20.0 Well Installation and Maintenance in the River Corridor

K. Thompson

This chapter describes new well and characterization borehole installations and maintenance activities conducted in the River Corridor during the reporting period. The River Corridor includes the 100-B/C Area, 100-K Area, 100-N Area, 100-D/H Area, 100-F Area, 300 Area, and 1100-EM-1 groundwater interest area. Chapter 9.0 in Volume 1 provides general information on well installation and maintenance.

This chapter covers the period from October 1, 2008, through December 31, 2009. As a result of this change, the following date conventions are used throughout this report:

- Fiscal year (FY) 2009: Refers to the fiscal year named (i.e., October 1, 2008, to September 30, 2009).
- Calendar year (CY) 2009: Refers to the calendar year named (i.e., January 1, 2009, to December 31, 2009).
- Reporting period: Refers to the entire 15-month reporting period covered for this report (i.e., October 1, 2008, to December 31 2009).

20.1 Well Installation

During the reporting period, a total of 38 wells were installed in the River Corridor (Table 20-1). These wells were constructed to support activities funded under either *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989) Milestone M-24 or other project-specific activities. The approximate locations of the new wells are shown on Figure 20-1.

The 38 wells installed in the River Corridor during the reporting period to support Tri-Party Agreement Milestone M-24 are as follows:

- One well in the 100-D Area (100-HR-3 Operable Unit [OU]) to support an iron injection test
- Three wells in the 100-D Area (100-HR-3 OU) for the northern plume investigation
- Two injection wells for the KW Reactor pump-and-treat system in the 100-KR-4 OU
- Seven air injection wells for Washington Closure Hanford Phase I petroleum hydrocarbon bioremediation in the 100-NR-2 OU
- Nine wells for apatite infiltration gallery test in the 100-NR-2 OU
- One *Resource Conservation and Recovery Act of 1976* (RCRA) monitoring well to replace dry well for sulfate plume monitoring in the 100-NR-2 OU
- Fifteen wells to support polyphosphate infiltration treatability testing in the 300-FF-5 OU.

Additional wells were drilled beginning in fall 2009 and were completed in 2010. These wells will be described in the 2010 report.

Water well reports for all newly constructed wells, as required in *Washington Administrative Code* (WAC) 173-160, "Minimum Standards for Construction and Maintenance of Wells," are submitted to the Washington State Department of Ecology (Ecology) and are added to Ecology's well log database. Detailed information for

the wells is stored in the Integrated Data Management System database, including the geologic and geophysical descriptions, a listing of characterization activities (i.e., sediment and groundwater sampling, aquifer testing, and geophysical logging), and construction records for the new wells. Selected drilling and well construction information (e.g., drill depth and screen interval) also are entered in the Well Information and Document Lookup (WIDL) database, which is contained within the Hanford Environmental Information System database.

20.2 Characterization Boreholes and Direct-Push Technology Installation

During the reporting period, eight characterization boreholes were installed in the 100-D Area (100-HR-3 OU). Construction requirements for characterization borings are the same as those for an environmental investigation well (WAC 173-160-410) and are considered a subclass of resource protection wells. The boreholes are installed for subsurface characterization of radiological constituents, volatile organics (e.g., carbon tetrachloride), or hydrologic property determination (e.g., moisture and grain-size distribution). While typically installed to characterize the vadose zone, borings can be drilled to groundwater to obtain a one-time sample. Table 20-2 provides a summary of the number and general location of the direct-push boreholes. The approximate locations of the new characterization borings are shown in Figure 20-1.

A summary of the eight characterization boreholes installed in the River Corridor during CY 2009 to support Tri-Party Agreement Milestone M-24 is as follows:

- Six direct-push technology characterization boreholes to support chromium source plume investigation in the 100-HR-3 OU
- Two characterization boreholes to support chromium source plume investigation in the 100-HR-3 OU.

20.3 Well Maintenance

During the reporting period, non-routine maintenance was completed on 136 wells in the River Corridor. A summary of non-routine maintenance activities by regulatory program is presented in Table 20-3. Non-routine maintenance tasks, which include surface and subsurface aspects, are varied and depend on the specific problem that may be encountered at a well. Several wells required multiple visits to correct new or recurring problems. Surface tasks include conducting field inspections, labeling wells, maintaining and replacing locking well caps, casing repairs, diagnosing and repairing surface electrical wiring, and repairing or replacing pump-discharge fittings. Subsurface tasks typically include repairing and/or replacing sampling pumps, performing camera surveys, retrieving pumps and/or equipment, and replacing discharge tubing.

In the past, the distinction between routine and non-routine maintenance activities was based on a set group of activities and a 5-year cleaning cycle. Currently, any well requiring maintenance to preserve sampling efficiency is repaired under the non-routine maintenance program. If a project scientist determines that a well is losing sampling efficiency, those tasks typically conducted under routine maintenance (e.g., surge block swabbing, screen brushing, or well development) can be conducted as non-routine tasks. Therefore, while not following a 5-year maintenance schedule, wells continue to be maintained to meet project-specific and schedule requirements.

Table 20-1. Well Installations, Calendar Year 2009.

Operable Unit	Well Name	Well ID	Casing Diameter (in.)	Drill Depth (ft bgs)	Screened Interval (ft bgs)	Casing Material	Well Purpose	Accepted Date
100-HR-3	199-D4-94	C7075	8.75	102.7	98.07 to 73.11	Stainless steel	Well to support iron injection test	3/31/2009
100-HR-3	199-D5-123	C6387	8.75	123.7	119.0 to 78.7	Stainless steel	EM-22 northern plume investigation	11/3/2008
100-HR-3	199-D5-126	C6390	6	114.1	110.02 to 80.23	Stainless steel	EM-22 northern plume investigation	11/3/2008
100-HR-3	199-D5-125	C6389	6	111.8	107.17 to 77.02	Stainless steel	EM-22 northern plume investigation	11/3/2008
100-KR-4	199-K-174	C7061	6	132.5	128.1 to 68.1	Stainless steel	Injection wells for KW Reactor	3/12/2009
100-KR-4	199-K-175	C7062	6	148.5	143.92 to 83.92	Stainless steel	Injection wells for KW Reactor	3/12/2009
100-NR-2	199-N-166	C7031	4	33	29.54 to 9.53	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-167	C7032	4	83	77.86 to 52.91	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-168	C7033	2	33	29.75 to 9.75	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-169	C7034	2	83	78.4 to 53.47	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-170	C7035	2	83.5	78.84 to 54.87	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-171	C7036	2	84	79.68 to 54.79	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-172	C7037	4	82	77.14 to 57.14	PVC	WCH Phase 1 bioremediation wells air injection well	3/19/2009
100-NR-2	199-N-173	C7038	8	45.2	25.10 to 10.10	Stainless steel	6-inch TPH petroleum monitoring well	3/19/2009
100-NR-2	199-N-174	C7039	4	20.8	15.68 to 13.74	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/6/2009
100-NR-2	199-N-175	C7040	4	19.7	15.88 to 13.93	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/4/2009
100-NR-2	199-N-176	C7041	4	18.6	15.85 to 14.12	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/4/2009
100-NR-2	199-N-177	C7042	4	18.4	15.82 to 13.85	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/6/2009
100-NR-2	199-N-178	C7043	4	18.7	15.95 to 13.49	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/6/2009
100-NR-2	199-N-179	C7044	4	20.0	15.81 to 13.84	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/6/2009
100-NR-2	199-N-180	C7045	4	18.8	15.81 to 13.84	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/6/2009
100-NR-2	199-N-181	C7046	4	19.3	15.82 to 13.84	PVC	6-inch TPH petroleum, eight 4-inch PVC infiltration gallery test	5/6/2009
100-NR-2	199-N-165	C6693	4	86.0	82.89 to 67.89	Stainless steel	RCRA 1324-N/NA sulfate plume monitoring	10/20/2008
300-FF-5	399-1-39	C7116	4	37.0	35.55 to 33.05	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-40	C7117	4	36.5	35.58 to 33.08	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-41	C7118	4	37.5	35.43 to 32.94	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-42	C7119	4	37.0	35.57 to 33.08	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-43	C7120	4	37.0	35.49 to 33.01	PVC	Support for polyphosphate infiltration treatability test	5/6/2009

Table 20-1. (Cont.)

Operable Unit	Well Name	Well ID	Casing Diameter (in.)	Drill Depth (ft bgs)	Screened Interval (ft bgs)	Casing Material	Well Purpose	Accepted Date
300-FF-5	399-1-44	C7121	4	36.5	35.59 to 33.09	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-45	C7122	4	39.5	35.93 to 35.55	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-46	C7123	4	37.0	35.55 to 33.08	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-47	C7124	4	35.5	35.78 to 33.28	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-48	C7125	4	37.0	35.54 to 33.05	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-49	C7126	4	37.08	35.55 to 33.06	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-50	C7127	4	37.0	35.54 to 33.05	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-51	C7128	4	39.0	35.61 to 33.11	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-52	C7129	4	37.20	35.49 to 33.00	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
300-FF-5	399-1-53	C7130	4	36.9	35.47 to 32.98	PVC	Support for polyphosphate infiltration treatability test	5/6/2009
100-HR-3-H	199-H3-25	C7110	6	61.2	53.71 to 33.7	Stainless steel	Pump-and-treat wells in 100-H Area	In progress*
100-HR-3-H	199-H3-27	C7114	6	61.9	55.79 to 35.77	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H3-26	C7115	6	56.3	44.98 to 34.96	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H1-45	C7477	6	61.08	53.88 to 38.86	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H4-70	C7483	6	61.4	55.0 to 45.0	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H4-73	C7484	6	71.0	63.27 to 43.25	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H4-69	C7485	6	63.83	55.75 to 45.75	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H4-71	C7487	6	71.0	60.07 to 45.04	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H4-72	C7488	6	61.25	55.04 to 39.98	Stainless steel	Pump-and-treat wells in 100-H Area	In progress
100-HR-3-H	199-H6-2	C7489	6	60.7	44.81 to 39.81	Stainless steel	Pump-and-treat wells in 100-H Area	In progress

Notes:
* Wells that were drilled but not accepted by the end of calendar year 2009.

bgs = below ground surface
ID = identification
PVC = polyvinyl chloride
RCRA = *Resource Conservation and Recovery Act of 1976*
TPH = total petroleum hydrocarbon
WCH = Washington Closure Hanford

Table 20-2. Characterization Boreholes and Direct-Push Technology Installation, Calendar Year 2009.

Project/Location	Well ID/Name
100-HR-3	C6436
100-HR-3	C6443
100-HR-3	C6445
100-HR-3	C6446
100-HR-3	C6447
100-HR-3	C6448
100-HR-3	C6449
100-HR-3	C6450

Notes:
ID = identification

Table 20-3. Well Maintenance Summary, Calendar Year 2009.

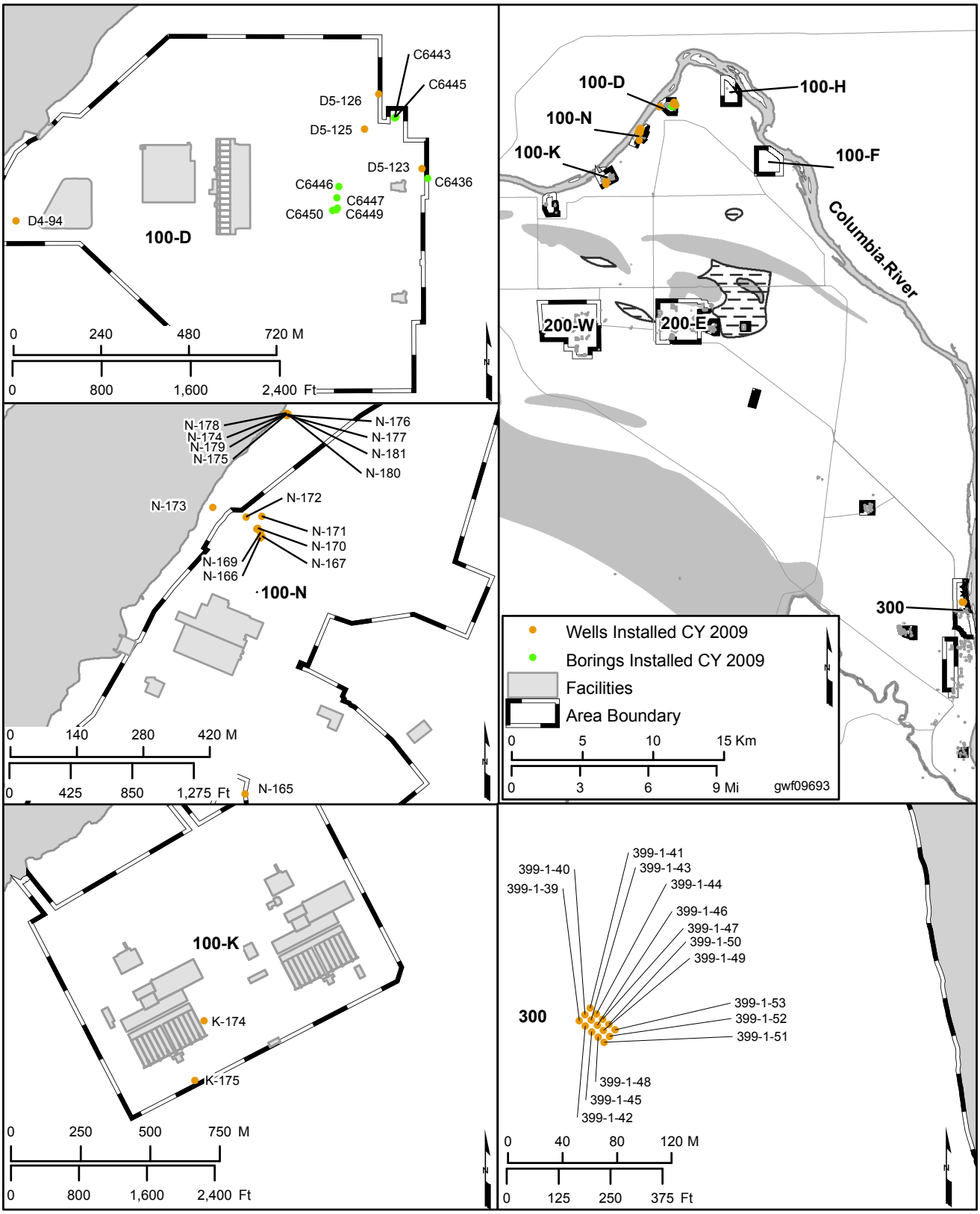
Well Name	Well ID	Field Order No.	Program	Well Name	Well ID	Field Order No.	Program
199-B4-5	A5540	WMO-NR-2009-2-013	CERCLA	699-99-44	C5650	WMO-NR-2009-1-035	CERCLA
199-B4-6	A4558	WMO-NR-2009-2-014	CERCLA	699-100-43B	C5647	WMO-NR-2009-1-038	CERCLA
199-B8-8	C5672	WMO-NR-2009-4-036	RCRA	699-101-45	C5666	WMO-NR-2009-1-077	CERCLA
699-63-95	A8958	WMO-NR-2009-3-001	RCRA	699-101-45	C5666	WMO-NR-2009-1-039	CERCLA
C7074	C7074	WMO-NR-2009-1-081	CERCLA	199-K-19	A4648	WMO-NR-2009-4-016	RCRA
C7074	C7074	WMO-NR-2009-1-080	Other	199-K-121A	B2808	WMO-NR-2009-1-064	CERCLA
199-F8-7	C6834	WMO-NR-2009-1-001	CERCLA	199-K-122A	B2809	WMO-NR-2009-4-008	RCRA
699-60-32	A5279	WMO-NR-2009-1-074	CERCLA	199-K-124A	B2811	WMO-NR-2009-1-063	CERCLA
699-62-31	A5287	WMO-NR-2009-1-075	CERCLA	199-K-137	C5112	WMO-NR-2009-2-032	Other
699-63-25A	A5289	WMO-NR-2009-1-054	CERCLA	199-K-139	C5114	WMO-NR-2009-3-096	CERCLA
699-69-45O	A5317	WMO-NR-2009-4-009	RCRA	199-K-141	C5303	WMO-NR-2009-2-071	RCRA
699-71-30	A5320	WMO-NR-2009-1-052	CERCLA	199-K-144	C5360	WMO-NR-2009-3-067	RCRA
199-D4-1	B2895	WMO-NR-2009-1-091	CERCLA	199-K-145	C5361	WMO-NR-2009-1-023	CERCLA
199-D4-36	B8987	WMO-NR-2009-3-060	RCRA	199-K-148	C5364	WMO-NR-2009-1-024	CERCLA
199-D4-62	C3292	WMO-NR-2009-4-034	RCRA	199-K-150	C5366	WMO-NR-2009-1-025	CERCLA
199-D4-84	C3316	WMO-NR-2009-2-025	--	199-K-153	C5369	WMO-NR-2009-4-030	Other
199-D4-84	C3316	WMO-NR-2009-2-030	RCRA	199-K-154	C5370	WMO-NR-2009-2-070	RCRA
199-D4-94	C7075	WMO-NR-2009-2-067	CERCLA	199-K-162	C5940	WMO-NR-2009-1-022	CERCLA
199-D5-15	A4572	WMO-NR-2009-3-082	RCRA	199-K-163	C6172	WMO-NR-2009-2-072	RCRA
199-D5-34	C4187	WMO-NR-2009-3-013	Other	199-K-164	C6386	WMO-NR-2009-2-052	Other
199-D5-42	B8752	WMO-NR-2009-1-017	CERCLA	199-K-165	C6451	WMO-NR-2009-2-033	Other
199-D5-99	C5392	WMO-NR-2009-1-010	CERCLA	199-K-165	C6451	WMO-NR-2009-1-019	CERCLA
199-D5-102	C5398	WMO-NR-2009-3-065	RCRA	199-K-166	C6452	WMO-NR-2009-2-035	Other
199-D5-119	C5933	WMO-NR-2009-1-026	CERCLA	199-K-166	C6452	WMO-NR-2009-1-021	CERCLA
199-D5-120	C5934	WMO-NR-2009-1-027	CERCLA	199-K-168	C6454	WMO-NR-2009-3-072	Other
199-D5-121	C5935	WMO-NR-2009-1-028	CERCLA	199-K-168	C6454	WMO-NR-2009-2-034	Other
199-D5-122	C5936	WMO-NR-2009-1-029	CERCLA	199-K-168	C6454	WMO-NR-2009-1-018	CERCLA
199-D5-123	C6387	WMO-NR-2009-1-093	CERCLA	199-K-171	C6746	WMO-NR-2009-4-031	Other
199-D5-125	C6389	WMO-NR-2009-1-094	CERCLA	199-K-171	C6746	WMO-NR-2009-2-008	RCRA
199-D5-126	C6390	WMO-NR-2009-1-092	CERCLA	199-K-171	C6746	WMO-NR-2009-2-002	CERCLA
199-D8-71	B2775	WMO-NR-2009-3-014	Other	199-K-173	C7016	WMO-NR-2009-1-020	CERCLA

Table 20-3. (Cont.)

Well Name	Well ID	Field Order No.	Program	Well Name	Well ID	Field Order No.	Program
699-95-48	C5667	WMO-NR-2009-1-044	CERCLA	199-K-174	C7061	WMO-NR-2009-2-041	Other
699-95-51	C5663	WMO-NR-2009-1-041	CERCLA	199-K-175	C7062	WMO-NR-2009-2-042	Other
699-96-52B	C5668	WMO-NR-2009-1-045	CERCLA	699-73-61	A5327	WMO-NR-2009-4-010	Other
699-97-48B	C5662	WMO-NR-2009-1-046	CERCLA	699-78-62	A5332	WMO-NR-2009-2-073	RCRA
699-97-48C	C5687	WMO-NR-2009-1-050	CERCLA	C7292	C7292	WMO-NR-2009-2-069	CERCLA
699-98-51	C5669	WMO-NR-2009-1-030	CERCLA	199-N-46	A5833	WMO-NR-2009-4-064	Other
DD-16-3	B8475	WMO-NR-2009-2-019	Other	199-N-51	A4694	WMO-NR-2009-4-060	RCRA
DD-16-4	B8476	WMO-NR-2009-2-020	Other	199-N-52	A4695	WMO-NR-2009-4-038	RCRA
DD-39-3	B8481	WMO-NR-2009-2-021	Other	199-N-165	C6693	WMO-NR-2009-1-014	RCRA
199-H3-2C	A4613	WMO-NR-2009-4-050	Other	199-N-173	C7038	WMO-NR-2009-3-062	Other
199-H3-3	B2778	WMO-NR-2009-2-028	Other	199-N-176	C7041	WMO-NR-2009-4-039	Other
199-H3-4	B2779	WMO-NR-2009-2-029	Other	199-N-180	C7045	WMO-NR-2009-4-040	Other
199-H3-5	B2780	WMO-NR-2009-2-027	Other	699-81-58	A5338	WMO-NR-2009-3-085	RCRA
199-H4-2	A5686	WMO-NR-2009-2-001	CERCLA	699-84-63D	A9047	WMO-NR-2009-2-068	CERCLA
199-H4-12A	A4616	WMO-NR-2009-4-046	Other	699-87-55	A5346	WMO-NR-2009-2-003	CERCLA
199-H4-12C	A4618	WMO-NR-2009-4-051	Other	699-S33-2A	B8102	WMO-NR-2009-3-000	RCRA
199-H4-14	A4620	WMO-NR-2009-4-048	Other	699-S34-2A	B8103	WMO-NR-2009-3-078	RCRA
199-H4-15CP	A9496	WMO-NR-2009-2-022	RCRA	699-S34-2B	B8104	WMO-NR-2009-3-081	RCRA
199-H4-15CS	A4625	WMO-NR-2009-4-053	Other	699-S34-4A	B8105	WMO-NR-2009-3-002	RCRA
199-H4-18	A4628	WMO-NR-2009-4-049	Other	699-S34-E15	A5389	WMO-NR-2009-3-087	RCRA
199-H4-63	B2776	WMO-NR-2009-1-002	CERCLA	699-S36-E13A	A5392	WMO-NR-2009-3-086	RCRA
199-H4-64	B2777	WMO-NR-2009-4-047	Other	1199-38-16	A9355	WMO-NR-2009-3-093	RCRA
199-H4-65	B8759	WMO-NR-2009-3-077	RCRA	399-1-12	A5021	WMO-NR-2009-2-004	CERCLA
699-89-35	A5348	WMO-NR-2009-4-028	Other	399-1-15	A5024	WMO-NR-2009-4-066	Other
699-94-41	C5665	WMO-NR-2009-1-040	CERCLA	399-1-18C	A5033	WMO-NR-2009-1-069	CERCLA
699-94-43	C5661	WMO-NR-2009-1-043	CERCLA	399-4-1	A5052	WMO-NR-2009-4-015	RCRA
699-95-45	C5660	WMO-NR-2009-1-042	CERCLA	399-4-7	A5055	WMO-NR-2009-1-070	CERCLA
699-96-43	A5357	WMO-NR-2009-1-076	CERCLA	399-5-4B	A8094	WMO-NR-2009-4-014	RCRA
699-97-41	C5657	WMO-NR-2009-1-033	CERCLA	699-13-3A	B2540	WMO-NR-2009-4-020	RCRA
699-97-43B	C5664	WMO-NR-2009-1-047	CERCLA	699-15-E13	A8338	WMO-NR-2009-1-083	CERCLA
699-97-43C	C5685	WMO-NR-2009-1-048	CERCLA	699-S6-E4A	A9152	WMO-NR-2009-1-008	CERCLA
699-97-45	C5659	WMO-NR-2009-1-031	CERCLA	699-S6-E4A	A9152	WMO-NR-2009-3-029	RCRA
699-97-45B	C5686	WMO-NR-2009-1-049	CERCLA	699-S6-E4J	A9159	WMO-NR-2009-1-085	CERCLA
699-98-43	C5656	WMO-NR-2009-1-034	CERCLA	699-S6-E14A	A5405	WMO-NR-2009-2-066	RCRA
699-98-46	C5658	WMO-NR-2009-1-032	CERCLA	699-S11-E12A	A9181	WMO-NR-2009-1-055	CERCLA
699-99-41	C5649	WMO-NR-2009-1-036	CERCLA	699-S30-E14	A9209	WMO-NR-2009-3-068	RCRA
699-99-42B	C5648	WMO-NR-2009-1-037	CERCLA	C9500	C9500	WMO-NR-2009-1-079	Other

Notes:
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
ID = identification
RCRA = *Resource Conservation and Recovery Act of 1976*

Figure 20-1. Well, Characterization Borehole, and Direct-Push Technology Installations, Calendar Year 2009.



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