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Rev. 0

Sampling and Analysis Instruction for FY 2001 Well Decommissioning Waste Designation Release 3

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Environmental Restoration

Submitted by: Bechtel Hanford, Inc.

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Sampling and Analysis Instruction for FY 2001 Well Decommissioning Waste Designation Release 3

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ACRONYMS

bgs	below ground surface
BHI	Bechtel Hanford, Inc.
FY	fiscal year
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
MTCA	*Model Toxics Control Act*
RCRA	*Resource Conservation and Recovery Act of 1976*

METRIC CONVERSION CHART

Into Metric Units

If You Know	*Multiply By*	*To Get*
Length		
inches	25.4	millimeters
inches	2.54	centimeters
feet	0.305	meters
yards	0.914	meters
miles	1.609	kilometers
Area		
sq. inches	6.452	sq. centimeters
sq. feet	0.093	sq. meters
sq. yards	0.0836	sq. meters
sq. miles	2.6	sq. kilometers
acres	0.405	hectares
Mass (weight)		
ounces	28.35	grams
pounds	0.454	kilograms
ton	0.907	metric ton
Volume		
teaspoons	5	milliliters
tablespoons	15	milliliters
fluid ounces	30	milliliters
cups	0.24	liters
pints	0.47	liters
quarts	0.95	liters
gallons	3.8	liters
cubic feet	0.028	cubic meters
cubic yards	0.765	cubic meters
Temperature		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius
Radioactivity		
picocuries	37	Millibecquerel

Out of Metric Units

If You Know	*Multiply By*	*To Get*
Length		
millimeters	0.039	inches
centimeters	0.394	inches
meters	3.281	feet
meters	1.094	yards
kilometers	0.621	miles
Area		
sq. centimeters	0.155	sq. inches
sq. meters	10.76	sq. feet
sq. meters	1.196	sq. yards
sq. kilometers	0.4	sq. miles
hectares	2.47	acres
Mass (weight)		
grams	0.035	ounces
kilograms	2.205	pounds
metric ton	1.102	ton
Volume		
milliliters	0.033	fluid ounces
liters	2.1	pints
liters	1.057	quarts
liters	0.264	gallons
cubic meters	35.315	cubic feet
cubic meters	1.308	cubic yards
Temperature		
Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity		
millibecquerel	0.027	picocuries

1.0 INTRODUCTION

The purpose of this sampling and analysis instruction is to provide adequate information to disposition waste material generated from decommissioning of 69 selected Hanford Site groundwater wells. Sixty-seven of these wells are located in Columbia River Corridor Area 1B, and two wells are located in Columbia River Corridor Area 1A. These wells are typically noncompliant, are not in use, or are located in areas that are scheduled for excavation. In addition, the U.S. Department of Energy, Richland Operations Office has identified restoring the Columbia River Corridor as one of the three outcomes of the cleanup of the Hanford Site. The Columbia River Corridor Project activities will support completing remediation of 60 mi^2 of the Hanford Site. The work scope includes the decommissioning of nonessential vadose zone and groundwater wells in the northwestern, nonfacility portion of the Hanford Site (between SR24 to the west, Hanford Route 6 to the east, Route 11A south, and the Columbia River to the north), and the eastern, nonfacility portion of the site, bounded by the Hanford Townsite (north), the Columbia River (east), Hanford Routes 2S and 4S (west), and the Hanford Site 300 Area (south).

1.1 WELLS TO BE DECOMMISSIONED IN SUPPORT OF AREA 1B OF THE COLUMBIA RIVER CORRIDOR CLEANUP PROJECT

Sixty-seven wells will be included for decommissioning in Columbia River Corridor Area 1B. Well locations are shown in Figures 1 and 2. Figure 1 shows Group 1, 3, 4, 5, 7, and 8 wells, whereas Figure 2 shows Group 2, 6, 7, and 8 wells. Decommissioning profiles are documented in the *Description of Work for FY 2001 Well Decommissioning Release 3* (BHI 2001a).

1.1.1 Geologic Investigation Wells (Group 1)

The wells in Group 1 include six noncompliant wells that were drilled as geologic investigation holes using air rotary (wells A8621 and A8648 [699-40-6 and 699-41-5]) and air and mud rotary equipment in 1980.

The following is a key for Group 1 wells shown in Figure 1:

1a. Well A8725 (699-46-3)
1b. Well A8621 (699-40-6)
1c. Well A8561 (699-36-1)
1d. Well A8648 (699-41-5)
1e. Well A8575 (699-37-4)
1f. Well A8525(699-33-6)

Figure 1. Well Locations, Columbia River Corridor Area 1B (Northern Half).

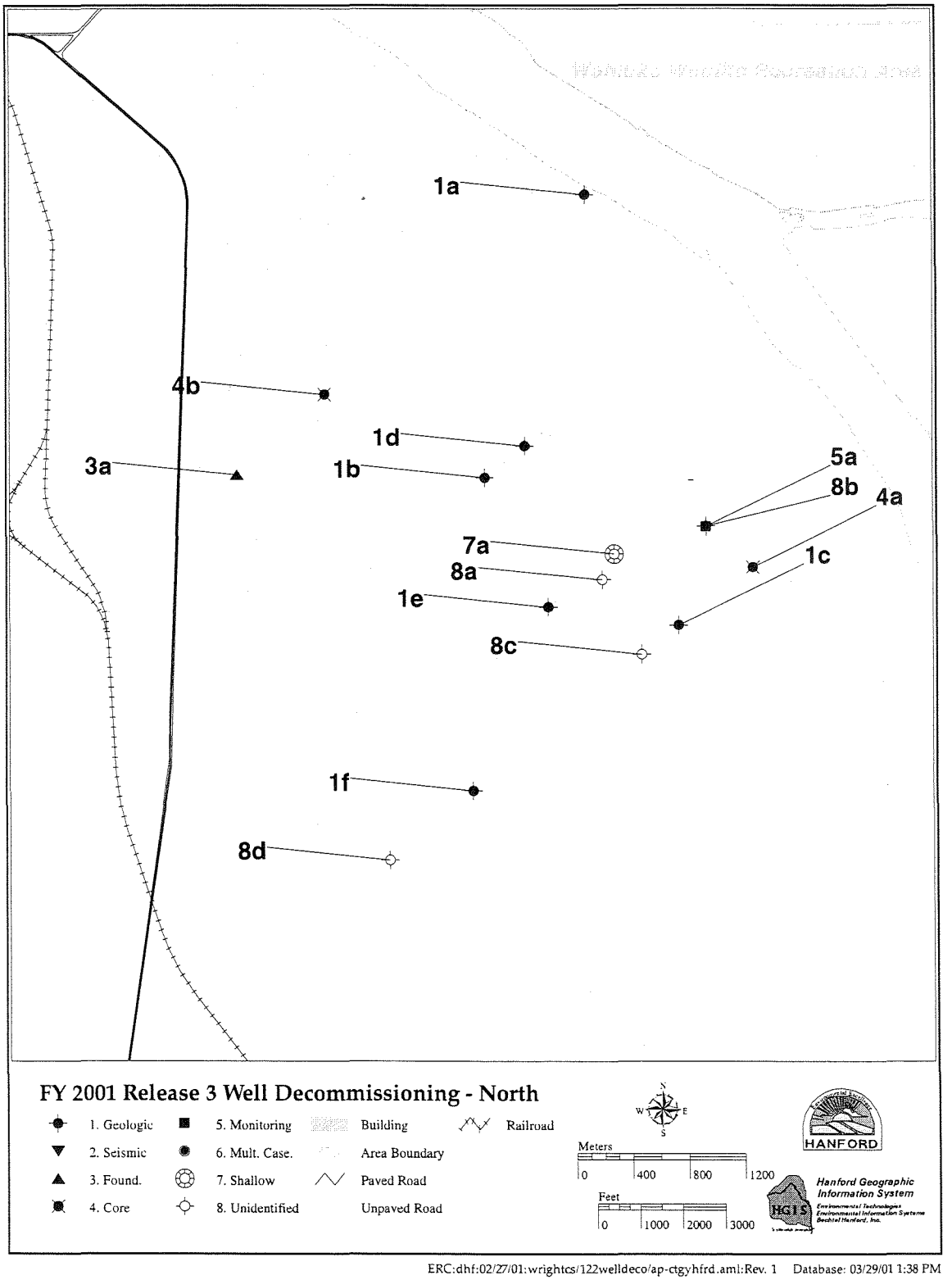
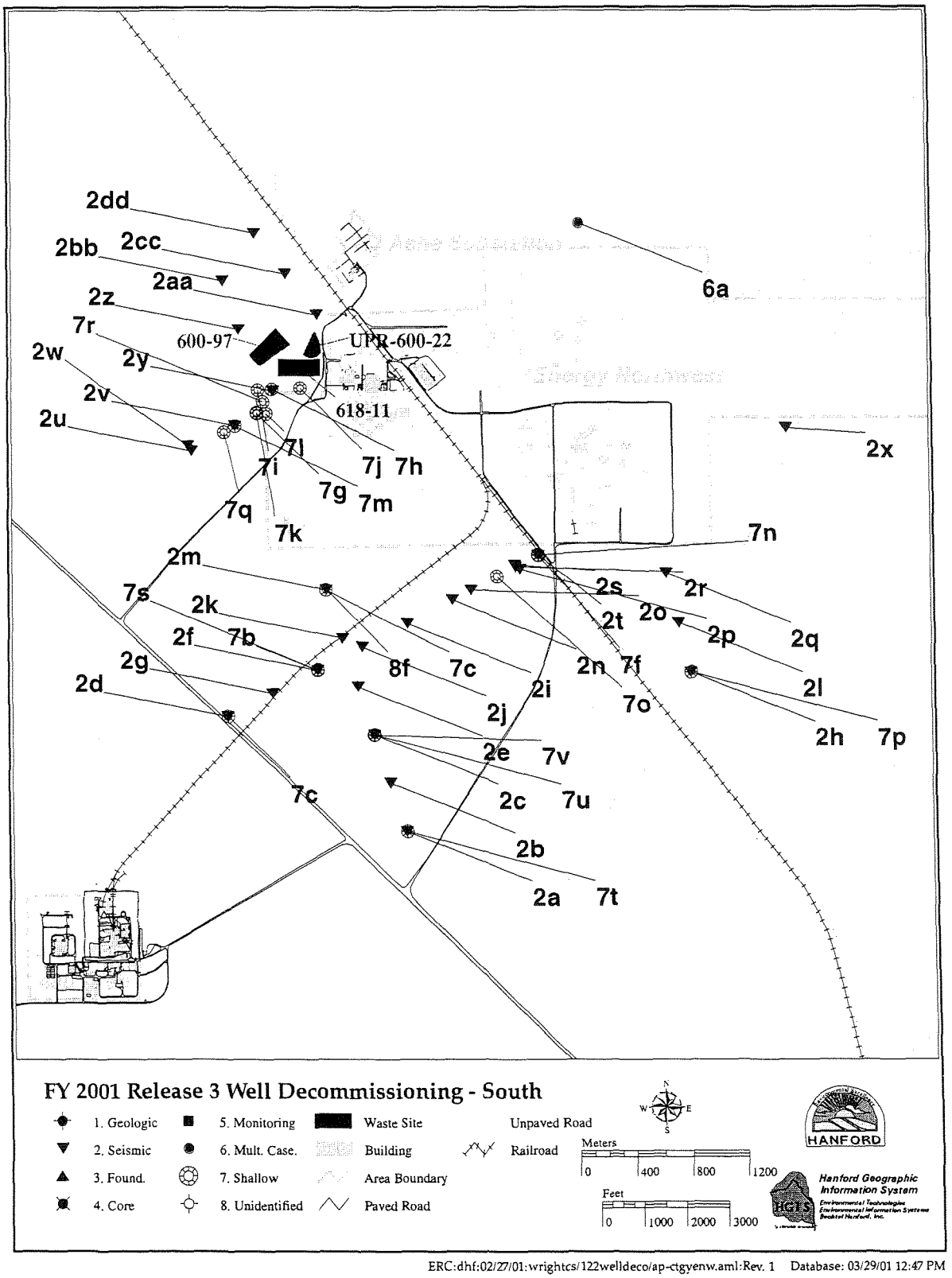


Figure 2. Well Locations, Columbia River Corridor Area 1B (Southern Half).



1.1.2 Seismic Shot Wells (Group 2)

The wells in Group 2 are noncompliant wells that were all drilled in 1974 as seismic shot holes using air rotary drilling techniques.

The following is a key for Group 2 wells shown in Figure 2:

2a. Well A8119 (699-1-1)
2b. Well A8121 (699-2-1)
2c. Well A8127 (699-4-1)
2d. Well A8128 (699-4-5)
2e. Well A8133 (699-5-2)
2f. Well A8134 (699-5-3)
2g. Well A8135 (699-5-4)
2h. Well A8136 (699-5-E6)
2i. Well A8137 (699-6-1)
2j. Well A8139 (699-6-2B)
2k. Well A1840 (699-6-2C)
2l. Well A8143 (699-6-E6)
2m. Well A8145 (699-7-3)
2n. Well A8147 (699-7-E1A)
2o. Well A8148 (699-7-E1B)
2p. Well A8149 (699-7-E2)
2q. Well A8150 (699-7-E6)
2r. Well A8155 (699-8-E2A)
2s. Well A8156 (699-8-E2B)
2t. Well A8159 (699-8-E3C)
2u. Well A8177 (699-10-6)
2v. Well A8211 (699-11-5)
2w. Well A8212 (699-11-6)
2x. Well A8228 (699-11-E8A)
2y. Well A8250 (699-12-4B)
2z. Well A8266 (699-13-5)
2aa. Well A8292 (699-14-3)
2bb. Well A8293 (699-14-5)
2cc. Well A8316 (699-15-3)
2dd. Well A8317 (699-15-4)

1.1.3 Foundation Investigation Wells (Group 3)

The Group 3 well is a noncompliant well that was drilled with a hollow-stem auger and an air rotary (casing hammer) rig as a foundation test hole.

The following is a key for the Group 3 well shown in Figure 1:

3a. Well A8633 (699-40-12G)

1.1.4 Geologic Investigation/Diamond Core Wells (Group 4)

The Group 4 wells include noncompliant well A8599 (699-38-E0) that was drilled as geologic investigation hole using air rotary to ~137 ft and mud rotary (diamond core) to ~270 ft in 1980. Noncompliant well A8662 (699-42-10) was drilled as a geologic investigation hole using air rotary to total depth in 1980.

The following is a key for Group 4 wells shown in Figure 1:

4a. Well A8599 (699-38-E0)
4b. Well A8662 (699-42-10)

1.1.5 Monitoring Well (Group 5)

The Group 5 well is noncompliant well A8601 (699-39-1A) that was drilled to 105 ft below ground surface (bgs) by cable tool for monitoring purposes in 1980.

The following is a key for the Group 5 well shown in Figure 1:

5a. Well A8601 (699-39-1A)

1.1.6 Geologic Investigation Well with Multiple Casing Strings (Group 6)

The Group 6 well is a noncompliant well that was drilled in 1980 as a geologic test hole. The original depth was 706 ft bgs.

The following is a key for the Group 6 well shown in Figure 2:

6a. Well A8349 (699-16-E4A)

1.1.7 Unidentified Shallow Wells (Group 7)

The wells in Group 7 are 16 noncompliant wells that were drilled for unknown purposes, and their drilling dates, original depths, and drilling methods are not known. The current depth to fill is less than ~10 ft in each of the wells.

The following is a key for Group 7 wells shown in Figure 2:

7a. Well A8589 (699-38-3)
7b. Well B2870
7c. Well B2884
7d. Well B2876
7e. Well B2877
7f. Well B2887
7g. Well C3182
7h. Well C3184

7i. Well C3185
7j. Well C3320
7k. Well C3321
7l. Well C3322
7m. Well C3323
7n. Well C3345
7o. Well C3346
7p. Well C3347
7q. Well C3349
7r. Well C3361
7s. Well C3362
7t. Well C3363
7u. Well C3378
7v. Well C3397

1.1.8 Previously Unidentified Wells (Group 8)

The Group 8 wells are noncompliant wells that were drilled for unknown purposes, and their drilling dates, original depths, and drilling methods are not known.

The following is a key for Group 8 wells shown in Figure 1:

8a. Well C3351, HWDS-52
8b. Well C3352, HWDS-51
8c. Well C3353, HWDS-53
8d. Well C3354, HWDS-56

1.2 WELLS TO BE DECOMMISSIONED IN SUPPORT OF COLUMBIA RIVER CORRIDOR AREA 1A

The following two wells are included in FY 2001 Well Decommissioning Release 3 to support Columbia River Corridor Area 1A activities. Well locations are shown in Figure 3. Decommissioning profiles are documented in the *Description of Work for FY 2001 Well Decommissioning Release 3* (BHI 2001a).

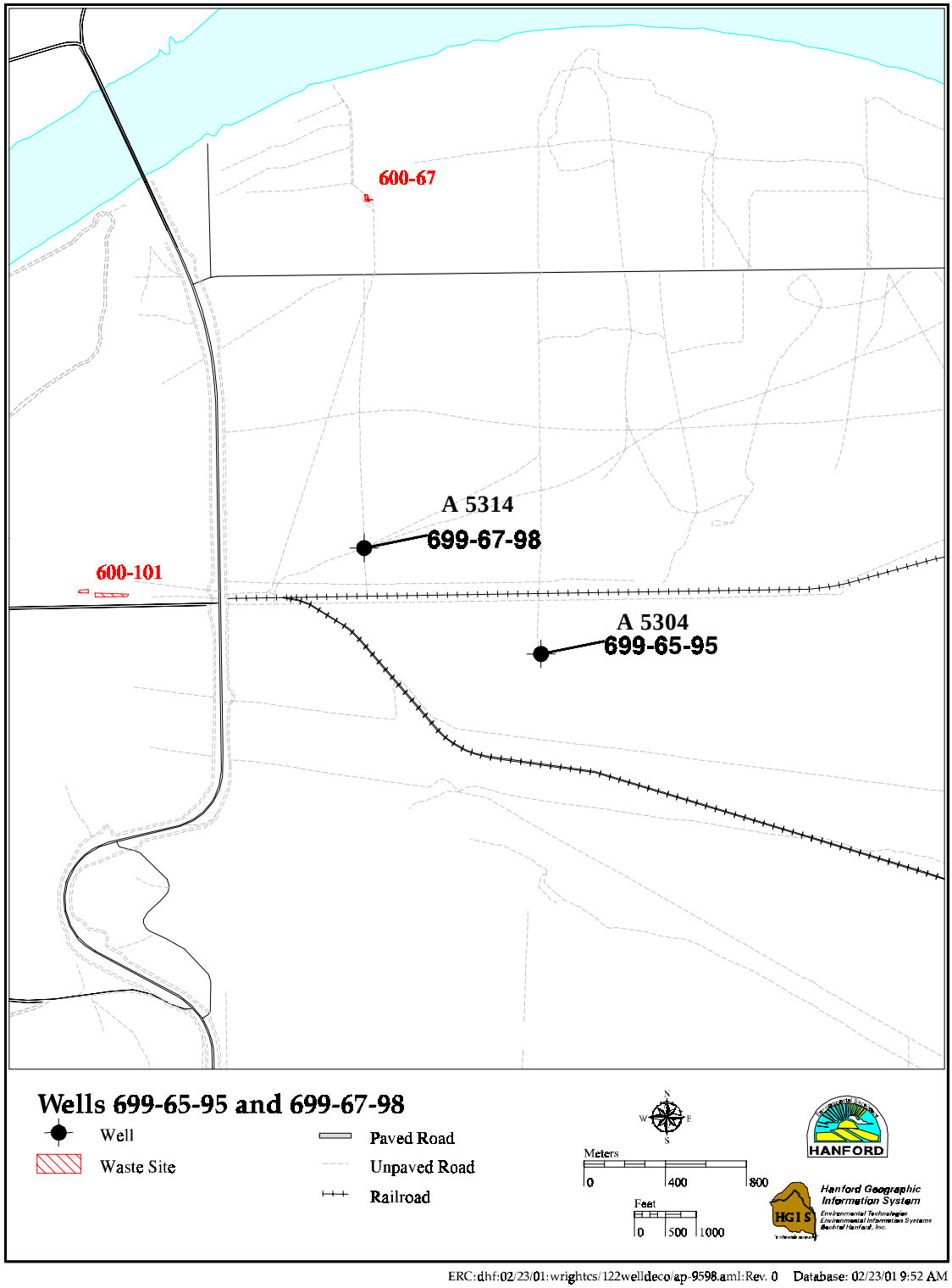
1.2.1 Well A5304 (699-65-95)

This well is a nominal 6-in. well drilled in April 1973 using air rotary methods to a depth of 106 ft. Records indicate that 6-in. carbon steel casing was set to a depth of 56 ft bgs.

1.2.2 Well A5314 (699-67-98)

This well is a nominal 9-in. well drilled using cable tool methods in September and October 1960. The well was drilled to a depth of 185 ft bgs, and 8-in. casing was set at 176.7 ft bgs. Records show a wood and cement plug was set at 110 ft bgs in November 1976.

Figure 3. Well Locations, Columbia River Corridor Area 1A.



1.3 CONTAMINANTS OF CONCERN

1.3.1 Groundwater-Contacted Waste

Groundwater-contacted waste consists of well decommissioning waste that has been in contact with the groundwater from the well and has potential to be contaminated with constituents that are present in the associated groundwater (e.g., groundwater plumes). Contact with groundwater is based on field inspections performed in January and February 2001, and documented in the *Description of Work for FY 2001 Well Decommissioning Release 3* (BHI 2001a). A list of contaminants of concern for groundwater-contacted waste was developed by the following methods:

- Evaluating the radiological and chemical constituents that have been detected in groundwater samples collected from these wells, or nearby wells, and reported in the Hanford Environmental Information System database. *Waste Designation: Hanford Groundwater Contacted Waste* (BHI 2000b) provides a waste designation for Hanford Site groundwater-contacted wastes and includes a summary of the existing Hanford Environmental Information System data. Little recent groundwater sampling data are available for these wells; however, calendar year 2000 plume maps for Columbia River Corridor Areas 1A and 1B were evaluated (PNNL 2001). These maps show groundwater concentrations of tritium at levels of 20,000 to 100,000 pCi/L for Columbia River Corridor Area 1B, and no plumes associated with Columbia River Corridor Area 1A wells.

- Applying the listed waste codes provided in *Application of Listed Waste Codes to Secondary Solid Wastes Related to Well Construction, Maintenance, and Sampling* (BHI 2000a). No listed waste codes are applicable to these wells (Hopkins 2001).

- Examining groundwater chemical data for well 699-67-98 (Table 1) and recent groundwater sample data for Columbia River Corridor Area 1B wells (Table 2). These data are consistent with plume maps examined in PNNL (2001).

1.3.2 Non-Groundwater-Contacted Waste

Noncontact waste consists of well decommissioning waste that has had no contact with the associated groundwater. Evaluation of soil background samples taken to support investigations for the *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes* (DOE-RL 2001) and *Hanford Site Background: Part 2, Soil Background for Radionuclides* (DOE-RL 1996) revealed no contaminants of concern associated with the vadose zone samples collected in 1992. In addition, walkdowns were conducted for all wells planned for decommissioning. No wells are immediately adjacent to waste sites or unplanned releases.

Table 1. Maximum Sample Detections in Well 699-67-98.

Sample Date	Constituent	Value	Units
10/23/89	Alpha	2.13	pCi/L
1/24/86	Ammonium ion	92	µg/L
1/24/86	Barium	9	µg/L
1/24/86	Chloride	8250	µg/L
1/24/86	Coliform bacteria	93	MPN
11/30/88	Gross alpha	1.48	pCi/L
10/23/89	Gross beta	3.82	pCi/L
1/24/86	Iron	157	µg/L
10/23/89	Nitrate	5000	µg/L
12/18/93 10:39	pH Measurement	8	pH
1/24/86	Potassium	4450	µg/L
1/24/86	Sodium	10400	µg/L
12/18/93 10:39	Specific conductance	332	µS/cm
1/24/86	Sulfate	23700	µg/L
1/24/86	Total organic carbon	5750	µg/L
5/3/87	Tritium	1980	pCi/L
9/20/86	Tritium	480	pCi/L
8/6/85	Tritium[a]	-19	pCi/L

[a]Tritium values ranges from 1,980 pCi/L to 0 pCi/L.
MPN = most probable number

Table 2. Maximum Recent (Post-1997) Values for All Sampled Columbia River Corridor Area 1B Wells. (2 Pages)

Well Name	Sample Date	Constituent	Value	Units
699-10-E12	5/17/00 10:08	Alkalinity	264000	µg/L
699-17-5	2/7/00 12:23	Aluminum	46.4	µg/L
699-17-5	2/7/00 12:23	Barium	65.4	µg/L
699-41-1A	5/15/00 13:38	Beryllium	0.68	µg/L
699-17-5	6/26/97 12:55	Bromide	171	µg/L
699-10-E12	9/1/00 11:26	Cadmium	3	µg/L
699-10-E12	9/1/00 11:26	Calcium	75400	µg/L
699-17-5	6/26/97 12:55	Chloride	17100	µg/L
699-12-4D	2/7/00 13:35	Chlorobenzene	0.41	µg/L
699-41-1A	4/21/99 9:37	Chromium	5.3	µg/L
699-46-4	9/16/99 12:52	Cobalt	3.8	µg/L
699-41-1A	5/15/00 13:38	Copper	5.3	µg/L
699-27-8	2/22/01 8:37	Dissolved oxygen	13600	µg/L

Table 2. Maximum Recent (Post-1997) Values for All Sampled Columbia River Corridor Area 1B Wells. (2 Pages)

Well Name	Sample Date	Constituent	Value	Units
699-S11-E12AP	5/16/00 9:32	Fluoride	680	µg/L
699-S11-E12A	6/17/98 14:09	Gross alpha	5.87	pCi/L
699-41-1A	9/17/98 10:08	Gross beta	45.8	pCi/L
699-27-8	10/22/97 12:58	Iodine-129	2.97	pCi/L
699-46-4	9/16/99 12:52	Iron	384	µg/L
699-10-E12	5/17/00 10:08	Magnesium	23500	µg/L
699-S11-E12AP	5/16/00 9:32	Manganese	52.2	µg/L
699-17-5	6/22/98 9:01	Methylenechloride	1	µg/L
699-46-4	9/16/99 12:52	Nickel	18.6	µg/L
699-17-5	2/7/00 12:23	Nitrate	72599.52	µg/L
699-17-5	2/7/00 12:23	Nitrite	318.6004	µg/L
699-40-1	1/17/01 11:44	Oxidation reduction potential	144	mV
699-17-5	8/30/00 11:54	pH Measurement	9.03	pH
699-15-15B	2/8/00 10:13	Potassium	8550	µg/L
699-41-1A	4/16/97 8:05	Silver	4.2	µg/L
699-S11-E12AP	5/16/00 9:32	Sodium	47500	µg/L
699-10-E12	9/23/98 12:19	Specific conductance	615	µS/cm
699-10-E12	2/8/00 13:01	Strontium	547	µg/L
699-10-E12	9/30/99 11:18	Strontium-90	16.4	pCi/L
699-15-15B	2/8/00 10:13	Sulfate	90600	µg/L
699-41-1A	4/16/97 8:05	Technetium-99	144	pCi/L
699-17-5	6/26/97 12:55	Temperature	21.1	Deg C
699-17-5	6/26/97 12:55	Toluene	0.9	µg/L
699-10-E12	5/17/00 10:08	Total organic carbon	1200	µg/L
699-41-1A	4/21/99 9:37	Total organic halides	4.85	µg/L
699-41-1A	4/16/97 8:05	Tritium	150000	pCi/L
699-20-E5A	10/22/97 13:55	Turbidity	189	NTU
699-12-4D	8/29/00 12:17	Uranium	6.37	µg/L
699-15-15B	2/8/00 10:13	Uranium-234	3.39	pCi/L
699-15-15B	2/8/00 10:13	Uranium-238	2.28	pCi/L
699-41-1A	5/15/00 13:38	Vanadium	47.8	µg/L
699-15-15B	2/8/00 10:13	Zinc	136	µg/L

1.4 PROBLEM DEFINITION

Waste generated during the decommissioning of 69 wells in Columbia River Corridor Areas 1A and 1B requires supplemental sampling and analysis and field radiological surveys in order to properly disposition.

Figure 4 provides a summary of the potential disposal options for waste resulting from the well decommissioning activities.

1.5 DECISIONS TO BE MADE

The following section presents the decision statements that need to be made to resolve the problem and the inputs needed to resolve each decision statement.

1.5.1 Decision Statements

The decisions that apply to this task are as follows:

Radioactive – Determine if waste meets the criteria for being released as "Non-Radioactive" in accordance with BHI-EE-10, *Waste Management Plan*, Part II, Procedure 8.0, "Release of Nonradioactive Material"; otherwise, treat as radioactive waste.

Listed Dangerous Waste – Determine whether the material is a listed dangerous waste and requires the assignment of a listed dangerous waste code; otherwise, do not assign a listed dangerous waste code.

Characteristic Waste – Determine whether the material is a characteristic waste and requires the assignment of a characteristic waste code; otherwise, do not assign a characteristic waste code.

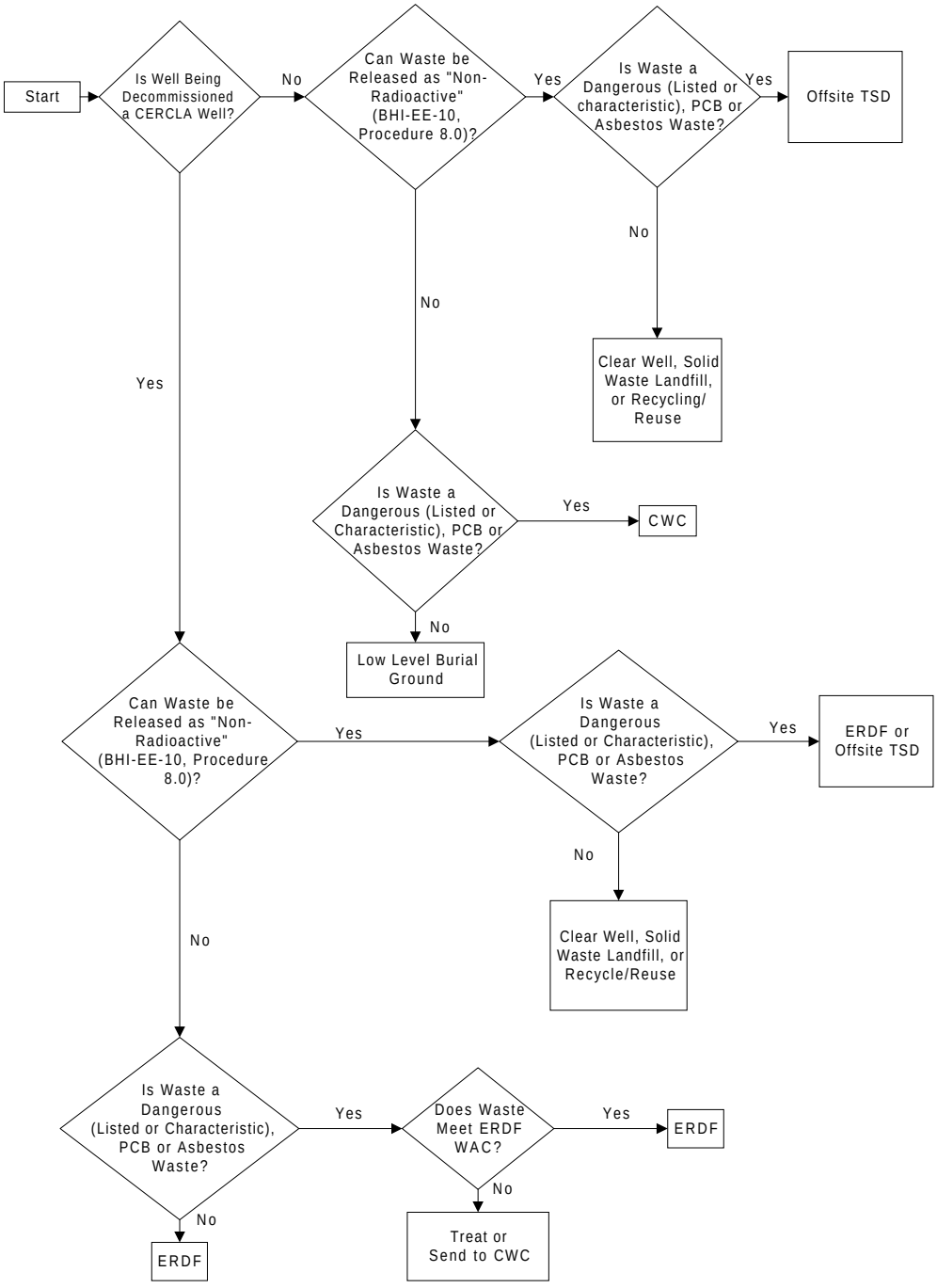
Toxic Waste – Determine whether the material is a toxic dangerous waste and requires the assignment of a toxic waste code; otherwise, do not assign a toxic waste code.

Persistent Waste – Determine whether the material is a persistent waste and requires the assignment of a persistent waste code; otherwise, do not assign a persistent waste code.

PCBs – Determine whether the material is a polychlorinated biphenyl (PCB) waste and requires it to be regulated as such; otherwise, do not regulate as a PCB waste.

Asbestos – Determine whether the material is an asbestos waste and requires it to be regulated as such; otherwise, do not regulate as an asbestos waste.

Figure 4. Potential Waste Disposal Options for Well Decommissioning Waste.



Land Disposal Restricted – Determine whether the material is land disposal restricted and requires it to be regulated as such; otherwise, do not regulate as a land disposal restricted waste.

MTCA Waste – Determine whether the material exceeds established limits (*Model Toxics Control Act* [MTCA] or DOE-RL 2000, Table 2-7); otherwise, do not regulate as a MTCA waste.

1.5.2 Required Inputs for Decision Making

For each well to be decommissioned, the following section identifies if additional sampling and analysis (or surveying) is required to provide the data needed to properly disposition individual waste streams. If no sampling and analysis (or surveying) is identified as being required, the source of the data to be used for disposition has been provided. Note that no sampling is being performed for PCBs or asbestos because process knowledge suggests that these were not disposed anywhere near the wells to be decommissioned, and the only potential source of PCBs is the motors of a limited number of submersible pumps found on the Hanford Site. One of these pumps was removed from well 699-67-98, and the capacitor potentially containing PCBs was an intact sealed unit. No other wells scheduled for decommissioning have pumps in place.

The vadose zone soil will not be sampled and will be released back to the ground, unless the routine daily field surveys conducted by the radiological control technicians, detect the presence of radiological contamination. The wells are located well away from any known or potentially contaminated areas. The wells are located in areas that are considered to represent natural background levels that occur at the Hanford Site.

1.5.2.1 Wells 699-65-95 and 699-67-98. The two wells are in Area 1A and both are managed under WMI-WELL001 Rev. 4 (Stocker 2000). Potential waste is composed of inert and geologic materials, some of which have contacted groundwater, that are generated from well decommissioning activities. Decontamination fluids from decontamination of drilling tools and equipment may also be generated. Evaluating both wells against the decision statements in Section 1.5.1 yields the following information.

Ignitability – Adequate Information Exists. Inert, geologic material and decontamination fluids do not meet any of the criteria for ignitability. There are no analytical data or process knowledge identified in any of the documents reviewed and referenced within this document that indicate sufficient organic contamination in the groundwater or soil to status the waste as potentially ignitable.

Corrosivity – Adequate Information Exists. The groundwater contacting the waste is not corrosive pursuant to BHI (2000b). Hanford Site natural geologic materials that are not associated with unplanned releases or waste sites have not historically been designated as corrosive.

Reactivity – Adequate Information Exists. Soil, groundwater, and inert materials are considered to be normally stable materials that do not react or undergo spontaneous changes.

Pursuant to DOE-RL (2001) and BHI (2000b), neither the soils nor the groundwater contains cyanides or sulfides at levels that would regulate the associated waste as reactive.

Toxicity – Adequate Information Exists. Pursuant to DOE-RL (2000) and BHI (2000b), this the geologic material and groundwater associated with the waste is not a toxic hazardous waste.

Toxic Dangerous Waste – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), constituent levels in the geologic material and groundwater are insufficient to regulate the associated waste as a toxic dangerous waste.

Persistent Dangerous Waste – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), constituent levels in the geologic material are insufficient to regulate the associated waste as a persistent dangerous waste.

Listed Waste – Adequate Information Exists. Pursuant to WHC (1996) and BHI (2000a, 2000b), there are no listed waste codes associated with the groundwater of geologic material for these wells.

PCBs – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), PCB levels in the geologic material and groundwater are insufficient to regulate the associated waste for PCBs. The capacitor potentially containing PCBs found in well 699-76-98 was determined to be intact.

Radiological – Adequate Information Exists. Pursuant to DOE-RL (1996) and Hanford Environmental Information System groundwater data, the Hanford Site geologic materials and groundwater associated with these wells do not exceed levels for regulation as radioactive waste.

1.5.2.2 Area 1B Wells Not Contacting Groundwater. Wells B2870, B2884, B2876, B2877B2887, C3182, C3184, C3185, C3320, C3321, C3322, C3323, C3345, C3346, C3347, C3349, C3361, C3362, C3363, C3365, C3378, C3379 C3351, C3352, C3353, C3345, 699-1-1, 699-2-1, 699-4-1, 699-4-5, 699-5-2, 699-5-3, 699-5-4, 699-5-E6, 699-6-1, 699-6-2B, 699-6-2C, 699-6-E6, 699-7-3, 699-7-E1B, 699-7-E6, 699-8-E2A, 699-8-E2B, , 699-8-E3C, 699-10-6, 699-11-5, 699-11-6, 699-12-4B, 699-13-5, 699-14-5, 699-36-1, 699-38-3, 699-39-1A, 699-40-6, and 699-40-12G are not drilled to groundwater. Potential waste is composed of inert and geologic materials, none of which have contacted groundwater, that are generated from well decommissioning activities. Decontamination fluids from cleaning of drilling tools and equipment may also be generated. Evaluating these wells against the decision statements in Section 1.5.1 yields the following results.

Ignitability – Adequate Information Exists. Inert, geologic material and decontamination fluids do not meet any of the criteria for ignitability. There are no analytical data or process knowledge identified in any of the documents reviewed and referenced within this document that indicate sufficient organic contamination in the soil to status the waste as potentially ignitable.

Corrosivity –**Adequate Information Exists.** Hanford Site natural geologic materials that are not associated with unplanned releases or waste sites have not historically been designated as corrosive.

Reactivity – **Adequate Information Exists.** Soil and inert materials are considered to be normally stable materials that do not react or undergo spontaneous changes. Pursuant to DOE-RL (2001), the soils do not contain cyanides or sulfides at levels that would regulate the associated waste as reactive.

Toxicity –**Adequate Information Exists.** Pursuant to DOE-RL (2001), the geologic material associated with the waste is not a toxic hazardous waste.

Toxic Dangerous Waste – Adequate Information Exists. Pursuant to DOE-RL (2001), constituent levels in the geologic material are insufficient to regulate the associated waste as a toxic dangerous waste.

Persistent Dangerous Waste –Adequate Information Exists. Pursuant to DOE-RL (2001), constituent levels in the geologic material are insufficient to regulate the associated waste as a persistent dangerous waste.

Listed Waste – Adequate Information Exists. Pursuant to WHC (1996) and BHI (2000a, 2000b), there are no listed waste codes associated with the geologic material and associated wastes from these wells.

PCBs – Adequate Information Exists. Pursuant to DOE-RL (2001), PCB levels in the geologic material are insufficient to regulate the associated waste for PCBs.

Radiological – Adequate Information Exists. Pursuant to DOE-RL (1996), Hanford Site geologic materials (and thus secondary wastes) associated with these wells do not exceed the release criteria for nonradioactive waste detailed in BHI-EE-10, Part II, Procedure 8.0. In addition, none of these wells are adjacent to known radioactive waste sites.

1.5.2.3 Wells Contacting Groundwater. Wells 699-7-E1A, 699-7-E2, 699-11-E8A, 699-15-3, 699-15-4, 699-46-3, 699-41-5, 699-37-4, 699-33-6, 699-38-E0, 699-38-3, 699-42-10, 699-39-1A, 699-16-E4A, and 699-14-3 were drilled or potentially drilled to groundwater (and managed under WMI-WELLDECOM001 [BHI 2001b]). Waste from these wells has or potentially has contacted groundwater. Decontamination (decon) fluids from cleaning of decommission tools and equipment may also be generated. Evaluating these wells against the decision statements in Section 1.5.1 yields the following results.

Ignitability – Adequate Information Exists. Inert, geologic material and decon fluids do not meet any of the criteria for ignitability. There are no analytical data or process knowledge identified in any of the documents reviewed and referenced within this document that indicate sufficient organic contamination in the groundwater or soil to status the waste as potentially ignitable.

Corrosivity – Adequate Information Exists. The groundwater contacting the waste is not corrosive pursuant to BHI (2000b). Hanford Site natural geologic materials that are not associated with unplanned releases or waste sites have not historically been designated as corrosive.

Reactivity – Adequate Information Exists. Soil, groundwater, and inert materials are considered to be normally stable materials that do not react or undergo spontaneous changes. Pursuant to DOE-RL (2001) and BHI (2000b), neither the soils nor the groundwater contains cyanides or sulfides at levels that would regulate the associated waste as reactive.

Toxicity – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), the geologic material and groundwater associated with the waste is not a toxic hazardous waste.

Toxic Dangerous Waste – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), constituent levels in the geologic material and groundwater are insufficient to regulate the associated waste as a toxic dangerous waste.

Persistent Dangerous Waste – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), constituent levels in the geologic material are insufficient to regulate the associated waste as a persistent dangerous waste.

Listed Waste – Adequate Information Exists. Pursuant to WHC (1996) and BHI (2000a, 2000b), there are no listed waste codes associated with the groundwater of geologic material for these wells.

PCBs – Adequate Information Exists. Pursuant to DOE-RL (2001) and BHI (2000b), PCB levels in the geologic material and groundwater are insufficient to regulate the associated waste for PCBs.

Radiological – Inadequate Information. Pursuant to DOE-RL (1996), Hanford Site geologic materials associated with these wells do not exceed levels for regulation as radioactive waste. However, pursuant to BHI-01505 (BHI 2001a) and calendar year 2000 plume maps of Columbia River Corridors 1A and 1B (PNNL 2001), the groundwater associated with these wells may contain tritium at levels significantly above the release criteria as nonradioactive waste detailed in BHI-EE-10, Part II, Procedure 8.0. Therefore, field screening, sampling, and laboratory analysis of materials (i.e., well casing) that have intimately contacted the groundwater will be conducted to disposition these wastes.

2.0 PROJECT MANAGEMENT

The following section identifies the individuals or organizations participating in the project and discusses specific roles and responsibilities of the individuals/organizations. This section also discusses the quality objectives for measurement data, and discusses the special training requirements for the staff performing the work.

2.1 PROJECT/TASK ORGANIZATION

The following organizations will provide support for well decommissioning and waste sampling and surveying activities:

- The Groundwater/Vadose Zone Integration Project will provide project management, task leadership, and engineering support for the planning and implementation of well decommissioning activities.

- The CHI Geosciences/Modeling Organization will provide geotechnical support for well decommissioning activities.

- The CHI Analytical Field Services and Sample Management Organization will provide personnel to support sample collection, packaging and shipping activities.

- The Waste Management/Transportation Organization will provide waste management support including waste designation, preparation of waste profiles, arrangements for waste transportation services, and coordination of waste disposal.

- The Radiological Control Organization will provide radiological control technicians and instrumentation necessary to perform radiological surveys.

- The Compliance and Quality Control Organization is responsible for performing independent quality assurance activities, as appropriate.

- The Project Safety Organization is responsible for project and worker safety.

2.2 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

The required detection limits and precision and accuracy requirements for each of the laboratory and field analyses to be performed are summarized in Table 3. Table 4 summarizes the release limits from DOE Order 5400.5, Table IV-1, as amended and amplified by the Pelletier memorandum (DOE 1995) for surface contamination. The use of surface contamination limits for the release of materials such as well casing is considered sufficient due to the generally nonporous nature of the casing and the survey techniques that will be employed. In addition, the

results of survey and smear samples will be evaluated against release criteria defined in BHI-EE-10, Part II, Procedure 8.0.

Table 3. Analytical Performance Requirements for Radionuclides.

Method	Radionuclide	Action Level	Detection Limit	Precision	Accuracy
Field Radiological Surveys (fixed and removable contamination)					
E-600/SHP-380AB	Alpha	See Table 4	100 dpm/100cm^2	70-130%	±30%
	Beta-gamma	See Table 4	5,000 dpm/100cm^2	70-130%	±30%
Radiological Technical Smears (removable contamination)					
Tennelecs	Gamma energy analysis	See Table 4	20-80 dpm depending on activity, volume, and count time	70-130%	±30%
Ludlum 2929	Alpha	See Table 4	20 dpm	70-130%	±30%
	Beta-gamma	See Table 4	1,000 dpm	70-130%	±30%
Liquid scintillation	Tritium (low energy beta emitters)	See Table 4	To be determined	70-130%	±20%

Table 4. Surface Contamination Release Limits.

Radionuclides[a]	Average[b, c] dpm/100cm^2	Maximum[d, e] dpm/100cm^2	Removable[f] dpm/100cm^2
Group 1 Transuranics, ^{125}I, ^{129}I, ^{226}Ra, ^{228} Ra, 228 Th, ^{230}Th, ^{231}Pa	100	300	20
Group 2 Th-natural, ^{90}Sr, ^{126}I, ^{131}I, ^{133}I, ^{223}Ra, ^{224}Ra, ^{232}U, ^{232}Th	1,000	3,000	200
Group 3 U-natural, ^{235}U, ^{238}U, and associated decay products, alpha emitters	5,000	15,000	1,000
Group 4 Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous[f] fission) except ^{90}Sr and others noted above.	5,000	15,000	1,000
Tritium (applicable to surface and subsurface)[g]	N/A	N/A	10,000

[a] Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[b] Measurements of average contamination should not be averaged over an area of more than 1m^2. For objects of smaller surface area, the average should be derived for each such object.

[c] The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

[f] This category of radionuclides includes mixed fission products, including the Sr-90, which is present in them. It does not apply to Sr-90, which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

[g] Property recently exposed or decontaminated, should have measurements (smears) at regular time intervals to ensure that there is not a build-up of contamination over time. Because tritium typically penetrates material it contacts, the surface guidelines in Group 4 are not applicable to tritium. DOE has reviewed the analysis conducted by the DOE Tritium Surface Contamination Limits Committee ("Recommended Tritium Surface Contamination Release Guides," February 1991), and has assessed

Table 4. Surface Contamination Release Limits.

Radionuclides[a]	Average[b, c] dpm/100cm^2	Maximum[d, e] dpm/100cm^2	Removable[f] dpm/100cm^2

potential doses associated with the release of property containing residual tritium. DOE recommends the use of the stated guideline as an interim value for removable tritium. Measurements demonstrating compliance of the removable fraction of tritium on surfaces with this guideline are acceptable to ensure that nonremovable fractions and residual tritium in mass will not cause exposures that exceed DOE dose limits and constraints.

2.3 SPECIAL TRAINING REQUIREMENTS

Personnel training or certification requirements are described in BHI-HR-02, *ERC Training Procedures*, and BHI-QA-03, *ERC Quality Assurance Program Plans*, Plans 5.1, 5.2, and 5.3. Field personnel shall have completed the following mandatory training before starting work:

- Occupational Safety and Health Administration 40-Hour Hazardous Waste Worker Training
- Hanford General Employee Training.

3.0 MEASUREMENT/DATA ACQUISITION

The following section presents the sampling process design, along with the requirements for sampling methods, sample handling, custody, preservation, containers, and holding times. This section also addresses the requirements for field and laboratory quality control (QC), instrument calibration and maintenance, and field documentation.

3.1 SAMPLING PROCESS DESIGN

As discussed in Section 1.5.2, historical groundwater sampling data and site background data will be used extensively to disposition well decommissioning waste. The following subsections discuss the sampling design for the radiological survey design for evaluation of residual surface radiological activity in order to release nonporous materials such as well casing.

3.1.1 Radiological Survey Design

General requirements for survey and release of equipment such as well casing are provided in BHI-RC-04, *Radiological Control Work Instructions*, Procedure 4.4, "Material Release." Two Environmental Radiological Survey Task Instructions (ERSTIs) will be prepared to provide specific survey requirements, including coverage and number/location of smears. A combination of static and scan measurements will be performed to evaluate total surface contamination. Technical smears and large area wipes will be collected to evaluate removable contamination. The results of the field surveys and technical smear samples will be used to evaluate the material

against the release criteria provided in Table 4, and the results of survey and smears samples will be evaluated against release criteria defined in BHI-EE-10, Part II, Procedure 8.0.

- Casing from all wells not reaching groundwater will be field surveyed to the analytical performance requirements in Table 3. If radiation is detected above background, a technical smear will be taken and analyzed for alpha, beta, and gamma energy analysis as defined in Table 3.

- Casing from wells reaching groundwater will be field surveyed to the analytical performance requirements in Table 3 and a technical smear taken for tritium analysis. If radiation is detected above background during the field survey, the technical smear will also be analyzed for alpha, beta, and gamma energy analysis as defined in Table 3.

Area 1B wells contacting groundwater include 699-7-E1A, 699-7-E2, 699-11-E8A, 699-15-3, 699-15-4, 699-46-3, 699-40-6, 699-41-5, 699-37-4, 699-33-6, 699-38-E0, 699-42-10, 699-39-1A, 699-16-E4A, and 699-14-3.

3.2 SAMPLING METHODS REQUIREMENTS

3.2.1 Radiological Survey Methods

The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination. The Environmental Restoration Contractor does not have the capability to analyze for tritium, so samples will be sent to an offsite laboratory for liquid scintillation analysis.

3.3 SAMPLE HANDLING, SHIPPING, AND CUSTODY REQUIREMENTS

All sample handling, shipping, and custody shall be performed in a accordance with BHI-EE-01, *Environmental Investigations Procedures,* Procedure 3.1, "Sample Packaging and Shipping," Procedure 3.0, "Chain of Custody," and Procedure 4.2, "Sample Storage and Shipping Facility."

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLDING TIMES

Sample preservation, containers, and holding times will be specified on the Sample Authorization Form.

3.5 QUALITY CONTROL REQUIREMENTS

QC requirements for sample collection are specified in BHI-QA-03, Plan 5.1, "Field Sampling Quality Assurance Program Plan." No field QC samples are required for this sampling activity. QC requirements for radiological surveys are specified in BHI-EE-05, *Field Screening Procedures*, Procedure 2.11, "Portable Environmental Survey Instrument Operation," and BHI-RC-05, Instruction 2.8, "Bench Top Scalers." QC requirements for laboratory analytical methods will be performed in accordance with the laboratory statement of work.

3.6 INSTRUMENT CALIBRATION AND MAINTENANCE

All radiological instruments used will be calibrated within the frequency specified in the instrument operating procedures. Instrument source checks for portable instruments will be performed in accordance with this release plan and BHI-EE-05, Procedure 2.11, "Portable Environmental Survey Instrument Operation." Stationary counting devices (e.g., Ludlum 2929 with 44-10-l detector) used to count technical smears will be operated in accordance with BHI-RC-05, Instruction 2.8, "Bench Top Scaler Operation."

The count times for all static measurements will be determined by using the instrument background, counting efficiency, and the required detection limit.

In addition, instruments used for radiological surveys will be calibrated in accordance with the requirements specified in DOE Order 5400.5, American National Standards Institute Standard N323A (ANSI 1997), and the manufacturer's instructions.

3.7 FIELD DOCUMENTATION

Field documentation shall be kept in accordance with applicable BHI-EE-05, BHI-RC-05, and BHI-EE-01 procedures, including the following:

- Procedure 1.5, "Field Logbooks"
- Procedure 3.0, "Chain of Custody."

4.0 ASSESSMENTS AND RESPONSE ACTIONS

The Compliance and Quality Programs group may conduct random surveillance and assessments in accordance with BHI-MA-02, *ERC Project Procedures*, Procedure 2.14, "ERC Assessment Program," to verify compliance with the requirements outlined in this sampling and analysis instruction, project work packages, the Bechtel Hanford, Inc. (BHI) quality management plan, and BHI procedures and regulatory requirements.

Deficiencies identified by these assessments shall be reported in accordance with BHI-MA-02, Procedure 2.14. When appropriate, corrective actions will be taken by the project engineer in accordance with BHI-MA-02, Procedure 2.1, "Corrective Action Request."

5.0 DATA VERIFICATION AND VALIDATION REQUIREMENTS

Data validation and verification are not required by this project due to the limited use (waste designation purposes only) of this information.

6.0 WASTE MANAGEMENT

Waste from the two Area 1A wells (699-65-95 and 699-67-98) will be managed as *Resource Conservation and Recovery Act of 1976* (RCRA)-derived waste according to the *Site Specific Waste Management Instruction for Well Decommissioning, Maintenance and Sampling*, WMI-WELL001, Rev. 4 (Stocker 2000). Prior to final disposition, all waste will be stored on the RCRA 90-day pad at the 100-N Area.

Waste from all Area 1B wells will be managed in accordance with *Site Specific Waste Management Instruction for Columbia River Corridor Phase 1B Well Decommissioning*, WMI-WELLDECOM001, Rev. 0 (BHI 2001b). Prior to final disposition, waste will be transferred to the waste storage location at Pit 12, or the 100-N Area 90-day pad as directed by BHI waste transportation specialists.

7.0 HEALTH AND SAFETY

All field operations will be performed in accordance with BHI health and safety requirements, which are outlined in BHI-RC-01, *Radiation Protection Program Manual*.". The sampling procedures and associated activities will consider exposure reduction and contamination control techniques that will minimize the radiation exposure to the sampling team as required by BHI-QA-01, *ERC Quality Program,* and BHI-SH-01, *Hanford ERC Safety and Health Program*.

8.0 REFERENCES

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BHI, 2001a, *Description of Work for FY 2001 Well Decommissioning Release 3*, BHI-01505, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

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BHI-EE-01, *Environmental Investigations Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-EE-05, *Field Screening Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-EE-10, *Waste Management Plan*, Bechtel Hanford, Inc., Richland, Washington.

BHI-HR-02, *ERC Training* Procedures, Bechtel Hanford, Inc., Richland, Washington.

BHI-MA-02, *ERC Project Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-QA-01, *ERC Quality Program*, Bechtel Hanford, Inc., Richland, Washington.

BHI-QA-03, *ERC Quality Assurance Program Plans*, Bechtel Hanford, Inc., Richland, Washington.

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BHI-RC-04, *Radiological Control Work Instructions*, Bechtel Hanford, Inc., Richland, Washington.

BHI-RC-05, *Radiological Instrumentation Instructions*, Bechtel Hanford, Inc., Richland, Washington.

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