5.0 Well Installation, Maintenance, and Decommissioning

B. A. Williams and G. G. Kelty

This section describes new well installation activities conducted on the Hanford Site during calendar year 2004. Well maintenance and decommissioning activities are summarized for fiscal year (FY) 2004. In addition, FY 2004 characterization boreholes and aquifer tube activities are provided.

5.1 Well Installation

The Groundwater Performance Assessment Project (groundwater project) along with the Groundwater Remediation Project define the need for new wells at Hanford. Each year, the groundwater project identifies new wells to meet the requirements of the *Resource Conservation and Recovery Act* (RCRA) detection and assessment groundwater monitoring requirements; characterization and monitoring for the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA); and long-term monitoring of regional groundwater plumes under U.S. Department of Energy (DOE) Orders based on the *Atomic Energy Act of 1954* (AEA). These efforts include ongoing RCRA assessment of groundwater contamination, replacement of monitoring wells that go dry because of the declining water table, replacement of wells that pose contamination risks to the environment, improvement of spatial coverage of the monitoring networks or for plume monitoring, and vertical characterization of groundwater contamination.

Each year the Groundwater Remediation Project reviews the need for new monitoring wells. In FY 2004, 25 new wells were installed.

The Groundwater Remediation Project, managed by Fluor Hanford, Inc., determines the need for new remediation (i.e., pump-and-treat systems) and performance assessment monitoring wells annually to fulfill obligations of CERCLA. Other projects may also request new wells based on specific needs (i.e., vadose investigations, seismic investigations, and other research).

Well needs are integrated and documented via the data quality objectives process (e.g., CP-15329). This process integrates the borehole and well data needs of the various Hanford Site regulatory driven projects (i.e., CERCLA, RCRA, and AEA). Based on the data quality objectives documentation, the Washington State Department of Ecology (Ecology), U.S. Environmental Protection Agency (EPA), and DOE (the Tri-Parties) negotiated an integrated well drilling list that coordinates and prioritizes the requirements of RCRA,

Based on groundwater monitoring requirements, DOE, EPA, and Ecology agree on new wells needed and prioritize the requirements of RCRA, CERCLA, and AEA. During calendar year 2004, 25 new wells were installed on the Hanford Site:

- ***Six for RCRA monitoring.***
- ***Sixteen for CERCLA investigations or remediation.***
- ***Three for the 100-N barrier project.***

Also, there were 108 aquifer tubes installed during FY 2004 along the Columbia River shoreline.

Routine well maintenance is performed on a 5-year cycle to support groundwater sampling. Non-routine maintenance varies and depends on specific problems identified in the field. During FY 2004, 67 wells received routine maintenance and 278 wells received non-routine maintenance.

Wells are decommissioned when they are no longer used, they are in poor condition, or they pose an environmental, safety, or health hazard. During FY 2004, 98 wells were decommissioned.

CERCLA, and AEA. In 2004, as a result of this integration, the Tri-Parties approved Tri-Party Agreement (Ecology et al. 1989) Milestone M-24-57; the revised agreement now includes CERCLA (and AEA) wells along with RCRA. This agreement requires the installation of a minimum of 15 wells per year and includes a prioritized list and schedule for installation of 60 wells over 4 years during calendar years 2003 to 2006. New well proposals will continue to be reviewed and approved annually as defined under Tri-Party Agreement Milestone M-24-00. All new wells are constructed and decommissioned in accordance with the provisions of WAC 173-160.

During calendar year 2004, a total of 25 new wells were installed at the Hanford Site (Table 5.1-1), which are shown on Figure 5.1-1. Tri-Party Agreement Milestone M-24-57 approved the installation of 22 of these wells, which included 6 RCRA wells and 16 CERCLA wells. Three wells were also installed at 100-N Area to support monitoring at the 100-NR-2 (N Barrier).

A revised Tri-Party Agreement milestone includes a prioritized list and schedule for installation of 60 wells over 4 years.

Of the six RCRA wells, five were drilled in 200 East Area around Waste Management Area A-AX (2 wells) and B-BX-BY (3 wells) and the remaining well was drilled in 200 West Area at Waste Management Area U. The 16 CERCLA wells include 2 wells in the 100-K Area for chromium extraction and monitoring, 3 wells for the 100-HR-3 monitoring network at the 100-D Area, 4 wells for the 200-ZP-1 Operable Unit, and 7 wells for the 200-UP-1 Operable Unit in the 200 West Area.

Two temporary wells were constructed as seismic characterization wells to determine shear wave velocities in the Ringold Formation and Hanford formation to evaluate seismic hazards at the Waste Treatment Plant. The first well reached the top of basalt but had a cracked casing that could not be sealed. This limited its usefulness, so a second borehole was drilled to the top of the lower mud unit. This well was successful, and between the two boreholes a complete data set was obtained. Both seismic characterization wells will be decommissioned following data analysis and after it is determined that they will no longer be needed.

Data packages for new wells installed during calendar year 2004 will provide detailed information about the wells including the detailed geologic and geophysical descriptions and a complete set of sediment and groundwater sampling data results (e.g., PNNL-14320; CP-14265). Detailed drilling and construction records for the new wells are also electronically stored in the drilling contractor database.

During FY 2004, 108 aquifer tubes (Table 5.1-2) were installed along the Columbia River shoreline (Figure 5.1-1). Fifteen tubes were installed along the 100-BC-5 rivershore, 18 tubes along 100-KR-4 rivershore, 8 tubes along the 100-NR-2 rivershore, 14 tubes along the 100-HR-3-D rivershore, 8 tubes along the 100-HR-3-H rivershore, 12 tubes along the 100-FR-3 rivershore, and 33 tubes along the 300-FF-5 rivershore. The aquifer tubes were installed to fill in gaps in shoreline monitoring.

During FY 2004, 51 vadose characterization boreholes (i.e., cone penetrometers and direct push probes) were installed (Table 5.1-3). Of these, 39 direct push probes were installed at the U Plant Area (200 West Area) for geophysical logging in the vadose zone around various waste sources (i.e., cribs). Five cone penetrometers boreholes were installed for characterization around the A-8 crib located in the 200 East Area. Five cone penetrometers boreholes were also installed for BC Cribs plume characterization south of 200 East Area. Two characterization boreholes, one drilled by cable tool and one constructed by cone penetrometer were also installed in the single-shell tank farms. All vadose characterization boreholes will be decommissioned after data acquisition activities are completed. Chapter 3 provides more details about vadose characterization studies conducted during FY 2004.

5.2 Well Maintenance

Maintenance of groundwater wells is performed to meet regulatory requirements (e.g., Ecology 1994a, Condition II.F.2) as part of a scheduled preventive maintenance cycle (routine)

or in response to problems identified in the field (non-routine). During FY 2004, routine maintenance was performed at 67 wells and non-routine maintenance at 278 wells. A summary of maintenance activities by regulatory program is presented in Table 5.2-1.

Well maintenance activities include casing repairs, repairing and replacing sampling pumps, pump and equipment retrieval, and tubing replacement.

Routine maintenance is planned based on a 5-year cycle to support groundwater sampling and to minimize non-routine maintenance activities. At a minimum, routine maintenance includes the following tasks:

- Removing groundwater sampling pump systems or aquifer-testing equipment.
- Inspecting and repairing or replacing sampling pump systems or aquifer-testing equipment.
- Brushing or cleaning of well casing perforations or well screens.
- Removing debris and fill material.
- Developing the well.
- Performing borehole video camera survey.
- Re-installing sampling pumps and/or aquifer-testing instrumentation/equipment.
- Documenting well conditions and maintenance activities.

Non-routine maintenance tasks are varied and depend on the specific problem encountered at a well; these tasks include both surface and subsurface tasks. Surface tasks include conducting field inspections, well labeling, maintenance and replacement of locking well caps, casing repairs, diagnosis and repair of surface electrical, and pump-discharge fitting. Subsurface tasks include repairing and replacing sampling pumps, performing camera surveys, pump and equipment retrieval, and tubing replacement.

5.3 Well Decommissioning

A well becomes a candidate for decommissioning (1) if its use has been permanently discontinued (i.e., it has gone dry); (2) if its condition is so poor that its continued use is impractical; (3) if it is in the path of intended remediation/excavation/construction activities; or (4) it poses an environmental, safety, or public health hazard. At this time, decommissioning is generally driven by the long-range environmental restoration schedule (DOE/RL-96-105), available funding, and provisions of WAC 173-160.

Wells are filled with grout if they are in poor condition, interfere with surface construction activities, or are no longer used.

Approximately 6,277 wells have been identified within the Hanford Site. To date, 1,379 of these wells have been decommissioned (~22% of the total wells). During FY 2004, 1,253 wells were in use and 98 wells were decommissioned (Table 5.3-1). The location of wells decommissioned is shown on Figure 5.3-1. In 2003, it was discovered that two relatively new RCRA monitoring wells (299-E24-19 and 299-E25-46) in the single-shell tanks Waste Management Area A-AX, failed due to rapid corrosion of the stainless steel casing at the same relative interval within each well. DOE funded an investigation to determine what causes the rapid corrosion (see Section 3.3.1). Prior to decommissioning these two wells, sidewall core samples of the corroded interval in each well were collected. In addition, archived, lithology/depth equivalent sediment samples from nearby wells were collected. These samples, along with a sample of bentonite well seal material and perched water, collected from a lithologically equivalent interval in a nearby well (299-E24-33), were analyzed and evaluated to determine the cause of this corrosion. Details about this casing corrosion investigation are provided in Section 3.3.1.

Decommissioning activities result in the permanent removal of a well, borehole, or piezometer from service and from the Hanford Site active well inventory. Decommissioning is performed in accordance with Ecology standards (WAC 173-160), applicable variances, and conditions defined in the Hanford Facility RCRA Permit (Ecology 1994a, Condition II.F.2). Decommissioning involves backfilling a well with impermeable material

to prevent vertical movement of water and/or contaminants. For resource protection wells, decommissioning typically is performed by placing sand across the screen interval and filling the casing with an impermeable material (e.g., bentonite or cement grout). For older, non-compliant wells, the casing(s) is perforated and pressure grouted. The sealing of the annular space between the casing(s) and formation is intended to minimize the creation of preferential pathways. Where possible, the casing is removed and a brass survey marker identifying the well is set in grout at the surface and over the well location. If the casing cannot be removed, the casing is generally cut ~1 meter below ground surface and the identifying brass survey marker is set in the grout below land surface; the hole is then backfilled to grade.

Table 5.1-1. Well Installations for Calendar Year 2004

Well Name	Well ID	Program	Facility
199-D5-92	C4583	CERCLA	100-HR-3 OU/River
199-D8-73	C4474	CERCLA	100-HR-3 OU/River
199-D8-88	C4536	CERCLA	100-HR-3 OU/River
199-K-131	C4561	CERCLA	100-KR-4 OU/River
199-K-132	C4670	CERCLA	100-KR-4 OU/River
199-N-119	C4471	N-Barrier	100-NR-2 OU
199-N-120	C4472	N-Barrier	100-NR-2 OU
199-N-121	C4473	N-Barrier	100-NR-2 OU
299-E24-33	C4257	RCRA ORP	SST WMA A-AX
299-E25-94	C4665	RCRA RL	SST WMA A-AX
299-E33-47	C4259	RCRA ORP	SST WMA B-BX-BY
299-E33-48	C4260	RCRA ORP	SST WMA B-BX-BY
299-E33-49	C4261	RCRA ORP	SST WMA B-BX-BY
299-W13-1	C4238	CERCLA	200-ZP-1 OU
299-W15-47	C4184	CERCLA	200-ZP-1 OU
299-W15-49	C4301	CERCLA	200-ZP-1 OU
299-W18-16	C4303	CERCLA	200-ZP-1 OU
299-W19-47	C4258	RCRA ORP	SST WMA U
299-W19-48	C4300	CERCLA	200-UP-1 OU
299-W21-2	C4639	CERCLA	200-UP-1 OU
699-30-66	C4298	CERCLA	200-UP-1 OU
699-36-70B	C4299	CERCLA	200-UP-1 OU
699-38-70B	C4236	CERCLA	200-UP-1 OU
699-38-70C	C4256	CERCLA	200-UP-1 OU
699-40-65	C4235	CERCLA	200-UP-1 OU

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act*.
ORP = Office of River Protection.
OU = Operable Unit.
RCRA = *Resource Conservation and Recovery Act*.
RL = Richland Operations Office.
SST = Single-shell tank.
WMA = Waste management area.

Table 5.1-2. Aquifer Tubes Installed during FY 2004

Well ID (HEIS)	Tube Name (HEIS)	Shore Segment	Well ID (HEIS)	Tube Name (HEIS)	Shore Segment
C4376	AT-B-1-S	BC5	C4325	AT-H-3-D	HR3H
C4375	AT-B-1-M	BC5	C4391	AT-F-1-S	FR3
C4378	AT-B-2-S	BC5	C4390	AT-F-1-M	FR3
C4379	AT-B-2-M	BC5	C4389	AT-F-1-D	FR3
C4377	AT-B-2-D	BC5	C4394	AT-F-2-S	FR3
C4382	AT-B-3-S	BC5	C4393	AT-F-2-M	FR3
C4381	AT-B-3-M	BC5	C4392	AT-F-2-D	FR3
C4380	AT-B-3-D	BC5	C4385	AT-F-3-S	FR3
C4368	AT-B-4-S	BC5	C4384	AT-F-3-M	FR3
C4371	AT-B-7-S	BC5	C4383	AT-F-3-D	FR3
C4370	AT-B-7-M	BC5	C4388	AT-F-4-S	FR3
C4369	AT-B-7-D	BC5	C4387	AT-F-4-M	FR3
C4374	AT-B-5-S	BC5	C4386	AT-F-4-D	FR3
C4373	AT-B-5-M	BC5	C4347	AT-3-1-S	3FF5
C4372	AT-B-5-D	BC5	C4346	AT-3-1-M	3FF5
C4341	AT-K-1-S	KR4	C4345	AT-3-1-D(1)	3FF5
C4340	AT-K-1-M	KR4	C4348	AT-3-1-D(2)	3FF5
C4339	AT-K-1-D	KR4	C4350	AT-3-2-S	3FF5
C4329	AT-K-2-S	KR4	C4349	AT-3-2-M	3FF5
C4327	AT-K-2-M	KR4	C4353	AT-3-3-S	3FF5
C4328	AT-K-2-D	KR4	C4352	AT-3-3-M	3FF5
C4344	AT-K-3-S	KR4	C4351	AT-3-3-D	3FF5
C4343	AT-K-3-M	KR4	C4356	AT-3-4-S	3FF5
C4342	AT-K-3-D	KR4	C4355	AT-3-4-M	3FF5
C4338	AT-K-4-S	KR4	C4354	AT-3-4-D	3FF5
C4337	AT-K-4-M	KR4	C4358	AT-3-5-S	3FF5
C4336	AT-K-4-D	KR4	C4357	AT-3-5-M	3FF5
C4335	AT-K-5-S	KR4	C4361	AT-3-6-S	3FF5
C4331	AT-K-5-M	KR4	C4360	AT-3-6-M	3FF5
C4330	AT-K-5-D	KR4	C4359	AT-3-6-D	3FF5
C4333	AT-K-6-S	KR4	C4364	AT-3-7-S	3FF5
C4334	AT-K-6-M	KR4	C4363	AT-3-7-M	3FF5
C4332	AT-K-6-D	KR4	C4362	AT-3-7-D	3FF5
C4307	AT-D-1-S	HR3D	C4367	AT-3-8-S	3FF5
C4305	AT-D-1-D	HR3D	C4366	AT-3-8-M	3FF5
C4306	AT-D-1-M	HR3D	C4365	AT-3-8-D	3FF5
C4314	AT-D-4-S	HR3D	C4585	NS-2A-23cm	NR2
C4315	AT-D-4-M	HR3D	C4586	NS-2A-87cm	NR2
C4316	AT-D-4-D	HR3D	C4587	NS-2A-168cm	NR2
C4310	AT-D-2-S	HR3D	C4588	NS-3A-10cm	NR2
C4309	AT-D-2-M	HR3D	C4589	NS-3A-176cm	NR2
C4308	AT-D-2-D	HR3D	C4590	NS-3A-87cm	NR2
C4313	AT-D-3-S	HR3D	C4640	NS-4A-17cm	NR2
C4312	AT-D-3-M	HR3D	C4641	NS-4A-138cm	NR2
C4311	AT-D-3-D	HR3D	C4642	300SPR9A-19cm	3FF5
C4318	AT-D-5-M	HR3D	C4643	300SPR9A-86cm	3FF5
C4317	AT-D-5-D	HR3D	C4644	300SPR9A-142cm	3FF5
C4321	AT-H-1-S	HR3H	C4741	300-3-3C-409cm	3FF5
C4320	AT-H-1-M	HR3H	C4742	300-3-3C-589cm	3FF5
C4319	AT-H-1-D	HR3H	C4646	300-3-3B-376cm	3FF5
C4324	AT-H-2-S	HR3H	C4740	300-3-3B-518cm	3FF5
C4323	AT-H-2-M	HR3H	C4690	300-3-3A-124cm	3FF5
C4322	AT-H-2-D	HR3H	C4645	300-3-3A-410cm	3FF5
C4326	AT-H-3-S	HR3H	C4739	300-3-3A-579cm	3FF5

HEIS = Hanford Environmental Information System (database).
ID = Identification number.

Table 5.1-3. Characterization Boreholes, Soil-Gas Probes, and GeoProbe/Push Installations for FY 2004

ID	Program	Facility	Location
C4540	CERCLA/A-8 Crib	200-PO-1 OU	200 East Area
C4541	CERCLA/A-8 Crib	200-PO-1 OU	200 East Area
C4542	CERCLA/A-8 Crib	200-PO-1 OU	200 East Area
C4543	CERCLA/A-8 Crib	200-PO-1 OU	200 East Area
C4544	CERCLA/A-8 Crib	200-PO-1 OU	200 East Area
C4673	CERCLA/BC-Cribs	200-PO-1 OU	200 East Area
C4674	CERCLA/BC-Cribs	200-PO-1 OU	200 East Area
C4675	CERCLA/BC-Cribs	200-PO-1 OU	200 East Area
C4676	CERCLA/BC-Cribs	200-PO-1 OU	200 East Area
C4677	CERCLA/BC-Cribs	200-PO-1 OU	200 East Area
C4201	CERCLA	200-UP-1 OU	200 West Area
C4202	CERCLA	200-UP-1 OU	200 West Area
C4203	CERCLA	200-UP-1 OU	200 West Area
C4204	CERCLA	200-UP-1 OU	200 West Area
C4205	CERCLA	200-UP-1 OU	200 West Area
C4206	CERCLA	200-UP-1 OU	200 West Area
C4207	CERCLA	200-UP-1 OU	200 West Area
C4208	CERCLA	200-UP-1 OU	200 West Area
C4209	CERCLA	200-UP-1 OU	200 West Area
C4210	CERCLA	200-UP-1 OU	200 West Area
C4211	CERCLA	200-UP-1 OU	200 West Area
C4212	CERCLA	200-UP-1 OU	200 West Area
C4213	CERCLA	200-UP-1 OU	200 West Area
C4215	CERCLA	200-UP-1 OU	200 West Area
C4217	CERCLA	200-UP-1 OU	200 West Area
C4218	CERCLA	200-UP-1 OU	200 West Area
C4219	CERCLA	200-UP-1 OU	200 West Area
C4220	CERCLA	200-UP-1 OU	200 West Area
C4221	CERCLA	200-UP-1 OU	200 West Area
C4222	CERCLA	200-UP-1 OU	200 West Area
C4223	CERCLA	200-UP-1 OU	200 West Area
C4224	CERCLA	200-UP-1 OU	200 West Area
C4225	CERCLA	200-UP-1 OU	200 West Area
C4226	CERCLA	200-UP-1 OU	200 West Area
C4227	CERCLA	200-UP-1 OU	200 West Area
C4228	CERCLA	200-UP-1 OU	200 West Area
C4229	CERCLA	200-UP-1 OU	200 West Area
C4231	CERCLA	200-UP-1 OU	200 West Area
C4232	CERCLA	200-UP-1 OU	200 West Area
C4547	CERCLA	200-UP-1 OU	200 West Area
C4548	CERCLA	200-UP-1 OU	200 West Area
C4549	CERCLA	200-UP-1 OU	200 West Area
C4550	CERCLA	200-UP-1 OU	200 West Area

Table 5.1-3. (contd)

ID	Program	Facility	Location
C4551	CERCLA	200-UP-1 OU	200 West Area
C4552	CERCLA	200-UP-1 OU	200 West Area
C4553	CERCLA	200-UP-1 OU	200 West Area
C4554	CERCLA	200-UP-1 OU	200 West Area
C4555	CERCLA	200-UP-1 OU	200 West Area
C4556	CERCLA	200-UP-1 OU	200 West Area
C4292	RCRA-ORP	SST WMA C	200 East Area
C4409	RCRA-ORP	SST WMA C	200 East Area
C4562[a]	RCRA-IDF	IDF	200 East Area
C4666[a]	RCRA-IDF	IDF	200 East Area

(a) Temporary wells.
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act.*
IDF = Integrated Disposal Facility.
ORP = Office of River Protection.
OU = Operable unit.
RCRA = *Resource Conservation and Recovery Act.*
SST = Single-shell tank.
WMA = Waste management area.

Table 5.2-1. Well Maintenance Summary for FY 2004

Program	Routine	Non-Routine
CERCLA	41	109
RCRA	26	169
Total	**67**	**278**

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act.*
RCRA = *Resource Conservation and Recovery Act.*

Table 5.3-1. Wells Decommissioned during FY 2004

Well Name	HEIS Well ID	Well Name	HEIS Well ID
299-E24-19	A4754	299-W26-9	A4995
299-E25-30[(a)]	A6035	299-W6-5	A5000
299-E25-30P[(a)]	A4776	299-W6-8	A5003
299-E25-30Q[(a)]	A4777	699-10-30A	A8179
299-E25-46	A4793	699-11-29	A8215
299-E26-1	A4798	699-16-23	A8341
299-E33-11	A6854	699-16-30A	A8342
299-E34-11	A4876	699-17-26A	A8361
299-E34-3	A4878	699-17-26B[(a)]	A8362
299-E34-4	A4879	699-17-26BP[(a)]	A9592
299-E34-6	A4881	699-17-26BQ[(a)]	A9593
299-E35-1	A4885	699-17-26BR[(a)]	A9594
299-W10-18	A4895	699-18-27D	A8386
299-W10-9	A4900	699-18-28	A8396
299-W11-1	A7275	699-19-26A	A8407
299-W11-15	A7281	699-19-26B[(a)]	A8408
299-W11-16	A7282	699-19-26BP[(a)]	A9601
299-W11-17	A7283	699-19-26BQ[(a)]	A9602
299-W11-19	A4904	699-21-30B	A8440
299-W11-2	A7276	699-25-31	A8461
299-W11-21	A7286	699-25-33B[(a)]	A8462
299-W11-23	A4905	699-25-33BP[(a)]	A8463
299-W11-24	A4906	699-25-33BQ[(a)]	A9619
299-W11-27	A4907	699-26-35D[(a)]	A8472
299-W11-2P[(a)]	A9463	699-26-35DP[(a)]	A9625
299-W11-2Q[(a)]	A9464	699-26-35DQ[(a)]	A9626
299-W11-2R[(a)]	A9465	699-35-28	A8555
299-W11-2S[(a)]	A9466	699-37-82B[(a)]	A8580
299-W11-2T[(a)]	A9467	699-37-82BP[(a)]	A9680
299-W11-35[(a)]	A9924	699-37-82BQ[(a)]	A9681
299-W11-35P[(a)]	B2406	699-37-82BR[(a)]	A9682
299-W11-35Q[(a)]	B2405	699-37-82BS[(a)]	A9683
299-W11-4	A7277	699-42-41	A5170
299-W11-5	A7278	699-43-43	A5179
299-W11-8	A7279	699-47-46A	A5200
299-W11-9	A4911	699-52-46B	A8841
299-W14-12	A4914	699-52-54	A5236
299-W15-12	A4917	699-53-48B	A5242
299-W15-18	A4922	699-55-50A[(a)]	A8865
299-W15-22	A4925	699-55-50AP[(a)]	A9738
299-W18-25	A4937	699-55-50AQ[(a)]	A9739
299-W18-251	A7731	699-55-50D	A8867
299-W18-4	A7522	699-56-51	A8891
299-W22-39	A4970	199-N-25	A4674
299-W22-41	A4972	199-N-12	A5824
299-W22-42	A4973	199-N-13	A5825
299-W23-13	A4982	199-N-22	A5827
299-W26-10	A4992	C3658	C3658
299-W26-3	A5444	C4584	C4584

(a) Piezometer wells with same well name but with suffix of one or more letters are all within a single large diameter casing.
HEIS = Hanford Environmental Information System.
ID = Identification.

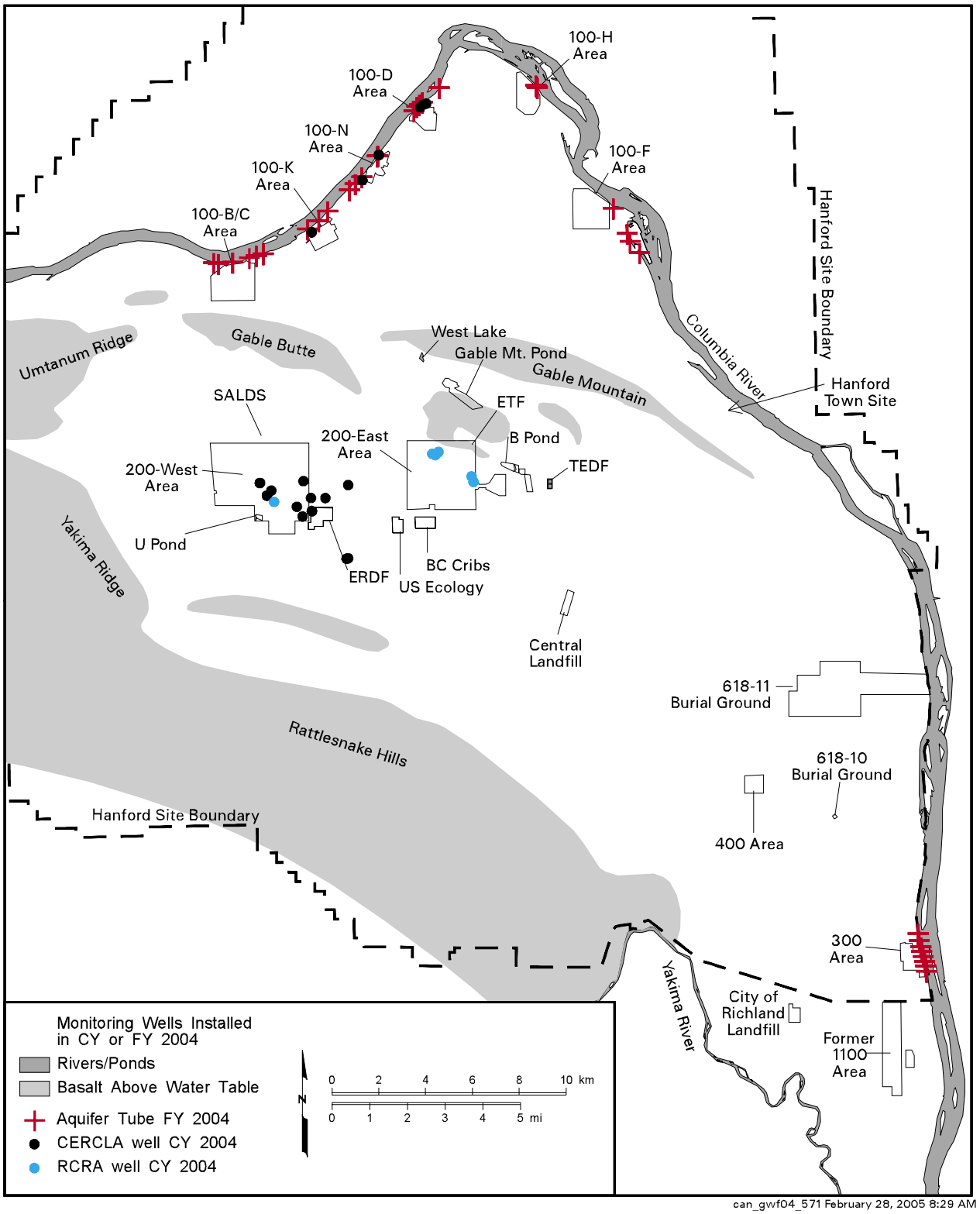

Figure 5.1-1. Groundwater Monitoring Wells and Aquifer Tubes Installed in Calendar Year 2004

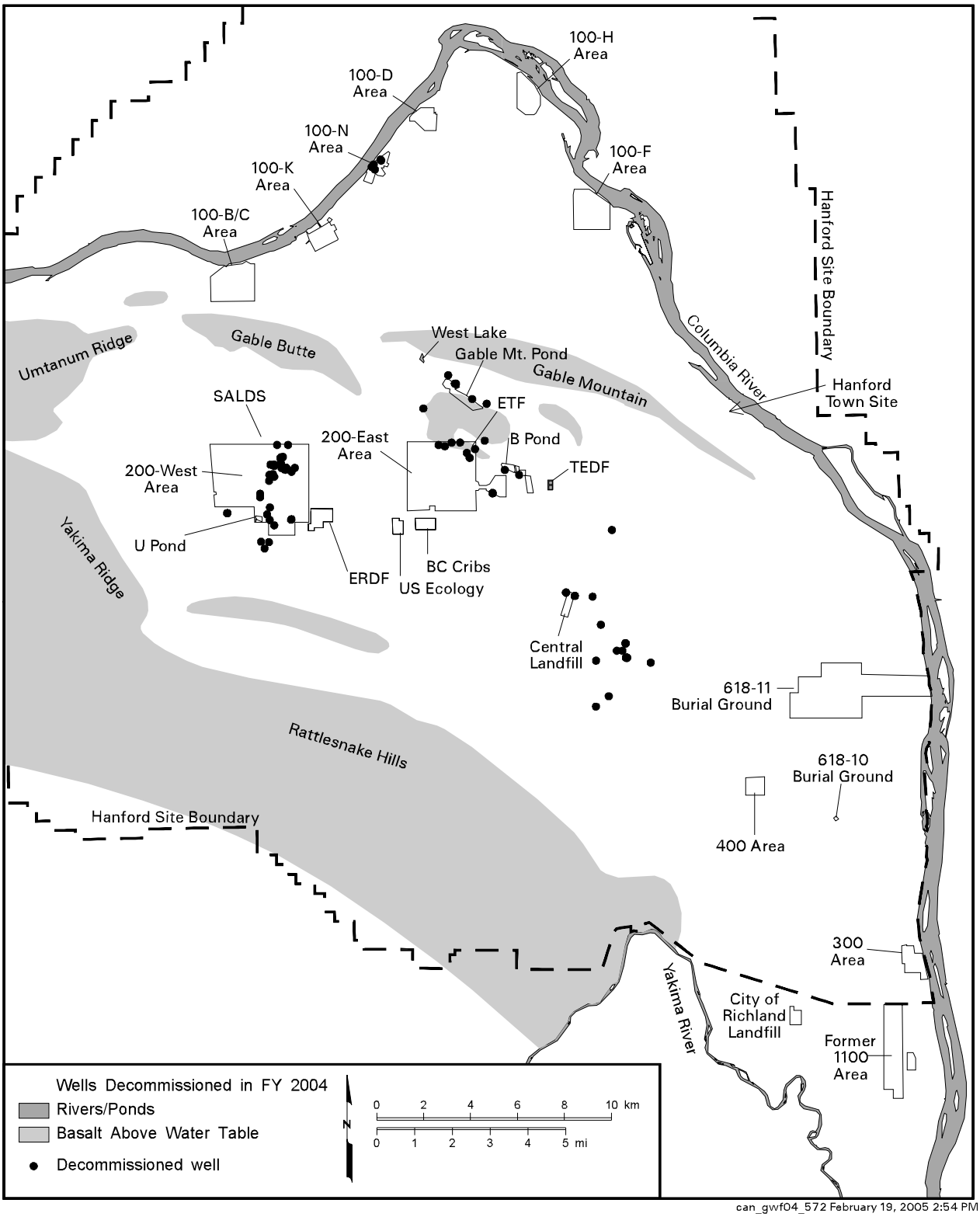

Figure 5.3-1. Location of Wells Decommissioned during FY 2004