0076901

Tri-Party Agreement

Change Notice for Modifying Approved Documents/ Workplans
In Accordance with the Tri-Party Agreement Action Plan,
Section 9.0, *Documentation and Records*

Change Number	Document Submitted Under Tri-Party Agreement Milestone	Date:
TPA-CN-212	N/A	April 8, 2008

Document Number and Title:	Date Document Last Issued:
Sampling and Analysis Plan for Aquifer Sampling Tubes, DOE/RL-2000-59, Rev. 0	October 2000

Originator: John Winterhalder	Phone: 372-8144

Description of Change: The *Installation and Sampling Analysis Instruction for Fiscal Year 2008 Aquifer Tubes*, SGW-36398, is the companion document to the *Sampling and Analysis Plan for Aquifer Sampling Tubes*, DOE/RL-2000-59, Rev. 0, which includes the quality assurance project plan and a field sampling plan. This specific sampling and analysis instruction provides the locations and analyses proposed for the FY08 installed aquifer tubes. The document includes the purpose of the installation and sampling, a brief history and description of the tube installation and tube naming conventions, and a list of the data reports. Analytical data and field measurements will be stored in the Hanford Environmental Information System (HEIS) database.

For purposes of this change notice, the *Installation and Sampling Analysis Instruction for Fiscal Year 2008 Aquifer Tubes*, SGW-36398 is considered a change to the already approved *Sampling and Analysis Plan for Aquifer Sampling Tubes* that was issued in FY 2000.

B. L. Charboneau (RL) and D. Goswami and L Gadbois/A Boyd (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement.*

Justification and Impacts of Change:
The purpose of this change notice is to obtain Tri-Party approval of the *Installation and Sampling Analysis Instruction for Fiscal Year 2008 Aquifer Tubes*, SGW-36398.

Approvals:

DOE-RL	4-10-08 Date	✓ Approved	__ Disapproved	
EPA	4-10-08 Date	✓ Approved	__ Disapproved	
EPA	Date	✓ Approved	__ Disapproved	
Ecology	4-10-08 Date	✓ Approved	__ Disapproved	

SGW-36398
Revision 0

Installation and Sampling Analysis Instructions for Fiscal Year 2008 Aquifer Tubes

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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SGW-36398
Revision 0

Installation and Sampling Analysis Instructions for Fiscal Year 2008 Aquifer Tubes

Document Type: TR Program/Project: S&GRP

J. V. Borghese
Fluor Hanford, Inc.

Date Published
April 2008

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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LIST OF TERMS

CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FH	Fluor Hanford, Inc.
FY	fiscal year
HEIS	Hanford Environmental Information System
ID	identification
LFI	limited field investigation
NTU	nephelometric turbidity unit
OU	operable unit
PNNL	Pacific Northwest National Laboratory
QA	quality assurance
QAPjP	quality assurance project plan
QC	quality control
RL	U.S. Department of Energy, Richland Operations Office
SAI	sampling and analysis instruction
TCE	trichloroethene
TPH	total petroleum hydrocarbon
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
VOA	volatile organic analyte
VOC	volatile organic compound
WAC	*Washington Administrative Code*

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METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerels	millibecquerels	0.027	picocuries

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1.0 INTRODUCTION

Aquifer sampling tubes (aquifer tubes) monitor the groundwater at the river shore. Aquifer tubes are small-diameter tubes that have been installed in the unconfined aquifer along the Hanford Reach of the Columbia River. The aquifer tubes provide additional sampling points for monitoring the groundwater near the Columbia River. The goal is to enhance descriptions of groundwater contamination near the river to support cleanup decisions. Over 400 aquifer tubes were installed since the mid-1990s to assist in describing the nature and extent of contamination in groundwater near the river. Appendix A lists pertinent information for existing aquifer sampling tubes. Additional tubes are needed to extend the coverage in key areas along the Columbia River in order to confirm the presence or absence of contaminants. A few of the tubes that are no longer in service are in key locations and need to be replaced.

The purpose of this report is to identify the location of aquifer tube sites that will extend the coverage, replace key aquifer tubes that are no longer in service, and identify the first suite of analyses that will be collected from the aquifer tubes after installation.

This report is divided into six sections:

- Section 1.0 – Introduction
- Section 2.0 – Data Quality Objectives (DQOs)
- Section 3.0 – Quality Assurance Project Plan
- Section 4.0 – Field Sampling Plan
- Section 5.0 – Health and Safety
- Section 6.0 – Project Schedule
- Section 7.0 – References.

1.1 BACKGROUND INFORMATION

1.1.1 Aquifer Tube Installation History

The aquifer tubes were originally proposed as a means of providing numerous inexpensive sampling points along the Columbia River shoreline between existing monitoring wells. Table 1-1 summarizes the number of sites and tubes installed for each operable unit (OU). The table also provides the total of aquifer tubes that were in service (i.e., those that can be sampled) as of fall 2007.

The first type of tubes were porewater tubes installed during the spring of 1995 (*Pore Water Chromium Concentrations at 100-H Reactor Area Adjacent to Fall Chinook Salmon Spawning Habitat of the Hanford Reach, Columbia River* [BHI-00345]). These tubes were located in the river substrate off the 100-H Area shoreline. Hexavalent chromium above the U.S. Environmental Protection Agency's (EPA's) chronic ambient water quality criteria of 11 μg/L was detected in 3 of 31 sample sites. These sites have generally been destroyed over time by the action of the river and are no longer available for sampling. This work is described in BHI-00345.

Aquifer tubes along the river shoreline were installed in the 100-D Area during October and November 1995, and the scope was expanded to include both porewater tubes in the river substrate and onshore aquifer tubes. The tubes were installed again along transects on approximately 61-m (200-ft) centers. The data collected from tubes in transect 39 led to the

discovery of the southwest chromium plume. Nearly all of the aquifer tubes have survived to date, but most of the porewater tubes have been destroyed. This work was described in *Chromium in River Substrate Pore Water and Adjacent Groundwater: 100-D/DR Area, Hanford Site, Washington* (BHI-00778).

Additional aquifer tubes were installed along the Columbia River shoreline in the fall of 1997 from the B/C Reactor area to the Hanford townsite (*Description of Work for Installing Aquifer Sampling Tubes Along the 100 Area and Hanford Townsite Shoreline* [BHI-01090]). Aquifer tubes were installed at 70 sites, for a total of 178 individual tubes. The tubes were driven to depth using a truck-mounted Geoprobe® direct-push technology rig or a pneumatic air hammer. The work is described in the *Aquifer Sampling Tube Installation Completion Report: 100 Area and Hanford Townsite Shorelines* (BHI-01153). Four additional porewater sites (eight individual tubes) were also installed offshore from the current In Situ Redox Manipulation barrier by Pacific Northwest National Laboratory (PNNL).

Data gaps in shoreline coverage, as well as the destruction of tubes by animals and the elements, have led to additional installations in the 100 and 300 Areas to support investigation of the 300-FF-5 Groundwater OU. These tubes were installed mainly in 2003 and 2004, and the numbers of tubes installed are summarized as follows:

- 100-BC-5 OU: 15 tubes in six sites
- 100-KR-4 OU: 18 tubes in six sites
- 100-HR-3 OU (100-D): 14 tubes in five sites
- 100-HR-3 OU (100-H): 8 tubes in three sites
- 100-FR-3 OU: 12 tubes in four sites
- 300-FF-5 OU: 23 tubes in 12 sites.

Additional aquifer tubes were installed in the 100-N Area and 300 Area by PNNL's Science and Technology Program to study groundwater/river interaction. Some of these tubes will be sampled during fiscal year 2008 (FY08) to support the synthetic apatite treatability test, to monitor near-shore groundwater chemistry, and to evaluate contaminant rebound after shutdown of the 100-NR-2 pump-and-treat system.

In the fall of 2007, nine aquifer tubes sites were installed in the 600 Area, between 100-D and 100-H (*Sampling and Analysis Instruction for Investigating Chromium Groundwater Contamination in the 600 Area Between 100-D and 100-H* [SGW-33224]). These tubes were installed to better define the chromium contamination in the groundwater at these locations.

Figures 1-1 through 1-3 provide an indication of the aquifer tube coverage along the Columbia River. These figures indicate the tubes that are in service, those not in service, and the proposed tubes. Detailed tube locations for each OU are shown in the figures in Section 2.0. A list of previous aquifer tube data summary reports is included in the "References" section of this document (see Section 7.1).

1.1.2 Aquifer Tube Nomenclature Description

Aquifer tube nomenclature varies with the date of installation. The advisory group for the Hanford Environmental Information System (HEIS) database is proposing a nomenclature for the aquifer tubes. This nomenclature is currently under review. Once approved, the names will

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be changed to the new nomenclature and the existing names will be preserved in a synonym table.

The aquifer tubes installed in 1995 have "DD," "DH," or "DK" prefixes. The first letter signifies that the tube was driven into the sediment, and the second letter identifies the reactor area (namely D, H, or K). For example, site "DD-17-2" signifies an aquifer tube driven into sediment in the D Reactor area along transect 17, at depth horizon "2." Relative depth horizons were identified as "1" through "4," with "1" being the shallowest and "4" being the deepest.

The tubes installed in 1997 were identified numerically from "1" to"86," with up to three sampling ports (i.e., screens) in each array. Site "1" is located immediately upriver of the B/C Reactor area, and site "86" is located downriver from the Hanford townsite. The depth horizons were identified simply as shallow port (S), mid-depth port (M), and deep port (D). The depths are relative to one another rather than representing a specific depth. Many arrays have less than three ports because driving the small-diameter casing to depth with an air hammer or Geoprobe rig was problematic in gravelly sediments or when caliche was encountered, or when the deep port would not yield water during development. The maximum installation depth was 8.8 m (29 ft) below ground surface. These tubes are displayed in the figures in this sampling and analysis instruction (SAI) with the prefix "AT."

Aquifer tubes installed in 2003 and 2004 contain the prefix "AT" (aquifer tube); the reactor area (B, K, D, H, or F); a site location (1 through 7); and a depth horizon of "S," "M," or "D" (i.e., shallow, middle, or deep port). For example, "AT-H-1-D" signifies an aquifer tube in the 100-H Area at location "1," and "D" indicates the deepest tube in the array. Tubes installed in the 300 Area where there is no reactor contain a "3" in the tube site nomenclature. For example, "AT-3-7-S" signifies an aquifer tube in the 300 Area at location "7" and is the shallowest tube in the array.

There are several distinct types of names of 100-N Area aquifer tubes. One group of tubes was installed to monitor multiple depths (vertical profile) as an array, not as a single hole. These were identified as NVP1-1 through NVP1-5. Tube NVP1-1 is the shallowest and tube NVP1-5 is the deepest. A second set of five vertical profile tubes was designated NVP2-116.3 through NVP2-115.1, with the final numbers in the name identifying the elevation of the tube screen. Another array of 17 tubes was spread out along the 100-N Area shoreline at an elevation of 116 m (381 ft) and designated as N116m Array-0A through N116m Array-16A.

Five tubes specifically installed for the apatite treatability test were designated with the prefix "APT."

Each aquifer sampling tube has a unique well identification number (well ID). The well ID consists of an alpha character followed by four numeric characters. This is a unique identification for each aquifer sampling tube and can be correlated to the assigned WELL_NAME field in the HEIS:WELL table and to alternate names used in the HEIS:WELL_SYNONYM table in the HEIS database. The new aquifer sampling tubes described in this report will be referred to by their well ID. Associated data in the HEIS:SAMPLE and HEIS:RESULT tables are accessed using the assigned WELL_NAME from the HEIS:WELL table for each aquifer tube.

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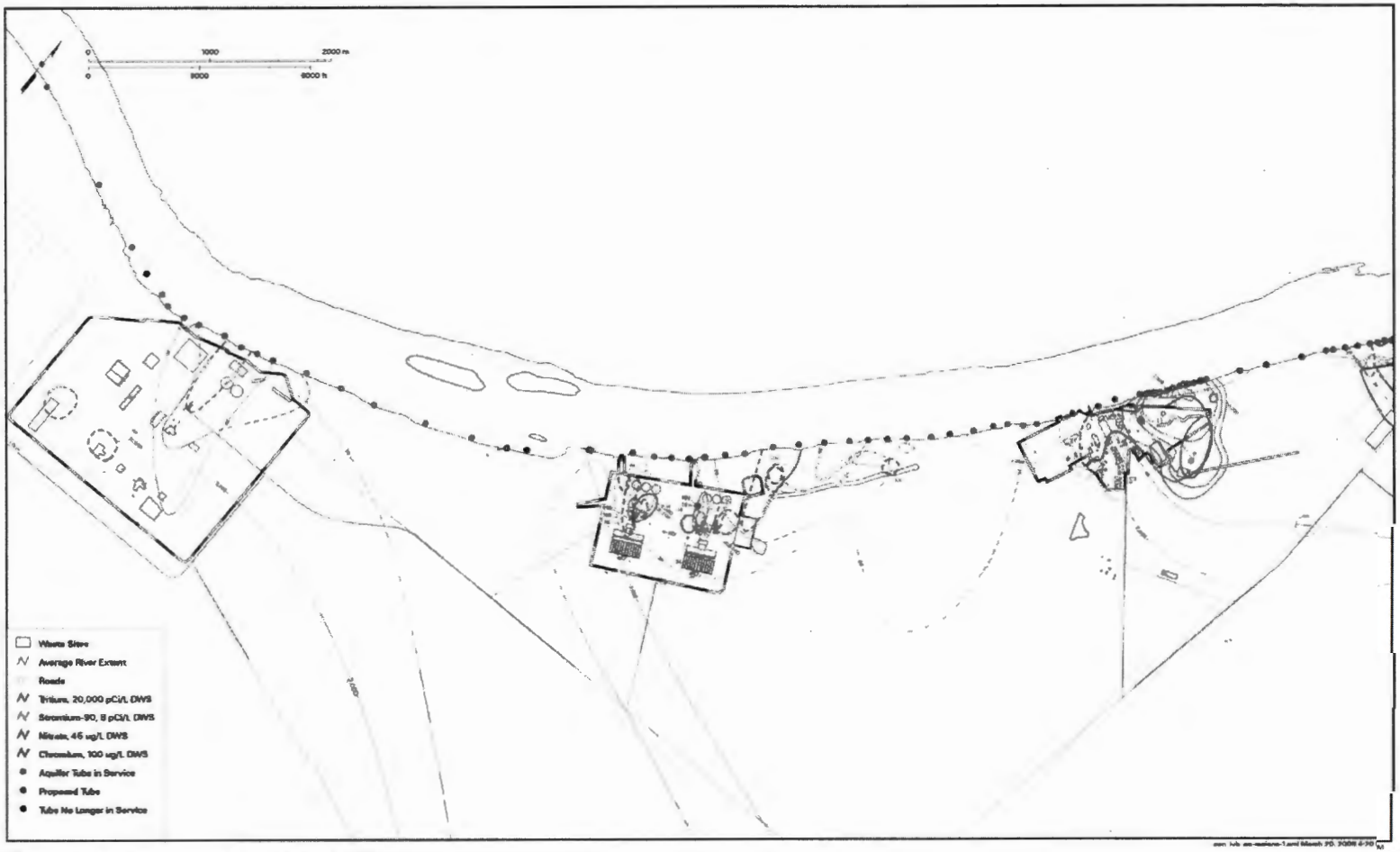
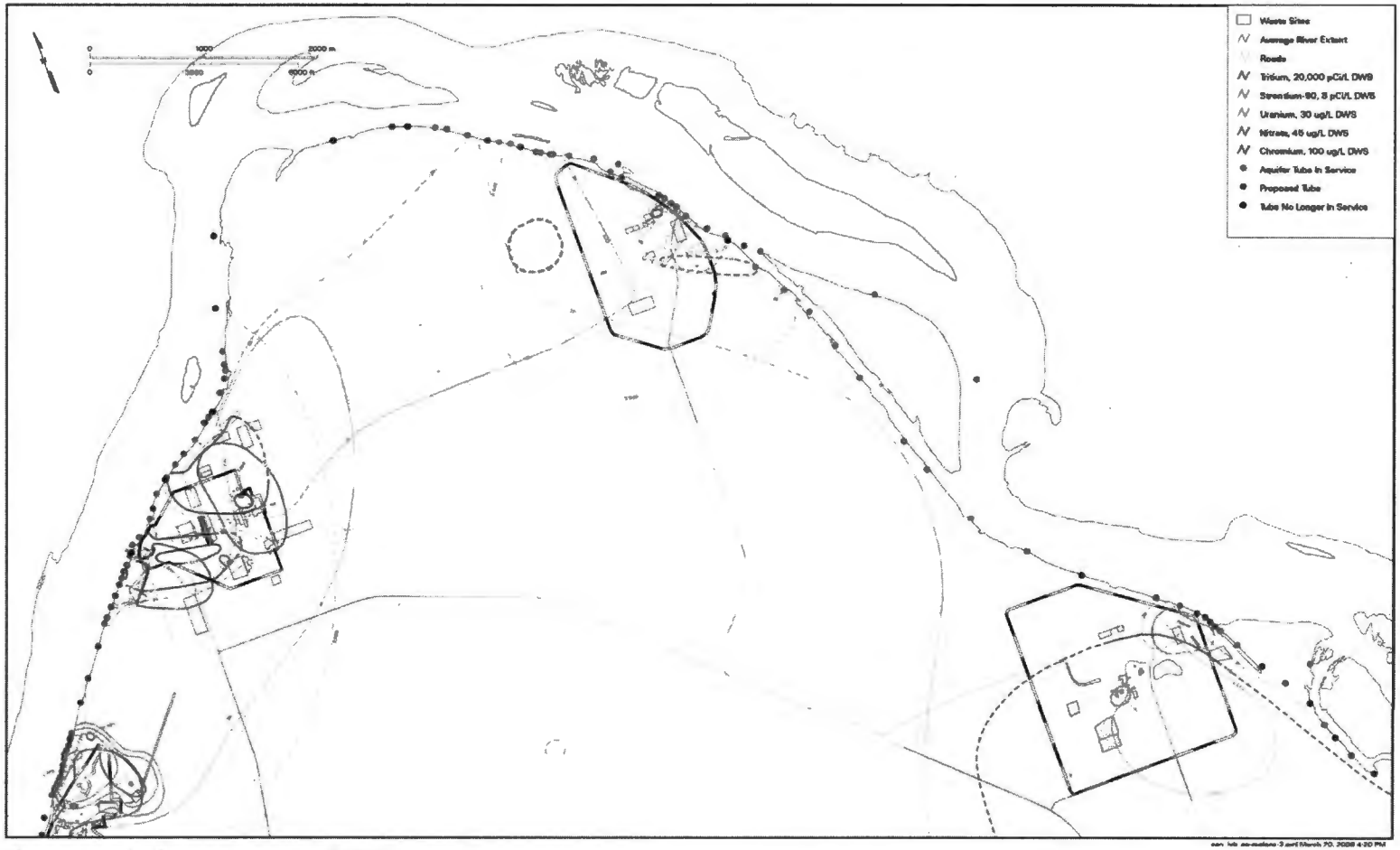
Figure 1-1. Aquifer Tube Locations from 100-B to 100-N Area.



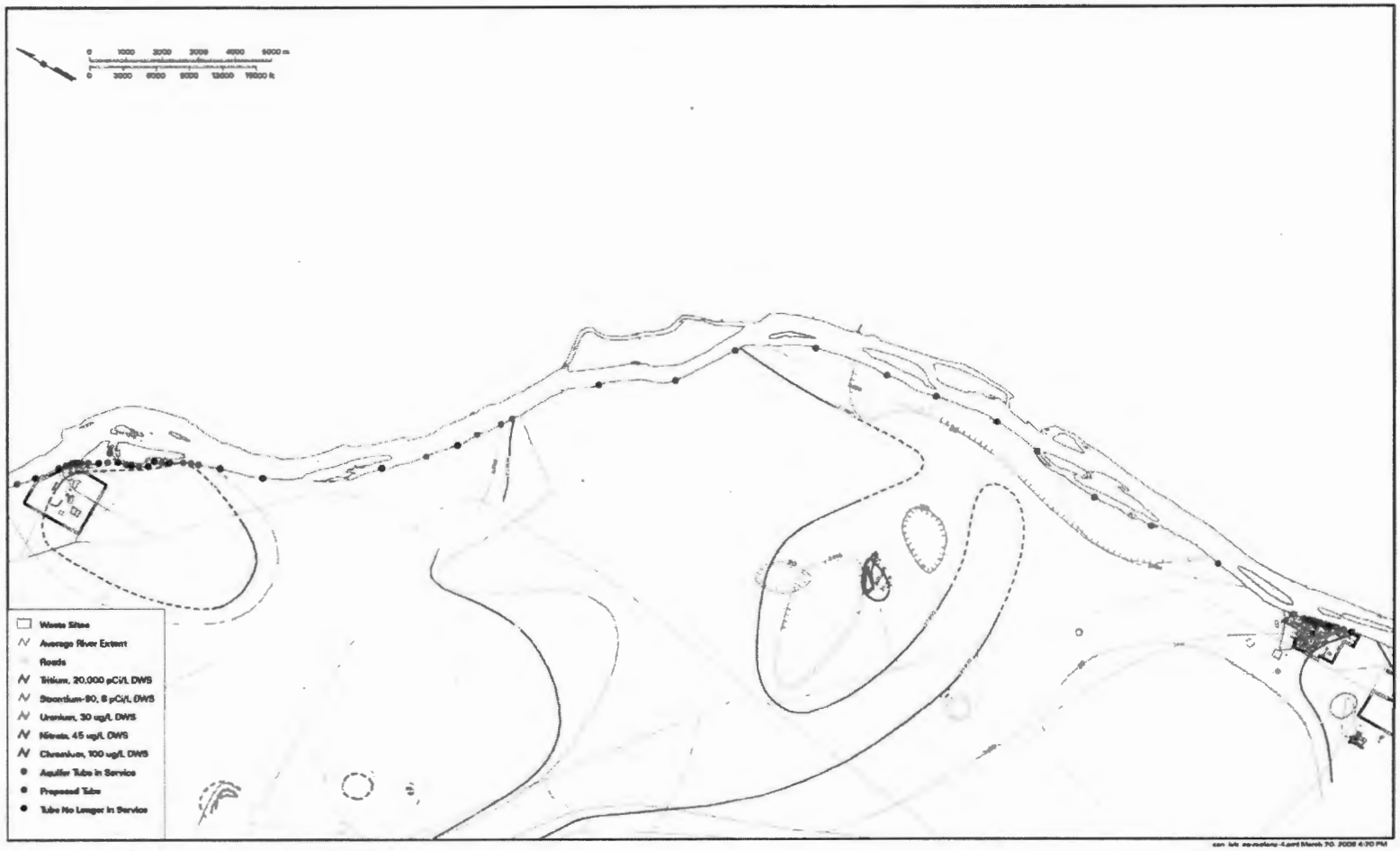
Plume contours are based on average concentrations for 2007.

Figure 1-2. Aquifer Tube Locations from 100-N to 100-F Area.



Plume contours are based on average concentrations for 2007.

Figure 1-3. Aquifer Tube Locations from 100-F to 300 Area.



Plume contours are based on average concentrations for 2007.

Table 1-1. Number of Aquifer Tubes for Each Operable Unit.

Operable Unit	Sites Proposed for 2008	Aquifer Tube Sites	Year of Installation	Number of Tubes Installed	Number of Tubes in Service (as of Fall 2007)	Number of Tubes Not in Service (as of Fall 2007)
100-BC-5	3	9	1997	35	33	2
		6	2003/2004			
100-KR-4	10	2	1996	41	39	2
		10	1997			
		6	2003/2004			
100-NR-2	6	3	2004	43	35	8
		15	2005			
		24	2006			
100-HR-3 (D)	6	14	1995	76	67	9
		9	1997			
		5	2003/2004			
100-HR-3 (H)	6	3	1996	87	74	13
		20	1997			
		3	2003/2004			
		9	2007			
100-FR-3	2	19	1997	66	47	19
	(3 placeholders)	4	2003/2004			
200-PO-1	11	6	1997	15	11	4
300-FF-5	4	12	2003/2004	42	40	2
		9	2005			
Total	**51**	**188**		**405**	**346**	**59**

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2.0 DATA QUALITY OBJECTIVES

2.1 PROJECT DESCRIPTION

This section presents the DQOs for installation and analysis of the aquifer sampling tubes. The criteria and recommendations by the technical team for aquifer tube installation are the outcome of the review of current conditions and the status of existing aquifer tubes. The technical team is comprised of representatives of the various groundwater OUs and other knowledgeable individuals. The recommendations of the technical team were then presented to U.S. Department of Energy, Richland Operations Office (RL) Groundwater staff and the regulatory agencies. The resulting recommendations for the installation and sampling of the aquifer tubes are presented in this report.

2.1.1 Issue, Statement of Problem, Objective, Scope, and Boundaries

The primary issue driving the installation of aquifer sampling tubes is to extend the coverage and to replace the sites that are no longer in service. Although many tube sites have lasted much longer than originally expected, a few sites in key locations are no longer in service. These sites have either been destroyed, no longer yield water, or cannot be found.

The problem to be addressed by this installation and sampling is as follows:

- Aquifer tubes monitor the groundwater at the river shore. The tubes provide an indication of the quality of water entering the river and allow the tracking of plume constituents at the shoreline. This tracking has proven very useful in monitoring groundwater remedial actions and identifying potential problem areas. There is an increase in knowledge of the groundwater conditions based on monitoring since the majority of aquifer tubes were installed. This increased knowledge has led to the need to reassess the groundwater condition near the Columbia River.

From this problem statement, the objectives, scope, and boundaries for the task of installing aquifer sampling tubes can be derived. The objective is to reduce the data gap in aquifer tube coverage. The scope is to install aquifer sampling tubes and collect samples in order to confirm the absence or presence of contaminants. The boundaries of the task are along the shoreline at the 100-B, 100-K, 100-N, 100-D, 100-H, and 100-F Areas; the 300 Area; and the shoreline associated with the 200-PO-1 Groundwater OU. Reporting of the installation and analytical results will be included in the annual Hanford Sitewide groundwater summary report.

2.1.2 Project Assumptions

The principal assumptions underlying the planning of this work are summarized as follows:

- The focus area of installation for each reactor area and the shoreline associated with the 200-PO-1 OU is the area where groundwater contaminant plumes are known to be adjacent to the river shore.
- Geologic conditions at each site are amenable to install tubes at three different depths for vertical monitoring of the unconfined aquifer.
- Tubes placed in the 300 Area will be constructed in the Ringold sand unit, where volatile organics are known to exist.
- Cultural review of the proposed locations allows for installation in that area.

2.2 TECHNICAL APPROACH

This section presents the general requirements for installation, sampling, field measurements, and data analysis. Additional details regarding sampling activities are provided in the field sampling plan in Section 4.0.

2.2.1 Aquifer Sampling Tube Locations

The locations of the aquifer sampling tube sites were based on the current understanding of the contaminant plumes and knowledge of the status of previously installed tubes. Table 2-1 lists the aquifer sampling tubes by area and provides the rationale for their locations. Figures 2-1 through 2-8 show the proposed aquifer tube locations.

2.2.2 Aquifer Sampling Tube Installation

At each location listed in Table 2-1, three tubes will be installed. Each aquifer sampling tube consists of 0.6-cm (1/4-in.) outside-diameter polyethylene tubing that is attached to a 15–cm (6-in.)-long, stainless-steel, wire-mesh screen on the buried end to serve as a sampling port. A hollow probe rod, drive cap, drive point holder, and an expendable drive point are assembled and driven into the ground using a truck-mounted Geoprobe direct-push technology rig or a pneumatic air hammer. The drive cap is removed, another section of probe rod is attached, the drive cap is reattached, and the driving resumes.

This process is repeated until refusal occurs or a shallower desired depth is reached. At that depth, the drive cap is removed. The probe rod is filled with water. The probe rod is back-pulled a few inches and the drive point is driven from the point holder. The screen and polyethylene tubing are pushed down the inside of the hollow probe rod until the screen extends beyond the end of the point holder. The peristaltic pump is attached to the end of the polyethylene tubing and pumping begins. If the screen is in permeable sediment, the aquifer tube will produce water; however, if the screen is situated in impermeable sediment, the aquifer tube will quickly run dry. If the aquifer tube runs dry, the aquifer tube and probe rod are filled with water and then back-pulled together until permeable sediment is encountered. Then the aquifer tube is pumped to confirm that it will produce water at that depth. The probe rod is then pulled from the ground without moving the aquifer tube toward the surface. The aquifer tube is pumped to develop it. The depth of the screen below the surface is measured with a round, fiberglass fish tape that is inserted inside the polyethylene tubing. The aquifer tube is marked with the well ID and screen depth. The aquifer tube is then protected from sunlight, animals, and other natural hazards by an outer polyvinyl chloride pipe, cap, and elbows, which are held in place by cobbles, sandbags, or rebar stakes as necessary. Completed aquifer tubes are sampled from the surface using a peristaltic pump.

2.3 SAMPLING REQUIREMENTS

Samples obtained for the purpose of measuring analyte concentrations will be collected using a peristaltic pump. The samples will be collected after the construction of the aquifer sampling tube. Field parameters (i.e., pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity), and in most locations hexavalent chromium, will be measured from each tube. At most sites, the tube with the highest specific conductance (indicating groundwater) will be sampled for a longer list of analytes. In most areas, samples are not collected if specific conductance is below 160 μS/cm because the samples are considered too

diluted with river water. This practice is not followed for the tubes at 100-N Area, which typically have low conductance, even when strontium-90 concentrations are high. Each area has specific analytes (e.g., some 100-N Area tubes will be analyzed for total petroleum hydrocarbon [TPH], and 300 Area will be analyzed for volatile organics compounds [VOCs]). Table 4-1 in Section 4.0 lists the analytes for each area.

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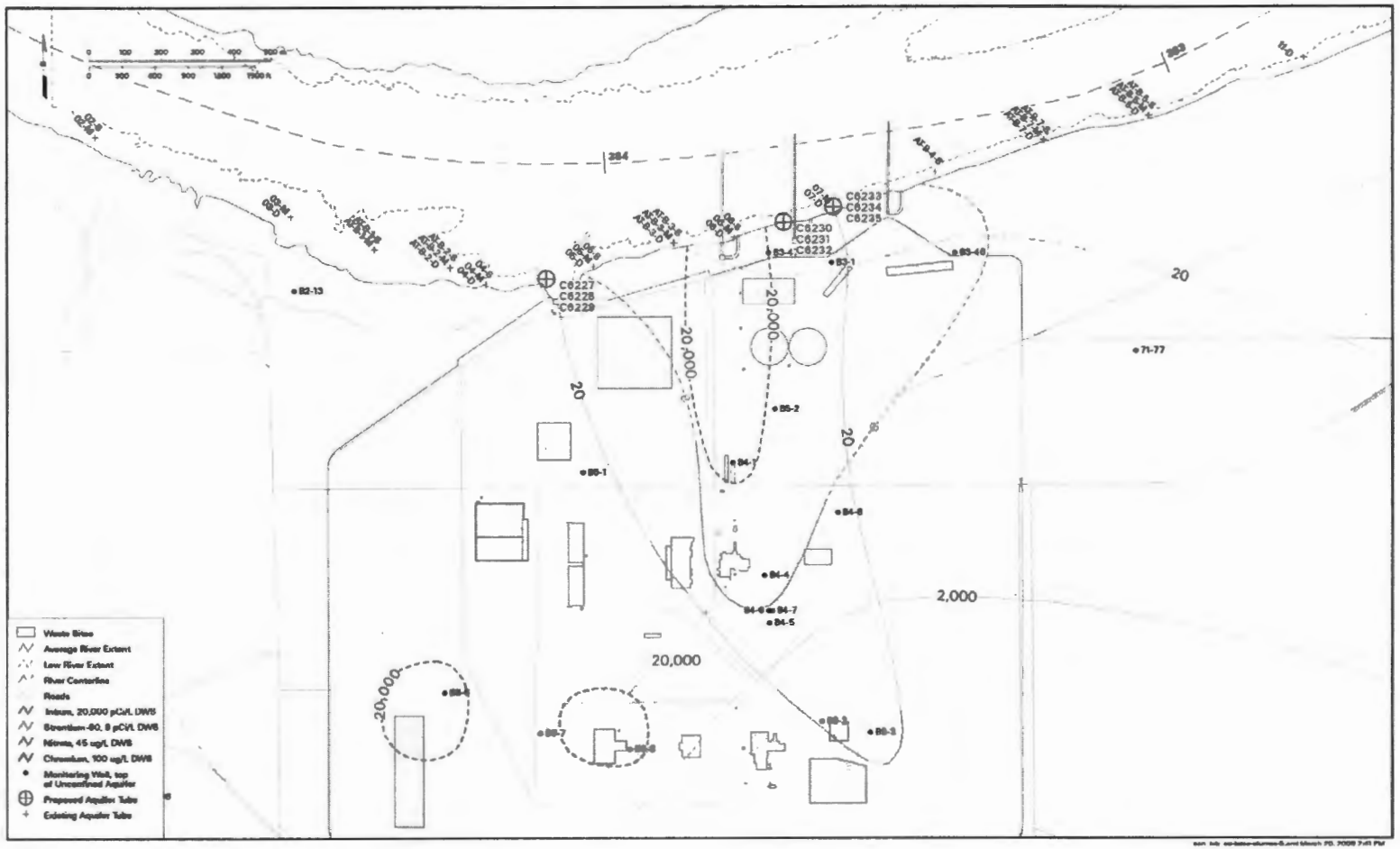
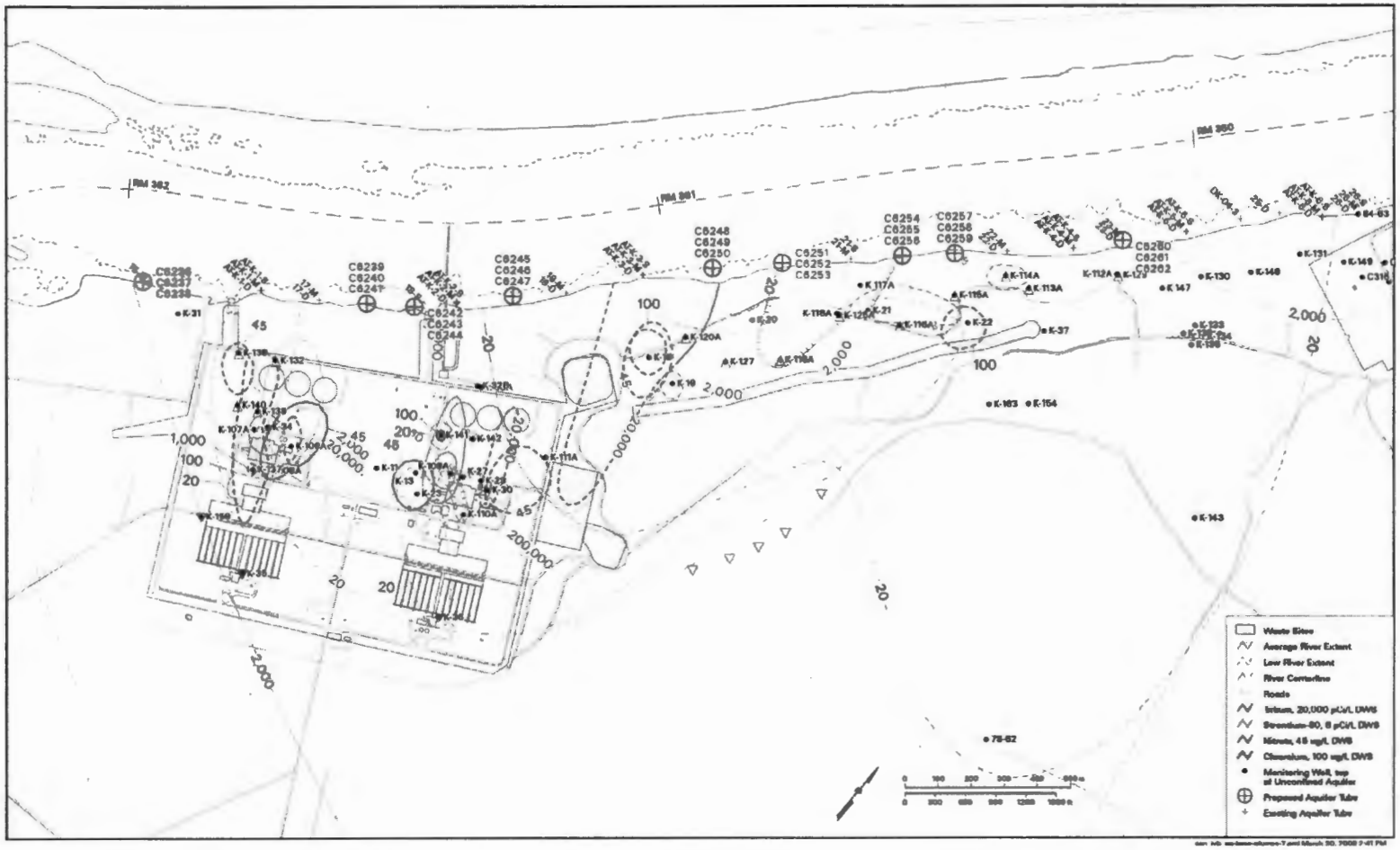
Figure 2-1. Proposed Aquifer Tubes for 100-B Area.



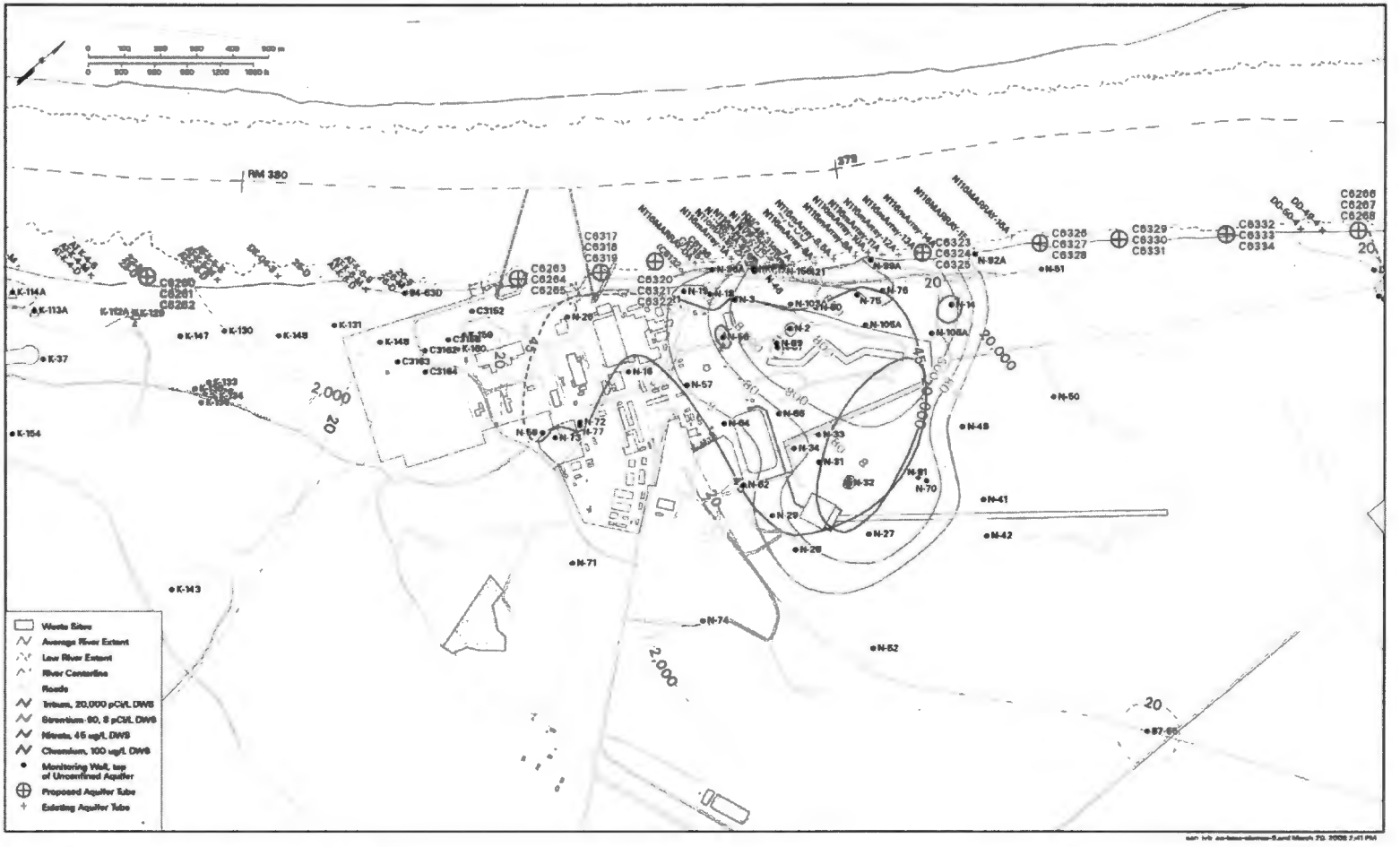
Plume contours are based on average concentrations for 2007.

Figure 2-2. Proposed Aquifer Tubes for 100-K Area.



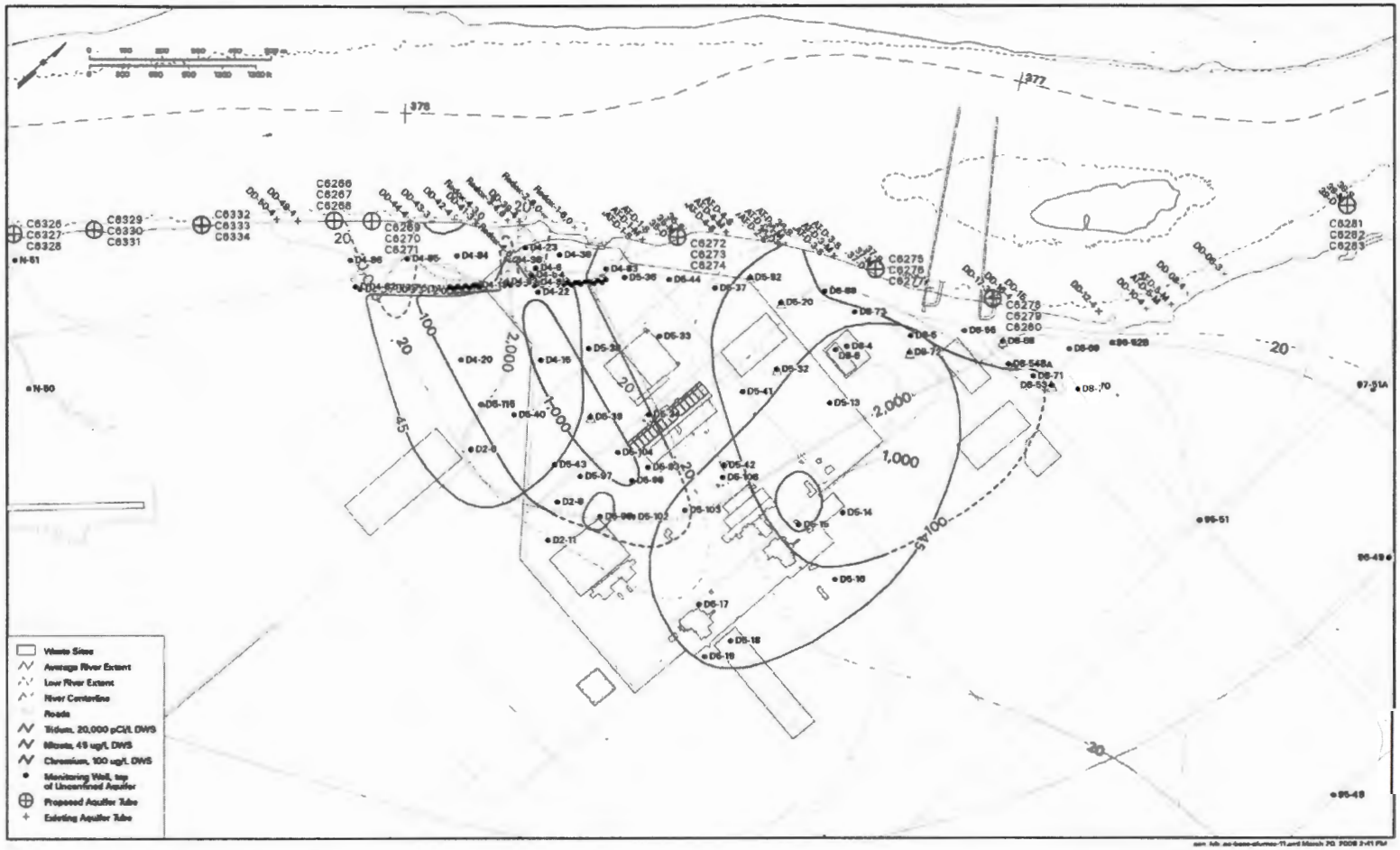
Plume contours are based on average concentrations for 2007.

Figure 2-3. Proposed Aquifer Tubes for 100-K, 100-N, and 100-D. Area.



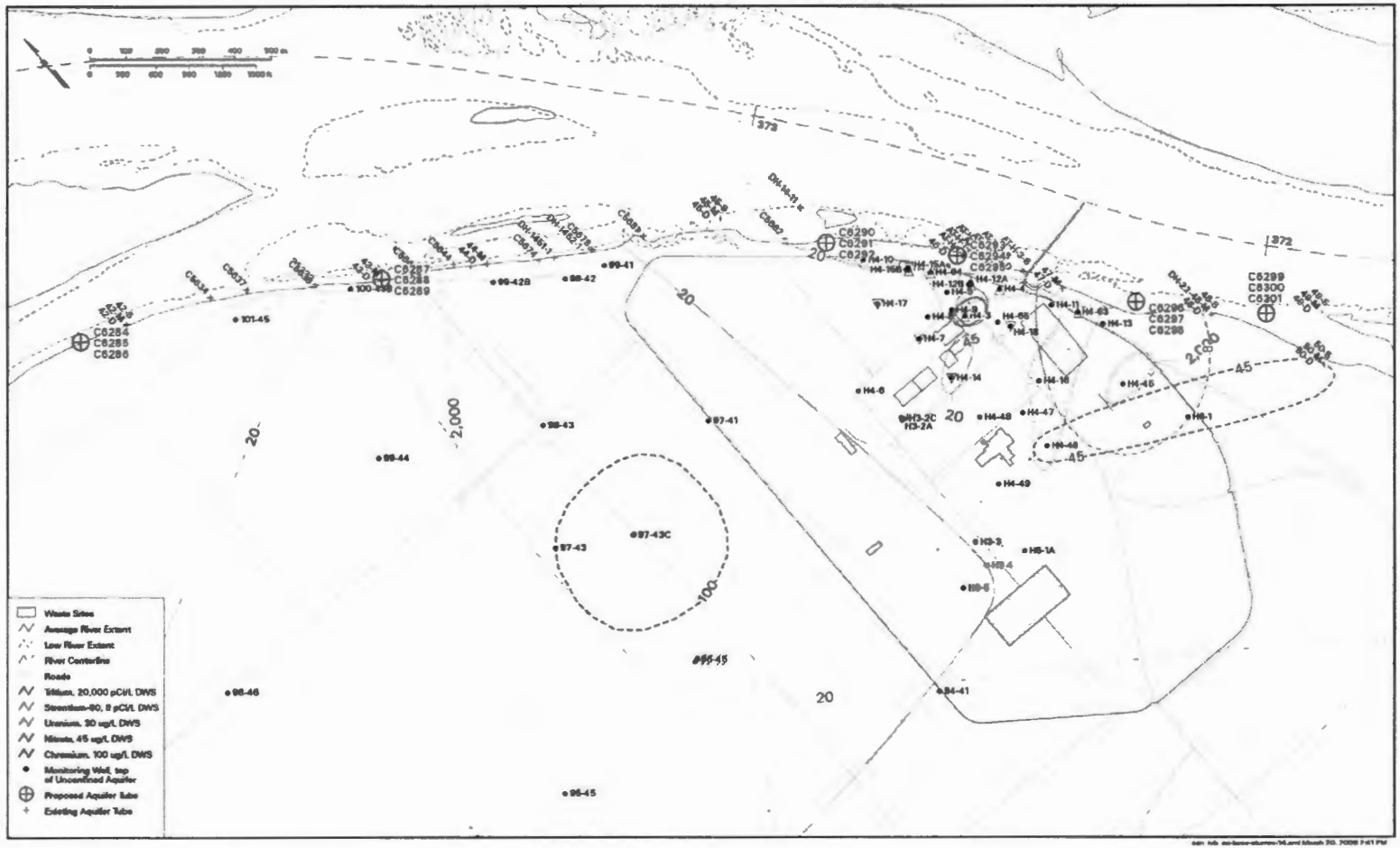
Plume contours are based on average concentrations for 2007.

Figure 2-4. Proposed Aquifer Tubes for 100-N and 100-D Areas.



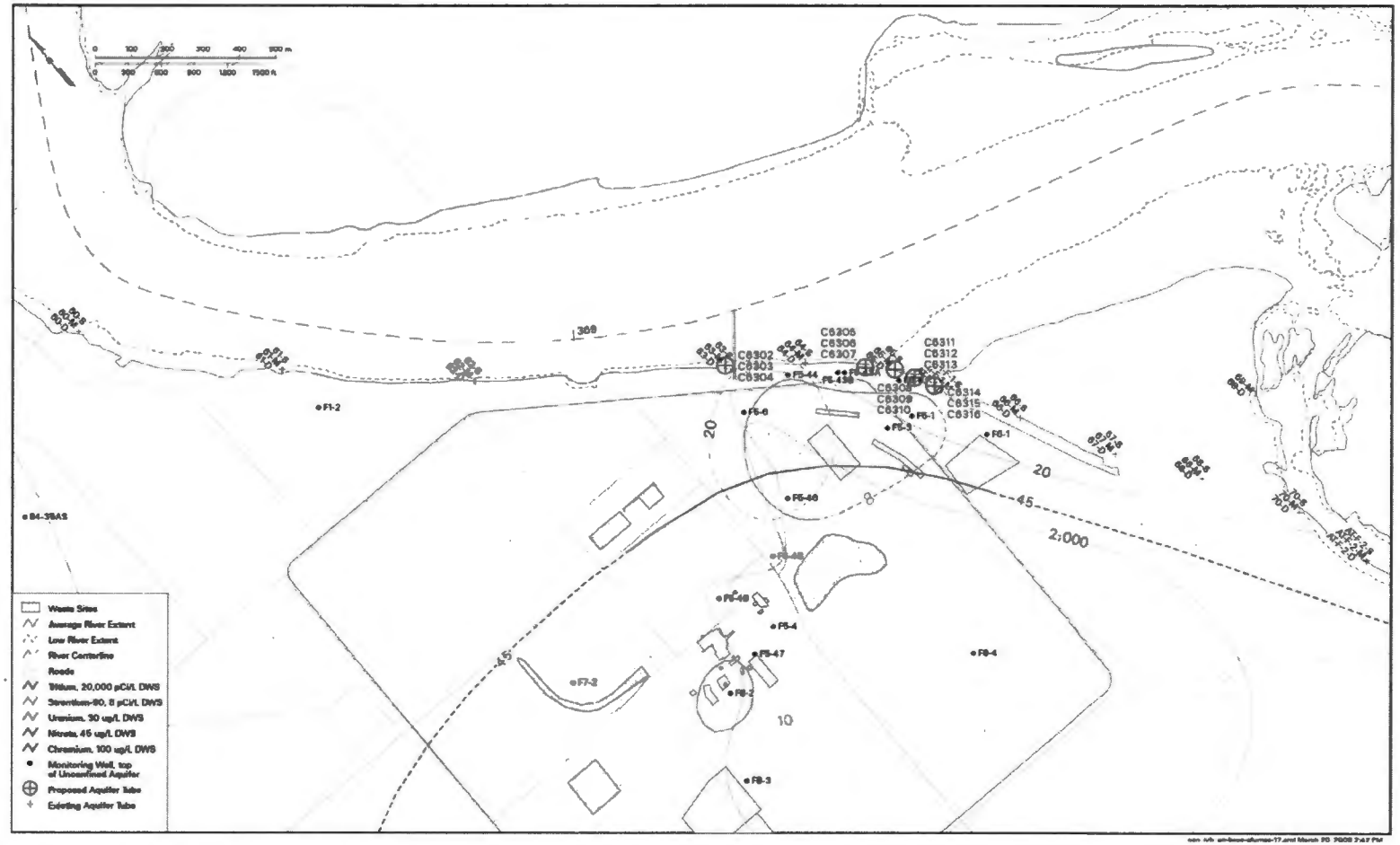
Plume contours are based on average concentrations for 2007.

Figure 2-5. Proposed Aquifer Tubes for 100-H Area.



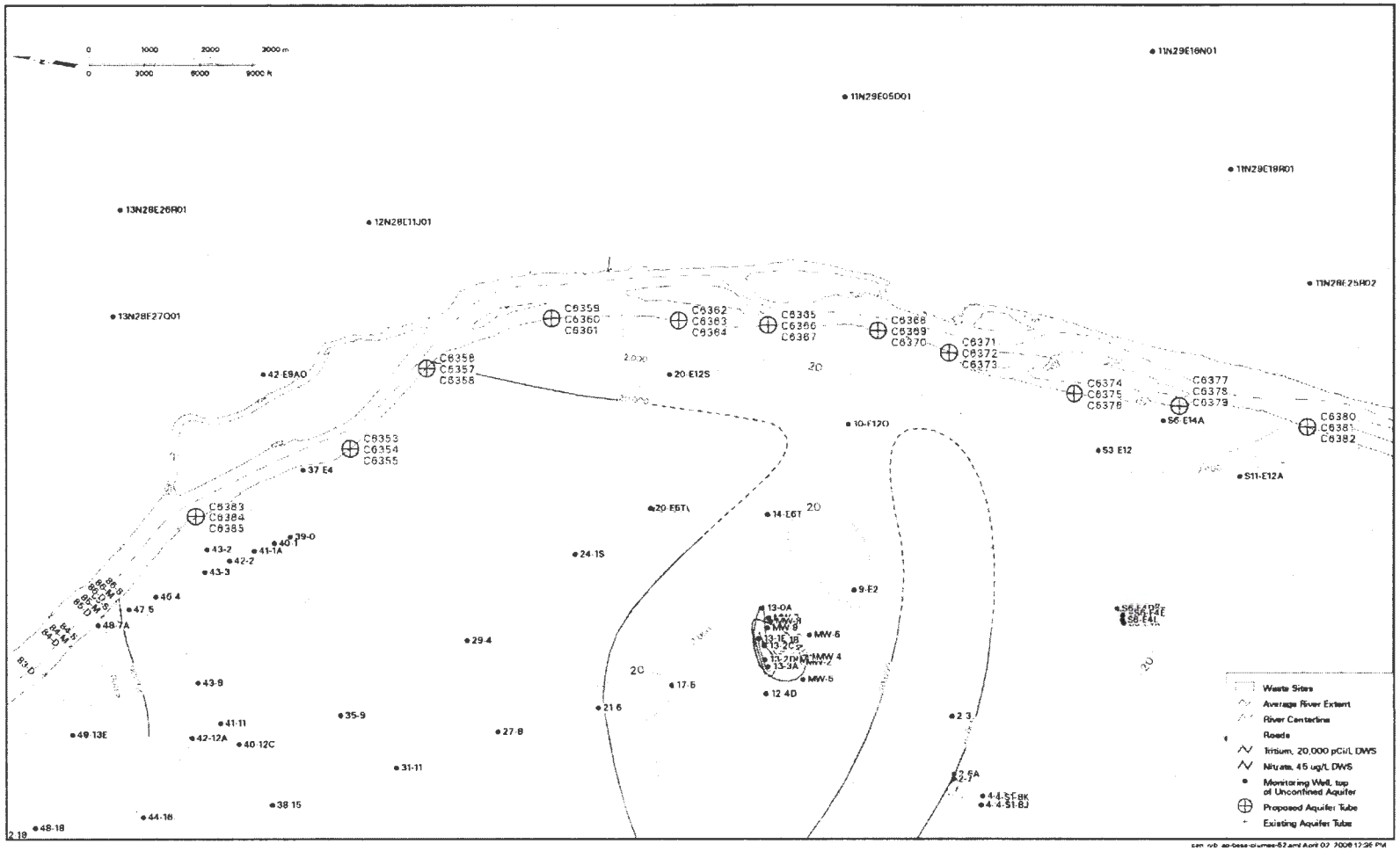
Plume contours are based on average concentrations for 2007.

Figure 2-6. Proposed Aquifer Tubes for 100-F Area.



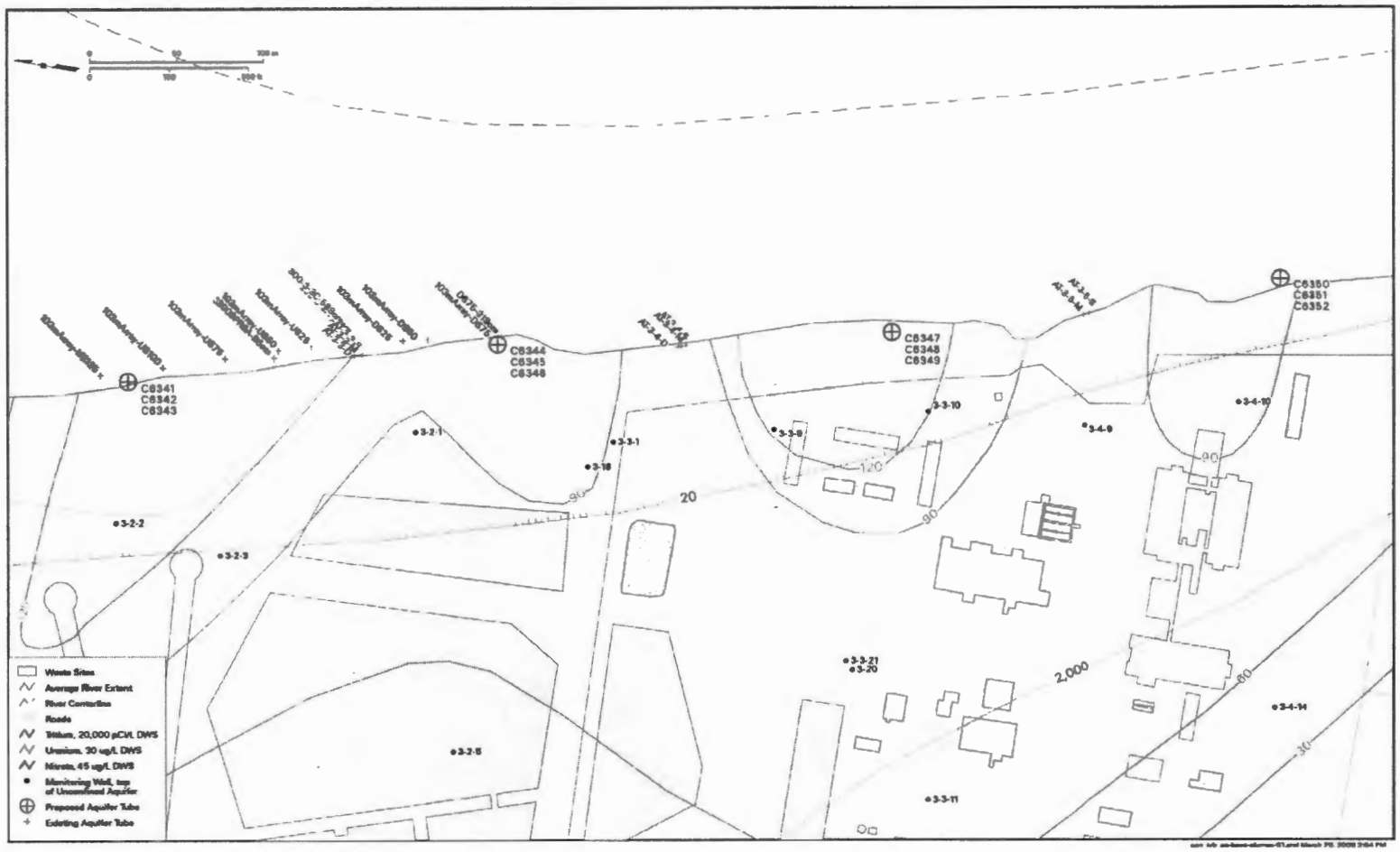
Plume contours are based on average concentrations for 2007.

Figure 2-7. Proposed Aquifer Tubes for 200-PO-1 Operable Unit Shoreline.



Plume contours are based on average concentrations for 2007.

Figure 2-8. Proposed Aquifer Tubes for 300 Area.



Plume contours are based on average concentrations for 2007.

Table 2-1. Well Identification, Approximate Location, and Rationale for Aquifer Sampling Tubes. (5 sheets)

OU	Well ID (Tube)	Location	Rationale
100-B/C	C6227 C6228 C6229	Between AT-4 and AT-5	New location; downgradient of waste sites 100-B-27 and 126-B-3.
100-B/C	C6230 C6231 C6232	Between AT-6 and AT-7	New location; additional monitoring of chromium and Sr-90 plumes.
100-B/C	C6233 C6234 C6235	Replace or supplement AT-7	Only AT-7-D remains; need shallower tubes to look for Sr-90.
100-K	C6236 C6237 C6238	Replace or supplement AT-15	Only AT-15-M remains; upstream of 100-K Area.
100-K	C6239 C6240 C6241	Between AT-17 and AT-18	New location; gap in coverage between KE and KW Reactors.
100-K	C6242 C6243 C6244	Replace or supplement AT-18	Only AT-18-S remains; downgradient of KE Reactor plumes.
100-K	C6245 C6246 C6247	Between AT-K-2 and AT-19	New location; gap in coverage downgradient of KE Reactor.
100-K	C6248 C6249 C6250	Between AT-K-3 and AT-21	New location; gap in coverage downgradient of trench. Access may be limited by cultural resources.
100-K	C6251 C6252 C6253	Between AT-K-3 and AT-21	New location; gap in coverage downgradient of trench. Access may be limited by cultural resources.
100-K	C6254 C6255 C6256	Between AT-21 and AT-22	New location; gap in coverage downgradient of trench. Access may be limited by cultural resources.

Table 2-1. Well Identification, Approximate Location, and Rationale for Aquifer Sampling Tubes. (5 sheets)

OU	Well ID (Tube)	Location	Rationale
100-K	C6257 C6258 C6259	Between AT-21 and AT-22	New location; gap in coverage downgradient of trench. Access may be limited by cultural resources.
100-K	C6260 C6261 C6262	Between AT-23 and AT-K-5	New location; gap in coverage near treatability test site.
100-K	C6263 C6264 C6265	Downstream of AT-26 by the Hanford Generating Plant	Monitor downstream movement of chromium.
100-D	C6266 C6267 C6268	Between DD-49 and DD-44	New location; south chromium plume; also 100-N Area tritium.
100-D	C6269 C6270 C6271	Between DD-49 and DD-44	New location; south chromium plume; also 100-N Area tritium.
100-D	C6272 C6273 C6274	Replace AT-35	Only AT-35-S can still be sampled so it needs replacement to monitor chromium.
100-D	C6275 C6276 C6277	Replace AT-37	Only AT-35-S can still be sampled so it needs replacement to monitor chromium.
100-D	C6278 C6279 C6280	Between AT-38 and DD-17	Nearby well samples have increased chromium; also monitor Sr-90 and nitrate.
100-D	C6281 C6282 C6283	Replace AT-39 (north of 100-D Area)	AT-39 not found. Monitor to see if chromium is migrating northward along river (previous data at this location is chromium less than detection limit, so low priority).
100-H	C6284 C6285 C6286	Replace AT-42 (north of 100-H Area)	AT-42 tubes destroyed; additional "Horn" monitoring point.

Table 2-1. Well Identification, Approximate Location, and Rationale for Aquifer Sampling Tubes. (5 sheets)

OU	Well ID (Tube)	Location	Rationale
100-H	C6287 C6288 C6289	Replace AT-43 (north of 100-H Area)	Only AT-43-M remains; useful to have depths.
100-H	C6290 C6291 C6292	Between AT-45 and AT-46	New location. Gap in coverage since DH-14/DH-141 are not sampled (and probably destroyed).
100-H	C6293 C6294 C6295	Replace AT-46	AT-46 no yield. Near 183-H plume. Move upstream a bit from AT-46 location to improve coverage.
100-H	C6296 C6297 C6298	Between AT-47 and AT-48	Monitor Sr-90 plume.
100-H	C6299 C6300 C6301	South of AT-48	Monitor chromium plume.
100-F	C6302 C6303 C6304	Replace AT-63	Only AT-63-S remains. Low levels of chromium in the past.
100-F	C6305 C6306 C6307	Replace AT-65	AT-65 destroyed. Detectable Sr-90 in past. Near 128-F-2 burn pit.
100-F	C6308 C6309 C6310	Near the 128-F-2 100-F burn pit	Monitor metals at this location.
100-F	C6311 C6312 C6313	Near the 128-F-2 100-F burn pit	Monitor metals at this location.
100-F	C6314 C6315 C6316	Near the 128-F-2 100-F burn pit	Monitor metals at this location.

Table 2-1. Well Identification, Approximate Location, and Rationale for Aquifer Sampling Tubes. (5 sheets)

OU	Well ID (Tube)	Location	Rationale
100-N	C6317 C6318 C6319	River edge of 199-N-47	Previous sampling indicated TPH, sulfate, and nitrate.
100-N	C6320 C6321 C6322	River edge of 199-N-21	Previous sampling indicated TPH, sulfate, and nitrate.
100-N	C6323 C6324 C6325	Near seep 9-2	Previous sampling during the ecological risk assessment indicated elevated metals in this area.
100-N	C6326 C6327 C6328	Near seep Dirkes-I	Previous sampling during the ecological risk assessment indicated elevated metals in this area.
100-N	C6329 C6330 C6331	Near seep Dirkes-K	Previous sampling during the ecological risk assessment indicated elevated metals in this area.
100-N	C6332 C6333 C6334	Near seep Dirkes-M	Previous sampling during the ecological risk assessment indicated elevated metals in this area.
PO-1	C6383 C6384 C6385		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0); the most upstream new tube in plan.
PO-1	C6353 C6354 C6355		Tube will be discussed in the revision of 200-PO-1 work plan (DOE/RL-2007-31, Rev 0).
PO-1	C6356 C6357 C6358		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6359 C6360 C6361		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).

Table 2-1. Well Identification, Approximate Location, and Rationale for Aquifer Sampling Tubes. (5 sheets)

OU	Well ID (Tube)	Location	Rationale
PO-1	C6362 C6363 C6364		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6365 C6366 C6367		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6368 C6369 C6370		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6371 C6372 C6373		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6374 C6375 C6376		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6377 C6378 C6379		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0).
PO-1	C6380 C6381 C6382		In 200-PO-1 work plan (DOE/RL-2007-31, Rev. 0); the most downstream tube in plan.
300	C6341 C6342 C6343	Near Spr-8	Additional coverage of VOCs discovered during LFI in 2006. Installation will include placing one tube screen at each site in the Ringold Unit E and subunit. These sites provide increased coverage of shoreline segment where uranium plumes enters the river.
300	C6344 C6345 C6346	Near Spr-10	Additional coverage of VOCs discovered during LFI in 2006. Installation will include placing one tube screen at each site in the Ringold Unit E and subunit. These sites provide increased coverage of shoreline segment where uranium plumes enters the river.
300	C6347 C6348 C6349	Between AT-3-4 and AT-3-5	Additional coverage of VOCs discovered during LFI in 2006. Installation will include placing one tube screen at each site in the Ringold Unit E and subunit. These sites provide increased coverage of shoreline segment where uranium plumes enters the river.

Table 2-1. Well Identification, Approximate Location, and Rationale for Aquifer Sampling Tubes. (5 sheets)

OU	Well ID (Tube)	Location	Rationale
300	C6350 C6351 C6352	Near Spr-11	Additional coverage of VOCs discovered during LFI in 2006. Installation will include placing one tube screen at each site in the Ringold Unit E and subunit. These sites provide increased coverage of shoreline segment where uranium plumes enters the river.

NOTE: Reference made to the 200-PO-1 work plan is the *Remedial Investigation Feasibility Study Work Plan for the 200-PO-1 Groundwater Operable Unit*, DOE/RL-2007-31, Rev. 0.

ID = identification
LFI = limited field investigation
OU = operable unit
TPH = total petroleum hydrocarbon
VOC = volatile organic compound

3.0 QUALITY ASSURANCE PROJECT PLAN

The quality assurance project plan (QAPjP) establishes the quality requirements for environmental data collection, including sampling, field measurements, and laboratory analysis. The QAPjP complies with the requirements of the following:

- U.S. Department of Energy (DOE) O 414.1C, *Quality Assurance*
- 10 *Code of Federal Regulations* (CFR) 830.120, "Quality Assurance Requirements"
- *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5 (EPA/240/B-01/003).

The following subsections describe the quality requirements and controls applicable to this investigation. Correlation between EPA QA/R-5 requirements and the information in this section are provided in Table 3-1.

Quality assurance (QA) requirements are implemented in accordance with Fluor Hanford, Inc.'s (FH's) internal QA program. The QA program document describes how FH implements the QA requirements conveyed in DOE O 414.1C and 10 CFR 830.120, and how the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 2003) and Hanford Site internal laboratory QA requirements apply to FH environmental QA program plans.

All work performed under this SAI will be performed in compliance with the FH QA program plan, the FH Groundwater Remediation Project plan, or subsequent and equivalent FH quality program plans. Field sample collection and documentation activities will be performed in accordance with applicable FH procedures, except as modified for certain non-routine procedures documented herein.

3.1 PROJECT ORGANIZATION

The project organization is described in the subsections that follow and is shown in Figure 3-1.

3.1.1 Groundwater 100/300 Area Project Manager

The Groundwater 100/300 Area project manager provides oversight for all activities and coordinates with RL and the regulators in support of sampling activities.

3.1.2 Task Lead

The task lead is responsible for direct management of sampling documents and requirements, as well as field activities. The task lead ensures that the field team leader, samplers, and others responsible for implementation of this SAI are provided with current copies of this document and any revisions thereto. The task lead works closely with QA, Health and Safety, and the field team leaders to integrate these and the other lead disciplines in planning and implementing work.

3.1.3 Quality Assurance Engineer

The QA engineer coordinates directly with the task lead and is responsible for QA issues on the project. Responsibilities include overseeing the implementation of project QA requirements, reviewing project documents (including SAIs [and the QAPjP]), and participating in QA assessments on sample collection and analysis activities, as appropriate.

3.1.4 Waste Management

The waste management lead communicates waste-handling policies and procedures and ensures project compliance for safe and effective storage, transportation, disposal, and tracking of waste.

Other responsibilities include identifying waste management sampling/characterization requirements to ensure regulatory compliance interpretation with *Washington Administrative Code* (WAC) 173-303 ("Dangerous Waste Regulations") and the applicable waste control plan.

3.1.5 Field Team Leader

The field team leader has the overall responsibility for the planning, coordination, and execution of field characterization activities. Specific responsibilities include converting the sampling design requirements into field task instructions that provide specific direction for field activities. Responsibilities also include directing training and practice sessions with field personnel to ensure that the sampling design is understood and can be performed as specified. The field team leader communicates with task lead to identify field constraints that could affect the sampling design. In addition, the field team leader directs the procurement and installation of materials and equipment needed to support fieldwork.

The field team leader oversees field-sampling activities that include sample collection, packaging, provision of certified clean sampling bottles/containers, documentation of sampling activities in controlled logbooks, chain-of-custody documentation, and packaging and transportation of samples to the laboratory or shipping center.

The field team leader, field geologists, samplers, and others responsible for implementation of this SAI and the QAPjP will be provided with current copies of this document and any revisions thereto.

3.1.6 Radiological Engineering

The Radiological Engineering lead is responsible for the radiological engineering and health physics support within the project. Specific responsibilities include conducting as low as reasonably achievable reviews, conducting exposure and release modeling, and optimizing radiological controls for all planned work. In addition, radiological hazards are identified and appropriate controls are implemented to minimize worker exposure to radiological hazards. Radiological Engineering interfaces with the project Health and Safety representative and plans and directs radiological control technician support for all activities.

3.1.7 Sample and Data Management

The Sample and Data Management organization selects the laboratories that perform the analyses. This organization also ensures that the laboratories conform to Hanford Site internal laboratory QA requirements (or their equivalent), as approved by RL, EPA, and the Washington State Department of Ecology (Ecology). The Sample and Data Management organization initiates audits of the laboratories periodically to ensure compliance. Sample and Data Management receives analytical data from the laboratories and enters the data into the HEIS database.

3.1.8 Health and Safety

The responsibilities of the Health and Safety organization include coordinating industrial safety and health support within the project as carried out through safety and health plans, job hazard analyses, and other pertinent safety documents required by Federal regulations or by internal FH work requirements. In addition, assistance is provided to project personnel in complying with applicable health and safety standards and requirements. Personnel protective clothing requirements are coordinated with Radiological Engineering.

3.2 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Laboratory analytical detection limits and the precision and accuracy requirements for each laboratory analysis to be performed are summarized in Section 4.4.

3.3 SPECIAL TRAINING REQUIREMENTS AND CERTIFICATIONS

Training or certification requirements for sampling personnel shall be in accordance with the requirements specified in the Hanford Site internal laboratory QA requirements.

Field personnel will typically have completed the following training before starting work:

- Occupational Safety and Health Administration 40-Hour Hazardous Waste Worker Training
- 8-Hour Hazardous Waste Worker Refresher Training (as required)
- Hanford General Employee Training.

3.4 DOCUMENTATION AND RECORDS

The aquifer tube installation task lead is responsible for ensuring that the field team leader, samplers, and others responsible for implementation of this SAI are provided with current copies of this document and any revisions thereto.

Field sampling and well site activity documentation will be performed in accordance with FH procedures pertaining to the following:

- Notebooks and logbooks
- Groundwater sampling
- Calibration of field equipment
- Sampling documentation
- Chain-of-custody/sample analysis requests
- Sample packaging and shipping.

Laboratory analytical documentation will be in accordance with the *Statement of Work for Environmental and Waste Characterization Analytical Services* (RFSH-SOW-0003) for groundwater sampling. Overall project documentation will be in accordance with the FH procedures standards-based management system.

3.5 DATA AND MEASUREMENT ACQUISITION

The following subsections present the requirements for sampling methods, sample handling and custody, analytical methods, and field and laboratory quality control (QC). The requirements for instrument calibration and maintenance, supply inspections, and data management are also addressed.

3.5.1 Sampling Methods Requirements

Sampling associated with this SAI will be performed in accordance with established sampling practices and requirements pertaining to sample collection, collection equipment, and sample handling. The procedures to be implemented in the field should be in accordance with those outlined in Hanford Site internal laboratory QA requirements and applicable FH procedures for the sampling and documentation activities listed in Section 3.4 of this SAI.

The field team leader is responsible for ensuring that all field procedures are followed completely and that field personnel are adequately trained. The field team leader must document situations that may impair the usability of the samples and/or data in the field logbook or nonconformance report forms in accordance with internal corrective action procedures, as appropriate. The field team leader will note any deviations from the standard procedures for sample collection, contaminants of potential concern, sample transport, or monitoring that occur.

3.5.2 Sample Identification

A sample and data-tracking database will be used to track the samples from the point of collection through the laboratory analysis process. The HEIS database is the repository for laboratory analytical results. The HEIS sample numbers will be issued to the sampling organization for this project, and the HEIS numbers are to be carried through the laboratory data-tracking system.

3.5.3 Sample Handling, Shipment, and Custody

All sample handling, labeling, shipping, and custody requirements will be performed in accordance the applicable FH procedures pertaining to sample packaging and shipping and chain-of-custody/sample analysis requests.

3.5.4 Sample Preservation, Containers, and Holding Times

Sample preservation, container, and holding-time requirements will be prepared for specific sample events as specified on the sampling authorization forms and chain-of-custody forms in accordance with the requirements specified in RFSH-SOW-0003 and the specific analytical method.

3.5.5 Analytical Method Requirements

Analytical parameters, procedures, and methods are addressed in Section 4.4. Laboratory-specific standard operating procedures for analytical methods are described in the Hanford Site internal laboratory QA requirements. Errors reported by the laboratories are reported to the sample management project coordinator, who initiates a sample disposition record in accordance with FH procedures. This process is used to document analytical errors and to establish resolution with the project task lead. Errors or difficulties encountered during field analysis will be reported to the project task lead.

3.5.6 Quality Control Requirements

The QC procedures described in the Hanford Site internal laboratory QA requirements must be followed in the field and laboratory to ensure that reliable data are obtained. When performing the field sampling effort, care should be taken to prevent the cross-contamination of sampling equipment, sample bottles, and other equipment that could compromise sample integrity.

Samples including a duplicate, a split, and a daily field blank (where volatile organic analytes are collected) will be collected at each OU, or per batch of 20 samples whichever is more frequent.

3.5.7 Instrument/Equipment Testing, Inspection, and Maintenance

All onsite environmental instruments shall be tested, inspected, and maintained in accordance with the manufacturer's specifications and FH procedures pertaining to control and calibration of field and monitoring instruments. The results from all testing, inspection, and maintenance activities shall be recorded in a bound logbook in accordance with applicable FH procedures.

3.5.8 Instrument Calibration and Frequency

All onsite environmental instruments shall be calibrated in accordance with the manufacturer's specifications and FH procedures pertaining to the following:

- Calibration requirements of field measurement equipment
- Control of monitoring instruments.

The results from all testing, inspection, and maintenance activities shall be recorded in a bound logbook in accordance with applicable FH procedures.

All instruments shall be calibrated with certified equipment or standards with a known valid relationship to a nationally recognized standard.

3.5.9 Inspection/Acceptance Requirements for Supplies and Consumables

Supplies and consumables procured by FH that are used in support of sampling and analysis activities are procured in accordance with internal work requirements and processes that describe the FH acquisition system and the responsibilities and interfaces necessary to ensure that structures, systems, and components, or other items and services procured/acquired for FH meet the specific technical and quality requirements. The procurement process ensures that purchased items and services comply with applicable procurement specifications. Supplies and consumables are checked and accepted by users prior to use. Supplies and consumables procured by the analytical laboratories are procured, checked, and used in accordance with the laboratory's QA plan.

3.5.10 Non-Direct Measurements

Non-direct measurement sources such as computer databases, programs, and literature files were used during preparation of this report to assist with tube-placement decisions and to determine analytes for analysis.

3.5.11 Data Management

Data resulting from the implementation of this QAPjP shall be managed and stored in accordance with applicable programmatic requirements governing data management procedures. At the direction of the task lead, all analytical data packages shall be subject to final technical review by qualified personnel before the results are submitted to the regulatory agencies or before inclusion in reports. Electronic data access, when appropriate, shall be via a database (e.g., HEIS). Where electronic data are not available, hard copies shall be provided in accordance with Section 9.6 of the Tri-Party Agreement (Ecology et al. 2003).

Planning for sample collection and analysis shall be in accordance with the programmatic requirements governing fixed laboratory sample collection activities, as discussed in the sampling procedures. In the event that specific procedures do not exist for a particular task, or if additional guidance to complete certain tasks is needed, a work package will be developed to adequately control the activities. Examples of the sample teams' requirements include activities associated with the following:

- Chain-of-custody/sample analysis requests
- Project and sample identification for sampling services
- Control of certificates of analysis
- Logbooks and checklists
- Sample packaging and shipping.

Logbooks undergo routine independent review that is documented in the logbook.

Approved work control packages and procedures will be used to document radiological measurements when implementing this SAI. Examples of the types of documentation for field radiological data include the following:

- Instructions regarding the minimum requirements for documenting radiological controls information in accordance with 10 CFR 835, "Occupational Radiation Protection"
- Instructions for managing the identification, creation, review, approval, storage, transfer, and retrieval of Hanford Site radiological records
- The minimum standards and practices necessary for preparing, performing, and retaining radiological-related records
- The indoctrination of personnel on the development and implementation of survey/sample plans
- The requirements associated with preparing and transporting regulated material.

Data will be cross-referenced between laboratory analytical data and radiation measurements to facilitate interpretation of the investigation results.

3.6 ASSESSMENT AND OVERSIGHT

3.6.1 Assessments and Response Actions

The FH Compliance and Quality Programs group may conduct random surveillance and assessments to verify compliance with the requirements outlined in this SAI, project work packages, the project quality management plan, procedures, and regulatory requirements. No specific assessments are planned for this investigation.

Deficiencies identified during these assessments shall be reported to the task lead. Appropriate, corrective actions will be taken by the task lead in accordance with Hanford Site internal laboratory QA requirements to minimize recurrence.

3.6.2 Reports to Management

Management shall be made aware of all deficiencies identified by self-assessments and QA surveillance. Identified deficiencies shall be reported to the Groundwater 100/300 Area project manager.

3.7 DATA REVIEW, VERIFICATION, AND USABILITY REQUIREMENTS

3.7.1 Data Verification and Usability Methods

Data review and verification are performed by the FH Soil and Groundwater Remediation Project Sample and Data Management organization to confirm that sampling and chain-of-custody documentation are complete. This review shall include tying sample numbers to specific sampling location, reviewing sample collection dates and sample preparation and analysis dates to assess whether or not holding times have been met, and reviewing QC data to determine whether analyses met the data quality requirements specified in this SAI.

All data verification and usability assessments shall be performed in accordance with Hanford Site internal laboratory QA requirements. Any suspect data will be flagged accordingly.

For field data, verification and usability assessment will be performed using FH internal requirements.

Data will be reviewed for comparison with nearby groundwater data. These data will be accepted, rejected, or qualified. Qualifications will be added to the database, if necessary.

3.7.2 Data Quality Assessment

The data quality assessment process compares completed field sampling activities to those proposed in corresponding sampling documents and provides an evaluation of the resulting data. The purpose of the data evaluation is to determine if quantitative data are of the correct type and are of adequate quality and quantity to meet the project DQOs. The EPA data quality assessment process (*Guidance for Data Quality Assessment*, EPA QA/G-9 [EPA/600/R-96/084]) identifies five steps for evaluating data generated from this project, as summarized below:

- Step 1 – Review DQOs and sampling design: This step requires a comprehensive review of the sampling and analytical requirements outlined in the project-specific DQO workbook and sampling and analysis plan (or SAI).
- Step 2 – Conduct a preliminary data review: In this step, a comparison is made between the actual QA/QC achieved (e.g., detection limits, precision, and accuracy) and the requirements determined during the DQO process. Any significant deviations will be documented. Basic statistics will be calculated from the analytical data at this point, as appropriate to the data set, including an evaluation of the distribution of the data and in accordance with the DQOs.
- Step 3 – Select the statistical test: Using the data evaluated in step 2, an appropriate statistical hypothesis test is selected and justified.

- Step 4 – Verify the assumptions: In this step, the validity of the data analyses is assessed by determining if the data support the underlying assumptions necessary for the analyses or if the data set must be modified (e.g., transposed or augmented with additional data) before further analysis. If one or more assumptions are questioned, step 3 is repeated.
- Step 5 – Draw conclusions from the data: The statistical test is applied in this step, and the results either reject the null hypothesis or fail to reject the null hypothesis. If the latter is true, the data should be analyzed further. If the null hypothesis is rejected, the overall performance of the sampling design should be evaluated by performing a statistical power calculation to assess the adequacy of the sampling design.

Figure 3-1. Project/Task Organization.

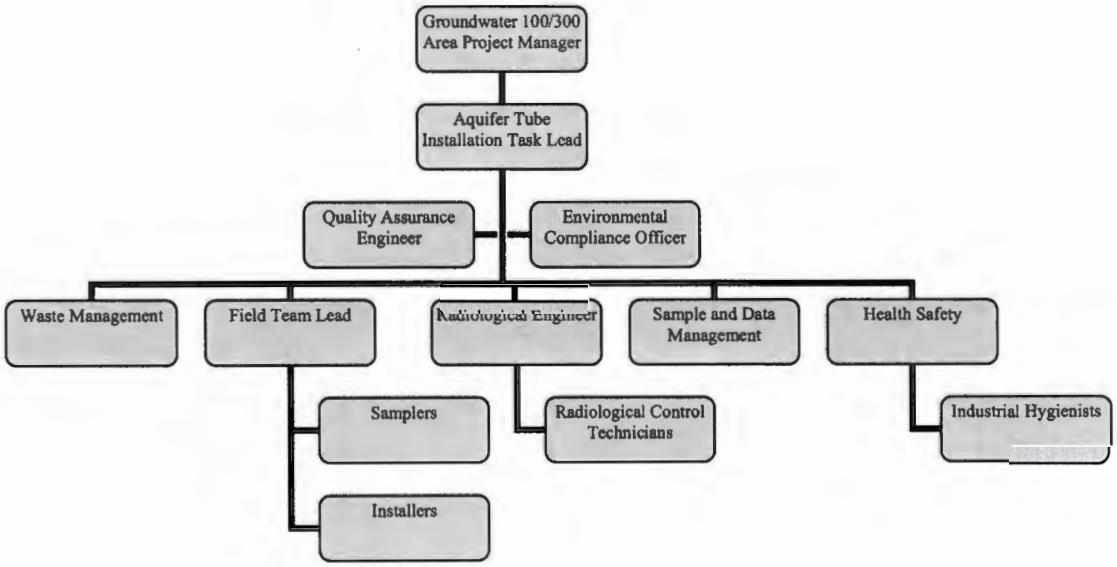


Table 3-1. Correlation Between EPA QA/R-5 Requirements and the Sampling and Analysis Instruction.

EPA QA/R-5 Criteria	EPA QA/R-5 Title	Reference Section
Project Management	Project/Task Organization	3.1
	Problem Definition/Background	1.0, 1.1
	Project/Task Description	2.1
	Quality Objectives and Criteria	3.2
	Special Training/Certification	3.3
	Documents and Records	3.4
Data Generation and Acquisition	Sampling Process Design	2.2, 3.5
	Sampling Methods	4.2
	Sample Handling and Custody	3.5.3
	Analytical Methods	4.4
	Quality Control	3.5.6
	Instrument/Equipment Testing, Inspection, and Maintenance	3.5.7
	Instrument/Equipment Calibration and Frequency	3.5.8
	Inspection/Acceptance of Supplies and Consumables	3.5.9
	Non-direct Measurements	3.5.10
	Data Management	3.5.11
Assessment and Oversight	Assessments and Response Actions	3.6.1
	Reports to Management	3.6.2
Data Validation and Usability	Data Review, Verification, and Validation	3.7
	Verification and Validation Methods	3.7.1, 3.7.2
	Reconciliation with User Requirements	3.7.3

NOTE: EPA QA/R-5 refers to *EPA Requirements for Quality Assurance Project Plans*, EPA/240/B-01/003, U.S. Environmental Protection Agency, Washington, D.C.

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4.0 FIELD SAMPLING PLAN

The field sampling plan defines the construction of the aquifer tubes; the number and types of samples to be collected; the criteria that apply to sample collection; and the purpose, analysis, and disposition of each sample type.

4.1 AQUIFER TUBE DESIGN

The tubes are installed by first directly driving a temporary casing into the sediments. The screened end of each tube is lowered through the casing to the desired sampling depth, and the temporary casing is withdrawn. Tubes are commonly installed in sets of three at each individual location (i.e., shallow, medium, and deep) using three separate casings driven by a portable air hammer. A description of the tubes and a discussion of tube installation, practical limitations, and procedures for sampling are provided in the *Description of Work for Installing Aquifer Sampling Tubes Along the 100 Area and Hanford Townsite Shorelines* (BHI-01090). The identification number, name, coordinates, and depth of each tube will be recorded in the HEIS database.

The goal at each location will be to install aquifer tubes with ports near the bottom of the unconfined aquifer, at aquifer mid-depth, and within approximately 1.5 m (5 ft) of the water table. It is recognized that the direct-drive method is limited by hard, impenetrable layers or boulders, but the lower-most depth is expected to be approximately 9.1-m (30-ft) depth. If the aquifer is thin, only one or two tubes will be installed.

The targeted location of one of the depths of each of the aquifer tubes in the 300 Area is screen placement within the fine-grained sand subunit of Ringold Unit E. Because exact formation contact cannot be determined with this method, knowledge of the unit in the area will assist in determining the placement of the aquifer tube.

The location of a tube site is predicated in the cultural review. If the cultural review indicates that the selected location is unsuitable, then another location will be selected by the field team, with cultural reviewer approval. The secondary location will attempt to be near the same area as the initial location. However, there may be some areas where the installation of tubes is not allowed, as these sites may be deemed culturally sensitive either at a specific location or there is no access to the site.

4.2 SAMPLING PROCEDURES

Standard FH procedures for groundwater sampling will be used, except as noted in previous sections of this SAI. Where procedural modifications are needed, separate written instructions will be provided.

4.3 SAMPLE MANAGEMENT

Sample and data management activities will be performed in accordance with FH QA program plans.

Sample preservation, container, and holding-time requirements will be specified on sampling authorization forms and chain-of-custody forms in accordance with the requirements specified in RFSH-SOW-0003 (or equivalent) and the specific analytical method prepared for specific sample events.

4.3.1 Sample Custody

All samples obtained during the project will be controlled from the point of origin to the analytical laboratory, as required by Hanford Site internal laboratory QA requirements and applicable FH procedures.

4.3.2 Sample Packaging, Shipping, and Field Documentation

Field documentation shall be maintained in accordance with Hanford Site internal laboratory QA requirements and FH procedures pertaining to the following:

- Chain-of-custody/sample analysis requests
- Logbooks
- Geologic logging
- Sampling documents.

4.4 SAMPLING AND ANALYSIS SUMMARY

Table 4-1 summarizes groundwater sampling and analysis for the aquifer tubes tested and sampled in this investigation. Table 4-2 lists the analytical methods, contract-required detection limits, precision, and accuracy for the selected analytes.

4.4.1 Sampling Schedule for Routine Groundwater Monitoring

Aquifer tubes constructed during the course of this field investigation will initially be sampled soon after installation for the suite of analyses shown in Table 4-1. Future sampling and analysis of the newly installed tubes and existing tubes will be discussed in the sampling update for the following FY. An update for each year is required by the *Sampling and Analysis Plan for Aquifer Sampling Tubes* (DOE/RL-2000-59).

4.5 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

The small amounts of waste generated during aquifer tube installation and sampling will be managed under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* in accordance with the *Environmental Restoration Program Strategy for Management of Investigation-Derived Waste* (Ecology et al. 1999) and the *Strategy for Handling and Disposing of Purgewater at the Hanford Site* (90-ERB-040, 1990). The anticipated waste streams associated with the activities included in this SAI include the following:

- Miscellaneous solid waste comprised of, but not limited to, latex gloves, paper wipes, 0.6-cm (1/4-in.)-diameter poly tubing, and an occasional bent push rod
- Purgewater generated during aquifer tube installation, development, testing, monitoring, and maintenance.

The decision-making process as it pertains to handling, designation, and disposition of waste derived from the installation of tubes associated with this SAI will be established in either

OU-specific waste control or management plans or an aquifer tube-specific waste control plan that is currently under development, as well as the project-specific waste packaging/labeling instruction sheet.

Unused samples and associated laboratory waste from the analyses performed will be disposed in accordance with the laboratory contract and agreements for return to the Hanford Site. In accordance with 40 CFR 300.440 ("Procedures for Planning and Implementing Off-Site Response Actions"), EPA lead approval is required before returning unused samples or waste from offsite laboratories.

Table 4-1. Aquifer Sampling Tube Analyses. (3 sheets)

ID (see Note)	Major Anions	Major Cations (Metals)	Major Cations (Metals - filtered)	VOA	Tritium	C-14	Hexavalent Chromium	Sr-90[a]	Technetium 99	Uranium – Total (Unfiltered)	Total Petroleum Hydrocarbons
100-B Segment (100-BC-5)											
C6227, C6228, C6229					1		1	1			
C6230, C6231, C6232					1		1	1			
C6233, C6234, C6235					1		1	1			
100-K Segment (100-KR-4)											
C6236, C6237, C6238	1				1	1	1	1			
C6239, C6240, C6241	1				1	1	1	1			
C6242, C6243, C6244	1				1	1	1	1			
C6245, C6246, C6247	1				1	1	1	1			
C6248, C6249, C6250	1				1	1	1	1			
C6251, C6252, C6253	1				1	1	1	1			
C6254, C6255, C6256	1				1	1	1	1			
C6257, C6258, C6259	1				1	1	1	1			
C6260, C6261, C6262	1				1	1	1	1			
C6263, C6264, C6265	1				1	1	1	1			
100-N Segment (100-NR-2)											
C6317, C6318, C6319	1	1	1				1	1			1
C6320, C6321, C6322	1	1	1				1	1			1
C6323, C6324, C6325[c]	1	1	1		1		1	1			
C6326, C6327, C6328		1	1		1		1	1			
C6329, C6330, C6331		1	1		1			1			
C6332, C6333, C6334		1	1		1			1			

Table 4-1. Aquifer Sampling Tube Analyses. (3 sheets)

ID (see Note)	Major Anions	Major Cations (Metals)	Major Cations (Metals - filtered)	VOA	Tritium	C-14	Hexavalent Chromium	Sr-90[a]	Technetium 99	Uranium – Total (Unfiltered)	Total Petroleum Hydrocarbons
100-D Segment (100-HR-3-D)											
C6266, C6267, C6258	1				1		1				
C6269, C6270, C6271	1				1		1				
C6272, C6273, C6274	1						1				
C6275, C6276, C6277	1						1				
C6278, C6279, C6280	1						1	1			
C6281, C6282, C6283	1						1				
100-H Segment (100-HR-3-H)											
C6284, C6285, C6286							1				
C6287, C6288, C6289	1						1				
C6290, C6291, C6292	1						1				
C6293, C6294, C6295	1						1	1	1	1	
C6296, C6297, C6298							1	1			
C6299, C6300, C6301	1						1				
100-F Segment (100-FR-3)											
C6302, C6303, C6304	1			1	1		1	1			
C6305, C6306, C6307	1			1	1		1	1			
C6308, C6309, C6310	1	1	1	1	1		1	1			
C6311, C6312, C6313	1	1	1	1	1		1	1			
C6314, C6315, C6316	1	1	1	1	1		1	1			
200-PO-1											
C6383, C6384, C6385											
C6353, C6354, C6355											
C6356, C6357, C6358											

Table 4-1. Aquifer Sampling Tube Analyses. (3 sheets)

ID (see note)	Major Anions	Major Cations (Metals)	Major Cations (Metals - filtered)	VOA	Tritium	C-14	Hexavalent Chromium	Sr-90[a]	Technetium 99	Uranium – Total (Unfiltered)	Total Petroleum Hydrocarbons
C6359, C6360, C6361											
C6362, C6363, C6364				As defined in the 200-PO-1 work plan[b]							
C6365, C6366, C6367											
C6368, C6369, C6370											
C6371, C6372, C6373											
C6374, C6375, C6376											
C6377, C6378, C6379											
C6380, C6381, C6382											
300 Area Segment (300-FF-5)											
C6341, C6342, C6343	1	1	1	1						1	
C6344, C6345, C6346	1	1	1	1						1	
C6347, C6348, C6349	1	1	1	1						1	
C6350, C6351, C6352	1	1	1	1						1	
General Place Holder											
GPH-1											

NOTES: One tube at each site will be sampled for the complete suite of analyses.
If VOAs are selected, they will be sampled at each tube regardless of specific conductance level.
Metals include antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, magnesium, manganese, nickel, potassium, silver, sodium, strontium, vanadium, and zinc. Anions include, but are not limited to, chloride, nitrate, nitrite, phosphate, and sulfate.
Gross alpha/beta and field parameters will be sampled for at each location.
Field parameters = pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity
Samples are unfiltered except as specified (e.g., major cations [metals – filtered]), or if turbidity is greater than 5 NTU and the analyte is hexavalent chromium.
[a] If Sr-90 is selected, it will be sampled at each tube regardless of specific conductance level.
[b] *Remedial Investigation Feasibility Study Work Plan for the 200-PO-1 Groundwater Operable Unit*, DOE/RL-2007-31, Rev. 0.
[c] Sampled at each tube regardless of specific conductance level.
NTU = nephelometric turbidity unit
VOA = volatile organic analyte

Table 4-2. Analytical Methods. (2 sheets)

Analyte	Analysis Method	Contract-Required Detection Limit (µg/L or pCi/L)	Precision	Accuracy	Comments
Phosphate	EPA 300.0	500	±20%	80% to 120%	
Nitrate	EPA 300.0	250	±20%	80% to 120%	
Nitrite	EPA 300.0	250	±20%	80% to 120%	
Sulfate	EPA 300.0	500	±20%	80% to 120%	
Chloride	EPA 300.0	200	±20%	80% to 120%	
Fluoride	EPA 300.0	500	±20%	80% to 120%	
Bromide	EPA 300.0	250	±20%	80% to 120%	
Iron	SW-846 6010	50	±20%	80% to 120%	
Lithium	SW-846 6010	25	±20%	80% to 120%	
Magnesium	SW-846 6010	750	±20%	80% to 120%	
Manganese	SW-846 6010	5	±20%	80% to 120%	
Nickel	SW-846 6010	40	±20%	80% to 120%	
Potassium	SW-846 6010	4,000	±20%	80% to 120%	
Silver	SW-846 6010	10	±20%	80% to 120%	
Sodium	SW-846 6010	500	±20%	80% to 120%	
Strontium (elemental)	SW-846 6010	10	±20%	80% to 120%	
Antimony	SW-846 6010	60	±20%	80% to 120%	
Arsenic	SW-846 6010	100	±20%	80% to 120%	
Barium	SW-846 6010	20	±20%	80% to 120%	
Beryllium	SW-846 6010	5	±20%	80% to 120%	
Cadmium	SW-846 6010	5	±20%	80% to 120%	
Chromium	SW-846 6010	10	±20%	80% to 120%	
Cobalt	SW-846 6010	20	±20%	80% to 120%	
Vanadium	SW-846 6010	25	±20%	80% to 120%	
Zinc	SW-846 6010	10	±20%	80% to 120%	
Calcium	SW-846 6010	1,000	±20%	80% to 120%	
TCE	SW-846 8260	5	±20%	80% to 120%	See footnote.
1,2 DCE	SW-846 8260	5	±20%	80% to 120%	See footnote.
Vinyl chloride	SW-846 8260	10	±20%	80% to 120%	See footnote.
Hexavalent chromium	SW-846 7196A	10	±20%	80% to 120%	
TPH - gasoline	WTPH-G	500	±20%	80% to 120%	
TPH - diesel	WTPH-D/K	500	±20%	80% to 120%	
TPH - kerosene	WTPH-D/K	500	±20%	80% to 120%	
Tritium	Liquid scintillation	400	±30%	70% to 130%	

Table 4-2. Analytical Methods. (2 sheets)

Analyte	Analysis Method	Contract-Required Detection Limit (µg/L or pCi/L)	Precision	Accuracy	Comments
C-14	Liquid scintillation	50	±30%	70% to 130%	
Sr-90	Gas proportional counting	2	±30%	70% to 130%	
Tc-99	Liquid scintillation	15	±30%	70% to 130%	
Uranium-total (unfiltered)	EPA 200.8 or laser phosphorimetry	1	±20%	80% to 120%	

NOTE: Accuracy criteria are the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control if more stringent. Additional analyte-specific evaluations also performed for matrix spikes and surrogates as appropriate to the method. Precision criteria for batch laboratory replicate matrix spike sample analyses.

EPA = U.S. Environmental Protection Agency
TCE = trichloroethene
TPH = total petroleum hydrocarbon

5.0 HEALTH AND SA

All personnel working at the aquifer tube sites addressed b
a minimum, the following:

- Occupational Safety and Health Administration 40
  Training Program (29 CFR 1910.120)
- Hanford General Employee Training
- Hanford Radiation Worker II Training.

Work will be performed in accordance with the following

- Site-specific plans, as applicable:
  - Health and safety plans
  - Radiological work permit, as applicable
  - Automated job hazard analysis
  - Site-specific waste packaging instruction
- Hanford nuclear facility implementing procedures
- Soil and Groundwater Remedial Project radiologic
- FH environmental procedures.

Table 4-2. Analytical Methods. (2 sheets)

Analyte	Analysis Method	Contract-Required Detection Limit (µg/L or pCi/L)	Precision	Accuracy	Comments
Phosphate	EPA 300.0	500	±20%	80% to 120%	
Nitrate	EPA 300.0	250	±20%	80% to 120%	
Nitrite	EPA 300.0	250	±20%	80% to 120%	
Sulfate	EPA 300.0	500	±20%	80% to 120%	
Chloride	EPA 300.0	200	±20%	80% to 120%	
Fluoride	EPA 300.0	500	±20%	80% to 120%	
Bromide	EPA 300.0	250	±20%	80% to 120%	
Iron	SW-846 6010	50	±20%	80% to 120%	
Lithium	SW-846 6010	25	±20%	80% to 120%	
Magnesium	SW-846 6010	750	±20%	80% to 120%	
Manganese	SW-846 6010	5	±20%	80% to 120%	
Nickel	SW-846 6010	40	±20%	80% to 120%	
Potassium	SW-846 6010	4,000	±20%	80% to 120%	
Silver	SW-846 6010	10	±20%	80% to 120%	
Sodium	SW-846 6010	500	±20%	80% to 120%	
Strontium (elemental)	SW-846 6010	10	±20%	80% to 120%	
Antimony	SW-846 6010	60	±20%	80% to 120%	
Arsenic	SW-846 6010	100	±20%	80% to 120%	
Barium	SW-846 6010	20	±20%	80% to 120%	
Beryllium	SW-846 6010	5	±20%	80% to 120%	
Cadmium	SW-846 6010	5	±20%	80% to 120%	
Chromium	SW-846 6010	10	±20%	80% to 120%	
Cobalt	SW-846 6010	20	±20%	80% to 120%	
Vanadium	SW-846 6010	25	±20%	80% to 120%	
Zinc	SW-846 6010	10	±20%	80% to 120%	
Calcium	SW-846 6010	1,000	±20%	80% to 120%	
TCE	SW-846 8260	5	±20%	80% to 120%	See footnote.
1,2 DCE	SW-846 8260	5	±20%	80% to 120%	See footnote.
Vinyl chloride	SW-846 8260	10	±20%	80% to 120%	See footnote.
Hexavalent chromium	SW-846 7196A	10	±20%	80% to 120%	
TPH - gasoline	WTPH-G	500	±20%	80% to 120%	
TPH - diesel	WTPH-D/K	500	±20%	80% to 120%	
TPH - kerosene	WTPH-D/K	500	±20%	80% to 120%	
Tritium	Liquid scintillation	400	±30%	70% to 130%	

5.0 HEALTH AND SAFETY

All personnel working at the aquifer tube sites addressed by this SAI will have completed, at a minimum, the following:

- Occupational Safety and Health Administration 40-Hour Hazardous Waste Site Worker Training Program (29 CFR 1910.120)
- Hanford General Employee Training
- Hanford Radiation Worker II Training.

Work will be performed in accordance with the following policies, specifications, or procedures:

- Site-specific plans, as applicable:
  - Health and safety plans
  - Radiological work permit, as applicable
  - Automated job hazard analysis
  - Site-specific waste packaging instruction
- Hanford nuclear facility implementing procedures
- Soil and Groundwater Remedial Project radiological control procedures
- FH environmental procedures.

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6.0 PROJECT SCHEDULE

Installation and sampling of the aquifer tubes will occur over two periods of time in FY08. The installation for high-priority sites (determined by the Tri-Parties [i.e., DOE, EPA, and Ecology]) will be attempted during the expected winter low river flow. There may be cultural or biological restrictions that cause some sites to be installed during one period or another. The remaining sites will be installed in late summer, during a period of low river flow. Sampling of the sites will occur soon after installation.

Data will be reported within the normal laboratory turnaround time of 45 days. Once data are received from the laboratory and undergo verification, the data will be recorded in the HEIS database. Data collected during installation will be available for use in the annual Hanford Sitewide groundwater summary report for FY08.

The newly installed tubes will be integrated into the updated SAI for FY09 aquifer tube sample collection.

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7.0 REFERENCES

10 CFR 830.120, "Quality Assurance Requirements," *Code of Federal Regulations*.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*.

29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*.

40 CFR 300.440, "Procedures for Planning and Implementing Off-Site Response Actions," *Code of Federal Regulations*.

90-ERB-040, 1990, "Strategy for Handling and Disposing of Purgewater at the Hanford Site, Washington," (letter to P. T. Day, U.S. Environmental Protection Agency, and T. L. Nord, Washington State Department of Ecology, from R. D. Izatt) U.S. Department of Energy, Richland Operations Office, Richland, Washington, July 1990.

BHI-00345, 1996, *Pore Water Chromium Concentrations at 100-H Reactor Area Adjacent to Fall Chinook Salmon Spawning Habitat of the Hanford Reach, Columbia River*, Rev. 1, Bechtel Hanford, Inc., Richland, Washington.

BHI-00778, 1996, *Chromium in River Substrate Pore Water and Adjacent Groundwater: 100-D/DR Area, Hanford Site, Washington*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

BHI-01090, 1997, *Description of Work for Installing Aquifer Sampling Tubes Along the 100 Area and Hanford Townsite Shorelines*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

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DOE/RL-2003-04, 2003, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

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Ecology, EPA, and DOE, 2003, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), 2 vols., as amended, 89-10, Rev. 6, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

EPA/240/B-01/003, 2000, *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, U.S. Environmental Protection Agency, Environmental Protection Office of Environmental Information, Washington, D.C.

EPA/600/R-96/084, 1996, *Guidance for Data Quality Assessment*, EPA QA/G-9, U.S. Environmental Protection Agency, Environmental Protection Office of Environmental Information, Washington, D.C.

RFSH-SOW-0003, 1999, *Statement of Work for Environmental and Waste Characterization Analytical Services*, Rev. 6, Rust Federal Services, Richland, Washington.

SGW-33224, 2007, *Sampling and Analysis Instruction for Investigating Chromium Groundwater Contamination in the 600 Area Between 100-D and 100-H*, Rev. 0, Fluor Hanford, Inc, Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*.

7.1 LIST OF AQUIFER TUBE DATA SUMMARY REPORTS

<u>Fiscal Year 1996: October-November 1995</u>:

BHI-00778, 1996, *Chromium in River Substrate Pore Water and Adjacent Groundwater: 100-D/DR Area, Hanford Site, Washington*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

<u>Fiscal Year 1998: September-November 1997</u>:

BHI-01153, 1998, *Aquifer Sampling Tube Installation Completion Report: 100 Area and Hanford Townsite Shorelines*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

<u>Fiscal Year 1999: October-November 1998</u>: No report produced.

<u>Fiscal Year 2000: October-November 1999</u>:

BHI, 2000, *Fall 1999 Aquifer Sampling Tube Results at the 100 Area and Hanford Townsite Shoreline*, CCN #078404, dated May 2000, Bechtel Hanford, Inc., Richland, Washington.

<u>Fiscal Year 2001: October-November 2000</u>:

BHI-01494, 2001, *Aquifer Sampling Tubes Data Summary, Fall 2000*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

<u>Fiscal Year 2002: November 2001</u>:

BHI-01624, 2002, *Aquifer Sampling Tubes Data Summary, Fall 2001*, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

Fiscal Year 2003: November 2002-January 2003:

PNNL-14444, 2003, *Aquifer Sampling Tube Results for Fiscal Year 2003*, Rev. 0, Pacific Northwest National Laboratory, Richland, Washington.

Fiscal Year 2004: December 2003-April 2004: No separate report produced; interpretations of tube sampling results included in annual groundwater report.

Fiscal Year 2005: November 2004-April 2005: No separate report produced; interpretations of tube sampling results included in annual groundwater report.

Fiscal Year 2006: November 2005-April 2006: No separate report produced; interpretations of tube sampling results included in annual groundwater report.

Fiscal Year 2007: November 2006-April 2007:

SGW-35028, 2007, *Aquifer Sampling Tube Results for Fiscal Year 2007*, Rev. 0 (in review) Fluor Hanford, Inc., Richland, Washington.

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APPENDIX A

DATA FOR EXISTING AQUIFER SAMPLING TUBES

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Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford[a] River Marker	No Longer In Service
B8113	01-D	02-Oct-97	24.5	562697.662	146033.078	NAD83(91)	122.676	NAVD88	100-BC-5	2.60	
B8114	01-M	02-Oct-97	16.5	562697.662	146033.078	NAD83(91)	122.676	NAVD88	100-BC-5	2.60	
B8115	01-S	02-Oct-97	7.5	562697.662	146033.078	NAD83(91)	122.676	NAVD88	100-BC-5	2.60	
B8117	02-M	03-Oct-97	15.4	563539.581	145689.247	NAD83(91)	122.267	NAVD88	100-BC-5	3.13	
B8118	02-S	03-Oct-97	6.5	563539.581	145689.247	NAD83(91)	122.267	NAVD88	100-BC-5	3.13	
B8119	03-D	14-Nov-97	13.5	564077.431	145469.247	NAD83(91)	121.154	NAVD88	100-BC-5	3.45	
B8120	03-M	14-Nov-97	7.5	564077.431	145469.247	NAD83(91)	121.154	NAVD88	100-BC-5	3.45	
B8122	04-D	08-Oct-97	25.5	564612.184	145283.275	NAD83(91)	122.484	NAVD88	100-BC-5	3.73	
B8123	04-M	08-Oct-97	13.5	564612.066	145283.047	NAD83(91)	122.491	NAVD88	100-BC-5	3.73	
B8124	04-S	09-Oct-97	8.8	564612.459	145283.419	NAD83(91)	122.407	NAVD88	100-BC-5	3.73	
B8125	05-D	09-Oct-97	26	564908.31	145332.29	NAD83(91)	121.992	NAVD88	100-BC-5	3.89	
B8126	05-M	09-Oct-97	17.5	564908.31	145332.29	NAD83(91)	121.992	NAVD88	100-BC-5	3.89	
B8127	05-S	09-Oct-97	9	564908.31	145332.29	NAD83(91)	121.992	NAVD88	100-BC-5	3.89	
B8128	06-D	10-Oct-97	23.5	565293.927	145412.052	NAD83(91)	122.122	NAVD88	100-BC-5	4.12	
B8129	06-M	10-Oct-97	16	565293.927	145412.052	NAD83(91)	122.122	NAVD88	100-BC-5	4.12	
B8130	06-S	10-Oct-97	9.3	565293.927	145412.052	NAD83(91)	122.122	NAVD88	100-BC-5	4.12	
B8131	07-D	20-Oct-97	20.5	565564.591	145493.904	NAD83(91)	120.662	NAVD88	100-BC-5	4.27	
B8132	07-M	20-Oct-97	8.5	565566.011	145495.641	NAD83(91)	120.653	NAVD88	100-BC-5	4.27	X
B8143	11-D	03-Nov-97	11	566862.628	145903.913	NAD83(91)	108.894	NAVD88	100-BC-5	5.07	
B8146	12-D	03-Nov-97	10.5	567231.722	146055.169	NAD83(91)	105.813	NAVD88	100-BC-5	5.33	
B8149	13-D	06-Oct-97	23.4	567566	146219	NAD83(91)			100-KR-4	5.61	X
B8151	13-S	06-Oct-97	8.8	567566	146219	NAD83(91)			100-KR-4	5.61	
B8152	14-D	07-Oct-97	22	567870	146429	NAD83(91)			100-KR-4	5.88	
B8153	14-M	07-Oct-97	15	567870	146429	NAD83(91)			100-KR-4	5.88	
B8154	14-S	07-Oct-97	8	567870	146429	NAD83(91)			100-KR-4	5.88	X
B8156	15-M	07-Oct-97	14.2	568082	146642	NAD83(91)			100-KR-4	6.08	
B8161	17-D	10-Oct-97	20	568521.65	147072.19	NAD83(91)			100-KR-4	6.47	
B8162	17-M	10-Oct-97	11.5	568521.65	147072.19	NAD83(91)			100-KR-4	6.47	
B8204	18-S	08-Oct-97	9	568869	147226	NAD83(91)			100-KR-4	6.56	
B8205	19-D	07-Oct-97	22.5	569032.057	147394.816	NAD83(91)	82.779	NAVD88	100-KR-4	6.85	
B8206	19-M	09-Oct-97	10.5	569031.891	147394.208	NAD83(91)	82.506	NAVD88	100-KR-4	6.85	
B8212	21-M	22-Oct-97	15.5	569603.828	148039.275	NAD83(91)	125.478	NAVD88	100-KR-4	7.42	
B8213	21-S	22-Oct-97	11.5	569604.82	148035.757	NAD83(91)	124.668	NAVD88	100-KR-4	7.42	
B8214	22-D	23-Oct-97	12.8	569951.313	148359.468	NAD83(91)	126.818	NAVD88	100-KR-4	7.73	
B8215	22-M	23-Oct-97	8	569951.313	148359.468	NAD83(91)	126.818	NAVD88	100-KR-4	7.73	
B8217	23-D	23-Oct-97	12.5	570228	148593.3	NAD83(91)			100-KR-4	7.90	
B8218	23-M	23-Oct-97	7.5	570225.5	148592.7	NAD83(91)			100-KR-4	7.90	
B8223	25-D	27-Oct-97	8	570547	149001	NAD83(91)			100-KR-4	8.26	
B8226	26-D	27-Oct-97	23.5	570725	149148	NAD83(91)			100-KR-4	8.39	
B8227	26-M	27-Oct-97	14.5	570725	149148	NAD83(91)			100-KR-4	8.39	
B8228	26-S	27-Oct-97	6.5	570725	149148	NAD83(91)			100-KR-4	8.39	
B8253	35-D	06-Nov-97	21.5	572806	151832	NAD83(91)			100-HR-3 (D)	10.48	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford* River Marker	No Longer In Service
B8254	35-M	06-Nov-97	14.5	572806	151832	NAD83(91)			100-HR-3 (D)	10.48	
B8255	35-S	06-Nov-97	8.5	572806	151832	NAD83(91)			100-HR-3 (D)	10.48	
B8256	36-D	05-Nov-97	21.5	572992	152060	NAD83(91)			100-HR-3 (D)	10.67	
B8257	36-M	05-Nov-97	14.5	572992	152060	NAD83(91)			100-HR-3 (D)	10.67	
B8258	36-S	05-Nov-97	8.5	572992	152060	NAD83(91)			100-HR-3 (D)	10.67	
B8259	37-D	04-Nov-97	20	573168	152198	NAD83(91)			100-HR-3 (D)	10.83	X
B8260	37-M	04-Nov-97	14	573168	152198	NAD83(91)			100-HR-3 (D)	10.83	X
B8261	37-S	04-Nov-97	7	573168	152198	NAD83(91)			100-HR-3 (D)	10.83	
B8262	38-D	04-Nov-97	17	573361	152301	NAD83(91)			100-HR-3 (D)	10.92	
B8263	38-M	04-Nov-97	10.5	573361	152301	NAD83(91)			100-HR-3 (D)	10.92	
B8265	39-D	29-Sep-97	28.5	574035	153393	NAD83(91)			100-HR-3 (D)	11.62	X
B8266	39-M	29-Sep-97	18.5	574035	153393	NAD83(91)			100-HR-3 (D)	11.62	X
B8267	39-S	29-Sep-97	8.5	574035	153393	NAD83(91)			100-HR-3 (D)	11.62	X
B8269	40-M	29-Sep-97	16	574238	153997	NAD83(91)			100-HR-3 (H)	11.98	X
B8270	40-S	29-Sep-97	8.5	574238	153997	NAD83(91)			100-HR-3 (H)	11.98	X
B8271	41-D	09-Sep-97	25.5	575515.614	154424.185	NAD83(91)	116.526	NAVD88	100-HR-3 (H)	13.10	X
B8272	41-M	09-Sep-97	15.5	575512.511	154424.668	NAD83(91)	116.299	NAVD88	100-HR-3 (H)	13.10	X
B8273	41-S	09-Sep-97	10.5	575511.26	154423.723	NAD83(91)	116.509	NAVD88	100-HR-3 (H)	13.10	X
B8274	42-D	08-Sep-97	24.5	576167.589	154320.018	NAD83(91)	116.273	NAVD88	100-HR-3 (H)	13.55	X
B8275	42-M	08-Sep-97	15.5	576166.225	154320.454	NAD83(91)	116.339	NAVD88	100-HR-3 (H)	13.55	X
B8276	42-S	08-Sep-97	10.5	576165.935	154320.154	NAD83(91)	116.376	NAVD88	100-HR-3 (H)	13.55	X
B8277	43-D	10-Sep-97	10.2	576779.961	153965.24	NAD83(91)	116.452	NAVD88	100-HR-3 (H)	14.04	X
B8278	43-M	10-Sep-97	8	576782.564	153963.57	NAD83(91)	116.085	NAVD88	100-HR-3 (H)	14.04	
B8280	44-D	03-Sep-97	13.17	577031.509	153811.744	NAD83(91)	116.085	NAVD88	100-HR-3 (H)	14.26	X
B8281	44-M	03-Sep-97	9	577033.113	153810.532	NAD83(91)	116.114	NAVD88	100-HR-3 (H)	14.26	X
B8283	45-D	05-Sep-97	23.5	577529	153514	NAD83(91)			100-HR-3 (H)	14.66	
B8284	45-M	05-Sep-97	15.5	577529	153514	NAD83(91)			100-HR-3 (H)	14.66	
B8285	45-S	05-Sep-97	8.5	577529	153514	NAD83(91)			100-HR-3 (H)	14.66	
B8286	46-D	10-Sep-97	11	578031.495	152999.261	NAD83(91)	115.347	NAVD88	100-HR-3 (H)	15.12	X
B8289	47-D	21-Oct-97	15	578193.394	152744.421	NAD83(91)	115.856	NAVD88	100-HR-3 (H)	15.30	
B8290	47-M	21-Oct-97	8.5	578193.919	152743.533	NAD83(91)	115.765	NAVD88	100-HR-3 (H)	15.30	
B8292	48-D	10-Oct-97	25.5	578465.538	152420.844	NAD83(91)	116.159	NAVD88	100-HR-3 (H)	15.52	X
B8293	48-M	10-Oct-97	17.5	578465.52	152420.795	NAD83(91)	116.348	NAVD88	100-HR-3 (H)	15.52	
B8294	48-S	10-Oct-97	9.5	578465.52	152420.795	NAD83(91)	116.348	NAVD88	100-HR-3 (H)	15.52	
B8295	49-D	01-Oct-97	26	578699.755	152232.861	NAD83(91)	115.813	NAVD88	100-HR-3 (H)	15.68	
B8296	49-M	01-Oct-97	18	578699.741	152232.831	NAD83(91)	115.985	NAVD88	100-HR-3 (H)	15.68	
B8297	49-S	01-Oct-97	9	578699.741	152232.831	NAD83(91)	115.985	NAVD88	100-HR-3 (H)	15.68	
B8298	50-D	25-Sep-97	27	578611.816	152118.084	NAD83(91)	117.083	NAVD88	100-HR-3 (H)	15.71	
B8299	50-M	25-Sep-97	18	578611.816	152118.084	NAD83(91)	117.083	NAVD88	100-HR-3 (H)	15.71	
B8300	50-S	25-Sep-97	9	578611.792	152118.154	NAD83(91)	117.083	NAVD88	100-HR-3 (H)	15.71	
B8301	51-D	25-Sep-97	26	578779.254	151843.755	NAD83(91)	116.76	NAVD88	100-HR-3 (H)	15.89	
B8302	51-M	25-Sep-97	18	578779.254	151843.755	NAD83(91)	116.76	NAVD88	100-HR-3 (H)	15.89	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford* River Marker	No Longer In Service
B8303	51-S	25-Sep-97	10	578779.254	151843.755	NAD83(91)	116.76	NAVD88	100-HR-3 (H)	15.89	
B8304	52-D	24-Sep-97	24.5	578919.484	151586.176	NAD83(91)	115.996	NAVD88	100-HR-3 (H)	16.10	
B8305	52-M	24-Sep-97	15.5	578919.484	151586.176	NAD83(91)	115.996	NAVD88	100-HR-3 (H)	16.10	
B8306	52-S	24-Sep-97	7.5	578919.484	151586.176	NAD83(91)	115.996	NAVD88	100-HR-3 (H)	16.10	
B8307	53-D	23-Sep-97	26.5	579510.188	151531.413	NAD83(91)	115.356	NAVD88	100-HR-3 (H)	16.37	
B8308	53-M	23-Sep-97	17.5	579510.574	151531.727	NAD83(91)	115.344	NAVD88	100-HR-3 (H)	16.37	
B8309	53-S	23-Sep-97	8.5	579510.574	151531.727	NAD83(91)	115.344	NAVD88	100-HR-3 (H)	16.37	
B8310	54-D	24-Sep-97	26.5	579033.518	151231.944	NAD83(91)	116	NAVD88	100-HR-3 (H)	16.40	
B8311	54-M	24-Sep-97	17.5	579033.518	151231.944	NAD83(91)	116	NAVD88	100-HR-3 (H)	16.40	
B8312	54-S	24-Sep-97	8	579033.518	151231.944	NAD83(91)	116	NAVD88	100-HR-3 (H)	16.40	
B8313	55-D	24-Sep-97	26.5	579135.286	150891.368	NAD83(91)	115.251	NAVD88	100-HR-3 (H)	16.67	
B8314	55-M	24-Sep-97	18.5	579134.582	150891.146	NAD83(91)	115.295	NAVD88	100-HR-3 (H)	16.67	
B8315	55-S	24-Sep-97	10.5	579134.582	150891.146	NAD83(91)	115.295	NAVD88	100-HR-3 (H)	16.67	
B8319	57-D	23-Sep-97	29.5	580101	150525	NAD83(91)			100-HR-3 (H)	17.10	
B8320	57-M	23-Sep-97	18.5	580101	150525	NAD83(91)			100-HR-3 (H)	17.10	
B8321	57-S	23-Sep-97	7.5	580101	150525	NAD83(91)			100-HR-3 (H)	17.10	
B8322	58-D	01-Oct-97	27	579310.118	150233.17	NAD83(91)	114.858	NAVD88	100-HR-3 (H)	17.16	
B8323	58-M	01-Oct-97	20	579311.429	150232.317	NAD83(91)	114.88	NAVD88	100-HR-3 (H)	17.16	
B8324	58-S	01-Oct-97	11.5	579310.627	150232.255	NAD83(91)	114.929	NAVD88	100-HR-3 (H)	17.16	
B8325	59-D	02-Oct-97	23.5	579420.305	149930.079	NAD83(91)	114.963	NAVD88	100-HR-3 (H)	17.38	
B8326	59-M	02-Oct-97	17	579420.3	149930.907	NAD83(91)	114.86	NAVD88	100-HR-3 (H)	17.38	
B8327	59-S	02-Oct-97	11.5	579420.404	149928.523	NAD83(91)	114.857	NAVD88	100-HR-3 (H)	17.38	
B8328	60-D	22-Sep-97	27	579638	149392	NAD83(91)			100-HR-3 (H)	17.74	
B8329	60-M	22-Sep-97	18	579638	149392	NAD83(91)			100-HR-3 (H)	17.74	
B8330	60-S	22-Sep-97	9	579638	149392	NAD83(91)			100-HR-3 (H)	17.74	
B8331	61-D	20-Oct-97	24.5	580000.071	148950.427	NAD83(91)	115.079	NAVD88	100-FR-3	18.10	
B8332	61-M	16-Oct-97	16	580001.323	148949.889	NAD83(91)	115.017	NAVD88	100-FR-3	18.10	
B8333	61-S	16-Oct-97	9	580002.501	148949.718	NAD83(91)	115.001	NAVD88	100-FR-3	18.10	
B8334	62-D	14-Oct-97	28.5	580389.375	148585.095	NAD83(91)	115.395	NAVD88	100-FR-3	18.40	X
B8335	62-M	14-Oct-97	18.5	580387.631	148586.32	NAD83(91)	115.37	NAVD88	100-FR-3	18.40	
B8336	62-S	14-Oct-97	8.5	580388.397	148585.067	NAD83(91)	115.161	NAVD88	100-FR-3	18.40	
B8337	63-D	15-Oct-97	23.5	580943.236	148175.4	NAD83(91)	115.077	NAVD88	100-FR-3	18.81	X
B8338	63-M	15-Oct-97	16.5	580944.736	148174.517	NAD83(91)	115.122	NAVD88	100-FR-3	18.81	X
B8339	63-S	15-Oct-97	10.5	580945.002	148174.193	NAD83(91)	115.055	NAVD88	100-FR-3	18.81	
B8340	64-D	15-Oct-97	27.5	580945.002	148174.193	NAD83(91)	115.386	NAVD88	100-FR-3	18.94	
B8341	64-M	15-Oct-97	17.5	580945.002	148174.193	NAD83(91)	115.386	NAVD88	100-FR-3	18.94	
B8342	64-S	15-Oct-97	8	581118.756	148037.975	NAD83(91)	115.386	NAVD88	100-FR-3	18.94	
B8343	65-D	16-Oct-97	27.5	581295.747	147866.273	NAD83(91)	115.502	NAVD88	100-FR-3	19.10	X
B8344	65-M	16-Oct-97	16.5	581295.747	147866.273	NAD83(91)	115.502	NAVD88	100-FR-3	19.10	X
B8345	65-S	16-Oct-97	9	581297.412	147864.503	NAD83(91)	115.367	NAVD88	100-FR-3	19.10	X
B8346	66-D	13-Nov-97	28.6	581475.927	147541.818	NAD83(91)	114.421	NAVD88	100-FR-3	19.37	
B8347	66-M	13-Nov-97	19.7	581475.927	147541.818	NAD83(91)	114.421	NAVD88	100-FR-3	19.37	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford® River Marker	No Longer In Service
B8348	66-S	13-Nov-97	10.5	581475.927	147541.818	NAD83(91)	114.421	NAVD88	100-FR-3	19.37	
B8349	67-D	16-Sep-97	30.5	581616.352	147291.431	NAD83(91)	114.902	NAVD88	100-FR-3	19.58	X
B8350	67-M	16-Sep-97	20.5	581616.352	147291.431	NAD83(91)	114.902	NAVD88	100-FR-3	19.58	
B8351	67-S	16-Sep-97	10.5	581616.352	147291.431	NAD83(91)	114.902	NAVD88	100-FR-3	19.58	
B8352	68-D	16-Sep-97	25.5	581758.431	147085.176	NAD83(91)	115.459	NAVD88	100-FR-3	19.76	
B8353	68-M	16-Sep-97	18.8	581758.431	147085.176	NAD83(91)	115.459	NAVD88	100-FR-3	19.76	
B8354	68-S	16-Sep-97	11	581758.431	147085.176	NAD83(91)	115.459	NAVD88	100-FR-3	19.76	
B8355	69-D	17-Sep-97	31.5	582017	147168	NAD83(91)			100-FR-3	19.80	
B8356	69-M	17-Sep-97	15.5	582017	147168	NAD83(91)			100-FR-3	19.80	
B8358	70-D	16-Sep-97	31.5	581902.543	146843.106	NAD83(91)	116.72	NAVD88	100-FR-3	19.95	X
B8359	70-M	16-Sep-97	24.5	581902.543	146843.106	NAD83(91)	116.72	NAVD88	100-FR-3	19.95	X
B8360	70-S	16-Sep-97	17.5	581902.543	146843.106	NAD83(91)	116.72	NAVD88	100-FR-3	19.95	X
B8361	71-D	16-Sep-97	8	581992	146474	NAD83(91)			100-FR-3	20.26	X
B8364	72-D	16-Sep-97	28.5	582224.473	146066.634	NAD83(91)	120.802	NAVD88	100-FR-3	20.67	
B8365	72-M	17-Sep-97	18.5	582224.292	146067.252	NAD83(91)	120.7	NAVD88	100-FR-3	20.67	
B8366	72-S	17-Sep-97	10	582223.666	146067.007	NAD83(91)	120.858	NAVD88	100-FR-3	20.67	X
B8367	73-D	17-Sep-97	27.5	582424.378	145988.225	NAD83(91)	120.119	NAVD88	100-FR-3	20.81	X
B8368	73-M	18-Sep-97	19.5	582424.473	145989.251	NAD83(91)	120.159	NAVD88	100-FR-3	20.81	X
B8369	73-S	18-Sep-97	11	582424.818	145989.728	NAD83(91)	120.033	NAVD88	100-FR-3	20.81	X
B8370	74-D	18-Sep-97	29.5	582600.48	145608.435	NAD83(91)	120.783	NAVD88	100-FR-3	21.16	
B8371	74-M	18-Sep-97	17.5	582599.881	145609.471	NAD83(91)	120.887	NAVD88	100-FR-3	21.16	
B8372	74-S	22-Sep-97	11.5	582599.498	145609.94	NAD83(91)	120.914	NAVD88	100-FR-3	21.16	X
B8373	75-D	22-Sep-97	27.5	582793.49	145283.988	NAD83(91)	119.393	NAVD88	100-FR-3	21.49	
B8374	75-M	22-Sep-97	19.5	582792.893	145285.862	NAD83(91)	118.816	NAVD88	100-FR-3	21.49	
B8375	75-S	22-Sep-97	11.5	582790.915	145287.068	NAD83(91)	118.997	NAVD88	100-FR-3	21.49	
B8376	76-D	22-Sep-97	25.5	582878.748	145087.325	NAD83(91)	119.123	NAVD88	100-FR-3	21.68	
B8377	76-M	22-Sep-97	19.5	582878.733	145088.849	NAD83(91)	118.942	NAVD88	100-FR-3	21.68	
B8378	76-S	22-Sep-97	11.5	582877.989	145089.114	NAD83(91)	119.032	NAVD88	100-FR-3	21.68	
B8379	77-D	19-Sep-97	25	582957.215	144889.256	NAD83(91)	111.539	NAVD88	100-FR-3	21.86	
B8380	77-M	19-Sep-97	17	582957.215	144889.256	NAD83(91)	111.539	NAVD88	100-FR-3	21.86	
B8381	77-S	19-Sep-97	9	582957.215	144889.256	NAD83(91)	111.539	NAVD88	100-FR-3	21.86	
B8382	78-D	19-Sep-97	24.5	583152.559	144325.675	NAD83(91)	111.346	NAVD88	100-FR-3	22.30	
B8383	78-M	19-Sep-97	16.5	583152.559	144325.675	NAD83(91)	111.346	NAVD88	100-FR-3	22.30	X
B8384	78-S	19-Sep-97	8.5	583152.559	144325.675	NAD83(91)	111.346	NAVD88	100-FR-3	22.30	X
B8388	80-D	25-Sep-97	26	583510.578	143175.382	NAD83(91)	111.941	NAVD88	100-FR-3	23.10	
B8389	80-M	30-Sep-97	16	583510.578	143175.382	NAD83(91)	111.941	NAVD88	100-FR-3	23.10	X
B8390	80-S	30-Sep-97	5.5	583509.431	143178.792	NAD83(91)	111.826	NAVD88	100-FR-3	23.10	
B8391	81-D	30-Sep-97	25	585375	140494	NAD83(91)			200-PO-1	25.12	X
B8392	81-M	30-Sep-97	17	585375	140494	NAD83(91)			200-PO-1	25.12	X
B8393	81-S	30-Sep-97	9	585375	140494	NAD83(91)			200-PO-1	25.12	X
B8395	82-M	01-Oct-97	15	586252.47	139595.836	NAD83(91)	108.814	NAVD88	200-PO-1	25.72	
B8396	82-S	01-Oct-97	9	586252.47	139595.836	NAD83(91)	108.814	NAVD88	200-PO-1	25.72	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford* River Marker	No Longer In Service
B8397	83-D	26-Nov-97	20.5	586949.357	139005.466	NAD83(91)	109.262	NAVD88	200-PO-1	26.23	X
B8400	84-D	11-Nov-97	22.5	587476.487	138683.945	NAD83(91)	110.885	NAVD88	200-PO-1	26.64	
B8401	84-M	11-Nov-97	14.5	587476.025	138683.515	NAD83(91)	110.941	NAVD88	200-PO-1	26.64	
B8402	84-S	11-Nov-97	8.5	587477.148	138683	NAD83(91)	110.895	NAVD88	200-PO-1	26.64	
B8403	85-D	13-Nov-97	26.5	588052.7	138256.786	NAD83(91)	111.022	NAVD88	200-PO-1	27.13	
B8404	85-M	13-Nov-97	17.5	588052.7	138256.786	NAD83(91)	111.022	NAVD88	200-PO-1	27.13	
B8405	85-S	13-Nov-97	8.5	588052.7	138256.786	NAD83(91)	111.022	NAVD88	200-PO-1	27.13	
B8406	86-D	12-Nov-97	26.5	588333.555	138067.727	NAD83(91)	111.749	NAVD88	200-PO-1	27.39	
B8407	86-M	12-Nov-97	10.5	588333.214	138068.172	NAD83(91)	111.767	NAVD88	200-PO-1	27.39	
B8408	86-S	12-Nov-97	7.5	588332.623	138068.82	NAD83(91)	111.766	NAVD88	200-PO-1	27.39	
B8464	DD-06-2	22-Nov-95	12.5	573964.576	153015.374	NAD83(91)	117.578	NAVD88	100-HR-3 (D)	11.40	
B8465	DD-06-3	22-Nov-95	16.5	573964.576	153015.374	NAD83(91)	117.578	NAVD88	100-HR-3 (D)	11.40	
B8466	DD-08-3	21-Nov-95	17.7	573940.057	152903.527	NAD83(91)			100-HR-3 (D)	11.34	
B8467	DD-08-4	21-Nov-95	22.8	573940.057	152903.527	NAD83(91)			100-HR-3 (D)	11.34	
B8468	DD-10-4	20-Nov-95	22.5	573899.056	152788.072	NAD83(91)	117.287	NAVD88	100-HR-3 (D)	11.27	
B8469	DD-12-2	24-Oct-95	10.5	573818.681	152683.696	NAD83(91)	117.03	NAVD88	100-HR-3 (D)	11.20	
B8470	DD-12-3	26-Oct-95	15.5	573820.559	152683.591	NAD83(91)	116.933	NAVD88	100-HR-3 (D)	11.20	
B8471	DD-12-4	26-Oct-95	21.5	573819.657	152683.584	NAD83(91)	117.154	NAVD88	100-HR-3 (D)	11.20	
B8472	DD-15-2	27-Oct-95	15.5	573700.609	152547.828	NAD83(91)	119.316	NAVD88	100-HR-3 (D)	11.10	X
B8473	DD-15-3	27-Oct-95	21.5	573700.597	152547.317	NAD83(91)	116.933	NAVD88	100-HR-3 (D)	11.10	
B8474	DD-15-4	06-Nov-95	26	573701.271	152548.199	NAD83(91)	119.289	NAVD88	100-HR-3 (D)	11.10	X
B8475	DD-16-3	27-Oct-95	18	573650.431	152516.128	NAD83(91)	120.013	NAVD88	100-HR-3 (D)	11.06	
B8476	DD-16-4	27-Oct-95	26	573651.165	152516.993	NAD83(91)	119.965	NAVD88	100-HR-3 (D)	11.06	
B8477	DD-17-2	24-Oct-95	11	573597.984	152482.772	NAD83(91)	117.39	NAVD88	100-HR-3 (D)	11.03	
B8478	DD-17-3	24-Oct-95	15.5	573597.162	152483.304	NAD83(91)	117.313	NAVD88	100-HR-3 (D)	11.03	
B8479	DD-39-1	03-Nov-95	6	572606.547	151625.856	NAD83(91)	117.913	NAVD88	100-HR-3 (D)	10.21	
B8480	DD-39-2	03-Nov-95	11	572606.894	151626.189	NAD83(91)	117.94	NAVD88	100-HR-3 (D)	10.21	
B8481	DD-39-3	03-Nov-95	15.5	572606.548	151626.197	NAD83(91)	117.883	NAVD88	100-HR-3 (D)	10.21	
B8482	DD-39-4	03-Nov-95	21.5	572606.888	151625.527	NAD83(91)	118.012	NAVD88	100-HR-3 (D)	10.21	X
B8483	DD-41-2	07-Nov-95	14.1	572532.209	151530.033	NAD83(91)	117.684	NAVD88	100-HR-3 (D)	10.12	
B8484	DD-41-3	07-Nov-95	19.1	572532.688	151530.738	NAD83(91)	117.646	NAVD88	100-HR-3 (D)	10.12	
B8503	DD-41-1	07-Nov-95	8.6	572532.894	151530.892	NAD83(91)			100-HR-3 (D)	10.12	
B8504	DD-42-2	08-Nov-95	10.7	572485.319	151492.503	NAD83(91)	117.919	NAVD88	100-HR-3 (D)	10.09	
B8505	DD-42-3	08-Nov-95	15.7	572485.766	151492.564	NAD83(91)	117.939	NAVD88	100-HR-3 (D)	10.09	
B8506	DD-42-4	09-Nov-95	18.7	572486.189	151492.48	NAD83(91)	117.973	NAVD88	100-HR-3 (D)	10.09	
B8507	DD-43-2	10-Nov-95	10.5	572450.504	151443.236	NAD83(91)	117.939	NAVD88	100-HR-3 (D)	10.05	
B8508	DD-43-3	09-Nov-95	14.4	572450.906	151443.222	NAD83(91)	117.521	NAVD88	100-HR-3 (D)	10.05	
B8509	DD-44-3	27-Nov-95	12.5	572412.676	151394.279	NAD83(91)	118.199	NAVD88	100-HR-3 (D)	10.01	
B8510	DD-44-4	13-Nov-95	18.5	572411.362	151396.947	NAD83(91)	117.645	NAVD88	100-HR-3 (D)	10.01	
B8511	DD-49-1	08-Dec-95	12.5	572213.696	151161.553	NAD83(91)	119.627	NAVD88	100-HR-3 (D)	9.83	
B8512	DD-49-2	08-Dec-95	16.3	572213.968	151162.781	NAD83(91)	119.492	NAVD88	100-HR-3 (D)	9.83	
B8513	DD-49-3	12-Dec-95	25.5	572210.802	151163.304	NAD83(91)	118.557	NAVD88	100-HR-3 (D)	9.83	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford[a] River Marker	No Longer In Service
B8514	DD-49-4	04-Dec-95	31.5	572211.15	151163.981	NAD83(91)	118.487	NAVD88	100-HR-3 (D)	9.83	
B8515	DD-50-1	15-Dec-95	15.5	572172.189	151121.164	NAD83(91)	119.454	NAVD88	100-HR-3 (D)	9.80	
B8516	DD-50-2	15-Dec-95	20.5	572172.633	151121.569	NAD83(91)	119.478	NAVD88	100-HR-3 (D)	9.80	
B8517	DD-50-3	15-Dec-95	25.2	572172.166	151120.007	NAD83(91)	119.472	NAVD88	100-HR-3 (D)	9.80	
B8518	DD-50-4	12-Dec-95	31.5	572173.03	151121.18	NAD83(91)	119.514	NAVD88	100-HR-3 (D)	9.80	
B8519	DH-14-1	20-Oct-95	32.5	577787.186	153374.82	NAD83(91)	115.76	NAVD88	100-HR-3 (H)	14.87	
B8520	DH-14-11	unknown	unknown	577788.415	153377.955	NAD83(91)	115.031	NAVD88	100-HR-3 (H)	14.87	
B8521	DH-1451-1	unknown	unknown	577182.865	153704.528	NAD83(91)	116.227	NAVD88	100-HR-3 (H)	14.39	
B8522	DH-1452-1	unknown	unknown	577255.023	153661.681	NAD83(91)	115.982	NAVD88	100-HR-3 (H)	14.45	
B8523	DH-22-1	31-Mar-95	4.5	578460.331	152468.304	NAD83(91)	114.224	NAVD88	100-HR-3 (H)	15.50	
B8524	DH-22-2	31-Mar-95	8.5	578460.331	152468.304	NAD83(91)	114.224	NAVD88	100-HR-3 (H)	15.50	
B8525	DH-22-3	31-Mar-95	14	578460.331	152468.304	NAD83(91)	114.224	NAVD88	100-HR-3 (H)	15.50	
B8526	DK-04-2	29-Nov-95	12	570452	148876	NAD83(91)			100-KR-4	8.14	
B8527	DK-04-3	29-Nov-95	15.5	570453	148877	NAD83(91)			100-KR-4	8.14	
B8819	DD-10-2	20-Nov-95	12.5	573899.056	152788.072	NAD83(91)	117.287	NAVD88	100-HR-3 (D)	11.27	
B8820	DD-10-3	20-Nov-95	17.5	573899.056	152788.072	NAD83(91)	117.287	NAVD88	100-HR-3 (D)	11.27	
B8821	DD-08-2	21-Nov-95	11.7	573940.057	152903.527	NAD83(91)			100-HR-3 (D)	11.34	
C3382	Redox-1-3.3	04-Nov-97	3.8	572679	151676	NAD83(91)			100-HR-3 (D)	10.30	
C3383	Redox-4-3.0	03-Nov-97	3.5	572431	151417	NAD83(91)			100-HR-3 (D)	10.13	
C3384	Redox-3-3.3	30-Oct-97	3.8	572570	151566	NAD83(91)			100-HR-3 (D)	10.18	
C3385	Redox-2-3.0	29-Oct-97	3.5	572625	151654	NAD83(91)			100-HR-3 (D)	10.24	
C3512	Redox-1-6.0	04-Nov-97	6.5	572716.336	151730.81	UNKNOWN			100-HR-3 (D)	10.30	
C3513	Redox-2-6.0	29-Oct-97	6.5	572636.662	151687.803	UNKNOWN			100-HR-3 (D)	10.24	
C3514	Redox-3-4.6	30-Oct-97	5.1	572583.206	151603.027	UNKNOWN			100-HR-3 (D)	10.18	
C3515	Redox-4-6.0	03-Nov-97	6.5	572529.706	151540.006	UNKNOWN			100-HR-3 (D)	10.13	
C4305	AT-D-1-D	23-Dec-03	13.83	572860.651	151852.065	NAD83	118.286	NAVD88	100-HR-3 (D)	10.42	
C4306	AT-D-1-M	23-Dec-03	11.33	572861.512	151850.404	NAD83	118.662	NAVD88	100-HR-3 (D)	10.42	
C4307	AT-D-1-S	23-Dec-03	7.5	572861.059	151850.983	NAD83	118.536	NAVD88	100-HR-3 (D)	10.42	
C4308	AT-D-2-D	31-Dec-03	27	573105.575	152130.073	NAD83			100-HR-3 (D)	10.66	X
C4309	AT-D-2-M	31-Dec-03	16.75	573105.776	152130.318	NAD83			100-HR-3 (D)	10.66	
C4310	AT-D-2-S	31-Dec-03	14.83	573108.251	152129.777	NAD83			100-HR-3 (D)	10.66	
C4311	AT-D-3-D	05-Jan-04	12.25	573233.231	152224.319	NAD83			100-HR-3 (D)	10.75	
C4312	AT-D-3-M	05-Jan-04	9.25	573234.706	152224.974	NAD83			100-HR-3 (D)	10.75	
C4313	AT-D-3-S	05-Jan-04	7.75	573233.717	152224.602	NAD83			100-HR-3 (D)	10.75	
C4314	AT-D-4-S	12-Jan-04	12.92	572993.254	152039.864	NAD83			100-HR-3 (D)	10.58	
C4315	AT-D-4-M	12-Jan-04	14.33	572993.148	152040.484	NAD83			100-HR-3 (D)	10.58	
C4316	AT-D-4-D	12-Jan-04	16.17	572992.239	152039.564	NAD83			100-HR-3 (D)	10.58	
C4317	AT-D-5-D	13-Jan-04	9.25	573934.803	152850.597	NAD83	118.357	NAVD88	100-HR-3 (D)	11.31	
C4318	AT-D-5-M	13-Jan-04	7.33	573934.672	152848.206	NAD83	118.361	NAVD88	100-HR-3 (D)	11.31	
C4319	AT-H-1-D	14-Jan-04	13.29	578068.733	152955.059	NAD83	115.542	NAVD88	100-HR-3 (H)	15.16	
C4320	AT-H-1-M	14-Jan-04	11.54	578069.144	152954.335	NAD83	115.529	NAVD88	100-HR-3 (H)	15.16	
C4321	AT-H-1-S	14-Jan-04	6.71	578070.238	152957.484	NAD83	115.233	NAVD88	100-HR-3 (H)	15.16	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford* River Marker	No Longer In Service
C4322	AT-H-2-D	15-Jan-04	12.54	578109.838	152896.44	UNKNOWN	115.44	UNKNOWN	100-HR-3 (H)	15.20	
C4323	AT-H-2-M	15-Jan-04	9.67	578110.719	152895.191	NAD83	115.47	NAVD88	100-HR-3 (H)	15.20	
C4324	AT-H-2-S	15-Jan-04	5.83	578111.797	152893.943	NAD83	115.45	NAVD88	100-HR-3 (H)	15.20	
C4325	AT-H-3-D	19-Jan-04	7.83	578142.216	152853.072	NAD83	115.309	NAVD88	100-HR-3 (H)	15.23	
C4326	AT-H-3-S	19-Jan-04	5.83	578141.784	152848.945	NAD83	115.428	NAVD88	100-HR-3 (H)	15.23	
C4327	AT-K-2-M	23-Jan-04	18.71	568803.992	147158.032	NAD83	119.181	NAVD88	100-KR-4	6.64	
C4328	AT-K-2-D	23-Jan-04	22.79	568801.243	147157.944	NAD83	118.857	NAVD88	100-KR-4	6.64	
C4329	AT-K-2-S	23-Jan-04	15.5	568804.249	147153.321	NAD83	119.427	NAVD88	100-KR-4	6.64	
C4330	AT-K-5-D	26-Jan-04	21.58	570358.927	148738.273	NAD83	118.837	NAVD88	100-KR-4	8.09	
C4331	AT-K-5-M	26-Jan-04	16.17	570356.51	148737.414	NAD83	118.728	NAVD88	100-KR-4	8.09	
C4332	AT-K-6-D	28-Jan-04	22.08	570642.437	149034.926	NAD83	119.962	NAVD88	100-KR-4	8.31	
C4333	AT-K-6-S	28-Jan-04	11.92	570641.237	149033.719	NAD83	120.073	NAVD88	100-KR-4	8.31	
C4334	AT-K-6-M	28-Jan-04	15.75	570639.55	149032.947	NAD83	120.032	NAVD88	100-KR-4	8.31	
C4335	AT-K-5-S	26-Jan-04	11.04	570357.99	148738.194	NAD83	118.837	NAVD88	100-KR-4	8.09	
C4336	AT-K-4-D	02-Feb-04	15.79	570123.757	148477.489	NAD83	118.996	NAVD88	100-KR-4	7.88	
C4337	AT-K-4-M	29-Jan-04	13.67	570123.114	148476.953	NAD83	118.977	NAVD88	100-KR-4	7.88	
C4338	AT-K-4-S	29-Jan-04	11.5	570123.098	148476.95	NAD83	118.994	NAVD88	100-KR-4	7.88	
C4339	AT-K-1-D	03-Feb-04	22.17	568327.31	146807.11	NAD83	119.178	NAVD88	100-KR-4	6.27	
C4340	AT-K-1-M	03-Feb-04	15.5	568325.504	146806.936	NAD83	119.257	NAVD88	100-KR-4	6.27	
C4341	AT-K-1-S	03-Feb-04	9.67	568324.617	146805.775	NAD83	119.32	NAVD88	100-KR-4	6.27	
C4342	AT-K-3-D	05-Feb-04	23.5	569178.215	147581.051	NAD83	118.109	NAVD88	100-KR-4	7.00	
C4343	AT-K-3-M	05-Feb-04	18.33	569180.026	147581.403	NAD83	118.266	NAVD88	100-KR-4	7.00	
C4344	AT-K-3-S	05-Feb-04	13.92	569177.923	147579.927	NAD83	118.333	NAVD88	100-KR-4	7.00	
C4345	AT-3-1-D(1)	06-Feb-04	21.63	594384.577	116733.965	NAD83	105.273	NAVD88	300-FF-5	42.08	
C4346	AT-3-1-M	06-Feb-04	17.33	594384.907	116737.016	NAD83	105.279	NAVD88	300-FF-5	42.08	
C4347	AT-3-1-S	06-Feb-04	12.08	594383.725	116737.054	NAD83	105.542	NAVD88	300-FF-5	42.08	
C4348	AT-3-1-D(2)	06-Feb-04	21.5	594384.954	116739.488	NAD83	105.413	NAVD88	300-FF-5	42.08	
C4349	AT-3-2-M	09-Feb-04	17.08	594435.306	116437.665	NAD83	105.179	NAVD88	300-FF-5	42.24	
C4350	AT-3-2-S	09-Feb-04	11.25	594434.714	116439.56	NAD83	105.192	NAVD88	300-FF-5	42.24	
C4351	AT-3-3-D	10-Feb-04	29.58	594505.631	116159.062	NAD83	104.956	NAVD88	300-FF-5	42.39	
C4352	AT-3-3-M	10-Feb-04	15.58	594505.464	116160.406	NAD83	105.119	NAVD88	300-FF-5	42.39	
C4353	AT-3-3-S	10-Feb-04	7.42	594505.024	116163.568	NAD83	105.003	NAVD88	300-FF-5	42.39	
C4354	AT-3-4-D	11-Feb-04	12.5	594541.904	115980.412	NAD83	105.299	NAVD88	300-FF-5	42.49	
C4355	AT-3-4-M	11-Feb-04	9.71	594543.643	115976.383	NAD83	105.296	NAVD88	300-FF-5	42.49	
C4356	AT-3-4-S	11-Feb-04	7.5	594542.624	115978.828	NAD83	105.335	NAVD88	300-FF-5	42.49	
C4357	AT-3-5-M	17-Feb-04	12.67	594600.678	115753.181	UNKNOWN			300-FF-5	42.61	X
C4358	AT-3-5-S	17-Feb-04	8.21	594602.159	115749.968	UNKNOWN	105.1	UNKNOWN	300-FF-5	42.61	
C4359	AT-3-6-D	17-Feb-04	39.13	594663.947	115547.715	NAD83	104.837	NAVD88	300-FF-5	42.72	
C4360	AT-3-6-M	17-Feb-04	22.33	594663.856	115545.896	NAD83	104.944	NAVD88	300-FF-5	42.72	
C4361	AT-3-6-S	17-Feb-04	10.13	594663.336	115548.309	NAD83	104.892	NAVD88	300-FF-5	42.72	
C4362	AT-3-7-D	19-Feb-04	37.75	594706.323	115348.62	NAD83	104.87	NAVD88	300-FF-5	42.82	
C4363	AT-3-7-M	19-Feb-04	21.33	594706.026	115350.598	NAD83	104.93	NAVD88	300-FF-5	42.82	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford* River Marker	No Longer In Service
C4364	AT-3-7-S	19-Feb-04	9.13	594705.293	115352.844	NAD83	104.887	NAVD88	300-FF-5	42.82	
C4365	AT-3-8-D	20-Feb-04	20.58	594759.951	115130.709	NAD83	105.049	NAVD88	300-FF-5	42.94	X
C4366	AT-3-8-M	20-Feb-04	14.46	594760.643	115129.001	NAD83	104.94	NAVD88	300-FF-5	42.94	
C4367	AT-3-8-S	20-Feb-04	8.46	594761.597	115127.249	NAD83	104.99	NAVD88	300-FF-5	42.94	
C4368	AT-B-4-S	23-Feb-04	8	565845.848	145591.657	NAD83	119.674	NAVD88	100-BC-5	4.44	
C4369	AT-B-7-D	25-Feb-04	18.58	566143.55	145679.155	NAD83	119.549	NAVD88	100-BC-5	4.62	
C4370	AT-B-7-M	25-Feb-04	13.83	566143.324	145680.047	NAD83	119.343	NAVD88	100-BC-5	4.62	
C4371	AT-B-7-S	25-Feb-04	7.29	566142.321	145678.989	NAD83	119.493	NAVD88	100-BC-5	4.62	
C4372	AT-B-5-D	26-Feb-04	24.5	566438.064	145746.81	NAD83	119.32	NAVD88	100-BC-5	4.77	
C4373	AT-B-5-M	26-Feb-04	16.67	566436.65	145746.469	NAD83	119.34	NAVD88	100-BC-5	4.77	
C4374	AT-B-5-S	26-Feb-04	10.08	566434.241	145745.075	NAD83	105.104	NAVD88	100-BC-5	4.77	
C4375	AT-B-1-M	01-Mar-04	13.75	564308.894	145379.938	NAD83	121.271	NAVD88	100-BC-5	3.57	
C4376	AT-B-1-S	01-Mar-04	8.5	564307.002	145379.276	NAD83	121.239	NAVD88	100-BC-5	3.57	X
C4377	AT-B-2-D	03-Mar-04	19.5	564513.954	145329.139	NAD83	120.92	NAVD88	100-BC-5	3.66	
C4378	AT-B-2-S	03-Mar-04	9.15	564514.817	145329.643	NAD83	120.902	NAVD88	100-BC-5	3.66	
C4379	AT-B-2-M	03-Mar-04	14.5	564515.9	145329.366	NAD83	120.862	NAVD88	100-BC-5	3.66	
C4380	AT-B-3-D	03-Mar-04	23.67	565130.482	145397.266	NAD83	120.737	NAVD88	100-BC-5	4.02	
C4381	AT-B-3-M	03-Mar-04	14.67	565128.625	145397.704	NAD83	120.505	NAVD88	100-BC-5	4.02	
C4382	AT-B-3-S	03-Mar-04	8.58	565127.529	145397.211	NAD83	120.623	NAVD88	100-BC-5	4.02	
C4383	AT-F-3-D	15-Mar-04	14.63	582089.48	146284.025	NAD83	112.696	NAVD88	100-FR-3	20.42	
C4384	AT-F-3-M	15-Mar-04	11.33	582088.405	146286.839	NAD83	112.667	NAVD88	100-FR-3	20.42	
C4385	AT-F-3-S	15-Mar-04	6.5	582089.124	146285.494	NAD83	112.628	NAVD88	100-FR-3	20.42	
C4386	AT-F-4-D	15-Mar-04	32.83	582492.808	145788.865	NAD83	112.13	NAVD88	100-FR-3	21.00	
C4387	AT-F-4-M	15-Mar-04	18.5	582491.931	145787.683	NAD83	112.118	NAVD88	100-FR-3	21.00	
C4388	AT-F-4-S	15-Mar-04	7.71	582491.278	145787.132	NAD83	112.106	NAVD88	100-FR-3	21.00	
C4389	AT-F-1-D	16-Mar-04	26.63	581378.715	147707.333	NAD83	114.798	NAVD88	100-FR-3	19.22	
C4390	AT-F-1-M	16-Mar-04	18.58	581378.347	147708.405	NAD83	114.738	NAVD88	100-FR-3	19.22	
C4391	AT-F-1-S	16-Mar-04	10.83	581377.937	147709.395	NAD83	114.734	NAVD88	100-FR-3	19.22	
C4392	AT-F-2-D	17-Mar-04	19.83	581956.315	146622.707	NAD83	112.607	NAVD88	100-FR-3	20.11	
C4393	AT-F-2-M	17-Mar-04	14.08	581957.953	146619.127	NAD83	112.633	NAVD88	100-FR-3	20.11	
C4394	AT-F-2-S	17-Mar-04	8.04	581956.97	146621.604	NAD83	112.703	NAVD88	100-FR-3	20.11	
C4585	NS-2A-23cm	18-Feb-04	1.25	571292.325	149925.438	UNKNOWN	116.99	UNKNOWN	100-NR-2	8.910	
C4586	NS-2A-87cm	22-Feb-04	3.35	571292.325	149925.438	UNKNOWN	116.97	UNKNOWN	100-NR-2	8.910	
C4587	NS-2A-168cm	24-Feb-04	6.01	571292.325	149925.438	UNKNOWN	116.93	UNKNOWN	100-NR-2	8.910	
C4588	NS-3A-10cm	18-Feb-04	0.83	571310.501	149941.215	UNKNOWN	116.98	UNKNOWN	100-NR-2	8.919	X
C4589	NS-3A-176cm	18-Feb-04	6.27	571310.501	149941.215	UNKNOWN	117.02	UNKNOWN	100-NR-2	8.919	X
C4590	NS-3A-87cm	24-Feb-04	3.35	571310.501	149941.215	UNKNOWN	116.96	UNKNOWN	100-NR-2	8.919	X
C4640	NS-4A-17cm	24-Feb-04	1.06	571328.703	149954.77	UNKNOWN	117.29	UNKNOWN	100-NR-2	8.932	X
C4641	NS-4A-138cm	24-Feb-04	5.03	571328.703	149954.77	UNKNOWN	117.23	UNKNOWN	100-NR-2	8.932	X
C4642	300SPR9A-19cm	30-Mar-04	1.12	594495.324	116209.672	UNKNOWN	104.92	UNKNOWN	300-FF-5	42.365	
C4643	300SPR9A-86cm	30-Mar-04	3.32	594495.324	116209.672	UNKNOWN	104.94	UNKNOWN	300-FF-5	42.365	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford[a] River Marker	No Longer In Service
C4644	300SPR9A-142cm	23-Mar-04	5.16	594495.324	116209.672	UNKNOWN	104.95	UNKNOWN	300-FF-5	42.365	
C4645	300-3-3A-410cm	30-Mar-04	13.95	594512.206	116163.246	UNKNOWN	105.05	UNKNOWN	300-FF-5	42.391	
C4646	300-3-3B-376cm	30-Mar-04	12.84	594516.017	116165.529	UNKNOWN	104.48	UNKNOWN	300-FF-5	42.389	
C4690	300-3-3A-124cm	03-Jun-04	4.6	594512.706	116163.246	UNKNOWN			300-FF-5	42.391	
C4739	300-3-3A-579cm	08-Aug-04	19.5	594512.21	116163.25	UNKNOWN			300-FF-5	42.391	
C4740	300-3-3B-518cm	08-Aug-04	17.49	594516.02	116165.53	UNKNOWN			300-FF-5	42.389	
C4741	300-3-3C-409cm	08-Aug-04	13.92	594524.41	116167.35	UNKNOWN			300-FF-5	42.390	
C4742	300-3-3C-589cm	08-Aug-04	19.82	594524.71	116167.65	UNKNOWN			300-FF-5	42.390	
C4892	NS-3B-40CM	21-Feb-05	1.81	571308	149945.7656	UNKNOWN			100-NR-2	8.921	X
C4893	NS-3B-52CM	21-Feb-05	2.21	571308	149945.7656	UNKNOWN			100-NR-2	8.921	X
C4894	NS-4B-31CM	21-Feb-05	1.52	571326.5625	149959.1406	UNKNOWN			100-NR-2	8.933	X
C5245	NVP1-1	17-Jun-05	3.79	571317.5	149935.7031	UNKNOWN			100-NR-2	8.918	
C5246	NVP1-2	17-Jun-05	4.61	571317.5	149935.7031	UNKNOWN			100-NR-2	8.918	
C5247	NVP1-3	17-Jun-05	6.08	571317.5	149935.7031	UNKNOWN			100-NR-2	8.918	
C5248	NVP1-4	17-Jun-05	6.21	571317.4375	149939.0938	UNKNOWN			100-NR-2	8.922	
C5249	NVP1-5	17-Jun-05	7.68	571317.375	149945.875	UNKNOWN			100-NR-2	8.925	
C5250	NVP2-116.3	02-Aug-05	2.8	571313.3125	149944.5625	UNKNOWN			100-NR-2	8.924	
C5251	NVP2-116.0	02-Aug-05	3.8	571313.3125	149944.5625	UNKNOWN			100-NR-2	8.924	
C5252	NVP2-115.7	02-Aug-05	4.8	571313.3125	149944.5625	UNKNOWN			100-NR-2	8.924	
C5253	NVP2-115.4	02-Aug-05	5.8	571313.3125	149944.5625	UNKNOWN			100-NR-2	8.924	
C5255	N116mArray-1A	02-Aug-05	4.4	571225	149859.9844	UNKNOWN			100-NR-2	8.865	
C5256	N116mArray-2A	02-Aug-05	2.5	571259.6875	149888.375	UNKNOWN			100-NR-2	8.882	
C5257	N116mArray-3A	02-Aug-05	2.5	571273.375	149911.8594	UNKNOWN			100-NR-2	8.895	
C5258	N116mArray-4A	02-Aug-05	3.8	571292.5	149925.2344	UNKNOWN			100-NR-2	8.907	
C5259	N116mArray-6A	02-Aug-05	2.8	571325.4375	149955.7344	UNKNOWN			100-NR-2	8.931	
C5260	N116mArray-7A	02-Aug-05	3.5	571346.6875	149981.8438	UNKNOWN			100-NR-2	8.950	
C5261	N116mArray-8A	03-Aug-05	3.8	571381.1875	150029.75	UNKNOWN			100-NR-2	8.983	
C5262	N116mArray-8.5A	09-Feb-06	3.51	571404.5625	150074.5469	UNKNOWN			100-NR-2	9.012	
C5263	N116mArray-9A	03-Aug-05	3.8	571437.8125	150124.9844	UNKNOWN			100-NR-2	9.044	
C5264	N116mArray-10A	10-Nov-05	3.28	571452	150158.6563	UNKNOWN			100-NR-2	9.065	

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford[a] River Marker	No Longer In Service
C5265	N116mArray-11A	10-Nov-05	3.28	571482.0625	150184.4531	UNKNOWN			100-NR-2	9.090	
C5266	N116mArray-12A	10-Nov-05	3.48	571512	150219.1563	UNKNOWN			100-NR-2	9.118	
C5267	N116mArray-13A	09-Feb-06	5.18	571540.6875	150264.0156	UNKNOWN			100-NR-2	9.149	
C5268	N116mArray-14A	09-Feb-06	5.25	571573.375	150311.0469	UNKNOWN			100-NR-2	9.183	
C5269	APT1	15-Mar-06	9.39	571276.5	149897.4844	UNKNOWN			100-NR-2	8.891	
C5270	APT2	15-Mar-06	5.72	571275.3125	149899.5781	UNKNOWN			100-NR-2	8.892	
C5271	APT3	15-Mar-06	3.28	571270.5625	149905.0469	UNKNOWN			100-NR-2	8.893	
C5272	103mArray-AT3A	25-Jul-05	7.39	594512.4375	116163.0859	UNKNOWN			300-FF-5	42.391	
C5273	103mArray-US25	25-Jul-05	6.08	594505.5625	116188.8516	UNKNOWN			300-FF-5	42.377	
C5274	103mArray-US50	25-Jul-05	6.57	594500	116207.4219	UNKNOWN			300-FF-5	42.367	
C5275	103mArray-US75	25-Aug-05	6.73	594490.125	116237.375	UNKNOWN			300-FF-5	42.350	
C5276	103mArray-US100	25-Aug-05	6.54	594479	116271.5469	UNKNOWN			300-FF-5	42.332	
C5277	103mArray-US125	25-Aug-05	3.22	594468.5	116306.1563	UNKNOWN			300-FF-5	42.313	
C5278	103mArray-DS25	25-Jul-05	6.08	594518.125	116137.7344	UNKNOWN			300-FF-5	42.404	
C5279	103mArray-DS50	25-Jul-05	5.75	594521.25	116123.3672	UNKNOWN			300-FF-5	42.412	
C5280	103mArray-DS75	25-Jul-05	8.37	594530.125	116082.3672	UNKNOWN			300-FF-5	42.434	
C5281	DS75-100cm	29-Nov-05	3.68	594530.125	116082.3672	UNKNOWN					
C5282	DS75-319cm	29-Nov-05	10.97	594530.125	116082.3672	UNKNOWN					
C5386	APT5	22-Sep-06	10.51						100-NR-2	8.935	
C5512	N116mArray-15A	16-Nov-06	6	571632	150391	NAD83	115.96	NAVD88	100-NR-2	9.217	
C5513	N116mArray-16A	16-Nov-06	5.9	571674	150491	NAD83	116.04	NAVD88	100-NR-2	9.251	
C5514	N116mArray-0A	16-Nov-06	5.9	571169	149776	NAD83	117.6	NAVD88	100-NR-2	8.831	
C5632	C5632	31-Oct-07	7.76	576389.25	154227.69	NAD83(91)	115.62	NAVD88	100-HR-3 (H)	13.72	
C5633	C5633	31-Oct-07	17.98	576390.6	154227.98	NAD83(91)	115.52	NAVD88	100-HR-3 (H)	13.72	
C5634	C5634	30-Oct-07	32.5	576391.43	154228.9	NAD83(91)	115.32	NAVD88	100-HR-3 (H)	13.72	
C5635	C5635	29-Oct-07	7.5	576478.81	154181.12	NAD83(91)	115.42	NAVD88	100-HR-3 (H)	13.78	
C5636	C5636	29-Oct-07	18.3	576481.4	154179.43	NAD83(91)	115.38	NAVD88	100-HR-3 (H)	13.78	
C5637	C5637	30-Oct-07	17.55	576483.67	154178.3	NAD83(91)	115.38	NAVD88	100-HR-3 (H)	13.78	
C5638	C5638	29-Oct-07	12.1	576634.08	154070.38	NAD83(91)	115.17	NAVD88	100-HR-3 (H)	13.92	
C5639	C5639	29-Oct-07	9.5	576627	154067	UNKNOWN					
C5641	C5641	27-Oct-07	8.15	576871.56	153916.62	NAD83(91)	115.1	NAVD88	100-HR-3 (H)	14.03	
C5642	C5642	27-Oct-07	8	576870	153909	UNKNOWN					

Table A-1. Data for Existing Aquifer Sampling Tubes. (11 sheets)

Identification Number	Name	Installation Date	Depth (ft)	Easting	Northing	Horizontal Datum (m)	Elevation	Vertical Datum (m)	Operable Unit	Hanford[a] River Marker	No Longer In Service
C5644	C5644	26-Oct-07	9.33	576960.87	153869.32	NAD83(91)	114.82	NAVD88	100-HR-3 (H)	14.20	
C5673	C5673	25-Oct-07	11.03	577146	153725	UNKNOWN			100-HR-3 (H)	14.36	
C5674	C5674	26-Oct-07	12	577146	153725	UNKNOWN			100-HR-3 (H)	14.36	
C5676	C5676	24-Oct-07	7.35	577276.26	153656.07	NAD83(91)	115.3	NAVD88	100-HR-3 (H)	14.46	
C5677	C5677	25-Oct-07	11.4	577277.33	153657.18	NAD83(91)	114.85	NAVD88	100-HR-3 (H)	14.46	
C5678	C5678	24-Oct-07	13.7	577278.65	153653.5	NAD83(91)	115.37	NAVD88	100-HR-3 (H)	14.46	
C5679	C5679	31-Oct-07	4.47	577409.7	153593.4	NAD83(91)	114.97	NAVD88	100-HR-3 (H)	14.56	
C5680	C5680	23-Oct-07	15.75	577408.4	153593.79	NAD83(91)	115.07	NAVD88	100-HR-3 (H)	14.56	
C5681	C5681	24-Oct-07	15.75	577407.43	153594.58	NAD83(91)	114.9	NAVD88	100-HR-3 (H)	14.56	
C5682	C5682	23-Oct-07	10.1	577699.79	153338.71	NAD83(91)			100-HR-3 (H)	14.84	
C5820	C5820	23-Oct-07	12	566281.66	135357.92	NAD83(91)	211.2	NAVD88			
C6131	C6131	16-Feb-07	4.5	571153.81	149733.71	UNKNOWN					
C6132	C6132	16-Feb-07	5.5	571165.27	149734.96	UNKNOWN					
C6133	C6133	16-Feb-07	2.7	571168.61	149776.13	UNKNOWN					
C6134	C6134	16-Feb-07	2.5	571181.41	149794.07	UNKNOWN					
C6135	C6135	16-Feb-07	4.9	571181.41	149794.07	UNKNOWN					
C6136	C6136	16-Feb-07	4.9	571195.69	149815.36	UNKNOWN					
C6457	C6457	22-Sep-06	5.3								

[a] Approximate distance in miles from Vernita bridge.

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