U.S. DEPARTMENT OF ENERGY

PNNL-19052

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Water Quality Sampling Locations Along the Shoreline of the Columbia River, Hanford Site, Washington

RE Peterson
GW Patton

December 2009

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Pacific Northwest National Laboratory
Richland, Washington 99352

Summary

As environmental monitoring evolved on the Hanford Site, several different conventions were used to name or describe location information for various sampling sites along the Hanford Reach of the Columbia River. These conventions range from handwritten descriptions in field notebooks to the use of modern electronic surveying equipment, such as global positioning system receivers. Because of the diverse methods, inconsistent archiving of analytical results in various electronic databases and published reports occurred, including use of multiple names for the same site and inaccurate location information.

This document provides listings of sampling sites that are associated with groundwater and river water sampling. The report identifies names and locations for sites associated with sampling: (a) near-river groundwater using aquifer sampling tubes; (b) riverbank springs and seepage areas; (c) pore water collected from riverbed sediment; and (d) Columbia River water. Included in the listings are historical names used for a particular site and the best available geographic coordinates for the site, as of 2009.

In an effort to create more consistency in the descriptive names used for water quality sampling sites, a naming convention is proposed in this document. The convention assumes that a unique identifier is assigned to each site that is monitored and that this identifier serves electronic database management requirements. The descriptive name is assigned for the convenience of the particular project and subsequent data user. As the historical database is used more intensively, this document may be revised as a consequence of discovering potential errors and the need to gain consensus on a proposed naming convention for some water quality monitoring sites.

Acknowledgments

This report has drawn on the efforts of numerous individuals who have worked along the Columbia River shoreline at the Hanford Site, to whom the authors extend their sincere appreciation. Of particular help in sorting out the locations and names associated with riverbank springs were Roger Dirkes,[1] who provided detailed recollections of his early work on the river, and Richard Mahood,[2] who spent countless days in the field documenting locations and collecting samples. Rich was also the principal developer of methods to install aquifer sampling tubes along the shoreline and provided leadership to several campaigns that resulted in the comprehensive monitoring network available today.

William Webber[2] and JoAnne Rieger[2] engaged the senior author in extensive discussions regarding site location information from the perspective of database developers, which certainly helped guide the level of detail provided in this report. JoAnne patiently responded to numerous requests for assistance in querying existing databases, for which the authors are grateful. Lynn Bisping[1] graciously provided peer review of the report and offered numerous suggestions that improved clarity and accuracy. Kyle Parker[1] developed the location maps found in the appendix, using coverages available from the Hanford Site's central mapping services. His efforts to assemble this geographic information system provides a very useful tool for shoreline investigations. Mike Parker[1] masterfully put all this material together in a report format that will prove useful to numerous Hanford Site field workers and database management staff.

Finally, the authors would like to thank in advance those who choose to respond to the proposal to develop more consistent conventions for descriptive names for monitoring sites. We also appreciate feedback on any errors and omissions that are discovered.

Bob Peterson and Greg Patton
December 2009

[1]Pacific Northwest National Laboratory
[2]CH2M Hill Plateau Remediation Company

Acronyms and Abbreviations

BHI	Bechtel Hanford, Inc.
BNWL	Battelle Northwest Laboratory
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CHPRC	CH2M HILL Plateau Remediation Company
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERC	Environmental Restoration Contractor
GIS	geographic information system
GPS	global positioning system
GW	groundwater media code (HEIS)
HEIS	Hanford Environmental Information System
HGIS	Hanford Geographic Information System
HRM	Hanford River Mile (pre-1999); Hanford River Marker (post-1999)
HWIS	Hanford Well Information System
PNL	Pacific Northwest Laboratory (prior to 1995)
PNNL	Pacific Northwest National Laboratory (post-1995)
PSRPP	Public Safety and Resource Protection Program
RCBRA	River Corridor Baseline Risk Assessment
RCRA	*Resource Conservation and Recovery Act of 1976*
SESP	Surface Environmental Surveillance Project
SW	surface water media code (HEIS)
USGS	U.S. Geological Survey
TPA	*Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)
Tri-Parties	DOE, EPA, and Ecology
WAC	Washington State Administrative Code
WCH	Washington Closure Hanford, LLC
WHC	Westinghouse Hanford Company
WIDL	Well Information and Document Lookup (user interface with HWIS)
WIDS	Waste Information Data System

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1.0 Introduction

This report contains an inventory of water quality sampling locations along the Columbia River as it flows across the Hanford Site, i.e., the "Hanford Reach" (Figure 1.1). The inventory addresses a need created by former inconsistent use of sampling site names and inaccurate or undocumented location information for various monitoring activities. The importance of historical and newly collected monitoring data is increasing as a consequence of environmental restoration efforts throughout the Columbia River corridor at the Hanford Site, and also because of the recent designation of the Hanford Reach as a National Monument (65 FR 114 2000). Monitoring data from the river environment contribute to a better understanding of the features and processes of the natural system, through which contamination may be dispersed.

In the past, numerous methods have been used to describe river-related sampling locations and features since monitoring activities began with the startup of reactor operations in the mid-1940s. These methods range from handwritten descriptions in field notebooks to use of modern electronic surveying equipment, such as global positioning system (GPS) receivers. The diverse methods resulted in inconsistent archiving of analytical results in electronic databases and published reports because of multiple names occasionally being used for the same site and inaccurate location information.

This report provides listings of water quality sampling sites that are associated with the groundwater/river interface. The listings provide names and locations for the following types of sampling sites: (a) near-river groundwater using aquifer sampling tubes; (b) riverbank springs and seepage areas; (c) pore water collected from riverbed sediment; and (d) Columbia River water. Figure 1.2 illustrates these various types of sampling sites. Included in the listings are historical names used for a particular site and the best available geographic coordinates for the site.

The information contained in this report has evolved during the early part of the 21st century as a consequence of activities being conducted under a variety of environmental programs, including the U.S. Department of Energy's (DOE) Environmental Management program and Public Safety and Resource Protection program. Detailed information on sampling activities in the Hanford Reach corridor is continuing to evolve as projects such as the River Corridor Baseline Risk Assessment (RCBRA) conduct comprehensive sampling efforts throughout the Hanford Reach. Also, the DOE and other agencies continue to support research activities on various aspects of the river environment, so new insight relevant to monitoring is frequently produced.

As the historical database is used more intensively, this document may need to be revised within a relatively short time period as a consequence of discovering potential errors, newly identified sampling locations and media, and a need to gain consensus on naming conventions for some water quality monitoring sites.

1.1 Purpose

This inventory of river-related water quality monitoring sites establishes a basis to remove, or at least decrease, existing limitations on accessing historical data stored in the Hanford Environmental Information System (HEIS) database. Historical and newly collected monitoring data will, thus, become

more readily available for evaluation, manipulation, and display using electronic databases and computer-based geographic information systems.

In an effort to create more consistency in the descriptive names used for water quality sampling sites, a naming convention is proposed in Chapter 8. The convention assumes that a unique identifier is assigned to each site that is monitored, and that this identifier serves electronic database management requirements. The descriptive name is assigned for the convenience of the individual project and subsequent data users.

1.2 River-Related Water Quality Monitoring Activities

Environmental monitoring activities for the Hanford Site are described in an environmental monitoring plan (DOE-RL 2008a), which is updated every three years. Monitoring locations, schedules, and analysis suites for the river environment are described in the Pacific Northwest National Laboratory's (PNNL) annual Hanford Site Environmental Surveillance Master Sampling Schedule (e.g., Bisping 2009). Sampling and analysis activities associated with environmental restoration activities and regulatory compliance monitoring are described in project-specific monitoring/characterization plans.

PNNL's Surface Environmental Surveillance Project (SESP) collects samples at the following locations on a routine basis. Riverbank springs samples are collected annually at each of the six retired reactor areas (100 Area), the Hanford town site, and the 300 Area. Transect and near-shore samples of river water are collected quarterly at Vernita Bridge and the city of Richland's pumphouse, and annually at the 100-N Area, Hanford town site, and 300 Area. Continuous river water sampling systems are located at Priest Rapids Dam and the Richland pumphouse. Samples of Columbia River sediment are collected annually (typically after the peak spring runoff) from behind Priest Rapids and McNary Dams, and at White Bluffs Slough, 100-F Slough, Hanford Slough, selected riverbank springs, and a shoreline beach near the Richland pumphouse. The results of these activities are reported in the annual Hanford Site environmental report (e.g., Poston et al. 2009).

River water quality monitoring is also conducted by the U.S. Geological Survey (USGS) at Vernita Bridge and the Richland pumphouse on a quarterly basis, under subcontract to PNNL. In addition to sampling, the USGS measures river flow at a gauging station downstream from Priest Rapids Dam (USGS station #12472800). Real-time stream flow data for this station are available at http://wa.water.usgs.gov. Additional current and historical river flow data are available at a website maintained by the University of Washington (http://www.cbr.washington.edu). The website contains a wide variety of river-related data.

The groundwater project, a part of the Soil and Groundwater Remediation Project currently managed by CH2M Hill Plateau Remediation Company (CHPRC), collects and evaluates samples from near-river wells, aquifer sampling tubes at the shoreline, and riverbank springs on at least an annual basis. This monitoring supports *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) environmental restoration activities, which include remedial investigations of waste sites and groundwater contamination, and performance evaluations associated with interim remedial actions. The groundwater project also collects groundwater data from near-river wells as part of regulatory requirements under the *Resource Conservation and Recovery Act* (RCRA). The results of groundwater

monitoring activities are reported in an annual groundwater report (e.g., Hartman et al. 2009) and summarized in the annual Hanford Site environmental report (e.g., Poston et al. 2009).

1.3 Geographic Referencing Systems

As environmental monitoring evolved on the Hanford Site, several different conventions were used to provide location information for the various sampling sites along the Hanford Reach. This section summarizes some of those conventions. The summary starts with a description of the Hanford River Marker system, which has become part of the descriptive name for some sites, such as riverbank springs.

Geographic coordinates listed in this report are referenced to the Washington State Plane system, South Zone. The horizontal datum is the North American Datum of 1983 (NAD83) and the vertical datum is the North American Vertical Datum of 1988 (NAVD88). When conversion of historical data from the previously used vertical datum (i.e., NGVD29) has been necessary, an offset of 1.031 meters has been assumed (NAVD88 is higher than NGVD29). A factor of 3.2808 has been used for conversions from feet to meters. Coordinates may have been recorded in the field using latitude and longitude. When necessary, those coordinates have been converted to the Washington State Plane system using a conversion program maintained by the U.S. Army Corps of Engineers ("Corpscon;" available at http://crunch.tec.army.mil/software/corpscon/corpscon.html).

1.3.1 Hanford River Miles/Markers and Shoreline Segments

In the early 1980s, a student work crew from Pacific Northwest Laboratory (PNL) installed a series of 46 signposts along the Hanford Site shoreline from the Vernita Bridge (#0) to Ferry Street in Richland, Washington (#46). These signposts were installed to assist field crews, primarily those working from boats, in identifying environmental surveillance locations for the facilities side of the Hanford Site shoreline (i.e., right bank of the river). The signposts were spaced approximately 1.6 kilometers (1 mile) apart, as estimated by driving mileage; however, the actual distance between the signposts varies. The signposts were originally referred to as Hanford River "miles" but are now referred to as the Hanford River "markers," to avoid the impression that they represent exact one-mile intervals.

In 1999, a PNNL project was undertaken to locate the original signposts, survey their geographical coordinates using GPS receivers, and repair or replace damaged or missing signs. Most signs were successfully located and repaired, and some were moved farther onshore because of bank erosion. Where no signpost could be found, a new marker was installed at a position on the shoreline midway between existing upriver and downriver signposts. The updated reference system is referred to as Hanford River Markers (HRM) and the locations of signposts are shown on the maps in the Appendix. The upgraded system is referred to in the following site location tables as "HRM (2k)" to distinguish it from the HRM references made prior to the 1999 upgrade.

The coordinates for existing and original HRM signposts are listed in Table 1.1. The fields in the table are defined as follows:

- Hanford River Marker Name – Name used for the signpost. If an original signpost was replaced during the 1999 upgrade, the original signpost is listed at the end of the table as "#_-old," along with the original coordinates.

- Segment – Segments defined to aid grouping monitoring sites by CERCLA groundwater operable units or other common characteristic.
- Northing and Easting – Horizontal coordinates in Washington State Plane (South Zone) system; units are meters; North American Datum of 1983.
- Coordinate Quality – Quality of the coordinates, either "estimated" from maps, or "surveyed" using global positioning system receivers and traditional land surveying methods.
- Coordinate Type – "GPS" refers to global positioning system equipment; some coordinates are estimated using GIS maps for the Hanford Site.
- Coordinate Reference – Report citation or other source information for coordinates.
- Site Description – Narrative description of the signpost location, as recorded during the 1999 upgrade project.

1.3.2 Columbia River Channel Centerline

A second reference system for position along the Columbia River is provided by a river channel centerline that appears on USGS topographic quadrangle maps and river navigation charts. This line represents the approximate center or deepest part (thalweg) of the channel. It includes mileage markers showing the distance upstream from the mouth of the river at Astoria, Oregon. Although this reference system has not been used in naming conventions for monitoring sites, it does provide a distance scale for river-channel related investigations. The centerline is shown on the maps provided in the Appendix.

1.3.3 Aerial Photographs

Abundant aerial photography of the Hanford Reach has been obtained over the years; however, providing a complete inventory of that coverage is beyond the scope of this report. One coverage that has been used extensively was obtained on April 10, 1976, as part of a project entitled "Observations on Juvenile Salmon Stranding in the Columbia River" (Contract No. 2311202335 with United Engineers and Contractors to Battelle, as part of a larger project with Washington Public Power Supply System, now Energy Northwest).

The color aerial photographs were obtained while the Columbia River was held at a constant discharge of approximately 50,000 cubic feet per second, a relatively low flow for the Hanford Reach. The actual shoreline for a subset of this coverage, which extends from 100-B Area downstream to the Hanford town site, was digitized by the Environmental Restoration Contractor during the 1990s and is used on various maps to indicate a low river stage shoreline, including the maps in this report. An example photograph from this set is shown in Figure 1.3. A mosaic of the photographs is available from the PNNL Ecology Group. The original negatives are archived by Lockheed Martin Information Services photography group, and are available as digitized images (^Photography LMSI@rl.gov; 509-376-3975).

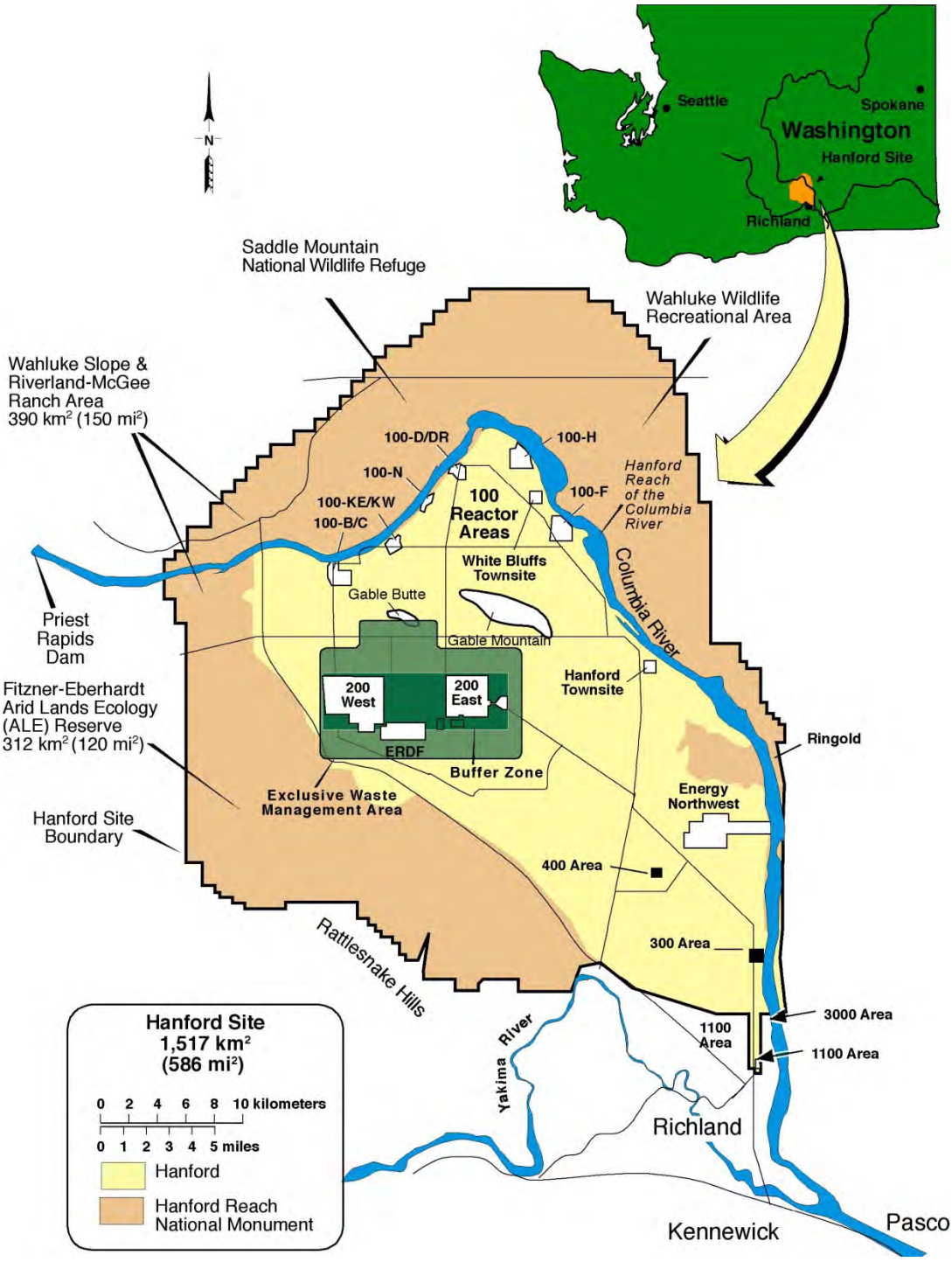


Figure 1.1. Index Map for the Hanford Site, Washington

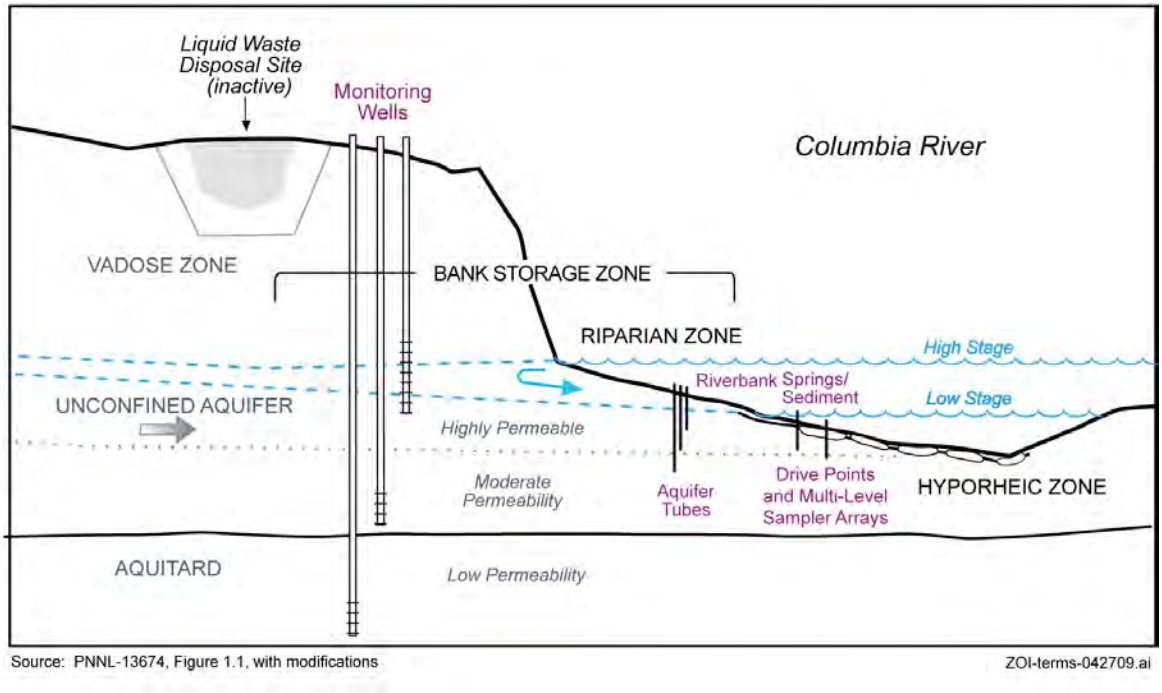


Figure 1.2. Illustration Showing Principal Features and Various Types of Water Quality Monitoring Sites Along the Hanford Reach

Figure 1.3. Example of 1976 Aerial Photography Showing Low River Stage Conditions (100-H Area)

Table 1.1. Hanford River Marker (HRM) System Signposts

Hanford River Marker Name	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type[2]	Coordinate Reference	Site Description[3]
HRM-1	VB	146,101.700	560,218.900	SURV	GPS	G. Patton (11/3/99)	
HRM-2	VB	146,209.700	561,705.100	SURV	GPS	G. Patton (11/3/99)	In grove of vegetation, hard to see
HRM-3	VB	145,727.400	563,293.600	SURV	GPS	G. Patton (11/3/99)	
HRM-4	BC5	145,306.500	565,094.700	SURV	GPS	G. Patton (11/3/99)	
HRM-5	BC5	145,835.400	566,849.100	SURV	GPS	G. Patton (11/3/99)	Near Old Irrigation Bld Between 100-B and 100-K
HRM-6	KR4	146,553.700	567,972.300	SURV	GPS	G. Patton (11/3/99)	Upriver from 100-K Launch
HRM-7	KR4	147,545.700	569,208.700	SURV	GPS	G. Patton (11/3/99)	Downriver from 100-K
HRM-8	KR4	148,576.900	570,282.900	SURV	GPS	G. Patton (11/3/99)	Upriver from 100-N
HRM-9	NR2	150,022.200	571,449.800	SURV	GPS	G. Patton (11/3/99)	Top of Bluff 100-N Springs
HRM-10	NR2	151,349.900	572,435.900	SURV	GPS	G. Patton (11/3/99)	Top of Bluff Between 100-N and 100-D
HRM-11	HR3D	152,413.200	573,584.900	SURV	GPS	G. Patton (11/3/99)	Top of Bluff at 100-D Spring
HRM-12	HR3D	154,033.800	574,282.500	SURV	GPS	G. Patton (11/3/99)	On floodplain
HRM-13	HR3D	154,418.400	575,371.700	SURV	GPS	G. Patton (11/3/99)	Near warning siren
HRM-14	HR3H	153,987.000	576,716.800	SURV	GPS	G. Patton (11/3/99)	Top of Bluff Between Locust Groves Upriver from 100-H
HRM-15	HR3H	153,164.200	577,856.100	SURV	GPS	G. Patton (11/3/99)	Upriver of 100-H Reactor (moved from island in flood plain to top of bluff)
HRM-16	HR3H	151,784.300	579,064.900	SURV	GPS	G. Patton (11/3/99)	Peninsula above White Bluffs Slough
HRM-17	HR3H	150,731.300	579,959.300	SURV	GPS	G. Patton (11/3/99)	Peninsula above White Bluffs Slough; moved from 150730 580017
HRM-18	FR3	149,036.700	579,862.100	SURV	GPS	G. Patton (11/3/99)	On floodplain, near powerline
HRM-19	FR3	147,971.200	581,182.400	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, Head of 100-F Slough
HRM-20	FR3	147,269.000	582,810.000	SURV	GPS	G. Patton (11/3/99)	On Island, 100-F Slough
HRM-21	FR3	145,603.700	583,401.200	SURV	GPS	G. Patton (11/3/99)	On Island #10, 100-F Slough
HRM-22	FR3	144,716.500	582,978.000	SURV	GPS	G. Patton (11/3/99)	
HRM-23	HTS	143,317.400	583,399.500	SURV	GPS	G. Patton (11/3/99)	
HRM-24	HTS	142,044.300	584,340.700	SURV	GPS	G. Patton (11/3/99)	On floodplain
HRM-25	HTS	140,951.900	585,444.900	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, upriver of wooden powerline
HRM-26	HTS	139,191.800	586,664.200	SURV	GPS	G. Patton (11/3/99)	Downriver from Hanford Townsite Launch
HRM-27	HTS	138,322.200	587,875.300	SURV	GPS	G. Patton (11/3/99)	
HRM-28	HTS	137,619.300	589,034.800	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, Lower Hanford Townsite (SESP spring location)
HRM-29	HTS	136,638.100	590,127.100	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, End of Hanford Townsite Road
HRM-30	PO1	135,399.300	591,065.800	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, across from Savage Island

Table 1.1. (contd)

Hanford River Marker Name	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type[2]	Coordinate Reference	Site Description[3]
HRM-31	PO1	134,043.500	592,441.500	SURV	GPS	G. Patton (11/3/99)	Below the Bluff
HRM-32	PO1	132,452.900	593,866.700	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, 1st Island above Ringold
HRM-33	PO1	130,796.060	594,367.436	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, Across from top of island at Ringold
HRM-34	PO1	129,668.900	594,457.600	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, Ringold Powerline
HRM-35	PO1	128,163.400	594,616.200	SURV	GPS	G. Patton (11/3/99)	On floodplain, between Powerlines
HRM-36	PO1	126,690.600	594,797.200	SURV	GPS	G. Patton (11/3/99)	800 m Downriver from WPPSS Pumphouse
HRM-37	PO1	125,024.100	594,526.000	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, Head of Wooded Island
HRM-38	PO1	123,584.400	594,334.700	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, Lower End of Wooded Island
HRM-39	PO1	121,834.400	594,411.200	SURV	GPS	G. Patton (11/3/99)	Top of Bluff
HRM-40	PO1	120,003.300	594,636.700	SURV	GPS	G. Patton (11/3/99)	Top of Bluff
HRM-41	3FF5	118,206.600	594,364.400	SURV	GPS	G. Patton (11/3/99)	Top of Bluff, 800 m Upriver from 300-TEDF
HRM-42	3FF5	116,897.300	594,340.800	SURV	GPS	G. Patton (11/3/99)	North Side of 300 Area on Bluff
HRM-43	3FF5	115,016.900	594,765.100	SURV	GPS	G. Patton (11/3/99)	Between 300-Area and Unimproved Boat Launch
HRM-44	3FF5	113,627.900	594,952.300	SURV	GPS	G. Patton (11/3/99)	Just upriver of Submarine Compartment Dock
HRM-45	RLD	112,109.700	595,188.600	SURV	GPS	G. Patton (11/3/99)	Above WSU-TC, near bike path
HRM-46	RLD	110,580.300	595,462.000	SURV	GPS	G. Patton (11/3/99)	Ferry St. Richland
Coordinate data for some of the original marker posts (i.e., pre-1999):							
HRM-4-old	BC5	145,305.399	565,061.998	SURV	GPS	IT92 (4/5/93)	
HRM-5-old	BC5	145,825.000	566,865.000	EST	ERC-map	IT92 (4/5/93)	
HRM-6-old	KR4	146,573.017	567,944.824	SURV	GPS	IT92 (4/5/93)	
HRM-7-old	KR4	147,565.000	569,205.000	EST	ERC-map	IT92 (4/5/93)	
HRM-8-old	KR4	148,537.825	570,279.382	SURV	GPS	IT92 (4/5/93)	
HRM-9-old	NR2	150,051.230	571,375.296	SURV	GPS	IT92 (4/5/93)	
HRM-10-old	NR2	151,299.185	572,424.124	SURV	GPS	IT92 (4/5/93)	
HRM-11-old	HR3D	152,407.000	573,573.000	EST	ERC-map	IT92 (4/5/93)	
HRM-12-old	HR3D	154,027.612	574,254.963	SURV	GPS	IT92 (4/5/93)	
HRM-14-old	HR3H	153,948.333	576,776.371	SURV	GPS	IT92 (4/5/93)	
HRM-15-old	HR3H	153,156.899	577,908.022	SURV	GPS	IT92 (4/5/93)	
HRM-16-old	HR3H	151,787.098	579,070.712	SURV	GPS	IT92 (4/5/93)	
HRM-18-old	FR3	149,075.914	579,844.914	SURV	GPS	IT92 (4/5/93)	
HRM-19-old	FR3	147,937.039	581,183.455	SURV	GPS	IT92 (4/5/93)	
HRM-21-old	FR3	145,615.042	583,434.102	SURV	GPS	IT92 (4/5/93)	

Table 1.1. (contd)

Hanford River Marker Name	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type[2]	Coordinate Reference	Site Description[3]
HRM-22-old	FR3	144,718.908	582,939.355	SURV	GPS	IT92 (4/5/93)	
HRM-23-old	HTS	143,818.114	583,339.363	SURV	GPS	IT92 (4/5/93)	
HRM-24-old	HTS	142,077.695	584,335.092	SURV	GPS	IT92 (4/5/93)	
HRM-25-old	HTS	140,987.831	585,402.235	SURV	GPS	IT92 (4/5/93)	

[1] Abbreviations: VB = Vernita Bridge; BC5 = 100-B Area; KR4 = 100-K Area; NR2 = 100-N Area; HR3D = 100-D Area; HR3H = 100-H Area; FR3 = 100-F Area; HTS = Hanford Town Site; PO1 = Hanford town site downstream to 300 Area; 3FF5 = 300 Area; RLD = North Richland
[2] EST = estimated from field narratives or geographic information system maps; SURV = surveyed using traditional or global positioning system (GPS) methods
[3] Verbatim from historical notebook entries

2.0 Historical Investigations and Previous Work

The exposure of contaminated groundwater along the riverbank and release of reactor coolant to the river via outfalls and spillways were significant concerns during the reactor operating years (primarily the late 1940s to mid-1960s). Intentional and accidental release to the soil column of the huge volumes of liquid effluent generated at each reactor resulted in groundwater mounds that accentuated flow toward the river, as illustrated in Figure 2.1 (Brown 1963). At some locations, steaming riverbank springs could be observed during periods of low river stage (Figure 2.2). Areas of effluent springs and the resulting thermal plume in the river were traced using infrared imagery (Eliason 1969). Additional contaminant load was presented to the shoreline environment by the operation of concrete effluent spillways at each reactor area (also shown in Figure 2.2). These spillways dispersed reactor coolant and other effluents that would normally be discharged to the center of the river channel via outfall pipelines, except when the river stage was too high for flow via the pipelines (HAPO 1963).

An aerial view of the 100-K Area during operations in 1965 is shown in Figure 2.3. Overland flow of effluent disposed to infiltration cribs and trenches is visible near some disposal sites and is responsible for the enhanced growth of vegetation (greenish areas) near the river. Because of a mound that formed above the ambient water table beneath the disposal trench at the top of the photo, riverbank springs were more prominent during the operating years than under current conditions. Residual amounts of contaminants, such as chromium, nitrate, strontium-90, tritium, and uranium, remain in the vadose zone and upper portion of the unconfined aquifer at near-river locations. These contaminants are monitored under existing programs.

Some monitoring of riverbank springs was conducted during the peak years of the cold war (i.e., 1950s and 1960s), although formal environmental monitoring did not start until the 1970s. By the late 1960s and into the early 1980s, public awareness of the potential danger created by contaminants exposed along the river shore prompted more comprehensive monitoring, which was performed by Battelle Northwest Laboratory (subsequently Pacific Northwest Laboratory and Pacific Northwest National Laboratory). Nitrate, tritium, uranium, and gross beta concentrations were typically measured for riverbank springs samples.

The following sections in this chapter describe the principal projects that have collected, or continue to collect, water quality data from sampling sites along the facilities side of the Hanford Reach shoreline. This background information is presented to provide perspective on the naming conventions previously used.

2.1 Sitewide Environmental Surveillance Under Pacific Northwest Laboratory

The first comprehensive survey of riverbank springs along the Hanford Site shoreline was conducted between fall 1982 and fall 1983 by the Hanford Environmental Surveillance Program (McCormack and Carlile 1984). At that time, the program's objective was to evaluate discharges to the Columbia River that occurred as the result of Hanford operations. The riverbank springs study supplemented routine monitoring activities, which focused primarily on analysis of river water.

During 1982, the shoreline from just upstream of the 100-B Area downstream to North Richland was visually inspected. Approximately 115 locations were identified where groundwater appeared at the surface during periods of low river stage. In 1983, many of the previously identified locations were revisited and riverbank spring water was sampled. In addition, river water was collected from within several meters of the shoreline adjacent to each spring sampled. Selected samples were analyzed for nitrate, gross beta, iodine-129, strontium-90, technetium-99, tritium, and uranium. Because the specific conductance of the samples was not measured, estimates for the relative proportions of groundwater and river water in the spring samples are not available.

The numbering system for the 1982-1983 springs investigation used HRM signposts, which subdivide the shoreline between Vernita Bridge and North Richland into 46 segments, each approximately one-mile long.[1] A spring site name was derived using the nearest upstream marker, to which a suffix was added that indicated the sequence of the spring site downstream of the marker. For example, spring site "3-5" indicated the fifth spring observed downstream from HRM number 3.

A second comprehensive survey of riverbank springs was completed by the PNL environmental surveillance project during 1988 (Dirkes 1990). This study provided a follow-up to the initial 1982-1983 riverbank springs study, with an expanded geographic coverage and a more extensive suite of analyses. Near-shore river water samples were collected from locations adjacent to where riverbank springs were sampled. Samples were also collected from sites in Franklin County across the river from Hanford facilities and from irrigation return canals. An important discovery was that some radiological constituents that are typical of Hanford Site groundwater (e.g., uranium and the associated gross alpha activity) were present in irrigation return water at levels higher than in Columbia River water.

The location names used for riverbank springs during the 1988 survey followed the convention established by the earlier 1982 survey. However, the analytical results were tabulated according to HRM position and were not given discreet location names (Dirkes 1990). As for the earlier survey, specific conductance measurements for the samples were not reported.

2.2 Environmental Restoration Under Westinghouse Hanford Company

A third comprehensive survey of riverbank springs was conducted in fall 1991 as part of environmental restoration project activities (DOE 1992). The work was prompted by an increased need for information to be used by DOE and regulatory agencies to support decisions regarding groundwater contamination near the river. A Tri-Party Agreement (Ecology 1989) major milestone was framed to provide impetus for generating this information (major milestone M-30; sub-milestone M-30-01).

The PNL environmental surveillance project provided considerable help in planning the fall 1991 environmental restoration project. PNL staff outlined all known areas along the shoreline, where springs had been observed previously, on the newly-acquired 1:2,000 series of topographic maps for the Hanford

[1] No published reference to the initial installation of these markers has been identified. They were subsequently reset and surveyed during summer 1999 by the Surface Environmental Surveillance Project (SESP), successor to the original surveillance program.

Site.[2] A new naming system for riverbank spring locations was devised, again based on the HRM signposts, and efforts were made to associate all previously sampled locations with the new naming convention. The new format consisted of the location to the nearest tenth of a HRM signpost, followed by a suffix used to indicate multiple springs at the same approximate location. For example, springs 057-1, 057-2, etc. would indicate multiple springs at a site located seven tenths of the downstream distance between HRM signposts #5 and #6 (i.e., HRM 5.7).

During this project, samples were collected of (1) riverbank spring water, (2) fine-grained sediment associated with springs, and (3) nearshore river water adjacent to springs. Twenty-six locations were sampled; analyses included a comprehensive suite of chemical and radiological contamination indicators. The sampling and analysis activities were completed following CERCLA protocols for obtaining environmental data to support restoration decisions. Data to estimate the relative proportions of groundwater and river water in the spring samples were collected by recording the specific conductance for each sample and for nearshore river water, along with temperature and pH. As a consequence, it became possible to discuss the results not only in terms of concentrations at the location and time of exposure at the spring, but also to make a qualitative statement regarding how representative the concentrations were of nearby groundwater. The data collected during this project are stored in the HEIS under the surface water (SW) media category.

The data collected during fall 1991 were further analyzed to better understand the relationship between water quality data obtained from near-river wells, riverbank springs, and near-shore river water. Concentrations of various contamination indicators were plotted as function of position along the shoreline. The results showed a good correlation with previously mapped groundwater plumes, and also that concentrations in exposed riverbank springs tended to fall in a range between values in groundwater and adjacent river water, although considerable variability existed. Additional work to provide consistent names, HRM references, and geographic coordinates was completed during this time period. The results were published in an interpretive report (Peterson and Johnson 1992). The principal conclusions presented in that report are:

- Riverbank spring water concentrations for contamination indicators typically fall within the range bounded by groundwater (high) and nearshore river water (low) concentrations. Within that range, spring water concentrations vary in response to river stage fluctuations.
- The timing of sample collection relative to river stage characteristics prior to sampling must be considered when determining the representativeness of the sample. The height and duration of river stage cycles (daily and seasonal) are key factors that influence water quality at riverbank springs.
- Data from riverbank springs samples are not the most representative data to use for estimating groundwater contaminant flux to the Columbia River.

The environmental restoration program resampled the 1991 riverbank springs during 1993. There are no published reports that describe the results of this sampling. Many of these sites were then incorporated into the CERCLA remedial investigation sampling and analysis schedules associated with the 100 Area groundwater Operable Units.

[2] Personal communication to Westinghouse Hanford Company staff from RL Dirkes, Pacific Northwest Laboratory, Richland, Washington, dated 1991.

Shoreline sampling and analysis was also conducted at the 300 Area as part of the limited field investigation for the 300-FF-5 groundwater Operable Unit (Friant and Hulstrom 1993). In that investigation, near-river wells, riverbank springs, shoreline sediments, and near-shore river water samples were collected during September 1992. The samples were analyzed for radionuclides, metals, and organic constituents. Uranium was identified as the chief contaminant of concern, with the primary source being nuclear fuel fabrication effluent that was discharged to the 300 Area Process Trenches, and earlier to the North and South Process Ponds, and the 307 Process Trenches. The investigation also concluded that shoreline sediment did not appear to be an important sink for contaminants.

2.3 Environmental Restoration Under Bechtel Hanford, Inc.

The Environmental Restoration Contractor team, initially involving Bechtel Hanford, Inc., CH2M HILL Hanford Inc., and IT Hanford, Inc., assumed responsibility for the environmental restoration program in July 1994. This responsibility included follow-on work to TPA Milestone M-30-05 that involved the groundwater/river interface. Several projects provided new and unique data from the interface in the 100 Area. Riverbank springs sampling as part of the environmental restoration program was conducted each fall since 1996. Sampling logistics were integrated with shoreline monitoring activities conducted under the Surface Environmental Surveillance Project (SESP), which is run by Pacific Northwest National Laboratory (PNNL).

During spring 1995, CH2M HILL divers collected samples of substrate pore water from the riverbed adjacent to the 100-H Area (Hope and Peterson 1996a; Figure 2.4). The area for the investigation included riverbed substrate that is heavily used by fall Chinook salmon as spawning habitat. The area is also adjacent to where groundwater contaminated by chromium enters the river. The pore water samples were analyzed for hexavalent chromium using several methods, including adsorptive stripping voltametry, which offers very low detection levels (Olsen and Kucheryavyy 1995). At one location within a gravelly area used as a redd (collection of egg pockets), chromium was observed at concentrations up to 130 µg/L, which is well above the federal standard for protecting freshwater aquatic organisms (i.e., 11 µg/L). The specific conductance of the sample indicated that it contained a significant proportion of river water, so the concentration of groundwater approaching that area might have been even higher than the measured value.

A second field investigation using divers to collect pore water samples from the riverbed was conducted during fall 1995 at the 100-D Area (Hope and Peterson 1996b; Figure 2.5). In addition to collecting pore water samples, numerous sampling tubes fitted with 6-inch long stainless steel screens were installed in the aquifer at multiple depths along the shoreline. Along one segment of the shoreline, samples contained hexavalent chromium at concentrations higher than previously observed in any other water samples from the 100 Area. The highest concentrations observed were 630 µg/L in pore water from riverbed sediment and 870 µg/L in an aquifer tube at the shoreline adjacent to the pore water site. This discovery led to the installation of new groundwater monitoring wells and vigorous investigation of potential sources, including a reconstruction of the water table that may have existed during the operating years (Connelly 1997). The newly discovered area of chromium contamination became known as the 100-D “hot spot.” The plume was initially treated using an *in situ* redox treatment system to form a reactive barrier that prevents or reduces the mass flux of chromium into the river (Williams et al. 2000).

The following year (1996), divers returned to pore water sampling sites at 100-H, 100-D, and 100-K Areas and installed permanent pore water sampling ports, with tubing leading ashore to a point above the high-water line.[3] These tubes, along with additional permanent installations at 100-D and 100-K Areas, may still be viable for sample collection.

An additional method for shoreline monitoring was developed as part of the riverbed pore water sampling investigation. This method involved using direct-push tools to implant small diameter tubes at multiple depths in the aquifer beneath the shoreline (subsequently referred to as aquifer sampling tubes). Based on the success of this method at the 100-D Area, a more comprehensive installation project was developed, which resulted in nearly continuous coverage of the shoreline from the 100-B Area downstream to the Hanford town site, at intervals of ~600 meters (~2,000 feet) (Peterson et al. 1998).

In fall 2002, work scope involving aquifer sampling tubes was transferred from the environmental restoration contractor to PNNL, where it became incorporated as part of the groundwater project. Subsets of these tubes were subsequently resampled annually by PNNL to collect data that support environmental restoration program objectives (e.g., Hartman and Peterson 2003). Sampling of the network continued at PNNL until being transferred to Fluor Hanford, Inc. in 2006.

2.4 Soil and Groundwater Remediation Under Fluor Hanford, Inc. and CH2M Hill Plateau Remediation Company

Starting in 2003, the aquifer tube network was enhanced by additional installations at areas not initially covered and to replace damaged or lost tubes. A summary of the several expansion campaigns is provided in the updated sampling and analysis plan for the network (Kasza 2009). An evaluation of how to optimize use of the tube network was recently completed that includes a comprehensive description of the network, along with summaries of recent analytical results for constituents of interest and graphics that illustrate the positions of tube and near-river well screens to stratigraphic intervals beneath the shoreline (Hartman 2009).

2.5 River Corridor Baseline Risk Assessment Under Washington Closure Hanford, LLC

The River Corridor Baseline Risk Assessment (RCBRA) project began in 2004 with an extensive effort toward identifying and compiling all available environmental data for various segments of the Columbia River (DOE-RL 2008b). The project is still underway and involves comprehensive sampling of the river environment where it crosses the Hanford Site. During 2008 and 2009, numerous samples of pore water were collected from approximately a 10-inch depth in the riverbed sediment, using newly developed field methods and equipment to accommodate the dynamic conditions encountered in the Columbia River. Considerable effort was expended to bias sampling towards obtaining samples that were representative of groundwater, i.e., when discharge of groundwater to the river was at its maximum rate. This sampling effort is producing significant new information on the discharge of groundwater and

[3] Interoffice Memorandum Control No. 044041, from SJ Hope (CH2M Hill Hanford, Inc.) to MH Sturges and AJ Knepp (Bechtel Hanford, Inc.), *Installation of Riverbed Pore Water Sampling Ports in the Columbia River at 100-D/DR, 100-H, and 100-K Reactor Areas*, dated March 11, 1997.

dissolved contaminants, information that will assist in developing remedial action decisions during the next several years. The first formal reports on the locations sampled and analytical results are expected during 2010.

2.6 Miscellaneous Investigations

During 1988, investigators from SEARCH Technical Services, Davenport, Washington, collected samples of riverbank springs and shoreline sediment at various locations along the Hanford Reach (Buske and Josephson 1989). Their work focused on gamma-emitting radionuclides in the shoreline environment and they used the earlier work by McCormack and Carlile (1984) as a guide to sampling locations. Because they recorded their sampling locations relative to the HRM signposts, it has been possible to relate their sampling sites to those of other investigators.

As part of research into the zone of interaction between groundwater and river water, sampling methods similar to the aquifer sampling tubes just described have been employed at the 100-N and 300 Areas starting in 2004. The objectives are to investigate the water quality characteristics in riverbed sediment that is used as habitat (i.e., the upper ~0.5 meter) and also to further refine the conceptual model that describes the dynamics of interaction. The investigations at the 300 Area are described in Fritz et al. (2009, 2008, and 2007) and Arntzen et al. (2006).

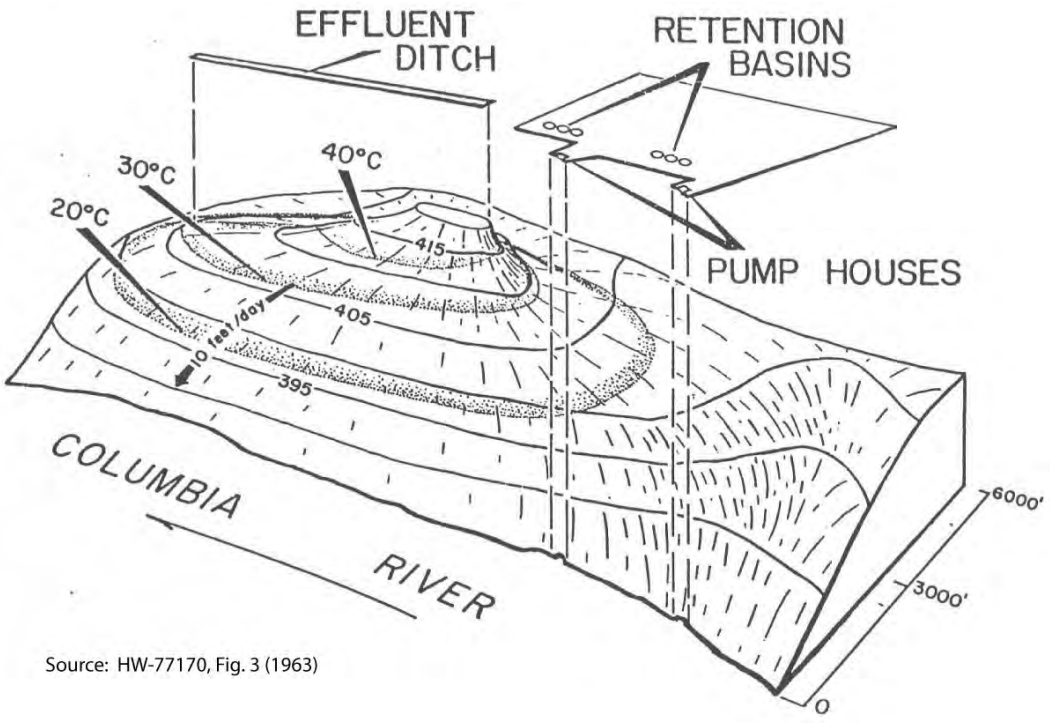
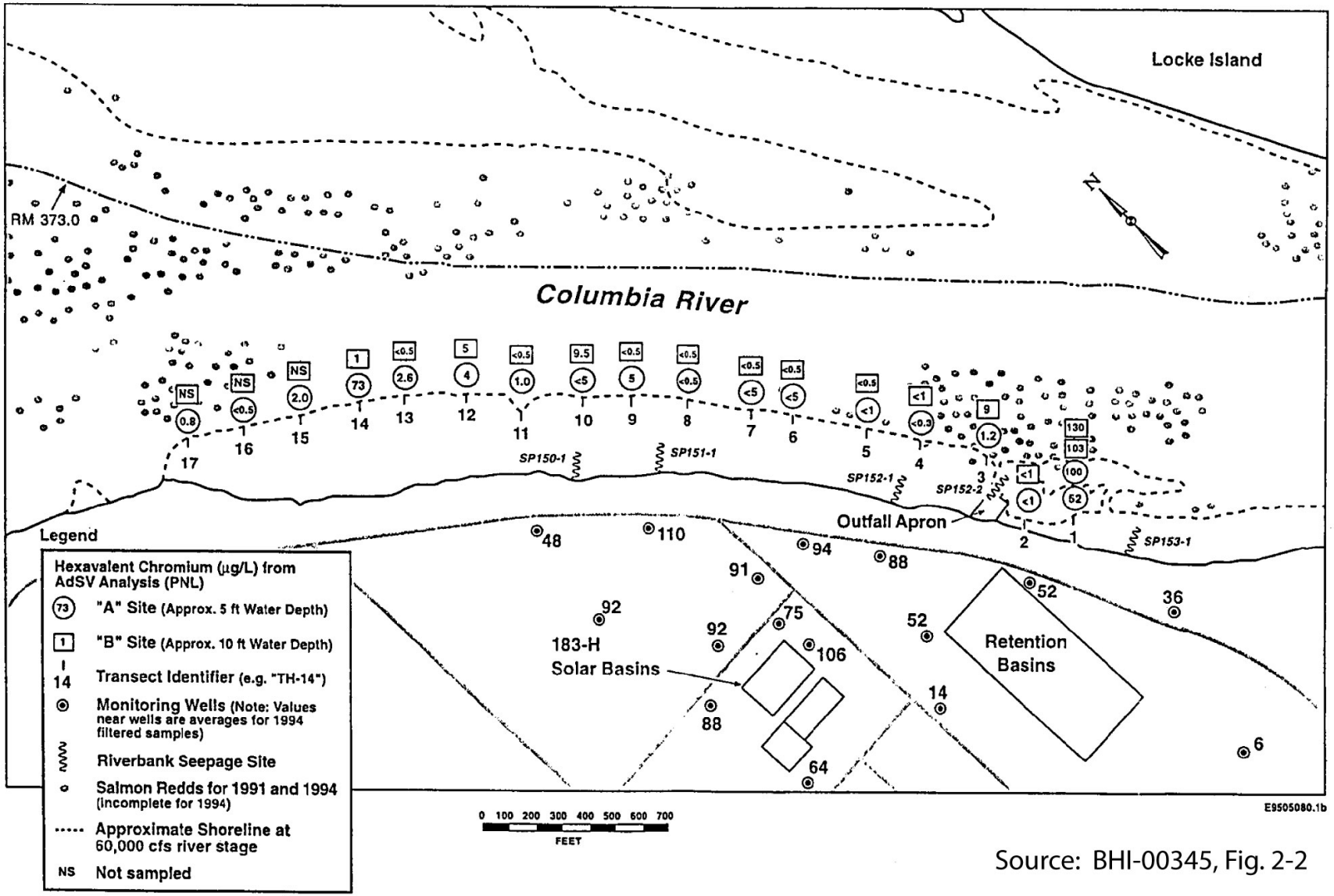


Figure 2.1. Illustration Showing Mounding of Water Table at 100-K Area During Operations

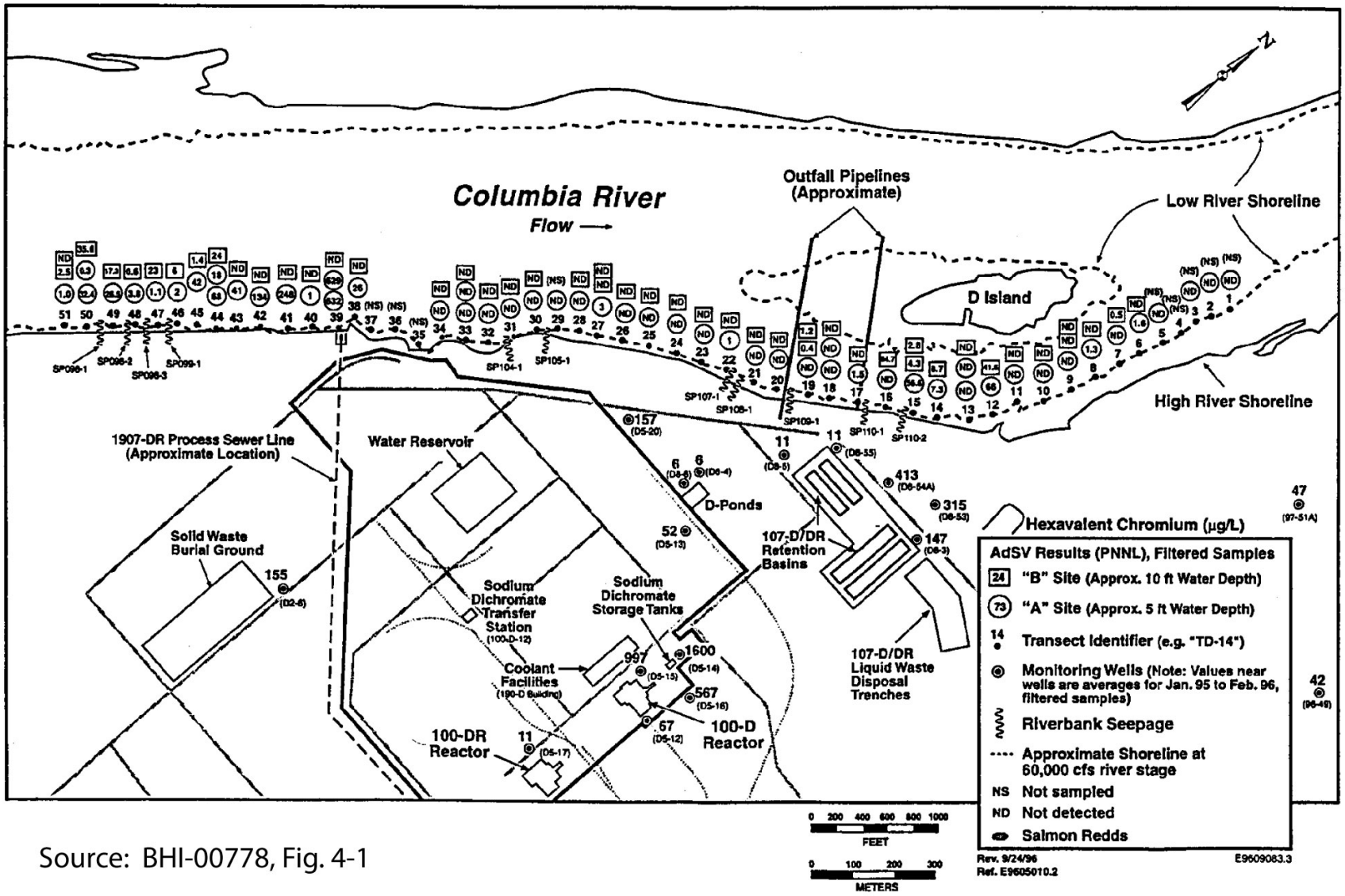
Figure 2.2. Aerial Photograph Showing Surface Runoff Across Shoreline at 100-K Area During Operations in 1955

Figure 2.3. Aerial Photograph Showing 100-K Area During Operations in 1965



Source: BHI-00345, Fig. 2-2

Figure 2.4. Locations Along 100-H Area Where Riverbed Pore Water Samples were Collected in March 1995



Source: BHI-00778, Fig. 4-1

Figure 2.5. Locations Along 100-D Area Where Riverbed Pore Water Samples were Collected in October/November 1995

3.0 Aquifer Sampling Tubes

An aquifer sampling tube is a small-diameter polyethylene tube inserted into the aquifer near the low-river stage shoreline using direct-push methods. A stainless mesh screen 6 inches (15.2 centimeters) in length is attached at the lower end of the tube as a sampling port. Multiple tubes are installed at several depths at each location. Each tube is considered a separate entity for recordkeeping purposes. They provide samples of groundwater from locations as close as logistically practical to the point where groundwater discharges into the riverbed substrate.

At some sites, up to three tubes were bundled together and installed using a single temporary driven casing. At other sites, individual tubes were installed using individual temporary driven casings, which may be separated by up to several meters distance (Figure 3.1). For installations made after 2003, each tube was installed using a separately driven temporary casing (i.e., bundling was no longer used). The temporary casings were driven into the ground using either a hand-held air hammer or a truck-mounted hydraulic ram.

3.1 Aquifer Sampling Tube Naming Conventions

Three different conventions have been used to name the sites where aquifer sampling tubes are installed. The first convention was used during the riverbed pore water sampling investigations conducted at 100-D Area in fall 1995 (Hope and Peterson 1996b). An example for an aquifer sampling tube location for those investigations is: "DD-17-2." The first letter indicates a sampling tube that is driven into the aquifer. The second letter refers to the 100-D Area. The number "17" refers to pore water transect 17 (see Chapter 5.0 that follows for a description of "transects") and the number "2" indicates the depth of the sampling port, with "1" being the most shallow and "4" being the deepest.

The second naming convention was established for a fall 1997 project to install aquifer sampling tubes along the Hanford Reach shoreline from the 100-B Area downstream to the Hanford town site (Peterson et al. 1998). Temporary location names were created that represent the sequence of locations, progressing downstream, and a suffix that indicated the relative depth of the sampling port. For example, location "14-D" is the fourteenth location downstream of the upstream starting point. The suffix "D" indicates the deepest port in the uppermost hydrologic unit at that location ("S" stands for the shallowest port, and "M" for the mid-depth port). The objective for the installations included one port approximately 1.5 meters (5 feet) below the water table; one port as close to the bottom of the aquifer as possible; and a third port at mid-depth between the other two.

The third convention appeared during planning for installing tubes at additional sites to fill in coverage gaps, and to replace existing tubes that no longer yielded samples. This project was conducted between December 2003 and April 2004. The names used started with a prefix "AT-" for aquifer tube, followed by a letter that designated a reactor area or shoreline segment, and ending with a sequential number. A suffix was also added to indicate the relative depth of each individual tube at a site. For example, AT-B-5-M is an aquifer sampling tube at the 100-B Area. It is the fifth site at 100-B equipped during the installation campaign in 2004 and is the medium-depth tube.

Because the aquifer sampling tubes are considered "resource protection wells" under the Washington State Administrative Code (WAC 173-160), they have been assigned well identification numbers in the

Hanford Well Information System (HWIS). These numbers serve an internal data management purpose and are not normally shown in reports.

3.2 Aquifer Sampling Tube Location Names and Coordinates

A listing of all aquifer sampling tubes installed under the Environmental Restoration (ER) program to support CERCLA investigations is presented in Table 3.1. Also, installations of similar facilities, variously described as piezometers and drive points, are included on the table, although no claim is made for completeness for non-ER program installations. For convenience, any small diameter (i.e., less than 5-centimeter [2-inch] diameter) tube driven into the shoreline and riverbed sediment will be referred to as an "aquifer sampling tube," a label which may indicate measurement of hydrostatic pressures and *in situ* monitoring equipment, as well as actual water sample collection. The columns in Table 3.1 are defined as follows:

- Well Identifier (HWIS) – Formal identifier code assigned to each groundwater monitoring well and aquifer sampling tube by the organization responsible for administering groundwater monitoring facilities on the Hanford Site. The code is used for internal data management purposes.
- Port Depth – Depth below ground surface (in feet) to the top of the six-inch screened sampling port. Typically measured by inserting a fiberglass "fish tape" down the tube; the tape "bottoms" at the top of the screen.
- Aquifer Tube Name – The name in use during 2009 for tubes routinely sampled under the CERCLA program. For the most recently installed tubes, the HWIS well identifier is being used as the descriptive name.
- HRM for Site ("2k") – Aquifer sampling tube location relative to the Hanford River Marker system, as updated in 1999.
- Segment – Segments defined for convenience in grouping monitoring sites by CERCLA groundwater operable units, groundwater interest areas, or other common characteristic.
- Northing and Easting – Location coordinates in Washington State Plane (South Zone) system; units are meters; North American Datum of 1983.
- Coordinate Quality – Quality of the coordinates, e.g., "surveyed" using global positioning system (GPS) equipment or traditional land surveying methods; "estimated" using geographic information system (GIS) maps.
- Coordinate Reference – Citation for information on the aquifer sampling tube site.
- Ground Elevation – Vertical reference for ground surface; units are meters; North American Vertical Datum of 1988.
- Elevation Quality – Quality of the vertical reference; estimated from maps; if blank, quality is uncertain.

3.3 Previous Names for Aquifer Tubes

For most aquifer tube sites, the descriptive names assigned during the planning operations have not been subsequently changed. Exceptions include the tubes installed as part of the *in situ* Redox

manipulation test to create a barrier to hexavalent chromium migration. Also, for a brief period during approximately 2001, attempts were made to assign names to tubes based on the convention used for naming monitoring wells (Chamness and Merz 1993), but this convention was never fully implemented. Table 3.2 lists the various names used previously to refer to some of the aquifer sampling tubes. Some column headings are the same as those used in Table 3.1, with the following exceptions:

- Name as Used in Reference – Name as used in historical report or other reference that includes aquifer sampling tube names.
- Name Reference – Report citation or other source.
- Year of Name Use – Year in which a tube name was published in the reference cited.

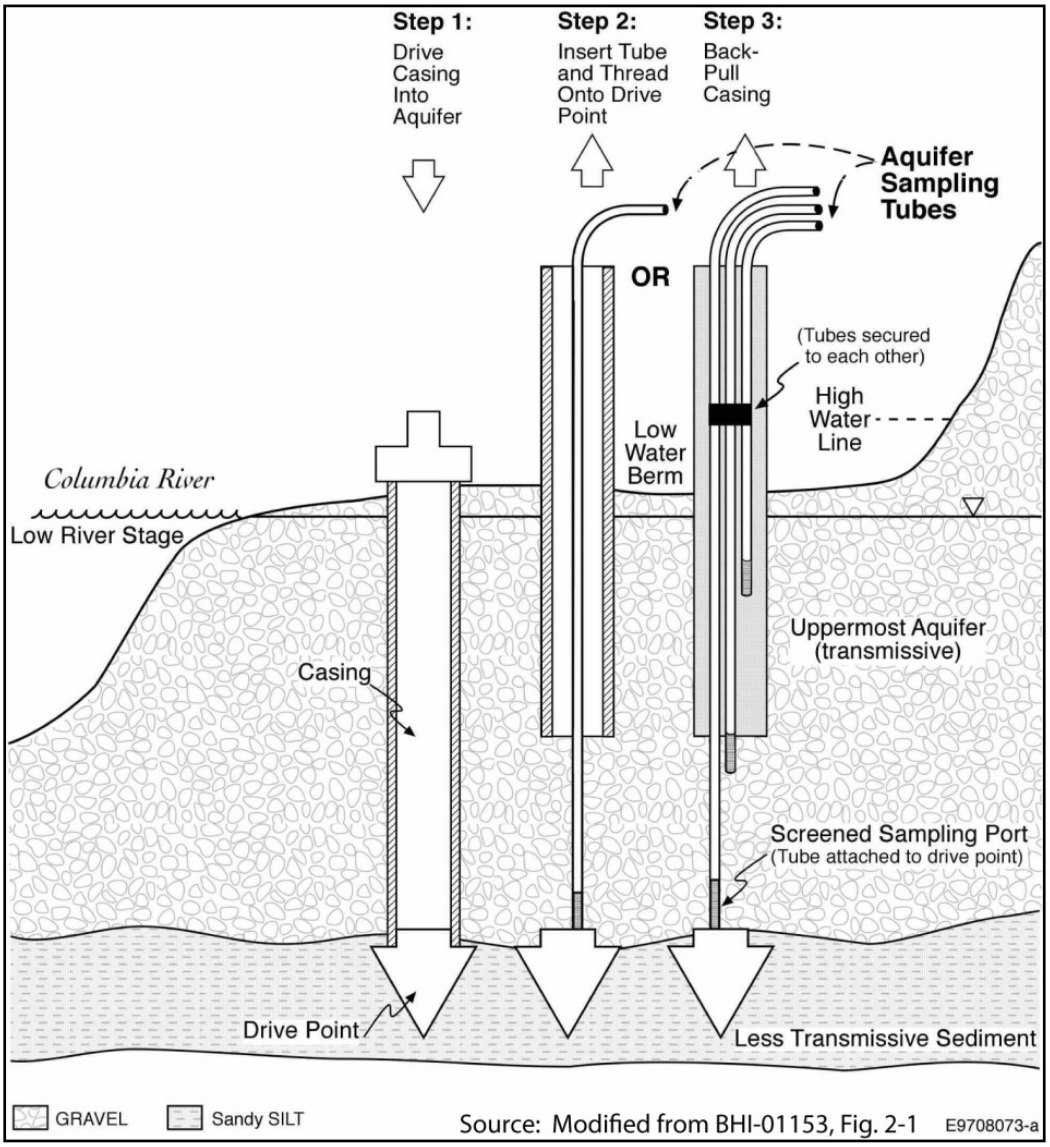


Figure 3.1. Illustration Showing Installation of Aquifer Sampling Tubes

Table 3.1. Aquifer Sampling Tube Sites Along the Hanford Site Shoreline

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8115	7.0	01-S	2.600	VB	146,033.078	562,697.662	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.676	
B8114	16.0	01-M	2.600	VB	146,033.078	562,697.662	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.676	
B8113	24.0	01-D	2.600	VB	146,033.078	562,697.662	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.676	
B8118	6.0	02-S	3.130	VB	145,689.247	563,539.581	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.267	
B8117	14.9	02-M	3.130	VB	145,689.247	563,539.581	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.267	
B8120	7.0	03-M	3.450	BC5	145,469.247	564,077.431	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	121.154	
B8119	13.0	03-D	3.450	BC5	145,469.247	564,077.431	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	121.154	
C4376	8.0	AT-B-1-S	3.570	BC5	145,379.276	564,307.002	SURV	GPS ID1544 FHI-TimJohnson-March04	121.239	
C4375	13.3	AT-B-1-M	3.570	BC5	145,379.938	564,308.894	SURV	GPS ID1543 FHI-TimJohnson-March04	121.271	
C4378	8.6	AT-B-2-S	3.660	BC5	145,329.643	564,514.817	SURV	GPS ID1550 FHI-TimJohnson-March04	120.902	
C4379	14.0	AT-B-2-M	3.660	BC5	145,329.366	564,515.900	SURV	GPS ID1548 FHI-TimJohnson-March04	120.862	
C4377	19.0	AT-B-2-D	3.660	BC5	145,329.139	564,513.954	SURV	GPS ID1549 FHI-TimJohnson-March04	120.920	
B8124	8.3	04-S	3.730	BC5	145,283.419	564,612.459	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.407	
B8123	13.0	04-M	3.730	BC5	145,283.047	564,612.066	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.491	
B8122	25.0	04-D	3.730	BC5	145,283.275	564,612.184	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.484	
C6227	11.2	C6227	3.810	BC5	145,303.590	564,749.630	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.930	
C6228	17.5	C6228	3.810	BC5	145,303.780	564,746.340	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.960	
C6229	23.4	C6229	3.810	BC5	145,303.790	564,748.320	SURV	AST Survey Data 1995-2008-MH-07509.xls	120.000	
B8127	8.5	05-S	3.890	BC5	145,332.290	564,908.310	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	121.992	
B8126	17.0	05-M	3.890	BC5	145,332.290	564,908.310	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	121.992	
B8125	25.5	05-D	3.890	BC5	145,332.290	564,908.310	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	121.992	
C4382	8.1	AT-B-3-S	4.020	BC5	145,397.266	565,130.482	SURV	GPS ID1546 FHI-TimJohnson-March04	120.737	
C4381	14.2	AT-B-3-M	4.020	BC5	145,397.704	565,128.625	SURV	GPS ID1547 FHI-TimJohnson-March04	120.505	
C4380	23.2	AT-B-3-D	4.020	BC5	145,397.211	565,127.529	SURV	GPS ID1545 FHI-TimJohnson-March04	120.623	
B8130	8.8	06-S	4.120	BC5	145,412.052	565,293.927	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.122	
B8129	15.5	06-M	4.120	BC5	145,412.052	565,293.927	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.122	
B8128	23.0	06-D	4.120	BC5	145,412.052	565,293.927	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	122.122	
C6230	9.2	C6230	4.200	BC5	145,459.990	565,423.770	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.840	
C6231	13.0	C6231	4.200	BC5	145,460.440	565,426.020	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.720	
C6232	26.5	C6232	4.200	BC5	145,453.670	565,426.350	SURV	AST Survey Data 1995-2008-MH-07509.xls	120.090	
B8132	8.0	07-M	4.270	BC5	145,495.641	565,566.011	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	120.653	
B8131	20.0	07-D	4.270	BC5	145,493.904	565,564.591	SURV	Confirmed 9/24/02 PNNL sub-meter GPS	120.662	
C6233	9.6	C6233	4.290	BC5	145,496.480	565,561.410	SURV	AST Survey Data 1995-2008-MH-07509.xls	120.230	
C6234	15.3	C6234	4.290	BC5	145,495.820	565,560.410	SURV	AST Survey Data 1995-2008-MH-07509.xls	120.170	
C6235	19.2	C6235	4.290	BC5	145,495.240	565,563.420	SURV	AST Survey Data 1995-2008-MH-07509.xls	120.310	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C4368	7.5	AT-B-4-S	4.440	BC5	145,591.644	565,845.890	SURV	GPS ID1552 FHI-TimJohnson-March04	119.662	
C4371	6.8	AT-B-7-S	4.620	BC5	145,678.989	566,142.321	SURV	GPS ID1555 FHI-TimJohnson-March04	119.493	
C4370	13.3	AT-B-7-M	4.620	BC5	145,680.047	566,143.324	SURV	GPS ID1554 FHI-TimJohnson-March04	119.343	
C4369	18.1	AT-B-7-D	4.620	BC5	145,679.155	566,143.550	SURV	GPS ID1553 FHI-TimJohnson-March04	119.549	
C4374	9.6	AT-B-5-S	4.770	BC5	145,745.679	566,435.772	SURV	GPS ID1562 FHI-TimJohnson-March04	119.330	EST
C4373	16.2	AT-B-5-M	4.770	BC5	145,746.469	566,436.650	SURV	GPS ID1556 FHI-TimJohnson-March04	119.340	
C4372	24.0	AT-B-5-D	4.770	BC5	145,746.810	566,438.064	SURV	GPS ID1557 FHI-TimJohnson-March04	119.320	
B8143	10.5	11-D	5.070	BC5	145,903.913	566,862.628	SURV	ERC-GPS ID#99 (Nov/Dec 1997)	119.300	EST
B8146	10.0	12-D	5.330	BC5	146,055.169	567,231.722	SURV	ERC-GPS ID#100 (Nov/Dec 1997)	119.300	EST
B8151	8.3	13-S	5.610	BC5	146,172.598	567,507.297	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	119.200	EST
B8149	22.9	13-D	5.610	BC5	146,172.598	567,507.297	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	119.200	EST
B8154	7.5	14-S	5.880	KR4	146,268.095	567,645.588	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	119.000	EST
B8153	14.5	14-M	5.880	KR4	146,268.095	567,645.588	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	119.000	EST
B8152	21.5	14-D	5.880	KR4	146,268.095	567,645.588	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	119.000	EST
C6236	9.7	C6236	6.040	KR4	146,606.750	568,031.670	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.480	
C6237	15.0	C6237	6.040	KR4	146,603.730	568,031.500	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.700	
C6238	21.6	C6238	6.040	KR4	146,604.180	568,033.650	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.800	
B8156	13.7	15-M	6.050	KR4	146,602.100	568,051.900	SURV	PNNL-field recon (10/01/03); sub-meter	119.000	EST
C4341	9.2	AT-K-1-S	6.270	KR4	146,805.775	568,324.617	SURV	GPS ID1569 FHI-TimJohnson-March04	119.320	
C4340	15.0	AT-K-1-M	6.270	KR4	146,806.936	568,325.504	SURV	GPS ID1571 FHI-TimJohnson-March04	119.257	
C4339	21.7	AT-K-1-D	6.270	KR4	146,807.110	568,327.310	SURV	GPS ID1570 FHI-TimJohnson-March04	119.178	
B8162	11.0	17-M	6.370	KR4	146,895.929	568,480.003	SURV	PNNL-GPS sub-meter (11/20/02)	119.000	EST
B8161	19.5	17-D	6.370	KR4	146,895.929	568,480.003	SURV	PNNL-GPS sub-meter (11/20/02)	119.000	EST
C6239	10.2	C6239	6.466	KR4	146,979.250	568,591.066	SURV	AST Survey Data 1995-2008-MH-07509.xls	120.090	
C6240	14.9	C6240	6.466	KR4	146,980.255	568,591.043	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.880	
C6241	21.8	C6241	6.466	KR4	146,979.656	568,589.901	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.940	
C6244	27.5	C6244	6.552	KR4	147,065.122	568,693.696	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.460	
C6242	12.7	C6242	6.552	KR4	147,063.409	568,693.016	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.490	
C6243	20.7	C6243	6.552	KR4	147,063.896	568,693.967	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.470	
B8204	8.5	18-S	6.560	KR4	147,064.320	568,712.600	SURV	PNNL-field recon (10/01/03); sub-meter	119.000	EST
C4329	15.0	AT-K-2-S	6.640	KR4	147,153.321	568,804.249	SURV	GPS ID1576 FHI-TimJohnson-March04	119.427	
C4327	18.2	AT-K-2-M	6.640	KR4	147,158.032	568,803.992	SURV	GPS ID1575 FHI-TimJohnson-March04	119.181	
C4328	22.3	AT-K-2-D	6.640	KR4	147,157.944	568,801.243	SURV	GPS ID1577 FHI-TimJohnson-March04	118.857	
C6245	11.2	C6245	6.750	KR4	147,279.520	568,922.440	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.970	
C6246	16.6	C6246	6.750	KR4	147,277.730	568,920.870	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.940	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C6247	23.1	C6247	6.750	KR4	147,276.150	568,921.680	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.950	
B8204	8.5	19-S	6.860	KR4						
B8206	10.0	19-M	6.860	KR4	147,389.952	569,036.700	SURV	PNNL-GPS sub-meter (11/19/02)	119.000	EST
B8205	22.0	19-D	6.860	KR4	147,389.952	569,036.700	SURV	PNNL-GPS sub-meter (11/19/02)	119.000	EST
C4344	13.4	AT-K-3-S	7.000	KR4	147,579.927	569,177.923	SURV	GPS ID1573 FHI-TimJohnson-March04	118.333	
C4343	17.8	AT-K-3-M	7.000	KR4	147,581.403	569,180.026	SURV	GPS ID1574 FHI-TimJohnson-March04	118.266	
C4342	23.0	AT-K-3-D	7.000	KR4	147,581.051	569,178.215	SURV	GPS ID1572 FHI-TimJohnson-March04	118.109	
C6248	10.1	C6248	7.120	KR4	147,687.040	569,313.260	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.510	
C6249	15.0	C6249	7.120	KR4	147,688.300	569,309.540	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.250	
C6250	23.2	C6250	7.120	KR4	147,686.210	569,314.980	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.610	
C6251	10.1	C6251	7.180	KR4	147,888.040	569,467.170	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.640	
C6252	18.3	C6252	7.180	KR4	147,898.500	569,475.540	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C6253	24.0	C6253	7.180	KR4	147,897.150	569,464.260	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.240	
B8213	11.0	21-S	7.420	KR4	148,020.334	569,628.862	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	118.500	EST
B8212	15.0	21-M	7.420	KR4	148,020.334	569,628.862	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	118.500	EST
C6254	8.0	C6254	7.540	KR4	148,159.940	569,713.150	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.980	
C6255	10.8	C6255	7.540	KR4	148,158.550	569,709.360	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.890	
C6256	16.4	C6256	7.540	KR4	148,158.600	569,711.500	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.930	
C6257	9.8	C6257	7.660	KR4	148,265.880	569,853.390	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.030	
C6258	15.0	C6258	7.660	KR4	148,265.220	569,851.350	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.980	
C6259	19.5	C6259	7.660	KR4	148,271.310	569,850.480	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.770	
B8215	7.5	22-M	7.730	KR4	148,340.349	569,975.776	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	118.500	EST
B8214	12.3	22-D	7.730	KR4	148,340.349	569,975.776	SURV	PNNL-GPS sub-meter fld recon (9/24/02)	118.500	EST
C4338	11.0	AT-K-4-S	7.880	KR4	148,475.999	570,122.433	SURV	GPS ID1567 FHI-TimJohnson-March04	118.973	
C4337	13.2	AT-K-4-M	7.880	KR4	148,476.953	570,123.114	SURV	GPS ID1565 FHI-TimJohnson-March04	118.977	
C4336	15.3	AT-K-4-D	7.880	KR4	148,477.489	570,123.757	SURV	GPS ID1564 FHI-TimJohnson-March04	118.996	
B8218	7.0	23-M	7.950	KR4	148,592.700	570,225.500	SURV	PNNL-GPS submeter (5-2-05)	118.800	EST
B8217	12.0	23-D	7.950	KR4	148,593.300	570,228.000	SURV	PNNL-GPS submeter (5-2-05)	118.800	EST
C6260	8.3	C6260	7.990	KR4	148,608.840	570,214.850	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.190	
C6261	13.6	C6261	7.990	KR4	148,618.500	570,209.670	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.020	
C4335	10.5	AT-K-5-S	8.090	KR4	148,738.194	570,357.990	SURV	GPS ID1562 FHI-TimJohnson-March04	118.837	
C4331	15.7	AT-K-5-M	8.090	KR4	148,737.414	570,356.510	SURV	GPS ID1563 FHI-TimJohnson-March04	118.728	
C4330	21.1	AT-K-5-D	8.090	KR4	148,738.273	570,358.927	SURV	GPS ID1561 FHI-TimJohnson-March04	118.837	
B8526	11.5	DK-04-2	8.140	KR4	148,872.300	570,456.600	SURV	PNNL-GPS sub-meter (11/19/02)	119.000	EST
B8527	15.0	DK-04-3	8.140	KR4	148,872.300	570,456.600	SURV	PNNL-GPS sub-meter (11/19/02)	119.000	EST

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8223	7.5	25-D	8.260	KR4	148,960.980	570,534.770	SURV	PNNL-GPS sub-meter (11/19/02)	119.000	EST
C4333	11.4	AT-K-6-S	8.310	KR4	149,033.719	570,641.237	SURV	GPS ID1559 FHI-TimJohnson-March04	120.073	
C4334	15.3	AT-K-6-M	8.310	KR4	149,032.947	570,639.550	SURV	GPS ID1560 FHI-TimJohnson-March04	120.032	
C4332	21.6	AT-K-6-D	8.310	KR4	149,034.926	570,642.437	SURV	GPS ID1558 FHI-TimJohnson-March04	119.962	
B8228	6.0	26-S	8.390	KR4	149,115.832	570,718.626	SURV	PNNL-GPS sub-meter (11/20/02)	120.000	EST
B8227	14.0	26-M	8.390	KR4	149,115.832	570,718.626	SURV	PNNL-GPS sub-meter (11/20/02)	120.000	EST
B8226	23.0	26-D	8.390	KR4	149,115.832	570,718.626	SURV	PNNL-GPS sub-meter (11/20/02)	120.000	EST
C6263	12.8	C6263	8.539	NR2	149,364.420	570,887.320	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.890	
C6264	20.2	C6264	8.540	NR2	149,363.590	570,887.190	SURV	AST Survey Data 1995-2008-MH-07509.xls	119.020	
C6265	27.3	C6265	8.541	NR2	149,365.430	570,886.330	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.740	
C6317	7.9	C6317	8.660	NR2	149,554.570	571,025.320	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.640	
C6318	13.5	C6318	8.661	NR2	149,554.800	571,026.840	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.770	
C6319	22.2	C6319	8.662	NR2	149,554.400	571,023.870	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C6320	8.5	C6320	8.746	NR2	149,677.990	571,128.660	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.320	
C6321	12.6	C6321	8.747	NR2	149,677.460	571,128.660	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.380	
C6352	14.1	C6352	8.748	NR2	149,678.602	571,129.473	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.380	
C6322	18.8	C6322	8.748	NR2	149,679.680	571,127.030	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.670	
C6131	4.5	C6131	8.791	NR2	149,733.710	571,153.810	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C6132	5.5	C6132	8.795	NR2	149,734.960	571,165.270	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.670	
C6133	2.7	C6133	8.813	NR2	149,776.130	571,168.610	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C5514	5.4	N116mArray-0A	8.815	NR2	149,776.131	571,168.610		PNNL-GPS xyz from Brad Fritz, 11/16/06	117.649	
C6134	2.5	C6134	8.825	NR2	149,794.070	571,181.410	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C6135	4.9	C6135	8.825	NR2	149,794.070	571,181.410	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C6136	4.9	C6136	8.393	NR2	149,815.360	571,195.690	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.600	
C5255	3.9	N116mArray-1A	8.865	NR2	149,860.200	571,224.900	SURV	PNNL-BradFritz-(file 10/13/06)	117.200	
C5256	2.0	N116mArray-2A	8.882	NR2	149,888.375	571,259.688		PNNL-GPS xyz from Brad Fritz, 9/1/06	116.630	
C5269	8.9	APT1	8.891	NR2	149,897.484	571,276.500	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	118.860	
C5270	5.2	APT2	8.892	NR2	149,899.578	571,275.313	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	118.002	
C5271	2.8	APT3	8.893	NR2	149,905.047	571,270.563	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	117.008	
C5257	2.0	N116mArray-3A	8.895	NR2	149,911.859	571,273.375		PNNL-GPS xyz from Brad Fritz, 9/1/06	116.600	
C5258	3.3	N116mArray-4A	8.907	NR2	149,925.234	571,292.500		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C4585	0.8	NS-2A-23cm	8.910	NR2	149,925.438	571,292.325	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	116.988	
C4586	2.9	NS-2A-87cm	8.910	NR2	149,925.438	571,292.325	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	116.970	
C4587	5.5	NS-2A-168cm	8.910	NR2	149,925.438	571,292.325	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	116.925	
C5245	3.3	NVP1-1	8.918	NR2	149,935.703	571,317.500		PNNL-GPS xyz from Brad Fritz, 9/1/06	119.000	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C5246	4.1	NVP1-2	8.918	NR2	149,935.703	571,317.500		PNNL-GPS xyz from Brad Fritz, 9/1/06	119.000	
C5247	5.6	NVP1-3	8.918	NR2	149,935.703	571,317.500		PNNL-GPS xyz from Brad Fritz, 9/1/06	119.000	
C4588	0.3	NS-3A-10cm	8.919	NR2	149,941.215	571,310.501	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	116.978	
C4590	2.9	NS-3A-87cm	8.919	NR2	149,941.215	571,310.501	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	116.958	
C4589	5.8	NS-3A-176cm	8.919	NR2	149,941.215	571,310.501	SURV	PNNL-GPS xyz from Brad Fritz, 9/1/06	117.020	
C4892	1.3	NS-3B-40cm	8.921	NR2	149,947.000	571,316.000	EST	PNNL-GPS xyz from Brad Fritz, 9/1/06	115.880	
C4893	1.7	NS-3B-52cm	8.921	NR2	149,947.000	571,316.000	EST	PNNL-GPS xyz from Brad Fritz, 9/1/06	115.880	
C5248	5.7	NVP1-4	8.922	NR2	149,939.094	571,317.438		PNNL-GPS xyz from Brad Fritz, 9/1/06	118.500	
C5250	2.3	NVP2-116.3	8.924	NR2	149,944.563	571,313.313		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5251	3.3	NVP2-116.0	8.924	NR2	149,944.563	571,313.313		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5252	4.3	NVP2-115.7	8.924	NR2	149,944.563	571,313.313		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5253	5.3	NVP2-115.4	8.924	NR2	149,944.563	571,313.313		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5254	6.2	NVP2-115.1	8.924	NR2	149,944.563	571,313.313		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5249	7.2	NVP1-5	8.925	NR2	149,945.875	571,317.375		PNNL-GPS xyz from Brad Fritz, 9/1/06	118.500	
C5259	2.3	N116mArray-6A	8.931	NR2	149,955.734	571,325.438		PNNL-GPS xyz from Brad Fritz, 9/1/06	116.700	
C4640	0.6	NS-4A-17cm	8.932	NR2	149,954.770	571,328.703	SURV	GPS xyz from Brad Fritz, 9/1/06	117.289	
C4641	4.5	NS-4A-138cm	8.932	NR2	149,954.770	571,328.703	SURV	GPS xyz from Brad Fritz, 9/1/06	117.229	
C4894	1.0	NS-4B-31cm	8.933	NR2	149,959.000	571,328.000	EST	GPS xyz from Brad Fritz, 9/1/06		
(none)	5.3	APT5S	8.935	NR2	149,957.200	571,334.100	SURV	PNNL-BradFritz-(file 10/13/06); install est.		
(none)	10.0	APT5	8.935	NR2	149,957.200	571,334.100	SURV	PNNL-BradFritz-(file 10/13/06); install est.		
C5260	3.0	N116mArray-7A	8.950	NR2	149,981.844	571,346.688		PNNL-GPS xyz from Brad Fritz, 9/1/06	116.900	
C5261	3.3	N116mArray-8A	8.983	NR2	150,029.750	571,381.188		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5262		N116mArray-8.5A	9.012	NR2	150,074.547	571,404.563		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.070	
C5263	3.3	N116mArray-9A	9.044	NR2	150,124.984	571,437.813		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.000	
C5264		N116mArray-10A	9.065	NR2	150,158.656	571,452.000		PNNL-GPS xyz from Brad Fritz, 9/1/06		
C5265		N116mArray-11A	9.090	NR2	150,184.453	571,482.063		PNNL-GPS xyz from Brad Fritz, 9/1/06		
C5266		N116mArray-12A	9.118	NR2	150,219.156	571,512.000		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.060	
C5267		N116mArray-13A	9.149	NR2	150,264.016	571,540.688		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.580	
C6323	7.7	C6323	9.161	NR2	150,269.680	571,555.040	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.730	
C6324	14.2	C6324	9.161	NR2	150,268.720	571,554.350	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.700	
C6325	23.4	C6325	9.161	NR2	150,267.910	571,553.390	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.540	
C5268		N116mArray-14A	9.183	NR2	150,311.047	571,573.375		PNNL-GPS xyz from Brad Fritz, 9/1/06	117.600	
C5512	5.5	N116mArray-15A	9.217	NR2	150,390.786	571,631.861		PNNL-GPS xyz from Brad Fritz, 11/16/06	117.650	
C5513	5.4	N116mArray-16A	9.251	NR2	150,491.336	571,674.274		PNNL-GPS xyz from Brad Fritz, 11/16/06	117.686	
C6326	9.9	C6326	9.357	NR2	150,540.300	571,738.800	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.160	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C6327	16.7	C6327	9.357	NR2	150,540.590	571,740.710	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.330	
C6328	24.8	C6328	9.357	NR2	150,541.110	571,741.350	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.270	
C6329	15.6	C6329	9.491	NR2	150,718.710	571,871.470	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.580	
C6330	22.1	C6330	9.491	NR2	150,718.880	571,872.000	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.550	
C6331	28.7	C6331	9.491	NR2	150,720.490	571,872.770	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.490	
C6332	9.8	C6332	9.670	NR2	150,949.080	572,045.850	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.410	
C6333	17.1	C6333	9.670	NR2	150,948.240	572,045.340	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.320	
C6334	24.7	C6334	9.670	NR2	150,949.920	572,046.290	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.280	
B8515	15.0	DD-50-1	9.800	HR3D	151,121.164	572,172.189	SURV	ERC-GPS ID#1034 (Sep 1996)	119.454	
B8516	20.0	DD-50-2	9.800	HR3D	151,121.569	572,172.633	SURV	ERC-GPS ID#1035 (Sep 1996)	119.478	
B8517	24.7	DD-50-3	9.800	HR3D	151,120.007	572,172.166	SURV	ERC-GPS ID#1033 (Sep 1996)	119.472	
B8518	31.0	DD-50-4	9.800	HR3D	151,121.180	572,173.030	SURV	ERC-GPS ID#1036 (Sep 1996)	119.514	
B8511	12.0	DD-49-1	9.830	HR3D	151,161.553	572,213.696	SURV	ERC-GPS ID#1030 (Sep 1996)	119.627	
B8512	15.8	DD-49-2	9.830	HR3D	151,162.781	572,213.968	SURV	ERC-GPS ID#1031 (Sep 1996)	119.492	
B8513	25.0	DD-49-3	9.830	HR3D	151,163.304	572,210.802	SURV	ERC-GPS ID#1028 (Sep 1996)	118.557	
B8513a	25.0	DD-49-3a	9.830	HR3D					118.557	EST
B8514	31.0	DD-49-4	9.830	HR3D	151,163.981	572,211.150	SURV	ERC-GPS ID#1029 (Sep 1996)	118.487	
C6266	9.6	C6266	9.890	HR3D	151,241.630	572,269.900	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.680	
C6267	12.7	C6267	9.890	HR3D	151,242.230	572,270.420	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.630	
C6268	21.7	C6268	9.890	HR3D	151,246.190	572,274.210	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.620	
C6269	8.0	C6269	9.952	HR3D	151,323.200	572,335.820	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.430	
C6270	12.8	C6270	9.952	HR3D	151,324.520	572,337.130	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.620	
C6271	18.3	C6271	9.952	HR3D	151,317.570	572,332.300	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.470	
B8509	12.0	DD-44-3	10.010	HR3D	151,394.279	572,412.676	SURV	ERC-GPS ID#1022 (Sep 1996)	118.199	
B8510	18.0	DD-44-4	10.010	HR3D	151,396.947	572,411.362	SURV	ERC-GPS ID#1021 (Sep 1996)	117.645	
B8507	10.0	DD-43-2	10.050	HR3D	151,443.222	572,450.906	SURV	ERC-GPS ID#1018 (Sep 1996)	117.536	
B8508	13.9	DD-43-3	10.050	HR3D	151,443.236	572,450.504	SURV	ERC-GPS ID#1019 (Sep 1996)	117.521	
B8504	10.2	DD-42-2	10.090	HR3D	151,492.564	572,485.766	SURV	ERC-GPS ID#1013 (Sep 1996)	117.919	
B8505	15.2	DD-42-3	10.090	HR3D	151,492.480	572,486.189	SURV	ERC-GPS ID#1014 (Sep 1996)	117.939	
B8506	18.2	DD-42-4	10.090	HR3D	151,492.503	572,485.319	SURV	ERC-GPS ID#1015 (Sep 1996)	117.973	
B8503	8.1	DD-41-1	10.124	HR3D	151,530.892	572,532.894	SURV	Unknown	117.689	
B8483	13.6	DD-41-2	10.124	HR3D	151,530.738	572,532.688	SURV	ERC-GPS ID#1009 (Sep 1996)	117.684	
B8484	18.6	DD-41-3	10.124	HR3D	151,530.033	572,532.209	SURV	ERC-GPS ID#1011 (Sep 1996)	117.646	
C3383	3.0	Redox-4-3.0	10.125	HR3D	151,540.006	572,529.706	SURV	PNNL-E. Arntzen (1999-2000)	116.600	EST
C3515	6.0	Redox-4-6.0	10.125	HR3D	151,540.006	572,529.706	SURV	PNNL-E. Arntzen (1999-2000)	116.600	EST

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C3384	3.3	Redox-3-3.3	10.180	HR3D	151,603.027	572,583.206	SURV	PNNL-E. Arntzen (1999-2000)	116.900	EST
C3514	4.6	Redox-3-4.6	10.180	HR3D	151,603.027	572,583.206	SURV	PNNL-E. Arntzen (1999-2000)	116.900	EST
B8479	5.5	DD-39-1	10.210	HR3D	151,625.856	572,606.547	SURV	ERC-GPS ID#1005 (Sep 1996)	117.913	
B8480	10.5	DD-39-2	10.210	HR3D	151,626.189	572,606.894	SURV	ERC-GPS ID#1006 (Sep 1996)	117.940	
B8481	15.0	DD-39-3	10.210	HR3D	151,626.197	572,606.548	SURV	ERC-GPS ID#1007 (Sep 1996)	117.883	
B8482	21.0	DD-39-4	10.210	HR3D	151,625.527	572,606.888	SURV	ERC-GPS ID#1004 (Sep 1996)	118.012	
C3385	3.0	Redox-2-3.0	10.240	HR3D	151,687.803	572,636.662	SURV	PNNL-E. Arntzen (1999-2000)	117.000	EST
C3513	6.0	Redox-2-6.0	10.240	HR3D	151,687.803	572,636.662	SURV	PNNL-E. Arntzen (1999-2000)	117.000	EST
C3382	3.3	Redox-1-3.3	10.295	HR3D	151,730.810	572,716.336	SURV	PNNL-E. Arntzen (1999-2000)	117.000	EST
C3512	6.0	Redox-1-6.0	10.295	HR3D	151,730.810	572,716.336	SURV	PNNL-E. Arntzen (1999-2000)	117.000	EST
C4307	7.0	AT-D-1-S	10.420	HR3D	151,850.983	572,861.059	SURV	GPS ID1579 FHI-TimJohnson-March04	118.536	
C4306	10.8	AT-D-1-M	10.420	HR3D	151,852.065	572,860.651	SURV	GPS ID1580 FHI-TimJohnson-March04	118.286	
C4305	13.3	AT-D-1-D	10.420	HR3D	151,850.404	572,861.512	SURV	GPS ID1578 FHI-TimJohnson-March04	118.662	
C6272	9.7	C6272	10.479	HR3D	151,926.860	572,920.420	SURV	AST Survey Data 1995-2008-MH-07509.xls	118.710	
B8255	8.0	35-S	10.480	HR3D	151,929.120	572,917.880	SURV	PNNL-field recon (10/01/03)	118.600	EST
B8254	14.0	35-M	10.480	HR3D	151,929.120	572,917.880	SURV	PNNL-field recon (10/01/03)	118.600	EST
B8253	21.0	35-D	10.480	HR3D	151,929.120	572,917.880	SURV	PNNL-field recon (10/01/03)	118.600	EST
C4314	12.4	AT-D-4-S	10.580	HR3D	152,039.864	572,993.254	SURV	GPS ID3009 FHI-TimJohnson-March04	118.878	
C4315	13.8	AT-D-4-M	10.580	HR3D	152,040.484	572,993.148	SURV	GPS ID3010 FHI-TimJohnson-March04	118.718	
C4316	15.7	AT-D-4-D	10.580	HR3D	152,039.564	572,992.239	SURV	GPS ID3008 FHI-TimJohnson-March04	118.718	
C4310	14.3	AT-D-2-S	10.660	HR3D	152,129.777	573,108.251	SURV	GPS ID3007 FHI-TimJohnson-March04	118.738	
C4309	16.3	AT-D-2-M	10.660	HR3D	152,130.073	573,105.575	SURV	GPS ID3005 FHI-TimJohnson-March04	118.358	
C4308	26.5	AT-D-2-D	10.660	HR3D	152,130.318	573,105.776	SURV	GPS ID3006 FHI-TimJohnson-March04	118.358	
B8258	8.0	36-S	10.665	HR3D	152,146.430	573,120.650	SURV	PNNL-field recon (10/01/03)	118.700	EST
B8257	14.0	36-M	10.665	HR3D	152,146.430	573,120.650	SURV	PNNL-field recon (10/01/03)	118.700	EST
B8256	21.0	36-D	10.665	HR3D	152,146.430	573,120.650	SURV	PNNL-field recon (10/01/03)	118.700	EST
C4313	7.3	AT-D-3-S	10.750	HR3D	152,224.602	573,233.717	SURV	GPS ID3003 FHI-TimJohnson-March04	118.654	
C4312	8.8	AT-D-3-M	10.750	HR3D	152,224.974	573,234.706	SURV	GPS ID3004 FHI-TimJohnson-March04	118.652	
C4311	11.8	AT-D-3-D	10.750	HR3D	152,224.319	573,233.231	SURV	GPS ID3002 FHI-TimJohnson-March04	118.681	
B8261	6.5	37-S	10.825	HR3D	152,287.340	573,335.960	SURV	PNNL-field recon (10/01/03)	118.000	EST
B8260	13.5	37-M	10.825	HR3D	152,287.340	573,335.960	SURV	PNNL-field recon (10/01/03)	118.000	EST
B8259	19.5	37-D	10.825	HR3D	152,287.340	573,335.960	SURV	PNNL-field recon (10/01/03)	118.000	EST
C6275	10.4	C6275	10.832	HR3D	152,284.930	573,337.490	SURV	AST Survey Data 1995-2008-MH-07509.xls	117.930	
B8263	10.0	38-M	10.920	HR3D	152,368.720	573,471.850	SURV	PNNL-field recon (10/01/03)	118.000	EST
B8262	16.5	38-D	10.920	HR3D	152,368.720	573,471.850	SURV	PNNL-field recon (10/01/03)	118.000	EST

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8477	10.5	DD-17-2	11.030	HR3D	152,482.772	573,597.984	SURV	ERC-GPS ID#1042 (Sep 1996)	117.390	
B8478	15.0	DD-17-3	11.030	HR3D	152,483.304	573,597.162	SURV	ERC-GPS ID#1041 (Sep 1996)	117.313	
C6278	9.7	C6278	11.041	HR3D	152,429.805	573,532.396	SURV	Garmin V by Rich Mahood		
B8475	17.5	DD-16-3	11.060	HR3D	152,516.128	573,650.431	SURV	ERC-GPS ID#1045 (Sep 1996)	120.013	
B8476	25.5	DD-16-4	11.060	HR3D	152,516.993	573,651.165	SURV	ERC-GPS ID#1046 (Sep 1996)	119.965	
B8472	15.0	DD-15-2	11.100	HR3D	152,547.828	573,700.609	SURV	ERC-GPS ID#1049 (Sep 1996)	119.316	
B8473	21.0	DD-15-3	11.100	HR3D	152,547.828	573,700.609	SURV	ERC-GPS ID#1048 (Sep 1996)	119.365	
B8474	25.5	DD-15-4	11.100	HR3D	152,547.828	573,700.609	SURV	ERC-GPS ID#1050 (Sep 1996)	119.289	
B8469	10.0	DD-12-2	11.200	HR3D	152,683.584	573,819.657	SURV	ERC-GPS ID#1056 (Sep 1996)	117.030	
B8470	15.0	DD-12-3	11.200	HR3D	152,683.696	573,818.681	SURV	ERC-GPS ID#1057 (Sep 1996)	116.933	
B8471	21.0	DD-12-4	11.200	HR3D	152,683.591	573,820.559	SURV	ERC-GPS ID#1058 (Sep 1996)	117.154	
B8819	12.0	DD-10-2	11.270	HR3D	152,788.072	573,899.056	SURV	ERC-GPS ID#1059 (Sep 1996)	117.287	
B8820	17.0	DD-10-3	11.270	HR3D	152,788.072	573,899.056	SURV	ERC-GPS ID#1059 (Sep 1996)	117.287	
B8468	22.0	DD-10-4	11.270	HR3D	152,788.072	573,899.056	SURV	ERC-GPS ID#1059 (Sep 1996)	117.287	
C4318	6.8	AT-D-5-M	11.310	HR3D	152,848.206	573,934.672	SURV	GPS ID1582 FHI-TimJohnson-March04	118.361	
C4317	8.8	AT-D-5-D	11.310	HR3D	152,850.597	573,934.803	SURV	GPS ID1581 FHI-TimJohnson-March04	118.357	
B8821	11.2	DD-08-2	11.340	HR3D	152,903.527	573,940.057	EST	ERC-Project planning; L. Peterson (1997)	118.000	EST
B8466	17.2	DD-08-3	11.340	HR3D	152,903.527	573,940.057	SURV	ERC-GPS ID#3039 (Sep 1996)	118.000	EST
B8467	22.3	DD-08-4	11.340	HR3D	152,903.527	573,940.057	EST	ERC-Project planning; L. Peterson (1997)	118.000	EST
B8464	12.0	DD-06-2	11.400	HR3D	153,015.374	573,964.576	SURV	ERC-GPS ID#1061 (Sep 1996)	117.578	
B8465	16.0	DD-06-3	11.400	HR3D	153,015.374	573,964.576	SURV	ERC-GPS ID#1061 (Sep 1996)	117.578	
C6281	7.9	C6281	11.564	HR3D	153,353.310	574,056.820	SURV	AST Survey Data 1995-2008-MH-07509.xls	116.700	
C6282	15.6	C6282	11.564	HR3D	153,353.600	574,057.530	SURV	AST Survey Data 1995-2008-MH-07509.xls	116.770	
B8267	8.0	39-S	11.620	HR3D	153,393.000	574,035.000	EST	ERC-Project planning; L. Peterson (1997)	117.000	EST
B8266	18.0	39-M	11.620	HR3D	153,393.000	574,035.000	EST	ERC-Project planning; L. Peterson (1997)	117.000	EST
B8265	28.0	39-D	11.620	HR3D	153,393.000	574,035.000	EST	ERC-Project planning; L. Peterson (1997)	117.000	EST
B8270	8.0	40-S	11.980	HR3D	153,997.000	574,238.000	EST	ERC-Project planning; L. Peterson (1997)	116.800	EST
B8269	15.5	40-M	11.980	HR3D	153,997.000	574,238.000	EST	ERC-Project planning; L. Peterson (1997)	116.800	EST
B8273	10.0	41-S	13.100	HR3D	154,424.185	575,515.614	SURV	ERC-GPS ID#34 (Nov/Dec 1997)	116.526	
B8272	15.0	41-M	13.100	HR3D	154,423.723	575,511.260	SURV	ERC-GPS ID#32 (Nov/Dec 1997)	116.509	
B8271	25.0	41-D	13.100	HR3D	154,424.668	575,512.511	SURV	ERC-GPS ID#33 (Nov/Dec 1997)	116.299	
C6284	9.7	C6284	13.450	HR3D	154,363.630	576,042.290	SURV	AST Survey Data 1995-2008-MH-07509.xls	116.050	
C6285	14.6	C6285	13.450	HR3D	154,364.310	576,039.240	SURV	AST Survey Data 1995-2008-MH-07509.xls	116.130	
C6286	34.0	C6286	13.450	HR3D	154,364.500	576,037.530	SURV	AST Survey Data 1995-2008-MH-07509.xls	116.140	
B8276	10.0	42-S	13.550	HR3D	154,320.154	576,165.935	SURV	ERC-GPS ID#37 (Nov/Dec 1997)	116.376	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8275	15.0	42-M	13.550	HR3D	154,320.454	576,166.225	SURV	ERC-GPS ID#36 (Nov/Dec 1997)	116.339	
B8274	24.0	42-D	13.550	HR3D	154,320.018	576,167.589	SURV	ERC-GPS ID#35 (Nov/Dec 1997)	116.273	
C5632	7.3	C5632	13.722	HR3H	154,227.690	576,389.250	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.620	
C5633	17.5	C5633	13.722	HR3H	154,227.980	576,390.600	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.520	
C5634	31.0	C5634	13.722	HR3H	154,228.900	576,391.430	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.320	
C5635	7.0	C5635	13.791	HR3H	154,181.120	576,478.810	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.420	
C5637	12.4	C5637	13.791	HR3H	154,178.300	576,483.670	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.380	
C5636	15.6	C5636	13.791	HR3H	154,179.430	576,481.400	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.380	
C5638	5.7	C5638	13.920	HR3H	154,070.380	576,634.080	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.170	
B8278	7.5	43-M	14.040	HR3H	153,963.570	576,782.564	SURV	ERC-GPS ID#38 (Nov/Dec 1997)	116.411	
B8277	9.7	43-D	14.040	HR3H	153,965.240	576,779.961	SURV	ERC-GPS ID#39 (Nov/Dec 1997)	116.452	
C6287	6.5	C6287	14.054	HR3H	153,965.550	576,781.620	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.880	
C6288	7.8	C6288	14.054	HR3H	153,964.050	576,783.380	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.980	
C5641	4.7	C5641	14.129	HR3H	153,916.620	576,871.560	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.100	
C5644	6.4	C5644	14.194	HR3H	153,869.320	576,960.870	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.820	
B8281	8.5	44-M	14.260	HR3H	153,810.532	577,033.113	SURV	ERC-GPS ID#40 (Nov/Dec 1997)	116.085	
B8280	12.7	44-D	14.260	HR3H	153,811.744	577,031.509	SURV	ERC-GPS ID#41 (Nov/Dec 1997)	116.114	
C5673	5.2	C5673	14.365	HR3H	153,736.670	577,157.450	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.760	
C5674	8.1	C5674	14.365	HR3H	153,733.425	577,156.226	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.760	
B8521		DH-1451-1	14.390	HR3H	153,704.528	577,182.865	SURV	ERC-GPS ID#2039 (Sep 1996)	115.982	
B8522		DH-1452-1	14.450	HR3H	153,661.681	577,255.023	SURV	ERC-GPS ID#2036 (Sep 1996)	116.227	
C5676	5.4	C5676	14.465	HR3H	153,656.070	577,276.260	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.300	
C5677	7.9	C5677	14.465	HR3H	153,657.180	577,277.330	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.850	
C5678	8.0	C5678	14.465	HR3H	153,653.500	577,278.650	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.370	
C5679	4.0	C5679	14.548	HR3H	153,593.400	577,409.700	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.970	
C5680	11.9	C5680	14.548	HR3H	153,593.790	577,408.400	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.070	
C5681	13.2	C5681	14.548	HR3H	153,594.580	577,407.430	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.900	
B8285	8.0	45-S	14.660	HR3H	153,494.837	577,600.791	SURV	PNNL-GPS (submeter) 3/17/04	116.000	EST
B8284	15.0	45-M	14.660	HR3H	153,494.837	577,600.791	SURV	PNNL-GPS (submeter) 3/17/04	116.000	EST
B8283	23.0	45-D	14.660	HR3H	153,494.837	577,600.791	SURV	PNNL-GPS (submeter) 3/17/04	116.000	EST
C5682	8.9	C5682	14.836	HR3H	153,338.710	577,699.790	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.340	
B8519	32.0	DH-14-1	14.870	HR3H	153,374.820	577,787.186	SURV	ERC-GPS ID#2032 (Sep 1996)	115.760	
B8520		DH-14-11	14.870	HR3H	153,377.955	577,788.415	SURV	ERC-GPS ID#2031 (Sep 1996)	115.031	
C6290	8.6	C6290	14.919	HR3H	153,266.010	577,793.470	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.020	
C6291	13.0	C6291	14.919	HR3H	153,267.000	577,792.390	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.040	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8286	10.5	46-D	15.120	HR3H	152,999.261	578,031.495	SURV	ERC-GPS ID#42 (Nov/Dec 1997)	115.347	
C6293	7.9	C6293	15.129	HR3H	152,996.700	578,035.060	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.080	
C4321	6.2	AT-H-1-S	15.160	HR3H	152,957.484	578,070.238	SURV	GPS ID1587 FHI-TimJohnson-March04	115.233	
C4320	11.0	AT-H-1-M	15.160	HR3H	152,955.059	578,068.733	SURV	GPS ID1588 FHI-TimJohnson-March04	115.542	
C4319	12.8	AT-H-1-D	15.160	HR3H	152,954.335	578,069.144	SURV	GPS ID1589 FHI-TimJohnson-March04	115.529	
C4324	5.3	AT-H-2-S	15.200	HR3H	152,895.191	578,110.719	SURV	GPS ID1591 FHI-TimJohnson-March04	115.470	
C4323	9.2	AT-H-2-M	15.200	HR3H	152,893.943	578,111.797	SURV	GPS ID1592 FHI-TimJohnson-March04	115.450	
C4322	12.0	AT-H-2-D	15.200	HR3H	152,896.440	578,109.838	SURV	GPS ID1590 FHI-TimJohnson-March04	115.442	
C4326	5.3	AT-H-3-S	15.230	HR3H	152,848.945	578,141.784	SURV	GPS ID1594 FHI-TimJohnson-March04	115.428	
C4325	7.3	AT-H-3-D	15.230	HR3H	152,853.072	578,142.216	SURV	GPS ID1593 FHI-TimJohnson-March04	115.309	
B8290	8.0	47-M	15.300	HR3H	152,743.533	578,193.919	SURV	ERC-GPS ID#22 (Nov/Dec 1997)	115.765	
B8289	14.5	47-D	15.300	HR3H	152,744.421	578,193.394	SURV	ERC-GPS ID#21 (Nov/Dec 1997)	115.856	
C6296	8.0	C6296	15.411	HR3H	152,574.800	578,314.840	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.130	
C6297	13.1	C6297	15.411	HR3H	152,575.130	578,313.220	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.160	
B8523	4.0	DH-22-1	15.500	HR3H	152,468.304	578,460.331	SURV	ERC-GPS ID#2000 (Sep 1996)	114.224	
B8524	8.0	DH-22-2	15.500	HR3H	152,468.304	578,460.331	SURV	ERC-GPS ID#2000 (Sep 1996)	114.224	
B8525	13.5	DH-22-3	15.500	HR3H	152,468.304	578,460.331	SURV	ERC-GPS ID#2000 (Sep 1996)	114.224	
B8294	9.0	48-S	15.520	HR3H	152,420.795	578,465.520	SURV	ERC-GPS ID#24 (Nov/Dec 1997)	116.348	
B8293	17.0	48-M	15.520	HR3H	152,420.795	578,465.520	SURV	ERC-GPS ID#24 (Nov/Dec 1997)	116.348	
B8292	25.0	48-D	15.520	HR3H	152,420.795	578,465.520	SURV	ERC-GPS ID#24 (Nov/Dec 1997)	116.348	
C6299	8.1	C6299	15.618	HR3H	152,323.620	578,585.360	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.150	
C6300	12.6	C6300	15.618	HR3H	152,324.650	578,585.170	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.030	
C6301	17.3	C6301	15.618	HR3H	152,323.270	578,583.540	SURV	AST Survey Data 1995-2008-MH-07509.xls	115.350	
B8297	8.5	49-S	15.680	HR3H	152,232.848	578,699.729	SURV	ERC-GPS ID#26 (Nov/Dec 1997)	115.985	
B8296	17.5	49-M	15.680	HR3H	152,232.848	578,699.729	SURV	ERC-GPS ID#26 (Nov/Dec 1997)	115.985	
B8295	25.5	49-D	15.680	HR3H	152,232.848	578,699.729	SURV	ERC-GPS ID#26 (Nov/Dec 1997)	115.985	
B8300	8.5	50-S	15.710	HR3H	152,118.154	578,611.792	SURV	ERC-GPS ID#27 (Nov/Dec 1997)	117.184	
B8299	17.5	50-M	15.710	HR3H	152,118.154	578,611.792	SURV	ERC-GPS ID#27 (Nov/Dec 1997)	117.184	
B8298	26.5	50-D	15.710	HR3H	152,118.154	578,611.792	SURV	ERC-GPS ID#45 (Nov/Dec 1997)	117.184	
B8303	9.5	51-S	15.890	HR3H	151,843.755	578,779.254	SURV	ERC-GPS ID#46 (Nov/Dec 1997)	116.760	
B8302	17.5	51-M	15.890	HR3H	151,843.755	578,779.254	SURV	ERC-GPS ID#46 (Nov/Dec 1997)	116.760	
B8301	25.5	51-D	15.890	HR3H	151,843.755	578,779.254	SURV	ERC-GPS ID#46 (Nov/Dec 1997)	116.760	
B8306	7.0	52-S	16.100	HR3H	151,586.176	578,919.484	SURV	ERC-GPS ID#47 (Nov/Dec 1997)	115.996	
B8305	15.0	52-M	16.100	HR3H	151,586.176	578,919.484	SURV	ERC-GPS ID#47 (Nov/Dec 1997)	115.996	
B8304	24.0	52-D	16.100	HR3H	151,586.176	578,919.484	SURV	ERC-GPS ID#47 (Nov/Dec 1997)	115.996	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8309	8.0	53-S	16.370	HR3H	151,531.727	579,510.574	SURV	ERC-GPS ID#49 (Nov/Dec 1997)	115.334	
B8308	17.0	53-M	16.370	HR3H	151,531.727	579,510.574	SURV	ERC-GPS ID#48 (Nov/Dec 1997)	115.334	
B8307	26.0	53-D	16.370	HR3H	151,531.413	579,510.188	SURV	ERC-GPS ID#49 (Nov/Dec 1997)	115.356	
B8312	7.5	54-S	16.400	HR3H	151,231.944	579,033.518	SURV	ERC-GPS ID#50 (Nov/Dec 1997)	116.000	
B8311	17.0	54-M	16.400	HR3H	151,231.944	579,033.518	SURV	ERC-GPS ID#50 (Nov/Dec 1997)	116.000	
B8310	26.0	54-D	16.400	HR3H	151,231.944	579,033.518	SURV	ERC-GPS ID#50 (Nov/Dec 1997)	116.000	
B8315	10.0	55-S	16.670	HR3H	150,891.146	579,134.582	SURV	ERC-GPS ID#79 (Nov/Dec 1997)	115.295	
B8314	18.0	55-M	16.670	HR3H	150,891.146	579,134.582	SURV	ERC-GPS ID#79 (Nov/Dec 1997)	115.295	
B8313	26.0	55-D	16.670	HR3H	150,891.368	579,135.286	SURV	ERC-GPS ID#78 (Nov/Dec 1997)	115.251	
B8321	7.0	57-S	17.100	HR3H	150,525.000	580,101.000	EST	ERC-Project planning; L. Peterson (1997)	115.000	EST
B8320	18.0	57-M	17.100	HR3H	150,525.000	580,101.000	EST	ERC-Project planning; L. Peterson (1997)	115.000	EST
B8319	29.0	57-D	17.100	HR3H	150,525.000	580,101.000	EST	ERC-Project planning; L. Peterson (1997)	115.000	EST
B8324	11.0	58-S	17.160	HR3H	150,232.255	579,310.627	SURV	ERC-GPS ID#51 (Nov/Dec 1997)	114.929	
B8323	19.5	58-M	17.160	HR3H	150,230.317	579,311.429	SURV	ERC-GPS ID#80 (Nov/Dec 1997)	114.880	
B8322	26.5	58-D	17.160	HR3H	150,233.170	579,310.118	SURV	ERC-GPS ID#52 (Nov/Dec 1997)	114.858	
B8327	11.0	59-S	17.380	HR3H	149,928.523	579,420.404	SURV	ERC-GPS ID#83 (Nov/Dec 1997)	114.857	
B8326	16.5	59-M	17.380	HR3H	149,930.907	579,420.300	SURV	ERC-GPS ID#82 (Nov/Dec 1997)	114.860	
B8325	23.0	59-D	17.380	HR3H	149,930.079	579,420.305	SURV	ERC-GPS ID#81 (Nov/Dec 1997)	114.963	
B8330	8.5	60-S	17.740	HR3H	149,392.000	579,638.000	EST	ERC-Project planning; L. Peterson (1997)	115.000	EST
B8329	17.5	60-M	17.740	HR3H	149,392.000	579,638.000	EST	ERC-Project planning; L. Peterson (1997)	115.000	EST
B8328	26.5	60-D	17.740	HR3H	149,392.000	579,638.000	EST	ERC-Project planning; L. Peterson (1997)	115.000	EST
B8333	8.5	61-S	18.100	FR3	148,950.427	580,000.071	SURV	ERC-GPS ID#86 (Nov/Dec 1997)	115.079	
B8332	15.5	61-M	18.100	FR3	148,949.889	580,001.323	SURV	ERC-GPS ID#85 (Nov/Dec 1997)	115.017	
B8331	24.0	61-D	18.100	FR3	148,949.718	580,002.501	SURV	ERC-GPS ID#84 (Nov/Dec 1997)	115.001	
B8336	8.0	62-S	18.400	FR3	148,585.876	580,388.292	SURV	ERC-GPS ID#53 (Nov/Dec 1997)	115.092	
B8335	18.0	62-M	18.400	FR3	148,586.349	580,387.648	SURV	ERC-GPS ID#54 (Nov/Dec 1997)	115.246	
B8334	28.0	62-D	18.400	FR3	148,585.095	580,389.375	SURV	ERC-GPS ID#19 (Nov/Dec 1997)	115.395	
B8339	10.0	63-S	18.810	FR3	148,174.193	580,945.002	SURV	ERC-GPS ID#16 (Nov/Dec 1997)	115.055	
B8338	16.0	63-M	18.810	FR3	148,174.517	580,944.736	SURV	ERC-GPS ID#17 (Nov/Dec 1997)	115.122	
B8337	23.0	63-D	18.810	FR3	148,175.400	580,943.236	SURV	ERC-GPS ID#18 (Nov/Dec 1997)	115.077	
C6302	8.5	C6302	18.815	FR3	148,180.160	580,940.000	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.850	
C6303	13.3	C6303	18.815	FR3	148,180.040	580,942.300	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.500	
B8342	7.5	64-S	18.940	FR3	148,037.975	581,118.756	SURV	ERC-GPS ID#15 (Nov/Dec 1997)	115.386	
B8341	17.0	64-M	18.940	FR3	148,037.975	581,118.756	SURV	PNNL Recon, Trimble sub-meter; 4/7/04	115.386	EST
B8340	27.0	64-D	18.940	FR3	148,037.975	581,118.756	SURV	PNNL Recon, Trimble sub-meter; 4/7/04	115.386	EST

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C6305	8.7	C6305	19.049	FR3	147,922.660	581,252.270	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.790	
C6306	14.3	C6306	19.049	FR3	147,924.000	581,251.350	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.760	
C6307	16.4	C6307	19.049	FR3	147,926.320	581,250.540	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.590	
B8345	8.5	65-S	19.100	FR3	147,864.503	581,297.412	SURV	ERC-GPS ID#13 (Nov/Dec 1997)	115.367	
B8344	16.0	65-M	19.100	FR3	147,866.273	581,295.747	SURV	ERC-GPS ID#13 (Nov/Dec 1997)	115.502	
B8343	27.0	65-D	19.100	FR3	147,866.273	581,295.747	SURV	ERC-GPS ID#14 (Nov/Dec 1997)	115.502	
C6308	9.4	C6308	19.105	FR3	147,871.210	581,296.370	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.810	
C6309	16.2	C6309	19.105	FR3	147,874.110	581,294.050	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.810	
C6311	9.7	C6311	19.141	FR3	147,821.260	581,332.970	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.770	
C6312	15.9	C6312	19.141	FR3	147,823.560	581,331.180	SURV	AST Survey Data 1995-2008-MH-07509.xls	113.710	
C6314	11.6	C6314	19.179	FR3	147,760.530	581,354.660	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.580	
C6315	18.4	C6315	19.179	FR3	147,761.410	581,354.490	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.610	
C6316	27.3	C6316	19.179	FR3	147,759.410	581,354.760	SURV	AST Survey Data 1995-2008-MH-07509.xls	114.650	
C4391	10.3	AT-F-1-S	19.220	FR3	147,707.333	581,378.715	SURV	GPS ID1630 FHI-TimJohnson-March04	114.798	
C4390	18.1	AT-F-1-M	19.220	FR3	147,708.405	581,378.347	SURV	GPS ID1631 FHI-TimJohnson-March04	114.738	
C4389	26.1	AT-F-1-D	19.220	FR3	147,709.395	581,377.937	SURV	GPS ID1632 FHI-TimJohnson-March04	114.734	
B8348	10.0	66-S	19.370	FR3	147,541.818	581,475.927	SURV	ERC-GPS ID#12 (Nov/Dec 1997)	114.421	
B8347	19.2	66-M	19.370	FR3	147,541.818	581,475.927	SURV	ERC-GPS ID#12 (Nov/Dec 1997)	114.421	
B8346	28.1	66-D	19.370	FR3	147,541.818	581,475.927	SURV	ERC-GPS ID#12 (Nov/Dec 1997)	114.421	
B8351	10.0	67-S	19.580	FR3	147,291.431	581,616.352	SURV	ERC-GPS ID#11 (Nov/Dec 1997)	114.902	
B8350	20.0	67-M	19.580	FR3	147,291.431	581,616.352	SURV	ERC-GPS ID#11 (Nov/Dec 1997)	114.902	
B8349	30.0	67-D	19.580	FR3	147,291.431	581,616.352	SURV	ERC-GPS ID#11 (Nov/Dec 1997)	114.902	
B8354	10.5	68-S	19.760	FR3	147,085.176	581,758.431	SURV	ERC-GPS ID#10 (Nov/Dec 1997)	115.459	
B8353	18.3	68-M	19.760	FR3	147,085.176	581,758.431	SURV	ERC-GPS ID#10 (Nov/Dec 1997)	115.459	
B8352	25.0	68-D	19.760	FR3	147,085.176	581,758.431	SURV	ERC-GPS ID#10 (Nov/Dec 1997)	115.459	
B8356	15.0	69-M	19.800	FR3	147,168.000	582,017.000	EST	ERC-Project planning; L. Peterson (1997)	116.000	EST
B8355	31.0	69-D	19.800	FR3	147,168.000	582,017.000	EST	ERC-Project planning; L. Peterson (1997)	116.000	EST
B8360	17.0	70-S	19.950	FR3	146,843.106	581,902.543	SURV	ERC-GPS ID#55 (Nov/Dec 1997)	116.720	
B8359	24.0	70-M	19.950	FR3	146,843.106	581,902.543	SURV	ERC-GPS ID#55 (Nov/Dec 1997)	116.720	
B8358	31.0	70-D	19.950	FR3	146,843.106	581,902.543	SURV	ERC-GPS ID#55 (Nov/Dec 1997)	116.720	
C4394	7.5	AT-F-2-S	20.110	FR3	146,621.604	581,956.970	SURV	GPS ID1628 FHI-TimJohnson-March04	112.703	
C4393	13.6	AT-F-2-M	20.110	FR3	146,619.127	581,957.953	SURV	GPS ID1629 FHI-TimJohnson-March04	112.633	
C4392	19.3	AT-F-2-D	20.110	FR3	146,622.707	581,956.315	SURV	GPS ID1627 FHI-TimJohnson-March04	112.607	
B8361	7.5	71-D	20.260	FR3	146,480.300	582,009.900	SURV	PNNL Recon, Trimble sub-meter; 4/7/04	112.700	EST
C4385	6.0	AT-F-3-S	20.420	FR3	146,285.494	582,089.124	SURV	GPS ID1625 FHI-TimJohnson-March04	112.628	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C4384	10.8	AT-F-3-M	20.420	FR3	146,286.839	582,088.405	SURV	GPS ID1626 FHI-TimJohnson-March04	112.667	
C4383	14.1	AT-F-3-D	20.420	FR3	146,284.025	582,089.480	SURV	GPS ID1624 FHI-TimJohnson-March04	112.696	
B8366	9.5	72-S	20.670	FR3	146,067.007	582,223.666	SURV	ERC-GPS ID#58 (Nov/Dec 1997)	112.400	EST
B8365	18.0	72-M	20.670	FR3	146,067.252	582,224.292	SURV	ERC-GPS ID#57 (Nov/Dec 1997)	112.400	EST
B8364	28.0	72-D	20.670	FR3	146,066.634	582,224.473	SURV	ERC-GPS ID#56 (Nov/Dec 1997)	112.400	EST
B8369	10.5	73-S	20.810	FR3	145,989.728	582,424.818	SURV	ERC-GPS ID#61 (Nov/Dec 1997)	112.200	EST
B8368	19.0	73-M	20.810	FR3	145,989.251	582,424.473	SURV	ERC-GPS ID#60 (Nov/Dec 1997)	112.200	EST
B8367	27.0	73-D	20.810	FR3	145,988.225	582,424.378	SURV	ERC-GPS ID#59 (Nov/Dec 1997)	112.200	EST
C4388	7.2	AT-F-4-S	21.000	FR3	145,787.132	582,491.278	SURV	GPS ID1623 FHI-TimJohnson-March04	112.106	
C4387	18.0	AT-F-4-M	21.000	FR3	145,787.683	582,491.931	SURV	GPS ID1622 FHI-TimJohnson-March04	112.118	
C4386	32.3	AT-F-4-D	21.000	FR3	145,788.865	582,492.808	SURV	GPS ID1621 FHI-TimJohnson-March04	112.130	
B8372	11.0	74-S	21.160	FR3	145,609.940	582,599.498	SURV	ERC-GPS ID#64 (Nov/Dec 1997)	112.200	EST
B8371	17.0	74-M	21.160	FR3	145,609.471	582,599.881	SURV	ERC-GPS ID#63 (Nov/Dec 1997)	112.200	EST
B8370	29.0	74-D	21.160	FR3	145,608.435	582,600.480	SURV	ERC-GPS ID#62 (Nov/Dec 1997)	112.200	EST
B8375	11.0	75-S	21.490	FR3	145,287.068	582,790.915	SURV	ERC-GPS ID#67 (Nov/Dec 1997)	111.700	EST
B8374	19.0	75-M	21.490	FR3	145,285.862	582,792.893	SURV	ERC-GPS ID#66 (Nov/Dec 1997)	111.700	EST
B8373	27.0	75-D	21.490	FR3	145,283.988	582,793.490	SURV	ERC-GPS ID#65 (Nov/Dec 1997)	111.700	EST
B8378	11.0	76-S	21.680	FR3	145,089.114	582,877.989	SURV	ERC-GPS ID#70 (Nov/Dec 1997)	111.600	EST
B8377	19.0	76-M	21.680	FR3	145,088.849	582,878.733	SURV	ERC-GPS ID#69 (Nov/Dec 1997)	111.600	EST
B8376	25.0	76-D	21.680	FR3	145,087.325	582,878.748	SURV	ERC-GPS ID#68 (Nov/Dec 1997)	111.600	EST
B8381	8.5	77-S	21.860	FR3	144,889.256	582,957.215	SURV	ERC-GPS ID#71 (Nov/Dec 1997)	111.539	
B8380	16.5	77-M	21.860	FR3	144,889.256	582,957.215	SURV	ERC-GPS ID#71 (Nov/Dec 1997)	111.539	
B8379	24.5	77-D	21.860	FR3	144,889.256	582,957.215	SURV	ERC-GPS ID#71 (Nov/Dec 1997)	111.539	
B8384	8.0	78-S	22.300	FR3	144,325.675	583,152.559	SURV	ERC-GPS ID#72 (Nov/Dec 1997)	111.346	
B8383	16.0	78-M	22.300	FR3	144,325.675	583,152.559	SURV	ERC-GPS ID#72 (Nov/Dec 1997)	111.346	
B8382	24.0	78-D	22.300	FR3	144,325.675	583,152.559	SURV	ERC-GPS ID#72 (Nov/Dec 1997)	111.346	
B8390	5.0	80-S	23.100	HTS	143,178.792	583,509.431	SURV	ERC-GPS ID#74 (Nov/Dec 1997)	111.826	
B8389	15.5	80-M	23.100	HTS	143,175.382	583,510.578	SURV	ERC-GPS ID#73 (Nov/Dec 1997)	111.941	
B8388	25.5	80-D	23.100	HTS	143,175.382	583,510.578	SURV	ERC-GPS ID#73 (Nov/Dec 1997)	111.941	
B8393	8.5	81-S	25.120	HTS	140,494.000	585,375.000	EST	ERC-Project planning; L. Peterson (1997)	108.000	EST
B8392	16.5	81-M	25.120	HTS	140,494.000	585,375.000	EST	ERC-Project planning; L. Peterson (1997)	108.000	EST
B8391	24.5	81-D	25.120	HTS	140,494.000	585,375.000	EST	ERC-Project planning; L. Peterson (1997)	108.000	EST
B8396	8.5	82-S	25.720	HTS	139,595.836	586,252.470	SURV	ERC-GPS ID#75 (Nov/Dec 1997)	108.814	
B8395	14.5	82-M	25.720	HTS	139,595.836	586,252.470	SURV	ERC-GPS ID#75 (Nov/Dec 1997)	108.814	
B8397	20.0	83-D	26.230	HTS	139,005.466	586,949.357	SURV	ERC-GPS ID#2 (Nov/Dec 1997)	109.262	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
B8402	8.0	84-S	26.640	HTS	138,683.000	587,477.148	SURV	ERC-GPS ID#5 (Nov/Dec 1997)	110.895	
B8401	14.0	84-M	26.640	HTS	138,683.515	587,476.025	SURV	ERC-GPS ID#3 (Nov/Dec 1997)	110.941	
B8400	22.0	84-D	26.640	HTS	138,683.945	587,476.487	SURV	ERC-GPS ID#4 (Nov/Dec 1997)	110.885	
B8405	8.0	85-S	27.130	HTS	138,256.786	588,052.700	SURV	ERC-GPS ID#6 (Nov/Dec 1997)	111.022	
B8404	17.0	85-M	27.130	HTS	138,256.786	588,052.700	SURV	ERC-GPS ID#6 (Nov/Dec 1997)	111.022	
B8403	26.0	85-D	27.130	HTS	138,256.786	588,052.700	SURV	ERC-GPS ID#6 (Nov/Dec 1997)	111.022	
B8408	7.0	86-S	27.390	HTS	138,068.820	588,332.623	SURV	ERC-GPS ID#7 (Nov/Dec 1997)	111.766	
B8407	10.0	86-M	27.390	HTS	138,068.172	588,333.214	SURV	ERC-GPS ID#8 (Nov/Dec 1997)	111.767	
B8406	26.0	86-D	27.390	HTS	138,067.727	588,333.555	SURV	ERC-GPS ID#9 (Nov/Dec 1997)	111.749	
C6383	7.1	C6383	28.694	PO1	137,049.790	589,904.200	SURV	AST Survey Data 1995-2008-MH-07509.xls	109.540	
C6384	14.3	C6384	28.694	PO1	137,046.730	589,905.770	SURV	AST Survey Data 1995-2008-MH-07509.xls	109.530	
C6353	3.2	C6353	30.420	PO1	134,707.740	591,487.200	SURV	AST Survey Data 1995-2008-MH-07509.xls	107.540	
C6356	3.4	C6356	31.316	PO1	133,699.990	593,014.880	SURV	AST Survey Data 1995-2008-MH-07509.xls	107.960	
C6359	4.3	C6359	32.410	PO1	131,807.600	594,209.150	SURV	AST Survey Data 1995-2008-MH-07509.xls	107.490	
C6362	6.6	C6362	33.971	PO1	129,703.410	594,504.590	SURV	AST Survey Data 1995-2008-MH-07509.xls	107.410	
C6365	8.7	C6365	34.924	PO1	128,216.740	594,644.690	SURV	AST Survey Data 1995-2008-MH-07509.xls	108.350	
C6368	6.4	C6368	36.110	PO1	126,500.860	594,894.340	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.880	
C6371	7.6	C6371	36.851	PO1	125,271.600	594,742.710	SURV	AST Survey Data 1995-2008-MH-07509.xls	106.490	
C6374	6.8	C6374	38.274	PO1	123,114.180	594,450.720	SURV	AST Survey Data 1995-2008-MH-07509.xls	106.030	
C6375	8.9	C6375	38.274	PO1	123,115.670	594,448.420	SURV	AST Survey Data 1995-2008-MH-07509.xls	106.150	
C6378	5.1	C6378	39.264	PO1	121,359.190	594,559.050	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.500	
C6380	1.5	C6380	40.432	PO1	119,218.610	594,571.830	SURV	AST Survey Data 1995-2008-MH-07509.xls	104.790	
C4347	11.6	AT-3-1-S	42.080	3FF5	116,737.054	594,383.725	SURV	GPS ID1654 FHI-TimJohnson-March04	105.542	
C4346	16.8	AT-3-1-M	42.080	3FF5	116,737.016	594,384.907	SURV	GPS ID1653 FHI-TimJohnson-March04	105.279	
C4348	21.0	AT-3-1-D(2)	42.080	3FF5	116,739.488	594,384.954	SURV	GPS ID1655 FHI-TimJohnson-March04	105.413	
C4345	21.1	AT-3-1-D(1)	42.080	3FF5	116,733.965	594,384.577	SURV	GPS ID1652 FHI-TimJohnson-March04	105.273	
C4350	10.8	AT-3-2-S	42.235	3FF5	116,439.560	594,434.714	SURV	GPS ID1651 FHI-TimJohnson-March04	105.192	
C4349	16.6	AT-3-2-M	42.235	3FF5	116,437.665	594,435.306	SURV	GPS ID1650 FHI-TimJohnson-March04	105.179	
C5277	2.7	103mArray-US125	42.313	3FF5	116,306.156	594,468.500	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	103.930	
C6341	11.7	C6341	42.320	3FF5	116,269.060	594,462.750	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.490	
C6342	17.5	C6342	42.320	3FF5	116,293.500	594,463.170	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.650	
C6343	20.6	C6343	42.320	3FF5	116,295.200	594,463.060	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.450	
C5276	6.0	103mArray-US100	42.332	3FF5	116,271.547	594,479.000	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.040	
C5275	6.2	103mArray-US75	42.350	3FF5	116,237.375	594,490.125	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.100	
C4642	0.6	300SPR9A-19cm	42.365	3FF5	116,209.672	594,495.324	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.922	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C4643	2.8	300SPR9A-86cm	42.365	3FF5	116,209.672	594,495.324	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.941	
C4644	4.7	300SPR9A-142cm	42.365	3FF5	116,209.672	594,495.324	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.946	
C5274	6.1	103mArray-US50	42.367	3FF5	116,207.422	594,500.000	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.050	
C5273	5.6	103mArray-US25	42.377	3FF5	116,188.852	594,505.563	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	103.900	
(none)	3.9	300-3-3B-120cm	42.389	3FF5	116,166.500	594,516.000	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.480	EST
C4646	12.3	300-3-3B-376cm	42.389	3FF5	116,165.529	594,516.017	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.480	
C4740	17.0	300-3-3B-518cm	42.389	3FF5	116,165.530	594,516.020	EST	PNNL-GPS xyz from Brad Fritz 9/01/06	103.680	
C4741	13.4	300-3-3C-409cm	42.390	3FF5	116,167.350	594,524.410	EST	PNNL-GPS xyz from Brad Fritz 9/01/06	103.290	
C4742	19.3	300-3-3C-589cm	42.390	3FF5	116,167.650	594,524.710	EST	PNNL-GPS xyz from Brad Fritz 9/01/06	103.290	
(none)	2.6	300-3-3-80cm	42.391	3FF5	116,163.600	594,507.000	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	105.000	EST
C4690	4.1	300-3-3A-124cm	42.391	3FF5	116,163.246	594,512.706	EST	PNNL-GPS xyz from Brad Fritz 9/01/06	104.250	
C4645	13.5	300-3-3A-410cm	42.391	3FF5	116,163.246	594,512.206	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	105.050	
C4739	19.0	300-3-3A-579cm	42.391	3FF5	116,163.250	594,512.210	EST	PNNL-GPS xyz from Brad Fritz 9/01/06	104.250	
C5272	6.9	103mArray-AT3A	42.391	3FF5	116,163.086	594,512.438	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.300	
C4353	6.9	AT-3-3-S	42.392	3FF5	116,163.568	594,505.024	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	105.003	
C4352	15.1	AT-3-3-M	42.392	3FF5	116,160.406	594,505.464	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	105.119	
C4351	29.1	AT-3-3-D	42.392	3FF5	116,159.062	594,505.631	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.956	
C5278	5.6	103mArray-DS25	42.404	3FF5	116,137.734	594,518.125	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	103.900	
C5279	5.2	103mArray-DS50	42.412	3FF5	116,123.367	594,521.250	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	103.800	
C6344	7.3	C6344	42.431	3FF5	116,077.560	594,525.240	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.350	
C5281	3.2	DS75-100cm	42.434	3FF5	116,082.367	594,530.125	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.600	
C5280	7.9	103mArray-DS75	42.434	3FF5	116,082.367	594,530.125	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.600	
C5282	10.5	DS75-319cm	42.434	3FF5	116,082.367	594,530.125	SURV	PNNL-GPS xyz from Brad Fritz 9/01/06	104.600	
C4356	7.0	AT-3-4-S	42.492	3FF5	115,978.828	594,542.624	SURV	GPS ID1645 FHI-TimJohnson-March04	105.335	
C4355	9.2	AT-3-4-M	42.492	3FF5	115,976.383	594,543.643	SURV	GPS ID1644 FHI-TimJohnson-March04	105.296	
C4354	12.0	AT-3-4-D	42.492	3FF5	115,980.412	594,541.904	SURV	GPS ID1646 FHI-TimJohnson-March04	105.299	
C6347	9.8	C6347	42.549	3FF5	115,859.250	594,578.360	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.070	
C6348	12.1	C6348	42.549	3FF5	115,861.980	594,577.930	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.140	
C4358	7.7	AT-3-5-S	42.608	3FF5	115,749.968	594,602.159	SURV	GPS ID1642 FHI-TimJohnson-March04	105.104	
C4357	12.2	AT-3-5-M	42.608	3FF5	115,753.181	594,600.678	SURV	GPS ID1643 FHI-TimJohnson-March04	105.198	
C6350	8.4	C6350	42.668	3FF5	115,642.050	594,638.090	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.200	
C6351	14.2	C6351	42.668	3FF5	115,640.530	594,638.560	SURV	AST Survey Data 1995-2008-MH-07509.xls	105.360	
C4361	9.6	AT-3-6-S	42.720	3FF5	115,548.309	594,663.336	SURV	GPS ID1641 FHI-TimJohnson-March04	104.892	
C4360	21.8	AT-3-6-M	42.720	3FF5	115,545.896	594,663.856	SURV	GPS ID1640 FHI-TimJohnson-March04	104.944	
C4359	38.6	AT-3-6-D	42.720	3FF5	115,547.715	594,663.947	SURV	GPS ID1639 FHI-TimJohnson-March04	104.837	

Table 3.1. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Reference	Ground Elevation (m-NAVD88)	Elevation Quality[2]
C4364	8.6	AT-3-7-S	42.820	3FF5	115,352.844	594,705.293	SURV	GPS ID1637 FHI-TimJohnson-March04	104.887	
C4363	20.8	AT-3-7-M	42.820	3FF5	115,350.598	594,706.026	SURV	GPS ID1638 FHI-TimJohnson-March04	104.930	
C4362	37.3	AT-3-7-D	42.820	3FF5	115,348.620	594,706.323	SURV	GPS ID1636 FHI-TimJohnson-March04	104.870	
C4367	8.0	AT-3-8-S	42.940	3FF5	115,127.249	594,761.597	SURV	GPS ID1633 FHI-TimJohnson-March04	104.990	
C4366	14.0	AT-3-8-M	42.940	3FF5	115,129.001	594,760.643	SURV	GPS ID1634 FHI-TimJohnson-March04	104.940	
C4365	20.1	AT-3-8-D	42.940	3FF5	115,130.709	594,759.951	SURV	GPS ID1635 FHI-TimJohnson-March04	105.049	

1 Abbreviations: VB = Vernita Bridge; BC5 = 100-B Area; KR4 = 100-K Area; NR2 = 100-N Area; HR3D = 100-D Area; HR3H = 100-H Area; FR3 = 100-F Area; HTS = Hanford Town Site; PO1 = Hanford town site downstream to 300 Area; 3FF5 = 300 Area; RLD = North Richland
2 EST = estimated from field narratives or geographic information system maps; SURV = surveyed using traditional or global positioning system (GPS) methods

Table 3.2. Historical Names Used for Some Aquifer Sampling Tube Sites

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Name as Used in Reference (historical use)	Name Reference	Year of Name Use[2]
C4376	8.0	AT-B-1-S	3.570	BC5	166-B-9	HEIS2_ADM_WELL table	2001
C4375	13.3	AT-B-1-M	3.570	BC5	166-B-8	HEIS2_ADM_WELL table	2001
C4378	8.6	AT-B-2-S	3.660	BC5	166-B-11	HEIS2_ADM_WELL table	2001
C4379	14.0	AT-B-2-M	3.660	BC5	166-B-12	HEIS2_ADM_WELL table	2001
C4377	19.0	AT-B-2-D	3.660	BC5	166-B-10	HEIS2_ADM_WELL table	2001
C4382	8.1	AT-B-3-S	4.020	BC5	166-B-15	HEIS2_ADM_WELL table	2001
C4381	14.2	AT-B-3-M	4.020	BC5	166-B-14	HEIS2_ADM_WELL table	2001
C4380	23.2	AT-B-3-D	4.020	BC5	166-B-13	HEIS2_ADM_WELL table	2001
C4368	7.5	AT-B-4-S	4.440	BC5	166-B-1	HEIS2_ADM_WELL table	2001
C4371	6.8	AT-B-7-S	4.620	BC5	166-B-4	HEIS2_ADM_WELL table	2001
C4370	13.3	AT-B-7-M	4.620	BC5	166-B-3	HEIS2_ADM_WELL table	2001
C4369	18.1	AT-B-7-D	4.620	BC5	166-B-2	HEIS2_ADM_WELL table	2001
C4374	9.6	AT-B-5-S	4.770	BC5	166-B-7	HEIS2_ADM_WELL table	2001
C4373	16.2	AT-B-5-M	4.770	BC5	166-B-6	HEIS2_ADM_WELL table	2001
C4372	24.0	AT-B-5-D	4.770	BC5	166-B-5	HEIS2_ADM_WELL table	2001
C4341	9.2	AT-K-1-S	6.270	KR4	166-K-16	HEIS2_ADM_WELL table	2001
C4340	15.0	AT-K-1-M	6.270	KR4	166-K-15	HEIS2_ADM_WELL table	2001
C4339	21.7	AT-K-1-D	6.270	KR4	166-K-14	HEIS2_ADM_WELL table	2001
C4329	15.0	AT-K-2-S	6.640	KR4	166-K-3	HEIS2_ADM_WELL table	2001
C4327	18.2	AT-K-2-M	6.640	KR4	166-K-1	HEIS2_ADM_WELL table	2001
C4328	22.3	AT-K-2-D	6.640	KR4	166-K-2	HEIS2_ADM_WELL table	2001
C4344	13.4	AT-K-3-S	7.000	KR4	166-K-19	HEIS2_ADM_WELL table	2001
C4343	17.8	AT-K-3-M	7.000	KR4	166-K-18	HEIS2_ADM_WELL table	2001
C4342	23.0	AT-K-3-D	7.000	KR4	166-K-17	HEIS2_ADM_WELL table	2001
C4338	11.0	AT-K-4-S	7.880	KR4	166-K-13	HEIS2_ADM_WELL table	2001
C4337	13.2	AT-K-4-M	7.880	KR4	166-K-12	HEIS2_ADM_WELL table	2001
C4336	15.3	AT-K-4-D	7.880	KR4	166-K-11	HEIS2_ADM_WELL table	2001
C4335	10.5	AT-K-5-S	8.090	KR4	166-K-10	HEIS2_ADM_WELL table	2001
C4331	15.7	AT-K-5-M	8.090	KR4	166-K-5	HEIS2_ADM_WELL table	2001
C4330	21.1	AT-K-5-D	8.090	KR4	166-K-4	HEIS2_ADM_WELL table	2001
C4333	11.4	AT-K-6-S	8.310	KR4	166-K-8	HEIS2_ADM_WELL table	2001
C4334	15.3	AT-K-6-M	8.310	KR4	166-K-9	HEIS2_ADM_WELL table	2001
C4332	21.6	AT-K-6-D	8.310	KR4	166-K-7	HEIS2_ADM_WELL table	2001
C3383	3.0	Redox-4-3.0	10.125	HR3D	Redox-4-3.0	FY2004 refurbishment (PNNL)	2004
					166-D-4	HEIS2_ADM_WELL table	2001
					ISRM-04	DOE/RL-2000-59	2000
					REDOX0403.0	PNNL-13349	2000
C3515	6.0	Redox-4-6.0	10.125	HR3D	Redox-4-6.0	FY2004 refurbishment (PNNL)	2004
					166-D-4B	HEIS2_ADM_WELL table	2001
					ISRM-04	DOE/RL-2000-59	2000
					REDOX0406.0	PNNL-13349	2000
C3384	3.3	Redox-3-3.3	10.180	HR3D	Redox-3-3.3	FY2004 refurbishment (PNNL)	2004
					166-D-3	PNNL-14444	2003
					Redox-03	WMP-18051	2003
					Redox-03	BHI-01624	2002
					REDOX-3-03	BHI-01494	2001
					166-D-3	HEIS2_ADM_WELL table	2001
					ISRM-03	DOE/RL-2000-59	2000
					REDOX0303.3	PNNL-13349	2000

Table 3.2. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Name as Used in Reference (historical use)	Name Reference	Year of Name Use[2]
C3514	4.6	Redox-3-4.6	10.180	HR3D	Redox-3-4.6	FY2004 refurbishment (PNNL)	2004
					166-D-3B	PNNL-14444	2003
					Redox-03	WMP-18051	2003
					Redox-03	BHI-01624	2002
					166-D-3B	HEIS2_ADM_WELL table	2001
					ISRM-03	DOE/RL-2000-59	2000
					REDOX0304.6	PNNL-13349	2000
C3385	3.0	Redox-2-3.0	10.240	HR3D	Redox-2-3.0	FY2004 refurbishment (PNNL)	2004
					166-D-2	PNNL-14444	2003
					Redox-02	WMP-18051	2003
					Redox-02	BHI-01624	2002
					166-D-2	HEIS2_ADM_WELL table	2001
					ISRM-02	DOE/RL-2000-59	2000
					REDOX0203.0	PNNL-13349	2000
C3513	6.0	Redox-2-6.0	10.240	HR3D	Redox-2-6.0	FY2004 refurbishment (PNNL)	2004
					166-D-2B	PNNL-14444	2003
					Redox-02	WMP-18051	2003
					Redox-02	BHI-01624	2002
					REDOX-2-06	BHI-01494	2001
					166-D-2B	HEIS_ADM_WELL table	2001
					ISRM-02	DOE/RL-2000-59	2000
					REDOX0206.0	PNNL-13349	2000
C3382	3.3	Redox-1-3.3	10.295	HR3D	Redox-1-3.3	FY2004 refurbishment (PNNL)	2004
					166-D-1	HEIS2_ADM_WELL table	2001
					ISRM-01	DOE/RL-2000-59	2000
					REDOX0103.3	PNNL-13349	2000
C3512	6.0	Redox-1-6.0	10.295	HR3D	Redox-1-6.0	FY2004 refurbishment (PNNL)	2004
					REDOX-1-06	BHI-01494	2001
					166-D-1B	HEIS2_ADM_WELL table	2001
					ISRM-01	DOE/RL-2000-59	2000
					REDOX0106.0	PNNL-13349	2000
C4307	7.0	AT-D-1-S	10.420	HR3D	166-D-7	HEIS2_ADM_WELL table	2001
C4306	10.8	AT-D-1-M	10.420	HR3D	166-D-6	HEIS2_ADM_WELL table	2001
C4305	13.3	AT-D-1-D	10.420	HR3D	166-D-5	HEIS2_ADM_WELL table	2001
C4314	12.4	AT-D-4-S	10.580	HR3D	166-D-14	HEIS2_ADM_WELL table	2001
C4315	13.8	AT-D-4-M	10.580	HR3D	166-D-15	HEIS2_ADM_WELL table	2001
C4316	15.7	AT-D-4-D	10.580	HR3D	166-D-16	HEIS2_ADM_WELL table	2001
C4310	14.3	AT-D-2-S	10.660	HR3D	166-D-10	HEIS2_ADM_WELL table	2001
C4309	16.3	AT-D-2-M	10.660	HR3D	166-D-9	HEIS2_ADM_WELL table	2001
C4308	26.5	AT-D-2-D	10.660	HR3D	166-D-8	HEIS2_ADM_WELL table	2001
C4313	7.3	AT-D-3-S	10.750	HR3D	166-D-13	HEIS2_ADM_WELL table	2001
C4312	8.8	AT-D-3-M	10.750	HR3D	166-D-12	HEIS2_ADM_WELL table	2001
C4311	11.8	AT-D-3-D	10.750	HR3D	166-D-11	HEIS2_ADM_WELL table	2001
C4318	6.8	AT-D-5-M	11.310	HR3D	166-D-18	HEIS2_ADM_WELL table	2001
C4317	8.8	AT-D-5-D	11.310	HR3D	166-D-17	HEIS2_ADM_WELL table	2001
C4321	6.2	AT-H-1-S	15.160	HR3H	166-H-3	HEIS2_ADM_WELL table	2001
C4320	11.0	AT-H-1-M	15.160	HR3H	166-H-2	HEIS2_ADM_WELL table	2001
C4319	12.8	AT-H-1-D	15.160	HR3H	166-H-1	HEIS2_ADM_WELL table	2001
C4324	5.3	AT-H-2-S	15.200	HR3H	166-H-6	HEIS2_ADM_WELL table	2001
C4323	9.2	AT-H-2-M	15.200	HR3H	166-H-5	HEIS2_ADM_WELL table	2001

Table 3.2. (contd)

Well Identifier (HWIS)	Port Depth [to top of opening] (ft-bgs)	Aquifer Tube Name (use in 2009)	HRM for Site ("2k")	Segment[1]	Name as Used in Reference (historical use)	Name Reference	Year of Name Use[2]
C4322	12.0	AT-H-2-D	15.200	HR3H	166-H-4	HEIS2_ADM_WELL table	2001
C4326	5.3	AT-H-3-S	15.230	HR3H	166-H-8	HEIS2_ADM_WELL table	2001
C4325	7.3	AT-H-3-D	15.230	HR3H	166-H-7	HEIS2_ADM_WELL table	2001
C4391	10.3	AT-F-1-S	19.220	FR3	166-F-9	HEIS2_ADM_WELL table	2001
C4390	18.1	AT-F-1-M	19.220	FR3	166-F-8	HEIS2_ADM_WELL table	2001
C4389	26.1	AT-F-1-D	19.220	FR3	166-F-7	HEIS2_ADM_WELL table	2001
C4394	7.5	AT-F-2-S	20.110	FR3	166-F-12	HEIS2_ADM_WELL table	2001
C4393	13.6	AT-F-2-M	20.110	FR3	166-F-11	HEIS2_ADM_WELL table	2001
C4392	19.3	AT-F-2-D	20.110	FR3	166-F-10	HEIS2_ADM_WELL table	2001
C4385	6.0	AT-F-3-S	20.420	FR3	166-F-3	HEIS2_ADM_WELL table	2001
C4384	10.8	AT-F-3-M	20.420	FR3	166-F-2	HEIS2_ADM_WELL table	2001
C4383	14.1	AT-F-3-D	20.420	FR3	166-F-1	HEIS2_ADM_WELL table	2001
C4388	7.2	AT-F-4-S	21.000	FR3	166-F-6	HEIS2_ADM_WELL table	2001
C4387	18.0	AT-F-4-M	21.000	FR3	166-F-5	HEIS2_ADM_WELL table	2001
C4386	32.3	AT-F-4-D	21.000	FR3	166-F-4	HEIS2_ADM_WELL table	2001
C4347	11.6	AT-3-1-S	42.080	3FF5	366-1-3	HEIS2_ADM_WELL table	2001
C4346	16.8	AT-3-1-M	42.080	3FF5	366-1-2	HEIS2_ADM_WELL table	2001
C4348	21.0	AT-3-1-D(2)	42.080	3FF5	366-1-4	HEIS2_ADM_WELL table	2001
C4345	21.1	AT-3-1-D(1)	42.080	3FF5	366-1-1	HEIS2_ADM_WELL table	2001
C4350	10.8	AT-3-2-S	42.235	3FF5	366-1-6	HEIS2_ADM_WELL table	2001
C4349	16.6	AT-3-2-M	42.235	3FF5	366-1-5	HEIS2_ADM_WELL table	2001
C4353	6.9	AT-3-3-S	42.392	3FF5	366-2-3	HEIS2_ADM_WELL table	2001
C4352	15.1	AT-3-3-M	42.392	3FF5	366-2-2	HEIS2_ADM_WELL table	2001
C4351	29.1	AT-3-3-D	42.392	3FF5	366-2-1	HEIS2_ADM_WELL table	2001
C4356	7.0	AT-3-4-S	42.492	3FF5	366-3-3	HEIS2_ADM_WELL table	2001
C4355	9.2	AT-3-4-M	42.492	3FF5	366-3-2	HEIS2_ADM_WELL table	2001
C4354	12.0	AT-3-4-D	42.492	3FF5	366-3-1	HEIS2_ADM_WELL table	2001
C4358	7.7	AT-3-5-S	42.608	3FF5	366-4-2	HEIS2_ADM_WELL table	2001
C4357	12.2	AT-3-5-M	42.608	3FF5	366-4-1	HEIS2_ADM_WELL table	2001
C4361	9.6	AT-3-6-S	42.720	3FF5	366-4-5	HEIS2_ADM_WELL table	2001
C4360	21.8	AT-3-6-M	42.720	3FF5	366-4-4	HEIS2_ADM_WELL table	2001
C4359	38.6	AT-3-6-D	42.720	3FF5	366-4-3	HEIS2_ADM_WELL table	2001
C4364	8.6	AT-3-7-S	42.820	3FF5	366-4-8	HEIS2_ADM_WELL table	2001
C4363	20.8	AT-3-7-M	42.820	3FF5	366-4-7	HEIS2_ADM_WELL table	2001
C4362	37.3	AT-3-7-D	42.820	3FF5	366-4-6	HEIS2_ADM_WELL table	2001
C4367	8.0	AT-3-8-S	42.940	3FF5	366-4-11	HEIS2_ADM_WELL table	2001
C4366	14.0	AT-3-8-M	42.940	3FF5	366-4-10	HEIS2_ADM_WELL table	2001
C4365	20.1	AT-3-8-D	42.940	3FF5	366-4-9	HEIS2_ADM_WELL table	2001

1 Abbreviations: BC5 = 100-B Area; KR4 = 100-K Area; NR2 = 100-N Area; HR3D = 100-D Area; HR3H = 100-H Area; FR3 = 100-F Area; HTS = Hanford Town Site; PO1 = Hanford town site downstream to 300 Area; 3FF5 = 300 Area
2 Review of name use in documents is valid through approximately 2003.

4.0 Riverbank Springs

Riverbank springs are observed at many locations along the Hanford Reach shoreline during periods of low river stage. As a general rule, most riverbank springs become visible when the Columbia River flow drops below 75,000 cubic feet per second (cfs). During high river stage, river water moves into the riverbank and interacts with groundwater that approaches the channel. When the river level drops, this bank storage water drains back toward the channel, often becoming exposed at the surface as springs or seepage areas along the beach. Figure 4.1 is a photo of a riverbank spring emerging at the 100-N Area shoreline. The composition of spring water may vary from nearly pure river water when the spring first emerges, to becoming more dominated by groundwater as the low river stage continues.

4.1 Riverbank Springs Naming Conventions

The naming system for the 1982-1983 springs investigation (McCormack and Carlile 1984) used HRM signposts, which subdivide the shoreline between Vernita Bridge and North Richland into 46 segments, each approximately one-mile long. A spring site name was composed from the nearest upstream signpost, to which a suffix was added that indicated the sequence of the site downstream of the signpost. For example, "3-5" indicated the fifth spring observed downstream from HRM #3. During a second comprehensive investigation of riverbank springs in 1988 (Dirkes 1990), the location names used followed the convention established by the earlier 1982 investigation. However, the analytical results are tabulated according to HRM position and are not given discreet location names (Dirkes 1990).

As part of a third comprehensive investigation of riverbank springs conducted in fall 1991, PNNL staff outlined all springs areas previously observed and sampled on the newly-acquired 1:2,000 series of topographic maps for the Hanford Site. A new naming system for spring locations was devised, again based on the HRM signposts, and efforts were made to associate all previously sampled locations with the new naming convention (DOE-RL 1992). The new name format consisted of the location to a tenth of a signpost position, followed by a suffix used to indicate multiple springs at the same approximate location. For example, springs 057-1, 057-2, etc. would indicate multiple springs at HRM 5.7, a location seven tenths of the distance downstream from HRM #5 to HRM #6.

Following the 1991 investigation, the method for naming riverbank springs continued to follow essentially the same scheme, but with some enhancements. A prefix (S) was added to identify the location as a spring and was combined with a letter that identifies the nearest reactor area. A spring site in the 100-K Area would thus be prefaced with "SK-" under this scheme, e.g., "SK-057-1."

This report proposes establishing a unique identifier for each riverbank spring site that is routinely monitored or is persistent. The five-digit alpha-numeric identifier would be analogous to the well identifiers assigned in HWIS to groundwater monitoring wells and aquifer tubes. The new identifier could be used in electronic databases to provide a unique tag for each location sampled. (Note: The proposed spring location identifiers listed in Tables 4.1 and 4.2 that follow have not been formally implemented as of the date of publication for this report).

Also, a new, simplified convention for assigning description names to riverbank springs is proposed in this report (see Chapter 8). Because acceptance of a naming convention depends on the needs of numerous users, and also on the need to maintain some continuity with names used previously, the

proposed convention has not yet been adopted in the sampling and analysis schedule databases for groundwater (GW) and surface water (SW) sample media. Based on acceptance from the user community at the Hanford Site, a future revision of this report will reflect any new conventions that may be adopted.

4.2 Riverbank Spring Names and Coordinates

The list of sites where riverbank springs have been observed and possibly sampled during past investigations is presented in Table 4.1. Each site listed is believed to represent a discreet occurrence of a spring. The inventory is the result of a detailed review of the location descriptions presented in the earlier reports discussed in Chapter 2. In many instances, a single location has been previously described using a variety of descriptive names. The review included interviews with investigators who have had abundant field experience along the shoreline, and also by referencing back to field notebooks kept during sampling events. The columns in Table 4.1 are defined as follows:

- Site Identifier (proposed) – Identifier code proposed for each riverbank spring site—for internal data management purposes. This code would be used in the same way as the well identifier code assigned in the HWIS for monitoring wells, boreholes, and aquifer sampling tubes.
- Spring Name (in use 2009) – The name in use during 2009 for a site that is sampled routinely under various monitoring programs. For those sites not currently sampled, the most commonly appearing name in historical reports is listed. In some instances, a riverbank spring had been identified on a map, but no name had ever been assigned, so a new temporary, informal name is listed that reflects the source of the information (e.g., Dirkes-A).
- Spring Name (proposed) – A descriptive name proposed for the site under the scheme presented in Chapter 8 of this report. The alpha prefix identifies the location as a riverbank spring in one segment of the Hanford Reach, and the following number is the position relative to the HRM system, to the nearest hundredth subdivision.
- HRM ("2k") – Riverbank spring site relative to the HRM system signposts. Each spring site has been plotted on a base map for the shoreline that includes the locations of HRM signposts, as updated in 1999. The spring position relative to these signposts was determined using proportional-scale dividers to subdivide the distance between each signpost position.
- Segment – Segments defined for convenience in grouping monitoring sites by CERCLA groundwater operable units, groundwater interest areas, or other common characteristic.
- Northing and Easting – Location coordinates in Washington State Plane (South Zone) system; units are meters; North American Datum of 1983.
- Coordinate Quality – Quality of the coordinates, e.g. "surveyed" using global positioning system (GPS) equipment or traditional land survey methods; "estimated" using geographic information system (GIS) maps.
- Coordinate Type/Source – Source for coordinate information. "GPS" refers to global positioning system equipment. "ARCmap" refers to geographic information system coverages for the river, including topography, shorelines, facilities, and the HRM system. This system was used to position riverbank spring sites when the best available information was narrative descriptions found in historical reports. The system (ARCInfo,™ ESRI Inc, Bellevue, Washington) uses the state plane

coordinate system, so estimates for coordinates could be read directly from the display. "1:2000map" refers to notes provided on 1:2,000 scale topographic maps during the 1991 field reconnaissance of springs sites by PNL and Westinghouse Hanford Company (WHC) personnel.

- Coordinate Reference – Citation for information on the riverbank spring site.

4.3 Riverbank Springs: Previous Names

Table 4.2 is a compendium of various names used to refer to riverbank springs during previous investigations. This table represents the reference database from which judgment calls were made to group riverbank springs together that appear to represent a single location. One record was chosen as the "prime" or host (i.e., those sites listed in previous Table 4.1). The other references to the same site are archived as "secondary" name records.

Table 4.2 provides the metadata necessary to document assigning a common site identifier and descriptive location name to results in the HEIS that represent riverbank spring water samples. Some of the columns in Table 4.2 are same as used in Table 4.1, with exceptions as follows:

- Name as Used in Reference – Name as used in historical report or other reference that includes riverbank spring names.
- Name Reference – Citation for where name has been used, or other source.
- Year of Name Use – Year in which a particular riverbank spring name was used. This was helpful in revealing the evolution of name usage for a particular location.

Figure 4.1. Photograph of Riverbank Spring Site

Table 4.1. Riverbank Springs Observed Along the Hanford Site Shoreline of the Columbia River

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference
S1000	SVB-000-1	SVB-0000	0.000	VB					100-B Pilot Risk Study
S1001	HRM 2.5		2.500	VB	146,095.900	562,547.600	EST	ARCmap	PNL-7500, Table B.6
S1002	3-1A		3.000	BC5	145,765.900	563,309.500	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1003	3-1B		3.050	BC5	145,758.800	563,327.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1004	3-2		3.300	BC5	145,527.100	563,825.700	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1005	3-3		3.410	BC5	145,440.100	564,037.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1006	3-4		3.550	BC5	145,302.500	564,271.000	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1007	SB-037-1	SB-0373	3.730	BC5	145,296.917	564,617.215	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1008	SB-038-3	SB-0375	3.750	BC5	145,278.036	564,662.546	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1009	SB-039-2	SB-0395	3.950	BC5	145,369.161	564,951.835	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1010	041-1		4.100	BC5	145,400.000	565,260.000	EST	1:2000map	WHC-0609, Table A-1
S1011	4-1		4.110	BC5	145,400.000	565,283.000	EST	1:2000map	WHC-0609, Table A-1
S1012	SB-042-1	SB-0419	4.190	BC5	145,443.000	565,430.000	EST	1:2000map	WHC-0609, Table A-1
S1013	047-1		4.890	BC5	145,817.000	566,633.000	EST	1:2000map	WHC-0609, Table A-1
S1014	5-1		5.060	BC5	145,908.000	566,920.000	EST	1:2000map	WHC-0609, Table A-1
S1015	5-2		5.290	BC5	146,030.000	567,208.000	EST	1:2000map	WHC-0609, Table A-1
S1016	5-3		5.360	BC5	146,060.000	567,300.000	EST	1:2000map	WHC-0609, Table A-1
S1017	5-4		5.390	BC5	146,088.000	567,339.000	EST	1:2000map	WHC-0609, Table A-1
S1018	SK-057-3	SK-0555	5.550	KR4	146,205.197	567,531.527	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1019	5-4A		5.560	KR4	146,190.000	567,551.000	EST	1:2000map	WHC-0609, Table A-1
S1020	5-6		5.970	KR4	146,525.000	567,900.000	EST	1:2000map	WHC-0609, Table A-1
S1021	6-1		6.115	KR4	146,635.000	568,138.000	EST	1:2000map	WHC-0609, Table A-1
S1022	6-2		6.125	KR4	146,644.000	568,160.000	EST	1:2000map	WHC-0609, Table A-1
S1023	6-3		6.270	KR4	146,800.000	568,339.000	EST	1:2000map	WHC-0609, Table A-1
S1024	SK-063-1	SK-0631	6.305	KR4	146,847.084	568,377.710	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1025	SK-063-2	SK-0632	6.320	KR4	146,934.800	568,541.600	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1026	7-0		6.770	KR4	147,250.000	568,986.000	EST	1:2000map	WHC-0609, Table A-1
S1027	SK-068-1	SK-0680	6.800	KR4	147,318.600	568,982.300	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1028	7-1A		6.950	KR4	147,500.000	569,121.000	EST	1:2000map	WHC-0609, Table A-1
S1029	7-1B		7.000	KR4	147,580.200	569,180.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1030	071-1		7.060	KR4	147,630.000	569,260.000	EST	1:2000map	WHC-0609, Table A-1
S1031	IT91-A		7.250	KR4	147,821.900	569,436.300	EST	ARCmap	Mahood91map; 1:2K reconnaissance
S1032	7-2		7.290	KR4	147,870.000	569,475.000	EST	1:2000map	WHC-0609, Table A-1
S1033	7-3		7.330	KR4	147,920.000	569,527.000	EST	1:2000map	WHC-0609, Table A-1
S1034	k-nonumb	SK-0738	7.380	KR4	147,993.950	569,559.900	SURV	GPS	PNNL10/01/03 AQST recon.
S1035	Dirkes-C		7.440	KR4	148,025.600	569,641.900	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1036	Dirkes-D		7.520	KR4	148,111.900	569,719.600	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)

Table 4.1. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference
S1037	IT91-B		7.560	KR4	148,159.300	569,770.800	EST	ARCmap	Mahood91map; 1:2K reconnaissance
S1038	SK-077-1	SK-0763	7.630	KR4	148,242.700	569,849.400	EST	ARCmap	Mahood91map; 1:2K reconnaissance
S1039	IT91-D		7.710	KR4	148,314.700	569,943.300	EST	ARCmap	Mahood91map; 1:2K reconnaissance
S1040	IT91-E		7.740	KR4	148,341.300	569,984.100	EST	ARCmap	Mahood91map; 1:2K reconnaissance
S1041	IT91-F		7.925	KR4	148,520.400	570,185.000	EST	ARCmap	Mahood91map; 1:2K reconnaissance
S1042	079-1		8.030	KR4	148,643.000	570,287.000	EST	1:2000map	WHC-0609, Table A-1
S1043	080-1		8.080	NR2	148,709.000	570,360.000	EST	1:2000map	WHC-0609, Table A-1
S1044	SK-082-2	SK-0811	8.110	NR2	148,792.099	570,370.443	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1045	Dirkes-E		8.380	NR2	149,131.200	570,727.900	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1046	8-10		8.660	NR2	149,540.000	571,018.000	EST	1:2000map	WHC-0609, Table A-1
S1047	8-11		8.700	NR2	149,600.000	571,073.000	EST	1:2000map	WHC-0609, Table A-1
S1048	Dirkes-F		8.760	NR2	149,682.900	571,135.900	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1049	8-12		8.820	NR2	149,791.000	571,188.400	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1050	SN-089-1	SN-0890	8.900	NR2	149,920.000	571,300.000	EST	1:2000map	WHC-0609, Table A-1
S1051	SN-092-2	SN-0906	9.060	NR2	150,150.000	571,465.000	EST	1:2000map	DOE/RL-92-12, App. C
S1052	SN-092-3	SN-0908	9.080	NR2	150,170.000	571,480.000	EST	1:2000map	DOE/RL-92-12, App. C
S1053	SN-093-1	SN-0915	9.150	NR2	150,256.800	571,552.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1054	9-2		9.175	NR2	150,288.000	571,575.000	EST	1:2000map	WHC-0609, Table A-1
S1055	9-3		9.225	NR2	150,350.000	571,618.000	EST	1:2000map	WHC-0609, Table A-1
S1056	9-4		9.250	NR2	150,391.900	571,640.700	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1057	Dirkes-H		9.275	NR2	150,424.800	571,662.800	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1058	SN-094-1	SN-0931	9.310	NR2	150,470.200	571,675.900	SURV	GPS	SESP Trimble sub-meter GPS, 3/30/04
S1059	SN-NS8-13	SN-0933	9.325	NR2	150,499.700	571,686.400	SURV	GPS	SESP Trimble sub-meter GPS, 3/30/04
S1060	Dirkes-I	SN-0936	9.360	NR2	150,541.700	571,728.700	SURV	GPS	SESP Trimble sub-meter GPS, 3/30/04
S1061	Dirkes-J		9.410	NR2	150,608.900	571,798.800	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1062	Dirkes-K		9.490	NR2	150,718.100	571,872.900	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1063	095-1		9.500	NR2	150,721.100	571,875.900	EST	1:2000map	WHC-0609, Table A-1
S1064	Dirkes-M		9.570	NR2	150,953.300	572,052.400	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1065	Dirkes-N		9.625	NR2	151,028.200	572,097.400	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1066	SD-098-1		9.700	NR2	151,132.971	572,173.329	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1067	Dirkes-O	SN-0986	9.860	NR2	151,204.600	572,244.100	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1068	Dirkes-L		9.930	NR2	150,896.100	572,010.400	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1069	Dirkes-P	SN-0995	9.950	NR2	151,321.500	572,341.100	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1070	Dirkes-Q		10.030	HR3D	151,420.800	572,432.000	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1071	SD-102-1	SD-1024	10.240	HR3D	151,682.899	572,633.693	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1072	SD-105-1	SD-1050	10.500	HR3D	151,958.225	572,919.626	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1073	SD-107-1	SD-1068	10.680	HR3D	152,168.980	573,143.112	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db

Table 4.1. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference
S1074	SD-108-1	SD-1081	10.810	HR3D	152,277.853	573,310.364	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1075	SD-109-1	SD-1088	10.875	HR3D	152,322.063	573,399.195	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1076	109-1c		10.925	HR3D	152,374.654	573,471.976	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1077	SD-110-1	SD-1103	11.025	HR3D	152,482.636	573,605.920	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1078	SD-110-2	SD-1112	11.115	HR3D	152,563.685	573,712.753	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1079	SH-144-1	SH-1422	14.220	HR3H	153,838.700	576,992.665	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1080	Dirkes-R		14.280	HR3H	153,805.700	577,067.700	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1081	SH-145-1	SH-1438	14.380	HR3H	153,712.996	577,184.064	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1082	SH-145-2	SH-1444	14.440	HR3H	153,666.605	577,257.223	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1083	Dirkes-S		14.525	HR3H	153,621.800	577,360.000	EST	ARCmap	Dirkes91map; prepared for WHC (IT91)
S1084	14-5		14.560	HR3H	153,580.000	577,400.000	EST	1:2000map	WHC-0609, Table A-1
S1085	147-1		14.760	HR3H	153,420.000	577,625.000	EST	1:2000map	WHC-0609, Table A-1
S1086	SH-150-1	SH-1502	15.020	HR3H	153,155.016	577,891.104	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1087	152-1		15.060	HR3H	153,090.525	577,957.719	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1088	151		15.115	HR3H	153,023.965	578,016.276	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1089	SH-152-2	SH-1526	15.265	HR3H	152,807.372	578,191.397	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1090	SH-152-4	SH-1532	15.315	HR3H	152,716.174	578,220.933	SURV	GPS	ERC(9&10/96); GPS-DATA.xls; GPS-CONV.db
S1091	SH-153-1	SH-1534	15.340	HR3H	152,679.045	578,255.479	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1092	158-1		15.600	HR3H	152,311.000	578,552.000	EST	1:2000map	WHC-0609, Table A-1
S1093	178-1		17.400	HR3H	149,883.000	579,459.900	EST	ARCmap	unknown
S1094	18-0		17.975	FR3	149,066.000	579,837.000	EST	1:2000map	WHC-0609, Table A-1
S1095	18-1		18.110	FR3	148,936.000	580,018.000	EST	1:2000map	WHC-0609, Table A-1
S1096	18-2		18.620	FR3	148,375.000	580,672.000	EST	1:2000map	WHC-0609, Table A-1
S1097	SF-187-1	SF-1880	18.800	FR3	148,193.412	580,927.850	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1098	18.3		18.840	FR3	148,156.394	580,975.221	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1099	SF-189-1	SF-1890	18.900	FR3	148,099.800	581,062.800	EST	ARCmap	unknown
S1100	SF-190-1		18.985	FR3	148,003.540	581,171.724	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1101	SF-190-4	SF-1903	19.030	FR3	147,940.000	581,230.000	EST	1:2000map	DOE/RL-92-12, App. C
S1102	SF-205-1	SF-1953	19.530	FR3	146,183.200	582,158.900	EST	ARCmap	unknown
S1103	SF-207-1	SF-2132	21.320	FR3	145,468.608	582,691.406	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1104	SF-210-1	SF-2141	21.410	FR3	145,370.658	582,751.292	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1105	SF-211-1	SF-2164	21.640	FR3	145,130.000	582,864.000	EST	1:2000map	DOE/RL-92-12, App. C
S1106	SF-213-1	SF-2190	21.900	FR3	144,813.000	582,962.000	EST	1:2000map	DOE/RL-92-12, App. C
S1107	SF-216-1	SF-2230	22.300	FR3	144,317.000	583,132.000	EST	1:2000map	DOE/RL-92-12, App. C
S1108	22-2		22.410	FR3	144,166.000	583,193.000	EST	1:2000map	WHC-0609, Table A-1
S1109	22-3		22.570	FR3	143,935.000	583,267.000	EST	1:2000map	WHC-0609, Table A-1
S1110	22-4		22.690	FR3	143,764.000	583,303.000	EST	1:2000map	WHC-0609, Table A-1

Table 4.1. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference
S1111	228-1		22.860	FR3	143,533.000	583,364.000	EST	1:2000map	WHC-0609, Table A-1
S1112	23-1		23.110	HTS	143,167.000	583,511.000	EST	1:2000map	WHC-0609, Table A-1
S1113	23-2		23.375	HTS	142,789.000	583,693.000	EST	1:2000map	WHC-0609, Table A-1
S1114	23-3		23.615	HTS	142,448.000	583,876.000	EST	1:2000map	WHC-0609, Table A-1
S1115	23-4A		23.700	HTS	142,358.000	583,986.000	EST	1:2000map	WHC-0609, Table A-1
S1116	238-2		23.800	HTS	142,143.000	584,192.000	EST	1:2000map	WHC-0609, Table A-1
S1117	23-4B		23.850	HTS	142,212.000	584,181.000	EST	1:2000map	WHC-0609, Table A-1
S1118	241-1	ST-2406	24.060	HTS	142,006.330	584,429.830	EST	ARCmap	WHC-0609, Table A-1
S1119	247-1	ST-2472	24.720	HTS	140,949.130	584,855.390	EST	ARCmap	WHC-0609, Table A-1
S1120	25-1S		24.750	HTS	140,924.000	584,876.000	EST	1:2000map	WHC-0609, Table A-1
S1121	25-2S		24.840	HTS	140,838.000	584,986.000	EST	1:2000map	WHC-0609, Table A-1
S1122	25-5S		25.220	HTS	140,345.600	585,462.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1123	25-1		25.240	HTS	140,271.000	585,473.000	EST	1:2000map	WHC-0609, Table A-1
S1124	25-2		25.310	HTS	140,192.000	585,632.000	EST	1:2000map	WHC-0609, Table A-1
S1125	25-3		25.380	HTS	140,070.000	585,729.000	EST	1:2000map	WHC-0609, Table A-1
S1126	25-4		25.740	HTS	139,597.100	586,275.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1127	25-5		25.760	HTS	139,582.000	586,339.000	EST	1:2000map	WHC-0609, Table A-1
S1128	25-6		25.780	HTS	139,541.400	586,370.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1129	26-1		26.200	HTS	139,033.900	586,910.600	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1130	26-2		26.240	HTS	138,994.600	586,979.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1131	26-3		26.600	HTS	138,722.800	587,421.400	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1132	26-4		26.880	HTS	138,441.200	587,745.500	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1133	27-1		27.070	HTS	138,293.900	587,974.800	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1134	27-2		27.250	HTS	138,162.900	588,184.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1135	27-3		27.500	HTS	137,976.300	588,456.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1136	SHTS-UR28-2	ST-2779	27.790	HTS	137,809.349	588,812.762	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1137	SHTS-28-2	ST-2810	28.100	HTS	137,605.364	589,190.770	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1138	SHTS-DR28-2	ST-2829	28.290	HTS	137,453.263	589,440.686	SURV	GPS	1998 1999 combo seeps.xls (GP spr2000)
S1139	28-4		28.660	HTS	137,079.100	589,867.400	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1140	28-5		28.875	HTS	136,811.320	590,047.730	EST	ARCmap	PNL-5289, Table C.1 Results
S1141	29-0		29.050	HTS	136,623.960	590,240.440	EST	ARCmap	PNL-5289, Table C.1 Results
S1142	25-4S		29.090	HTS	140,573.400	585,291.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1143	29-1		29.240	PO1	136,394.700	590,424.000	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1144	29-2		29.500	PO1	136,091.300	590,696.900	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1145	29-3		29.750	PO1	135,752.600	590,901.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1146	30-0		30.040	PO1	135,313.200	591,120.800	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1147	30-1		30.120	PO1	135,168.400	591,162.200	EST	ARCmap	PNL-5289, Table A.1 Narrative

Table 4.1. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference
S1148	30-2		30.940	PO1	134,108.500	592,359.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1149	31-1		31.000	PO1	134,059.400	592,447.000	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1150	31-2		31.300	PO1	133,702.600	593,013.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1151	31-3		31.495	PO1	133,436.400	593,344.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1152	31-4		31.505	PO1	133,413.100	593,356.900	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1153	31-5		31.600	PO1	133,229.500	593,455.200	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1154	32-0		32.500	PO1	131,565.450	594,224.000	EST	ARCmap	PNL-5289, Table C.1 Results
S1155	33-1		33.000	PO1	130,799.500	594,406.500	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1156	34-1		34.000	PO1	129,672.400	594,520.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1157	34-2		34.900	PO1	128,335.900	594,670.200	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1158	34-3		34.925	PO1	128,294.600	594,677.900	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1159	34-4		34.940	PO1	128,268.700	594,693.500	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1160	35-1		35.600	PO1	127,304.500	594,851.200	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1161	35-2		36.000	PO1	126,673.700	594,913.200	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1162	36-1		36.740	PO1	125,409.600	594,796.900	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1163	37-1		37.100	PO1	124,874.500	594,543.600	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1164	37-2		37.500	PO1	124,308.300	594,499.600	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1165	38-1		38.250	PO1	123,150.200	594,458.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1166	38-10		38.850	PO1	122,100.600	594,509.900	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1167	39-1		39.240	PO1	121,392.300	594,564.200	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1168	40-1		40.000	PO1	119,996.300	594,727.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1169	40-2		40.020	PO1	119,955.000	594,721.900	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1170	Spr-1	S3-4076	40.760	3FF5	118,630.064	594,482.956	SURV	Landsurv	KAISER(4/3/92)
S1171	Spr-2	S3-4089	40.890	3FF5	118,400.979	594,450.202	SURV	Landsurv	KAISER(4/3/92)
S1172	Spr-3	S3-4126	41.260	3FF5	117,861.591	594,365.433	SURV	Landsurv	KAISER(4/3/92)
S1173	Spr-4	S3-4132	41.325	3FF5	117,776.349	594,345.099	SURV	Landsurv	KAISER(4/3/92)
S1174	41-1		41.500	3FF5	117,550.800	594,326.400	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1175	Spr-5	S3-4173	41.730	3FF5	117,249.844	594,327.721	SURV	Landsurv	KAISER(4/3/92)
S1176	Spr-6	S3-4186	41.865	3FF5	117,082.551	594,338.230	SURV	Landsurv	KAISER(4/3/92)
S1177	42-1		42.000	3FF5	116,904.500	594,378.100	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1178	S3-42-2	S3-4211	42.105	3FF5	116,696.501	594,392.078	SURV	Landsurv	KAISER(4/3/92)
S1179	Spr-8	S3-4232	42.320	3FF5	116,289.940	594,467.539	SURV	Landsurv	KAISER(4/3/92)
S1180	S3-DR42-2	S3-4236	42.365	3FF5	116,209.879	594,488.883	SURV	Landsurv	KAISER(4/3/92)
S1181	Spr-10	S3-4243	42.430	3FF5	116,083.503	594,525.323	SURV	Landsurv	KAISER(4/3/92)
S1182	Spr-11	S3-4267	42.670	3FF5	115,644.462	594,640.955	SURV	Landsurv	KAISER(4/3/92)
S1183	Spr-12	S3-4306	43.060	3FF5	114,934.799	594,802.480	SURV	Landsurv	KAISER(4/3/92)
S1184	Spr-13	S3-4318	43.180	3FF5	114,769.187	594,825.660	SURV	Landsurv	KAISER(4/3/92)

Table 4.1. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference
S1185	Spr-14	S3-4348	43.475	3FF5	114,361.831	594,887.139	SURV	Landsurv	KAISER(4/3/92)
S1186	43-2		43.775	3FF5	113,952.300	594,946.800	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1187	43-3		43.860	3FF5	113,830.800	594,962.300	EST	ARCmap	PNL-5289, Table A.1 Narrative
S1188	SRL-444-1		44.400	RLD	113,071.564	595,050.997	EST	GPS	SESP field log, Greg Patton, 2001

1 Abbreviations: VB = Vernita Bridge; BC5 = 100-B Area; KR4 = 100-K Area; NR2 = 100-N Area; HR3D = 100-D Area; HR3H = 100-H Area; FR3 = 100-F Area; HTS = Hanford Town Site; PO1 = Hanford town site downstream to 300 Area; 3FF5 = 300 Area; RLD = North Richland
2 EST = estimated from field narratives or geographic information system maps; SURV = surveyed using traditional or global positioning system methods

Table 4.2. Historical Names Used for Riverbank Springs

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
S1000	SVB-000-1	SVB-0000	0.000	VB	none	none	2004
S1001	HRM 2.5		2.500	VB	HRM 2.5	PNL-7500 (report)	1990
					025-1	WHC-0609, Table A-1	1992
					Large flow	Search-89, Table 5	1989
S1002	3-1A		3.000	BC5	3-1A	PNL-5289 (report)	1984
					030-1	WHC-0609, Table A-1	1992
S1003	3-1B		3.050	BC5	3-1B	PNL-5289 (report)	1984
					030-2	WHC-0609, Table A-1	1992
S1004	3-2		3.300	BC5	3-2	PNL-5289 (report)	1984
					033-1	WHC-0609, Table A-1	1992
					3-2	PNL-7500 (report)	1990
S1005	3-3		3.410	BC5	3-3	PNL-5289 (report)	1984
					033-2	WHC-0609, Table A-1	1992
					035-2	WHC-0609, Table A-1	1992
S1006	3-4		3.550	BC5	3-4	PNL-5289 (report)	1984
					035-1	WHC-0609, Table A-1	1992
S1007	SB-037-1	SB-0373	3.730	BC5	seep371100b	PNNL-98/99 GPS survey	1999
					SB-037-1	PNNL-13404 (gw report)	2002
					seep371100b	PNNL-12088 (env report)	2000
					037-1	BC5-RI NPL No. M-15-99-03	1999
					100-B Spring 37-1	PNNL-12103 (env schedule)	1999
					seep371100b	SESP-SLM-01, S-2.4	1999
					SB-037-1	BC5-RI 1998 (SAF X99-004)	1998
					SB-037-1	BC5-RI 1997 (SAF N98-002)	1997
					SB-037-1	BC5-RI 1996 (CCN 041996)	1996
					037-1	BC5-RI NPL No. M-15-96-07	1996
					100 B Spring	PNL-1995 GPS survey	1995
					037-1	BC5-RI 1993	1993
					037-1	WHC-0609, Table A-1	1992
					037-1	DOE/RL-92-12, Appendix F	1992
					3-5	PNL-5289 (report)	1984
S1008	SB-038-3	SB-0375	3.750	BC5	seep38.3	PNNL-98/99 GPS survey	1999
					SB-038-3	PNNL-13404 (gw report)	2002
					100-B Spring 38-3	PNNL-13418 (env schedule)	2001
					100-b spring 38-3	PNNL-13230 (env report)	2000
					100-B Spring 38-3	PNNL-13109 (env schedule)	2000
					seep38.3	PNNL-12088 (env report)	2000
					seep38.3	SESP-SLM-01, S-2.4	1999
					100-B Spring	PNNL-11803 (env schedule)	1998
					100-B Spring	PNNL-11464 (env schedule)	1997
					100-B Spring	PNNL-10950 (env schedule)	1996
					100-B Spring	PNL-10423 (env schedule)	1995
					038-2	WHC-0609, Table A-1	1992
					038-3	DOE/RL-92-12, Appendix F	1992
					3-6	PNL-5289 (report)	1984
S1009	SB-039-2	SB-0395	3.950	BC5	seep39.2100b	PNNL-98/99 GPS survey	1999
					SB-039-2	PNNL-13404 (gw report)	2002
					100-B Spring 39-2	PNNL-13418 (env schedule)	2001
					100-b spring 39-2	PNNL-13230 (env report)	2000
					100-B Spring 39-2	PNNL-13109 (env schedule)	2000
					seep39.2100b	PNNL-12088 (env report)	2000

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					039-2	BC5-RI NPL No. M-15-99-03	1999
					seep39.2100b	SESP-SLM-01, S-2.4	1999
					SB-039-2	BC5-RI 1998 (SAF X99-004)	1998
					SB-039-2	BC5-RI 1997 (SAF N98-002)	1997
					SB-039-2	BC5-RI 1996 (CCN 041996)	1996
					039-2	BC5-RI NPL No. M-15-96-07	1996
					039-1	WHC-0609, Table A-1	1992
					039-2	DOE/RL-92-12, Appendix F	1992
					4-0	PNL-5289 (report)	1984
S1010	041-1		4.100	BC5	041-1	WHC-0609, Table A-1	1992
					B breakwater	Search-89, Table 5	1989
S1011	4-1		4.110	BC5	042-1	WHC-0609, Table A-1	1992
					4-1	PNL-5289 (report)	1984
S1012	SB-042-1	SB-0419	4.190	BC5	042-2	WHC-0609, Table A-1	1992
					042-2	WHC-0609, Table A-1	1992
					4-2	PNL-5289 (report)	1984
S1013	047-1		4.890	BC5	047-1	WHC-0609, Table A-1	1992
					d/s of B	Search-89, Table 5	1989
S1014	5-1		5.060	BC5	050-1	WHC-0609, Table A-1	1992
					5-1	PNL-5289 (report)	1984
S1015	5-2		5.290	BC5	050-2	WHC-0609, Table A-1	1992
					5-2	PNL-5289 (report)	1984
S1016	5-3		5.360	BC5	052-1	WHC-0609, Table A-1	1992
					5-3	PNL-5289 (report)	1984
S1017	5-4		5.390	BC5	052-2	WHC-0609, Table A-1	1992
					5-4	PNL-5289 (report)	1984
S1018	SK-057-3	SK-0555	5.550	KR4	100k57.3seep	PNNL-98/99 GPS survey	1999
					SK-057-3	PNNL-13404 (gw report)	2002
					100k57.3seep	PNNL-12088 (env report)	2000
					100k57.3seep	SESP-SLM-01, S-2.4	1999
					SK-057-3	KR4-RI 1997 (SAF C98-009)	1997
					SK-057-3	KR4-RI 1996 (CCN 041996)	1996
					057-3	KR4-RI NPL No. 108	1996
					057-3	WHC-0609, Table A-1	1992
					056-3	DOE/RL-92-12, Appendix F	1992
					057-3	DOE/RL-92-12, Appendix F	1992
					5-5	PNL-5289 (report)	1984
S1019	5-4A		5.560	KR4	056-1	WHC-0609, Table A-1	1992
					5-4A	PNL-5289 (report)	1984
S1020	5-6		5.970	KR4	059-1	WHC-0609, Table A-1	1992
					5-6	PNL-5289 (report)	1984
S1021	6-1		6.115	KR4	060-1	WHC-0609, Table A-1	1992
					6-1	PNL-5289 (report)	1984
S1022	6-2		6.125	KR4	062-1	WHC-0609, Table A-1	1992
					062-3	WHC-0609, Table A-1	1992
					u/s of K tanks	Search-89, Table 5	1989
					6-2	PNL-5289 (report)	1984
S1023	6-3		6.270	KR4	062-2	WHC-0609, Table A-1	1992
					063-1	WHC-0609, Table A-1	1992
					off d/s of K tanks	Search-89, Table 5	1989
					6-3	PNL-5289 (report)	1984
S1024	SK-063-1	SK-0631	6.305	KR4	100k6.6seep	PNNL-98/99 GPS survey	1999

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					SK-063-1	PNNL-13404 (gw report)	2002
					100-K Spring 63-1	PNNL-13418 (env schedule)	2001
					100-k spring 63-1	PNNL-13230 (env report)	2000
					100-K Spring 63-1	PNNL-13109 (env schedule)	2000
					100k6.6seep	PNNL-12088 (env report)	2000
					100-K Spring 63-1	PNNL-12103 (env schedule)	1999
					100k6.6seep	SESP-SLM-01, S-2.4	1999
					100-K Spring	PNNL-11803 (env schedule)	1998
					100-K Spring	PNNL-11464 (env schedule)	1997
					100-K Spring	PNNL-10950 (env schedule)	1996
					100 K Spring	PNL-1995 GPS survey	1995
					100-K Spring	PNL-10423 (env schedule)	1995
S1025	SK-063-2	SK-0632	6.320	KR4	Dirkes-A	SAC/S&T FY00 data comp	2000
					Dirkes-A	SAC/S&T FY00 data comp	2000
S1026	7-0		6.770	KR4	068-1	WHC-0609, Table A-1	1992
					7-0	PNL-5289 (report)	1984
S1027	SK-068-1	SK-0680	6.800	KR4	SK-068-1	Fall 2002 SESP sampling	2002
					Dirkes-B	SAC/S&T FY00 data comp	2000
S1028	7-1A		6.950	KR4	069-1	WHC-0609, Table A-1	1992
					7-1A	PNL-5289 (report)	1984
S1029	7-1B		7.000	KR4	7-1B	PNL-5289 (report)	1984
					070-1	WHC-0609, Table A-1	1992
S1030	071-1		7.060	KR4	071-1	WHC-0609, Table A-1	1992
					broad, below K	Search-89, Table 5	1989
S1031	IT91-A		7.250	KR4	IT91-A	SAC/S&T FY00 data comp	2000
S1032	7-2		7.290	KR4	072-1	WHC-0609, Table A-1	1992
					7-2	PNL-5289 (report)	1984
S1033	7-3		7.330	KR4	072-2	WHC-0609, Table A-1	1992
					7-3	PNL-5289 (report)	1984
S1034	k-nonumb	SK-0738	7.380	KR4	seep100knonumb	PNNL10/01/03 AQST recon.	2003
					seep100knonumb	PNNL-12088 (env report)	2000
					seep100knonumb	PNNL-98/99 GPS survey	1999
					seep100knonumb	SESP-SLM-01, S-2.4	1999
					7-4	PNL-5289 (report)	1984
S1035	Dirkes-C		7.440	KR4	Dirkes-C	SAC/S&T FY00 data comp	2000
S1036	Dirkes-D		7.520	KR4	Dirkes-D	SAC/S&T FY00 data comp	2000
S1037	IT91-B		7.560	KR4	IT91-B	SAC/S&T FY00 data comp	2000
S1038	SK-077-1	SK-0763	7.630	KR4	IT91-C	SAC/S&T FY00 data comp	2000
					SK-077-1	PNNL-13404 (gw report)	2002
					100-k spring 77-1	PNNL-13230 (env report)	2000
					100-K Spring 77-1	PNNL-13109 (env schedule)	2000
					100-K Spring 77-1	PNNL-12103 (env schedule)	1999
					SK-077-1	KR4-RI 1997 (SAF C98-009)	1997
					SK-077-1	KR4-RI NPL No. 108	1996
					077-1	KR4-RI 1993	1993
					077-1	WHC-0609, Table A-1	1992
					074-1	DOE/RL-92-12, Appendix F	1992
					077-1	DOE/RL-92-12, Appendix F	1992
S1039	IT91-D		7.710	KR4	IT91-D	SAC/S&T FY00 data comp	2000
S1040	IT91-E		7.740	KR4	IT91-E	SAC/S&T FY00 data comp	2000
S1041	IT91-F		7.925	KR4	IT91-F	SAC/S&T FY00 data comp	2000
S1042	079-1		8.030	KR4	079-1	WHC-0609, Table A-1	1992

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					onshore pool	Search-89, Table 5	1989
S1043	080-1		8.080	NR2	080-1	WHC-0609, Table A-1	1992
S1044	SK-082-2	SK-0811	8.110	NR2	100k8.2seep	PNNL-98/99 GPS survey	1999
					SK-082-2	PNNL-13404 (gw report)	2002
					100k8.2seep	PNNL-12088 (env report)	2000
					100k8.2seep	SESP-SLM-01, S-2.4	1999
					SK-082-2	KR4-RI 1997 (SAF C98-009)	1997
					SK-082-2	KR4-RI 1996 (CCN 041996)	1996
					082-2	KR4-RI NPL No. 108	1996
					082-1	WHC-0609, Table A-1	1992
					082-2	WHC-0609, Table A-1	1992
					080-2	DOE/RL-92-12, Appendix F	1992
					082-2	DOE/RL-92-12, Appendix F	1992
					u/s tower at N	Search-89, Table 5	1989
					8-1	PNL-5289 (report)	1984
					8.25-1	PNL-5289 (report)	1984
S1045	Dirkes-E		8.380	NR2	Dirkes-E	SAC/S&T FY00 data comp	2000
					083-2	WHC-0609, Table A-1	1992
S1046	8-10		8.660	NR2	085-1	WHC-0609, Table A-1	1992
					086-1	WHC-0609, Table A-1	1992
					riprap at N	Search-89, Table 5	1989
					8-10	PNL-5289 (report)	1984
S1047	8-11		8.700	NR2	087-1	WHC-0609, Table A-1	1992
					entering N chute	Search-89, Table 5	1989
					8-11	PNL-5289 (report)	1984
S1048	Dirkes-F		8.760	NR2	Dirkes-F	SAC/S&T FY00 data comp	2000
					088-1	WHC-0609, Table A-1	1992
S1049	8-12		8.820	NR2	8-12	PNL-5289 (report)	1984
					088-2	WHC-0609, Table A-1	1992
					Seep spot 1	UNI-3866, Fig. 1 (report)	1986
S1050	SN-089-1	SN-0890	8.900	NR2	089-1	WHC-0609, Table A-1	1992
					100-N Spring 199N-46	PNNL-13418 (env schedule)	2001
					100-n spring 199n-46	PNNL-13230 (env report)	2000
					100-N Spring 199N-46	PNNL-13109 (env schedule)	2000
					100-N Spring 199N-46	PNNL-12103 (env schedule)	1999
					090-1	WHC-0609, Table A-1	1992
					090-1	DOE/RL-92-12, Appendix F	1992
					N8T	PNL-7500 (report)	1990
					8-13	PNL-5289 (report)	1984
S1051	SN-092-2	SN-0906	9.060	NR2	091-1	DOE/RL-92-12, Appendix F	1992
					091-1	WHC-0609, Table A-1	1992
					092-2	WHC-0609, Table A-1	1992
					092-2	DOE/RL-92-12, Appendix F	1992
					lower N springs	Search-89, Table 5	1989
S1052	SN-092-3	SN-0908	9.080	NR2	092-1	DOE/RL-92-12, Appendix F	1992
					092-3	WHC-0609, Table A-1	1992
					092-3	DOE/RL-92-12, Appendix F	1992
S1053	SN-093-1	SN-0915	9.150	NR2	9-1	PNL-5289 (report)	1984
					093-2	WHC-0609, Table A-1	1992
					092-2	DOE/RL-92-12, Appendix F	1992
					093-1	DOE/RL-92-12, Appendix F	1992
					Seep spot 2	UNI-3866, Fig. 1 (report)	1986

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
S1054	9-2		9.175	NR2	093-1	WHC-0609, Table A-1	1992
					093-3(sic -4)	WHC-0609, Table A-1	1992
					093-7	WHC-0609, Table A-1	1992
					Seep spot 3	UNI-3866, Fig. 1 (report)	1986
					9-2	PNL-5289 (report)	1984
S1055	9-3		9.225	NR2	093-3	WHC-0609, Table A-1	1992
					9-3	PNL-5289 (report)	1984
S1056	9-4		9.250	NR2	Dirkes-G	SAC/S&T FY00 data comp	2000
					1325-N springs	Search-89, Table 5	1989
					Seep spot 4	UNI-3866, Fig. 1 (report)	1986
					9-4	PNL-5289 (report)	1984
S1057	Dirkes-H		9.275	NR2	Dirkes-H	SAC/S&T FY00 data comp	2000
					094-1	WHC-0609, Table A-1	1992
					094-1	DOE/RL-92-12, Appendix F	1992
S1058	SN-094-1	SN-0931	9.310	NR2	"A"	SESP field survey, 3/30/04	2004
					SN-NS8-13	PNNL-13404 (gw report)	2002
					100-N Spring 8-13	PNNL-13418 (env schedule)	2001
					100-n spring 8-13	PNNL-13230 (env report)	2000
					100-N Spring 8-13	PNNL-13109 (env schedule)	2000
					100n8.13mileapprox9.2	PNNL-12088 (env report)	2000
					100n8.13mileapprox9.2	PNNL-98/99 GPS survey	1999
					100-N Spring 8-13	PNNL-12103 (env schedule)	1999
					100n8.13mileapprox9.2	SESP-SLM-01, S-2.4	1999
					100-N Spring 8-13	PNNL-11803 (env schedule)	1998
					100-N Spring	PNNL-11464 (env schedule)	1997
					100-N Spring 8-13	PNNL-10950 (env schedule)	1996
					100 N Spring	PNL-1995 GPS survey	1995
					100-N Spring 8-13	PNL-10423 (env schedule)	1995
S1059	SN-NS8-13	SN-0933	9.325	NR2	"B"	SESP field survey, 3/30/04	2004
S1060	Dirkes-I	SN-0936	9.360	NR2	"C"	SESP field survey, 3/30/04	2004
					Dirkes-I	SAC/S&T FY00 data comp	2000
S1061	Dirkes-J		9.410	NR2	Dirkes-J	SAC/S&T FY00 data comp	2000
S1062	Dirkes-K		9.490	NR2	Dirkes-K	SAC/S&T FY00 data comp	2000
S1063	095-1		9.500	NR2	095-1	WHC-0609, Table A-1	1992
S1064	Dirkes-M		9.570	NR2	Dirkes-M	SAC/S&T FY00 data comp	2000
S1065	Dirkes-N		9.625	NR2	Dirkes-N	SAC/S&T FY00 data comp	2000
S1066	SD-098-1		9.700	NR2	100d9.8seep	PNNL-98/99 GPS survey	1999
					SD-098-1	PNNL-13404 (gw report)	2002
					100d9.8seep	PNNL-12088 (env report)	2000
					100d9.8seep	SESP-SLM-01, S-2.4	1999
					SD-098-1	HR3D-RI 1998 (SAF C99-005)	1998
					SD-098-1	HR3D-RI 1997 (SAF C98-003)	1997
					SD-098-1	HR3D-RI 1996 (CCN 041996)	1996
					098-1	HR3D-RI NPL No. 107(D)	1996
					098-1	WHC-0609, Table A-1	1992
					Below100N	PNL-7500 (report)	1990
S1067	Dirkes-O	SN-0986	9.860	NR2	Dirkes-O	SAC/S&T FY00 data comp	2000
S1068	Dirkes-L		9.930	NR2	Dirkes-L	SAC/S&T FY00 data comp	2000
S1069	Dirkes-P	SN-0995	9.950	NR2	Dirkes-P	SAC/S&T FY00 data comp	2000
S1070	Dirkes-Q		10.030	HR3D	Dirkes-Q	SAC/S&T FY00 data comp	2000
S1071	SD-102-1	SD-1024	10.240	HR3D	100d10.2crhot	PNNL-98/99 GPS survey	1999
					SD-102-1	PNNL-13404 (gw report)	2002

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					100-D Spring 102-1	PNNL-13418 (env schedule)	2001
					100-d spring 102-1	PNNL-13230 (env report)	2000
					100-D Spring 102-1	PNNL-13109 (env schedule)	2000
					100d10.2crhot	PNNL-12088 (env report)	2000
					100-D Spring 102-1	PNNL-12103 (env schedule)	1999
					100d10.2crhot	SESP-SLM-01, S-2.4	1999
					SD-102-1	HR3D-RI 1998 (SAF C99-005)	1998
					SD-102-1	HR3D-RI 1997 (SAF C98-003)	1997
					SD-102-1	HR3D-RI 1996 (CCN 041996)	1996
					102-1	HR3D-RI NPL No. 107(D)	1996
S1072	SD-105-1	SD-1050	10.500	HR3D	SD-105-1	HGIS GPS-ID 3020	1996
					SD-104-1	HEIS	1995
S1073	SD-107-1	SD-1068	10.680	HR3D	SD-107-1	HGIS GPS-ID 3014	1996
S1074	SD-108-1	SD-1081	10.810	HR3D	SD-108-1	HGIS GPS-ID 3008	1996
					108-1	WHC-0609, Table A-1	1992
					d/s of D	Search-89, Table 5	1989
S1075	SD-109-1	SD-1088	10.875	HR3D	SD-109-1	HGIS GPS-ID 3005	1996
					SD-109-1b	HGIS GPS-ID 3006	1996
S1076	109-1c		10.925	HR3D	SD-109-1c	HGIS GPS-ID 3028	1996
					110-1	WHC-0609, Table A-1	1992
					110-1	DOE/RL-92-12, Appendix F	1992
S1077	SD-110-1	SD-1103	11.025	HR3D	100d11.02seep	PNNL-98/99 GPS survey	1999
					SD-110-1	PNNL-13404 (gw report)	2002
					100-D Spring 110-1	PNNL-13418 (env schedule)	2001
					100-d spring 110-1	PNNL-13230 (env report)	2000
					100-D Spring 110-1	PNNL-13109 (env schedule)	2000
					100d11.02seep	PNNL-12088 (env report)	2000
					100-D Spring 110-1	PNNL-12103 (env schedule)	1999
					100d11.02seep	SESP-SLM-01, S-2.4	1999
					SD-110-1	HR3D-RI 1998 (SAF C99-005)	1998
					100-D Spring	PNNL-11803 (env schedule)	1998
					SD-110-1	HR3D-RI 1997 (SAF C98-003)	1997
					100-D Spring	PNNL-11464 (env schedule)	1997
					SD-110-1	HGIS GPS-ID 3030	1996
					SD-110-1	HR3D-RI 1996 (CCN 041996)	1996
					110-1	HR3D-RI NPL No. 107(D)	1996
					100-D Spring	PNNL-10950 (env schedule)	1996
					100 D Spring	PNL-1995 GPS survey	1995
					100 D Spring	PNL-1995 GPS survey	1995
					100-D Spring	PNL-10423 (env schedule)	1995
					110-1	HR3D-RI 1993	1993
					110-2	WHC-0609, Table A-1	1992
					110-2	DOE/RL-92-12, Appendix F	1992
					11-1	PNL-7500 (report)	1990
					11-1	PNL-5289 (report)	1984
S1078	SD-110-2	SD-1112	11.115	HR3D	SD-110-2	HGIS GPS-ID 3031	1996
					SD-110-2	PNNL-13404 (gw report)	2002
					SD-110-2	HR3D-RI (SAF C98-003)	1997
					SD-110-3	HGIS GPS-ID 3032	1996
					SD-110-2	HR3D-RI (CCN 041996)	1996
					110-2	HR3D-RI NPL No. 107(D)	1996
					111-1	WHC-0609, Table A-1	1992

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					large, d/s of D	Search-89, Table 5	1989
S1079	SH-144-1	SH-1422	14.220	HR3H	100h144	PNNL-98/99 GPS survey	1999
					SH-144-1	PNNL-13404 (gw report)	2002
					100h144	PNNL-12088 (env report)	2000
					100h144	SESP-SLM-01, S-2.4	1999
					SH-144-1	HR3H-RI 1998 (SAF C99-005)	1998
					SH-144-1	HR3H-RI 1997 (SAF C98-003)	1997
					SH-144-1	HGIS GPS-ID 2040	1996
					SH-144-1	HR3H-RI 1996 (CCN 041996)	1996
					144-1	HR3H-RI NPL No. 107(H)	1996
S1080	Dirkes-R		14.280	HR3H	Dirkes-R	SAC/S&T FY00 data comp	2000
					144-1	WHC-0609, Table A-1	1992
					143-1	DOE/RL-92-12, Appendix F	1992
					144-1	DOE/RL-92-12, Appendix F	1992
S1081	SH-145-1	SH-1438	14.380	HR3H	100h145seepq	PNNL-98/99 GPS survey	1999
					SH-145-1	PNNL-13404 (gw report)	2002
					100-H Spring 145-1	PNNL-13418 (env schedule)	2001
					100-h spring 145-1	PNNL-13230 (env report)	2000
					100-H Spring 145-1	PNNL-13109 (env schedule)	2000
					100h145seepq	PNNL-12088 (env report)	2000
					100h145seepq	SESP-SLM-01, S-2.4	1999
					145-1	HR3H-RI 1998 (SAF C99-005)	1998
					SH-145-1	HR3H-RI 1997 (SAF C98-003)	1997
					SH-145-1	HGIS GPS-ID 2038	1996
					145-1	HR3H-RI NPL No. 107(H)	1996
					14-4	PNL-5289 (report)	1984
S1082	SH-145-2	SH-1444	14.440	HR3H	SH-145-2	HGIS GPS-ID 2037	1996
					100-H Spring 145-2	PNNL-12103 (env schedule)	1999
					SH-145-2	HR3H-RI (CCN 041996)	1996
					145-2	HR3H-RI NPL No. 107(H)	1996
					145-2	HR3H-RI 1993	1993
					145-1	WHC-0609, Table A-1	1992
					144-1	DOE/RL-92-12, Appendix F	1992
					145-1	DOE/RL-92-12, Appendix F	1992
S1083	Dirkes-S		14.525	HR3H	Dirkes-S	SAC/S&T FY00 data comp	2000
					145-2	WHC-0609, Table A-1	1992
					146-1	DOE/RL-92-12, Appendix F	1992
					145-2	DOE/RL-92-12, Appendix F	1992
S1084	14-5		14.560	HR3H	145-3	WHC-0609, Table A-1	1992
					14-5	PNL-5289 (report)	1984
S1085	147-1		14.760	HR3H	147-1	WHC-0609, Table A-1	1992
					u/s of H @ pt.	Search-89, Table 5	1989
S1086	SH-150-1	SH-1502	15.020	HR3H	100h150	PNNL-98/99 GPS survey	1999
					SH-150-1	PNNL-13404 (gw report)	2002
					100h150	PNNL-12088 (env report)	2000
					100h150	SESP-SLM-01, S-2.4	1999
					SH-150-1	HR3H-RI 1998 (SAF C99-005)	1998
					SH-150-1	HR3H-RI 1997 (SAF C98-003)	1997
					SH-150-2	HGIS GPS-ID 2023	1996
					SH-150-1	HGIS GPS-ID 2024	1996
					SH-150-3	HR3H-RI 1996 (CCN 041996)	1996
					150-1	HR3H-RI NPL No. 107(H)	1996

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					150-1	WHC-0609, Table A-1	1992
					149-1	DOE/RL-92-12, Appendix F	1992
					150-1	DOE/RL-92-12, Appendix F	1992
					15-0	PNL-7500 (report)	1990
					15-0	PNL-5289 (report)	1984
S1087	152-1		15.060	HR3H	SH-152-1 (150-3?)	HGIS GPS-ID 2022	1996
					152-1	WHC-0609, Table A-1	1992
S1088	151		15.115	HR3H	SH-152-2 (151-1?)	HGIS GPS-ID 2018	1996
S1089	SH-152-2	SH-1526	15.265	HR3H	100h152seep	PNNL-98/99 GPS survey	1999
					SH-152-2	PNNL-13404 (gw report)	2002
					100-H Spring 152-2	PNNL-13418 (env schedule)	2001
					100-H Spring 152-2	PNNL-13109 (env schedule)	2000
					100h152seep	PNNL-12088 (env report)	2000
					100-H Spring 152-2	PNNL-12103 (env schedule)	1999
					100h152seep	SESP-SLM-01, S-2.4	1999
					SH-152-2	HR3H-RI 1998 (SAF C99-005)	1998
					100-H Spring	PNNL-11803 (env schedule)	1998
					SH-152-2	HR3H-RI 1997 (SAF C98-003)	1997
					100-H Spring	PNNL-11464 (env schedule)	1997
					SH-152-2	HR3H-RI 1996 (CCN 041996)	1996
					152-2	HR3H-RI NPL No. 107(H)	1996
					152-3	HR3H-RI NPL No. 107(H)	1996
					100-H Spring	PNNL-10950 (env schedule)	1996
					100 H Spring	PNL-1995 GPS survey	1995
					100 H Spring	PNL-1995 GPS survey	1995
					100-H Spring	PNL-10423 (env schedule)	1995
					152-2	HR3H-RI 1993	1993
					152-3	HR3H-RI 1993	1993
					152-2	WHC-0609, Table A-1	1992
					152-3	WHC-0609, Table A-1	1992
					H curtain wall	Search-89, Table 5	1989
					H outfall pipe	Search-89, Table 5	1989
S1090	SH-152-4	SH-1532	15.315	HR3H	SH-152-4	HGIS GPS-ID 2008	1996
					SH-152-4	PNNL-13404 (gw report)	2002
					15-4	PNL-5289 (report)	1984
S1091	SH-153-1	SH-1534	15.340	HR3H	100h153seep	PNNL-98/99 GPS survey	1999
					SH-153-1	PNNL-13404 (gw report)	2002
					100-h spring 153-1	PNNL-13230 (env report)	2000
					100h153seep	PNNL-12088 (env report)	2000
					100h153seep	SESP-SLM-01, S-2.4	1999
					SH-153-1	HR3H-RI 1998 (SAF C99-005)	1998
					SH-153-1	HR3H-RI 1997 (SAF C98-003)	1997
					SH-153-1	HGIS GPS-ID 2006	1996
					SH-153-1	HR3H-RI 1996 (CCN 041996)	1996
					153-1	HR3H-RI NPL No. 107(H)	1996
					153-1	HR3H-RI 1993	1993
					153-1	WHC-0609, Table A-1	1992
					154-1	DOE/RL-92-12, Appendix F	1992
					153-1	DOE/RL-92-12, Appendix F	1992
					15-5	PNL-5289 (report)	1984
S1092	158-1		15.600	HR3H	158-1	WHC-0609, Table A-1	1992
					d/s of H	Search-89, Table 5	1989

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
S1093	178-1		17.400	HR3H	178-1	unknown	1991
					178-1	WHC-0609, Table A-1	1992
					EWB Slough	Search-89, Table 5	1989
S1094	18-0		17.975	FR3	180-1	WHC-0609, Table A-1	1992
					pipe d/s EWB	Search-89, Table 5	1989
					18-0	PNL-5289 (report)	1984
S1095	18-1		18.110	FR3	180-2	WHC-0609, Table A-1	1992
					18-1	PNL-5289 (report)	1984
S1096	18-2		18.620	FR3	185-1	WHC-0609, Table A-1	1992
					186-1	WHC-0609, Table A-1	1992
					18-2	PNL-5289 (report)	1984
S1097	SF-187-1	SF-1880	18.800	FR3	100fgw187	PNNL-98/99 GPS survey	1999
					SF-187-1	PNNL-13404 (gw report)	2002
					100fgw187	PNNL-12088 (env report)	2000
					187-1	FR3-RI NPL No. M-15-99-02	1999
					100fgw187	SESP-SLM-01, S-2.4	1999
					187-1	FR3-RI NPL No. M-15-96-06	1996
					187-1	WHC-0609, Table A-1	1992
					187-1	DOE/RL-92-12, Appendix F	1992
S1098	18.3		18.840	FR3	100f18.3seepoutfall	PNNL-98/99 GPS survey	1999
					100f18.3seepoutfall	PNNL-12088 (env report)	2000
					100f18.3seepoutfall	SESP-SLM-01, S-2.4	1999
					100f18.3seepoutfall	SESP-SLM-01, S-2.4	1999
S1099	SF-189-1	SF-1890	18.900	FR3	189-1	unknown	1991
					189-1	FR3-RI 1993	1993
S1100	SF-190-1		18.985	FR3	100fgwseep19	PNNL-98/99 GPS survey	1999
					100fgwseep19	PNNL-12088 (env report)	2000
					100fgwseep19	SESP-SLM-01, S-2.4	1999
					190-1	WHC-0609, Table A-1	1992
					19-1	PNL-5289 (report)	1984
S1101	SF-190-4	SF-1903	19.030	FR3	190-4	DOE/RL-92-12, Appendix F	1992
					SF-190-4	PNNL-13404 (gw report)	2002
					190-4	FR3-RI NPL No. M-15-99-02	1999
					190-4	FR3-RI NPL No. M-15-96-06	1996
					190-4	WHC-0609, Table A-1	1992
S1102	SF-205-1	SF-1953	19.530	FR3	205-1	unknown	1991
					205-1	FR3-RI 1993	1993
S1103	SF-207-1	SF-2132	21.320	FR3	100fgwseep207	PNNL-98/99 GPS survey	1999
					SF-207-1	PNNL-13404 (gw report)	2002
					100-F Spring 207-1	PNNL-13418 (env schedule)	2001
					100-f spring 207-1	PNNL-13230 (env report)	2000
					100-F Spring 207-1	PNNL-13109 (env schedule)	2000
					100fgwseep207	PNNL-12088 (env report)	2000
					207-1	FR3-RI NPL No. M-15-99-02	1999
					100-F Spring 207-1	PNNL-12103 (env schedule)	1999
					100fgwseep207	SESP-SLM-01, S-2.4	1999
					SF-207-1	FR3-RI 1998 (SAF X99-004)	1998
					SF-207-1	FR3-RI 1997 (SAF N98-002)	1997
					207-1	PNNL-11472 (env report)	1997
					207-1	FR3-RI NPL No. M-15-96-06	1996
					207-1	WHC-0609, Table A-1	1992
					208-1	DOE/RL-92-12, Appendix F	1992

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					207-1	DOE/RL-92-12, Appendix F	1992
S1104	SF-210-1	SF-2141	21.410	FR3	100fsespspring	PNNL-98/99 GPS survey	1999
					100fsespspring	PNNL-12088 (env report)	2000
					100fsespspring	PNNL-98/99 GPS survey	1999
					100fsespspring	SESP-SLM-01, S-2.4	1999
					100-F Spring	PNNL-11803 (env schedule)	1998
					100-F Spring	PNNL-11464 (env schedule)	1997
					100-F Spring	PNNL-10950 (env schedule)	1996
					100 F Spring	PNL-1995 GPS survey	1995
					100-F Spring	PNL-10423 (env schedule)	1995
S1105	SF-211-1	SF-2164	21.640	FR3	216-1	DOE/RL-92-12, Appendix F	1992
					211-1	WHC-0609, Table A-1	1992
					211-1	DOE/RL-92-12, Appendix F	1992
S1106	SF-213-1	SF-2190	21.900	FR3	218-1	DOE/RL-92-12, Appendix F	1992
					213-1	WHC-0609, Table A-1	1992
					213-1	DOE/RL-92-12, Appendix F	1992
S1107	SF-216-1	SF-2230	22.300	FR3	221-1	DOE/RL-92-12, Appendix F	1992
					216-1	WHC-0609, Table A-1	1992
					222-2	WHC-0609, Table A-1	1992
					216-1	DOE/RL-92-12, Appendix F	1992
					22-1	PNL-5289 (report)	1984
					22-1A	PNL-5289 (report)	1984
S1108	22-2		22.410	FR3	222-1	WHC-0609, Table A-1	1992
					223-1	WHC-0609, Table A-1	1992
					22-2	PNL-5289 (report)	1984
S1109	22-3		22.570	FR3	225-1	WHC-0609, Table A-1	1992
					22-3	PNL-5289 (report)	1984
S1110	22-4		22.690	FR3	226-1	WHC-0609, Table A-1	1992
					F Slough	Search-89, Table 5	1989
					22-4	PNL-5289 (report)	1984
S1111	228-1		22.860	FR3	228-1	WHC-0609, Table A-1	1992
S1112	23-1		23.110	HTS	230-1	WHC-0609, Table A-1	1992
					23-1	PNL-5289 (report)	1984
S1113	23-2		23.375	HTS	232-1	WHC-0609, Table A-1	1992
					23-2	PNL-5289 (report)	1984
S1114	23-3		23.615	HTS	235-1	WHC-0609, Table A-1	1992
					23-3	PNL-5289 (report)	1984
S1115	23-4A		23.700	HTS	236-1	WHC-0609, Table A-1	1992
					23-4A	PNL-5289 (report)	1984
S1116	238-2		23.800	HTS	238-2	WHC-0609, Table A-1	1992
					broad cobbles	Search-89, Table 5	1989
S1117	23-4B		23.850	HTS	238-1	WHC-0609, Table A-1	1992
					23-4B	PNL-5289 (report)	1984
S1118	241-1	ST-2406	24.060	HTS	241-1	WHC-0609, Table A-1	1992
					241-1	WHC-0609, Table A-1	1992
					246-1	DOE/RL-92-12, Appendix F	1992
					241-1	DOE/RL-92-12, Appendix F	1992
S1119	247-1	ST-2472	24.720	HTS	247-1	WHC-0609, Table A-1	1992
					247-1	WHC-0609, Table A-1	1992
					252-1	DOE/RL-92-12, Appendix F	1992
					247-1	DOE/RL-92-12, Appendix F	1992
S1120	25-1S		24.750	HTS	250-1	WHC-0609, Table A-1	1992

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					248-1	WHC-0609, Table A-1	1992
					Hanford Slough	Search-89, Table 5	1989
					25-1S	PNL-5289 (report)	1984
S1121	25-2S		24.840	HTS	250-2	WHC-0609, Table A-1	1992
					250-3	WHC-0609, Table A-1	1992
					25-2S	PNL-5289 (report)	1984
					25-3S	PNL-5289 (report)	1984
					Kashier Spring	USGS #717	1972
S1122	25-5S		25.220	HTS	25-5S	PNL-5289 (report)	1984
					250-5	WHC-0609, Table A-1	1992
S1123	25-1		25.240	HTS	253-1	WHC-0609, Table A-1	1992
					25-1	PNL-5289 (report)	1984
S1124	25-2		25.310	HTS	255-1	WHC-0609, Table A-1	1992
					25-2	PNL-5289 (report)	1984
S1125	25-3		25.380	HTS	255-2	WHC-0609, Table A-1	1992
					25-3	PNL-5289 (report)	1984
S1126	25-4		25.740	HTS	25-4	PNL-5289 (report)	1984
					25-4	PNL-7500 (report)	1990
					ferry landing	Search-89, Table 5	1989
S1127	25-5		25.760	HTS	258-1	WHC-0609, Table A-1	1992
					25-5	PNL-5289 (report)	1984
S1128	25-6		25.780	HTS	25-6	PNL-5289 (report)	1984
					258-2	WHC-0609, Table A-1	1992
					258-3	WHC-0609, Table A-1	1992
S1129	26-1		26.200	HTS	26-1	PNL-5289 (report)	1984
S1130	26-2		26.240	HTS	26-2	PNL-5289 (report)	1984
S1131	26-3		26.600	HTS	26-3	PNL-5289 (report)	1984
S1132	26-4		26.880	HTS	26-4	PNL-5289 (report)	1984
S1133	27-1		27.070	HTS	27-1	PNL-5289 (report)	1984
					27-1	PNL-8167 (report)	1992
S1134	27-2		27.250	HTS	27-2	PNL-5289 (report)	1984
					27-2	PNL-8167 (report)	1992
					27-2	PNL-7500 (report)	1990
S1135	27-3		27.500	HTS	27-3	PNL-5289 (report)	1984
					27-3	PNL-8167 (report)	1992
					27-3	PNL-7500 (report)	1990
S1136	SHTS-UR28-2	ST-2779	27.790	HTS	hanftownsiteupriver28	PNNL-98/99 GPS survey	1999
					SHTS-UR28-2	PNNL-13404 (gw report)	2002
					Hanford Spr UR 28-2	PNNL-13418 (env schedule)	2001
					hanford spr ur 28-2	PNNL-13230 (env report)	2000
					Hanford Spr UR 28-2	PNNL-13109 (env schedule)	2000
					hanftownsiteupriver28	PNNL-12088 (env report)	2000
					Hanford Spr UR 28-2	PNNL-12103 (env schedule)	1999
					hanftownsiteupriver28	SESP-SLM-01, S-2.4	1999
S1137	SHTS-28-2	ST-2810	28.100	HTS	hanftownsite28.2	PNNL-98/99 GPS survey	1999
					SHTS-28-2	PNNL-13404 (gw report)	2002
					Hanford Spring 28-2	PNNL-13418 (env schedule)	2001
					hanford spring 28-2	PNNL-13230 (env report)	2000
					Hanford Spring 28-2	PNNL-13109 (env schedule)	2000
					hanftownsite28.2	PNNL-12088 (env report)	2000
					hanftownsite28.2	PNNL-12088 (env report)	2000
					SHTS-28-2	PNNL-12088 (env report)	2000

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Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					Hanford Spring 28-2	PNNL-12103 (env schedule)	1999
					hanftownsite28.2	SESP-SLM-01, S-2.4	1999
					SHTS-28-2	PNNL-11795 (env report)	1998
					Hanford Spring 28-2	PNNL-11803 (env schedule)	1998
					Hanford Spring 28-2	PNNL-11464 (env schedule)	1997
					Hanford Spring 28-2	PNNL-10950 (env schedule)	1996
					Hanford Spring	PNL-1995 GPS survey	1995
					Hanford Spring 28-2	PNL-10423 (env schedule)	1995
					28-2	PNL-8167 (report)	1992
					28-2	PNL-7500 (report)	1990
					HRM 28	Search-89, Table 5	1989
					28-1	PNL-5289 (report)	1984
					28-2	PNL-5289 (report)	1984
S1138	SHTS-DR28-2	ST-2829	28.290	HTS	hanftsdown28	PNNL-98/99 GPS survey	1999
					SHTS-DR28-2	PNNL-13404 (gw report)	2002
					Hanford Spr DR 28-2	PNNL-13418 (env schedule)	2001
					hanford spr dr 28-2	PNNL-13230 (env report)	2000
					Hanford Spr DR 28-2	PNNL-13109 (env schedule)	2000
					hanftsdown28	PNNL-12088 (env report)	2000
					Hanford Spr DR 28-2	PNNL-12103 (env schedule)	1999
					hanftsdown28	SESP-SLM-01, S-2.4	1999
					28-3	PNL-5289 (report)	1984
S1139	28-4		28.660	HTS	28-4	PNL-5289 (report)	1984
					28-4	PNL-8167 (report)	1992
					28-4	PNL-7500 (report)	1990
S1140	28-5		28.875	HTS	28-5	PNL-5289 (report)	1984
					28-5	PNL-8167 (report)	1992
S1141	29-0		29.050	HTS	29-0	PNL-5289 (report)	1984
					29-0	PNL-8167 (report)	1992
S1142	25-4S		29.090	HTS	25-4S	PNL-5289 (report)	1984
					250-4	WHC-0609, Table A-1	1992
S1143	29-1		29.240	PO1	29-1	PNL-5289 (report)	1984
S1144	29-2		29.500	PO1	29-2	PNL-5289 (report)	1984
S1145	29-3		29.750	PO1	29-3	PNL-5289 (report)	1984
S1146	30-0		30.040	PO1	30-0	PNL-5289 (report)	1984
S1147	30-1		30.120	PO1	30-1	PNL-5289 (report)	1984
					30-1	PNL-8167 (report)	1992
S1148	30-2		30.940	PO1	30-2	PNL-5289 (report)	1984
S1149	31-1		31.000	PO1	31-1	PNL-5289 (report)	1984
S1150	31-2		31.300	PO1	31-2	PNL-5289 (report)	1984
S1151	31-3		31.495	PO1	31-3	PNL-5289 (report)	1984
S1152	31-4		31.505	PO1	31-4	PNL-5289 (report)	1984
S1153	31-5		31.600	PO1	31-5	PNL-5289 (report)	1984
					Opposite Ringold	Search-89, Table 5	1989
S1154	32-0		32.500	PO1	32-0	PNL-5289 (report)	1984
S1155	33-1		33.000	PO1	33-1	PNL-5289 (report)	1984
S1156	34-1		34.000	PO1	34-1	PNL-5289 (report)	1984
S1157	34-2		34.900	PO1	34-2	PNL-5289 (report)	1984
S1158	34-3		34.925	PO1	34-3	PNL-5289 (report)	1984
S1159	34-4		34.940	PO1	34-4	PNL-5289 (report)	1984
S1160	35-1		35.600	PO1	35-1	PNL-5289 (report)	1984
					WPPSS	Search-89, Table 5	1989

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Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
S1161	35-2		36.000	PO1	35-2	PNL-5289 (report)	1984
					u/s of 3 lines	Search-89, Table 5	1989
S1162	36-1		36.740	PO1	36-1	PNL-5289 (report)	1984
S1163	37-1		37.100	PO1	37-1	PNL-5289 (report)	1984
					Wooded Island Slough	Search-89, Table 5	1989
S1164	37-2		37.500	PO1	37-2	PNL-5289 (report)	1984
S1165	38-1		38.250	PO1	38-1	PNL-5289 (report)	1984
					38-1	PNL-7500 (report)	1990
S1166	38-10		38.850	PO1	38-10	PNL-5289 (report)	1984
					38-10	PNL-7500 (report)	1990
S1167	39-1		39.240	PO1	39-1	PNL-5289 (report)	1984
S1168	40-1		40.000	PO1	40-1	PNL-5289 (report)	1984
S1169	40-2		40.020	PO1	40-2	PNL-5289 (report)	1984
S1170	Spr-1	S3-4076	40.760	3FF5	Spring 1	WHC-SD-EN-TI-125, App. A	1992
					40-3	PNL-5289 (report)	1984
S1171	Spr-2	S3-4089	40.890	3FF5	Spring 2	WHC-SD-EN-TI-125, App. A	1992
					40-4	PNL-5289 (report)	1984
S1172	Spr-3	S3-4126	41.260	3FF5	Spring 3	WHC-SD-EN-TI-125, App. A	1992
S1173	Spr-4	S3-4132	41.325	3FF5	Spring 4	WHC-SD-EN-TI-125, App. A	1992
S1174	41-1		41.500	3FF5	41-1	PNL-5289 (report)	1984
					41-1	PNL-7500 (report)	1990
					u/s of 300	Search-89, Table 5	1989
S1175	Spr-5	S3-4173	41.730	3FF5	Spring 5	WHC-SD-EN-TI-125, App. A	1992
S1176	Spr-6	S3-4186	41.865	3FF5	Spring 6	WHC-SD-EN-TI-125, App. A	1992
					41-2	PNL-7500 (report)	1990
					41-2	PNL-5289 (report)	1984
S1177	42-1		42.000	3FF5	42-1	PNL-5289 (report)	1984
					42-1	PNL-7500 (report)	1990
S1178	S3-42-2	S3-4211	42.105	3FF5	Spring 7	WHC-SD-EN-TI-125, App. A	1992
					S300-42-2	PNNL-13404 (gw report)	2002
					300 Area Spring 42-2	PNNL-13418 (env schedule)	2001
					300 area spring 42-2	PNNL-13230 (env report)	2000
					300 Area Spring 42-2	PNNL-13109 (env schedule)	2000
					300areaseepsespnormal	PNNL-12088 (env report)	2000
					300areaseepsespnormal	PNNL-98/99 GPS survey	1999
					300 Area Spring 42-2	PNNL-12103 (env schedule)	1999
					300areaseepsespnormal	SESP-SLM-01, S-2.4	1999
					300 Area Spring 42-2	PNNL-11803 (env schedule)	1998
					300 Area Spring 42-2	PNNL-11464 (env schedule)	1997
					300 Area Spring 42-2	PNNL-10950 (env schedule)	1996
					300 Area Seep	PNL-1995 GPS survey	1995
					300 Area Spring 42-2	PNL-10423 (env schedule)	1995
					42-2	PNL-7500 (report)	1990
					300 Area	Search-89, Table 5	1989
					spring #42-2	Search-89, Table 5	1989
					42-2	PNL-5289 (report)	1984
S1179	Spr-8	S3-4232	42.320	3FF5	Spring 8	WHC-SD-EN-TI-125, App. A	1992
					42-3	PNL-5289 (report)	1984
S1180	S3-DR42-2	S3-4236	42.365	3FF5	Spring 9	WHC-SD-EN-TI-125, App. A	1992
					S300-DR42-2	PNNL-13404 (gw report)	2002
					300 Area Spr DR 42-2	PNNL-13418 (env schedule)	2001
					300 Area Spr DR 42-2	PNNL-13109 (env schedule)	2000

Table 4.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (proposed)	HRM ("2k")	Segment[1]	Name as Used in Reference	Name Reference	Year of Name Use[2]
					300seepdownriver	PNNL-12088 (env report)	2000
					300seepdownriver	PNNL-98/99 GPS survey	1999
					300 Area Spr DR 42-2	PNNL-12103 (env schedule)	1999
					300seepdownriver	SESP-SLM-01, S-2.4	1999
					42-4	PNL-7500 (report)	1990
					42-4	PNL-5289 (report)	1984
S1181	Spr-10	S3-4243	42.430	3FF5	Spring 10	WHC-SD-EN-TI-125, App. A	1992
S1182	Spr-11	S3-4267	42.670	3FF5	Spring 11	WHC-SD-EN-TI-125, App. A	1992
					cascade	Search-89, Table 5	1989
S1183	Spr-12	S3-4306	43.060	3FF5	Spring 12	WHC-SD-EN-TI-125, App. A	1992
					u/w d/s of 300	Search-89, Table 5	1989
S1184	Spr-13	S3-4318	43.180	3FF5	Spring 13	WHC-SD-EN-TI-125, App. A	1992
S1185	Spr-14	S3-4348	43.475	3FF5	Spring 14	WHC-SD-EN-TI-125, App. A	1992
					43-1	PNL-7500 (report)	1990
					43-1	PNL-5289 (report)	1984
S1186	43-2		43.775	3FF5	43-2	PNL-5289 (report)	1984
S1187	43-3		43.860	3FF5	43-3	PNL-5289 (report)	1984
					u/s of Richland inlet	Search-89, Table 5	1989
S1188	SRL-444-1		44.400	RLD			2004

1 Abbreviations: VB = Vernita Bridge; BC5 = 100-B Area; KR4 = 100-K Area; NR2 = 100-N Area; HR3D = 100-D Area; HR3H = 100-H Area; FR3 = 100-F Area; HTS = Hanford Town Site; PO1 = Hanford town site downstream to 300 Area; 3FF5 = 300 Area; RLD = North Richland
2 Review of name use in various reports is valid through approximately 2002. Since then, name use has been reasonably consistent with the names shown under "current use."

5.0 Seep Wells in Rip Rap at N-Springs Shoreline

During the reactor operating years at the 100-N Area (1963 to 1987), a groundwater mound was created by liquid effluent disposal to the 1301-N Crib/Trench. The volume of effluent disposed caused extensive seepage of contaminated groundwater along the riverbank ("N-Springs," Figure 5.1). The seepage contained high levels of radionuclides, which posed a risk to humans and aquatic biota. To mitigate the risk of radiological exposure, large basalt boulders were placed along the shoreline as rip rap in 1984 (Probasco 1986). Fifteen steel casings, referred to as "seep wells," were installed with the rip rap to provide sampling access to the seepage (Figures 5.2 and 5.3). The seep wells have been routinely sampled in the past on an annual basis to satisfy near-field environmental monitoring requirements (Poston et al. 2003).

5.1 N-Springs Seep Well Names and Coordinates

The names and geographic coordinates for the N-Springs seep wells are listed in Table 5.1. The columns in the table are defined as follows:

- Site Identifier (proposed) – Identifier code proposed for each seep well—for internal data management purposes. This code would be used in the same way as the well identifier code assigned in the HWIS for monitoring wells, boreholes, and aquifer sampling tubes.
- Spring Name – The name appearing in recent reports describing the monitoring results for the near-field environmental monitoring project.
- Spring Name (alternate) – Alternate name used by other projects for samples collected from N-Springs seep well sites.
- HRM ("2k") – Location relative to the HRM system, as updated in 1999.
- Segment – Segments defined for convenience in grouping monitoring sites by CERCLA groundwater operable units, groundwater interest areas, or other common characteristic.
- Northing and Easting – Location coordinates in Washington State Plane (South Zone) system; units are meters; North American Datum of 1983.
- Coordinate Quality – Quality of the coordinates, e.g., "surveyed" using global position system (GPS) equipment or traditional land surveying methods; "estimated" using geographic information system (GIS) maps.
- Coordinate Type – Equipment or method used to establish coordinates.
- Coordinate Reference – Citation for information on the seep well site.

5.2 N-Springs Seep Well Name Usage

The N-Springs seep wells have been sampled for many years, with multiple names being used for individual seep wells. Because the analytical results from sampling these facilities have never been entered into the HEIS database, there has been little pressure to standardize the site names. Table 5.2 provides a listing of names used in many of the previous reports describing use of the seep wells, but no

claim is made that the list is complete. Many of the columns in Table 5.2 are the same as those used in Table 5.1, with exceptions as follows:

- Name as Used in Reference – Name as used in historical report or other reference that includes N-Springs seep well names.
- Name Reference – Citation or other source.
- Year of Name Use – Year in which a seep well name was published in reference cited.

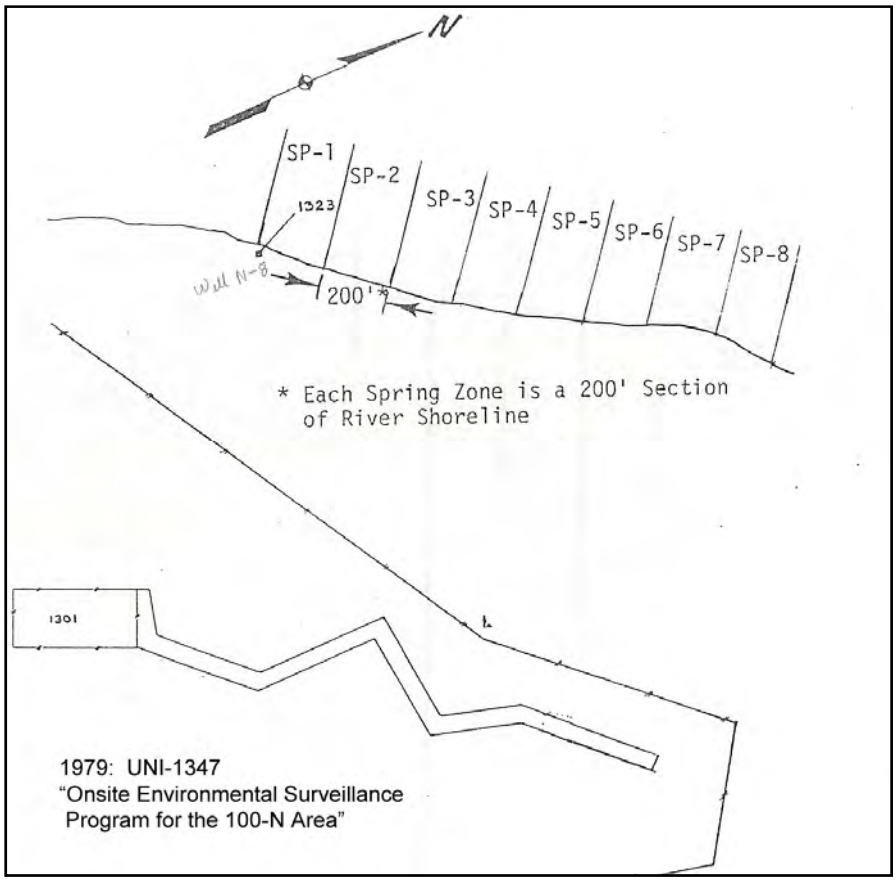

Figure 5.1. Areas of Riverbank Springs at 100-N Area During Operations (Prior to installation of rip rap and seep wells in 1984)

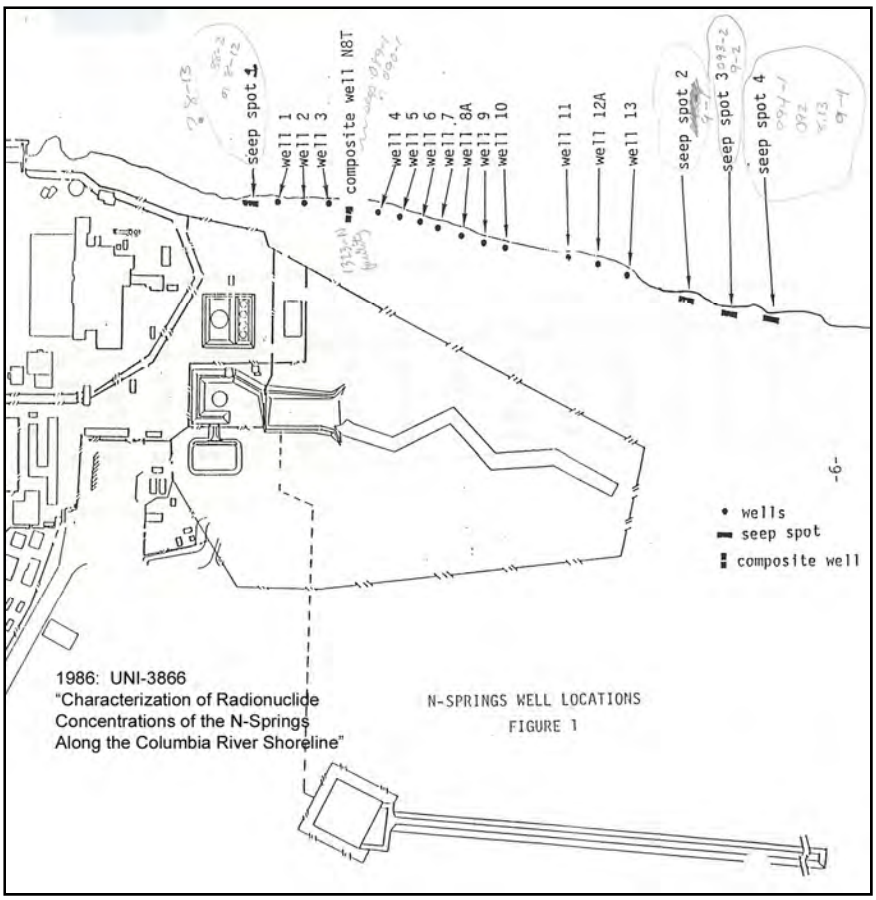

Figure 5.2. Locations of Seep Wells and Seepage Spots Along 100-N Area Shoreline (Post-installation of N-Springs seep wells in 1984)

Figure 5.3. Photograph of Seep Well Installed in Rip Rap Along 100-N Area Shoreline

Table 5.1. Riverbank Seepage Well Casings Along the N-Springs Shoreline, Hanford Site

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (alternate use)	HRM ("2k")	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type[2]	Coordinate Reference
S2000	Y301	NS-1	8.880	NR2	149,888.600	571,270.600	SURV	GPS	HGIS GPS-ID 5016
S2001	Y302	NS-2	8.895	NR2	149,911.800	571,290.400	SURV	GPS	HGIS GPS-ID 5015
S2002	Y303	NS-3	8.915	NR2	149,934.300	571,312.500	SURV	GPS	HGIS GPS-ID 5014
S2003	Y304	NS-4	8.930	NR2	149,954.500	571,335.700	SURV	GPS	HGIS GPS-ID 5013
S2004	Y305	NS-5	8.950	NR2	149,978.400	571,351.700	SURV	GPS	HGIS GPS-ID 5012
S2005	Y306	NS-6	8.970	NR2	150,003.500	571,370.200	SURV	GPS	HGIS GPS-ID 5011
S2006	Y307	NS-7	8.985	NR2	150,027.100	571,384.000	SURV	GPS	HGIS GPS-ID 5010
S2007	Y308	NS-8A	9.000	NR2	150,051.800	571,396.500	SURV	GPS	HGIS GPS-ID 5008
S2008	NS-8B	NS-8B	9.001	NR2	150,050.300	571,399.800	SURV	GPS	HGIS GPS-ID 5009
S2009	Y309	NS-9	9.015	NR2	150,080.800	571,412.400	SURV	GPS	HGIS GPS-ID 5007
S2010	Y310	NS-10	9.030	NR2	150,109.500	571,430.500	SURV	GPS	HGIS GPS-ID 5006
S2011	Y311	NS-11	9.100	NR2	150,190.400	571,495.500	SURV	GPS	HGIS GPS-ID 5005
S2012	Y312	NS-12A	9.125	NR2	150,216.300	571,513.300	SURV	GPS	HGIS GPS-ID 5003
S2013	NS-12B	NS-12B	9.126	NR2	150,214.700	571,519.300	SURV	GPS	HGIS GPS-ID 5004
S2014	Y313	NS-13	9.140	NR2	150,251.900	571,542.100	SURV	GPS	HGIS GPS-ID 5002

1 Segment abbreviations: NR2 = 100-N Area
2 Coordinate abbreviations: SURV = surveyed using traditional or global positioning system (GPS) methods

Table 5.2. Historical Names for Riverbank Seepage Well Casings Sites

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (alternate use)	HRM ("2k")	Name as Used in Reference	Name Reference	Year of Name Use[1]
S2000	Y301	NS-1	8.880	Y301	PNNL-14295, App. 2	2003
				Y301	PNNL-13910, App. 2	2002
				C3454	HEIS2_ADM_WELL	2001
				177-N-1	HEIS2_ADM_WELL	2001
				Y301	PNNL-13487, App. 2	2001
				Y301	PNNL-13230, App. 2	2000
				Y301	PNNL-12088, App. 2	1999
				Y301	HNF-EP-0573-6	1998
				Site 1	HNF-EP-0573-5	1997
				Site 1	WHC-EP-0573-4	1996
				NS-1	WHC-SP-0098-8, Fig. A-54	1996
				NS-1	BHI-00164	1995
				Site 1	WHC-EP-0573-1	1993
				Well 1	WHC-SP-0480	1989
				Well 1	WHC-SP-0277	1988
				Well 1	UNI-3866	1986
S2001	Y302	NS-2	8.895	Y302	PNNL-14295, App. 2	2003
				Y302	PNNL-13910, App. 2	2002
				C3455	HEIS2_ADM_WELL	2001
				177-N-2	HEIS2_ADM_WELL	2001
				Y302	PNNL-13487, App. 2	2001
				Y302	PNNL-13230, App. 2	2000
				Y302	PNNL-12088, App. 2	1999
				Y302	HNF-EP-0573-6	1998
				Site 2	HNF-EP-0573-5	1997
				Site 2	WHC-EP-0573-4	1996
				NS-2	WHC-SP-0098-8, Fig. A-54	1996
				NS-2	BHI-00164	1995
				Site 2	WHC-EP-0573-1	1993
				Well 2	WHC-SP-0480	1989
				Well 2	WHC-SP-0277	1988
				Well 2	UNI-3866	1986
S2002	Y303	NS-3	8.915	Y303	PNNL-14295, App. 2	2003
				Y303	PNNL-13910, App. 2	2002
				C3456	HEIS2_ADM_WELL	2001
				177-N-3	HEIS2_ADM_WELL	2001
				Y303	PNNL-13487, App. 2	2001
				Y303	PNNL-13230, App. 2	2000
				Y303	PNNL-12088, App. 2	1999
				Y303	HNF-EP-0573-6	1998
				Site 3	HNF-EP-0573-5	1997
				Site 3	WHC-EP-0573-4	1996
				NS-3	WHC-SP-0098-8, Fig. A-54	1996
				NS-3	BHI-00164	1995
				Site 3	WHC-EP-0573-1	1993
				Well 3	WHC-SP-0480	1989

Table 5.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (alternate use)	HRM ("2k")	Name as Used in Reference	Name Reference	Year of Name Use[1]
				Well 3	WHC-SP-0277	1988
				Well 3	UNI-3866	1986
S2003	Y304	NS-4	8.930	Y304	PNNL-14295, App. 2	2003
				Y304	PNNL-13910, App. 2	2002
				C3457	HEIS2_ADM_WELL	2001
				177-N-4	HEIS2_ADM_WELL	2001
				Y304	PNNL-13487, App. 2	2001
				Y304	PNNL-13230, App. 2	2000
				Y304	PNNL-12088, App. 2	1999
				Y304	HNF-EP-0573-6	1998
				Site 4	HNF-EP-0573-5	1997
				Site 4	WHC-EP-0573-4	1996
				NS-4	WHC-SP-0098-8, Fig. A-54	1996
				NS-4	BHI-00164	1995
				Site 4	WHC-EP-0573-1	1993
				N seep well #4	Search 89, Table 5	1989
				Well 4	WHC-SP-0480	1989
				Well 4	WHC-SP-0277	1988
				Well 4	UNI-3866	1986
S2004	Y305	NS-5	8.950	Y305	PNNL-14295, App. 2	2003
				Y305	PNNL-13910, App. 2	2002
				C3458	HEIS2_ADM_WELL	2001
				177-N-5	HEIS2_ADM_WELL	2001
				Y305	PNNL-13487, App. 2	2001
				Y305	PNNL-13230, App. 2	2000
				Y305	PNNL-12088, App. 2	1999
				Y305	HNF-EP-0573-6	1998
				Site 5	HNF-EP-0573-5	1997
				Site 5	WHC-EP-0573-4	1996
				NS-5	WHC-SP-0098-8, Fig. A-54	1996
				NS-5	BHI-00164	1995
				Site 5	WHC-EP-0573-1	1993
				Well 5	WHC-SP-0480	1989
				Well 5	WHC-SP-0277	1988
				Well 5	UNI-3866	1986
S2005	Y306	NS-6	8.970	Y306	PNNL-14295, App. 2	2003
				Y306	PNNL-13910, App. 2	2002
				C3459	HEIS2_ADM_WELL	2001
				177-N-6	HEIS2_ADM_WELL	2001
				Y306	PNNL-13487, App. 2	2001
				Y306	PNNL-13230, App. 2	2000
				Y306	PNNL-12088, App. 2	1999
				Y306	HNF-EP-0573-6	1998
				Site 6	HNF-EP-0573-5	1997
				Site 6	WHC-EP-0573-4	1996
				NS-6	WHC-SP-0098-8, Fig. A-54	1996
				NS-6	BHI-00164	1995

Table 5.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (alternate use)	HRM ("2k")	Name as Used in Reference	Name Reference	Year of Name Use[1]
				Site 6	WHC-EP-0573-1	1993
				Well 6	WHC-SP-0480	1989
				Well 6	WHC-SP-0277	1988
				Well 6	UNI-3866	1986
S2006	Y307	NS-7	8.985	Y307	PNNL-14295, App. 2	2003
				Y307	PNNL-13910, App. 2	2002
				C3460	HEIS2_ADM_WELL	2001
				177-N-7	HEIS2_ADM_WELL	2001
				Y307	PNNL-13487, App. 2	2001
				Y307	PNNL-13230, App. 2	2000
				Y307	PNNL-12088, App. 2	1999
				Y307	HNF-EP-0573-6	1998
				Site 7	HNF-EP-0573-5	1997
				Site 7	WHC-EP-0573-4	1996
				NS-7	WHC-SP-0098-8, Fig. A-54	1996
				NS-7	BHI-00164	1995
				Site 7	WHC-EP-0573-1	1993
				Well 7	WHC-SP-0480	1989
				Well 7	WHC-SP-0277	1988
				Well 7	UNI-3866	1986
S2007	Y308	NS-8A	9.000	Y308	PNNL-14295, App. 2	2003
				Y308	PNNL-13910, App. 2	2002
				C3461	HEIS2_ADM_WELL	2001
				177-N-8	HEIS2_ADM_WELL	2001
				Y308	PNNL-13487, App. 2	2001
				Y308	PNNL-13230, App. 2	2000
				Y308	PNNL-12088, App. 2	1999
				Y308	HNF-EP-0573-6	1998
				Site 8	HNF-EP-0573-5	1997
				Site 8	WHC-EP-0573-4	1996
				NS-8A	WHC-SP-0098-8, Fig. A-54	1996
				NS-8A	BHI-00164	1995
				Site 8	WHC-EP-0573-1	1993
				Well 8A	WHC-SP-0480	1989
				Well 8A	WHC-SP-0277	1988
				Well 8A	UNI-3866	1986
S2008	NS-8B	NS-8B	9.001	NS-8B	BHI-00164	1995
				C3462	HEIS2_ADM_WELL	2001
				177-N-9	HEIS2_ADM_WELL	2001
				NS-8B	WHC-SP-0098-8, Fig. A-54	1996
S2009	Y309	NS-9	9.015	Y309	PNNL-14295, App. 2	2003
				Y309	PNNL-13910, App. 2	2002
				C3463	HEIS2_ADM_WELL	2001
				177-N-10	HEIS2_ADM_WELL	2001
				Y309	PNNL-13487, App. 2	2001
				Y309	PNNL-13230, App. 2	2000
				Y309	PNNL-12088, App. 2	1999

Table 5.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (alternate use)	HRM ("2k")	Name as Used in Reference	Name Reference	Year of Name Use[1]
				Y309	HNF-EP-0573-6	1998
				Site 9	HNF-EP-0573-5	1997
				Site 9	WHC-EP-0573-4	1996
				NS-9	WHC-SP-0098-8, Fig. A-54	1996
				NS-9	BHI-00164	1995
				Site 9	WHC-EP-0573-1	1993
				Well 9	WHC-SP-0480	1989
				Well 9	WHC-SP-0277	1988
				Well 9	UNI-3866	1986
S2010	Y310	NS-10	9.030	Y310	PNNL-14295, App. 2	2003
				Y310	PNNL-13910, App. 2	2002
				C3464	HEIS2_ADM_WELL	2001
				177-N-11	HEIS2_ADM_WELL	2001
				Y310	PNNL-13487, App. 2	2001
				Y310	PNNL-13230, App. 2	2000
				Y310	PNNL-12088, App. 2	1999
				Y310	HNF-EP-0573-6	1998
				Site 10	HNF-EP-0573-5	1997
				Site 10	WHC-EP-0573-4	1996
				NS-10	WHC-SP-0098-8, Fig. A-54	1996
				NS-10	BHI-00164	1995
				Site 10	WHC-EP-0573-1	1993
				Well 10	WHC-SP-0480	1989
				Well 10	WHC-SP-0277	1988
				Well 10	UNI-3866	1986
S2011	Y311	NS-11	9.100	Y311	PNNL-14295, App. 2	2003
				Y311	PNNL-13910, App. 2	2002
				C3465	HEIS2_ADM_WELL	2001
				177-N-12	HEIS2_ADM_WELL	2001
				Y311	PNNL-13487, App. 2	2001
				Y311	PNNL-13230, App. 2	2000
				Y311	PNNL-12088, App. 2	1999
				Y311	HNF-EP-0573-6	1998
				Site 11	HNF-EP-0573-5	1997
				Site 11	WHC-EP-0573-4	1996
				NS-11	WHC-SP-0098-8, Fig. A-54	1996
				NS-11	BHI-00164	1995
				Site 11	WHC-EP-0573-1	1993
				Well 11	WHC-SP-0480	1989
				Well 11	WHC-SP-0277	1988
				Well 11	UNI-3866	1986
S2012	Y312	NS-12A	9.125	Y312	PNNL-14295, App. 2	2003
				Y312	PNNL-13910, App. 2	2002
				C3466	HEIS2_ADM_WELL	2001
				177-N-13	HEIS2_ADM_WELL	2001
				Y312	PNNL-13487, App. 2	2001
				Y312	PNNL-13230, App. 2	2000

Table 5.2. (contd)

Site Identifier (proposed)	Spring Name (use in 2009)	Spring Name (alternate use)	HRM ("2k")	Name as Used in Reference	Name Reference	Year of Name Use[1]
				Y312	PNNL-12088, App. 2	1999
				Y312	HNF-EP-0573-6	1998
				Site 12	HNF-EP-0573-5	1997
				Site 12	WHC-EP-0573-4	1996
				NS-12A	WHC-SP-0098-8, Fig. A-54	1996
				NS-12A	BHI-00164	1995
				Site 12	WHC-EP-0573-1	1993
				Well 12A	WHC-SP-0480	1989
				Well 12A	WHC-SP-0277	1988
				Well 12A	UNI-3866	1986
S2013	NS-12B	NS-12B	9.126	NS-12B	BHI-00164	1995
				C3467	HEIS2_ADM_WELL	2001
				177-N-14	HEIS2_ADM_WELL	2001
				NS-12B	WHC-SP-0098-8, Fig. A-54	1996
S2014	Y313	NS-13	9.140	Y313	PNNL-14295, App. 2	2003
				Y313	PNNL-13910, App. 2	2002
				C3468	HEIS2_ADM_WELL	2001
				177-N-15	HEIS2_ADM_WELL	2001
				Y313	PNNL-13487, App. 2	2001
				Y313	PNNL-13230, App. 2	2000
				Y313	PNNL-12088, App. 2	1999
				Y313	HNF-EP-0573-6	1998
				Site 13	HNF-EP-0573-5	1997
				Site 13	WHC-EP-0573-4	1996
				NS-13	WHC-SP-0098-8, Fig. A-54	1996
				NS-13	BHI-00164	1995
				Site 13	WHC-EP-0573-1	1993
				Well 13	WHC-SP-0480	1989
				Well 13	WHC-SP-0277	1988
				Well 13	UNI-3866	1986
S2015	SDW-110-1		11.025	SDW-110-1	ERC-IOM #040660	1996

1 Review of names used in various reports is valid through approximately 2003.

6.0 Riverbed Pore Water Sampling Sites

The upwelling of groundwater through riverbed substrate can be monitored by collecting samples of pore water (i.e., interstitial water) from bed sediment, although the logistics are extensive and sometimes dangerous. During 1995, a project was conducted using divers to insert small diameter sampling tubes into gravelly sediment in areas where groundwater containing chromium entered the river (Figure 6.1). The data from this project represent direct observation, rather than inference, of contaminant concentrations in the hyporheos that supports benthic habitat in the Hanford Reach.

6.1 Riverbed Pore Water Site Naming Conventions

The sampling naming convention adopted for the 1995 riverbed pore water sampling project is described in the project reports (Hope and Peterson 1996a, 1996b). For all sampling sites, the numbering convention started with a "T" to indicate a transect line extending offshore perpendicular to the shoreline. A steel pin was implanted at the shoreline to serve as the transect reference point. The second digit identified the reactor area: "H" for 100-H, "D" for 100-D, and "K" for 100-K. (Note: Only one transect was completed at 100-K before the project was cancelled).

At the 100-H Area, the sample site was further described by a transect number and distance offshore (Hope and Peterson 1996a). For example, site number "TH-3A" indicates transect number 3 at the 100-H Area, at distance A offshore (i.e., 9 meters). Distance B indicates 21 meters offshore.

For the 100-D Area sites, the naming convention was changed slightly by adding a "P" to the initial group of letters, signifying a pore water sample (Hope and Peterson 1996b). This was done to distinguish between pore water samples and river water samples ("R"), which were also collected at each riverbed site. Also, the "A" and "B" convention was changed from indicating distance offshore to indicating water depth (1.5 meter and 3 meters, respectively). A complete site name would be "TDP-17A," indicating transect 17 at the 100-D Area, pore water sample, and collected at depth A (1.5 meters). If a co-located sample was obtained for quality control purposes, a suffix "c" was added (TDP-17Ac).

In 1996, divers were again used to install six additional pore water sampling ports—two each at 100-D/DR, 100-H, and 100-K Areas (Environmental Restoration Contractor Interoffice Memorandum, MH Sturges to AJ Knepp, March 11, 1997, *Installation of Riverbed Pore Water Sampling Ports in the Columbia River at 100-D/DR, 100-H, and 100-K Reactor Areas.* Control No. 044041. Author: SJ Hope). These ports were connected to the high water shoreline by small diameter polyethylene tubing within a schedule 40 polyvinyl chloride overpack. Although very little use of these semi-permanent sampling facilities has occurred, a naming convention has been adopted that simply adds another "P" to the initial letter group, indicating permanent port (e.g., TDPP-15A).

Discreet identifiers for database purposes were not assigned to the sites sampled by the divers at the time of the project. The divers removed all equipment used to obtain the samples of sediment pore water, so it would not be possible to return to the exact location of sample collection.

6.2 Pore Water Sampling Site Names and Coordinates

A listing of all riverbed pore water sampling sites visited under the Environmental Restoration program investigations in 1995 and 1996 is presented in Table 6.1. The fields in Table 6.1 are defined as follows:

- Site Identifier (proposed) – Identifier code proposed for each riverbed pore water sampling site. The code is used for internal data management purposes.
- Riverbed Site Name – The name used in the two published reports for the riverbed pore water sampling project (Hope and Peterson 1996a and 1996b).
- Sample Depth – Depth below ground surface (in feet) from which the pore water sample was collected.
- Segment – Segments defined for convenience in grouping monitoring sites by CERCLA groundwater operable units or other common characteristic.
- Northing and Easting – Location coordinates in Washington State Plane (South Zone) system; units are meters; North American Datum of 1983.
- Coordinate Quality – Quality of the coordinates, either "estimated" from various maps, or "surveyed" using global positioning system equipment (GPS) or traditional land surveying methods.
- Coordinate Type/Source – Source for coordinate information. "GPS deriv." indicates that the sampling site coordinates were derived from a surveyed reference point. For the riverbed pore water projects, a steel pin was placed along the shoreline at each offshore diving transect. The direction and distance from the pin to the divers' location was recorded for each sampling site. The pins were surveyed using GPS equipment. "ARCmap" refers to GIS coverages for the river, including topography, shorelines, facilities, and the HRM system (ARCInfo,™ ESRI Inc., Bellevue, Washington). The GIS was used to position sites using narrative descriptions from field notes when GPS coordinates were not available.
- Coordinate Reference – Citation or project electronic file for information on the riverbed pore water sampling site.
- Comments – Notes verbatim from field notebooks.

6.3 Pore Water Transect Reference Pins

Table 6.2 lists the geographic coordinates for the reference pins used to locate the riverbed sites sampled by divers. The pins are steel rebar stakes driven into the cobbles along the rivershore, each fitted with a large orange-colored plastic cap. The columns are defined as follows:

- Segment – Segments defined for convenience in grouping monitoring sites by CERCLA groundwater operable units or other common characteristic.
- Transect Pin Identifier – Name assigned to steel pins (rebar) used as reference points for each of the offshore transects of riverbed pore water sampling tube locations.
- Transect Pin Field Label – Name attached to steel pin in the field during the investigations.

- GPS ID (ERC) – Identifier assigned by Bechtel Hanford, Inc. to each location surveyed using GPS equipment. Data from GPS surveys conducted by Bechtel are stored in the Hanford Geographic Information System (HGIS).
- Pin Northing and Pin Easting – Geographic coordinates for the pin referenced to the Washington State Plane system, South Zone; units are meters; North American Datum of 1983.

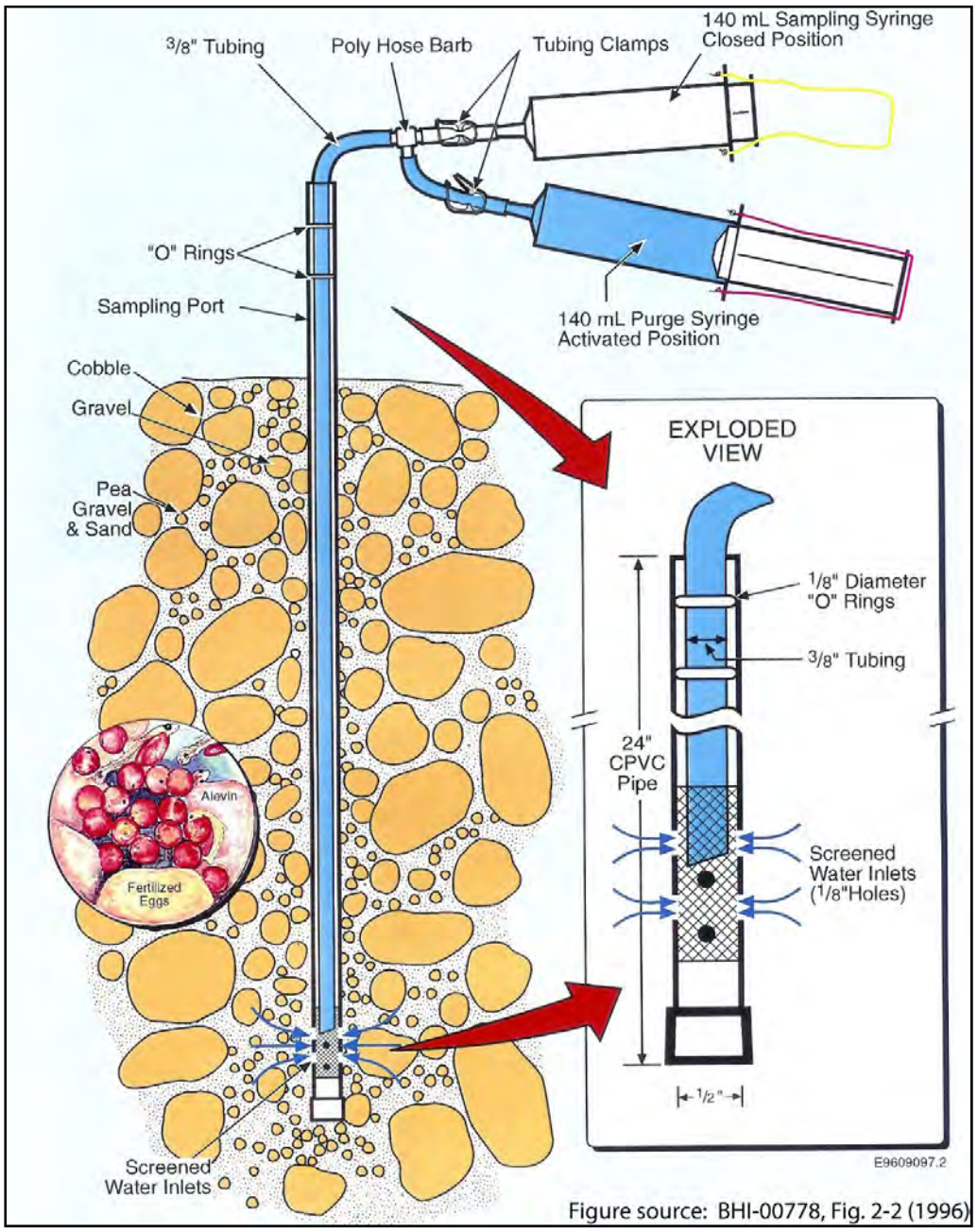

Figure 6.1. Diagram of Riverbed Pore Water Sampling Apparatus

Table 6.1. Riverbed Substrate Pore Water Sampling Sites Along the Hanford Site Shoreline

Site Identifier (proposed)	Riverbed Site Name	Sample Depth (ft-bgs)	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference	Comments
P1001	TH-01A	1.5	HR3H	152,732.228	578,208.895	SURV	GPS deriv.	BHI-00345	
P1002	TH-01B	1.5	HR3H	152,736.800	578,200.976	SURV	GPS deriv.	BHI-00345	
P1003	TH-02A	1.5	HR3H	152,791.316	578,169.898	SURV	GPS deriv.	BHI-00345	
P1004	TH-02B	1.5	HR3H	152,798.134	578,159.790	SURV	GPS deriv.	BHI-00345	
P1005	TH-03A	1.5	HR3H	152,845.605	578,175.004	SURV	GPS deriv.	BHI-00345	
P1006	TH-03B	1.5	HR3H	152,852.943	578,165.267	SURV	GPS deriv.	BHI-00345	
P1007	TH-04A	1.5	HR3H	152,904.172	578,152.989	SURV	GPS deriv.	BHI-00345	
P1008	TH-04B	1.5	HR3H	152,905.639	578,151.042	SURV	GPS deriv.	BHI-00345	
P1009	TH-05A	1.5	HR3H	152,966.674	578,123.881	SURV	GPS deriv.	BHI-00345	
P1010	TH-05B	1.5	HR3H	152,974.561	578,113.413	SURV	GPS deriv.	BHI-00345	
P1011	TH-06A	1.5	HR3H	153,017.723	578,090.511	SURV	GPS deriv.	BHI-00345	
P1012	TH-06B	1.5	HR3H	153,025.610	578,080.043	SURV	GPS deriv.	BHI-00345	
P1013	TH-07A	1.5	HR3H	153,067.463	578,061.403	SURV	GPS deriv.	BHI-00345	
P1014	TH-07B	1.5	HR3H	153,075.825	578,052.116	SURV	GPS deriv.	BHI-00345	
P1015	TH-08A	1.5	HR3H	153,116.737	578,026.432	SURV	GPS deriv.	BHI-00345	
P1016	TH-08B	1.5	HR3H	153,120.408	578,022.354	SURV	GPS deriv.	BHI-00345	
P1017	TH-09A	1.5	HR3H	153,168.886	577,986.459	SURV	GPS deriv.	BHI-00345	
P1018	TH-09B	1.5	HR3H	153,173.372	577,981.475	SURV	GPS deriv.	BHI-00345	
P1019	TH-10A	1.5	HR3H	153,212.878	577,948.760	SURV	GPS deriv.	BHI-00345	
P1020	TH-10B	1.5	HR3H	153,217.365	577,943.776	SURV	GPS deriv.	BHI-00345	
P1021	TH-11A	1.5	HR3H	153,254.251	577,904.310	SURV	GPS deriv.	BHI-00345	
P1022	TH-11B	1.5	HR3H	153,263.390	577,895.787	SURV	GPS deriv.	BHI-00345	
P1023	TH-12A	1.5	HR3H	153,300.227	577,867.328	SURV	GPS deriv.	BHI-00345	
P1024	TH-12B	1.5	HR3H	153,305.354	577,862.547	SURV	GPS deriv.	BHI-00345	
P1025	TH-13A	1.5	HR3H	153,345.550	577,825.384	SURV	GPS deriv.	BHI-00345	
P1026	TH-13B	1.5	HR3H	153,350.677	577,820.603	SURV	GPS deriv.	BHI-00345	
P1027	TH-14A	1.5	HR3H	153,383.622	577,784.674	SURV	GPS deriv.	BHI-00345	
P1028	TH-14B	1.5	HR3H	153,390.363	577,779.954	SURV	GPS deriv.	BHI-00345	
P1029	TH-15A	1.5	HR3H	153,421.543	577,731.286	SURV	GPS deriv.	BHI-00345	
P1030	TH-15B		HR3H	153,412.804	577,737.405	SURV	GPS deriv.	BHI-00345	Not sampled
P1031	TH-16A	1.5	HR3H	153,457.672	577,676.872	SURV	GPS deriv.	BHI-00345	
P1032	TH-16B		HR3H	153,451.180	577,681.417	SURV	GPS deriv.	BHI-00345	Not sampled
P1033	TH-17A	1.5	HR3H	153,487.252	577,636.467	SURV	GPS deriv.	BHI-00345	

Table 6.1. (contd)

Site Identifier (proposed)	Riverbed Site Name	Sample Depth (ft-bgs)	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference	Comments
P1034	TH-17B		HR3H	153,478.763	577,642.411	SURV	GPS deriv.	BHI-00345	Not sampled
P1035	TH-18A		HR3H	152,669.622	578,252.554	SURV	GPS deriv.	BHI-00345	Not sampled
P1036	TH-18B		HR3H	152,669.622	578,252.554	SURV	GPS deriv.	BHI-00345	Not sampled
P1037	TH-19A		HR3H	152,621.806	578,290.208	SURV	GPS deriv.	BHI-00345	Not sampled
P1038	TH-19B		HR3H	152,621.806	578,290.208	SURV	GPS deriv.	BHI-00345	Not sampled
P1039	TH-20A		HR3H	152,577.402	578,332.138	SURV	GPS deriv.	BHI-00345	Not sampled
P1040	TH-20B		HR3H	152,577.402	578,332.138	SURV	GPS deriv.	BHI-00345	Not sampled
P1041	TH-21A		HR3H	152,539.336	578,379.518	SURV	GPS deriv.	BHI-00345	Not sampled
P1042	TH-21B		HR3H	152,539.336	578,379.518	SURV	GPS deriv.	BHI-00345	Not sampled
P1043	TH-22A		HR3H	152,499.373	578,425.129	SURV	GPS deriv.	BHI-00345	Not sampled
P1044	TH-22B		HR3H	152,499.373	578,425.129	SURV	GPS deriv.	BHI-00345	Not sampled
P1045	TV-26A	1.5	VB	144,029.791	550,978.256	EST	ARCmap	BHI-00345	Background sites for Cr+6 study
P1046	TV-26B	1.5	VB	143,983.403	550,978.256	EST	ARCmap	BHI-00345	Background sites for Cr+6 study
P1047	TV-27A	1.5	VB	144,033.359	550,441.220	EST	ARCmap	BHI-00345	Background sites for Cr+6 study
P1048	TV-27B	1.5	VB	143,995.892	550,441.220	EST	ARCmap	BHI-00345	Background sites for Cr+6 study
P1049	TV-28A	1.5	VB	144,049.417	549,870.285	EST	ARCmap	BHI-00345	Background sites for Cr+6 study
P1050	TV-28B	1.5	VB	144,015.518	549,870.285	EST	ARCmap	BHI-00345	Background sites for Cr+6 study
P2001	TDP-01A	1.5	HR3D	153,307.320	574,041.452	SURV	GPS deriv.	BHI-00778	Azi estimate (poresurv cmt)
P2002	TDP-01B		HR3D	153,313.575	574,024.267	SURV	GPS deriv.	BHI-00778	Not sampled
P2003	TDP-02A	1.5	HR3D	153,255.351	574,007.581	SURV	GPS deriv.	BHI-00778	Azi estimate (poresurv cmt)
P2004	TDP-02B		HR3D	153,262.649	573,987.531	SURV	GPS deriv.	BHI-00778	Not sampled
P2005	TDP-03A	1.5	HR3D	153,201.632	573,979.142	SURV	GPS deriv.	BHI-00778	Azi estimate (poresurv cmt)
P2006	TDP-03B		HR3D	153,209.138	573,958.519	SURV	GPS deriv.	BHI-00778	Not sampled
P2007	TDP-04A		HR3D	153,144.379	573,958.843	SURV	GPS deriv.	BHI-00778	Estimate (poresurv cmt)
P2008	TDP-04B		HR3D	153,152.197	573,937.361	SURV	GPS deriv.	BHI-00778	Not sampled
P2009	TDP-05A	1.5	HR3D	153,087.985	573,932.759	SURV	GPS deriv.	BHI-00778	
P2010	TDP-05B		HR3D	153,093.866	573,913.522	SURV	GPS deriv.	BHI-00778	Not sampled
P2011	TDP-06A	1.5	HR3D	153,028.857	573,925.835	SURV	GPS deriv.	BHI-00778	
P2012	TDP-06B	0.8	HR3D	153,026.673	573,914.134	SURV	GPS deriv.	BHI-00778	
P2013	TDP-07A	1.5	HR3D	152,999.309	573,884.756	SURV	GPS deriv.	BHI-00778	
P2014	TDP-07B	1.5	HR3D	152,968.408	573,905.926	SURV	GPS deriv.	BHI-00778	
P2015	TDP-08A	1.5	HR3D	152,913.038	573,892.795	SURV	GPS deriv.	BHI-00778	

Table 6.1. (contd)

Site Identifier (proposed)	Riverbed Site Name	Sample Depth (ft-bgs)	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference	Comments
P2016	TDP-08B	1.0	HR3D	152,915.036	573,879.194	SURV	GPS deriv.	BHI-00778	
P2017	TDP-09A	1.5	HR3D	152,852.385	573,877.768	SURV	GPS deriv.	BHI-00778	
P2018	TDP-09B	1.3	HR3D	152,858.985	573,861.362	SURV	GPS deriv.	BHI-00778	
P2019	TDP-09Bc	0.8	HR3D	152,862.985	573,865.362	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2020	TDP-10A	1.5	HR3D	152,796.585	573,856.023	SURV	GPS deriv.	BHI-00778	
P2021	TDP-10B	1.5	HR3D	152,801.652	573,844.588	SURV	GPS deriv.	BHI-00778	
P2022	TDP-11A	1.5	HR3D	152,755.155	573,818.291	SURV	GPS deriv.	BHI-00778	
P2023	TDP-11B	1.5	HR3D	152,751.267	573,815.963	SURV	GPS deriv.	BHI-00778	
P2024	TDP-12A	1.5	HR3D	152,701.972	573,797.501	SURV	GPS deriv.	BHI-00778	
P2025	TDP-12B	1.5	HR3D	152,699.958	573,790.916	SURV	GPS deriv.	BHI-00778	
P2026	TDP-13A	1.5	HR3D	152,650.961	573,766.722	SURV	GPS deriv.	BHI-00778	
P2027	TDP-13Ac	1.5	HR3D	152,654.961	573,770.722	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2028	TDP-13B	1.5	HR3D	152,664.709	573,745.026	SURV	GPS deriv.	BHI-00778	
P2029	TDP-14A	1.5	HR3D	152,605.102	573,729.531	SURV	GPS deriv.	BHI-00778	
P2030	TDP-14B	1.5	HR3D	152,616.670	573,710.924	SURV	GPS deriv.	BHI-00778	
P2031	TDP-15A	1.5	HR3D	152,561.596	573,691.908	SURV	GPS deriv.	BHI-00778	
P2032	TDP-15B	1.5	HR3D	152,583.014	573,678.659	SURV	GPS deriv.	BHI-00778	
P2033	TDP-15Bc	1.5	HR3D	152,587.014	573,682.659	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2034	TDP-16A	1.5	HR3D	152,532.307	573,638.001	SURV	GPS deriv.	BHI-00778	
P2035	TDP-16B	1.5	HR3D	152,546.506	573,629.373	SURV	GPS deriv.	BHI-00778	
P2036	TDP-17A	1.5	HR3D	152,490.782	573,590.821	SURV	GPS deriv.	BHI-00778	
P2037	TDP-17B	1.5	HR3D	152,503.899	573,579.884	SURV	GPS deriv.	BHI-00778	
P2038	TDP-18A	1.5	HR3D	152,462.817	573,542.065	SURV	GPS deriv.	BHI-00778	
P2039	TDP-18Ac	1.5	HR3D	152,466.817	573,546.065	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2040	TDP-18B	1.3	HR3D	152,467.882	573,530.880	SURV	GPS deriv.	BHI-00778	
P2041	TDP-19A	1.5	HR3D	152,380.000	573,490.000	SURV	GPS deriv.	BHI-00778	Not in GPS survey list
P2042	TDP-19B	1.3	HR3D	152,395.000	573,475.000	SURV	GPS deriv.	BHI-00778	Not in GPS survey list
P2043	TDP-19Bc	0.8	HR3D	152,399.000	573,479.000	SURV	GPS deriv.	BHI-00778	Not in GPS survey list; colocate
P2044	TDP-20A	1.5	HR3D	152,388.174	573,432.948	SURV	GPS deriv.	BHI-00778	
P2045	TDP-20B	1.5	HR3D	152,390.462	573,434.652	SURV	GPS deriv.	BHI-00778	
P2046	TDP-21A	1.5	HR3D	152,362.855	573,394.522	SURV	GPS deriv.	BHI-00778	
P2047	TDP-21B	1.5	HR3D	152,355.013	573,388.964	SURV	GPS deriv.	BHI-00778	

Table 6.1. (contd)

Site Identifier (proposed)	Riverbed Site Name	Sample Depth (ft-bgs)	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference	Comments
P2048	TDP-22A	1.5	HR3D	152,320.921	573,348.062	SURV	GPS deriv.	BHI-00778	
P2049	TDP-22B	1.3	HR3D	152,324.934	573,338.772	SURV	GPS deriv.	BHI-00778	
P2050	TDP-23A	1.3	HR3D	152,293.394	573,296.902	SURV	GPS deriv.	BHI-00778	
P2051	TDP-23B	1.2	HR3D	152,311.636	573,276.577	SURV	GPS deriv.	BHI-00778	
P2052	TDP-24A	1.5	HR3D	152,257.185	573,243.436	SURV	GPS deriv.	BHI-00778	
P2053	TDP-24B	1.5	HR3D	152,275.394	573,231.745	SURV	GPS deriv.	BHI-00778	
P2054	TDP-25A	1.5	HR3D	152,213.693	573,193.813	SURV	GPS deriv.	BHI-00778	
P2055	TDP-25B	1.2	HR3D	152,229.612	573,187.445	SURV	GPS deriv.	BHI-00778	
P2056	TDP-26A	1.5	HR3D	152,183.062	573,137.300	SURV	GPS deriv.	BHI-00778	
P2057	TDP-26B	1.5	HR3D	152,194.479	573,136.029	SURV	GPS deriv.	BHI-00778	
P2058	TDP-27A	1.5	HR3D	152,145.394	573,092.755	SURV	GPS deriv.	BHI-00778	
P2059	TDP-27B	1.5	HR3D	152,156.111	573,087.141	SURV	GPS deriv.	BHI-00778	
P2060	TDP-27Bc	1.5	HR3D	152,160.111	573,091.141	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2061	TDP-28A	0.8	HR3D	152,105.697	573,047.953	SURV	GPS deriv.	BHI-00778	
P2062	TDP-28B	1.2	HR3D	152,112.980	573,036.511	SURV	GPS deriv.	BHI-00778	
P2063	TDP-29A	1.5	HR3D	152,081.837	572,994.625	SURV	GPS deriv.	BHI-00778	
P2064	TDP-29B		HR3D	152,088.932	572,981.860	SURV	GPS deriv.	BHI-00778	Not sampled
P2065	TDP-30A	0.8	HR3D	152,038.827	572,944.146	SURV	GPS deriv.	BHI-00778	
P2066	TDP-30B	1.5	HR3D	152,060.476	572,936.006	SURV	GPS deriv.	BHI-00778	
P2067	TDP-31A	1.5	HR3D	151,974.878	572,919.805	SURV	GPS deriv.	BHI-00778	
P2068	TDP-31B	1.5	HR3D	151,977.550	572,917.771	SURV	GPS deriv.	BHI-00778	
P2069	TDP-32A	1.5	HR3D	151,914.971	572,898.020	SURV	GPS deriv.	BHI-00778	
P2070	TDP-32B	1.5	HR3D	151,940.630	572,868.703	SURV	GPS deriv.	BHI-00778	
P2071	TDP-33A	1.5	HR3D	151,871.775	572,861.603	SURV	GPS deriv.	BHI-00778	
P2072	TDP-33Ac	1.5	HR3D	151,875.775	572,865.603	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2073	TDP-33B	1.2	HR3D	151,904.321	572,831.253	SURV	GPS deriv.	BHI-00778	
P2074	TDP-34A	1.5	HR3D	151,834.455	572,812.185	SURV	GPS deriv.	BHI-00778	
P2075	TDP-34B	1.5	HR3D	151,867.879	572,792.417	SURV	GPS deriv.	BHI-00778	
P2076	TDP-38A	1.5	HR3D	151,687.207	572,628.624	SURV	GPS deriv.	BHI-00778	
P2077	TDP-38B	1.5	HR3D	151,707.580	572,595.520	SURV	GPS deriv.	BHI-00778	
P2078	TDP-39A	1.5	HR3D	151,634.234	572,596.074	SURV	GPS deriv.	BHI-00778	
P2079	TDP-39Ac	1.5	HR3D	151,638.234	572,600.074	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north

Table 6.1. (contd)

Site Identifier (proposed)	Riverbed Site Name	Sample Depth (ft-bgs)	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference	Comments
P2080	TDP-39B	1.5	HR3D	151,662.678	572,580.192	SURV	GPS deriv.	BHI-00778	
P2081	TDP-40A	1.5	HR3D	151,580.000	572,570.000			BHI-00778	Not in GPS survey list
P2082	TDP-40B	1.2	HR3D	151,595.000	572,555.000			BHI-00778	Not in GPS survey list
P2083	TDP-41A	1.5	HR3D	151,538.597	572,521.491	SURV	GPS deriv.	BHI-00778	
P2084	TDP-41B	1.5	HR3D	151,559.007	572,503.780	SURV	GPS deriv.	BHI-00778	
P2085	TDP-42A	1.5	HR3D	151,504.828	572,474.040	SURV	GPS deriv.	BHI-00778	
P2086	TDP-42B	1.5	HR3D	151,517.060	572,463.026	SURV	GPS deriv.	BHI-00778	
P2087	TDP-43A	1.5	HR3D	151,453.540	572,437.351	SURV	GPS deriv.	BHI-00778	
P2088	TDP-43B	1.5	HR3D	151,466.103	572,431.128	SURV	GPS deriv.	BHI-00778	
P2089	TDP-44A	1.5	HR3D	151,402.539	572,402.832	SURV	GPS deriv.	BHI-00778	
P2090	TDP-44Ac	1.5	HR3D	151,406.539	572,406.832	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2091	TDP-44B	1.5	HR3D	151,433.587	572,381.309	SURV	GPS deriv.	BHI-00778	
P2092	TDP-45A	1.5	HR3D	151,365.013	572,355.653	SURV	GPS deriv.	BHI-00778	
P2093	TDP-45B	1.3	HR3D	151,369.514	572,352.859	SURV	GPS deriv.	BHI-00778	
P2094	TDP-46A	1.5	HR3D	151,321.607	572,312.272	SURV	GPS deriv.	BHI-00778	
P2095	TDP-46B	1.2	HR3D	151,328.876	572,300.169	SURV	GPS deriv.	BHI-00778	
P2096	TDP-47A	1.5	HR3D	151,279.916	572,271.092	SURV	GPS deriv.	BHI-00778	
P2097	TDP-47B	1.3	HR3D	151,280.851	572,267.314	SURV	GPS deriv.	BHI-00778	
P2098	TDP-48A	1.5	HR3D	151,233.207	572,233.175	SURV	GPS deriv.	BHI-00778	
P2099	TDP-48B	1.3	HR3D	151,236.321	572,222.840	SURV	GPS deriv.	BHI-00778	
P2100	TDP-49A	1.5	HR3D	151,185.420	572,191.918	SURV	GPS deriv.	BHI-00778	
P2101	TDP-49B	1.5	HR3D	151,189.782	572,185.652	SURV	GPS deriv.	BHI-00778	
P2102	TDP-50A	1.5	HR3D	151,139.327	572,156.143	SURV	GPS deriv.	BHI-00778	
P2103	TDP-50Ac	1.3	HR3D	151,143.327	572,160.143	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2104	TDP-50B	1.5	HR3D	151,149.234	572,141.660	SURV	GPS deriv.	BHI-00778	
P2105	TDP-51A	1.5	HR3D	151,092.701	572,115.791	SURV	GPS deriv.	BHI-00778	
P2106	TDP-51B	0.8	HR3D	151,096.701	572,111.191	SURV	GPS deriv.	BHI-00778	
P2107	TDP-51Bc	1.5	HR3D	151,100.701	572,115.191	SURV	GPS deriv.	BHI-00778	Colocate +4m east and north
P2108	TDP-52A		HR3D	151,032.393	572,093.526	SURV	GPS deriv.	BHI-00778	Not sampled
P2109	TDP-52B		HR3D	151,032.393	572,093.526	SURV	GPS deriv.	BHI-00778	Not sampled
P3001	THDS-5-S	1.0	HR3H	152,706.800	578,200.976	SURV	GPS deriv.	ERC#044041	Tube to shore; dwnstrm of TH-1
P3002	THDS-5-M	1.5	HR3H	152,706.800	578,200.976	SURV	GPS deriv.	ERC#044041	Tube to shore; dwnstrm of TH-1

Table 6.1. (contd)

Site Identifier (proposed)	Riverbed Site Name	Sample Depth (ft-bgs)	Segment[1]	Northing (m-NAD83)	Easting (m-NAD83)	Coordinate Quality[2]	Coordinate Type/Source	Coordinate Reference	Comments
P3003	THDS-5-D	2.0	HR3H	152,706.800	578,200.976	SURV	GPS deriv.	ERC#044041	Tube to shore; dwnstrm of TH-1
P3004	TH-01B-S	1.0	HR3H	152,736.800	578,200.976	SURV	GPS deriv.	ERC#044041	Tube to shore
P3005	TH-01B-M	1.5	HR3H	152,736.800	578,200.976	SURV	GPS deriv.	ERC#044041	Tube to shore
P3006	TH-01B-D	2.0	HR3H	152,736.800	578,200.976	SURV	GPS deriv.	ERC#044041	Tube to shore
P3007	TDP-15A-S	1.0	HR3D	152,561.596	573,691.908	SURV	GPS deriv.	ERC#044041	Tube to shore
P3008	TDP-15A-M	1.5	HR3D	152,561.596	573,691.908	SURV	GPS deriv.	ERC#044041	Tube to shore
P3009	TDP-15A-D	2.0	HR3D	152,561.596	573,691.908	SURV	GPS deriv.	ERC#044041	Tube to shore
P3010	TDP-39A-S	1.0	HR3D	151,634.234	572,596.074	SURV	GPS deriv.	ERC#044041	Tube to shore
P3011	TDP-39A-M	1.5	HR3D	151,634.234	572,596.074	SURV	GPS deriv.	ERC#044041	Tube to shore
P3012	TDP-39A-D	2.0	HR3D	151,634.234	572,596.074	SURV	GPS deriv.	ERC#044041	Tube to shore
P3013	TK-14-M	1.5	KR4	148,482.730	569,963.760	EST	ARCmap	ERC#044041	Tube to shore; Arc-View loc est.
P3014	TK-14-D	2.0	KR4	148,482.730	569,963.760	EST	ARCmap	ERC#044041	Tube to shore; Arc-View loc est.
P3015	TK-14-Dc	2.0	KR4	148,482.730	569,963.760	EST	ARCmap	ERC#044041	Tube to shore; Arc-View loc est.
P3016	TK-20-S	1.0	KR4	148,266.830	569,671.660	EST	ARCmap	ERC#044041	Tube to shore; Arc-View loc est.
P3017	TK-20-M	1.5	KR4	148,266.830	569,671.660	EST	ARCmap	ERC#044041	Tube to shore; Arc-View loc est.

1 Abbreviations: VB = Vernita Bridge; KR4 = 100-K Area; HR3D = 100-D Area; HR3H = 100-H Area
2 EST = estimated from field narratives or geographic information system maps; SURV = surveyed using traditional or global positioning system (GPS) methods

Table 6.2. Transect Locator Pins for Riverbed Pore Water Sampling Sites

Segment[1]	Transect Pin Identifier	Transect Pin Field Label	GPS ID[2] (ERC)	Pin Northing (m-NAD83)	Pin Easting (m-NAD83)
HR3D	TD-01-PIN	TD-1-PIN	3046	153,303.150	574,052.909
HR3D	TD-02-PIN	TD-2-PIN	3045	153,248.054	574,027.630
HR3D	TD-03-PIN	TD-3-PIN	3044	153,194.543	573,998.618
HR3D	TD-04-PIN	TD-4-PIN	3043	153,136.560	573,980.324
HR3D	TD-05-PIN	TD-5-PIN	3042	153,080.499	573,957.244
HR3D	TD-06-PIN	TD-6-PIN	1062	153,021.592	573,942.950
HR3D	TD-07-PIN	TD-7-PIN	3040	152,962.288	573,930.473
HR3D	TD-08-PIN	TD-8-PIN	1060	152,905.052	573,909.922
HR3D	TD-09-PIN	TD-9-PIN	3037	152,846.860	573,892.948
HR3D	TD-10-PIN	TD-10-PIN	3036	152,788.065	573,878.218
HR3D	TD-11-PIN	TD-11-PIN	3035	152,740.667	573,839.770
HR3D	TD-12-PIN	TD-12-PIN	1055	152,684.024	573,817.434
HR3D	TD-13-PIN	TD-13-PIN	1054	152,631.213	573,787.899
HR3D	TD-14-PIN	TD-14-PIN	1053	152,591.524	573,743.109
HR3D	TD-15-PIN	TD-15-PIN	1051	152,551.734	573,696.718
HR3D	TD-16-PIN	TD-16-PIN	1047	152,522.338	573,644.475
HR3D	TD-17-PIN	TD-17-PIN	1043	152,483.426	573,597.681
HR3D	TD-18-PIN	TD-18-PIN	3000	152,439.588	573,555.476
HR3D	TD-20-PIN	TD-20-PIN	3003	152,359.195	573,459.972
HR3D	TD-21-PIN	TD-21-PIN	3004	152,325.551	573,409.594
HR3D	TD-22-PIN	TD-22-PIN	3007	152,298.310	573,355.409
HR3D	TD-23-PIN	TD-23-PIN	3009	152,270.356	573,301.380
HR3D	TD-24-PIN	TD-24-PIN	3010	152,237.588	573,250.184
HR3D	TD-25-PIN	TD-25-PIN	3011	152,205.855	573,198.523
HR3D	TD-26-PIN	TD-26-PIN	3012	152,169.687	573,149.772
HR3D	TD-27-PIN	TD-27-PIN	3015	152,131.038	573,102.808
HR3D	TD-28-PIN	TD-28-PIN	3016	152,096.816	573,052.675
HR3D	TD-29-PIN	TD-29-PIN	3017	152,058.909	573,005.317
HR3D	TD-30-PIN	TD-30-PIN	3018	152,017.450	572,960.847
HR3D	TD-31-PIN	TD-31-PIN	3019	151,967.977	572,925.804
HR3D	TD-32-PIN	TD-32-PIN	3021	151,909.104	572,909.054
HR3D	TD-33-PIN	TD-33-PIN	3022	151,861.967	572,870.749
HR3D	TD-34-PIN	TD-34-PIN	3023	151,824.685	572,822.662
HR3D	TD-38-PIN	TD-38-PIN	1040	151,680.139	572,636.203
HR3D	TD-39-PIN	TD-39-PIN	1008	151,627.416	572,605.811
HR3D	TD-41-PIN	TD-41-PIN	1010	151,530.342	572,532.445
HR3D	TD-42-PIN	TD-42-PIN	1016	151,491.464	572,486.073
HR3D	TD-43-PIN	TD-43-PIN	1020	151,441.942	572,450.693

Table 6.2. (contd)

Segment[1]	Transect Pin Identifier	Transect Pin Field Label	GPS ID[2] (ERC)	Pin Northing (m-NAD83)	Pin Easting (m-NAD83)
HR3D	TD-44-PIN	TD-44-PIN	1023	151,395.878	572,410.771
HR3D	TD-45-PIN	TD-45-PIN	1024	151,355.697	572,365.300
HR3D	TD-46-PIN	TD-46-PIN	1025	151,310.244	572,325.814
HR3D	TD-47-PIN	TD-47-PIN	1026	151,264.535	572,285.435
HR3D	TD-48-PIN	TD-48-PIN	1027	151,214.928	572,250.221
HR3D	TD-49-PIN	TD-49-PIN	1032	151,170.266	572,210.631
HR3D	TD-50-PIN	TD-50-PIN	1037	151,127.487	572,167.577
HR3D	TD-51-PIN	TD-51-PIN	1039	151,077.304	572,133.504
HR3D	TD-52-PIN	TD-52-PIN	1038	151,032.393	572,093.526
HR3H	TH-01-PIN	TH-1-PIN	2009	152,721.560	578,227.373
HR3H	TH-01A-PIN	TH-DS-6-PIN	2007	152,718.181	578,216.364
HR3H	TH-02-PIN	TH-2-PIN	2013	152,774.272	578,195.167
HR3H	TH-03-PIN	TH-3-PIN	2014	152,838.268	578,184.741
HR3H	TH-04-PIN	TH-4-PIN	2015	152,898.669	578,160.292
HR3H	TH-05-PIN	TH-5-PIN	2016	152,961.721	578,130.453
HR3H	TH-06-PIN	TH-6-PIN	2017	153,012.770	578,097.083
HR3H	TH-07-PIN	TH-7-PIN	2019	153,061.548	578,067.972
HR3H	TH-08-PIN	TH-8-PIN	2020	153,111.026	578,032.774
HR3H	TH-09-PIN	TH-9-PIN	2021	153,162.767	577,993.254
HR3H	TH-10-PIN	TH-10-PIN	2025	153,207.167	577,955.102
HR3H	TH-11-PIN	TH-11-PIN	2027	153,247.786	577,910.338
HR3H	TH-12-PIN	TH-12-PIN	2028	153,295.323	577,871.901
HR3H	TH-13-PIN	TH-13-PIN	2029	153,340.646	577,829.957
HR3H	TH-14-PIN	TH-14-PIN	2030	153,377.879	577,788.695
HR3H	TH-15-PIN	TH-15-PIN	2033	153,412.804	577,737.405
HR3H	TH-16-PIN	TH-16-PIN	2034	153,451.180	577,681.417
HR3H	TH-17-PIN	TH-17-PIN	2035	153,478.763	577,642.411
HR3H	TH-18-PIN	TH-DS-5-PIN	2005	152,669.622	578,252.554
HR3H	TH-19-PIN	TH-DS-4-PIN	2004	152,621.806	578,290.208
HR3H	TH-20-PIN	TH-DS-3-PIN	2003	152,577.402	578,332.138
HR3H	TH-21-PIN	TH-DS-2-PIN	2002	152,539.336	578,379.518
HR3H	TH-22-PIN	TH-DS-1-PIN	2001	152,499.373	578,425.129

1 Abbreviations: HR3D = 100-D Area; HR3H = 100-H Area
2 ERC = Environmental Restoration Contractor; GPS = global positioning system

7.0 Columbia River Water Sampling Locations

The SESP collects water samples from the Columbia River at variety of locations (Figure 7.1). The sampling schedules and results are described in annual reports (e.g., Bisping 2009 and Poston et al. 2009, respectively). These locations include:

- Fixed-location monitoring stations at Priest Rapids Dam and the Richland pumphouse.
- Transects across the Columbia River at Vernita Bridge, 100-N Area, the Hanford town site, 300 Area, and Richland pumphouse.
- Near-shore sites along the shorelines at Vernita Bridge, 100-N Area, 100-F Area, Hanford town site, 300 Area, and Richland pumphouse.

The sampling sites at Priest Rapids Dam and Vernita Bridge are upstream from Hanford Site facilities and therefore provide reference data from locations unaffected by releases from the Hanford Site. Samples collected from all other locations are used to identify impacts caused by past releases associated with the Hanford Site reactor operating years (1944 to 1987). The city of Richland pumphouse is nearest location downstream of Hanford from which Columbia River water is withdrawn to provide water for the Richland municipal drinking system.

The fixed-location monitoring stations at Priest Rapids Dam and the Richland pumphouse consist of both an automated sampler and a continuous flow system. Transect sampling, i.e., multiple samples collected along a line across the Columbia River, was initiated as a result of a special study conducted during 1987 and 1988 (Dirkes et al. 1993). The study concluded that, under certain flow conditions, contaminants entering the river via release from the Hanford Site are not completely mixed with river water by the time the contaminants reach the routine monitoring stations located downriver. Incomplete mixing results in a slightly conservative (high) bias in the data generated using the routine, single-point, sampling system at the Richland pumphouse. During 1999, transect sampling strategy was modified, with some of the mid-river sampling points shifted to near-shore locations in the vicinity of the transect. For example, at the 100-N Area, instead of collecting ten evenly-spaced cross-river transect samples, only six cross-river samples were collected, and the other four samples were obtained at near-shore locations. This sampling pattern has been used since 1999 and allows for the cross-river concentration profile to be determined and also provides information over a larger portion of the Hanford shoreline where the highest contaminant concentrations are expected.

Transect and near-shore samples at Vernita Bridge and the Richland pumphouse are collected quarterly, while at 100-N Area, Hanford town site, and 300 Area they are collected annually during late summer when river flows are low (Bisping 2009). The river sampling locations and the methods used for sample collection are discussed in detail in DOE-RL (2008).

7.1 Columbia River Water Sampling Locations and Coordinates

The name and geographic coordinates for the Columbia River water sampling locations are listed in Table 7.1. The location names are based on usage in the HEIS database. The fixed sampling location at

Priest Rapids Dam is simply referred to as “Priest Rapids Dam” because the sampler is located inside the dam and collects samples from a raw water feed line. Priest Rapids Dam is located approximately 9.5 miles upstream from the Vernita Bridge. All other location names utilize a geographic descriptive name and the HRM system to identify the river location. For example, “Rich.Pmph HRM 46.4” indicates the Richland pumphouse at a location 4 tenths of the downstream distance between HRM signposts #46 and #47.

The cross-river transect locations (multiple samples collected on a cross-river transect) are identified by a geographic descriptive name, the Hanford River Marker numbering system, and a transect station number (typically 1-4 or 1-10). The transect station numbers represent roughly equally spaced sampling locations, with the lowest station number occurring on the Hanford shoreline. For example, 300 Area-1 HRM 43.1 signifies a transect sample collected at the 300 Area at HRM 43.1 at transect station number 1 (closest to the Hanford Site shoreline). A second example is 300 Area-5 HRM 43.1, signifying a transect station at the 300 Area at HRM 43.1 at transect station 5, which is approximately halfway across the river. Because the transect and nearshore river water samples are collected by boat, the exact transect locations vary somewhat with each sampling event. Only the station coordinates from the Hanford shoreline (right bank or station #1) and the opposite shore (left bank or station #10) are listed in Table 7.1. Detailed maps and description of transect sampling locations are provided in the SESP Locations Manual (PNNL controlled document, SESP-SLM-01).

Coordinates for the river sampling locations described in Table 7.1 are provided in Washington State Plane (South Zone), coordinate systems; units are meters; North American Datum of 1983. Coordinates were obtained using GPS equipment.

7.2 River Stage Recorders

The elevation of the Columbia River stage is recorded hourly at stations positioned at each of the former reactor areas and the 300 Area (Table 7.2). The stations are typically located at the river water intake structures for the former reactor areas, and at a water intake structure at the 300 Area. The stage recording project is currently managed by CHPRC as part of the Soil and Groundwater Remediation Project. Data are available for viewing and downloading using the Virtual Library system. Coordinates listed are in the Washington State Plan (South Zone) system; units are meters; North American Datum of 1983.

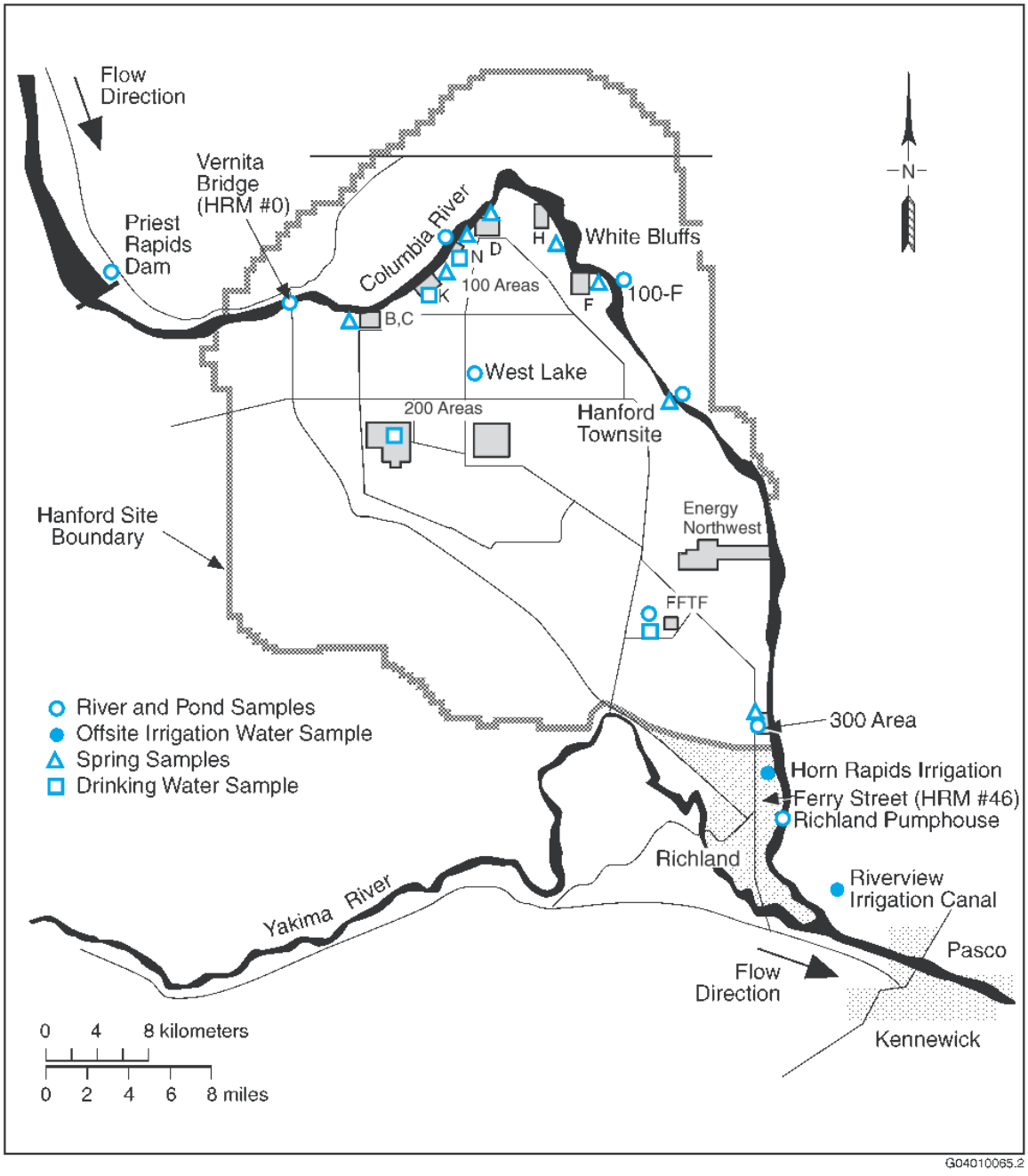

Figure 7.1. Index Map for Columbia River Water Sampling Sites

Table 7.1. Columbia River Water Sampling Locations in the Vicinity of the Hanford Site

Geographic Region Along Columbia River	River Water Sampling Location Name[1]	Sample Type[2]	Northing (m-NAD83)	Easting (m-NAD83)
Priest Rapids Dam	Priest Rapids-River	Fixed Location	146,056.722	545,351.336
Richland Pumphouse	Rich.Pmphs HRM 46.4	Fixed Location	109,812.049	595,441.466
Vernita Bridge, Hanford Site Shore	Vernita-1 HRM 0.3	Transect	145,808.019	558,996.328
Vernita Bridge, Grant Co. Shore	Vernita-4 HRM 0.3	Transect	146,018.380	558,910.056
100-N Area	100 N Shore HRM 8.4	Nearshore	149,044.428	570,527.283
100-N Area	100 N Shore HRM 8.9	Nearshore	149,930.777	571,220.846
100-N Area	100 N Shore HRM 9.2	Nearshore	150,222.208	571,423.982
100-N Area, Hanford Site Shore	100 N-1 HRM 9.5	Transect	150,535.875	571,626.834
100-N Area, Grant Co. Shore	100 N-10 HRM 9.5	Transect	150,754.451	571,310.576
100-N Area	100 N Shore HRM 9.8	Nearshore	151,018.280	571,995.955
100-F Area	100 F Shore HRM 18	Nearshore	149,049.329	579,832.753
100-F Area, Hanford Site Shore	100 F-1 HRM 19.0	Transect	109,850.604	595,772.085
100-F Area, Franklin Co. Shore	100 F-10 HRM 19.0	Transect	148,447.371	581,371.414
100-F Area	100 F Shore HRM 22	Nearshore	144,147.523	583,167.976
100-F Area	100 F Shore HRM 23	Nearshore	143,272.758	583,417.486
Hanford Town Site	Hanfrd Twnsite HRM 26	Nearshore	139,249.682	586,654.140
Hanford Town Site	Hanfrd Twnsite HRM 27	Nearshore	138,366.365	587,839.777
Hanford Town Site	Hanfrd Twnsite HRM 28	Nearshore	137,623.593	586,439.761
Hanford Town Site, Hanford Site Shore	Hanfrd TS-1 HRM 28.7	Transect	137,085.683	589,951.799
Hanford Town Site, Franklin Co. Shore	Hanfrd TS-10 HRM 28.7	Transect	137,277.023	590,109.980
Hanford Town Site	Hanfrd Twnsite HRM 30	Nearshore	135,433.944	591,004.194
300 Area	300 Area Sr HRM 41.5	Nearshore	117,518.980	594,227.923
300 Area	300 Area Sr HRM 42.1	Nearshore	116,686.645	594,317.796

Table 7.1. (contd)

Geographic Region Along Columbia River	River Water Sampling Location Name[1]	Sample Type[2]	Northing (m-NAD83)	Easting (m-NAD83)
300 Area	300 Area Sr HRM 42.5	Nearshore	116,055.079	594,450.735
300 Area	300 Area Sr HRM 42.9	Nearshore	115,224.428	594,648.372
300 Area, Hanford Site Shore	300 Area-1 HRM 43.1	Transect	114,870.592	594,769.339
300 Area, Franklin Co. Shore	300 Area-10 HRM 43.1	Transect	114,880.240	595,384.911
Richland	Rich.Pmphs HRM 43.5	Nearshore	114,370.836	594,800.236
Richland	Rich.Pmphs HRM 43.9	Nearshore	113,704.977	594,872.221
Richland	Rich.Pmphs HRM 45.0	Nearshore	112,098.196	595,197.638
Richland	Rich.Pmphs HRM 45.8	Nearshore	110,789.565	595,395.298
Richland Pumphouse, Benton Co. Shore	Rich.Pmphs-1 HRM 46.4	Transect	109,846.359	595,502.550
Richland Pumphouse, Franklin Co. Shore	Rich.Pmphs-10 HRM 46.4	Transect	109,936.193	596,263.717

1 "HRM" refers to Hanford River Marker, as amended 1999; names are reproduced as they appear in the HEIS.
2 For transect sampling, geographic coordinates are provided to show the approximate nearshore locations for the start and ending points of the transect. The exact transect positions vary with each sampling event because of changing river stage.

Table 7.2. River Stage Recorder Locations Along the Hanford Reach

Location	River Stage Recorder Name	Start Date	End Date	Northing (m-NAD88)	Easting (m-NAD88)
100-B Area	B-River	11-Mar-92	Operating	145,242.190	564,832.286
100-K Area	K-River	25-Mar-08	Operating	147,084.250	568,758.160
100-N Area	N-River	26-Nov-94	Operating	149,457.100	570,988.731
100-D Area	D-River	11-Nov-96	Operating	151,738.440	572,778.400
100-H Area	H-River	27-Sep-91	Operating	153,492.956	577,547.540
100-F Area	F-River	18-Sep-92	Operating[1]	148,139.838	580,977.001
300 Area	SWS-1	06-Nov-91	01-May-97[2]	115,780.554	594,582.972
300 Area	3-River	01-Sep-97	Operating	115,780.554	594,582.972

1 Temporarily out-of-service (2009)
2 Destroyed by high river conditions

8.0 Proposed Naming Convention for Shoreline Water Quality Monitoring Sites

Water samples are collected from a variety of sites near the Columbia River, including near-river monitoring wells; riverbank springs; aquifer sampling tubes located along the low stage shoreline; and pore water samples from riverbed sediment. Temporary site names are often assigned to these locations when they are first used. Once established, a unique site identifier is assigned to some sites/facilities for data management purposes, and a descriptive name is developed for use in reports. Unfortunately, no standardized convention has been developed for the latter, resulting in a variety of descriptive names for the same site being incorporated into databases and published reports. This creates a special problem for those sites for which a unique identifier has not been assigned.

8.1 Site Identifiers and Descriptive Site Names

The following discussion assumes that:

- Sample collection locations ("sites") can be uniquely defined geographically (i.e., by survey coordinates). A unique identifier is assigned to each site for data management purposes.
- Sampling sites also need a descriptive name, which is used in interpretive reports and presentations. Descriptive names are for the convenience of the data user and are included as supplemental information in database records.

Currently, unique site identifiers are only assigned to engineered structures that fall under the purview of WAC 173-160 "Minimum Standards for Construction and Maintenance of Wells." These include groundwater monitoring wells and aquifer sampling tubes. Riverbank springs and other water sampling sites associated with the groundwater/river interface have been assigned site identifiers for data management purposes, but in some instances they are not unique (e.g., riverbank springs). To qualify as a sampling "site," the location must be describable in terms of geographic coordinates (e.g., an XY coordinate as a minimum, with or without a radius of uncertainty; a polygon described by points with coordinates). The following proposal includes a new provision for assigning a unique site identifier to riverbank springs that consistently provide water samples for environmental monitoring. This site identifier is analogous to the existing identifier used for wells (i.e., the WELL_ID in the HEIS database).

Descriptive names for sampling locations should provide some information as to the nature of the site, as well as its geographic location. The primary purpose for the descriptive name is for the convenience of the data user, and not for internal data management purposes — the latter is the role of the unique site identifier. Whenever the need arises to assign names to new sampling locations, it is desirable to retain as much commonality as possible with descriptive names used in previously published reports and long-term historical conventions. But there is no compelling need to revise previously used descriptive names for sampling sites. The scheme proposed in the following paragraphs is suggested for newly discovered, established, or equipped sampling sites.

8.2 Proposed Convention for Descriptive Site Names

The naming convention proposed below attempts to honor the following characteristics for assigning a descriptive name to a sampling site (…to be used in conjunction with a unique site identification number):

- An indication of the nature of the sampling facility or site
- Some form of geographic orientation
- Similarity to previously established naming conventions

These characteristics have been honored in the groundwater well-naming convention that has existed on the Hanford Site since 1956 (Chamness and Merz 1993). For example, the descriptive name for monitoring well 199-K-30 in the 100-K Area is decoded as follows: "199-" indicates a groundwater monitoring well in the 100 Area; "K-" indicates the 100-K Area; and "30" is a sequential number for wells installed in the 100-K Area. The well also has a unique identifier (A4655) that is used for data management purposes.

For other types of water quality sampling sites located along the river shoreline, coded letters can be used to indicate the type of site, followed by a second code that refers to the geographic segment or area, followed by a numeric code that identifies the location between two adjacent Hanford River Marker posts. Suffixes can be added to further describe supplemental information about the site. A summary of the codes proposed for river-related water quality monitoring sites is shown in Table 8.1.

8.3 Examples of Proposed Site Names

Riverbank Spring

- **SB-0373** – Riverbank spring along the 100-B Area located at HRM 3.73, i.e., 0.73 of the distance from HRM signpost #3 downstream toward signpost #4. Previously used names for this spring are 037-1, SB-037-1, and 100-B Spring.
- **S3-4211** – Riverbank spring along the 300 Area located at HRM 42.105. Previously used names for this spring include Spring 7, 42-2, and 300 Area Spring 42-2.

Aquifer Sampling Tube

- **AB-0389-D** – Aquifer sampling tube along the 100-B Area shoreline located at HRM 3.89. The suffix "-D" indicates the deepest of three tubes at this site. Previously used name for this tube is 05-D.
- **AD-1021-S** – Aquifer sampling tube along the 100-D Area shoreline located at HRM 10.21. The suffix "-S" indicates the shallowest of three tubes at this site. Previous name for this tube is DD-39-1.

Table 8.1. Code for Naming Water Quality Sampling Sites Along the Hanford Reach

Format for Descriptive Name: 12-3333-4

1. Type of water quality sampling site:
   - S = Riverbank spring
   - A = Aquifer sampling tube (sample port >1 meter bgs)[1]
   - P = Riverbed sediment pore water tube (sample port <1 meter bgs)[1]
   - R = Nearshore river water

2. Hanford Site geographic region along Hanford Reach:
   - B = 100-B Area and adjacent upstream/downstream shorelines
   - K = 100-K Area and adjacent upstream/downstream shorelines
   - N = 100-N Area and adjacent upstream/downstream shorelines
   - D = 100-D Area and adjacent upstream/downstream shorelines
   - H = 100-H Area and adjacent upstream/downstream shorelines
   - F = 100-F Area and adjacent upstream/downstream shorelines
   - T = Hanford town site and adjacent upstream/downstream shorelines
   - 3 = 300 Area and adjacent upstream/downstream shorelines
   - 6 = 600 Area (intervening segments, including 200-PO-1 Operable Unit plume)

3. Hanford River Marker system position:
   - Measured to the nearest hundredth of a subdivision between signposts
   - Coordinates for HRM signposts, and for subdivisions between signposts, are maintained on ~1:10,000 scale base maps for the shoreline as ArcMap coverages

4. Optional codes as suffix:
   - Sequential site at same approximate location (e.g., multiple springs)
   - Shallow, medium, deep indicators (e.g., aquifer tubes; pore water tubes)
   - Numeric value for depth below ground surface
   - Alpha or numeric value to indicate distance offshore

1. The one-meter value is an arbitrary depth chosen to categorize samples as either surface water (SW) or groundwater (GW) in the media code field of HEIS. The hyporheic zone of the Hanford Reach channel is assumed to be primarily contained within this depth interval. If several sampling ports are installed at the same site, the deepest port is used to determine the category.

- **A3-4239-A410cm** – Aquifer sampling tube along the 300 Area located at HRM 42.39. The suffix "-A410cm" indicates the first of several locations extending offshore (A), and the 410cm indicates the depth of the sampling port.

Riverbed Sediment Pore Water

- **PH-1530-A45cm** – Riverbed pore water sample tube in the 100-H Area located at HRM 15.30. The sampling site is the first of two that extend in an offshore direction, and the sample port depth is 45 cm bgs. Original name: TH-1A in Hope and Peterson (1996a).

Nearshore River Water

- **R3-4211-SHR** – River water sample collected at the 300 Area shore at HRM 42.105. The suffix indicates nearshore river water. Previous name for this sample site is "300 AREA SHR HRM 42.2" (Patton et al. 2002).

9.0 Path Forward

The inventory of water quality monitoring sites in this report has been assembled over a period of many years. While every effort has been made to achieve accuracy in the location and name information, inaccuracies and errors may be present. Use of the tables for future projects involving the Columbia River will likely help reveal those deficiencies, and future versions of the document will incorporate those discoveries. However, the inventory as it stands can be used to update sampling site location information contained in the HEIS. Because numerous historical records for analytical results may contain ambiguous sample site information, it has not been possible to develop a convenient user interface for accessing historical data for certain samples assigned a media code for surface water.

Future work should consider the following:

- Correlate existing analytical records in HEIS for riverbank springs with the discreet locations information presented in Table 4.1. Adopting a unique site identifier for riverbank springs, to be used in sample site location tables in HEIS, will help in this regard.
- Revise existing sample site identifiers assigned to surface water media results, i.e., remove multiple identifiers (when they occur) for a single sampling site. This ambiguity is most frequent with analytical results for samples from riverbank springs.
- Convene a users' group to stimulate discussion of descriptive names for sampling sites. The goal is to adopt a convention that is acceptable to the majority of those working in the Columbia River environment and one that can be easily adopted for new sampling sites.

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Appendix A

Appendix A

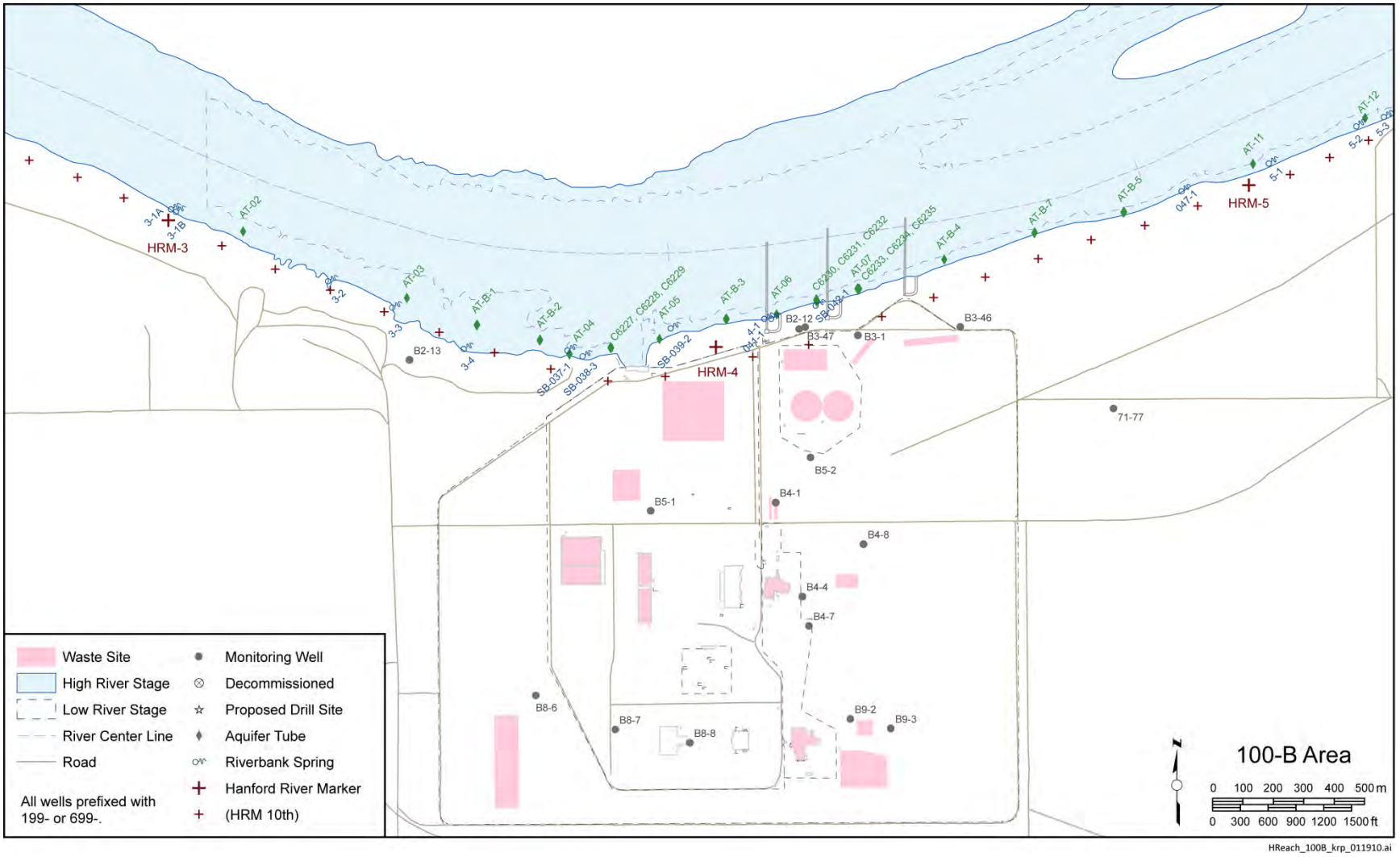

Figure A.1. Water Quality Monitoring Locations Along the 100-B Area Shoreline

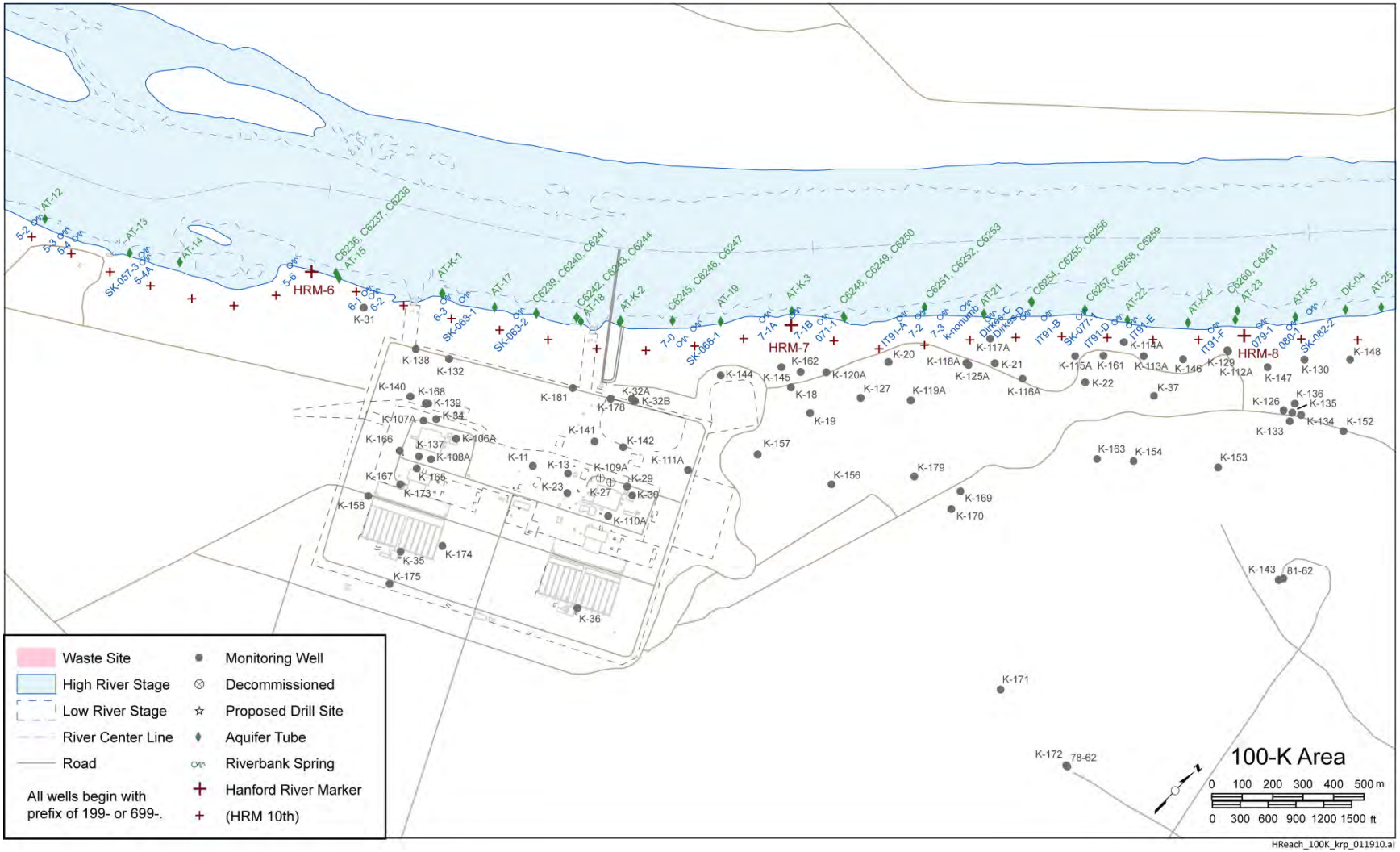

Figure A.2. Water Quality Monitoring Locations Along the 100-K Area Shoreline

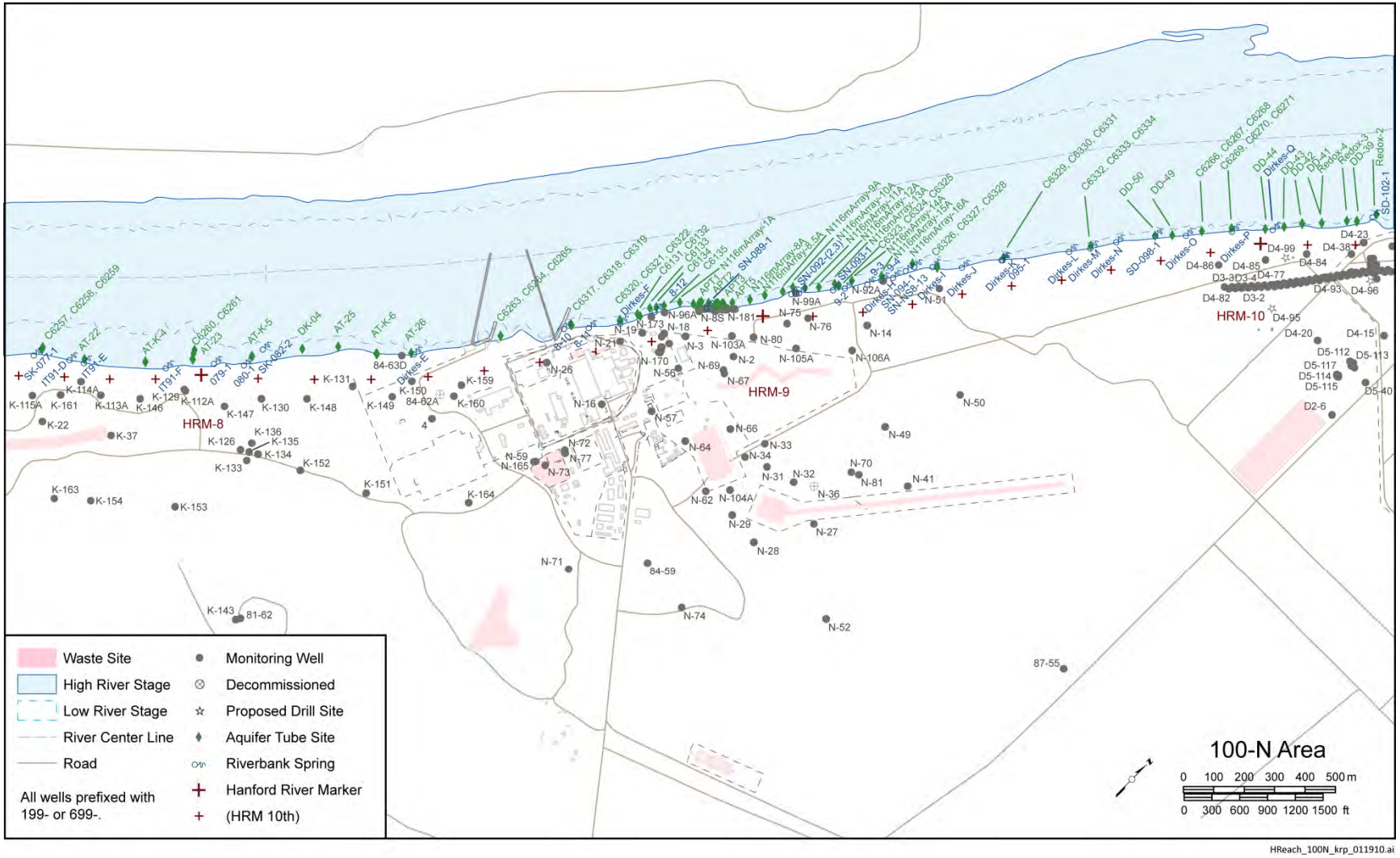

Figure A.3. Water Quality Monitoring Locations Along the 100-N Area Shoreline

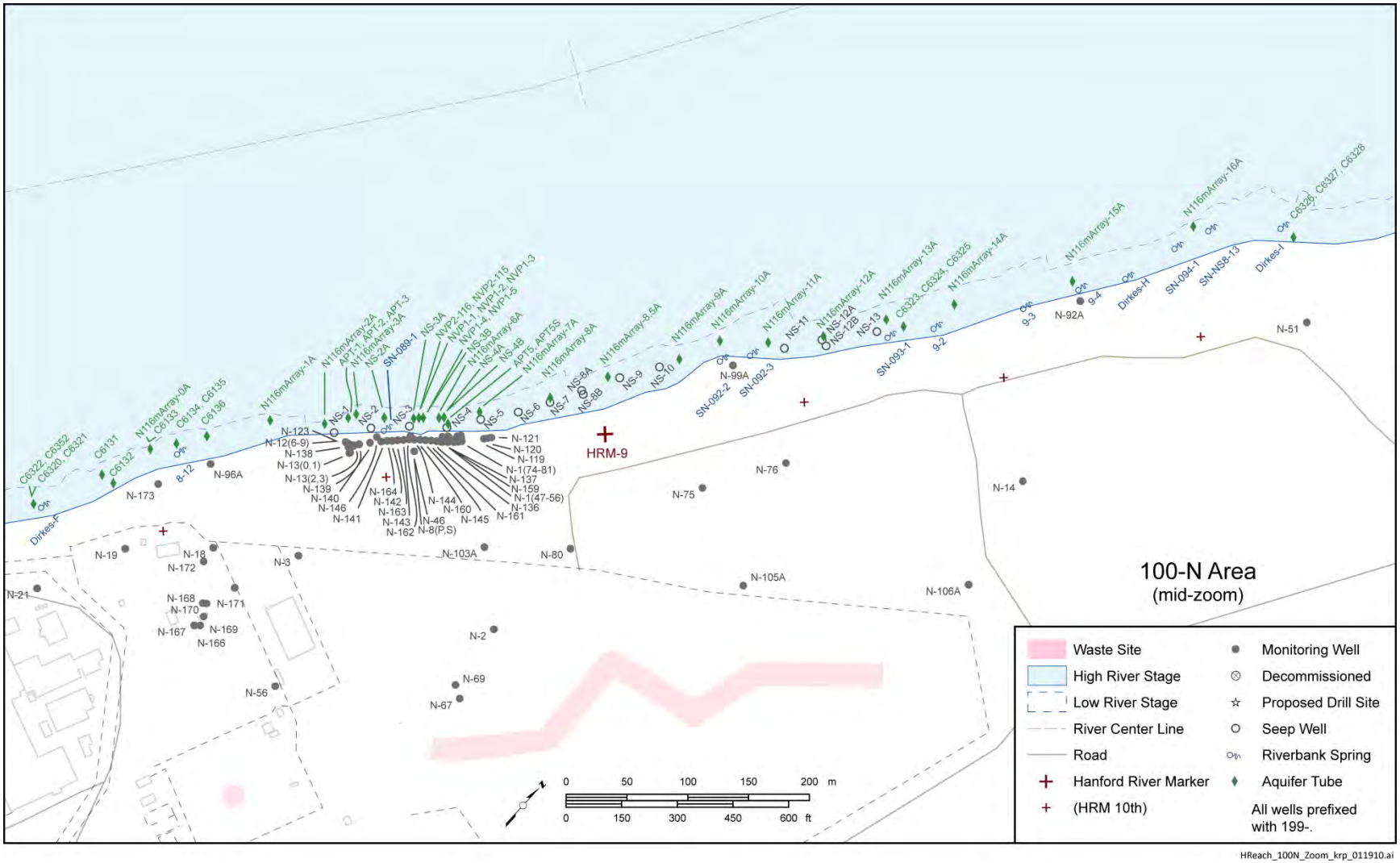

Figure A.4. Water Quality Monitoring Locations Along the Central Portion of the 100-N Area Shoreline

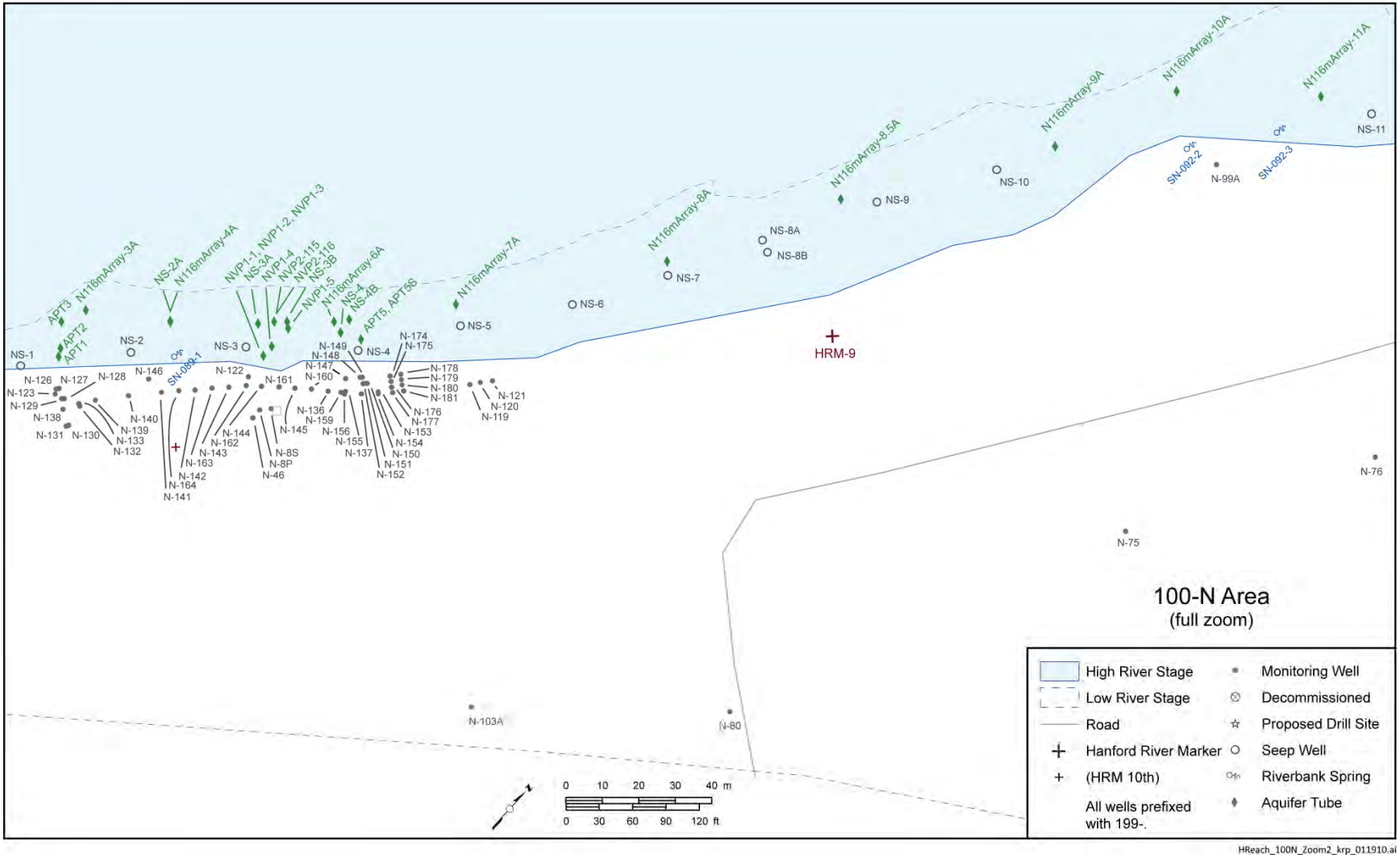

Figure A.5. Water Quality Monitoring Locations Along the Apatite Barrier Portion of the 100-N Area Shoreline

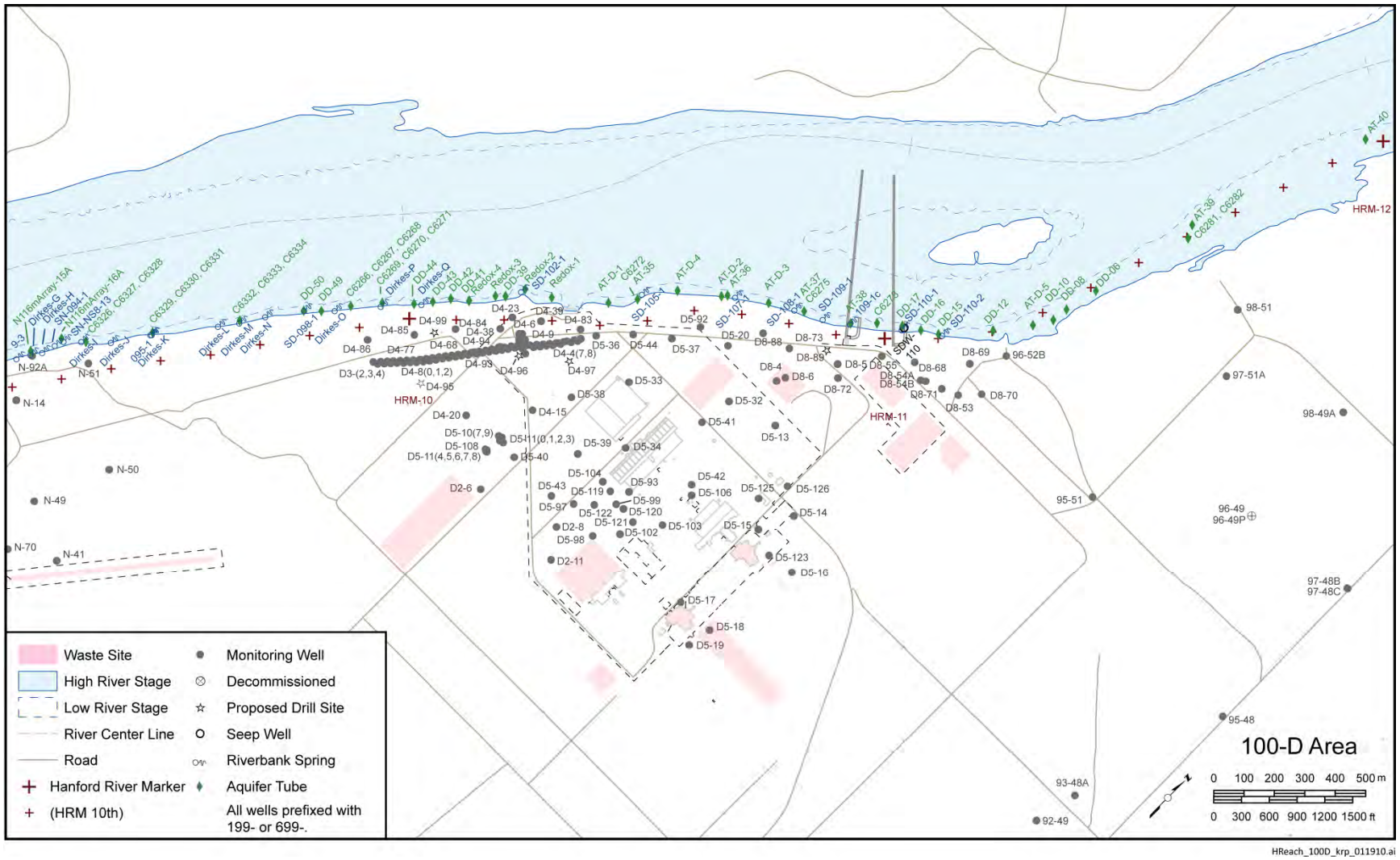

Figure A.6. Water Quality Monitoring Locations Along the 100-D Area Shoreline

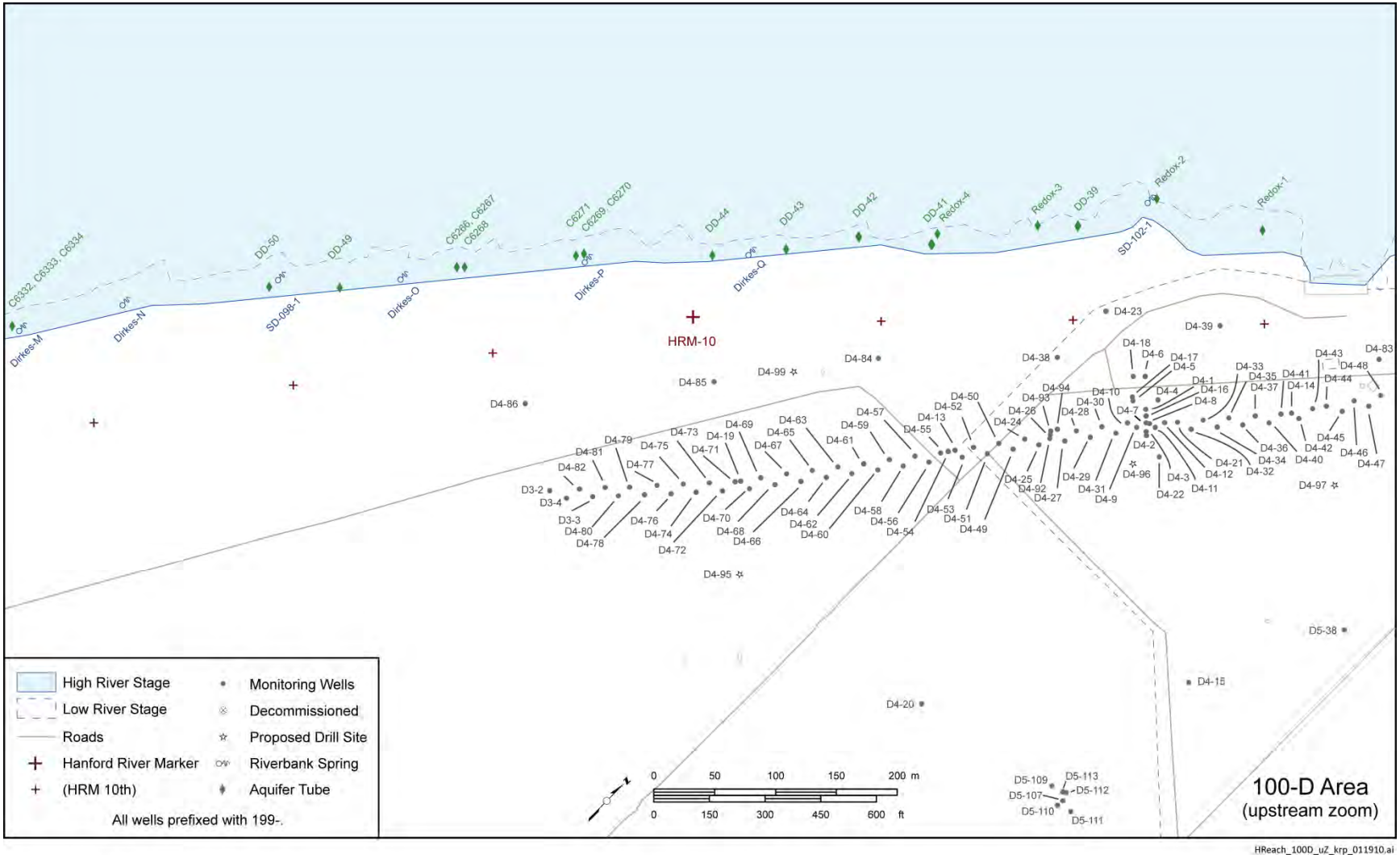

Figure A.7. Water Quality Monitoring Locations Along the ISRM Barrier Portion of the 100-D Area Shoreline

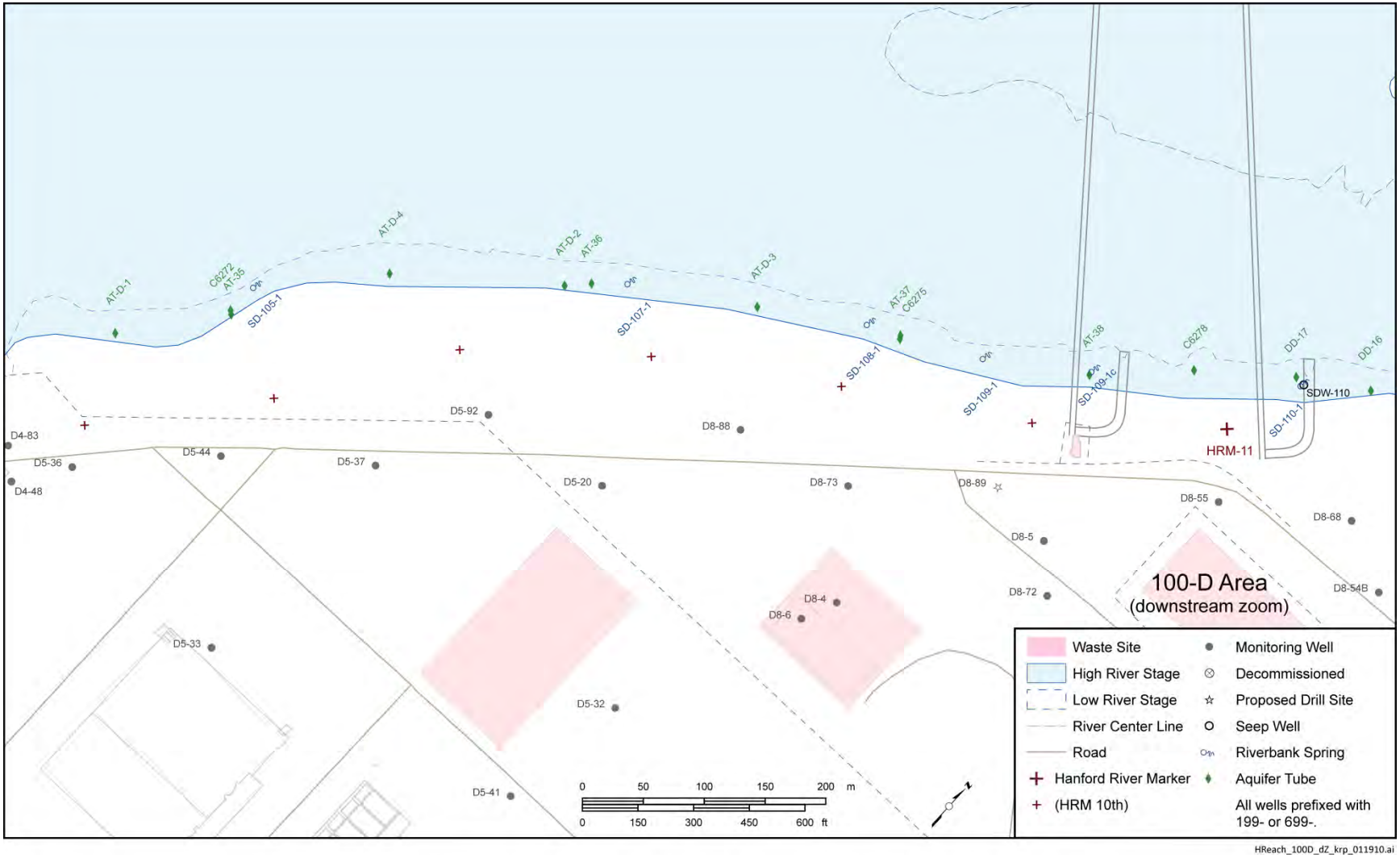

Figure A.8. Water Quality Monitoring Locations Along the Downstream Portion of the 100-D Area Shoreline

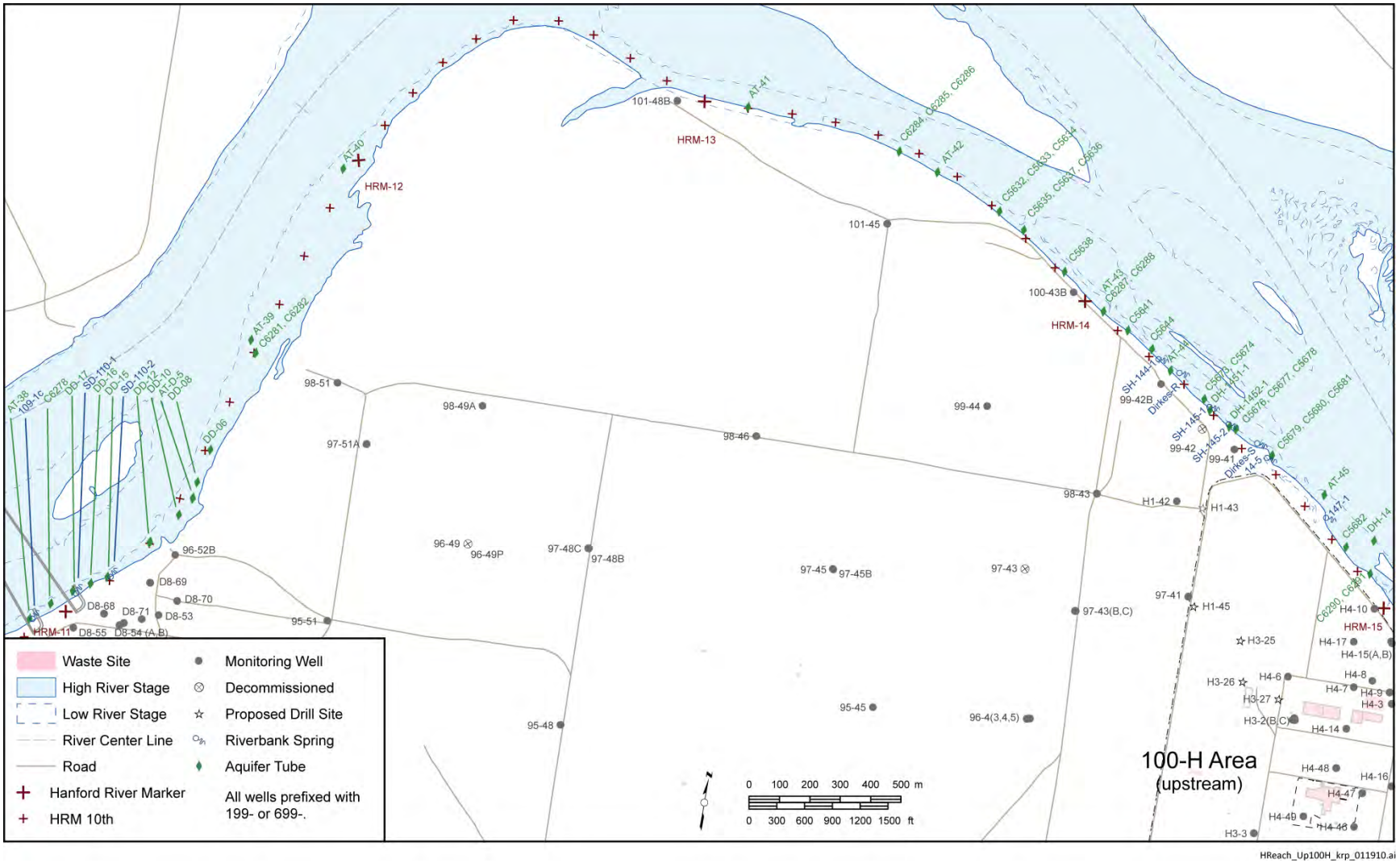

Figure A.9. Water Quality Monitoring Locations Along the Shoreline from 100-D to 100-H Areas

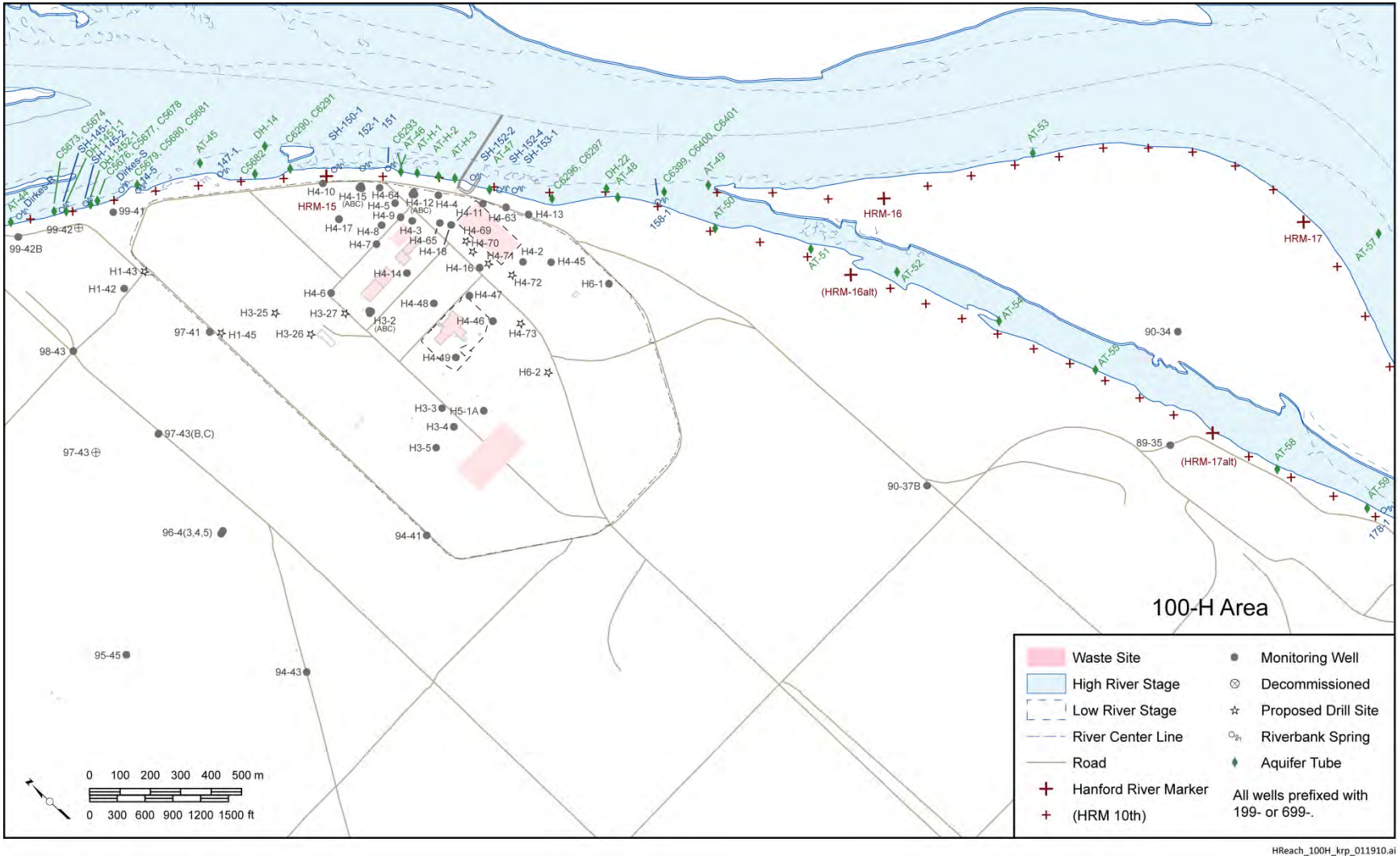

Figure A.10. Water Quality Monitoring Locations Along the 100-H Area Shoreline

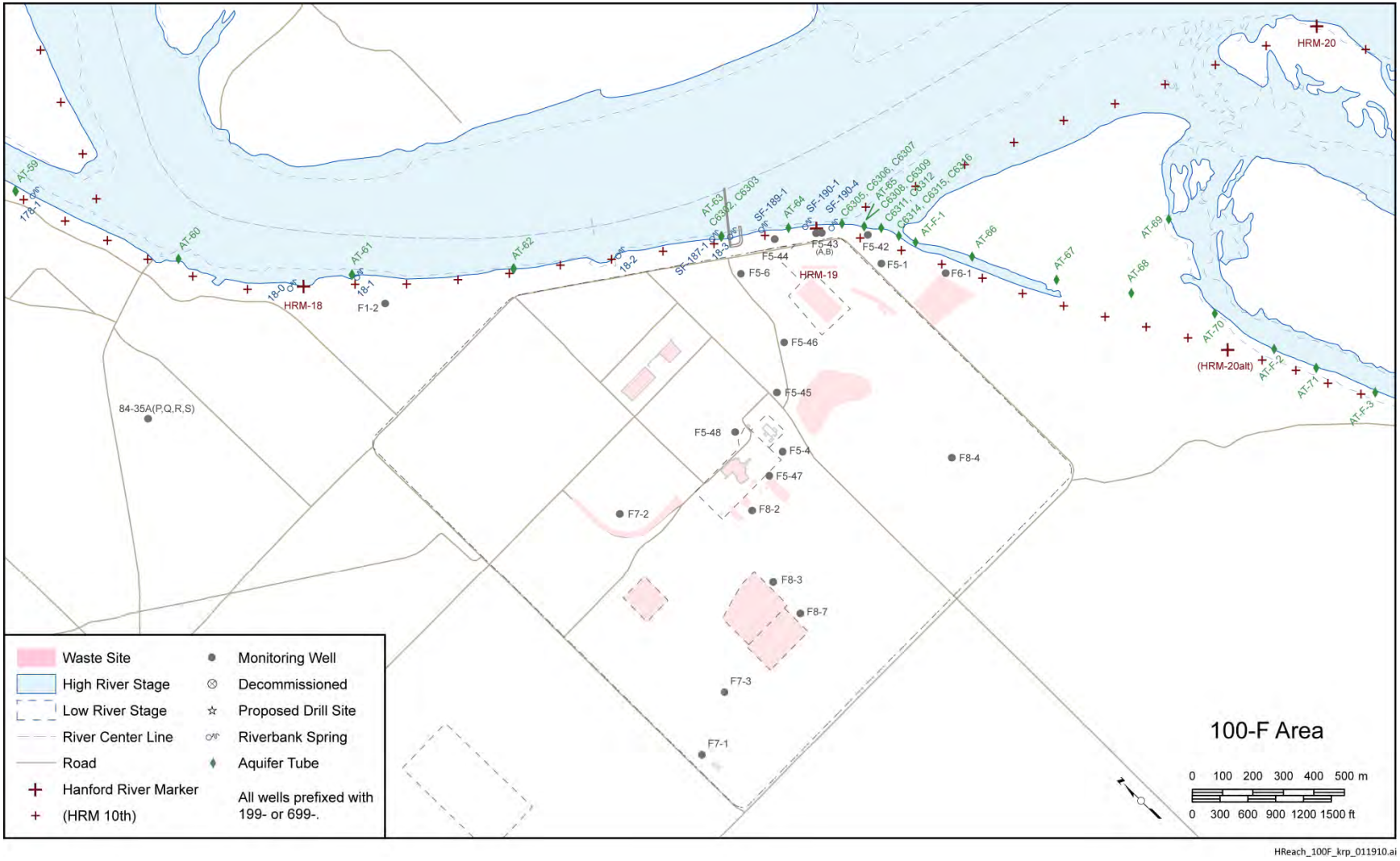

Figure A.11. Water Quality Monitoring Locations Along the 100-F Area Shoreline

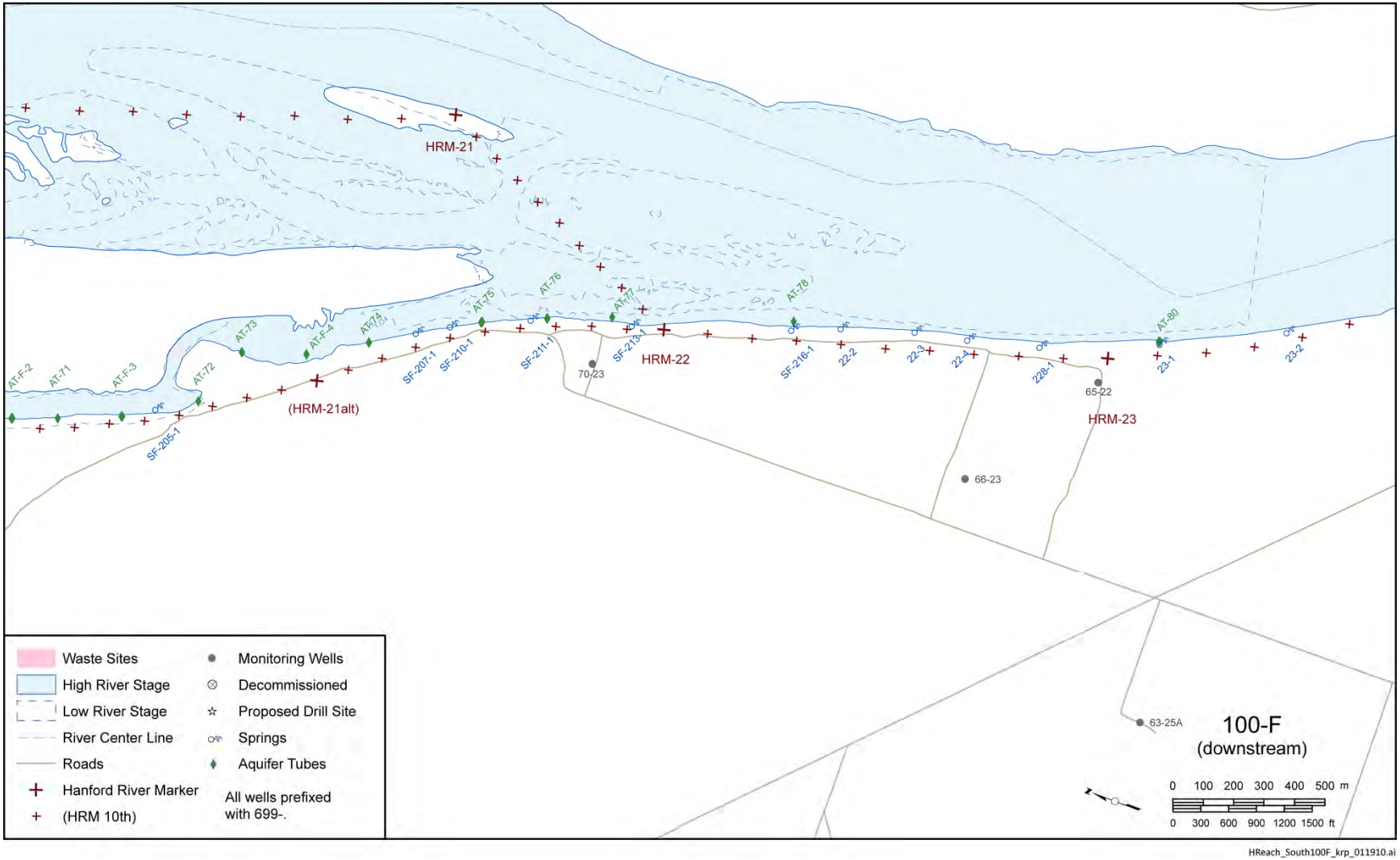

Figure A.12. Water Quality Monitoring Locations Along the Shoreline Downstream from 100-F Area

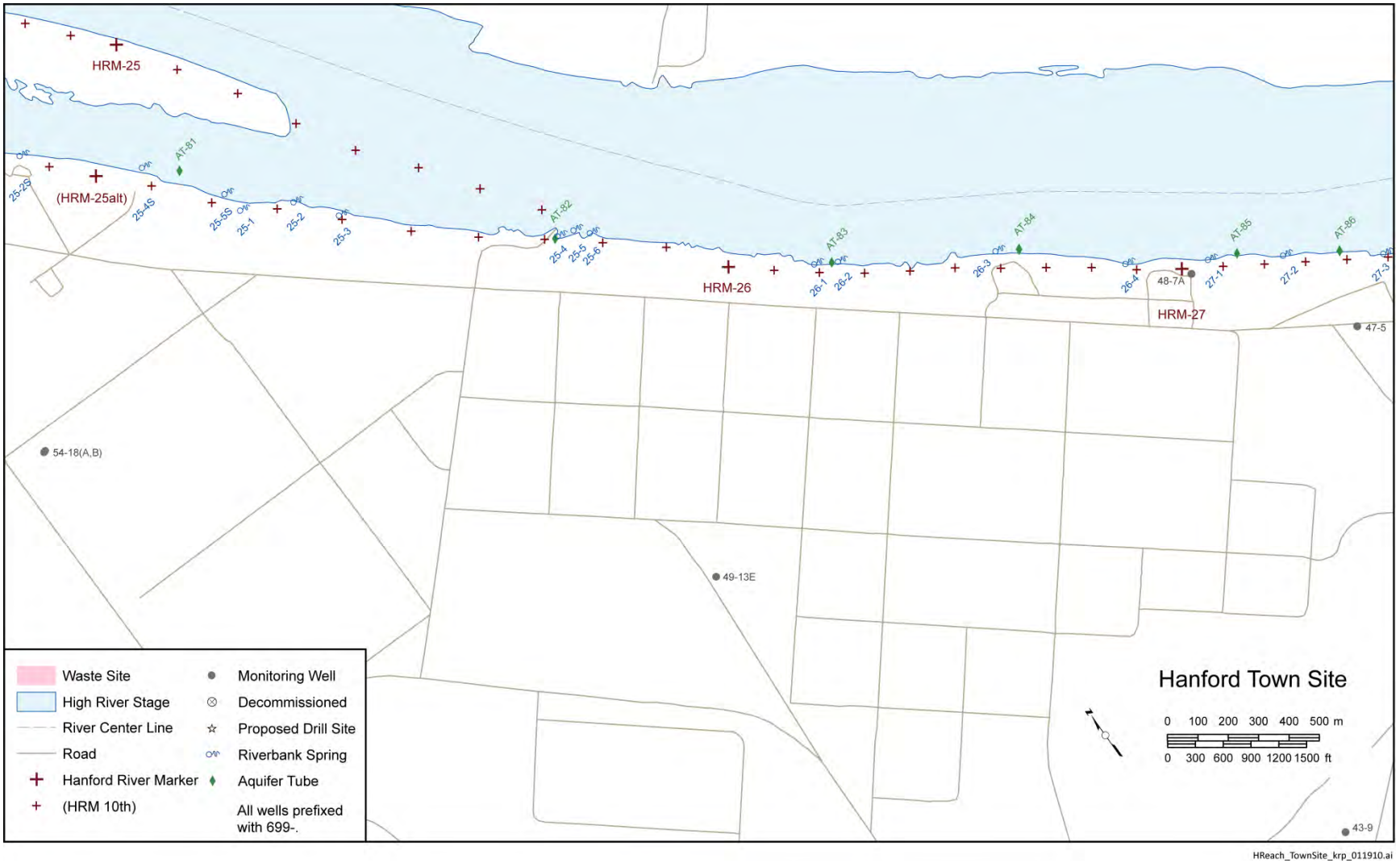

Figure A.13. Water Quality Monitoring Locations Along the Hanford Town Site Shoreline

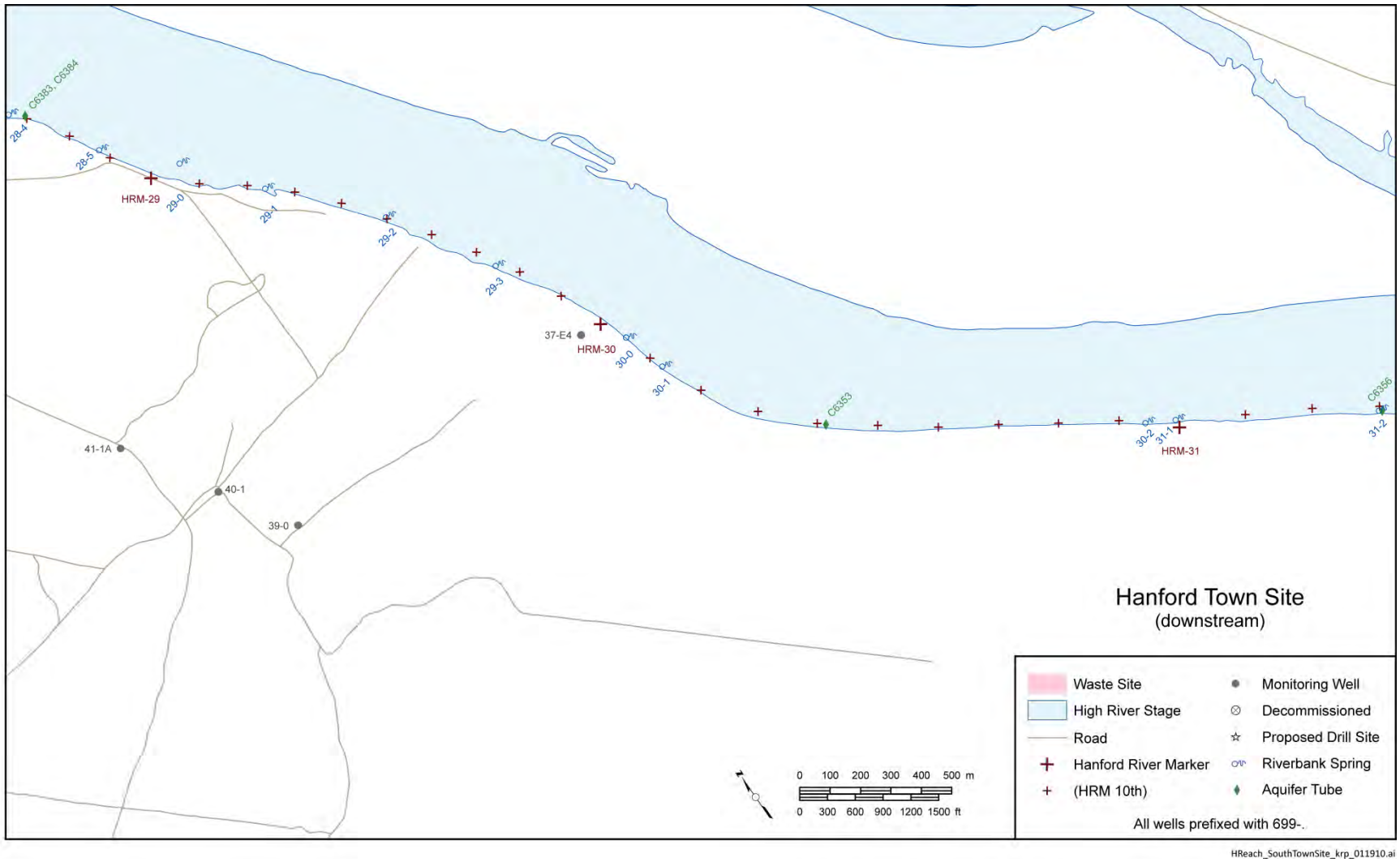

Figure A.14. Water Quality Monitoring Locations Along the Shoreline Downstream from the Hanford Town Site Shoreline

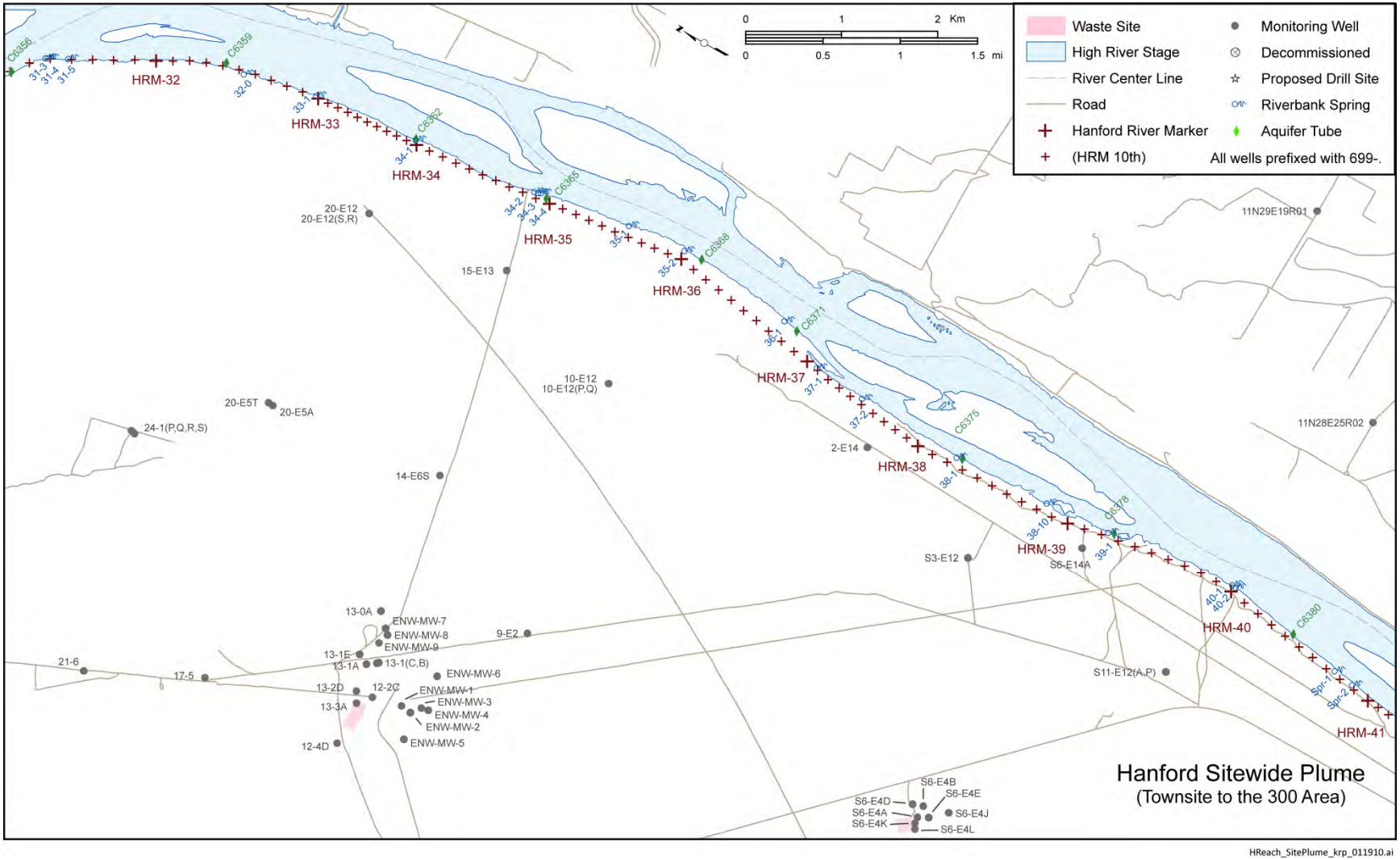

Figure A.15. Water Quality Monitoring Locations Along the Shoreline Impacted by the Hanford Sitewide Groundwater Plume

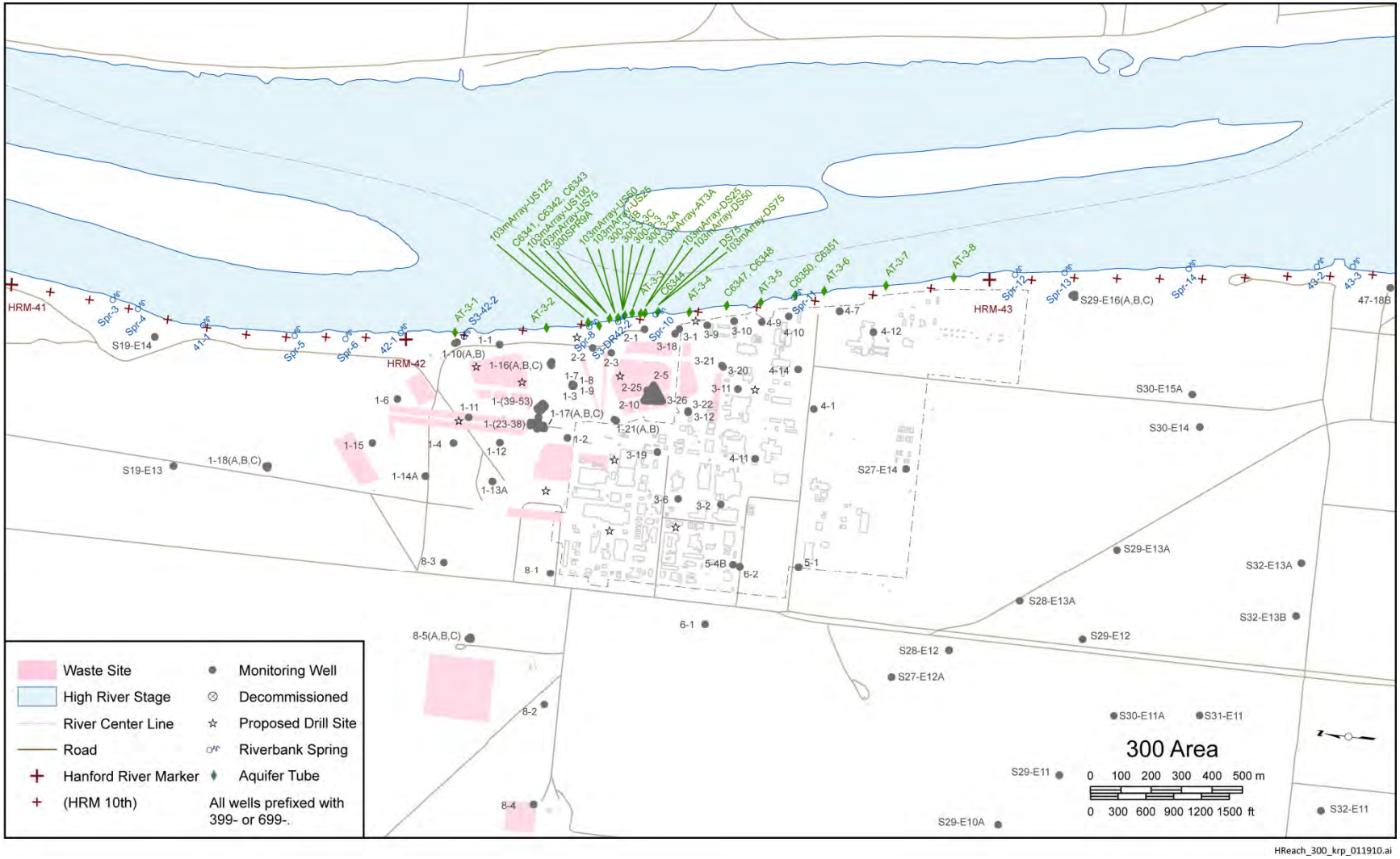

Figure A.16. Water Quality Monitoring Locations Along the 300 Area Shoreline

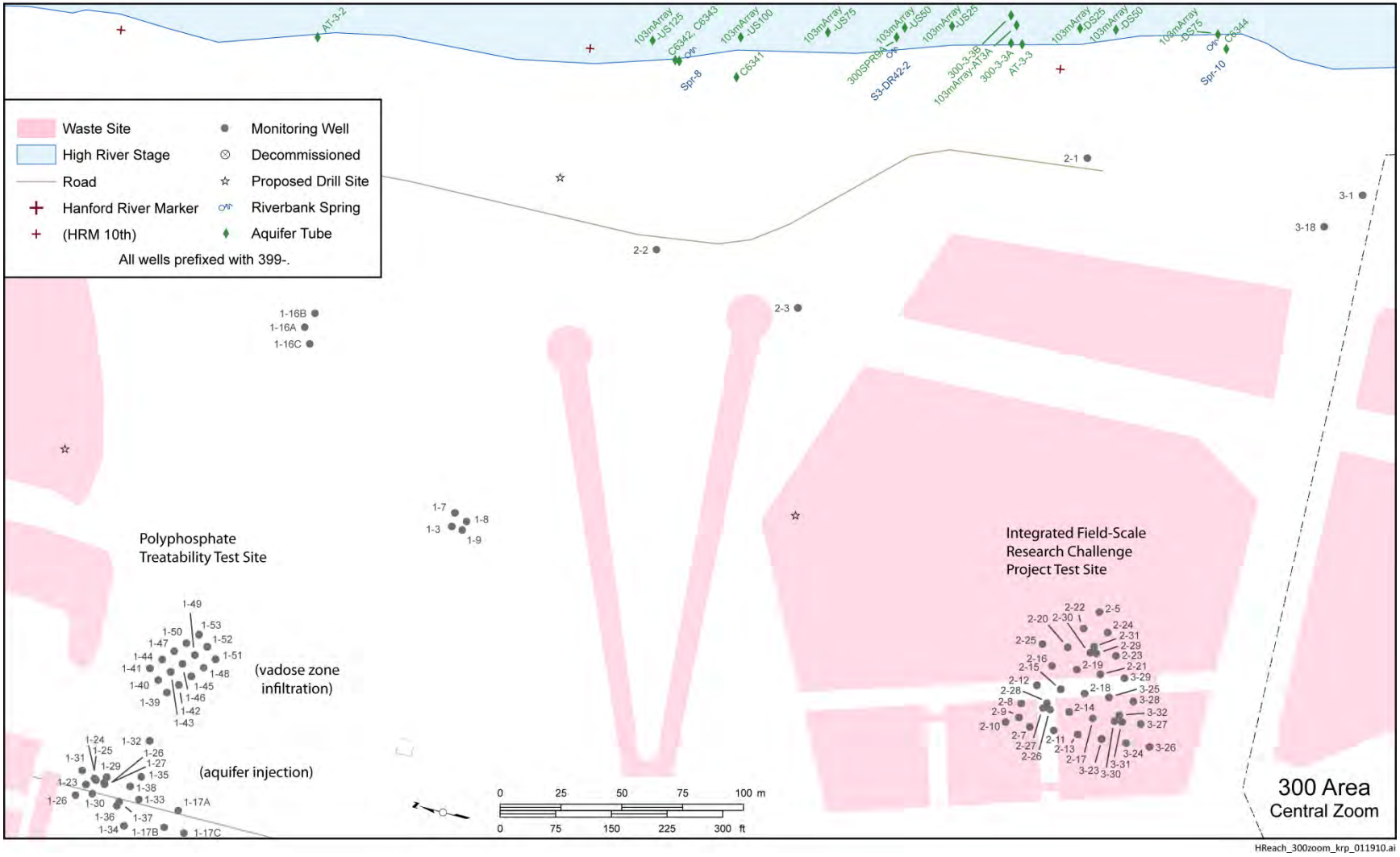

Figure A.17. Water Quality Monitoring Locations Along the Central Portion of the 300 Area Shoreline

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1 U.S. Environmental Protection Agency

L.E. Gadbois	B1-46

1 Washington State Department of Health

M. Priddy	B1-42

2 Other

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