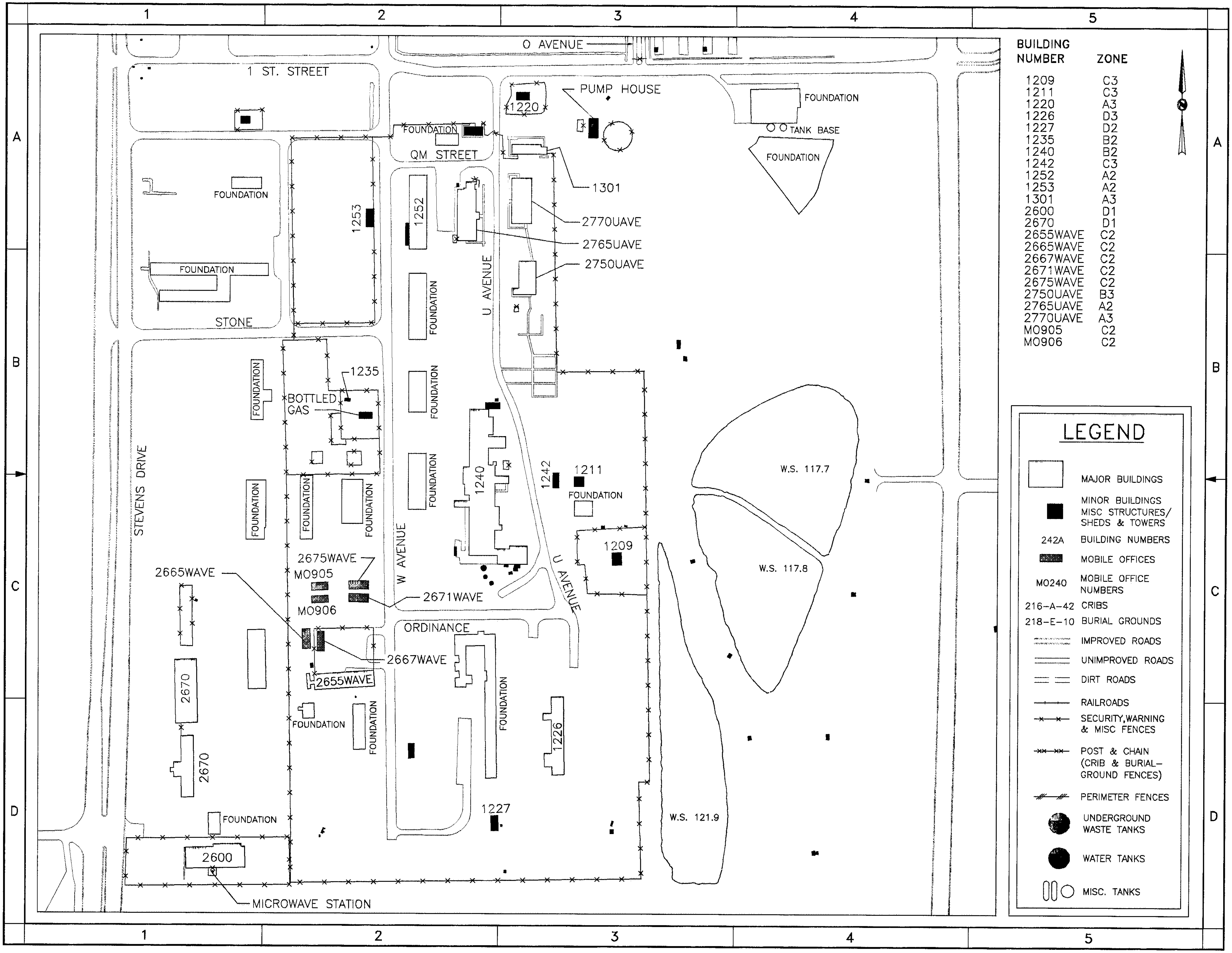

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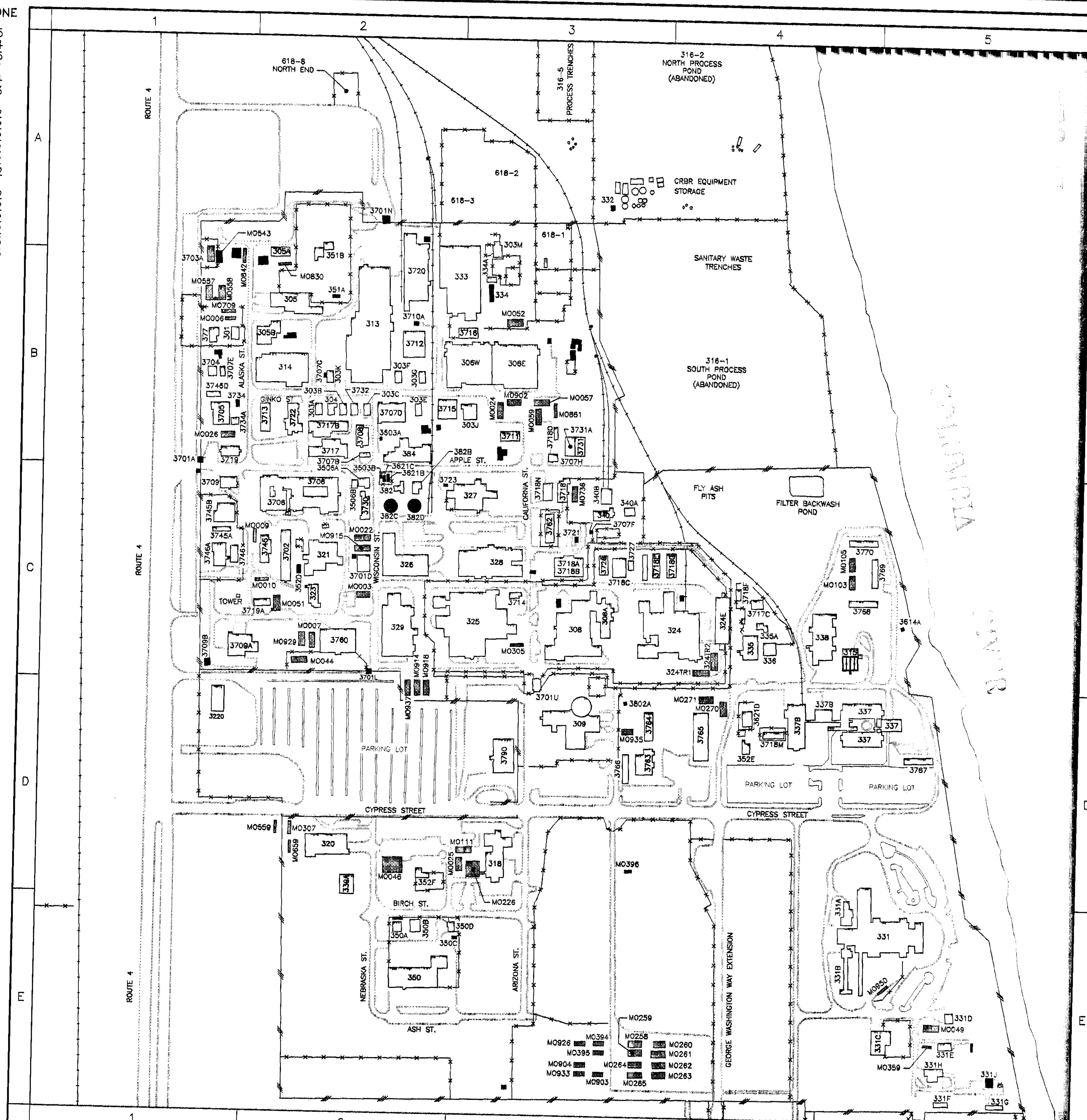
BUILDING NUMBER	ZONE	BUILDING NUMBER	ZONE	BUILDING NUMBER	ZONE
301	B1	352E	D4	3767	D5
303A	B2	352F	D2	3768	C4
303B	B2	3614A	C5	3769	C5
303C	B2	3621B	C2	377	B1
303E	B2	3621C	C2	3770	C4
303F	B2	3621D	D4	3790	D3
303G	B2	3701A	B1	3802A	D3
303J	B3	3701D	C2	382	C2
303K	B2	3701L	C2	382B	C2
303M	A3	3701N	A2	382C	C2
304	B2	3701U	D3	382D	C2
305	B2	3702	C2	384	B2
305A	B2	3703A	B1	M0003	C2
305B	B2	3704	B1	M0006	B1
306E	B3	3705	B1	M0007	C2
306W	B3	3706	C2	M0009	C2
308	C3	3707B	B2	M0010	C2
308A	C3	3707D	B2	M0022	C2
309	D3	3707E	B1	M0024	B3
313	B2	3707F	C3	M0025	D3
314	B2	3707G	B2	M0026	B1
315	C4	3707H	B3	M0044	C2
318	D3	3708	B2	M0046	D2
320	D2	3709	C1	M0049	E5
321	C2	3709A	C1	M0051	C2
3220	D1	3709B	C1	M0052	B3
323	C2	3710A	B2	M0057	B3
324	C4	3711	B3	M0059	B3
324E	C4	3712	B2	M0103	C4
324TR1	C4	3713	B2	M0105	C4
324TR2	C4	3714	C3	M0111	D3
325	C3	3715	B2	M0226	D3
326	C2	3716	B3	M0258	E3
327	C3	3717	B2	M0259	E3
328	C3	3717B	B2	M0260	E4
329	C2	3717C	C4	M0261	E4
331	E5	3718	C3	M0262	E4
331A	E4	3718A	C3	M0263	E4
331B	E4	3718B	C3	M0264	E3
331C	E5	3718C	C3	M0265	E3
331D	E5	3718E	C3	M0270	D4
331E	E5	3718F	C4	M0271	D4
331F	E5	3718G	C4	M0305	C3
331G	E5	3718M	D4	M0307	D2
331H	E5	3718N	C3	M0350	C2
31J	E5	37180	B3	M0359	E5
32	A3	3719	B1	M0394	E3
33	B2	3719A	C2	M0395	E3
34	B3	3720	B2	M0396	D3
34A	B3	3721	C3	M0543	B1
35	C4	3722	B2	M0557	B1
35A	C4	3723	C2	M0558	B1
36	C4	3727	C3	M0559	D2
37	D4	3728	C3	M0565	B1
37B	D4	3730	C2	M0659	D2
38	C4	3731	B3	M0709	B1
39A	D2	3731A	B3	M0736	C3
40	C3	3732	B2	M0830	B2
40A	C3	3734	B1	M0842	B1
40B	C3	3734A	B1	M0861	B3
50	E2	3745	C2	M0902	B3
503A	B2	3745A	C1	M0903	E3
503B	C2	3745B	C1	M0904	E3
506A	C2	3746	C1	M0914	D2
506B	C2	3746A	C1	M0915	C2
50A	E2	3746D	B1	M0918	D2
50B	E2	3760	C2	M0926	E3
50C	E3	3762	C3	M0929	C2
50D	E3	3763	D3	M0933	E3
51A	B2	3764	D3	M0935	D3
51B	B2	3765	D4	M0937	D2
52D	C2	3766	D3	M0950	E5

LEGEND

- MAJOR BUILDINGS
- MINOR BUILDINGS MISC STRUCTURES/ SHEDS & TOWERS
- 242A BUILDING NUMBERS
- MOBILE OFFICES
- M0240 MOBILE OFFICE NUMBERS
- -A-42 CRIBS
- -E-10 BURIAL GROUNDS
- ROADS
- RAILROADS
- SECURITY,WARNING & MISC FENCES
- POST & CHAIN (CRIB & BURIAL-GROUND FENCES)
- PERIMETER FENCES
- UNDERGROUND WASTE TANKS
- WATER TANKS
- MISC. TANKS



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ICF KAISER HANFORD COMPANY
MAPPING SERVICES GROUP (376-4433)

CADFILE: ZRBT0202
DATE: 7-24-96

DRAWN BY: RAFAEL TORRES

TITLE: 300 AREA

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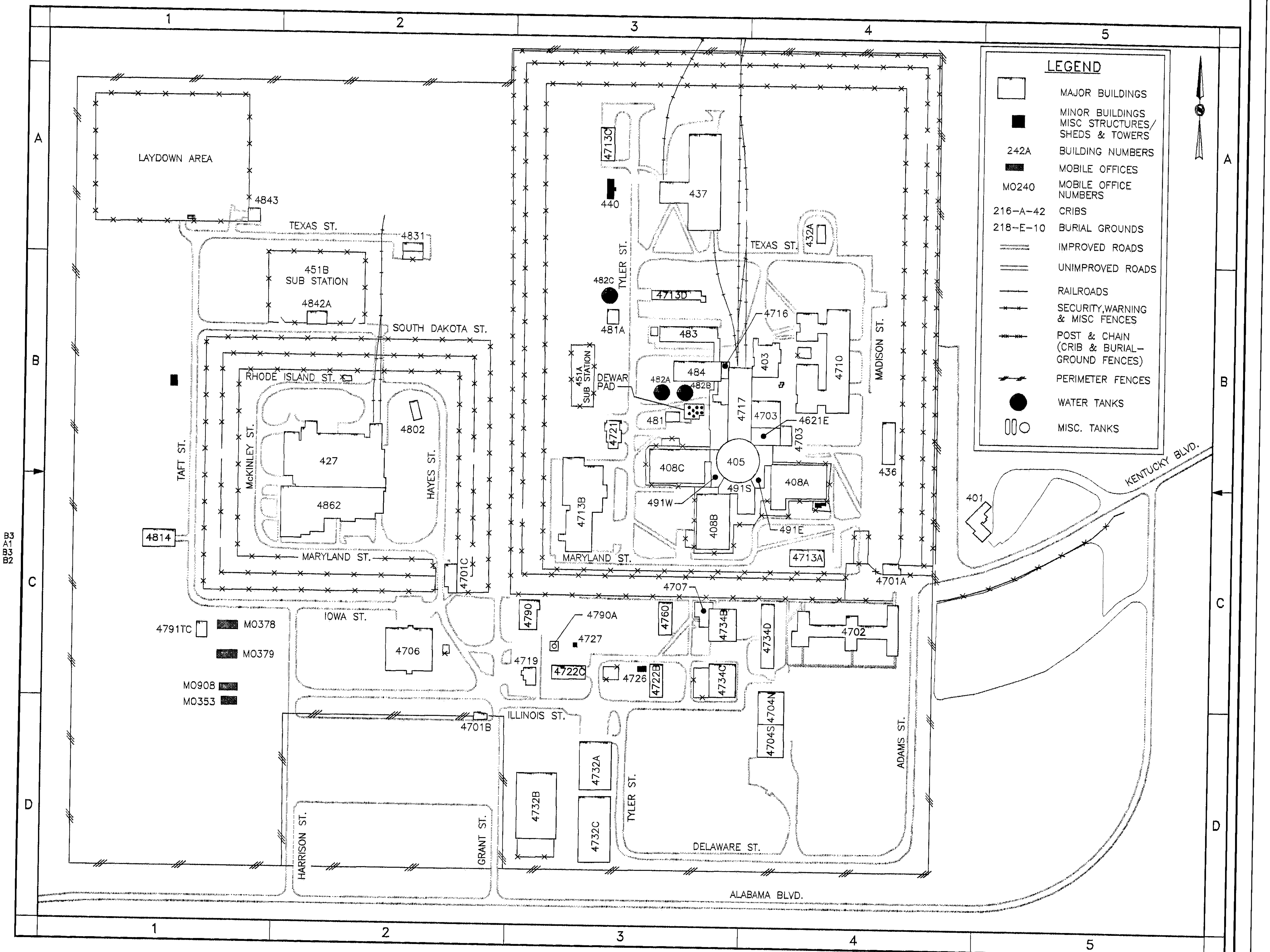
LDING IBER	ZONE
01	C4
03	B4
05	B3
08A	B4
08B	C3
08C	B3
27	B2
32A	A4
36	B4
37	A3
40	A3
621E	B4
701A	B4
701B	D2
701C	C2
702	B4
703	B4
703	B4
704N	D4
704S	D4
706	C2
707	C3
710	B4
713A	B4
713B	C3
713C	A3
713D	B3
716	B3
717	B3
719	C3
721	B3
722B	C3
722C	C3
726	C3
727	C3
32A	D3
32B	D3
32C	D3
34B	C3
34C	C3
34D	B4
60	C3
90	C3
91TC	C1
02	B2
1	B3
14	C1
1A	B3
3	B3
31	A2
4	B3
42A	B2
43	A1
62	C2
1E	B4
1S	C3
1W	B3
353	D1
378	C1
379	C1
908	C1
VER	C3
VAR PAD	B3
DOWN AREA	A1
A SUB STATION	B3
B SUB STATION	B2



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ICF KAISER HANFORD COMPANY
MAPPING SERVICES GROUP (376-4433)

CADFILE: ZRBT0203
DATE: 5-3-95

DRAWN BY: RAFAEL TORRES

TITLE: 400 AREA

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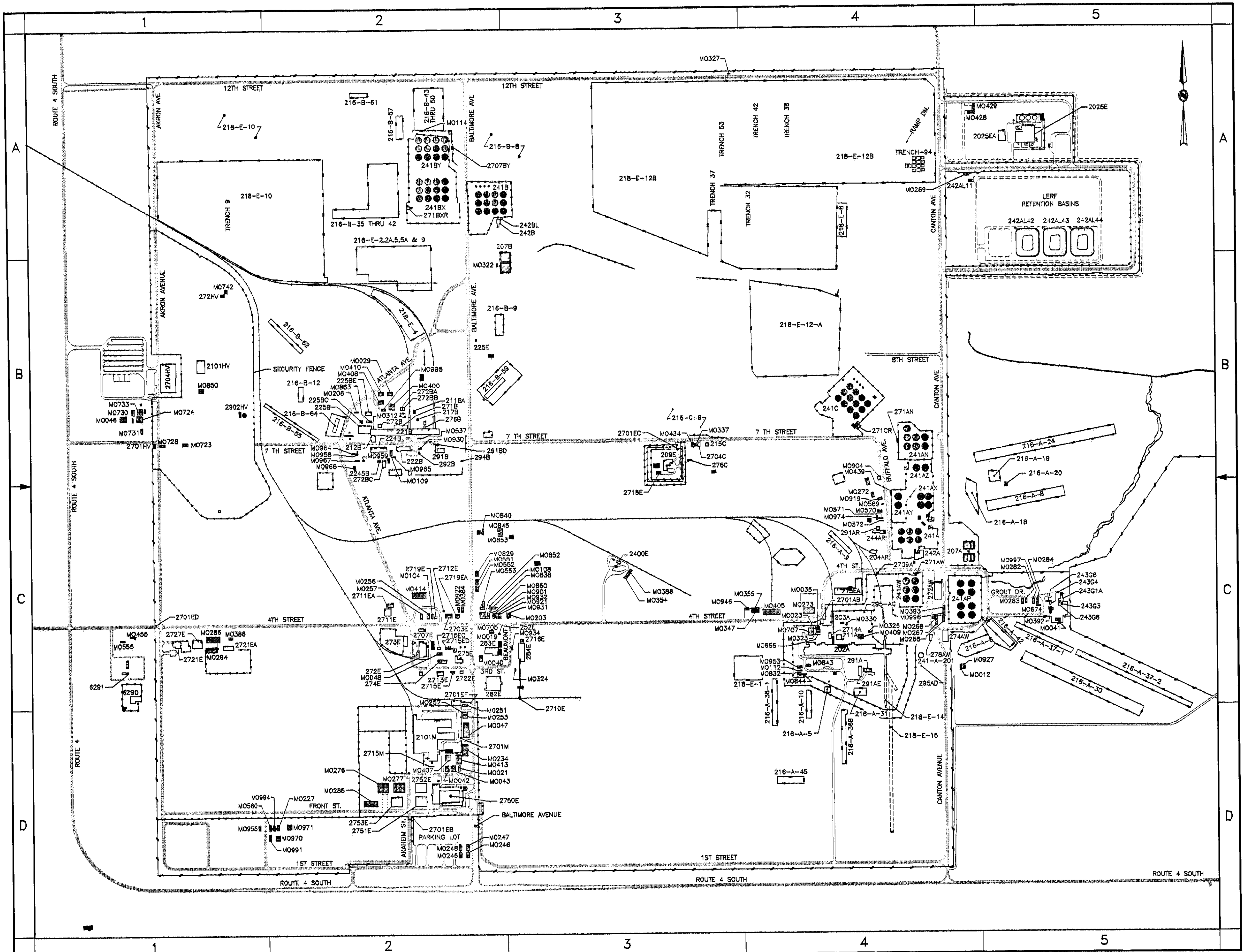
BUILDING NUMBER	ZONE	BUILDING NUMBER	ZONE
)2A	C4	M0108	C2
)3A	C4	M0109	B2
)4AR	C4	M0112	C4
)7A	C4	M0114	A2
)7B	B3	M0203	C3
)9E	B3	M0206	B2
)25E	A5	M0227	D2
)25EA	A5	M0234	D2
I01HV	B1	M0245	D2
I01M	D2	M0246	D2
I1A	C4	M0247	D2
I1BA	B2	M0248	D2
12B	B2	M0251	C2
15C	B3	M0252	D2
17B	B2	M0253	D2
21B	B2	M0256	C2
22B	B2	M0257	C2
245B	B2	M0266	C4
24B	B2	M0267	C4
25B	B2	M0268	C4
25BC	B2	M0269	A5
25BE	B2	M0272	C4
25E	B2	M0273	C4
400E	C3	M0276	D2
42A	C4	M0277	D2
42AL11	A4	M0282	C4
42B	A2	M0283	C4
42BL	A2	M0284	C4
43G1A	C5	M0285	D2
43G3	C5	M0286	C1
43G4	C5	M0294	C1
43G6	C5	M0312	B2
43G8	C5	M0322	B2
44AR	C4	M0323	C4
52E	C2	M0324	C3
72HV	B1	M0325	C4
78AW	C4	M0327	A3
701AB	C4	M0330	C4
701EB	D2	M0337	B3
701EC	B3	M0347	C4
701ED	C1	M0354	C3
701EF	C2	M0355	C4
701HV	B1	M0384	C2
701M	D2	M0386	C3
703E	C2	M0388	C1
704C	B3	M0392	C5
704HV	B1	M0393	C4
707BY	A2	M0400	B2
707E	C2	M0405	C4
709A	C4	M0407	D2
710E	C3	M0408	B2
711E	C2	M0409	C4
711EA	C2	M0410	B2
712E	C2	M0413	D2
713E	C2	M0414	C2
714A	C4	M0428	A5
715E	C2	M0429	A5
715EC	C2	M0434	B3
715ED	C2	M0439	C4
715M	D2	M0455	C1
716E	C3	M0537	B2
718E	B3	M0551	C2
719E	C2	M0552	C2
719EA	C2	M0553	C2
71AN	B4	M0555	C1
71AW	C4	M0560	D2
71B	B2	M0569	C4
71BXR	A2	M0570	C4
71CR	B4	M0571	C4
2721E	C1	M0572	C4
2721EA	C1	M0666	C4
2722E	C2	M0674	C5
2727E	C1	M0705	C2
272AW	C4	M0707	C4
272B	B2	M0723	B1
272BA	B2	M0724	B1
272BB	B2	M0728	B1
272BC	B2	M0730	B1
272E	C2	M0731	B1
273E	C2	M0733	B1
274AW	C4	M0742	B1
274E	C2	M0829	C2
2750E	D2	M0832	C4
2751E	D2	M0838	C2
2752E	D2	M0840	C2
2753E	D2	M0843	C4
275E	C2	M0844	C4
275EA	C4	M0845	C2
276B	B2	M0850	B1
276C	B3	M0852	C2
282E	C2	M0853	C2
283E	C2	M0860	C2
284E	C3	M0863	B2
291A	C4	M0901	C2
291AE	C4	M0904	C4
291AR	C4	M0919	C4
291B	B2	M0921	C2
291BD	B2	M0922	C2
292B	B2	M0927	C4
294B	B2	M0930	B2
295AC	C4	M0931	C3
295AD	C4	M0932	C2
2902HV	B1	M0934	C3
6290	C1	M0946	C4
6291	C1	M0953	C4
M0012	C4	M0955	D1
M0019	C2	M0958	B2
M0021	D2	M0959	B2
M0023	C4	M0964	B2
M0029	B2	M0965	B2
M0035	C4	M0966	B2
M0040	C2	M0967	B2
M0041	C5	M0970	D2
M0042	D2	M0971	D2
M0043	D2	M0974	C4
M0046	B1	M0991	D2
M0047	D2	M0994	D2
M0048	C2	M0995	B2
M0104	C2	M0996	C4
		M0997	C4

LEGEND

- MAJOR BUILDINGS
- MINOR BUILDINGS MISC STRUCTURES/ SHEDS & TOWERS
- 242A BUILDING NUMBERS
- MOBILE OFFICES
- M0240 MOBILE OFFICE NUMBERS
- 216-A-42 CRIBS
- 218-E-10 BURIAL GROUNDS
- IMPROVED ROADS
- UNIMPROVED ROADS
- RAILROADS
- SECURITY FENCES & MISC FENCES
- HAZARDOUS FENCES
- PERIMETER FENCES
- UNDERGROUND WASTE TANKS
- WATER TANKS
- MISC. TANKS
- BASINS



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CADFILE: ZRBT0200

DRAWN BY: RAFAEL TORRES

TITLE: 200 EAST AREA

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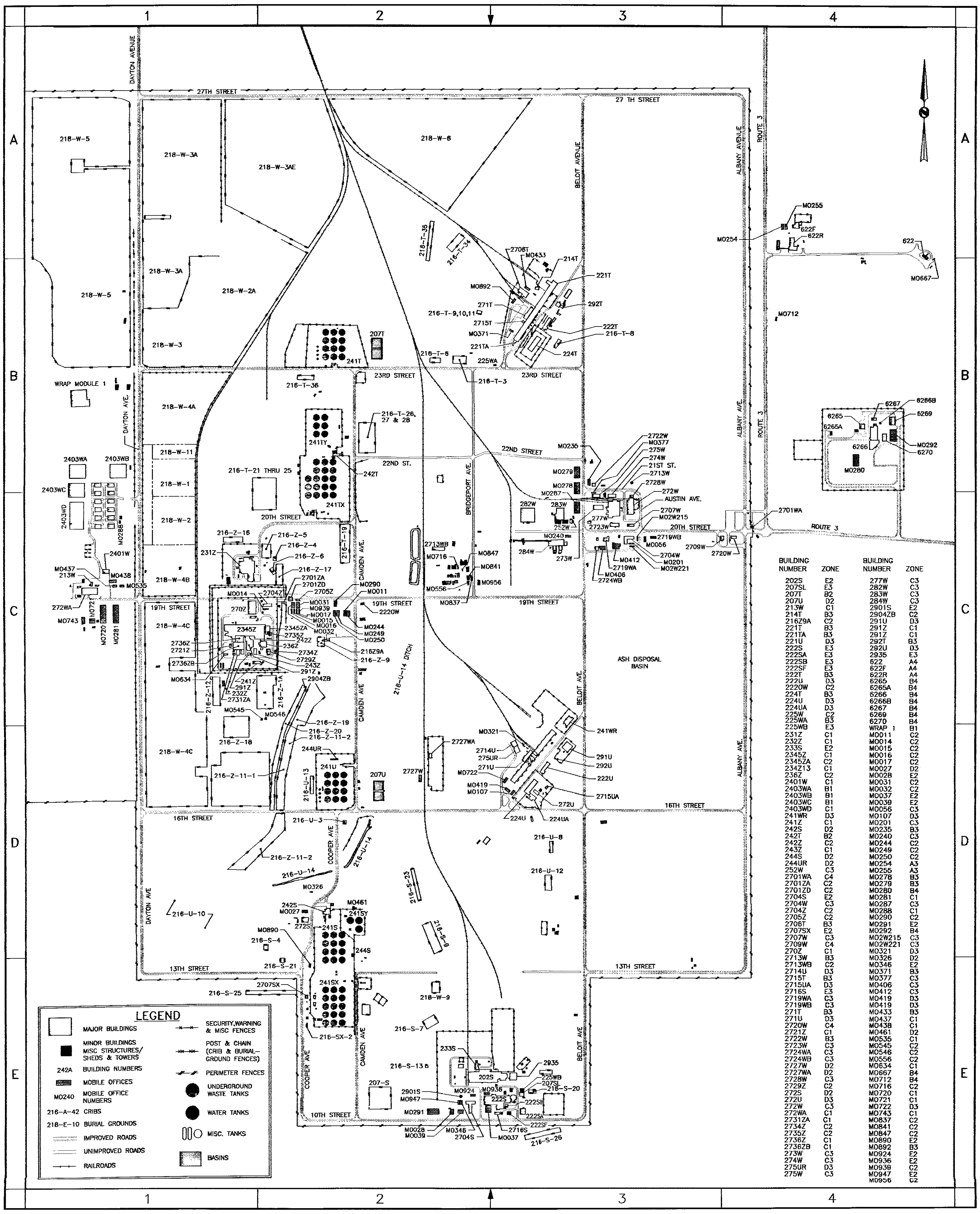

BUILDING NUMBER	ZONE	BUILDING NUMBER	ZONE
202S	E2	277W	C3
207SL	E3	282W	C3
207T	B2	283W	C3
207U	D2	284W	C3
213W	C1	2901S	E2
214T	B3	2904ZB	C2
216Z9A	C2	291U	D3
221T	B3	291Z	C1
221TA	B3	291Z	C1
221U	D3	292T	B3
222S	E3	292U	D3
222SA	E3	2935	E3
222SB	E3	622	A4
222SF	E3	622F	A4
222T	B3	622R	A4
222U	D3	6265	B4
2220W	C2	6265A	B4
224T	B3	6266	B4
224U	D3	6266B	B4
224UA	D3	6267	B4
225W	C2	6269	B4
225WA	B3	6270	B4
225WB	E3	WRAP 1	B1
231Z	C1	M0011	C2
232Z	C1	M0014	C2
233S	E2	M0015	C2
2345Z	C1	M0016	C2
2345ZA	C2	M0017	C2
234Z13	C1	M0027	D2
236Z	C2	M0028	E2
2401W	C1	M0031	C2
2403WA	B1	M0032	C2
2403WB	B1	M0037	E2
2403WC	B1	M0039	E2
2403WD	C1	M0056	C3
241WR	D3	M0107	D3
241Z	C1	M0201	C3
242S	D2	M0235	B3
242T	B2	M0240	C3
242Z	C2	M0244	C2
243Z	C1	M0249	C2
244S	D2	M0250	C2
244UR	D2	M0254	A3
252W	C3	M0255	A3
2701WA	C4	M0278	B3
2701ZA	C2	M0279	B3
2701ZD	C2	M0280	B4
2704S	E2	M0281	C1
2704W	C3	M0287	C3
2704Z	C2	M0288	C1
2705Z	C2	M0290	C2
2706T	B3	M0291	E2
2707SX	E2	M0292	B4
2707W	C3	M02W215	C3
2709W	C4	M02W221	C3
270Z	C1	M0321	D3
2713W	B3	M0326	D2
2713WB	C2	M0346	E2
2714U	D3	M0371	B3
2715T	B3	M0377	C3
2715UA	D3	M0406	C3
2716S	E3	M0412	C3
2719WA	C3	M0419	D3
2719WB	C3	M0419	D3
271T	B3	M0433	B3
271U	D3	M0437	C1
2720W	C4	M0438	C1
2721Z	C1	M0461	D2
2722W	B3	M0535	C1
2723W	C3	M0545	C2
2724WA	C3	M0546	C2
2724WB	C3	M0556	C2
2727W	D2	M0634	C1
2727WA	D2	M0667	B4
2728W	C3	M0712	B4
2729Z	C2	M0716	C2
272S	D2	M0720	C1
272U	D3	M0721	C1
272W	C3	M0722	D3
272WA	C1	M0743	C1
2731ZA	C1	M0837	C2
2734Z	C2	M0841	C2
2735Z	C2	M0847	C2
2736Z	C1	M0890	E2
2736ZB	C1	M0892	B3
273W	C3	M0924	E2
274W	C3	M0936	E2
275UR	D3	M0939	C2
275W	C3	M0947	E2
		M0956	C2

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ICF KAISER HANFORD COMPANY
MAPPING SERVICES GROUP
(376-4433)

CADFILE: ZRBT0201
DATE: 5-7-96
DRAWN BY: RAFAEL TORRES
TITLE: 200 WEST AREA

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BUILDING NUMBER	ZONE
103B	B3
104B2	B3
105B	C3
105C	D3
107C	A3
151B	C3
181B	A2
182B	B2
183B	C2,B2
183C	D2
190C	D3

LEGEND

- MAJOR BUILDINGS
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- M0240 MOBILE OFFICE NUMBERS
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- 218-E-10 BURIAL GROUNDS
- IMPROVED ROADS
- UNIMPROVED ROADS
- DIRT ROADS
- RAILROADS
- SECURITY, WARNING & MISC FENCES
- POST & CHAIN (CRIB & BURIAL-GROUND FENCES)
- PERIMETER FENCES
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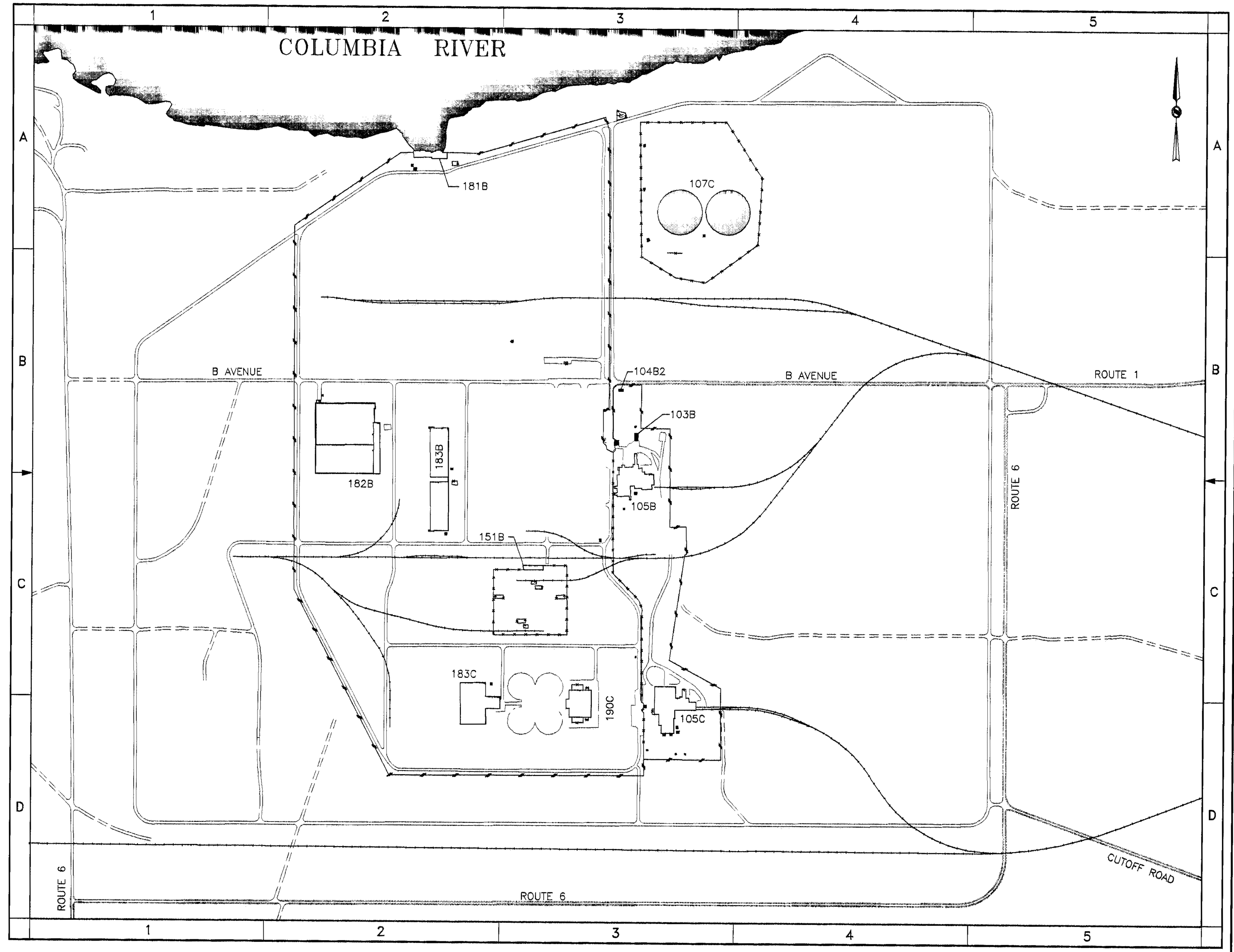
- WATER TANKS
- MISC. TANKS
- BASINS



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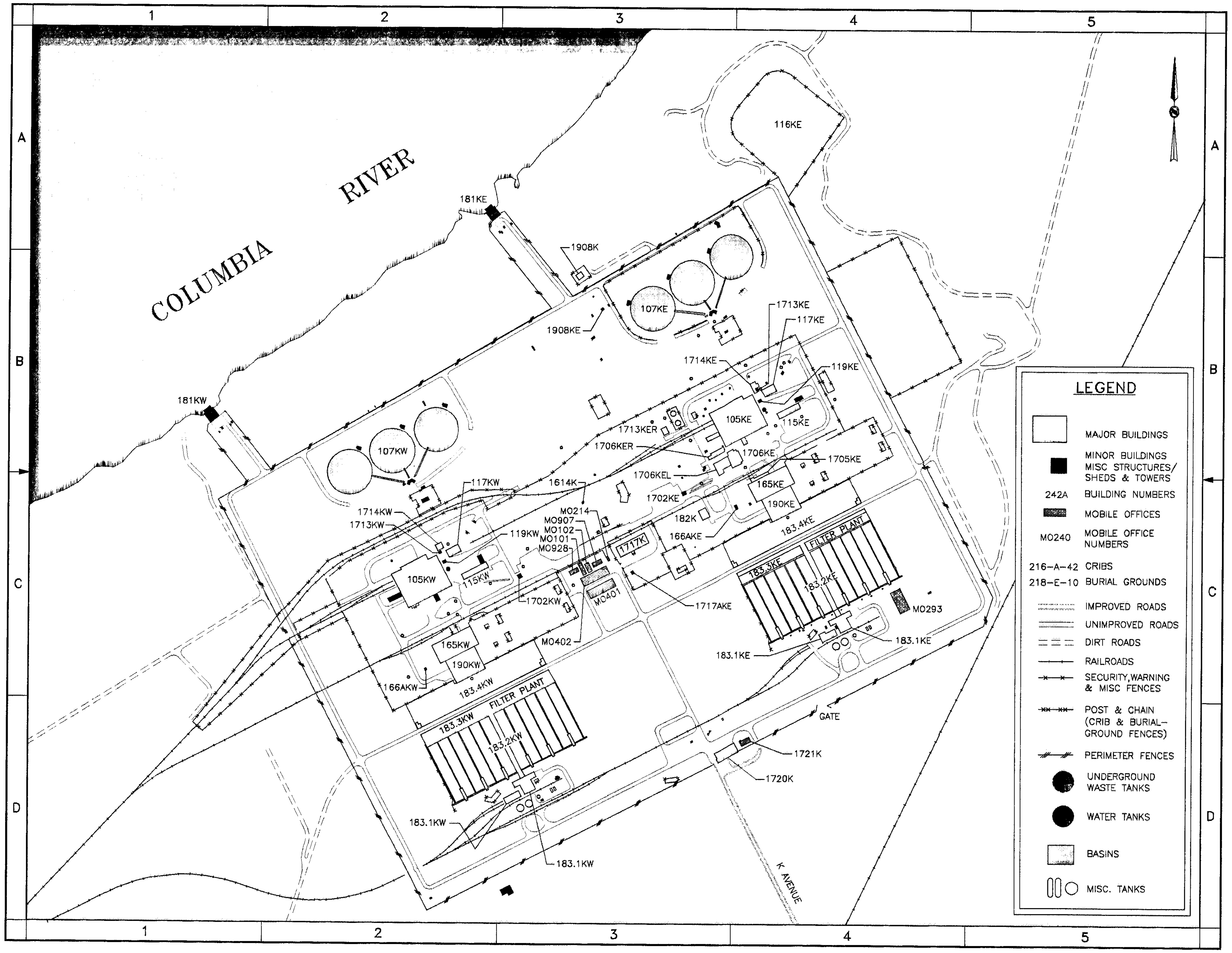
BUILDING NUMBER	ZONE
105KE	B4
105KW	C2
115KE	B4
115KW	C2
117KE	B4
117KW	C2
119KE	B4
119KW	C2
165KE	C4
165KW	C2
166AKW	C2
166AKE	C4
1614K	C3
1702KE	C3
1702KW	C3
1706KE	B4
1706KEL	B3
1706KER	B3
1713KE	B4
1713KER	B3
1713KW	C2
1714KE	B4
1714KW	C2
1717K	C3
1717AKE	C3
1720K	D3
1721K	D4
181KE	A2
181KW	B1
182K	C3
183.1KE	C4
183.2KE	C4
183.3KE	C4
183.4KE	C4
183.1KW	D3
183.2KW	D2
183.3KW	D2
183.4KW	D2
1908K	B3
1908KE	B3
190KE	C4
190KW	C2
MO101 (1711K)	C3
MO102 (1709K)	C3
MO214 (1701K)	C3
MO293 (1725K)	C4
MO401 (1719K)	C3
MO402 (1718K)	C3
MO907 (1722K)	C3
MO928 (1723K)	C3



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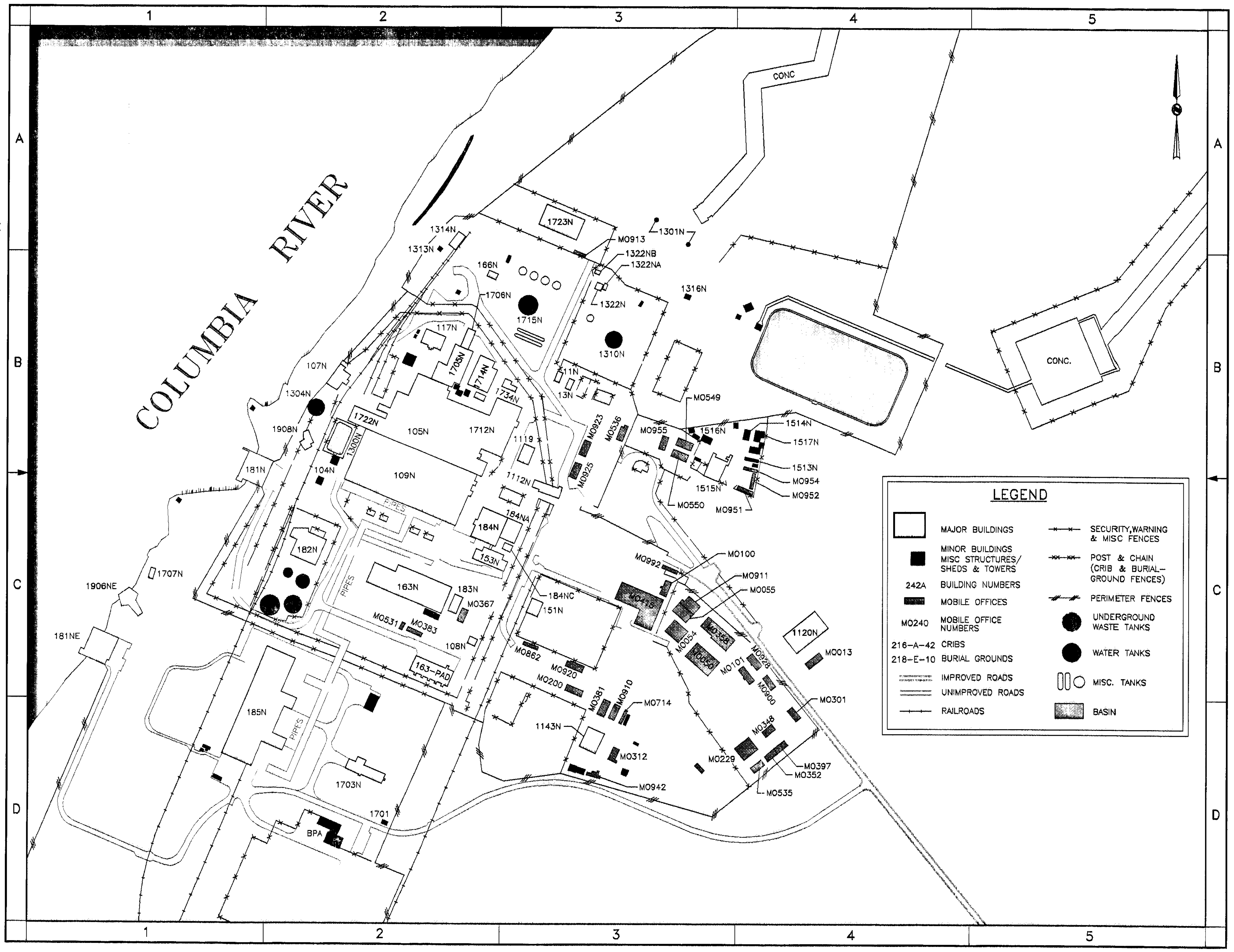
BUILDING NUMBER	ZONE	BUILDING NUMBER	ZONE
11N	B3	184NA	C3
104N	B2	184NC	C3
105N	B2	185N	D1
107N	B2	1906NE	C1
108N	C2	1908N	B2
109N	C2	BPA	D2
1112N	C3	M0013	C4
1120N	C4	M0050	C3
1143N	D3	M0054	C3
117N	B2	M0055	C3
1119	B3	M0100	C3
1301N	A3	M0101	C4
1313N	A2	M0200	C3
1314N	A2	M0229	D4
1316N	B3	M0301	D4
1322N	B3	M0312	D3
1322NA	B3	M0348	D4
1322NB	B3	M0352	D4
13N	B3	M0358	C3
1513N	B4	M0367	C2
1514N	B4	M0381	D3
1515N	B3	M0383	C2
1516N	B3	M0397	D4
1517N	B4	M0415	C3
151N	C3	M0531	C2
153N	C2	M0535	D4
163N	C2	M0536	B3
163PAD	C2	M0549	B3
166N	B2	M0550	B3
1701	D2	M0714	D3
1703N	D2	M0862	C3
1705N	B2	M0900	C4
1706N	B2	M0910	D3
1707N	C1	M0911	C3
1712N	B2	M0913	B3
1714N	B2	M0920	C3
1722N	B2	M0923	B3
1723N	A3	M0925	B3
1734N	B3	M0928	C4
181N	B1	M0942	D3
181NE	C1	M0951	C4
182N	C2	M0952	C4
183N	C2	M0954	B4
184N	C2	M0955	B3
		M0992	C3



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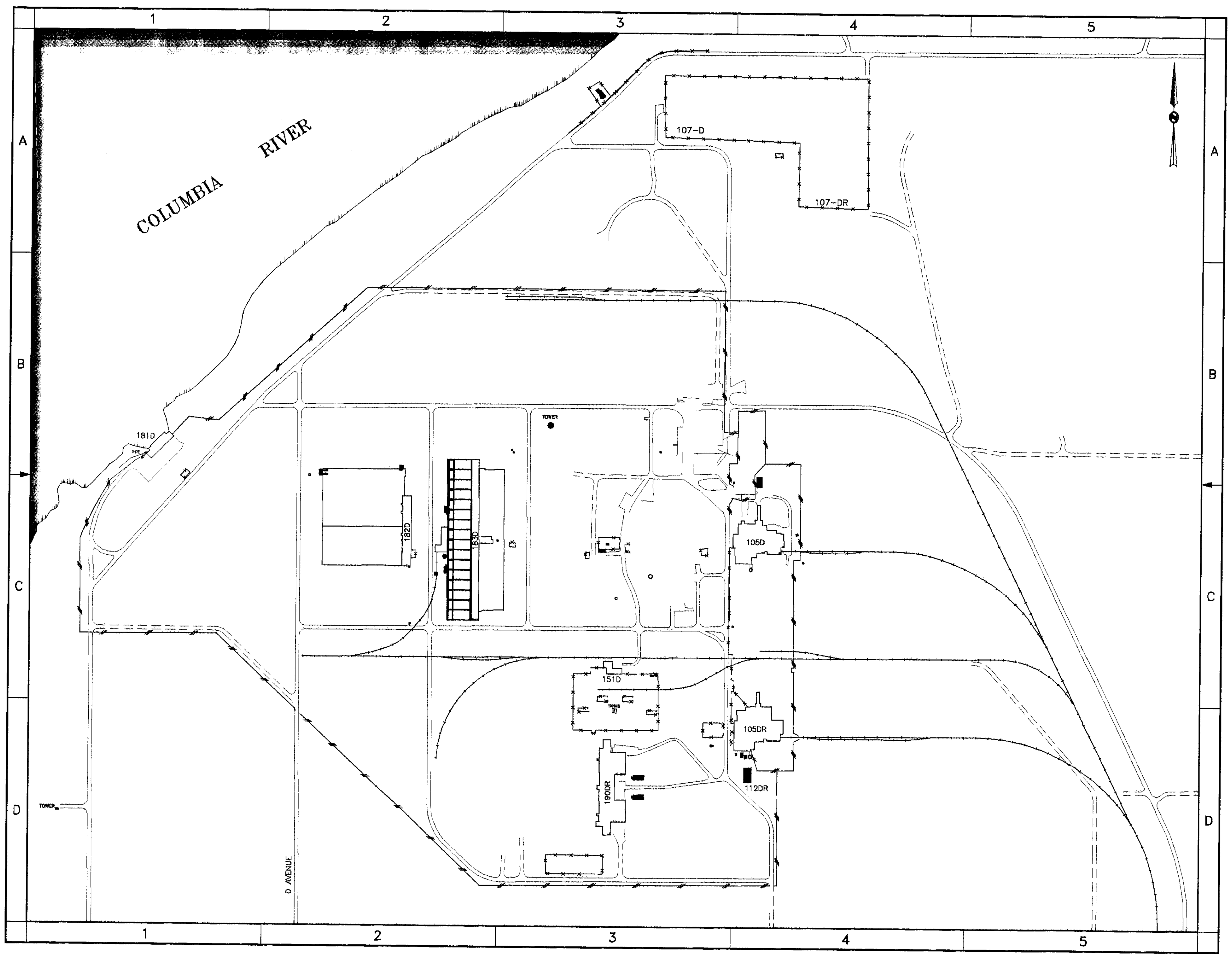
BUILDING NUMBER | ZONE

BUILDING NUMBER	ZONE
105D	C4
105DR	D4
112DR	D4
151D	C3
181D	B1
182D	C2
183D	C2
190DR	D3



LEGEND

	MAJOR BUILDINGS
	MINOR BUILDINGS MISC STRUCTURES/ SHEDS & TOWERS
242A	BUILDING NUMBERS
	MOBILE OFFICES
MO240	MOBILE OFFICE NUMBERS
216-A-42	CRIBS
218-E-10	BURIAL GROUNDS
	IMPROVED ROADS
	UNIMPROVED ROADS
	DIRT ROADS
	RAILROADS
	SECURITY,WARNING & MISC FENCES
	POST & CHAIN (CRIB & BURIAL-GROUND FENCES)
	PERIMETER FENCES
	UNDERGROUND WASTE TANKS
	WATER TANKS
	MISC. TANKS

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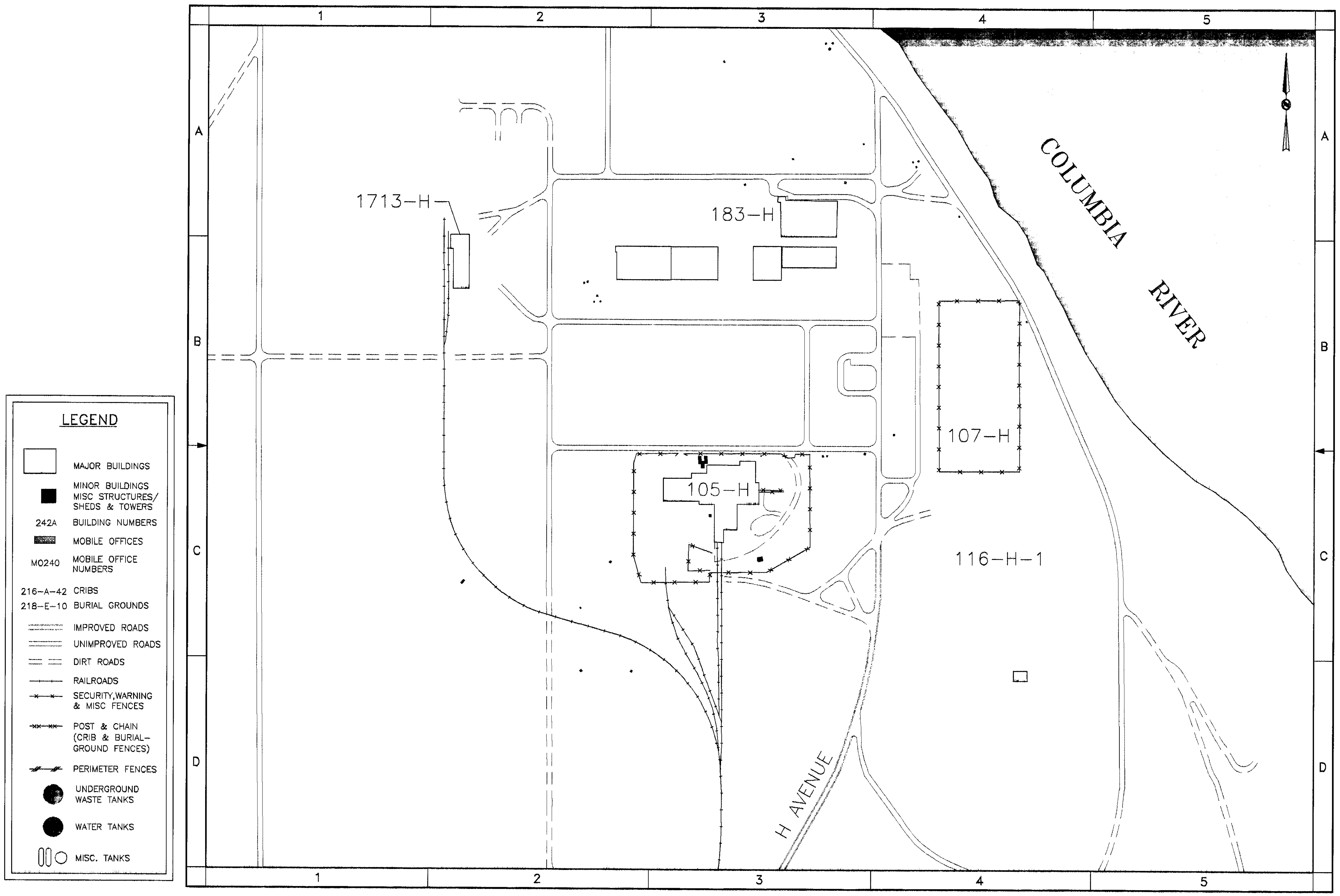

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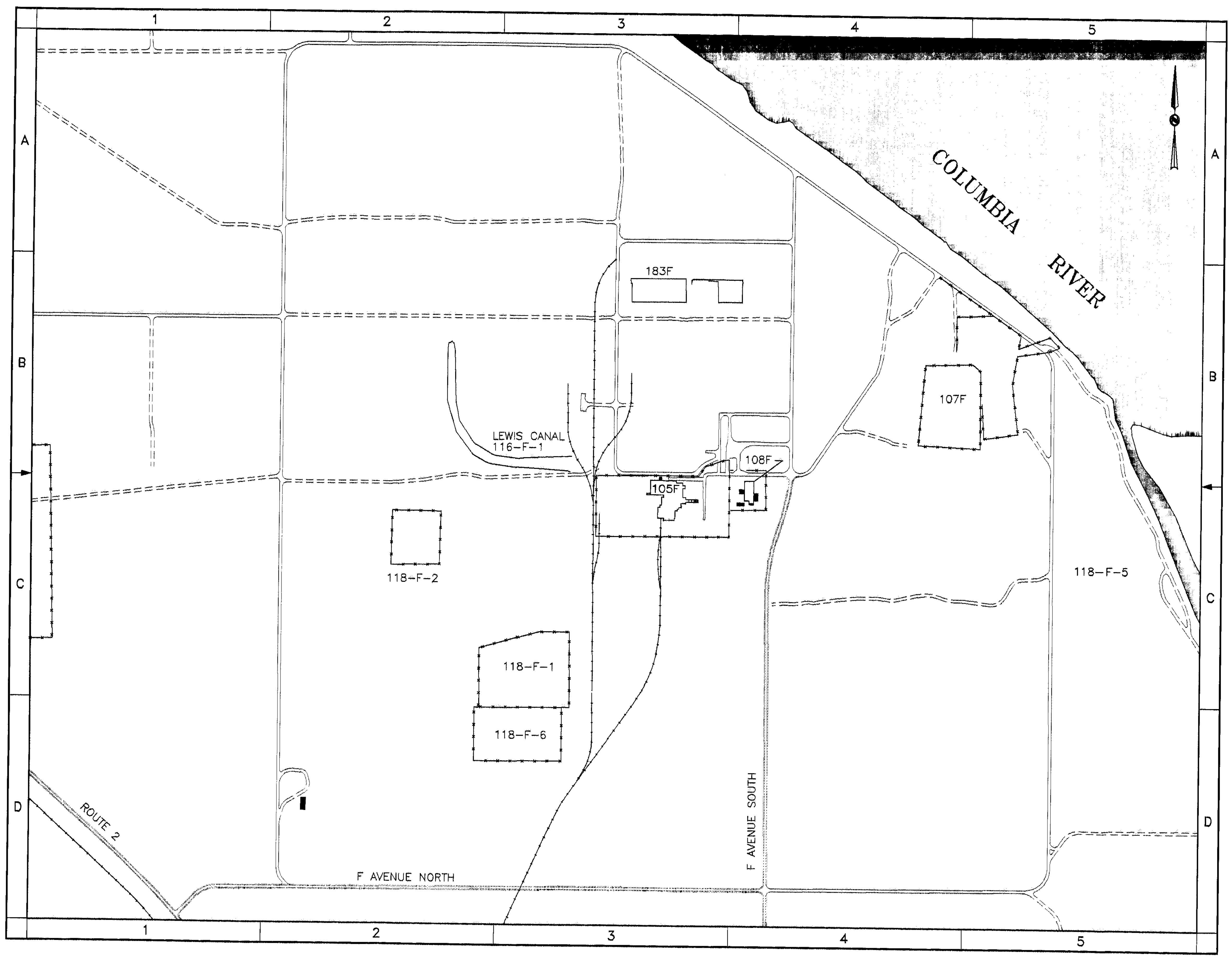

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CADFILE: ZRBT0209
DATE: 8-1-95

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Appendices

APPENDICES

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APPENDIX 2A

APPENDIX 2A

LOCATION MAPS

APPENDIX 2A

CONTENTS

* For general locational purposes only, the following maps are included: Hanford Site, North Richland, 1100 Area, 3000 Area, 300 Area, 400 Area, 200 East Area, 200 West Area, 100 B Area, 100 K Area, 100 N Area, 100 D Area, 100 H Area, and 100 F Area.

For specific locational purposes, current maps and information for the Hanford Facility TSD units can be obtained by contacting HGIS personnel at (509) 372-9378. The operable unit location for each TSD unit is provided in the following table and can be used to facilitate the acquisition of maps through the HGIS.

Operable Unit Location.

TSD unit	Location	Operable unit
Double-Shell Tank System	200EW	200-PO-3 200-PO-4 200-IU-6 200-TP-5 200-BP-7 200-UP-3 200-RO-2
204-AR Waste Unloading Station	200E	200-PO-3
242-A Evaporator	200E	200-PO-3
222-S Laboratory Complex	200W	200-RO-3
200 Area Effluent Treatment Facility	200E	200-BP-11
Liquid Effluent Retention Facility	200E	200-BP-11
Central Waste Complex	200W	200-ZP-3
Waste Receiving and Processing	200W	200-ZP-3
Low-Level Burial Grounds	200EW	200-BP-10 200-PO-6 200-ZP-3

Operable Unit Location.

TSD unit	Location	Operable unit
224-T Transuranic Waste Storage and Assay Facility	200W	200-TP-4
T Plant Complex	200W	200-TP-4
616 Nonradioactive Dangerous Waste Storage Facility	600	200-IU-6
PUREX Storage Tunnels	200E	200-PO-2
325 Hazardous Waste Treatment Units	300	300-FF-2
305-B Storage Unit	300	300-FF-2
207-A South Retention Basin	200E	200-PO-5
216-B-3 Expansion Ponds	200E	200-BP-11
216-B-63 Trench	200E	200-BP-8
200 West Area Ash Pit Demolition Site	200W	200-SS-2
218-E-8 Borrow Pit Demolition Site	200E	200-RO-2
Hanford Patrol Academy Demolition Sites	600	1100-EM-1
2727-S Storage Facility	200W	200-RO-3
4843 Alkali Metal Storage Facility	400	300-FF-2
105-DR Large Sodium Fire Facility	100	100-DR-1
3718-F Alkali Metal Treatment and Storage Area	300	300-FF-2
304 Concretion Facility	300	300-FF-2
300 Area Solvent Evaporator	300	300-FF-2
300 Area Waste Acid Treatment System	300	300-FF-2
303-M Oxide Facility	300	300-FF-2
303-K Storage Unit	300	300-FF-2
2101-M Pond	200E	200-SS-1
Hexone Storage and Treatment Facility	200W	200-RO-2
241-CX Tank System	200E	200-SO-1
183-H Solar Evaporation Basins	100	100-HR-1
1324-N Surface Impoundment	100	100-NR-1
1301-N Liquid Waste Disposal Facility	100	100-NR-1

Operable Unit Location.

TSD unit	Location	Operable unit
1325-N Liquid Waste Disposal Facility	100	100-NR-1
1324-NA Percolation Pond	100	100-NR-1
100-D Ponds	100	100-DP-1
216-S-10 Pond and Ditch	200W	200-RO-1
216-A-29 Ditch	200E	200-PO-5
216-B-3 Main Pond	200E	200-BP-11
216-A-10 Crib	200E	200-PO-2
216-U-12 Crib	200W	200-UP-2
216-A-36B Crib	200E	200-PO-2
216-A-37-1 Crib	200E	200-PO-4
300 Area Process Trenches	300	200-FF-1
Nonradioactive Dangerous Waste Landfill	600	200-IU-3
Simulated High-Level Waste Slurry Treatment/Storage	3000	1100-EM-3
PUREX Plant	200E	200-PO-1
241-Z Treatment and Storage Tanks	200W	200-ZP-1
B Plant Complex	200E	200-BP-6
1706-KE Waste Treatment System	100	100-KR-2
221-T Containment Systems Test Facility	200W	220-TP-4
2727-WA Sodium Reactor Experiment Sodium Storage Building	200W	200-UP-2
437 Maintenance and Storage Facility	400	300-FF-2
324 Pilot Plant	300	300-FF-2
Biological Treatment Test Facilities	300	300-FF-2
Physical and Chemical Treatment Test Facilities	300	300-FF-2
Thermal Treatment Test Facilities	300	300-FF-2
332 Storage Facility	300	300-FF-2
Sodium Storage Facility and Sodium Reaction Facility	400	300-FF-2

Operable Unit Location.

TSD unit	Location	Operable unit
600 Area Purgewater Storage and Treatment Facility	600	200-BP-11
Single-Shell Tank System	200EW	200-BP-7 200-PO-3 200-RO-4 200-TP-5 200-TP-6 200-UP-3
Grout Treatment Facility	200E	200-PO-3
Hanford Waste Vitrification Plant	200E	200-BP-9

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APPENDIX
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APPENDIX 2B

GLOSSARY

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GLOSSARY

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
CMS	corrective measures study
CWC	Central Waste Complex
D&D	decontamination and decommissioning
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	data quality objective
DST System	Double-Shell Tank System
DW	dangerous waste
°C	degree Celsius
°F	degree Fahrenheit
ECN	engineering change notice
Ecology	Washington State Department of Ecology
EMSL	Environmental and Molecular Sciences Laboratory
EPA	U.S. Environmental Protection Agency
FFTF	Fast Flux Test Facility
GTF	Grout Treatment Facility
HAMMER	Hazardous Materials Management and Emergency Response
HEIS	Hanford Environmental Information System
HEPA	high-efficiency particulate air
HF RCRA Permit	Hanford Facility Resource Conservation and Recovery Act Permit
HGIS	Hanford Geological Information System
HSWA	Hazardous and Solid Waste Amendments
HWVP	Hanford Waste Vitrification Plant
IRIS	Integrated Risk Information System
LDR	land disposal restriction
LERF	Liquid Effluent Retention Facility
LIGO	Laser Interferometer Gravitational Wave Observatory
LLBG	Low-Level Burial Grounds
M	Milestone
MEMO	monitoring efficiency model
MTCA	Model Toxics Control Act
ONC	Occurrence Notification Center
Part A	Dangerous Waste Part A Permit Application
Part B	Dangerous Waste Part B Permit Application

pH	negative concentration logarithm of the hydrogen-ion concentration
PUREX	plutonium-uranium extraction
Purgewater Facility	600 Area Purgewater Storage and Treatment Facility
QAPjP	quality assurance project plan
RCRA	*Resource Conservation and Recovery Act of 1976*
RD&D	research, development, and demonstration
RFI	RCRA facility investigation
SST	single-shell tank
SWMU	solid waste management unit
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
TWRS	Tank Waste Remediation System
UO_3	Uranium Oxide Plant
WAC	Washington Administrative Code
WIDS	Waste Information Data System
WRAP	Waste Receiving and Processing
200 Area ETF	200 Area Effluent Treatment Facility
204-AR	204-AR Waste Unloading Station
224-T TRUSAF	224-T Transuranic Waste Storage and Assay Facility
241-Z	241-Z Treatment and Storage Tanks
305-B	305-B Storage Facility
325 HWTUs	325 Hazardous Waste Treatment Units
616 NRDWSF	616 Nonradioactive Dangerous Waste Storage Facility

Accuracy--Relates to the quality of the result, and is distinguished from precision that relates to the quality of the operation by which the result is obtained.

Advection--Transport of water or an aqueous property solely by mass motion.

Aging Waste Tank--A tank that stores neutralized current acid waste generated from the PUREX Plant.

Analyte--The element, ion, or compound of interest.

ANOVA (analysis of variance)--Name given to a variety of statistics procedures. All of these procedures compare the means of different groups of observations to determine whether there are any significant differences among the groups.

Anticlinal--Pertaining to an anticline.

Anticline--A fold, generally convex upward, whose core contains the stratigraphically older rocks.

Aquifer--A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs.

Aquitard--A confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer.

Assessment-level monitoring--A program of monitoring groundwater under interim status requirements. After a release of contaminants to groundwater has been determined, the rate of migration, extent of contamination, and dangerous constituent concentration gradients of the contamination must be identified.

Background--The composition of a medium that has not been affected by activities at a waste management unit.

Bar--A mass of sand, gravel, or alluvium deposited on the bed of a stream, sea, or lake or at the mouth of a stream forming an obstruction to water navigation.

Basalt--A dark- to medium-dark-colored mafic (iron-magnesium rich) extrusive igneous rock with small grains composed primarily of feldspar (calcic plagioclase), pyroxene, with or without olivine, and varying proportions of glass.

Borehole Compilation Data Package Report--A document that summarizes all activities at a wellsite during a calendar year, based on a compilation of validated records. This document also includes an interpretation of hydrologic data used to support characterization and permitting activities for the RCRA TSD units.

Bottom zones--Refers to the base of basalt flows where aquifers can be found.

By-product material--A material that is not one of the primary products of a production process and is not solely or separately produced by the production process. Examples are process residues such as slags or distillation column bottoms. The term does not include a co-product that is produced for the general public's use and is ordinarily used in the form it is produced by the process (WAC 173-303-040).

"(a) For purposes of this part, the term "byproduct material" means any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.
(b) for purposes of determining the applicability of the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.) to any radioactive waste substance owned or produced by the Department of Energy pursuant to the exercise of its atomic energy research, development, testing and production responsibilities under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.), the words "any radioactive material," as used in paragraph (a) of this section, refer only to the actual radionuclides dispersed or suspended in the waste substance. The

nonradioactive hazardous component of the waste substance will be subject to regulation under the Resource Conservation and Recovery Act." (10 CFR 962.3)

Carbonate--A compound containing the radical carbonate.

Cataclysmic--Any geologic event that produces sudden and extensive changes in the Earth's surface.

CERCLA past-practice unit--A process by which a past-practice unit containing hazardous substances is addressed for remedial action (as opposed to RCRA past-practice).

CERCLA remedial investigation--The CERCLA process of determining the extent of hazardous waste contamination; analogous to the RCRA facility investigation.

Channelways--Ancient or recent streams or river beds including flood zones.

Cobble--A rock fragment that ranges from 64 to 256 millimeters in diameter.

Compliance--Not exceeding regulations.

Confined aquifer--Groundwater bounded above and below by impermeable layers.

Conglomerate--Rounded water worn fragments of rock or pebbles, cemented together by another mineral substance.

Conservative tracer--A tracer that does not chemically interact or degrade the aquifer system (i.e., the total quantity of the material in the solution remains constant).

Contaminant mobility--The capability of any physical, chemical, or biological substance having an adverse effect on air, water, or soil and that can be transported readily by wind or water.

Control chart--Area graphical presentations of analytical data to determine if results are within desired limits.

Corrective measures study--The step in the RCRA past-practice process in which alternatives for a corrective action system are investigated and screened; comparable to the feasibility study phase of the CERCLA process.

Criteria pollutants--(40 CFR, Part 58, Appendix G) means the pollutant or pollutant combination (TSP x SO_2) with the highest subindex during the reporting period.

Critical systems--Those specific portions of a TSD unit's structure or equipment whose failure could lead to the release of dangerous waste into the environment and/or systems, which include processes that treat, transfer, store or dispose of regulated waste. A list identifying the critical systems of a specific TSD unit may be developed and included in Part III or Part V of the HF RCRA Permit. In developing a critical system list, or in the absence of a critical system list, WAC 173-303-830 modifications will be considered.

Cross-section--A profile or portraying of an interpretation of a vertical section of the Earth explored by geophysical and or geological methods.

Dangerous wastes--As defined in the HF RCRA Permit, means those solid wastes designated under WAC 173-303 as dangerous or extremely hazardous waste. As used in the Permit, the words "dangerous waste" will refer to the full universe of wastes regulated by Chapter 70.105 RCW and WAC 173-303 (including dangerous waste, hazardous waste, extremely hazardous waste, mixed waste, and acutely hazardous waste).

Derived concentration guidelines--A calculated concentration that would result in an annual dose of 100 millirem.

Detection--The lowest concentration by which an analyte can be detected on a field or laboratory instrument. Often recorded in parts per million or parts per billion.

Detrital--Pertaining to or formed by detritus material.

Detritus--A collective term used for loose rock and mineral material that is worn away by mechanical means, as by disintegration or abrasion (e.g., sand, silt, and clay).

Diffusion--The actual transport of mass, in the form of discrete atoms, through the lattice of a crystalline solid.

Discharge--The rate of flow at any given moment, expressed in volume per unit time (e.g., cubic meters/second).

"Dangerous waste discharge" means the accidental or intentional release of hazardous substances, dangerous waste, or dangerous waste constituents such that the substance, waste, or a waste constituent may enter or be emitted into the environment (WAC 173-303-040).

Dispersivity--Ability of a contaminant to disperse within the groundwater by molecular diffusion and chemical mixing.

Distribution coefficient--The ratio of the concentration of a solute sorbed by ion exchange substances such as Earth materials, particularly clays, to the concentration of the solute remaining in solution. A large distribution coefficient implies that the substance is readily sorbed and is redissolved slowly. The concentration of material in the solid phase (i.e., rock or sediment) (moles per gram) divided by the concentration of material in the aqueous phase (moles per liter).

Domenico-Robbins--A two dimensional analytical transport model developed by Domenico and Robbins (1985).

Drinking Water Standard--Contaminant concentration specified in the *Safe Drinking Water Act*.

Drive-barrel--Heavy-walled pipe used in impact drilling. Soil and rock are driven into a pipe connected to a cable as it is dropped rapidly on to the ground. The soil or rock is extracted by striking the pipe.

Driving force--The hydraulic head that causes water to flow in one direction or another.

Duplicate blank--A sample retrieved from a single sampling location using the same equipment and sampling technique but analyzed independently.

Effective porosity--The ratio of the volume of the void spaces of a soil mass that can be drained by gravity to the total volume of the mass of the soil.

Eolian--(a) Pertaining to the wind; especially said of such deposits as loess and dune sand, of sedimentary structures such as wind-formed ripple marks, or of erosion and deposition accomplished by the wind. (b) Said of the active phase of a dune cycle, marked by diminished vegetal control and increased dune growth.

Epiclastic--A term applied to mechanically deposited sediments (e.g., mud, gravel, sand) consisting of weathered products of older rocks. A rock formed at the Earth's surface by consolidation of fragments of pre-existing rocks.

Epoch--A division of geologic time that identifies an abrupt change in the environment.

Equipment blanks--Prepared before sampling by running deionized water over sampling equipment and collecting the water in a clean sample container. If the equipment blank is found to be contaminated, the source of contamination is assumed to be the equipment used during the sampling event.

Erosional windows--Portions of the land surface that have been eroded away exposing landforms that represent the past.

Evapotranspiration--The sum total of that portion of precipitation that is returned to the atmosphere through evaporation and the transpiration of plants.

Extremely hazardous waste--Those dangerous and mixed wastes designated in WAC 173-303-100 as extremely hazardous.

Facies--Part of a rock body as differentiated from other parts by appearance or composition and that reflects the environment in which it was formed.

Facility--As defined in WAC 173-303-040 means all contiguous land, and structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combination of them). Unless otherwise specified, the terms "facility," "treatment, storage, and/or disposal facility," "TSD facility," "dangerous waste facility" or "waste management facility" are used interchangeably. For the purposes of implementing corrective action imposed pursuant to WAC 173-303-646 (2) or (3), the term facility has the following meaning: All contiguous property under the control of an owner or operator seeking or required to have a permit under the provisions of Chapter 70.105 RCW or WAC 173-303, including the definition of facility at RCW 70.105D.020(3).

As defined in the HF RCRA Permit, means all contiguous land, and structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste.

Depending on context, 'facility' could refer to:

- The Hanford Facility

- Building nomenclature commonly used on the Hanford Facility. In this context, the term 'facility' remains as part of the title for various TSD units (e.g., 616 Nonradioactive Dangerous Waste Storage Facility)

- For purposes of complying with the RCRA corrective action provisions, all contiguous property under the control of the owner or operator seeking a permit under Subtitle C of RCRA.

Fanglomerate--A fanglomerate is composed of heterogenous material that was originally deposited in an alluvial fan or delta as loose unconsolidated detrital material and has since become cemented into rock.

Feasibility study--The step in the CERCLA process in which alternatives for a remedial action system are investigated and screened.

Field duplicates--Independent samples that are taken from the same location at the same time and are used to measure the representativeness of the sampling event. This is a measure that describes both the variability of waste composition and variability of the sampling technique.

Fixed limits--A constant compliance limit or a fixed standard such as maximum concentration limit or assessment level monitoring.

Flow tops--Pertaining to the highest portion of individual basalt flows.

Fluvial-lacustrine--Said of those deposits formed by the streams flowing from lakes.

Formation(s)--Something naturally formed, commonly differing from adjacent rocks or soils. Most formations possess certain distinctive or repetitive combinations of distinctive rock types.

Geophysical--Pertaining to that science that deals with the exploration or prospecting of the Earth using instruments and applying the methods of physics and engineering by observation of magnetic, seismic, electrical, and thermal distribution.

Glaciofluvial--Pertaining to streams flowing from glaciers or to the deposits made from these streams. In the Hanford Site area, this pertains to the deposited sands and gravels that were deposited because of the Lake Missoula flood.

Grab sample--A single sample that is collected at a time and place most representative of total discharge.

Granule--A rock fragment larger than a very coarse sand grain and smaller than a pebble. The fragment ranges in size from 2 to 4 millimeters.

Gravels--An accumulation of water worn pebbles. Consists of rock grains or fragments that range in size from 4.76 to 76 millimeters.

Groundwater mounds--A mound shaped elevation in a water table that builds up as a result of the downward percolation of water through the zone of aeration.

Hard-tool--Drill bit used in cable tool drilling to crush rock. The slurry created by the bit is retrieved and examined.

Hazardous waste--Those solid waste designated by 40 CFR 261, and regulated as hazardous and/or mixed waste by the EPA.

Henry's Law--The weight of a gas dissolved by a liquid is proportional to the pressure of the gas.

High energy--Refers to the environment of sediment deposition where the stream or river flow or wave action is of sufficient quantity to carry significant amounts of suspended soil and rock particles.

High-activity waste--High- and low-activity is reflective of the relative concentration of radionuclides in mixed waste.

High-level waste--Highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid that contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation.

Holocene--Recent. That period in time (epoch) since the last ice age in North America; also those sediments deposited during that epoch.

Hydraulic head--The height of the free surface of a body of water above a given subsurface point.

Hydraulic conductivity--The ratio of the groundwater flow velocity to the driving force for fluid flow through porous medium under saturated conditions.

Hydraulic gradient--As applied to an aquifer, the rate of change of the hydraulic head per unit of distance at a given point and direction.

Hydrogeology--A term used interchangeably with geohydrology referring to the hydrologic or flow characteristics of groundwater.

Hydrologic properties--Properties of a rock related to the capacity to transmit, hold, and deliver water.

Immiscible--Cannot be mixed (fluids).

Indicator--A geologic or other feature that suggests the presence of a geochemical anomaly inherent to the local geologic setting.

Indurated--The consolidation of a rock or soil hardened by heat, pressure, or cementation.

Infiltration--The flow of fluid (water) into a solid substance through pores or small openings.

Intercalated--Said of a relatively thin layer of soil or rock material that alternates with thicker layers of some other kind of soil or rock.

Intermittent--Periodic. Stopping and starting again in intervals.

Interval--The vertical difference between soil or rock bodies of differing origin or composition.

Limit of Quantitation--The level above which quantitative analysis can be obtained with a specific degree of confidence (generally the mean background signal plus 10 standard deviations).

Loess--A homogeneous, nonstratified (nonlayered) unindurated soil consisting predominantly of silt of eolian (windblown) deposition. Often referred to as 'Palouse soil' located in the far central southeastern portion of Washington state.

Low-activity waste--Refer to high-activity waste.

Low-level waste--Waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel or 11e(2) by-product material as defined in U.S. Department of Energy Order 5820.2A. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of transuranic is less than 100 nanocuries per gram.

Maximum concentration limit--Contaminant concentration specified in the *Safe Drinking Water Act*.

Miocene--The fourth of the five epochs of which the Tertiary period is divided. The Miocene lasted from between 24 million years ago to 1.8 million years ago. Also those sediments that were deposited during that epoch.

Miscellaneous TSD unit--As defined in WAC 173-303-040, means a dangerous waste management unit where dangerous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, containment building, corrective action management unit, temporary unit, underground injection well with appropriate technical standards under 40 CFR Part 146, or unit eligible for a research, development, and demonstration permit under WAC 173-303-809.

Miscellaneous waste management unit--One-time spills to the environment and sanitary waste disposal facilities.

Mixed waste--As defined in WAC 173-303-040, means a dangerous, extremely hazardous, or acutely hazardous waste that contains both a nonradioactive hazardous component and, as defined by 10 CFR 20.1003, source, special nuclear, or by-product material subject to the *Atomic Energy Act*.

Model--A working hypothesis or precise simulation, by means of description, statistical data, or analogy of a phenomenon or process that cannot be observed directly or that is difficult to observe directly.

Monocline--A steplike bend (flexure) in otherwise flatlying layers or beds of rock.

Operable unit--A group of contiguous past-practice waste sites related by site characteristics or operations so as to be considered collectively for purposes of environmental restoration under the CERCLA process.

Operating unit--A TSD unit that has been, or is anticipated to be, included in Part III of the HF RCRA Permit.

Oral reference dose--Defined as the level of daily human exposure at or below which no adverse effect is expected to occur during a lifetime.

Overbank deposits--Sediments (usually silt and clay) deposited beyond the natural levee of a stream or river during a flooding event.

Paleosols--A buried soil of the ancient past.

Palouse soil--Refer to loess.

Parameter--In statistics, a numerical quantity (such as the mean) that characterizes the distribution of a random variable or a population.

Permeability--The property or capacity of a porous rock, sediment, or soil for transmitting a fluid (e.g., groundwater).

Permeameter--An instrument for measuring permeability.

Perennial--Streams that flow throughout the year from source to mouth.

Physiography--The study of the genesis and evolution of land forms.

Pleistocene--The earliest of the two epochs comprising the Quaternary period. The Pleistocene lasted from between 1.8 million years ago to 10,000 years ago. Also, those sediments that were deposited during that epoch.

Porosity--The percentage of the bulk volume of a rock or soil that is occupied by interstices or voids.

Potentiometric--Surface to which water in an aquifer would rise by hydrostatic pressure or head.

Practical quantification limits--The lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

Pre-Missoula--As pertaining to before the time of the flooding caused by the breaching of ice dams that contained Lake Missoula in northwest Montana.

Precision--The degree of agreement or uniformity of repeated measurements of a quantity; the degree of refinement. Refer to accuracy.

Prediction interval--In a regression analysis, a value or set of values for which one can assert with given probability that the value will contain a future observation.

Privatization--Refers to vendors, under contract with the U.S. Department of Energy, using private funding to design, permit, construct, operate, decontaminate, and decommission their own equipment and facilities to manage waste.

Purgewater--Water being excavated from wells or from wells that are undergoing aquifer testing.

Quartzose--Containing quartz as the principal constituent.

RCRA facility investigation--The RCRA process of determining the extent of hazardous waste contamination; analogous to the CERCLA remedial investigation.

Recharging--The quantity of water that is added to the zone of saturation or the aquifer. Intake.

Recovery phase--The time an aquifer requires to reach equilibrium after pumping, such as in a slug test.

Sand--Detrital material varying in diameter from very fine grained (0.0625 to 0.125 millimeter) to very coarse grained (2 millimeter).

Sandy--A rock or soil in which one of the constituents is sand. Refer to sand.

Sediment--(a) (geological) Solid fragmental material that originates from weathering of rocks and is transported by air, water, or ice, or that accumulates by other natural agents, such as chemical precipitation from solution or secretion by organisms; and that forms in layers on the Earth's surfaces at ordinary temperatures in a loose unconsolidated form; e.g., sand, gravel, silt, mud, till, loess, alluvium. (b) Strictly solid material that has settled from a state of suspension in a liquid, e.g., material at the bottom of an open body of water, such as a pond or an estuary. In the singular, the term usually is applied to material held in suspension in water or recently deposited from suspension. In the plural, the term is applied to all kinds of deposits, and refers to essentially unconsolidated materials.

Seismic--Pertaining to an earthquake or earth vibration.

Semi-confined aquifer--A partially isolated aquifer. Refer to definition of aquifer.

Significant discrepancy--In regard to a manifest or shipping paper means a discrepancy between the quantity or type of dangerous waste designated on the manifest or shipping paper and the quantity or type of dangerous waste a TSD unit actually receives. A significant discrepancy in quantity is a variation greater than 10 percent in weight for bulk quantities (e.g., tanker trucks, railroad tank cars, etc.), or any variation in piece count for nonbulk quantities (i.e., any missing container or package would be a significant discrepancy). A significant discrepancy in type is an obvious physical or chemical difference that can be discovered by inspection or waste analysis (e.g., waste solvent substituted for waste acid).

Silt--A soil particle that ranges in size from 0.0039 to 0.0625 millimeter in diameter.

Silty--A rock or soil in which one of the constituents is silt. Refer to silt.

Slope wash--Soil and rock material that is being or has been moved down slope predominantly by the action of gravity assisted by running water that is not concentrated into channels.

Slope--The inclined surface of hill, mountain, plateau, plain, or any other part of the Earth's surface.

Slug testing--A single well test to determine the insitu hydraulic conductivity of an aquifer by the instantaneous addition or removal of a known quantity (slug) of water into or from a well, and the subsequent measurement of the resulting well recovery time.

Solid waste management unit--Any discernible location at a facility, defined for the purposes of corrective action, where solid waste has been placed at any time, irrespective of whether the location was intended for the management of solid or dangerous waste. Such locations include any area at a facility at which solid waste, including spills, routinely and systematically have been released. Such units include regulated units as defined by WAC 173-303.

Source material--"(1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of Section 61

[42 U.S.C. 2091] to be source material; or (2) ores containing one or more of the foregoing materials, in such concentration as the Commission may by regulation determine from time to time." (*Atomic Energy Act*)

Special nuclear material--"(1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission, pursuant to the provisions of Section 51 [42 U.S.C. 2071], determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material." (*Atomic Energy Act*)

Specific conductance--A measure of the electrical conductivity of a liquid.

Split-spoon sampler--A device used to sample below the surface through the vadose zone. Samples are obtained using a split barrel that is lined with ring or tube liners.

Stratigraphic--Said of a stratum by which an arbitrary but systematic arrangement, zonation, or partitioning of a sequence of rock layers, of the Earth's crust, into units with reference to any or all of the attributes, properties, or characteristics that strata possess.

Structural--Pertaining to, part of, or consequent upon geologic structures.

Structures (tectonic)--Of, pertaining to, or designating rock structure and deformations as a result of forces caused by land movement and earthquakes.

Suprabasalt--Those sediments that are found above basalt flows.

Syncline--A fold, generally upward concaving, whose core contains the stratigraphically youngest rock.

Temperature--Degree of hotness or coldness of a body or environment.

Tolerance--A permissible deviation from a specified value, expressed in actual values or more often as a percentage of the nominal value.

Topography--The general configuration of a land surface or any part of the Earth's surface, including its relief and its natural and man made features.

Transmissive zone--Pertaining to transmissivity. The zone where intercommunication is possible between differing aquifers.

Transmissivity--The rate (flow) at which water is transmitted through a unit width of aquifer.

Transuranic waste--Without regard to source or form, waste that is contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years and concentrations greater than 100 nanocuries per gram at the time of assay. At the Hanford Site, transuranic waste also includes uranium-233 and radium sources.

Travel time--The period of time necessary for a dangerous waste constituent released to the soil to enter any onsite or offsite aquifer or water supply system.

Trip blanks--Sample containers that are prepared with deionized water and are carried into and out of the field but are not opened at any time during the sampling event. If the trip blank is found to be contaminated, the source of the contamination is assumed to be the container itself, the environment in which the trip blank was prepared, or another source outside the sample area.

Tuff--A general term for all consolidated volcanic fragments.

Turbidity--The state, condition, or quality of opaqueness or reduced clarity of a fluid, due to the presence of suspended matter.

Unit dispositioned through other options--A TSD unit that is not categorized as either an 'operating unit' or a 'unit undergoing closure'.

Unit undergoing closure--A TSD unit that has been, or is anticipated to be, included in Part V of the HF RCRA Permit.

Vadose zone--Zone of aeration. A subsurface zone containing water under pressure less than that of the atmosphere, including water held by capillarity; and containing air or gases generally under atmospheric pressure. This zone is limited above by the land surface and below by the surface of the 'zone of saturation', i.e., the water table.

Vapor pressure--The pressure at which a liquid and its vapor are at equilibrium at a given temperature.

Velocity--The rate of motion in a given direction (meter/second).

Veneer--A thin but extensive layer of sediments covering an older geologic layer or stratum.

Volcanic--Of, pertaining to, like, or characterized by or composed of material originating from volcanoes or fissures.

Volcaniclastic--Pertaining to clastic or fragmental rock material containing volcanic material in whatever proportion, and without regard to its origin or environment.

Waste management unit--Means an individual location on the Hanford Site where waste has or may have been placed, either planned or unplanned, as identified in the Tri-Party Agreement. Includes: (1) RCRA disposal units, (2) CERCLA disposal units, (3) unplanned releases, (4) inactive contaminated structures, (5) RCRA TSD units, and (6) other storage areas. Because of the comprehensive nature of the Units Report (DOE/RL-88-30), the list of units is more extensive than required by Section 3004(u) of HSWA.

Water table--The upper surface of a saturation zone except where that surface is formed by an impermeable layer.

Yakima Fold Belt--Characterized by long, narrow anticlines and broad synclines extending generally eastward from the Cascade Range to the approximate center of the Columbia Plateau.

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METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

APPENDIX
2C

APPENDIX
X

APPENDIX 2C

HANFORD FACILITY LEGAL DESCRIPTION

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HANFORD FACILITY LEGAL DESCRIPTION

The following legal description describes the overall facility boundaries of the DOE-RL controlled Hanford Site. Individual TSD units use only a very small portion of the Hanford Site. Additional descriptive information on the individual TSD units is contained in the Unit-Specific Portion of this permit application:

The Hanford Site being a tract of land located in Benton County, WA, the aforesaid tract being more particularly described as follows:

Commencing at the point of intersection of the E.-W. centerline of sec. 14, T.10N., R.28E. Willamette Meridian, with the western navigation line of the Columbia River;

Thence northerly 200 feet along said line of navigation to the TRUE POINT OF BEGINNING;

Thence W. to a point on the W. right-of-way line of George Washington Way, which line is the boundary of the city of Richland;

Thence southerly 100 feet or less, along said right-of-way line of George Washington Way to a point on the N. right-of-way line of Horn Rapids Road, an unplatted road;

Thence W. along the N. right-of-way line of Horn Rapids Road approximately 1/2 mile to the E. right-of-way line of Stevens Drive, an unplatted road;

Thence S. along said E. right-of-way line to a point on the N. right-of-way line of Spengler Street, a platted street;

Thence W. 145 feet to the W. right-of-way line of Stevens Drive;

Thence S. to a point 30 feet N. of the S. line of sec. 27, T.10N., R.28 E.W.M.;

Thence W. along a line 30 feet N. of, and parallel with, the S. line of sec. 27 to the E. line of the S.W. 1/4 of the S.E. 1/4 of said section;

Thence N. along the E. line of the S.W. 1/4 of the S.E. 1/4 of sec. 27 to the S.E. corner of the N.W. 1/4 of the S.E. 1/4 of said sec. 27;

Thence W. along the S. line of the N.W. 1/4 of the S.E. 1/4 to the W. line of the E. 1/2 of sec. 27;

Thence N. along the W. line of the E. 1/2 of sec. 27, and of the E. 1/2 of sec. 22 and the E. 1/2 of sec. 14 to the N. right-of-way line of Horn Rapids Road;

Thence westerly and northwesterly along the N. right-of-way line of Horn Rapids Road 26,000 feet more or less to the line's intersection with the N. right-of-way line of State Highway 240, in the N.E. 1/4 of sec. 11, T.10N., R.27E.W.M.;

Thence northwesterly along said N. right-of-way line of the highway, 75 feet N. of and parallel with the centerline of said highway to a point in sec. 3, T.10N., R.27E.W.M., which point is on the eastward extension of the N. right-of-way line of a county road from Horn Rapids to Benton City;

Thence along the northerly and westerly right-of-way line of said road, 75 feet northerly and westerly of, and parallel with, the center line of said road to a point on the E. line of sec. 8, T.10N., R.27E.W.M.;

Thence N. to the E. quarter corner of said section;

HANFORD FACILITY LEGAL DESCRIPTION (cont)

Thence W. to the S.W. corner of the E. 1/2 of the N.E. 1/4 of sec. 12, T.10N., R.26E.W.M.;

Thence N. to the N. line of said sec. 12;

Thence W. to the N.E. corner of the N.W. 1/4 of the N.W. 1/4 of the N.W. 1/4 of sec. 11, T.10N., R.26E.W.M.;

Thence S. 660 feet;

Thence W. 660 feet to the E. line of sec. 10, T.10N., R.26E.W.M.;

Thence S. to the S.E. quarter corner of said sec. 10;

Thence W. along the E.-W. centerline of sec. 10 to the W. line of said section;

Thence N. along the W. section line to the S.E. corner of sec. 4, T.10N., R.26E.W.M.;

Thence W. along the S. line of sec. 4 and sec. 5 to the S.W. corner of the S.E. 1/4 of the S.E. 1/4 of sec. 5;

Thence N. to the S.E. corner of the N.W. 1/4 of the S.E. 1/4 of sec. 5;

Thence W. along the S. line of the N.W. 1/4 of the S.E. 1/4 to the S.W. corner of the N.W. 1/4 of the S.E. 1/4;

Thence N. to the S.E. corner of the N. 1/2 of the N.W. 1/4;

Thence W. along the S. line of the N. 1/2 of the N.W. 1/4 to the W. line of sec. 5;

Thence N. to the S.E. corner of sec. 31, T.11N., R.26E.W.M.;

Thence W. along the S. line of the E. 1/2 of the S.E. 1/4 of sec. 31 to the E. line of said E. 1/2 of the S.E. 1/4 of sec. 31;

Thence N. along the W. line of the E. 1/2 of the S.E. 1/4 to the S.E. corner of the S.W. 1/4 of the N.E. 1/4 of sec. 31;

Thence W. along the S. line of the S.W. 1/4 of the N.E. 1/4 to the S.W. corner of the S.W. 1/4 of the N.E. 1/4;

Thence N. along the W. line of the S.W. 1/4 of the N.E. 1/4 to the S.E. corner of the N. 1/2 of the N.W. 1/4 of said sec. 31;

Thence W. along the S. line of the N. 1/2 of the N.W. 1/4 to the W. line of said sec. 31;

Thence N. along the W. line of sec. 31 to the S.E. corner of sec. 25, T.11N., R.25E.W.M.;

Thence W. along the S. line of sec. 25 to the S.W. corner of the S.E. 1/4 of the S.E. 1/4 of said sec. 25;

Thence N. along the W. line of the S.E. 1/4 of the S.E. 1/4 to the S.E. corner of the N.W. 1/4 of the S.E. 1/4;

Thence W. along the S. line of the N.W. 1/4 of the S.E. 1/4 to the S.W. corner of the N.W. 1/4 of the S.E. 1/4;

Thence N. along the W. line of the N.W. 1/4 of the S.E. 1/4 to the S.E. corner of the N.W. 1/4 of sec. 25;

Thence W. along the S. line of the N.W. 1/4 of sec. 25 to the W. line of sec 25;

Thence N. along the W. line of sec. 25 and the W. line of sec. 24 to the N. line of the S. 1/2 of the S. 1/2 of sec. 23;

Thence W. along the N. line of the S. 1/2 of the S. 1/2 of sec. 23 and the N. line of the S. 1/2 of the S. 1/2 of sec. 22 and the N. line of the S. 1/2 of the S. 1/2 of sec. 21 to the E. line of sec. 20;

HANFORD FACILITY LEGAL DESCRIPTION (cont)

Thence S. to the S.E. corner of sec. 20;

Thence W. along the S. line of sec. 20 and the S. line of sec. 19 to the S.E. corner of the S.W. 1/4 of the S.W. 1/4 of sec. 19;

Thence N. to the N.E. corner of the S.W. 1/4 of the S.W. 1/4 of sec. 19;

Thence W. to the W. line of sec. 19, all being in T.11N., R.25E.W.M.;

Thence continuing W. to the S.W. corner of the N.E. 1/4 of the S.E. 1/4 of sec. 24, T.11N., R.24E.W.M.;

Thence N. to the N.W. corner of said N.E. 1/4 of the S.E. 1/4 of sec. 24;

Thence W. to the S.W. corner of the S.E. 1/4 of the N.W. 1/4 of sec. 24;

Thence N. to the N.W. corner of said S.E. 1/4 of the N.W. 1/4 of sec. 24;

Thence W. to the W. line of sec. 24;

Thence N. to the N.W. corner of sec. 24;

Thence W. to the S.E. quarter corner of sec. 14;

Thence N. to the N.W. quarter corner of sec. 14;

Thence W. along the N. line of sec. 14 to the N.W. corner of sec. 14;

Thence N. along the W. line of sec. 11 and sec. 2 to the N.W. corner of sec. 2, all being in T.11N., R.24E.W.M., and continuing N. along the W. lines of secs., 35, 26, 23, 14, 11, and 2, all being in T.12N., R.24E.W.M.;

Thence continuing N. along the W. lines of secs. 35 and 26 in T.13N., R.24E.W.M., to the N.W. corner of sec. 26;

Thence W. along the S. line of sec. 22 to the S.E. quarter corner of sec. 22;

Thence N. along the N.-S. centerline of sec. 22 to the N.E. quarter corner of sec. 22;

Thence W. along the S. line of sec. 15 to the S.W. corner of sec. 15;

Thence N. along the W. line of sec. 15 to the S.W. corner of the N. 1/2 of the N.W. 1/4 of sec. 15;

Thence E. along the S. line of the N. 1/2 of the N.W. 1/4 of sec. 15 to the S.W. corner of the N.W. 1/4 of the N.E. 1/4 of sec. 15;

Thence N. along the W. line of the S.W. 1/4 of the N.E. 1/4 of sec. 15 and continuing N. along the centerline of sec. 10 to the W. navigation line of the Columbia River, following said navigation line easterly, northerly, and southerly to a point directly W. of the S. line of Tract 4 of Ringold Tracts according to the plat filed in the records of Franklin County.

Thence southerly along the said W. line of navigation to the TRUE POINT OF BEGINNING.

EXCEPTING FROM THE ABOVE-DESCRIBED LAND THE FOLLOWING PARCELS, EXCLUDING that portion of the Hanford Railroad and any Hanford Site access roads which may traverse these parcels.:

PARCEL A) The N. 1/2 of the N.W. 1/4, and that portion of the N.W. 1/4 of the N.E. 1/4 in sec. 14, T.13N., R.24E.W.M. in the ownership and jurisdiction of the BONNEVILLE POWER ADMINISTRATION.

PARCEL B) Sec. 1, T.11N., R.26E.W.M. in the ownership under quitclaim deed, of the STATE OF WASHINGTON.

PARCEL C) A tract of land leased to the STATE OF WASHINGTON lying in sections 7, 8, and 9, T.12N., R.26E.W.M., containing 1,000 acres more or less, more particularly described as follows: That part of the S. 1/2 of said sec. 7 bounded on the W. and N. by the following described line: BEGINNING at a

HANFORD FACILITY LEGAL DESCRIPTION (cont)

point on the S. line of said sec. 7, which point is S. 88° 44' 47" W. 4,515.30 feet from the S.E. corner of the sec., and at coordinates N. 438,868.46 and E. 2,222,800.00 on the Washington State Grid System, South Zone; thence N. 1,781.54 feet; thence E. 2,200.00 feet; thence N. 907.19 feet more or less to the N. line of said S. 1/2 of the sec.; thence N. 88° 38' 43" E. along said line 2,275.48 feet more or less to the E. quarter corner of said sec. 7. The S. 1/2 of sec. 8. The S. 1/2, and the S. 1/2 of the N. 1/2 of sec. 9, EXCEPT that portion lying easterly of the following described line: BEGINNING at a point on the E. line of said sec. 9, which point is N. 0° 53' 09" W. 3,071.71 feet from the S.E. corner of the sec., and at coordinates N. 442,268.92 and E. 2,237,790.19 on the Washington State Grid System, South Zone; thence northwesterly along a 1,055.37 foot radius curve to the right an arc distance of 1,064.64 feet (the chord of said arc bears N. 30° 21' 08" W. 1,020.05 feet) to a point on the N. line of the S. 1/2 of the N. 1/2 of said sec. 9, said point being at coordinates N. 443,149.16 and E. 2,237,274.74 on the Washington State Grid System, South Zone.

Three tracts of land leased to the WASHINGTON PUBLIC POWER SUPPLY SYSTEM more particularly described as follows:

PARCEL D) a tract of land (for the Hanford Generating Plant), commencing at the S.E. corner of sec. 28, T.14N., R.26E.W.M., said point having Washington State Coordinates, South Zone, of N. 486,994.01, and E. 2,236,672.11; thence N. 72° 02' 15" W. 3,483.15 feet, thence N. 67° 11' 41" W. 1,810 feet more or less to a point on the line of ordinary high water on the right bank of the Columbia River, which point is the TRUE POINT OF BEGINNING: thence S. 67° 11' 41" E. 1,810 feet more or less to a point, having Washington State Coordinates, South Zone, of N. 488,068.19 and E. 2,233,358.73, thence N. 22° 48' 19" E. a distance of 1,595 feet to a point, having Washington State Coordinates, South Zone, of N. 489,538.48 and E. 2,233,976.96, thence N. 67° 11' 41" W. 1,108 feet more or less to a point on the line of ordinary high water on the right bank of the Columbia River, thence southwesterly along the said line of ordinary high water to the TRUE POINT OF BEGINNING, containing 53.42 acres more or less; THIS PARCEL AMENDED BY DELETING THE FOLLOWING: Beginning at the S.E. corner of the leased parcel, which point is at coordinates N. 488,068.19 and E. 2,233,358.73 on the Washington State Coordinate, South Zone; thence N. 22° 48' 19" E. 1,060 feet; thence N. 67° 11' 41" W. 200 feet; thence S. 22° 48' 19" W. 1,060 feet; thence S. 67° 11' 41" E. 200 feet to the point of beginning; containing 4.85 acres, more or less;

PARCEL E) a tract of land (for WNP Site 2), beginning at the S.W. corner of sec. 11, T.11N., R.28E.W.M., said corner having Washington State coordinates, South Zone, of N. 408,335.30 and E. 2,307,653.50, thence N. 0° 41' 08" E. 8,065.28 feet to the TRUE POINT OF BEGINNING; thence W. 11,153.57 feet; thence S. 01° 01' 23" E. 3,000.48 feet; thence S. 88° 53' 54" W. 5,200.96 feet; thence N. 0° 31' 41" W. 3,690.15 feet; thence E. 1,430.00 feet; thence N. 1,865.69 feet; thence N. 87° 46' 08" E. 3,703.83 feet; thence S. 01° 01' 23" E. 1,600.25 feet; thence E. 11,189.29 feet; thence N. 01° 01' 23" E. 1,800.29 feet; thence N. 89° 07' 55" E. 3,300.38 feet to the line of Navigation of the W. bank of the Columbia River, thence southerly along said line of Navigation to a point that bears N. 89° 15' 21" E. from the TRUE POINT

HANFORD FACILITY LEGAL DESCRIPTION (cont)

OF BEGINNING; thence S. 89° 15' 21" W. 3,850.32 feet more or less to the TRUE POINT OF BEGINNING.

PARCEL F) A tract of land (for WNP Sites 1 and 4) lying in Section 4 of Township 11 North, Range 28 East, Willamette Meridian, described as follows:

Beginning at the Southwest corner of Section 11, Township 11 North, Range 28 East, W.M., (said corner being located by reference to the Washington State Coordinate System South Zone at coordinates North 408,335.30 and East 2,307,653.50) thence North 65°-17'-03" West 12113.14 feet to the TRUE POINT OF BEGINNING (said point being located by reference to the Washington State Coordinate System South Zone at coordinates North 413,400.00 and East 2,296,650.00); thence North 01°-01'-23" West 3000.48 feet to a point; thence East 5280.00 feet to a point; thence South 01°-01'-23" East 3000.48 feet to a point; thence West 5280.00 feet more or less to the TRUE POINT OF BEGINNING, containing 363.69 acres more or less; and

A parcel of land lying in Sections 3 and 4 of Township 11 North, Range 28 East, and Sections 33 and 34 of Township 12 North, Range 28 East, Willamette Meridian, described as follows:

Beginning at the Southwest corner of Section 11, Township 11 North, Range 28 East, W.M., (said corner being located by reference to the Washington State Coordinate System South Zone at coordinates North 408,335.30 and East 2,307,653.50) thence North 50°-42'-00" West 14,311.63 feet to the TRUE POINT OF BEGINNING (said point being located by reference to the Washington State Coordinate System South Zone at coordinates North 417,400.00 and East 2,296,578.57); thence North 01°-01'-23" West 3000.48 feet to a point; thence East 5,280.00 feet to a point; thence South 01°-01'-23" East 1200.19 feet to a point; thence East 5,973.57 feet to a point; thence South 1°-01'-23" West 1800.29 feet to a point; thence West 11,189.29 feet more or less to the TRUE POINT OF BEGINNING, containing 609.15 acres more or less.

PARCEL G) The parcels on the Hanford Site used but not owned by the Bonneville Power Administration including the Ashe Substation, the Hanford Substation, the Benton Switch Substation, and the White Bluffs Substation.

ASHE SUBSTATION. A parcel of land in the W. 1/2 S.E. 1/4, the S.E. 1/2 N.W. 1/4 and the S.W. 1/4 of Section 32, Township 12 North, Range 28 East, Willamette Meridian, Benton County, Washington, more particularly described as follows:

Commencing at a Bonneville Power Administration monument set at the intersection of the north-south and east-west base lines for the Ashe Substation Site in the S.E. 1/4 S.W. 1/4 of Section 32, Township 12 North, Range 28 East, Willamette Meridian. This monument is located N.26°49'15"E., 1503.1 feet from a 2-inch brass disc on the south line of Section 32, said disc being set by WPPSS survey of August 11, 1971. Thence N.52°10'10"E., 1200.0 feet to the true point of beginning. Thence S.37°49'50"E., 400.0 feet; thence S.52°10'10"W., 1100.0 feet; thence S.37°49'50"E., 1287.7 feet to a point on the south line of Section 32; thence S.87°46'12"W., along said south line of Section 32, a distance of 984.0 feet; thence N.37°49'50"W., 2014.8 feet; thence N.52°10'10"E., 1900.0 feet; thence S.37°49"50"E., 900.0 feet to the true point of beginning; containing 75.09 acres, more or less.

HANFORD FACILITY LEGAL DESCRIPTION (cont)

ASHE SS SOUTH CORRIDOR, PARCEL 1. A portion of Government Lot 3 of Section 5, Township 11 North, Range 28 East, Willamette Meridian, Benton County, Washington, more particularly described as follows:

Commencing at a point in Bay 3 in the Ashe Substation Site in the N.E. 1/4 S.W. 1/4 of Section 32, Township 12 North, Range 28 East, Willamette Meridian, said point being N.25°56'16"E., 1716.1 feet from a 2-inch brass disc on the south line of Section 32, said disc being set by WPPSS survey of August 11, 1971. Thence S.31°24'10"E., 553.5 feet; thence S.1°50'00"E., 1029.6 feet to a point on the north line of Section 5, Township 11 North, Range 28 East, Willamette Meridian, the true point of beginning for this description. Thence N.87°46'12"E., along said north line of Section 5, a distance of 75 feet; thence S.1°50'00"E., 1299.7 feet; thence S.88°10'00"W., 281.5 feet; thence N.1°50'00"W., 1297.6 feet to a point on said north line; thence N.87°46'12"E., along said north line, a distance of 206.5 feet to the true point of beginning.

ASHE SS SOUTH CORRIDOR, PARCEL 2. All that portion of the S.E. 1/4 S.W. 1/4 of Section 32, Township 12 North, Range 28 East, Willamette Meridian, Benton County, Washington, that lies southerly and easterly of the Ashe Substation Site and westerly of a line 75 feet easterly from and parallel with the survey line for the Bonneville Poser Administration WPPSS No. 2 Powerhouse-Ashe 500 kV line No. 2. The survey line is described, with reference to the Washington Coordinate System - South Zone, as follows:

Beginning at a point in Bay 3 in the Ashe Substation Site in the N.E. 1/4 S.W. 1/4 of Section 32, Township 12 North, Range 28 East, Willamette Meridian, at a survey Station 97+84.0, said point being N.25°56'16"E., 1716.1 feet from a 2-inch brass disc on the south line of Section 32, said disc being set by WPPSS survey of August 11, 1971. Thence S.31°24'10"E., 553.5 feet to station 92+30.5; thence S.1°50'00"E., 1029.6 feet to a point on the south line of Section 32, said point being N.87°46'12"E., 1072.1 feet from said brass disc.

ASHE-SS-AR-1. A portion of Lot 3 S.1/2 N.W. 1/4, and N.W. 1/4 S.W. 1/4 of Section 5, the E. 1/2 S.E. 1/4 and S.W. 1/4 S.E. 1/4 of Section 6, the N.W. 1/4 N.E. 1/4 and E. 1/2 N.W. 1/4 of Section 7, Township 11 North, Range 28 East, Willamette Meridian, Benton County. Washington.

HANFORD SUBSTATION SITE. Lot 1 of Block 8, Lots 13 and 14 of Block 9, and Lot 8 of Block 10 of Hanford, according to the recorded plat thereof, and that part of Thirteenth Street lying between the northeasterly line of Tract A of Hanford, according to the recorded plat thereof and the Columbia River, and that part of Dunham Street lying southeasterly of a line connecting the northwesterly lines of Lot 8 of Block 10 and Lot 13 of Block 9 of Hanford, according to the recorded plat thereof, all in Section 25, Township 13 North, Range 27 East, Willamette Meridian Benton County, Washington, containing 2.7 acres, more or less. Subject to easement to Pacific Power & Light Company for power line and access purposes.

BENTON SWITCH SUBSTATION. A parcel of land in the N.W. 1/4 of Section 11, Township 11 North, Range 28 East, Willamette Meridian, Benton County, Washington, described with reference to the Washington Coordinate System - South Zone, as follows:

HANFORD FACILITY LEGAL DESCRIPTION (cont)

Beginning at the northwest corner of said parcel, being S.54°50'E., 1804.0 feet more or less from the northwest corner of said Section 11; thence N.49°13'45"E., 550.0 feet to the northeast corner, evidenced by a brass cap; thence S.40°46'15"E., 500.0 feet to the southeast corner, evidenced by a brass cap; thence S.49°13'45"W., 550.0 feet to the southwest corner, evidenced by a brass cap; thence N.40°46'15"W., 500.0 feet to the point of beginning. The described parcel contains 6.31 acres, of which 2.75 acres lie within the boundaries of the existing Benton Switching Station.

WHITE BLUFFS SUBSTATION. A parcel of land in Government Lots 3 and 4 and the E. 1/2 S.W. 1/4 of Section 7, Township 10 North, Range 28 East, Willamette Meridian, Benton County, Washington, more particularly described as follows:

Commencing at a Bonneville Power Administration monument in said Government Lot 4 at the intersection of the east-west and north-south base lines for the White Bluffs Substation Site, said monument being N.36°45'35"E., 1623.7 feet from the southwest corner of Section 7. This corner is evidenced by a rock mound. Thence N.72°55'20"W., along the east-west base line, a distance of 500 feet to the true point of beginning. Thence N.17°04'40"E., 400 feet; thence S.72°55'20"E., 900 feet; thence S.17°04'40"W., 1060 feet, more or less, to a point 40 feet north of the centerline of Horn Rapids Road; thence N.72°55'20"W., 900 feet., thence N.17°04'40"E., 660 feet, more or less, to the true point of beginning, containing 21.90 acres, more or less.

Also included is a parcel of land situated in the Southwest quarter of Section 14, Township 10 North, Range 28 East, W.M., Benton County, Washington, described as follows: beginning at the Southeast corner of said Southwest quarter; thence North 01°45'22" West along the East line of said Southwest quarter a distance of 2640.77 feet to the Northeast corner of said Southwest quarter; thence South 89°31'50" West along the North line of said Southwest quarter a distance of 961.53 feet; thence South 00°55'00" East a distance of 47.10 feet to the South margin of Horn Rapids Road and being the True Point of Beginning; thence continuing South 00°55'00" East a distance of 1502.25 feet; thence South 89°04'36" West a distance of 430.57 feet; thence South 00°53'37" East a distance of 123.72 feet; thence South 89°43'26" West a distance of 410.23 feet; thence North 00°55'00" West a distance of 1625.69 feet to the South right of way margin of Horn Rapids Road; thence North 89°22'24" East along said South margin a distance of 840.83 feet to the True Point of Beginning.

For purposes of application of Part IV Corrective Action of the Hanford Facility Permit only, the Hanford Facility also includes PARCELS C, D, E, F, and G of the lands identified as Excepted from the ABOVE-DESCRIBED LAND, in the foregoing legal description.

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APPENDIX
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APPENDIX 2D

SOLID WASTE MANAGEMENT UNITS

APPENDIX 2D

CONTENTS

SOLID WASTE MANAGEMENT UNITS

The requirement to address SWMUs at a RCRA Facility was enacted as part of the HSWA to RCRA [under Section 3004(u), "Continuing Releases At Permitted Facilities"]. Section 3004(u) states:

> "Standards promulgated under this section shall require, and a permit issued after the date of enactment of the Hazardous and Solid Waste Amendments of 1984 by the administrator or a State shall require, corrective action for all releases of hazardous waste or constituents from any solid waste management unit at a treatment, storage, or disposal facility seeking a permit under this subtitle, regardless of the time at which waste was placed in such unit. Permits......."

Because this requirement is part of the HSWA, the EPA regulations for implementing Section 3004(u) currently are proposed under 40 CFR 264, Subpart S (264.501 through 264.560). The definition of a corrective action management unit and temporary unit were finalized on February 16, 1993. These definitions are promulgated at 40 CFR Part 264.552 and Part 264.553, respectively of 40 CFR Part 264, Subpart S.

1.0 SOLID WASTE MANAGEMENT UNITS AND KNOWN AND SUSPECTED RELEASES

Currently, over 1,600 waste management units have been identified within the Hanford Site, the majority of which are identified as SWMUs in accordance with the RCRA. These waste management units are tabulated and described in the Units Report (DOE/RL-88-30). As surveys and scoping studies are performed in support of the ongoing onsite cleanup program, additional SWMUs likely will be identified. The amount of information that currently exists for individual SWMUs varies significantly. It is intended that SWMUs be investigated in accordance with the past-practice process of the Tri-Party Agreement (refer to Chapter 2.0, Section 2.5). In support of the issuance of a Hanford Facility RCRA permit, the EPA conducted an initial RCRA Facility Assessment. If necessary, follow-on assessments, scoping studies, and investigations will be conducted in accordance with the Tri-Party Agreement to obtain additional information on currently identified SWMUs and newly identified SWMUs.

Conditions pertaining to SWMUs are contained in the HF RCRA Permit as follows: Condition II.I.1.a. of Part II (DW Portion), Part III (DW Portion), and Part IV (HSWA Portion) (refer to Chapter 2.0, Section 2.1.1.3). In support of Condition II.I.1.a. of the HF RCRA Permit (DW Portion), all known SWMUs must be identified and mapped, including any releases of dangerous waste (or constituents) from these units. Because of the number and complexity of SWMUs on the Hanford Site, the proposed approach to satisfy the requirements for identifying and updating SWMUs and releases from SWMUs uses a combination of the following:

- Hanford Waste Information Data System (WIDS)
- Units Report
- Set of SWMU topographical maps.

1.1 WASTE INFORMATION DATA SYSTEM

The WIDS is an electronic database that identifies known and reported SWMUs located within the DOE-RL controlled area (i.e., area on the Hanford Site over which DOE-RL has responsibility). The WIDS also includes other waste management units (i.e., non-SWMUs) in support of the overall cleanup mission of the Hanford Site. These non-SWMUs include one-time spills, domestic sewage sites, and structures awaiting decontamination and decommissioning. The SWMUs are clearly designated from the non-SWMUs within the WIDS. The WIDS includes the type and location of the unit, when the unit was operated, general dimensions and description, and general descriptions of waste placed in the unit to include estimated quantities of radionuclides and chemicals contained in some units. As additional information on the SWMUs is made available, this information is entered into the WIDS. The WIDS will be used as the official listing of SWMUs for the DOE-RL controlled area. The EPA and Ecology have been provided with electronic access to the database.

As additional SWMUs are identified as a result of investigations and scoping studies conducted within the DOE-RL controlled area, the SWMUs will be entered into the WIDS, along with required information concerning the unit. A special electronic file will be maintained within the WIDS system that identifies all SWMUs that have been entered into the system within the last 30 days. This will satisfy the requirement established by Condition III.F of the HF RCRA Permit (HSWA Portion) for notification of newly identified SWMUs. A second electronic file will be maintained to show all previously entered SWMUs whose descriptive data have been modified within the last 30 days. This file will be accessible upon request. Modifications will include newly discovered information concerning releases of hazardous materials from the SWMUs.

1.2 HANFORD SITE WASTE MANAGEMENT UNITS REPORT

The Units Report (DOE/RL-88-30) provides summary information on each waste management unit contained within the WIDS. In accordance with Section 3.5 of the Tri-Party Agreement Action Plan, the Units Report is reissued in January of each year, if determined necessary by representatives of the three parties (i.e., DOE-RL, EPA, and Ecology). Each update reflects waste management units added to the database since the preceding report, along with updated information on all units.

1.3 SET OF SOLID WASTE MANAGEMENT UNITS TOPOGRAPHICAL MAPS

Information on obtaining SWMU maps is contained in Appendix C of the Units Report (refer to Appendix 2A of this document).

2.0 CORRECTIVE ACTIONS IMPLEMENTED

Schedules to implement any corrective actions for the DOE-RL controlled area will be developed and maintained within the Tri-Party Agreement (refer to Chapter 2.0, Section 2.5). All identified SWMUs have been assigned to operable units within the Tri-Party Agreement along with other waste management units. Newly identified SWMUs will be assigned to the appropriate operable unit via the Tri-Party Agreement change control process outlined in Chapter 12.0 of the Action Plan. Either CERCLA response action authority or RCRA corrective action authority is assigned as the prime authority for the investigation and cleanup process for each operable unit. The schedules of compliance for those assigned RCRA corrective action authority are considered as part of the HF RCRA Permit via reference to the Tri-Party Agreement. The Tri-Party Agreement change control process will be used to modify the schedules of compliance as necessary, meeting the intent of 40 CFR 270.34 (proposed). Remedy selections, either as a corrective measure or as an interim measure, will be incorporated into modifications of the HF RCRA Permit.

The schedules of compliance will include any follow-on RCRA Facility Assessments that might be conducted, RCRA facility investigations, corrective measure studies, and corrective measure implementations. The schedules also will include any interim measures that are identified to be conducted.

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HANFORD FACILITY CONTINGENCY PLAN

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Document Title: HANFORD FACILITY CONTINGENCY PLAN
Quality, Safety, and Health
Environmental Assurance, Permits, and Policy

Prepared by: R H Palmer for L. N. Sutton, Engineer — 6-28-96 (Date)
Emergency Preparedness Support, Hazards Assessment, and Training

Approved by: for S. J. Veitenheimer, Director — 6-28-96 (Date)
Quality, Safety, and Health Programs Division

Approved by: Clifford E. Clark for J. E. Rasmussen, Director — 7-8-96 (Date)
Environmental Assurance, Permits, and Policy Division

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IMPLEMENTATION NOTICE

DOE/RL-93-75, *Hanford Facility Contingency Plan*
Revision 2

This document is being issued for use by personnel who are responsible for facilities that are required to meet the contingency planning requirements contained in *Washington Administrative Code* (WAC) 173-303.

The document replaces Attachment 4, *Hanford Facility RCRA Permit, Dangerous Waste Portion*.

This document is intended to be used in conjunction with existing TSD unit contingency planning documentation (e.g., building emergency plans) to present a complete picture of contingency planning to regulatory personnel. This document contains descriptions of the Hanford Facility emergency capabilities including equipment, organizations, and standard response actions; descriptions of agreements made with the local agencies; and a description of the occurrence reporting and notification process.

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HANFORD FACILITY CONTINGENCY PLAN

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LIST OF FIGURES

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1.0 GENERAL INFORMATION

The Hanford Facility is defined as a single *Resource Conservation and Recovery Act* (RCRA) *of 1976* facility, identified by the EPA/State Identification Number WA7890008967, that consists of over 60 treatment, storage, and/or disposal (TSD) units conducting dangerous waste management activities. The Hanford Facility consists of the contiguous portion of the Hanford Site that contains these TSD units and, for the purposes of RCRA, is owned and operated by the U.S. Department of Energy (excluding lands north and east of the Columbia River, river islands, lands owned or used by the Bonneville Power Administration, lands leased to the Washington Public Power Supply System, and lands owned by or leased to the state of Washington).

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2.0 PURPOSE

The Hanford Facility Contingency Plan, together with each TSD unit-specific contingency plan, meets the WAC 173-303 requirements for a contingency plan. Applicability of this plan to Hanford Facility activities is described in the Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A. General Condition II.A applies to Part III TSD units, Part V TSD units, and to releases of hazardous substances which threaten human health or the environment. Additional information about the applicability of this document may also be found in the Hanford Facility RCRA Permit Handbook (DOE/RL-96-10).

This plan includes descriptions of responses to a nonradiological hazardous substance spill or release at Hanford Facility locations not covered by TSD unit-specific contingency plans or building emergency plans. The term hazardous substances is defined in WAC 173-303-040 as: "any liquid, solid, gas, or sludge, including any material, substance, product, commodity, or waste, regardless of quantity, that exhibits any of the physical, chemical or biological properties described in WAC 173-303-090 or 173-303-100." Whenever the term hazardous substances is used in this document, it will be used in the context of this definition.

This plan includes descriptions of responses for spills or releases of hazardous substances occurring at areas between TSD units that may, or may not, threaten human health or the environment.

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3.0 EMERGENCY COORDINATORS

The overall responsibility for implementation of this plan lies with personnel responsible for performing the duties of the Emergency Coordinator as discussed in WAC 173-303-360. Based upon applicability of this document through the Hanford Facility RCRA Permit to Hanford Facility activities as defined by Section 2.0, the Emergency Coordinator must be discussed in terms of Part III TSD units, Part V TSD units, and releases of hazardous substances.

Part III TSD units: The Emergency Coordinator at Part III TSD units (operating TSD units) will be personnel who are assigned to the TSD unit. Personnel providing outside support for emergency response will not assume the role of the Emergency Coordinator at Part III TSD units; however, they may be in charge of first response activities.

Part V TSD units: For Part V TSD units, the Emergency Coordinator approach will depend on whether a building or structure is present as part of the TSD unit. The Emergency Coordinator will be personnel who are assigned to the TSD unit when a building or structure is present. Personnel providing outside support for emergency response will not assume the role of the Emergency Coordinator at these Part V TSD units; however, they may be in charge of first response activities.

For Part V TSD units that do not have a building or structure present as part of the TSD unit, the initial Emergency Coordinator will be Hanford Fire Department personnel who will also perform first response activities. The Hanford Fire Department will then delegate the Emergency Coordinator duties after the immediate threat of a release has been stabilized or eliminated. Remaining Emergency Coordinator duties will be delegated from the Hanford Fire Department to personnel who are assigned to the TSD unit after they are summoned to the event scene. TSD unit personnel will be summoned to the scene based upon the listing of Emergency Coordinators maintained at the single point-of-contact[1] in accordance with Hanford Facility RCRA Permit (DW Portion) General Condition II.A.4.

Hazardous Substance release: The Emergency Coordinator for a hazardous substance release occurring at Part III TSD units and Part V TSD units undergoing closure will be the personnel discussed above for those locations. For other locations on the Hanford Facility considered areas between TSD units, the Emergency Coordinator title will be held by different personnel based upon two different scenarios.

Scenario 1: Release during transportation from one project[2] to another. In this scenario, the Hanford Fire Department will serve as the initial Emergency Coordinator and will perform first response activities. The Hanford Fire

[1]The single point-of-contact is the Hanford Patrol Operations Center and/or the Pacific Northwest National Laboratory Security Center.

[2]This term is based upon information found in DOE\RL-91-28, Chapter 1.0, Table 1-1 for Hanford Facility TSD units.

Department will then delegate the Emergency Coordinator duties after the immediate threat of a release has been stabilized or eliminated. Remaining Emergency Coordinator duties will be delegated from the Hanford Fire Department to the organization that offered the hazardous substance for transportation. Delegation will occur after personnel from the offering organization are summoned to the event scene. Personnel will be summoned to the event scene based upon the listing of Emergency Coordinators maintained at the single point-of-contact in accordance with Hanford Facility RCRA Permit (DW Portion), General Condition II.A.4.

Scenario 2: Release during transportation to and from the same project or during product or waste storage. In this scenario, the organization responsible for the shipment or the hazardous substance in storage will be notified and will serve as the Emergency Coordinator. Personnel providing outside support for emergency response will not assume the role of the Emergency Coordinator on these transportation events however they may be in charge of first response activities.

For any event, at any location, one Emergency Coordinator will be at the scene. When called to respond, the Hanford Fire Department's involvement will be limited to first response activities.

A list of all Emergency Coordinators and designated alternates is maintained in accordance with the Hanford Facility RCRA Permit (DW Portion) General Condition II.A.4. These individuals can be reached 24 hours per day. The Emergency Coordinator has the authority to commit all necessary resources (both equipment and personnel) to respond to any emergency.

Response by an Emergency Coordinator usually is obtained through the single point-of-contact by dialing the appropriate emergency telephone number: 911 or Pacific Northwest National Laboratory telephones at 375-2400. The Hanford Patrol Operations Center may also be reached by calling their business line, 373-3800. The single point-of-contact has been designated as the contact point to mobilize a response to any Hanford Facility emergency. The single point-of-contact is available at all times and can initiate notifications to the Emergency Coordinator or alternate to begin responses to emergencies, as well as to dispatch emergency responders (Hanford Fire Department, Hanford Patrol, or ambulance services). All emergency notifications to the Emergency Coordinator can be made directly from the affected facility or TSD unit or through the single point-of-contact.

The unit-specific DOE-RL technical contact responds to regulatory agency inquiries regarding this Plan. The unit-specific DOE-RL technical contact is accessed by contacting 373-3800 or 375-2400.

4.0 IMPLEMENTATION OF THE CONTINGENCY PLAN

This Plan describes parallel decision flow paths for evaluating and classifying an incident. DOE orders and WAC 173-303-360 require incident classification. The definition of emergencies according to DOE orders differs from the definition contained in WAC 173-303. Because of this, a dual incident classification decision path is necessary to meet both DOE order and WAC 173-303 requirements. Incident classification according to DOE orders is described in this Plan for completeness only. DOE orders will not be used to evaluate whether an incident requires implementation of a contingency plan.

Implementation of a contingency plan will occur when an Emergency Coordinator has determined that a release, fire, or explosion has occurred at the facility which could threaten human health or the environment in accordance with sections 5.1.4 and 5.1.5 of this plan. A release is defined in WAC 173-303-040 within the definition of "discharge". An incident requiring evacuation of personnel or the summoning of emergency response units will not necessarily indicate that a contingency plan has been implemented.

Any incident that poses a potential threat to human health or the environment discovered by TSD unit personnel requires immediate notification of the Emergency Coordinator and the single point-of-contact who then notifies the Hanford Fire Department. Personnel may respond, in accordance with the procedures described in TSD unit-specific contingency plans, before the arrival of the Emergency Coordinator, as long as such response is within their level of training. The Hanford Fire Department is contacted through the single point-of-contact on all emergency incidents involving dangerous waste, mixed waste, or hazardous substances.

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5.0 INCIDENT RESPONSE

Incident response procedures have been established for each TSD unit. The initial response to any emergency will be to immediately protect the health and safety of persons in the immediate area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment will be the secondary responses.

The following sections describe actions for personnel for several different types of incidents, including a generic response, that might occur on the Hanford Facility. Regardless of how an incident is classified, minimum on-site notification requirements exist to ensure the appropriate organizations are contacted and that the incident is correctly classified.

5.1 INCIDENT GENERIC RESPONSES

Unless indicated in subsequent response sections, the incident generic responses will apply to any event.

5.1.1 *Discoverer*

1. The discoverer makes immediate notifications to potentially affected personnel (including the Emergency Coordinator for a TSD unit incident, if onsite) of the incident.

2. Immediately notifies the single point-of-contact by dialing the appropriate telephone number: 911, or Pacific Northwest National Laboratory telephones at 375-2400 and provides all known information, if the information can be obtained without jeopardizing personnel safety, including the following:

   - Name(s) of chemical(s) involved and amount(s) spilled, on fire, or otherwise involved, or threatened by, the incident

   - Name and callback telephone number of person reporting the incident

   - Location of incident (identify as closely as possible and include information about multiple building numbers)

   - Time incident began or was discovered

   - Where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.

   - Source and cause, if known, of spill or discharge

   - Name(s) of anyone contaminated or injured in connection with the incident

- Any corrective actions in progress

- Anyone else who the discoverer has contacted.

5.1.2 Single Point-of-Contact

1. Initiates notification to the Emergency Coordinator, or one of the alternates if the Emergency Coordinator cannot be reached immediately, to arrange immediate response to the incident

2. Requests immediate response from the Hanford Fire Department for fire, ambulance service, and/or hazardous substances/mixed waste incidents

3. Contacts the Hanford Patrol for traffic control and security measures, as needed, based on the report of the discoverer

4. Initiates notification to appropriate management of the spill or release incident

5. Supports the Emergency Coordinator in providing further notification and coordination of response activities if needed

6. Activates or requests activation of the appropriate alarm signals (as required) for the affected building or affected areas, when the Emergency Coordinator determines that protective actions are necessary

7. Notifies the emergency response organizations

8. Prompts activation of the affected area emergency control centers (ECC) if requested by the Emergency Coordinator or other authorized persons

9. Prompts activation of the DOE-RL Emergency Management Team (EMT), if necessary, to recommend protective actions for areas outside the Hanford Facility.

5.1.3 Emergency Coordinator (or alternate)

1. Sounds appropriate alarms to notify occupants

2. Notifies the single point-of-contact if additional support or an area evacuation is needed

3. Activates the building emergency response organization as necessary

4. Arranges for care of any injured persons

5. Requests the single point-of-contact to activate the affected ECC, if required. Activation of the ECC should be done whenever technical assistance is required in evaluating a spill, when the

emergency might affect neighboring buildings, or when otherwise deemed necessary by the Emergency Coordinator.

6. Provides for event notification in accordance with DOE Order O 232.1 and other established Hanford Facility procedures

7. Provides details of the event to appropriate management as the details become available.

5.1.4 Identification of Hazardous Substances and Dangerous Waste and Assessment of Hazards

The Emergency Coordinator ensures that trained personnel identify the character, source, amount, and areal extent of the hazardous substance or dangerous waste involved in the incident to the extent possible. Identification of waste can be made by visual inspection of involved containers; by sampling; by reference to inventory records, shipping manifests, or waste tracking forms; or by consulting with TSD unit operations personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate.

Concurrently, the hazards that the incident poses to human health and the environment must also be assessed. The assessment must take into consideration the direct, indirect, immediate, and long-term effects of the incident. In addition to the information sources identified above, the hazard assessment should include other sources such as Material Safety Data Sheet toxicity and health information, and results from any personnel monitoring examinations conducted at medical facilities. These are the types of tools which will aid in ascertaining the extent in which human health and the environment were threatened.

Upon activation, the ECC is available to assist the Emergency Coordinator if needed. Possible assistance could include determining the extent of an emergency, identifying the hazards associated with the materials or waste involved in the incident, assisting in response to the incident, or coordinating the mobilization of special equipment or supplies to the incident site.

If assessment of all available information does not yield a positive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions will be initiated. The Emergency Coordinator is responsible to initiate any protective actions.

5.1.5 Incident Classification

After the assessment has been completed in Section 5.1.4, the incident should be ready for classification. If not, the Emergency Coordinator shall take whatever means are necessary to obtain the information to complete the classification. The Emergency Coordinator must classify the incident according to the DOE order and contingency plan implementation criteria in this section.

1. DOE Order Incident Classification

   There are three categories of incidents on the Hanford Facility: offnormal event, unusual occurrence, and emergency as described in DOE Orders. Incidents are categorized based on degradation of TSD-unit safety systems and impact to other TSD units, employees, structures, public safety, and the environment. Incidents categorized as offnormal events and unusual occurrences are communicated as described in Section 9.0. Incidents categorized as an emergency are further classified into one of three emergency classes as required by DOE Orders. Incidents categorized as emergencies will prompt automatic activation of the appropriate ECCs.

2. WAC 173-303 Incident Classification

   Based upon the evaluation and hazard assessment in Section 5.1.4, the Emergency Coordinator may determine that the incident is classified as a release, fire, or explosion that threatens human health or the environment. When this occurs, the Emergency Coordinator must report his/her assessment to the ECC, if activated, or to the Patrol Operations Center by dialing 911 for dissemination to local authorities for evacuation of local areas, if applicable. In addition, the Emergency Coordinator or his/her designee, with assistance from environmental compliance/protection personnel, must immediately (within 2 hours) notify Ecology, and either the government official designated as the on-scene coordinator, or the National Response Center. The information included in the assessment report to these agencies is described in Section 9.0.

5.1.6 Protective Actions

1. Evacuation **(Signal: Steady siren)**. Each TSD unit has a building emergency procedure that includes an evacuation plan identifying emergency signals and staging area location. In the event a Facility-wide evacuation is required, TSD unit personnel evacuate to their designated staging area, are accounted for, and receive directions on routes to take to safely evacuate the area. If the primary route is blocked by the emergency, personnel use alternate evacuation routes determined at the time of the event.

   Evacuation routes for the Hanford Facility are shown on Figure 1. Specific routes will be determined at the time of the event based on event magnitude, location, and meteorology.

2. Take Cover **(Signal: Wavering siren)**. In the event of a take cover alarm, personnel must go inside or remain inside, close all exterior doors, and turn off all intake ventilation. Personnel secure all waste and classified documents.

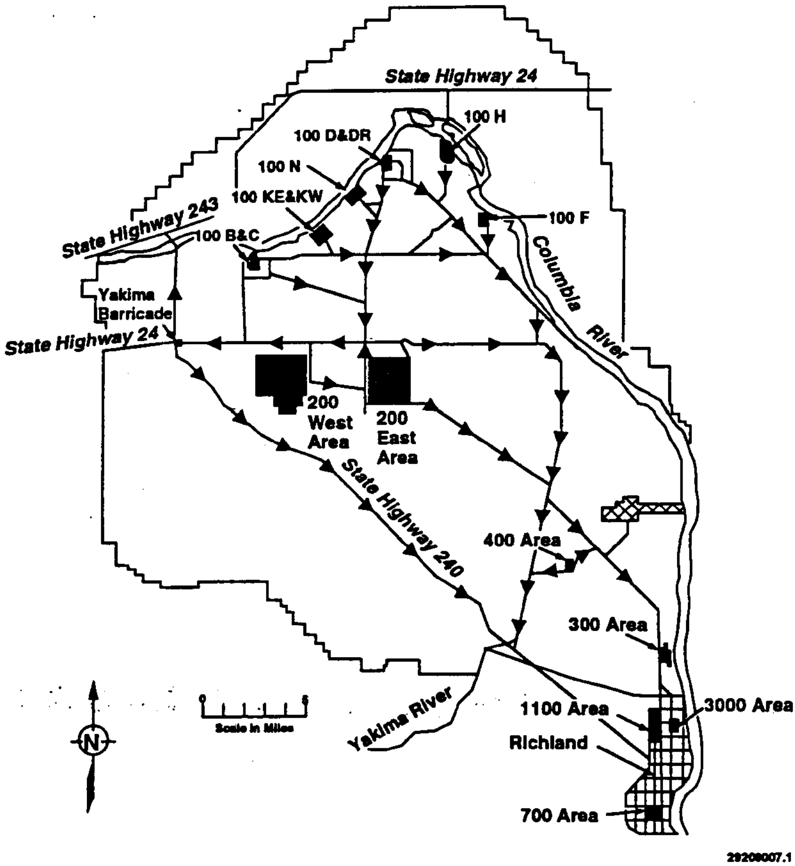

Figure 1. Hanford Facility Evacuation Routes.

5.2 RESPONSE TO MINOR SPILLS OR RELEASES AT TSD UNITS AND OTHER BUILDINGS

(Signal: None) The TSD unit personnel generally perform immediate cleanup of minor spills or releases using sorbents and emergency equipment. Personnel detecting such spills or releases contact their supervisor or manager to notify of the detection of such release and to ensure notification of the Emergency Coordinator. In the event a supervisor or manager is not available, the discoverer may notify the single point-of-contact to ensure an Emergency Coordinator is contacted. Responses to spills or releases occurring within individual storage cells, structures, modules, etc., during routine handling and storage are contained in TSD unit-specific contingency plans and/or procedures. Response to minor spills does not require the implementation of the contingency plan in accordance with sections 5.1.4 and 5.1.5.

A spill or release of hazardous substance or dangerous waste is considered 'minor' if <u>all</u> of the following are true:

- The spill does not threaten human health (e.g., an evacuation is not necessary)
- The spill does not threaten the environment
- non-emergency response personnel have received training to mitigate the spill and appropriate personal protective equipment is available
- The composition of the material or waste is known or can be quickly determined from label, manifest, material safety data sheets, or disposal request information.

If one or more of the foregoing conditions are not met, responses are performed as outlined in Section 5.3. Notification of the spill as outlined in Section 5.1 is not required for a minor spill or release.

5.3 RESPONSE TO MAJOR SPILLS OR RELEASES AT TSD UNITS OR OTHER BUILDINGS

(Signal: None) The following actions are taken in the event of a major spill or release. Response to major spills or releases may result in implementation of the contingency plan if the Emergency Coordinator makes this determination in accordance with Sections 5.1.4 and 5.1.5.

5.3.1 Discoverer

The discover performs the following:

1. If within the TSD unit, notify personnel (including the Emergency Coordinator) of discovery of spill or release by sounding the appropriate alarm, using the public address (PA) system, etc.
2. Initiate notifications to the single point-of-contact and provide all known information, in accordance with Section 5.1.

3. Takes action to contain and/or to stop the spill if all of the following are true:

   - The identity of the substance(s) involved is known
   - Appropriate protective equipment and control/cleanup supplies are readily available
   - Discoverer has received the appropriate training and can safely perform the action(s) without assistance, or assistance is readily available from other trained TSD unit personnel.

If any of the above conditions are not met, or there is any doubt, the discoverer evacuates the area and remains outside, upwind of the TSD unit, pending the arrival of the Emergency Coordinator. The discoverer remains available for consultation with the Emergency Coordinator, Hanford Fire Department, or other emergency response personnel.

5.3.2 Single Point-of-Contact

The single point-of-contact performs the following:

1. Notifies the Hanford Fire Department and relays information received from the event scene
2. Initiates notification to the Emergency Coordinator if not at the TSD unit
3. Remains available to support further notification and response activities if needed.

5.3.3 Emergency Coordinator

The Emergency Coordinator performs or arranges for the following:

1. Proceeds directly to the TSD unit to coordinate further activity and to establish a command post at a safe location
2. Obtains all available information pertaining to the incident and determines if the incident requires implementation of the contingency plan
3. Determines need for assistance from agencies listed in Section 8.0 and arranges for their mobilization and response through the single point-of-contact
4. Initiates the appropriate alarm, if building or area evacuation is necessary,
5. Arranges for care of any injured persons

6. Requests activation of the affected area ECC via the single-point of contact, if a threat to surrounding buildings or structures exists

7. Provides for event notification in accordance with Section 5.1

8. Maintains access control at the incident site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control if control of the boundary is difficult (e.g., repeated incursions). In determining controlled access areas, considers environmental factors such as wind velocity and direction

9. Arranges for proper remediation of the incident after evaluation.

10. Remains available for fire, patrol, and other authorities on the scene and provides all required information

11. Enlists the assistance of alternate Emergency Coordinator(s), if around-the-clock work is anticipated

12. Refers media inquiries to the Media Relations/Communications offices of the contractors or DOE-RL.

13. Ensures the use of proper protective equipment, remedial techniques (including ignition source control for flammable spills), and decontamination procedures by all involved personnel, if remediation is performed by TSD unit personnel. Areas of expertise are available in determining necessary equipment or procedures

14. Remains at the scene to oversee activities and to provide information, if remediation is performed by the Hanford Fire Department Hazardous Materials Response Team or other response teams

15. Ensures proper containerization, packaging, and labeling of recovered spill materials and overpacked containers

16. Ensures decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming TSD unit operations

17. Provides required reports after the incident in accordance with Section 9.0.

5.3.4 Hanford Fire Department Response to Major or Unknown Spills

The Hanford Fire Department response to unknown spills is as follows.

1. Initial Hanford Fire Department response includes one engine company, one hazardous materials unit, one ambulance unit, and one battalion commander.

2. The Hanford Fire Department, as the Hazardous Materials Incident Command Agency, establishes command and control of the situation. The first arriving unit assumes incident command and determines location of the command post, and evacuates personnel from a redzone consisting of a minimum of 100 feet (30.5 meters) in all directions. The red zone could be adjusted as deemed necessary by the hazardous materials team leader.

3. The Incident Commander evacuates all personnel within the red zone area.

4. The hazardous materials team leader establishes yellow zone and decontamination corridor.

5. The hazardous materials team leader assigns fully trained and qualified team members specific tasks i.e.,

Team Safety Officer	Decontamination Team Leader
Entry Team	Resource Leader
Backup Team	Science Leader

6. The hazardous materials team safety leader controls and directs the medical evaluations for personnel working in the red and the yellow zones.

7. Team members performing entry, back up, and decontamination, suit up in level "A" protection.

8. Entry team members make entry to obtain samples of unknown hazardous substances, and observe for other pertinent information.

9. Entry team collects sample and exits area going through decontamination by decontamination team.

10. The sample is analyzed on scene by hazardous materials team personnel using available testing equipment. This testing is to determine hazard group classification i.e., poison, acid, flammable, oxidizer, etc.

11. Once hazard classification has been identified, hazardous materials entry team makes re-entry to stabilize and control the hazardous substance to the point that the emergency no longer exists.

12. The entry team exits the area going through decontamination by decontamination team.

13. The hazardous materials team leader informs the Emergency Coordinator that the spill site is ready for cleanup by cleanup personnel.

14. The hazardous materials response command is dissolved; all units return to stations.

15. A critique of the hazardous materials incident is held with team members as soon as possible after Hanford Fire Department units have returned to stations.

5.4 RESPONSE TO FIRE

(Signal: Gong) In the event of a fire, the discoverer activates a fire alarm and calls the single point-of-contact in accordance with Section 5.1.1. Automatic initiation of a fire alarm (through the smoke detectors and sprinkler systems) also is possible. The TSD unit personnel are trained in the use of portable fire extinguishers for incipient fires. Personnel use their best judgment whether to fight a fire or to evacuate. Under no circumstances do personnel remain to fight a fire if unusual hazards exist.

The following actions are taken in the event of a fire or explosion.

1. On actuation of the fire alarm, personnel shut down equipment, secure waste (especially mixed waste), and lock up classified documents (or carry the documents with them), ONLY if time permits. The alarm automatically signals the Hanford Fire Department and the Patrol Operations Center.

2. Personnel leave the area/building by the nearest safe exit and proceed to the designated staging area for accounting.[3]

3. The single point-of-contact is notified immediately, who in turn initiates notifications to the Emergency Coordinator (or alternate) if necessary.

4. The Emergency Coordinator proceeds directly to the scene (if not already there).

5. The Emergency Coordinator obtains all necessary information pertaining to the incident.

6. Depending on the severity of the event, the Emergency Coordinator or his/her designee may be required to provide notifications to offsite agencies in accordance with section 5.1.5 and section 9.0 informing them as to the extent of the emergency (including estimates of dangerous waste and/or mixed waste quantities released to the environment) and any actions necessary to protect nearby buildings and/or structures.

7. Depending on severity, the Emergency Coordinator requests activation of the affected area ECC to establish organizations to provide assistance from the DOE-RL, other Hanford Facility contractors, and outside agencies.

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[3]During a fire alarm condition, all building occupants are required to evacuate unless otherwise stated in their specific building emergency plan.

8. The Hanford Patrol establishes roadblocks within the area to route traffic away from the emergency scene.

9. Hanford Fire Department medical personnel remove injured personnel to a safe location, apply first aid, and prepare the injured for transport to medical aid stations or to local hospitals in accordance with established memoranda of understanding (MOUs) summarized in Section 8.0. Medical personnel are on standby 24 hours per day.

10. Hanford Fire Department fire fighters extinguish the fire.

11. All emergency equipment is cleaned and fit for its intended use following completion of cleanup procedures.

5.5 UNUSUAL, IRRITATING, OR STRONG ODORS

(Signal: None) If an unusual, irritating, or strong odor is detected, and the discoverer has reason to believe that the odor might be the result of an uncontrolled release of a toxic or dangerous material, the discoverer performs the following:

- Activates the building evacuation alarm or fire alarm system to evacuate the building

- Notifies the single point-of-contact, the building manager, and cognizant line management.

If the discoverer knows of the source and scope of the release, this information is reported quickly to the Emergency Coordinator. Measures are taken to contain the release and ventilate the area, if safe and advisable to do so.

If an unusual odor is detected within the building or structure, and the source of the odor is unknown, the Emergency Coordinator considers additional protective actions.

5.6 RESPONSE TO CONTAINER SPILLS OR LEAKS

In addition to the foregoing Plan provisions, the following specific actions could be taken for leaks or spills from containers at TSD units. These actions may be taken only by appropriately trained personnel.

- Container leaks are stopped as soon as possible using appropriate procedures. Appropriate personnel protective equipment is used.

- If it is inadvisable to approach the container, absorbent materials are used, and access is restricted pending notification of the Emergency Coordinator .

- Contents of leaking containers could be transferred to appropriate nonleaking containers. Transfer procedures for fire safety are followed for ignitable or reactive waste (e.g., use of nonsparking tools, bonding and grounding of containers, isolation of ignition sources, and use of explosion-proof electrical equipment).

- Overpacked containers are marked and labeled in the same manner as the contents. All containers of spill debris, recovered product, etc., are managed in the same manner as waste containers received from outside the TSD unit. Overpacks in use at the TSD unit are marked with information pertaining to their contents and noted as to whether the container inside the overpack is leaking or is in good condition.

5.7 RESPONSE TO TRANSPORTATION INCIDENTS

This section describes the actions taken in the event of an unplanned sudden or nonsudden release of hazardous substances, dangerous waste, and/or mixed waste to air, soil, surface water, or groundwater during transportation activities on the Hanford Facility. This includes spills or releases of hazardous substances occurring at areas between TSD units that may, or may not, threaten human health or the environment. For spills or releases of hazardous substances occurring at TSD units or other buildings, consult Sections 5.2, 5.3, and 5.6. See Section 2.0 for the definition of hazardous substances.

The following steps are performed by those individuals discovering and responding to a hazardous substance transportation incident at the Hanford Facility. In addition, Emergency Coordinator steps are provided which occur after initial responder actions have been completed. Discoverer notifications for transportation incidents will not be accomplished in accordance with Section 5.1.1. but in accordance with Section 5.7.1.

5.7.1 Discoverer

The discoverer of a hazardous substance spill or release resulting from transportation activities may be the driver of a truck, the engineer of a railroad locomotive, support personnel associated with the transportation activity, or someone who is not involved in the transportation activity but witnesses the incident. The discoverer:

- Initiates notifications to the single point-of-contact by any means available (telephone, radio, passing motorist, etc.) to request assistance unless personnel associated with the transportation activity have received training to directly contact an Emergency Coordinator.

- Remains in a safe location.

- If appropriate training has been completed, the discoverer can assist injured personnel and attempt to isolate the area to prevent inadvertent personnel access.

5.7.2 Initial Responder Actions

The Hanford Fire Department will be the initial responder for most transportation incidents on the Hanford Facility. The Hanford Fire Department will be summoned to the incident scene primarily via the single point-of-contact. In limited cases, TSD unit personnel and/or Hanford Patrol will also provide initial responder actions based upon the training they have received and the severity of the incident. Prevention of further spills or releases is the primary goal to mitigating a transportation incident second only to protection of personnel. The initial responder will:

- Isolate event from personnel:
  - Cordon off access
  - Place apparatus to block roadways
  - Use Hanford Patrol roadblocks
  - Use TSD unit/vehicle PA systems
  - Sound appropriate alarms.
- Determine type of hazardous substances involved by consulting with the driver or locomotive engineer, shipping papers, container placards and labels, and any other resources available to the initial responder.
- Coordinate with emergency response organizations to establish a command post, upwind and uphill of the incident.
- Ensure that all personnel who enter the area are equipped with proper protective clothing and respiratory protection
- Complete other actions necessary to effect control of the scene, including but not limited to the following:

  NOTE: The following steps normally are conducted and/or directed by a Hanford Fire Department Hazardous Materials Response Team leader.

  - Secure the scene
  - Use absorbents
  - Use covering (blankets, polyethylene, etc.)
  - Overpack
  - Plug/patch
  - Transfer to new container
  - Venting/vapor suppression.
- Summon the Emergency Coordinator to the incident scene if not already there by communicating with the single point-of-contact. The single point-of-contact maintains the list of Emergency Coordinators in order to summon personnel from the organization

offering the hazardous substance for transportation. For transportation incidents originating from off the Hanford Facility, the Emergency Coordinator from the receiving organization and/or representatives from the co-operator's central environmental organization will by summoned to the incident scene.

- Delegate Emergency Coordinator duties to the organization offering the hazardous substance for transportation. The Hanford Fire Department will not leave the incident scene until the responsible Emergency Coordinator arrives to delegate the remaining Emergency Coordinator duties.

5.7.3 Emergency Coordinator

The Hanford Fire Department will serve as the initial Emergency Coordinator and will perform first response activities for most transportation incidents. Emergency Coordinator duties met by the Hanford Fire Department will be those pertaining to stabilizing or eliminating the immediate threat of further release of the hazardous substance described above. The Hanford Fire Department will not be the initial Emergency Coordinator when another Emergency Coordinator is at the transportation incident. The Hanford Fire Department may still perform, and be in charge of initial responder actions.

When the Hanford Fire Department is the initial Emergency Coordinator, they will delegate the Emergency Coordinator duties after the immediate threat of a release has been stabilized or eliminated. Remaining Emergency Coordinator actions are to:

- Ensure that the cause of the incident and its possible effects are investigated and evaluated as soon as possible.

- Assess possible hazards to human health and the environment (considering direct, indirect, immediate, and long-term effects) that might result from the release, fire, or explosion in accordance with Section 5.1.4.

- Determine whether the incident is a release, fire, or explosion that could threaten human health or the environment in accordance with Section 5.1.5.

- Terminate the event and recover from the incident in accordance with section 6.0.

- Complete required reports in accordance with section 9.0.

5.8 DAMAGED, UNACCEPTABLE SHIPMENTS

(Signal: None) When a damaged shipment of hazardous substance, or dangerous waste/mixed waste arrives at a TSD unit and the shipment is unacceptable for receipt, the damaged shipment should not be moved. The TSD unit personnel instead perform the following steps.

- If the release from damaged package is a 'minor' spill under the criteria of Section 5.2, the following actions are performed.
  - Notify the supervisor or manager to advise of the situation. The supervisor or manager contacts the Emergency Coordinator in order to respond and assist in the evaluation of, and response to, the incident.
  - Notify the shipper or generating unit of the damaged shipment and request that they provide any chemical information necessary to assist in responding to the 'minor' spill.
  - Proceed with remedial action, including overpacking damaged containers, cleanup of spilled material, or other necessary actions to contain the spill.
- Implement the TSD unit contingency plan if applicable in accordance with section 5.1.5, if the release does not meet the criteria of a 'minor' spill as noted previously, or the extent of the spill cannot be determined.

5.9 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, OR RELEASES

The Emergency Coordinator, in coordination with emergency response organizations, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The following actions are taken:

- Isolate the area of the initial incident by shutting off power, closing off ventilation systems, etc., to minimize the spread of a release and/or the potential for a fire or explosion
- Inspect containment for leaks, cracks, or other damage
- Inspect for toxic vapor generation
- Remove released material and waste remaining inside of containment structures as soon as possible
- Contain and isolate residual waste material using dikes and adsorbents
- Cover or otherwise stabilize areas where residual released materials remain to prevent migration or spread from wind or precipitation run-off
- Install new structures, systems, or equipment to enable better management of hazardous substances or dangerous waste
- Reactivate adjacent operations in affected areas only after cleanup of residual waste materials is achieved.

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6.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS

6.1 TERMINATION OF EVENT

It is a function of the Emergency Coordinator to declare the termination of an event. However, in an event where additional emergency centers are activated only the highest activated level of the emergency organization, in conjunction with the Emergency Coordinator, will declare that an event has ended. If the RL-EMT is activated, only the RL-EMT Emergency Manager officially terminates the event. In all cases, however, the Emergency Coordinator must be consulted before reentry is initiated.

6.2 INCIDENT RECOVERY AND RESTART OF OPERATIONS

A recovery plan is developed when necessary. A recovery plan is needed following an event when further risk could be introduced to personnel, a TSD unit, or the environment through recovery action and/or to maximize the preservation of evidence. If a recovery plan is required, it is reviewed by appropriate personnel and approved before restart. Restart of operations is performed in accordance with the approved plan.

If the contingency plan was implemented, notification must be made to Ecology before operations can resume. Section 9.0 discusses different reports to outside agencies. This notification is in addition to the required reports in Section 9.0. This notification must include that there are no incompatibility issues with the waste and released materials from the incident, and that all the equipment has been cleaned, is fit for its intended use and placed back into service. The notification may be made via telephone conference. Any additional information that Ecology requests regarding these restart conditions may be included in the required 15-day report identified in Section 9.0.

For emergencies not involving activation of the ECC, the Emergency Coordinator ensures that conditions are restored to normal before operations are resumed. If the ECC was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of the Emergency Coordinator to restore conditions to normal. The makeup of this organization depends on the extent of the damage and its effects. The recovery organization will be appointed by the appropriate contractors' emergency director.

6.3 INCOMPATIBLE WASTE

After an event, the Emergency Coordinator or the recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by TSD unit operations personnel or other assigned personnel. Actions to be taken might include, but are not limited to, any of the following:

- Neutralization of corrosive spills
- Chemical treatment of reactive materials to reduce hazards
- Overpacking or transfer of contents from leaking containers
- Use of sorbents to contain and/or absorb leaking liquids for containerization and disposal
- Decontamination of solid surfaces impacted by released material, e.g., intact containers, equipment, floors, containment systems, etc.
- Disposal of contaminated porous materials that cannot be decontaminated and any contaminated soil
- Containerization and sampling of recovered materials for classification and determination of proper disposal technique
- Follow up sampling of decontaminated surfaces to determine adequacy of cleanup techniques as appropriate.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in storage areas appropriate for their compatibility class.

If it is determined that incompatibility of waste was a factor in the incident, the Emergency Coordinator or the recovery organization ensures that the cause is corrected. Examples would be modification of an incompatibility chart or increased scrutiny of waste from a generating unit when incorrectly designated waste caused or contributed to an incident.

6.4 POST-EMERGENCY EQUIPMENT MAINTENANCE AND DECONTAMINATION

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumables and disposed materials are restocked. Fire extinguishers are recharged or replaced.

The Emergency Coordinator ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained breathing apparatus are cleaned and refilled, protective clothing are cleaned or disposed of and restocked, etc.

Equipment and personnel decontamination stations are established considering the following information and techniques.

Items to consider when establishing a decontamination station are as follows:

- Water supplies
- Containment/catch basins and/or systems
- Staff necessary to accomplish proper decontamination
- Protective clothing
- Decontamination supplies (buckets, brushes, soap, chemicals as needed)
- Risk to personnel
- Weather conditions; i.e., severe heat, cold (current and forecasted)
- Toxicity of material
- Porosity of equipment to be decontaminated
- Disposal requirements of decontamination rinse
- Use of controlled zones to maintain contamination control.

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7.0 EMERGENCY EQUIPMENT AND RESOURCES

7.1 HANFORD FACILITY EMERGENCY CENTERS

The emergency centers are those locations staffed to provide assistance to building emergency organizations in an emergency situation. The emergency centers are established to support and to provide overall direction of emergency events occurring at locations within their geographic area of responsibility, within the Hanford Facility. This includes acquisition of and assignment of resources to respond to emergency events. Responsibilities also include personnel protection (employee and public), TSD unit safety, and environmental protection. The establishment of emergency centers ensures that notification and communication of emergency conditions are communicated properly.

There are several emergency centers located throughout the Hanford Facility and Hanford Site (Table 1).

7.2 COMMUNICATIONS EQUIPMENT

The Hanford Facility has alarm systems that are monitored by the Hanford Fire Department and the Patrol Operations Center. The alarm signals that exist at the Hanford Facility are identified in Table 2. The TSD unit operations personnel also may use telephones, building PA systems, portable radios, and cellular telephones to summon assistance.

7.3 FIRE CONTROL EQUIPMENT

Many Hanford Facility buildings are equipped with automatic fire-suppression (sprinkler) systems. Portable fire extinguishers are located in working areas in compliance with National Fire Protection Association safety codes. Each Class ABC extinguisher is capable of suppressing fires involving ordinary combustible materials, flammable liquids, oils, paints, flammable gases, and electrical equipment. All extinguishers comply with the National Fire Code standards for portable extinguishers and are inspected monthly. The inspections are recorded on tags attached to each extinguisher.

7.4 PERSONAL PROTECTIVE EQUIPMENT

The TSD units have safety showers and eyewash stations, located as necessary, for personnel protection. Drainage from these stations is contained. In addition to these stations, portable eyewash equipment is maintained at protective storage areas as necessary. These eyewash/shower stations are inspected regularly.

Protective clothing and respiratory protective equipment are maintained for use during both routine and emergency operations. This equipment is identified in the unit-specific contingency plans.

Table 1. Emergency Centers.

Emergency Centers	Responsibility
<u>Northern Area Emergency Control Center</u> Location: 2750-E, 200 East Area	Geographic area of responsibility: All 100 and 200 Areas plus the 600 Area north of the WYE Barricade bounded by the Columbia River and Highway 240.
<u>300 Area Emergency Control Center</u> Location: 3701-D, 300 Area	Geographic area of responsibility: RCHS, RCHC, RCHN, 1100 and 3000 Areas plus the 600 Area south of the WYE Barricade bounded by the Columbia River and Highway 240.
<u>400 Area Emergency Control Center</u> Location: Fast Flux Test Facility, 400 Area	Geographic area of responsibility: 400 Area.
<u>North Richland Emergency Control Center</u> Location: Pacific Northwest Laboratory Materials Reliability Center Building	Battelle, Pacific Northwest National Laboratories operated facilities located in the RCHN area.
<u>DOE-RL Emergency Operations Center</u> Location: Federal Building, Richland	Area of responsibility: Responsible for the remaining 600 Area not covered by the area emergency centers, assisting area emergency centers, coordinating the Facility-wide response to emergencies, serving as the focal point for other Hanford Site contractors and DOE-RL during emergencies and for providing overall direction for all Hanford Facility emergency situations involving the DOE-RL and/or contractor personnel, ensuring direct interface with all offsite agencies for mitigation and protection of offsite populations, facilities, and the environment.

RCHS = Richland South.
RCHC = Richland Central.
RCHN = Richland North.

Table 2. Hanford Facility Alarm Systems.

Signal	Meaning	Response
Crash Alarm Telephones (red telephone)	Emergency message	Lift receiver, do not speak, listen to caller and relay message(s) to building occupants and Emergency Coordinator or alternate.
Gong (2 gongs/second)	Fire	Evacuate building. Move upwind. Keep clear of emergency vehicles.
Siren (steady blast)	Area evacuation	Proceed promptly to accountability area. Follow instructions.
Wavering Siren	Take cover	Close all exterior doors, turn off all intake ventilation and notify manager of whereabouts. Request call back for status and monitor portable radios.
Howler (AA-OO-GAH)	Criticality	Immediately run to the nearest exit and move and remain at least 100 feet (30.5 meters) from the building.

7.5 SPILL CONTROL AND CONTAINMENT SUPPLIES

Supplies of absorbent pillows are located in operating areas as necessary. These pillows absorb organic or inorganic materials and have a rated absorption capacity of approximately 0.26 gallon (1 liter) of waste each. Absorbents might be used for barriers to contain liquid spills as well as for absorbent purposes. Diatomaceous earth for absorption of liquid waste spills is available. Neutralizing absorbent is available for response to acid or caustic spills. A supply of empty containers and salvage containers (overpacks) also are maintained as well as brooms, shovels, and miscellaneous spill response supplies.

7.6 HANFORD SITE EMERGENCY ORGANIZATIONS

The Hanford Facility has fire and patrol personnel trained and equipped to respond in emergency situations. The Hanford Fire Department is the Hazardous Materials Incident Command Agency for the Hanford Site and has a Hazardous Materials Response Team that is trained to stabilize and control hazardous substances emergencies. A description of equipment for hazardous substances responses available through the Hazardous Materials Response Team is given in Table 3. Locations of the four fire stations on the Hanford Facility are shown on Figure 2.

The Hanford Patrol provides support to the Hanford Fire Department during an incident, including such activities as activation of area crash alarm telephone systems or area sirens (for evacuation or take cover), access control, traffic control, and assistance in emergency notifications.

Table 3. Fire Department Equipment List. (sheet 1 of 3)

Equipment	Description	*Normally Located
Engines 4 Ladders 4 Pumpers	Examples of equipment contained on engines: • 1,500-2,000 gal/min (5,678.1-7,570.8 L/min) pump • 300-500 gal (1,135.6-1,892.7 L) portable tank • Telescoping nozzle • Jaws of Life.	1 at each station
Tankers 6 Each	Examples of equipment contained on tankers and pumpers: • 500 gal/min (1,892.7 L/min) pump • 1,500 gal (5,678.1 L) tank • 6x6 with 2,000 gal (7,570.8 L) porti-tank • Hose, nozzles, fittings, and tools.	1 at Station 1 2 at Station 2 1 at Station 4 2 at Station 3
Water Tenders 1 Each	Examples of equipment contained on water tenders: • 450 gal/min (1,703.4 L/min) pump • 4,500 gal (17,034.3 L) tank • Hose, nozzles, fittings, and tools.	Station 1
Grass Fire Units 4 Each	Examples of equipment contained on grass fire units: • 100 gal/min (378.5 L/min) pump • 250 gal (946.3 L) tank • 4-wheel drive • Hose, nozzles, fittings, and tools.	1 at each station
Ambulances 5 Each	Examples of equipment contained on ambulances: • Life support systems • Medical supplies and emergency response supplies.	1 at Station 1 2 at Station 2 1 at Station 3 1 at Station 4
Command Vehicles 3 Each	Contains communications equipment and protective equipment for commander.	Station 2

Table 3. Fire Department Equipment List. (sheet 2 of 3)

Equipment	Description	*Normally Located
Attack Vehicles 1 Each	Examples of equipment contained on attack vehicles: • 450 lb (204.1 kg) of purple-K • 300 gal (1,1335.6 L) aqueous film-forming foam concentrate • 300 gal (1,135.6 L) of aqueous film-forming foam pre-mix solution • Hose, nozzles, fittings, and tools.	Station 2
Hazardous Materials Vehicle 2 Each	Examples of equipment contained on hazardous materials vehicle: • Protective clothing for Hazardous Materials Response Team • Breathing apparatus for Hazardous Materials Response Team • Diking, plugging, and damming equipment • Detection instruments for Hazardous Materials Response Team • Tools for plugging and repairing leaking containers • Overpack containers for leaking containers • Command module with material safety data sheets, software, and portable meteorological station • Tools and communications devices necessary to provide communications during emergency response activities.	1 at Station 2 1 at Station 3
Metal Fire Response Vehicle 1 Each	Examples of equipment contained on metal fire response vehicle: • Equipment for response to special metals fire • 500 lb (226.8 kg) of extinguishing powder • 1,000 lb (453.6 kg) of carbon microspheroids.	Station 4

Table 3. Fire Department Equipment List. (sheet 3 of 3)

Equipment	Description	*Normally Located
Mobile Air Vehicle 1 Each	Examples of equipment contained on mobile air vehicle: • Mobile air compressor, recharges self-contained breathing apparatus cylinders • Tools and fittings for operation of vehicle and spare cylinders.	Station 4

*The Hanford Fire Department Chief has the authority to direct the placement of Fire Department equipment as needed to control emergency events. The Hanford Fire Department Chief also has the authority to take pro-active action and assign different vehicle locations based on such conditions as fuel moisture content, area fire history, work in progress, or other conditions that could arise.

gal = gallon(s)
gal/min = gallon(s) per minute
kg = kilogram(s)
L = liter(s)
L/min = liter(s) per minute
lb = pound(s)

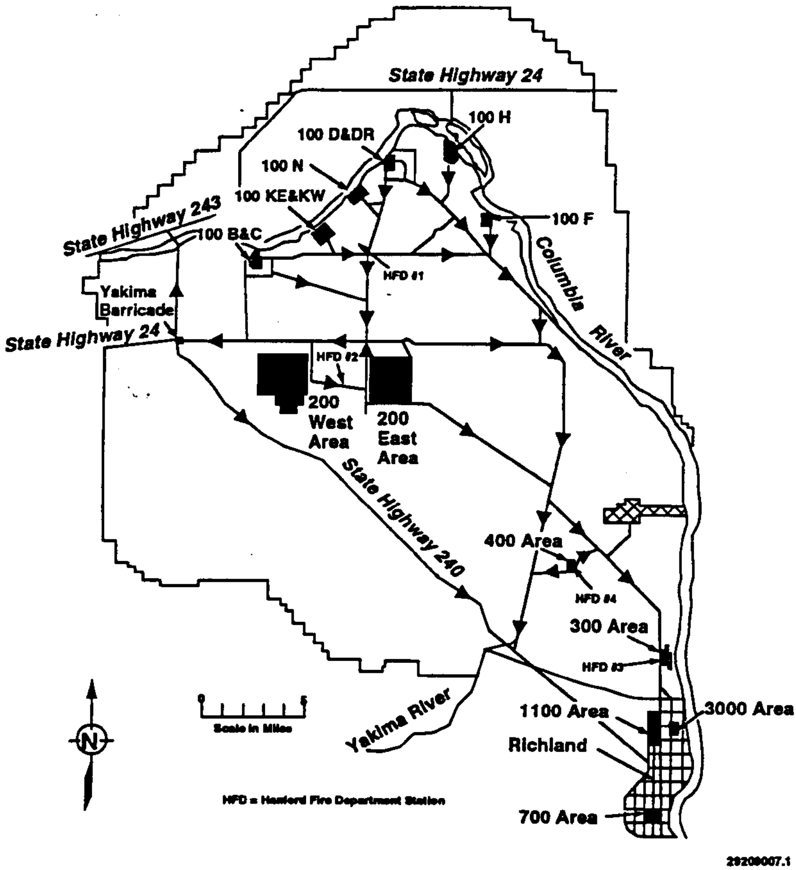

Figure 2. Locations of the Fire Stations on the Hanford Facility.

8.0 COORDINATION AGREEMENTS

This section describes a number of coordination agreements (MOUs) established by and through the DOE-RL to ensure proper response resource availability for incidents involving the Hanford Facility.

An agreement among the major Hanford Site contractors (an operations, engineering and construction contractor, an environmental restoration contractor, a research and development contractor, and a medical and health services contractor) defines the interfaces and notifications required during an emergency. The DOE-RL has the overall responsibility for emergency preparedness. Per the agreements, the operations and engineering contractor has responsibility for Site-wide emergency preparedness while each contractor retains responsibility for emergency preparedness at individual units. Agreements have been established with a number of offsite authorities to reduce the impact to human health and/or the environment in the event that an incident has offsite public health implications, or if an onsite emergency warrants offsite assistance. These agreements are activated through the emergency notification of the DOE-RL (Section 4.1).

8.1 LOCAL, STATE, AND FEDERAL AUTHORITIES

Various agreements have been established among the DOE-RL and Benton, Franklin, and Grant Counties and the states of Washington and Oregon. These agreements describe the cooperative arrangements among these agencies for any onsite emergency that warrants offsite assistance. These agreements describe the planning for, communication of, and response to emergencies at the Hanford Facility that might have offsite consequences.

8.2 HANFORD FIRE DEPARTMENT MUTUAL AID

The Hanford Fire Department provides fire department services for the Hanford Site and Hanford Facility. Mutual aid agreements have been established with Richland, Kennewick, and Pasco fire departments; with Benton County Fire Districts 1 through 6, Franklin County Fire District 3, and Walla Walla Fire District 5.

8.3 MEDICAL AND FIRST AID

Professional medical help is provided onsite by the DOE-RL through the Hanford Environmental Health Foundation. Doctors and nurses are available for emergency assistance at all times. These medical personnel are trained in procedures to assist personnel contaminated with hazardous and/or radioactive material. Emergency call lists are maintained to provide professional medical consultation at all times.

Referral to offsite hospital facilities is made by the Hanford Environmental Health Foundation physician providing emergency assistance by telephone or in person. The primary hospital used in emergencies is Kadlec

Hospital, Richland. Kennewick General Hospital, Kennewick, and Our Lady of Lourdes Hospital, Pasco, are used as backup facilities. Agreements have been established among these hospitals and the DOE-RL.

8.4 AMBULANCE SERVICE

Ambulance service is provided by the Hanford Fire Department, which uses paramedics and emergency medical technicians as attendants. This service is available from area fire stations on a 24-hour, 7-day basis. Additional ambulance service is available from other local city fire departments through the mutual aid agreements (Section 8.2).

8.5 UNIFIED DOSE ASSESSMENT CENTER

The Unified Dose Assessment Center (UDAC) is the technical extension of the DOE-RL-EMT, providing services to both the DOE-RL-EMT and the ECCs. The primary mission of the UDAC is to provide recommendations for protective actions, dose calculations and projections, and consultation in the area of industrial hygiene for hazardous substances, biology, environmental monitoring, and meteorology to support the DOE-RL-EMT and the ECCs.

Industrial hygiene and biological consultants at the UDAC advise and assist in determining proper response procedures for spills or releases of toxic, flammable, carcinogenic, and pathogenic materials. The UDAC personnel are responsible to provide a central unified assessment of the dispersion and impact of environmental releases from the Hanford Facility. In communication with the ECC, UDAC coordinates the assessment of impacts and assists in the determination of actual and potential release scenarios.

8.6 HANFORD PATROL/BENTON COUNTY SHERIFF

The Hanford Patrol serves as the security agency for the Hanford Facility. The Benton County Sheriff's Department provides law enforcement for the Hanford Facility. In the event of an emergency, the Hanford Patrol provides services such as activating the crash alarm systems or area sirens, coordinating the movement of emergency responders through security gates, assisting evacuation, establishing barricades, and making necessary notifications through the single point-of-contact. Benton County Deputies will assist with traffic control activities. Agreements also have been established with the Richland, Kennewick, and Pasco police departments to provide additional backup capabilities if required.

8.7 ALERTING OF PERSONNEL ON THE COLUMBIA RIVER

An agreement exists among the DOE-RL, the Washington Public Power Supply System, Benton and Franklin Counties, and the Thirteenth Coast Guard District to ensure safety on the Columbia River during an emergency at the Hanford Facility and to coordinate response activities for alerting personnel on the Columbia River.

8.8 METEOROLOGICAL INFORMATION

An agreement is in place between the DOE-RL and the National Weather Service to define mutual responsibilities for providing meteorological information in an emergency situation. Additional meteorological information can be obtained from the Hanford Site weather station.

8.9 WASHINGTON PUBLIC POWER SUPPLY SYSTEM

An agreement has been established between the DOE-RL and Washington Public Power Supply System for providing mutual assistance as needed. This assistance is available in the use of facilities and equipment for personnel decontamination, first aid, evacuation and reassembly areas, respiratory protective equipment, protective clothing, radiological survey equipment, resources for river evacuation, and radiological assistance response.

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9.0 REQUIRED REPORTS

Three types of written post-incident reports are required for incidents at the Hanford Facility. These reports are summarized in the following sections.

9.1 ASSESSMENT REPORT TO ECOLOGY AND GOVERNMENT OFFICIAL OR NATIONAL RESPONSE CENTER

Immediately following classification of an incident as a WAC 173-303 emergency, as assessment report must be transmitted when the regulatory agencies are notified. This initial assessment report will be submitted by the Emergency Coordinator and must include:

- Name and telephone number of reporter
- Name and Address of facility
- Time and type of incident (e.g., release, fire)
- Name and quantity of material(s) involved, to the extent known
- The extent of injuries, if any; and
- The possible hazards to human health and the environment outside the facility

9.2 WRITTEN REPORT TO ECOLOGY

Following an incident that requires implementation of the contingency plan, the Emergency Coordinator must ensure that the time, date, and details of the incident are recorded in the TSD units operating record. Within 15 day of the incident, a written report must be submitted to Ecology by the Emergency Coordinator . The report generated through the DOE-RL reporting system may be used to supplement this written report, but will not be used as a substitute unless Ecology approval is obtained. The 15 day report will be submitted by DOE-RL and must include;

- Name, address, and telephone number of RL contact
- Name, address, and telephone number of the affected TSD unit
- Date, time, and type of incident (e.g., fire, explosion)
- Name and quantity of material(s) involved
- The extent of any injuries if any
- Assessment of any actual or potential hazards to human health or the environment caused by the incident, where this is applicable;

- Estimated quantity and disposition of recovered material that resulted from the incident
- Cause of the incident
- Description of corrective action taken to prevent reoccurrence of the incident.

9.3 OCCURRENCE REPORTING

Under DOE Order O 232.1 an occurrence report is required for incidents occurring at the Hanford Facility involving hazardous substances release, fire, etc. Specific details of this reporting system are found in the DOE Order. To summarize, the event is categorized within 2 hours and proper notifications are completed to onsite and offsite agencies to include contractor, DOE, county, and state organizations.

These occurrences are investigated, reported, and analyzed promptly to ensure that effective corrective actions are taken in compliance with contractual and statutory requirements. All such occurrences are recorded in the building manager's log book, and the log book is audited to ensure that incidents were reported and handled properly. In the DOE reporting system, three levels of incidents are described, in descending order of severity: emergency, unusual occurrence, and offnormal occurrences.

9.3.1 Emergency Event Reporting

An emergency event involves an incident in progress or having occurred that is the most serious occurrence and requires an increased alert status for onsite and, in specified cases, for offsite authorities. There are three classifications associated with emergency events: Alert, Site Area Emergency, and General Emergency. Occurrences are classified into one of the three levels based on real or potential consequences to personnel, facilities, or the environment, both on and off of the Hanford Facility. Current MOUs between the state of Washington and the Hanford Site identify events that would be classified at the stated levels. Emergency events require notification of classification to affected populations.

9.3.2 Unusual Occurrence Reporting

An unusual occurrence is a nonemergency occurrence that has significant impact or potential for impact on safety, environment, health, security, or operations. Generally, these types of events result in release of radioactive or hazardous substances in minor amounts, involve degradation of unit safety systems, result in fatalities, exposures to hazardous or radioactive materials, or significant contamination incidents.

9.3.3 Offnormal Event Reporting

An offnormal event is a significant deviation from normal operations that requires categorization and reporting. Hanford Facility management is required to evaluate an event to determine the depth of investigation and level of reporting required.

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10.0 CONTINGENCY PLAN LOCATION

Copies of this Plan are maintained at the following locations:

- Each specific Part III TSD unit
- Hanford Fire Department (area fire stations)
- Area Emergency Centers
- Occurrence Notification Center
- The DOE-RL Emergency Operations Center, Federal Building, Richland
- Patrol Operations Center
- Kennewick Police Department
- West Richland Police Department
- Washington State Patrol
- Pasco Fire Department
- Richland Fire Department
- City of Kennewick
- Kadlec Medical Center
- Our Lady of Lourdes Health Center
- Benton County Emergency Management Center
- Franklin County Emergency Management Center
- Grant County Emergency Management Center

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11.0 REFERENCES

DOE Order O 232.1, *Occurrence Reporting and Processing of Operations Information*

DOE Order O 151.1, *Comprehensive Emergency Management System*

DOE Order 5500.3B, *Planning and Preparedness for Operational Emergencies*

DOE, 1996, *Hanford Facility RCRA Permit Handbook*, DOE\RL-96-10, U.S. Department of Energy, Richland, Washington

Ecology, *Hanford Facility RCRA Permit (DW Portion)*, as amended, Washington State Department of Ecology, Olympia, Washington.

NIOSH, 1985, *Pocket Guide to Chemical Hazards*, National Institute of Occupational Safety and Health, U.S. Department of Health and Human Resources, Public Health Service, Centers for Disease Control, Washington, D.C.

WAC 173-303, *Dangerous Waste Regulations*, Washington State Department of Ecology, Olympia, Washington.

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