
5.0 Well Installation, Maintenance, and Decommissioning

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This section describes new well installation activities conducted on the Hanford Site during calendar year 2003 and well maintenance and decommissioning activities during fiscal year 2003.

5.1 Well Installation

The Groundwater Performance Assessment Project (groundwater project) along with the Groundwater Remediation Project define needs for new wells at Hanford. Each year, the groundwater project identifies new wells to maintain compliance with the *Resource Conservation and Recovery Act* (RCRA) detection and assessment groundwater monitoring requirements and U.S. Department of Energy (DOE) orders, which includes long-term monitoring of regional groundwater plumes and monitoring for the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA). These compliance issues 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, compliance for corrective actions at the 116-H-6 evaporation basins and 300 Area process trenches, and vertical characterization of groundwater contamination. The Groundwater Remediation Project, operated 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.

Well needs are integrated via the data quality objectives process and documented (e.g., CP-15329). This process integrates the borehole and well data needs of the various Hanford Site projects (i.e., CERCLA, RCRA, and *Atomic Energy Act of 1954* [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, CERCLA, and the AEA. In 2003, the Tri-Parties agreed that the highest

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 2003, 18 new wells were installed on the Hanford Site:

- *Seven for RCRA monitoring.*
- *Nine for CERCLA investigations or remediation.*
- *Two for Natural Accelerated Bioremediation Investigation and Remediation.*

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 fiscal year 2003, 243 wells received non-routine maintenance for such things as casing repairs, well labeling, or replacing tubing.

Wells are decommissioned when they are no longer used, they are in poor condition, or they pose an environmental, safety, or health hazard. During fiscal year 2003, 63 wells were decommissioned.

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

priority for well installation is completion of the RCRA groundwater detection well networks at the single-shell tank waste management areas and wells needed to upgrade existing CERCLA pump-and-treat systems.

As a result of this integration, the Tri-Parties agreed to revise the existing *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement, Ecology et al. 1998), Tri-Party Agreement Milestone M-24-00 to allow prioritization of all groundwater well drilling activities at the Hanford Site – not just RCRA; the revised agreement now includes CERCLA and AEA wells along with RCRA. These negotiations have resulted in an approved tentative agreement to install a minimum of 15 wells per year to satisfy the proposed Tri-Party Agreement Milestone M-24-57. The revised milestone includes a prioritized list and schedule for installation of 60 wells over 4 years during calendar years 2003 to 2006. New wells to be installed will continue to be reviewed and approved annually via the Tri-Party Agreement Milestone M-24-00 (Ecology et al. 1998).

During calendar year 2003, a total of 18 new wells were installed at the Hanford Site. The Tri-Parties agreed to install 16 wells, which included 7 RCRA wells, and 9 CERCLA wells, as defined in Tri-Party Agreement Milestone M-24-57. Of the seven RCRA wells, one CERCLA investigation borehole was completed as a RCRA well for the 216-S-10 pond and ditch in the 200 West Area, five boreholes were drilled; ultimately, four wells were completed (C4126 was abandoned due to drilling problems) for Waste Management Area C, and two wells were completed at Waste Management Area A-AX in the 200 East Area. The nine CERCLA wells include two wells in the 100-K Area for chromium extraction and monitoring, three wells for the 100-HR-3 monitoring network at the 100-D Area, one well for the 200-ZP-1 and one well for the 200-UP-1 Operable Unit in the 200 West Area, and two wells to support the tritium investigation at the 618-10 burial ground.

In addition, two wells were installed for the chromate bio-reduction in situ research under the DOE Office of Science and Biological and Environmental Research (Natural Accelerated Bioremediation Investigation and Remediation). Table 5.1-1 lists all new wells completed in calendar year 2003 (Figure 5.1-1).

Data packages for new wells installed during calendar year 2003 will provide detailed information about the wells including the detailed geologic and geophysical descriptions and a complete set of soil and/or groundwater sampling data results (e.g., PNNL-14320 and CP-14265). Detailed drilling and construction records for the new wells can also be located electronically by well identification number at either the Records Management Information System or the Hanford Well Information System [<http://apweb02/cfroot/rapidweb/phmc/cp/hwisapp/>] managed for DOE by Fluor Hanford, Inc.

During 2003, 60 characterization boreholes (i.e., soil gas probes and GeoProbe/push probes) were installed (Table 5.1-2). Of these, 15 were installed at the 100-K burial ground as soil-gas probes for soil-gas sampling in the vadose zone to investigate tritium sources. The probes will be decommissioned as soon as the investigations are completed. Thirty-eight GeoProbe boreholes were installed for vadose characterization and carbon tetrachloride investigation at the 200-ZP-1 Operable Unit. The other nine boreholes were installed for characterization of various waste sites as listed in Table 5.1-2.

5.2 Well Maintenance

Maintenance of groundwater wells is performed to meet regulatory requirements (e.g., Ecology 1994, Condition II.F.2) as part of a scheduled preventive maintenance cycle (routine) or in response to problems identified in the field (non-routine). No routine well maintenance was performed during fiscal year 2003 due to funding constraints. Two hundred and forty-three wells received non-routine maintenance in fiscal year 2003. A summary of maintenance activities by regulatory program is presented in Table 5.2-1.

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; (2) if its condition is so poor that its continued use is impractical; or (3) 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) and available funding. Sixty-three wells were decommissioned during fiscal year 2003 (Table 5.3-1).

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 1994, Condition II.F.2). Decommissioning involves backfilling a well with impermeable material to prevent vertical movement of water and/or contaminants. Typically, well decommissioning is performed by placing sand across the screened interval, perforating the casing across any confining layers, and pressure grouting those intervals. 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.

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

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

Table 5.1-1. Well Installations for Calendar Year 2003

<u>Well ID</u>	<u>Well Number</u>	<u>Program</u>	<u>Facility</u>
B8828	299-W26-14	RCRA	216-S-10 Pond
C4072	699-S6-E4K	CERCLA	618-10 BG
C4073	699-S6-E4L	CERCLA	618-10 BG
C4117	199-K-129	CERCLA	100-K-4 OU
C4119	299-W15-45	CERCLA	200-ZP-1 OU
C4120	199-K-130	CERCLA	100-K-4 OU
C4122	299-E25-93	RCRA	SST WMA A-AX
C4123	299-E24-22	RCRA	SST WMA A-AX
C4124	299-E27-22	RCRA	SST WMA C
C4125	299-E27-4	RCRA	SST WMA C
C4127	299-E27-21	RCRA	SST WMA C
C4131	699-96-44	NABIR	100-H Area
C4132	699-96-45	NABIR	100-H Area
C4190	299-E27-23	RCRA	SST WMA C
C4185	199-D5-32	CERCLA	100-HR-3 OU
C4186	199-D5-33	CERCLA	100-HR-3 OU
C4187	199-D5-34	CERCLA	100-HR-3 OU
C4237	299-W17-1	CERCLA	200-ZP-1 OU

BG = Burial ground.
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act.*
NABIR = Natural Accelerated Bioremediation Investigation and Remediation.
OU = Operable Unit.
RCRA = *Resource Conservation and Recovery Act.*
SST = Single-shell tank.
WMA = Waste management area.

Table 5.1-2. Vadose Characterization Wells, Soil-Gas Probes, and GeoProbe/Push Installations for Fiscal Year 2003

<u>Well ID</u>	<u>Well Name</u>	<u>Facility</u>	<u>Location</u>
B8826	B8826	216-A-29 Ditch	200 East Area
B8827	B8827	216-B-63 Trench	200 East Area
C3245	C3245	216-A-19 Ditch	200 East Area
C3246	C3246	216-B-12	200 East Area
C3247	C3247	216-A-10 Ditch	200 East Area
C3248	C3248	216-A-36B Ditch	200 East Area
C3876	C3876	200-ZP-1 OU	200 West Area
C3877	C3877	200-ZP-1 OU	200 West Area
C3878	C3878	200-ZP-1 OU	200 West Area
C3879	C3879	200-ZP-1 OU	200 West Area
C4059	C4059	200-ZP-1 OU	200 West Area
C4060	C4060	200-ZP-1 OU	200 West Area
C4061	C4061	200-ZP-1 OU	200 West Area
C4062	C4062	200-ZP-1 OU	200 West Area
C4063	C4063	200-ZP-1 OU	200 West Area
C4064	C4064	200-ZP-1 OU	200 West Area
C4065	C4065	200-ZP-1 OU	200 West Area
C4066	C4066	200-ZP-1 OU	200 West Area
C4067	C4067	200-ZP-1 OU	200 West Area
C4068	C4068	200-ZP-1 OU	200 West Area
C4104	C4104	200-ZP-1 OU	200 West Area
C4106	C4106	200-ZP-1 OU	200 West Area
C4107	C4107	200-ZP-1 OU	200 West Area
C4108	C4108	200-ZP-1 OU	200 West Area
C4110	C4110	200-ZP-1 OU	200 West Area
C4111	C4111	200-ZP-1 OU	200 West Area
C4112	C4112	200-ZP-1 OU	200 West Area
C4129	C4129	200-ZP-1 OU	200 West Area
C4133	C4133	200-ZP-1 OU	200 West Area
C4136	C4136	200-ZP-1 OU	200 West Area
C4137	C4137	200-ZP-1 OU	200 West Area
C4138	C4138	200-ZP-1 OU	200 West Area
C4146	C4146	EAPS	200 West Area
C4147	144-K-1	118-K-1 BG	100-K Area
C4148	144-K-2	118-K-1 BG	100-K Area
C4149	144-K-3	118-K-1 BG	100-K Area
C4150	144-K-4	118-K-1 BG	100-K Area
C4151	144-K-5	118-K-1 BG	100-K Area
C4152	144-K-6	118-K-1 BG	100-K Area
C4153	144-K-7	118-K-1 BG	100-K Area
C4154	144-K-8	118-K-1 BG	100-K Area
C4155	144-K-9	118-K-1 BG	100-K Area
C4156	144-K-10	118-K-1 BG	100-K Area
C4157	144-K-11	118-K-1 BG	100-K Area
C4158	144-K-12	118-K-1 BG	100-K Area
C4159	144-K-13	118-K-1 BG	100-K Area
C4160	C4160	200-ZP-1 OU	200 West Area

Table 5.1-2. (contd)

<u>Well ID</u>	<u>Well Name</u>	<u>Facility</u>	<u>Location</u>
C4161	C4161	200-ZP-1 OU	200 West Area
C4162	C4162	200-ZP-1 OU	200 West Area
C4163	C4163	200-ZP-1 OU	200 West Area
C4164	C4164	200-ZP-1 OU	200 West Area
C4188	144-K-14	118-K-1 BG	100-K Area
C4189	144-K-15	118-K-1 BG	100-K Area
C4240	C4240	200-ZP-1 OU	200 West Area
C4241	C4241	200-ZP-1 OU	200 West Area
C4242	C4242	200-ZP-1 OU	200 West Area
C4243	C4243	200-ZP-1 OU	200 West Area
C4244	C4244	200-ZP-1 OU	200 West Area
C4245	C4245	200-ZP-1 OU	200 West Area
C4246	C4246	200-ZP-1 OU	200 West Area

BG = Burial ground.

EAPS = Enhanced access penetration system.

OU = Operable unit.

Table 5.2-1. Well Maintenance Summary for Fiscal Year 2003

<u>Program</u>	<u>Routine</u>	<u>Non-Routine</u>
CERCLA	0	56
RCRA	0	161
LTMC	0	3
Surveillance ^(a)	0	15
Geophysical Logging Support	0	8
Total	0	243

(a) *Atomic Energy Act of 1954* monitoring.

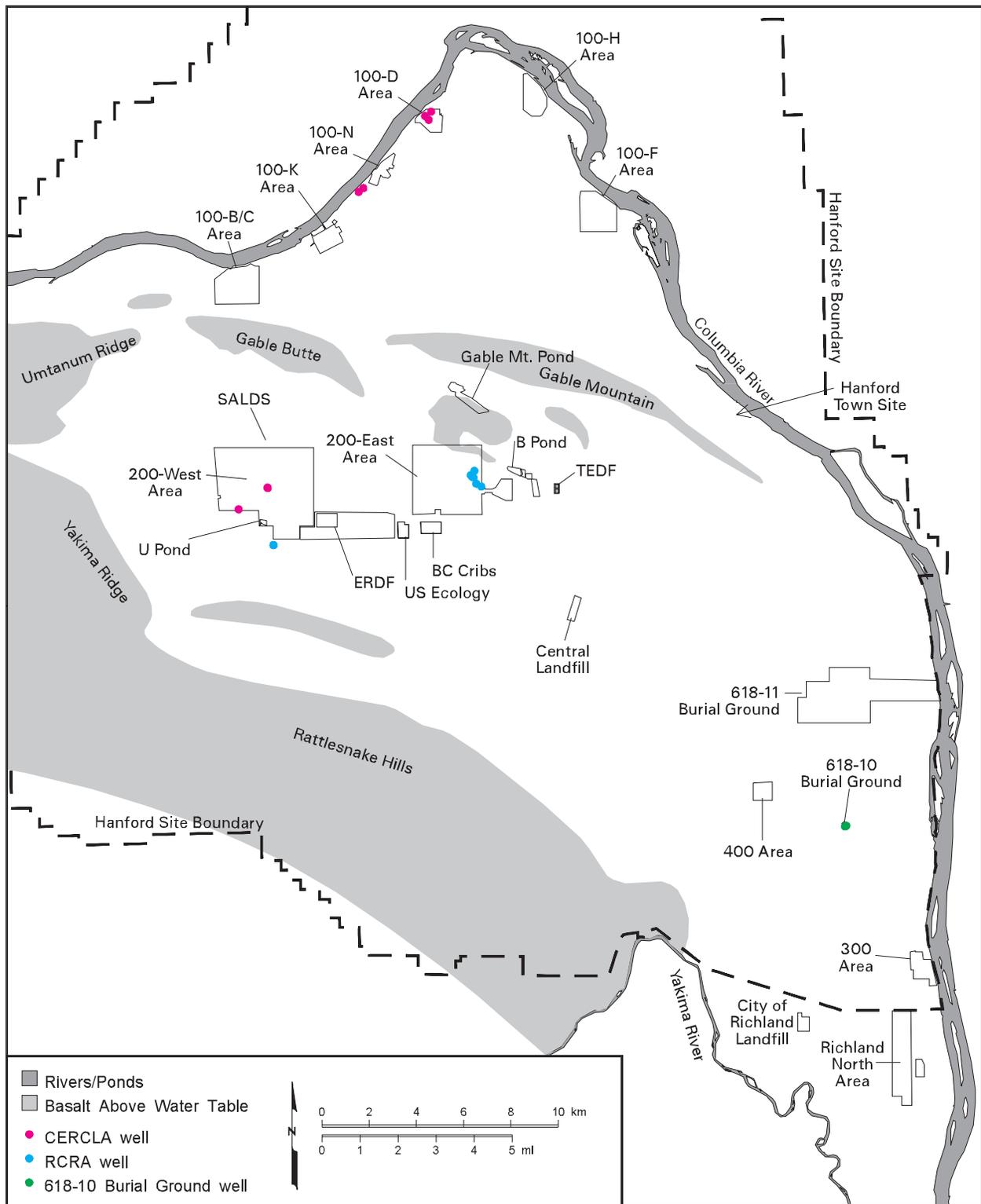
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act.*

LTMC = Long-term monitoring - CERCLA.

RCRA = *Resource Conservation and Recovery Act.*

Table 5.3-1. Wells Decommissioned During Fiscal Year 2003

<u>Well ID</u>	<u>Well Name</u>	<u>Well ID</u>	<u>Well Name</u>
A7340	299-W14-56	A4955	299-W19-29
A7341	299-W14-57	A7748	299-W19-30
A7342	299-W14-58	A4956	299-W19-31
A7345	299-W14-61	A4957	299-W19-32
A4916	299-W15-10	B2463	299-W19-38
A4923	299-W15-19	A7790	299-W19-90
A4924	299-W15-20	A4960	299-W19-91
A4926	299-W15-23	A4961	299-W19-92
A4927	299-W15-24	A4962	299-W19-93
A9831	299-W15-25	A4963	299-W21-1
A5478	299-W18-2	A7830	299-W22-4
A5470	299-W18-5	A4967	299-W22-22
A5479	299-W18-17	A7844	299-W22-23
A7531	299-W18-18	A4969	299-W22-28
A5471	299-W18-20	A7856	299-W22-37
A4938	299-W18-26	A7857	299-W22-38
A4941	299-W18-29	A4971	299-W22-40
A7565	299-W18-82	A7867	299-W22-60
A7569	299-W18-86	A7878	299-W22-74
A7571	299-W18-88	A4991	299-W23-8
A7578	299-W18-95	A7885	299-W23-16
A7730	299-W18-250	A7886	299-W23-17
A4944	299-W19-1	A7833	299-W22-8
A7734	299-W19-5	A7343	299-W14-59
A7744	299-W19-19	A7344	299-W14-60
A7735	299-W19-7	A9462	299-W11-20
A4952	299-W19-24	C4094	199-N-118
A7745	299-W19-23	C4095	199-N-114
A7746	299-W19-25	C4096	199-N-115
A7747	299-W19-26	C4097	199-N-116
A4953	299-W19-27	C4098	199-N-117
A4954	299-W19-28		



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Figure 5.1-1. Groundwater Monitoring Wells Installed in Calendar Year 2003