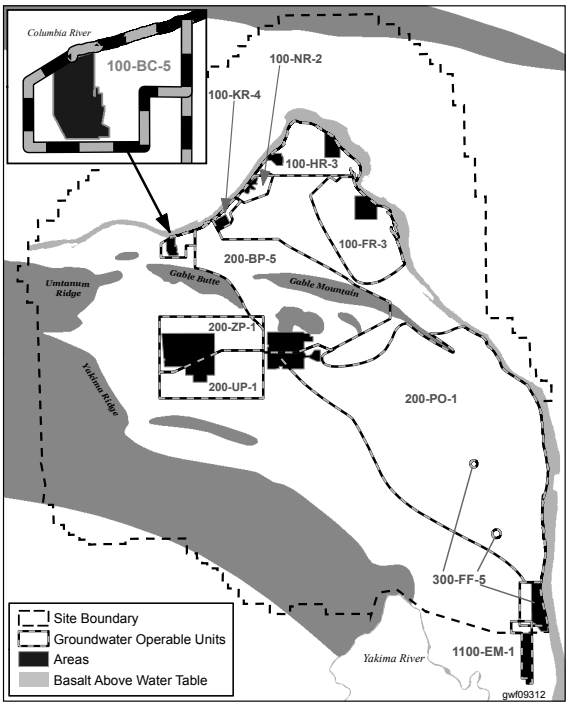
13.0 100-BC-5 Operable Unit

M. J. Hartman

This section describes groundwater flow and contaminant distribution in the vicinity of the 100-B/C Area. Figure 13-1 shows facilities, wells, and shoreline monitoring sites in the 100-B/C Area.



Groundwater monitoring for the *Atomic Energy Act of 1954* (AEA) is integrated fully with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) monitoring. No active waste disposal facilities or *Resource Conservation and Recovery Act of 1976* sites are located in the 100-B/C Area. Previous assessments have not identified groundwater conditions that warrant interim remedial measures. Final decisions on groundwater cleanup will be reached in the future.

A brief conceptual model for the 100-BC-5 Operable Unit (OU) is provided in Section 13.1. Section 13.2 discusses the primary groundwater contaminants. The CERCLA activities completed during this monitoring period are discussed in Section 13.3, and Section 13.4 provides a brief discussion of the conclusions and recommendations for the OU.

Previous annual reports have covered a fiscal year (FY) (October through September). Beginning in 2010, the annual report will cover a calendar year (CY). As a transitional year, this report 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.

- FY 2009: Refers to the fiscal year named (i.e., October 1, 2008, to September 30, 2009).
- 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).

13.1 Conceptual Model

This section provides a brief summary of the site conceptual model for the 100-BC-5 OU. For additional details, see *Integrated 100 Area Remedial Investigation Study/Work Plan, Addendum 3: 100-BC-1, 100-BC-2, and 100-BC-5 Operable Units* (DOE/RL-2008-46-ADD3).

The DOE has cleaned up nearly all of the former waste sites in the 100-B/C Area. Only one waste site remains to be remediated.

The primary sources of contamination in the 100-BC-5 OU were two water-cooled nuclear reactors (B and C Reactors) and the structures and processes associated with reactor operations. The water-cooled reactors were built to irradiate uranium-enriched fuel rods from which plutonium and other special nuclear materials could be extracted in the 200 Areas. The B Reactor operated from 1944 to 1968, and the C Reactor from 1952 to 1969. Reactor operations generated large quantities of liquid and solid waste, which was contaminated with radionuclides, hazardous chemicals, or both (mixed waste). Effluents were released directly to temporary surface impoundments, cribs,

ditches, and the Columbia River. Solid waste was placed in unlined burial grounds. Waste released to the environment created secondary sources of contamination beneath ponds, ditches, cribs, burial grounds, and unplanned release sites where contaminants were retained in the subsurface (vadose zone) and released over long periods of time. Over the past decade, the U.S. Department of Energy (DOE) has remediated these liquid waste sites and solid waste burial grounds, usually by excavating contaminated soil and disposing it in a landfill on the Central Plateau, backfilling, and replanting native vegetation. Only one of the former waste sites in the 100-B/C Area remains to be remediated.

In the 100-BC-5 OU, the groundwater system comprises several hydrostratigraphic units. From shallowest to deepest, these units include the following:

- Vadose (unsaturated) zone, which is predominantly Hanford formation gravels; 2 to 30 meters thick beneath the 100-B/C Area
- Unconfined aquifer, which consists predominantly of Ringold Unit E (Unit 5) gravels
- Uppermost aquitard, which consists of Ringold upper mud unit (clay and silt; Unit 6)
- Series of confined and semiconfined aquifers in the Ringold Formation (Units C, B, and A or 5, 7, and 9), separated by fine-grained, overbank and paleosol deposits
- Basalt aquitard and basalt-confined aquifers (shallowest is the Rattlesnake Ridge interbed).

The thickness of the unconfined aquifer is not well characterized because, until CY 2009, few wells were drilled through the entire aquifer thickness. Well drilling during CY 2009 showed aquifer thickness ranging from ~32 meters (well 199-B3-50) to 48 meters (well 199-B5-5).

The groundwater beneath the 100-BC-5 OU is currently contaminated with hexavalent chromium, strontium-90, and tritium at levels above aquatic standards or drinking water standards (DWSs).

All but one of the monitoring wells installed before CY 2009 and currently in use is screened at the top of the aquifer. Well 199-B2-12 is screened ~38 meters below the water table in the Ringold upper mud unit and has not detected contamination. New wells drilled in CY 2009 and those planned for installation in CY 2010 are being drilled and sampled through the entire aquifer thickness to help characterize the distribution of contaminants in the aquifer. Preliminary data indicate that contaminant concentrations in some locations may be higher at depth than at the top of the aquifer.

Groundwater enters the 100-B/C Area from upgradient areas along the Columbia River and the gaps between Umtanum Ridge, Gable Butte, and Gable Mountain. Groundwater flows primarily to the north beneath the 100-B/C Area and discharges to the Columbia River (Figure 13-2). Near the river, the horizontal hydraulic gradient in March 2009 was 0.0027 meters per day. The hydraulic gradient is very flat in the southern 100-B/C Area. The average gradient from the southern region to the river was 0.0013 in March 2009.

13.2 Groundwater Contaminants

This section summarizes the distribution of groundwater contamination in the 100-BC-5 OU as required by the *100-BC-5 Operable Unit Sampling and Analysis Plan* (DOE/RL-2003-38). Wells are sampled for the contaminants of concern selected

through the use of the data quality objectives process (PNNL-14287, *Data Quality Objectives Summary Report – Designing a Groundwater Monitoring and Assessment Network for the 100-BC-5 and 100-FR-3 Operable Units*). The contaminants of concern are strontium-90, tritium, and hexavalent chromium. DOE/RL-2008-46-ADD3 identified additional contaminants of potential concern to be evaluated in the ongoing remedial investigation (Table 13-1).

Plume Areas (square kilometers) in the 100-BC-5 Operable Unit:
Chromium, 20 µg/L — 0.913
Strontium-90, 8 pCi/L — 0.627
Tritium, 20,000 pCi/L — 0.23

Waste sites that received high volumes of effluent were located in the eastern half of the 100-B/C Area (DOE/RL-2008-46-ADD3). These included cribs and pipelines near the former reactor buildings and the major retention basins, trenches, and cribs near the Columbia River (Figure 13-1).

Contaminant distribution maps presented in this section show CY 2009 average concentrations for each well. Many of the wells are sampled only once per year, but a few wells were sampled quarterly (Appendix A, Table A-1). Some wells are sampled every other year; if there were no CY 2009 data, earlier data are posted on the maps with a distinct symbol.

13.2.1 Strontium-90

A wedge-shaped plume of strontium-90 extends from the central 100-B/C Area north toward the Columbia River (Figure 13-3). The DWS for strontium-90 is 8 pCi/L. Strontium-90 sorbs to aquifer sediment grains, so the plume has not changed significantly for more than 15 years. Figure 13-4 shows strontium-90 trends in wells near some of the former contaminant sources: the 116-B-11 retention basin, 116-B-1 Trench, and 116-C-1 Trench. The highest concentration during the reporting period was 29 pCi/L in well 199-B3-1, near the 116-B-1 Trench. Long-term trends are steady or declining.

Strontium-90 levels in four aquifer tubes exceeded the DWS during the reporting period, with a maximum of 25 pCi/L in aquifer tube C6230 (the CY 2009 average for this tube was 20 pCi/L). Tubes 05-M and 06-M also had strontium-90 concentrations above the DWS; however, concentrations in these tubes have declined since 1999.

As in the 100-N Area, strontium-90 in the 100-B/C Area appears to be limited to the upper portion of the unconfined aquifer. Deep aquifer tubes C6332, 05-D, and 06-D had strontium-90 levels below detection limits, while their shallower counterparts had concentrations above the DWS. Characterization data from new well 199-B2-14 had the highest concentration approximately 5 meters below the water table. Well 199-B2-12, screened in a water-bearing zone of the Ringold upper mud unit, consistently has no detectable strontium-90, while its shallow counterpart, well 199-B3-47, has levels above the DWS.

13.2.2 Tritium

The unconfined aquifer beneath the 100-B/C Area is contaminated with tritium at concentrations that exceed the DWS (20,000 pCi/L) in several wells (Figure 13-5). Tritium was present in effluent discharged to former cribs near the B Reactor (e.g., 116-B-5 Crib) and near the Columbia River. The former 118-B-1 Burial Ground in the southwestern 100-B/C Area was another source of contamination.

Strontium-90 and tritium continued to exceed DWSs in 100-B/C Area groundwater.

In the northern 100-B/C Area, only well 199-B3-47 and aquifer tube 06-M had tritium concentrations above the DWS during the reporting period. Recent increases in tritium concentrations in well 199-B3-47 (to 47,000 pCi/L in 2009) and tube 06-M (to 29,000 pCi/L in October 2009) may represent the pulse of tritium detected in well 199-B5-2 in 2005 and 2006 (Figure 13-6).

Tritium concentrations in two portions of the southern 100-B/C Area exceed the DWS (maximum of 42,000 pCi/L in well 199-B8-8). Because the area has only three monitoring wells, these plumes are not well defined. The tritium concentration fell below the DWS in well 199-B8-6, which is located near the 118-B-1 Burial Ground (formerly a source of tritium contamination). The plume map provided in Figure 13-5 portrays a small plume near the burial ground on the assumption that the plume has moved or shrunk, but it has not dissipated completely. Wells 199-B8-7 and 199-B8-8 continued to have tritium concentrations above the DWS (Figure 13-7). Characterization groundwater samples from new well 199-B5-6, completed in early CY 2010, showed tritium levels above the DWS (22,000 to 26,000 pCi/L) near the top of the aquifer. The location of this well is shown in Figure 13-1. The tritium plume map (Figure 13-5) reflects the presence of tritium at the water table in the location of the new well. The DOE will continue to monitor the new wells for tritium and other constituents.

East of the 100-B/C Area, tritium concentrations are elevated, but declining, in well 699-72-73 (see Figure 4-2 in Chapter 4.0). The average 2009 concentration was 13,000 pCi/L. Aquifer tubes in this region also show elevated, but declining, tritium concentrations. Tritium east of the 100-B/C Area is believed to represent a plume from the 200 Areas that migrated northward.

13.2.3 Chromium

Sources of hexavalent chromium were located primarily in the eastern portion of the 100-B/C Area. The sources included cribs near the reactor buildings, trenches and retention basins near the Columbia River (e.g., 116-B-1, 116-B-11, 116-C-1, and 116-C-5), and pipelines from the reactor buildings to these near-river facilities. During remediation activities in recent years, additional chromium sources were identified in the western 100-B/C Area: the 100-C-7 site and associated pipelines in the south, and the 100-B-27 sodium dichromate spill site in the northwest.

Hexavalent chromium is of potential concern to salmon and other aquatic life. The aquatic standard for hexavalent chromium is 10 µg/L (*Washington Administrative Code* [WAC] 173-201A-040, "Water Quality Standards for Surface Waters of the State Of Washington"). Chromium concentrations continued to be below the DWS (100 µg/L for total chromium), but concentrations exceeded 10 µg/L in wells and aquifer tubes beneath a portion of the 100-B/C Area.

The highest chromium concentration in 100-B/C Area groundwater in CY 2009 was 56 µg/L.

Figure 13-8 illustrates the portion of the plume with concentrations greater than 20 µg/L[1] in CY 2009. The changes from FY 2008 are as follows:

- The western contour moved farther west to encompass well 199-B5-1. The chromium concentration in this well was low in the mid-1990s because of a nearby water line leak. Concentrations have since rebounded and were above 20 µg/L in CY 2009.
- The southwestern boundary moved farther west to encompass new well 199-B5-6. Although the well was not completed until CY 2010, characterization data collected near the top of the aquifer during drilling showed chromium concentrations greater than 20 µg/L.
- The elimination of the 20 µg/L contour around well 199-B8-8. In FY 2008, this contour was an artifact of a single sampling event that apparently represented a

1 The interim cleanup level for the 100-KR-4 and 100-HR-3 OUs is 20 µg/L, based on ambient surface water quality criteria with 1:1 dilution applied (EPA/ROD/R10-96/134, Declaration of the Record of Decision for the 100-HR-3 and 100-KR-4 Operable Units, Hanford Site, Benton County, Washington).

transient spike of chromium. Chromium concentrations in this well during the reporting period were less than 20 µg/L.

- The southern tip of the plume moved north slightly, as the concentration dropped to 16 µg/L in well 199-B9-3.

The highest concentration was 56 µg/L (unfiltered hexavalent chromium) in well 199-B3-47, downgradient of the 116-B-11 retention basin. This result was within the range observed since 1999 (Figure 13-9).

In the southern 100-B/C Area, waste site investigations identified chromium contamination in the deep vadose zone at the 100-C-7 waste site. Chromium concentrations for groundwater samples from wells 199-B8-7 and 199-B8-8 were less than 20 µg/L during the reporting period. Remediation of the 100-C-7 waste site is planned to begin in CY 2010.

Four new wells were drilled in late CY 2009 and early CY 2010. Water samples were collected every 1.5 meters through the entire thickness of the unconfined aquifer. Figure 13-10 illustrates hexavalent chromium data with depth in the four wells. In well 199-B2-14, located in north-central 100-B/C Area, concentrations were highest in the upper half of the aquifer at 22 to 23 µg/L. In well 199-B3-50, located east of the 100-B/C Area chromium plume, concentrations were less than or equal to11 µg/L throughout the aquifer. In well 199-B5-5 (downgradient of the 100-B-27 sodium dichromate spill in the northwestern 100-B/C Area), the highest concentrations (~30 µg/L), were at a depth of 23 to 30 meters below the water table. The well screen was placed across the entire interval with characterization sampling results greater than ~20 µg/L. Waste site 100-B-27 had chromium contamination in the deep vadose zone, and contaminated soil was excavated to the top of the water table in CY 2009. In well 199-B5-6, north of the 100-C-7 waste site, chromium concentrations were highest (~34 µg/L) near the top and bottom of the aquifer. It appears that concentrations were lower in the middle of the aquifer, but this well had many suspect data points. Data points noted as suspect in Figure 13-10 may have been affected by drilling activities. The drilling process can create chemically reducing conditions in the borehole, which can eliminate hexavalent chromium in samples if the hole is not purged sufficiently. Aquifer conditions (e.g., a low-yielding formation) do not always allow for a full purge. Dissolved oxygen measurements and other supporting data were reviewed to determine whether the hexavalent chromium data are representative. Routine sampling of the four new wells began in CY 2010.

Chromium contamination appears to be limited to the unconfined aquifer. Deep monitoring well 199-B2-12, which is screened in the Ringold upper mud unit and located adjacent to shallow well 199-B3-47, has no detectable chromium. Another well will be installed to monitor the Ringold upper mud unit in CY 2010 (DOE/RL-2008-46-ADD3).

Chromium concentrations exceed the aquatic standard in some aquifer tubes in the 100-B/C Area.

Aquifer tubes provide additional information on the distribution of chromium with depth in the unconfined aquifer. Figure 13-11 illustrates the distribution of chromium concentrations with depth for 100-B/C Area aquifer tubes and nearby wells in October 2009. Concentrations in some shallow tubes are lower than in the mid-depth and deep tubes because groundwater is mixed with river water. Mid-depth and deep tubes have approximately equal concentrations.

13.2.4 Nitrate

In the *100-B/C Pilot Project Risk Assessment Report* (DOE/RL-2005-40), nitrate was identified as a contaminant of concern based on its exceedance of the DWS

(45 mg/L) in well 199-B3-47 in 1998 and 1999; however, concentrations have subsequently decreased. The highest nitrate concentration in a 100-B/C Area well in CY 2009 was 34.1 mg/L in well 199-B3-47, which was a decrease from FY 2008. Aquifer tube 06-M had higher nitrate concentrations (45.2 and 44.3 mg/L) in duplicate samples collected in October 2009.

13.2.5 Additional Contaminants of Potential Concern

Table 13-1 lists contaminants of potential concern for groundwater that were identified in DOE/RL-2008-46-ADD3. The table lists the maximum concentrations detected in groundwater in CY 2009; the data are provided for information only. Not all of the constituents were analyzed under the routine groundwater sampling and analysis plan (DOE/RL-2003-38), and the proposed well list in the addendum (DOE/RL-2008-46-ADD3) is not the same as the list in the routine groundwater sampling and analysis plan. Under the new work plan addendum, monitoring wells will be sampled for the contaminants of potential concern three times in CY 2010 (see Section 13.3).

13.3 CERCLA Activities

Routine groundwater sampling requirements are defined in the groundwater sampling and analysis plan (DOE/RL-2003-38), as modified by *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989) change notices TPA-CN-240 and TPA-CN-293. Scheduled sampling occurred as planned for wells and seeps during the reporting period (Appendix A, Table A-1).

In 2009, a draft remedial investigation/feasibility study work plan addendum (DOE/RL-2008-46-ADD3) and a draft sampling and analysis plan (DOE/RL-2009-44, *Sampling and Analysis Plan for the 100-BC Decision Unit Remedial Investigation/ Feasibility Study*) were submitted to the U.S. Environmental Protection Agency (EPA) for review. The documents are related to the *Integrated 100 Area Remedial Investigation/Feasibility Study Work Plan* (DOE/RL-2008-46). The documents describe the data to be collected to support selection of final remedies under CERCLA and the approach integrates data needs for waste sites and groundwater. The draft work plan addendum and the sampling and analysis plan for the 100-B/C Area were revised in response to EPA's comments and were approved in March 2010. The plans will be implemented beginning in CY 2010. The data and results will be reported in a remedial investigation/feasibility study report, which will lead to the selection of alternatives for final action site cleanup.

The planned installation of four wells that were proposed during early stages of the remedial investigation/feasibility study work plan preparation was moved forward and the wells were installed in CY 2009 and early 2010. Six additional wells are proposed under the remedial investigation/feasibility study addendum:

- A shallow well adjacent to well 199-B5-6 to characterize and monitor vertical contaminant distribution and flow
- A well near the water intake structure (south of aquifer tube site 05) to define contaminant plumes near the river
- A well adjacent to 199-B2-12 and 199-B3-47, screened at the base of the unconfined aquifer, to provide information on vertical contaminant distribution and flow
- A well west of C Reactor to define the western extent of contamination

- A well in the southeastern corner of the 100-B/C Area to define the southern extent of contamination
- A well adjacent to well 199-B2-14 and screened in the Ringold upper mud unit.

These wells will be added to the routine groundwater sampling and analysis plan (DOE/RL-2003-38) after completion.

Samples of porewater from the Columbia River bed contained higher concentrations of hexavalent chromium than anticipated.

As part of a study of groundwater upwelling in the river channel (see Chapter 21.0), porewater samples were collected from depths of ~0.3 meter in the river bottom at 22 locations along the 100-B/C segment of shoreline. Chromium concentrations up to 112 µg/L were detected at locations beneath the deepest part of the river channel. In some cases, these concentrations were greater than those currently measured in groundwater. One possible explanation is that groundwater in deeper, unmonitored portions of the aquifer has higher concentrations than at the top of the aquifer. Alternatively, the high concentrations in porewater could represent the remnants of an older, more concentrated plume or a current plume not intercepted by monitoring wells. The DOE is continuing the upwelling study in CY 2010 and will subsequently publish a report of the results.

In response to the unexpected porewater results, DOE took the following actions:

- Prioritized sampling of 100-B/C Area aquifer tubes in fall 2009 (results were in trend with previous samples).
- Sampled three wells near the shoreline one extra time in fall 2009 (results were in trend with previous samples).
- Expedited drilling of one of the remedial investigation/feasibility study proposed wells in an area of particular interest (well 199-B2-14). Characterization results were consistent with the previous interpretation of the chromium plume (Figure 13-10).
- In conjunction with EPA, DOE modified the planned locations and depths for other remedial investigation/feasibility study wells. The final version of DOE/RL-2008-46-ADD3 reflects the new locations. Characterization data from these wells will provide data on chromium distribution with depth and will identify whether there is a higher-concentration plume at depth in the aquifer.
- Added workscope to the remedial investigation/feasibility study work plan addendum to install three aquifer tube clusters and conduct additional porewater sampling.

13.4 Conclusions and Recommendations

Groundwater beneath the 100-B/C Area is contaminated with chromium, tritium, and strontium-90. The contaminant plumes are present at the top of the aquifer. The vertical extent of the plumes was previously undefined, but four new wells drilled in CY 2009 and early 2010 provided vertical characterization data. In some locations, chromium concentrations were somewhat higher at depth than near the water table. Two of the wells were screened at depth, so the data from future monitoring will provide better definition of contaminant distribution.

Ten new wells will be installed as part of CERCLA investigations. The wells will be drilled to the bottom of the unconfined aquifer, and one well will be screened within the Ringold upper mud unit. Geologic and groundwater chemistry data from the new wells will be used to help characterize the hydrogeology and contaminant distribution.

Additional data are needed to support the final CERCLA remedy for the 100-B/C Area. The remedial investigation/feasibility study work plan addendum will be implemented in CY 2010 so the necessary data can be gathered.

Seventeen wells were sampled as scheduled during the reporting period for CERCLA and the AEA, and one seep was sampled (Appendix A). Routine groundwater monitoring will continue in CY 2010 and will be coordinated with remedial investigation/feasibility study sampling. Ten new wells will be added to the schedule for routine groundwater monitoring.

Table 13-1. Contaminants of Potential Concern for 100-B/C Area Groundwater

Contaminant	Maximum Concentration in CY 2009 (Filtered/Unfiltered)	Number of Analyses	Comment
Antimony	ND/ND	52	--
Arsenic	3.39/3.22 µg/L	2	Only analyzed in well 699-72-73[a]
Beryllium	ND/ND	52	--
Cadmium	ND/ND	52	--
Carbon-14	ND/ND	2	Only analyzed in well 699-72-73[a]
Cesium-137	--	0	Not analyzed
Chromium (hexavalent)	48.7/56.1 µg/L	50	--
Chromium (total)	48.3/54.1 µg/L	50	--
Cobalt	0.128/0.138 µg/L	52	--
Cobalt-60	--	0	Not analyzed
Copper	0.403/0.372 µg/L	52	--
Europium-155	--	0	Not analyzed
Iodine-129	--	0	Not analyzed
Lead	ND/ND	2	Only analyzed in well 699-72-73[a]
Manganese	8.2/17.9 µg/L	50	--
Mercury	ND/ND	2	Only analyzed in well 699-72-73[a]
Nickel	ND/ND	50	--
Nickel-63	--	0	Not analyzed
Nitrate	34.1 mg/L	23	--
Organics[b]	--	0	Not analyzed
Radium-228	--	0	Not analyzed
Selenium	2.5/2.77 µg/L	2	Only analyzed in well 699-72-73[a]
Strontium-90	29 pCi/L	14	--
Technetium-99	48	5	--
Thallium	ND/ND	2	Only analyzed in well 699-72-73[a]
Tritium	47,000 pCi/L	30	
Uranium	2.16	2	Only analyzed in well 699-72-73[a]
Zinc	7.0/8.4 µg/L	50	

Notes:

Contaminants of potential concern are from *Integrated 100 Area Remedial Investigation Study/Work Plan, Addendum 3: 100-BC-1, 100-BC-2, and 100-BC-5 Operable Units* (DOE/RL-2008-46-ADD3). Sampling under that addendum had not yet begun in 2009. Wells are those listed in the routine groundwater sampling and analysis plan (DOE/RL-2003-38, *100-BC-5 Operable Unit Sampling and Analysis Plan*, as modified by Tri-Party Agreement Change Notices TPA-CN-240 and TPA-CN-293).

a. These constituents are not routinely analyzed for the 100-BC-5 Operable Unit. Well 699-72-73 is co-sampled for another operable unit.

b. Benzene, 1,1-dichloroethene; 1,1,2,2-tetrachloroethane, carbon tetrachloride, chloroform, tetrachloroethene, total petroleum hydrocarbons (diesel range), trichloroethene, and vinyl chloride.

CY = calendar year

ND = not detected

Tri-Party Agreement = *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989)

Figure 13-1. Facilities and Groundwater Monitoring Wells in the 100-B/C Area.

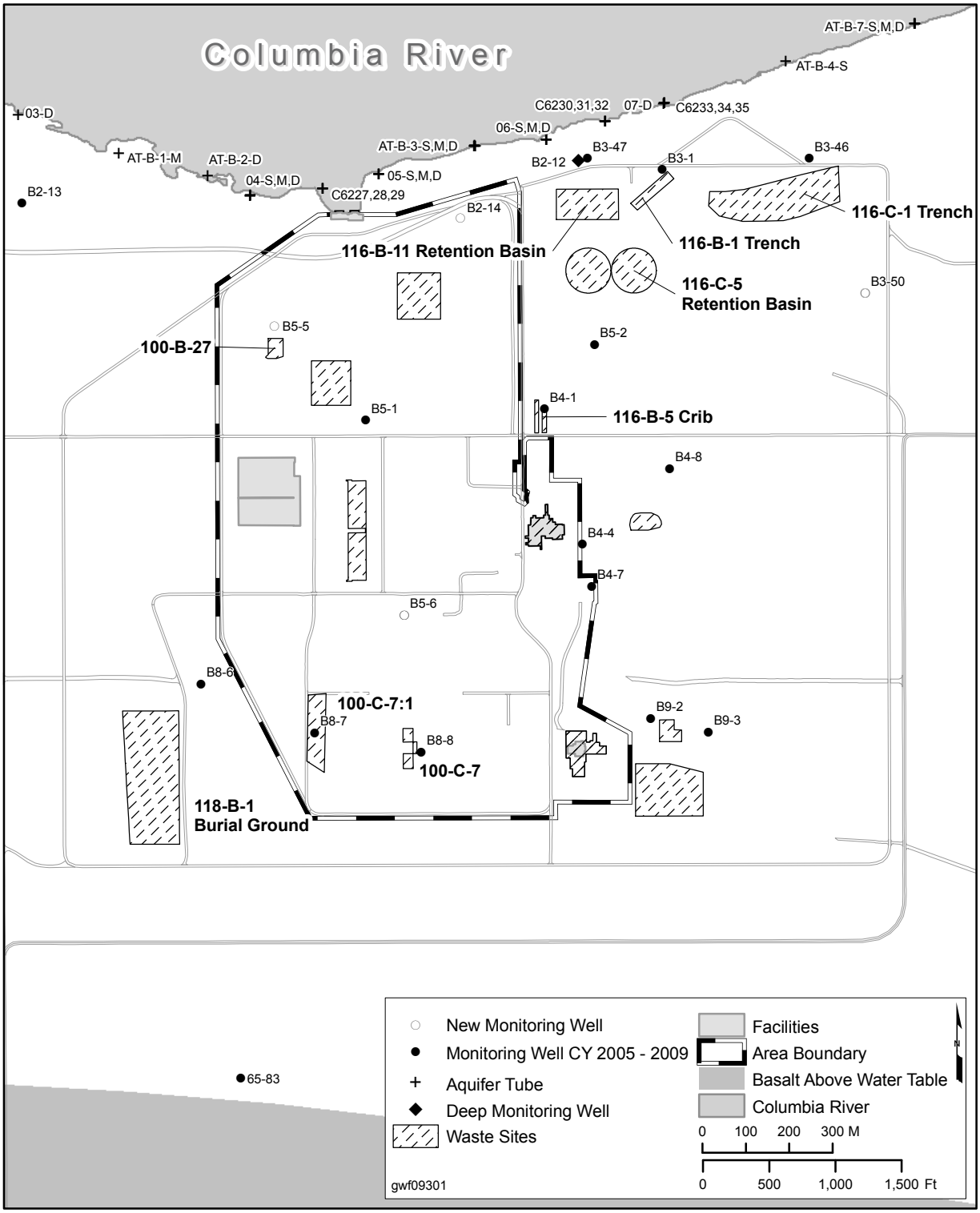


Figure 13-2. 100-B/C Area Water Table Map, March 2009.

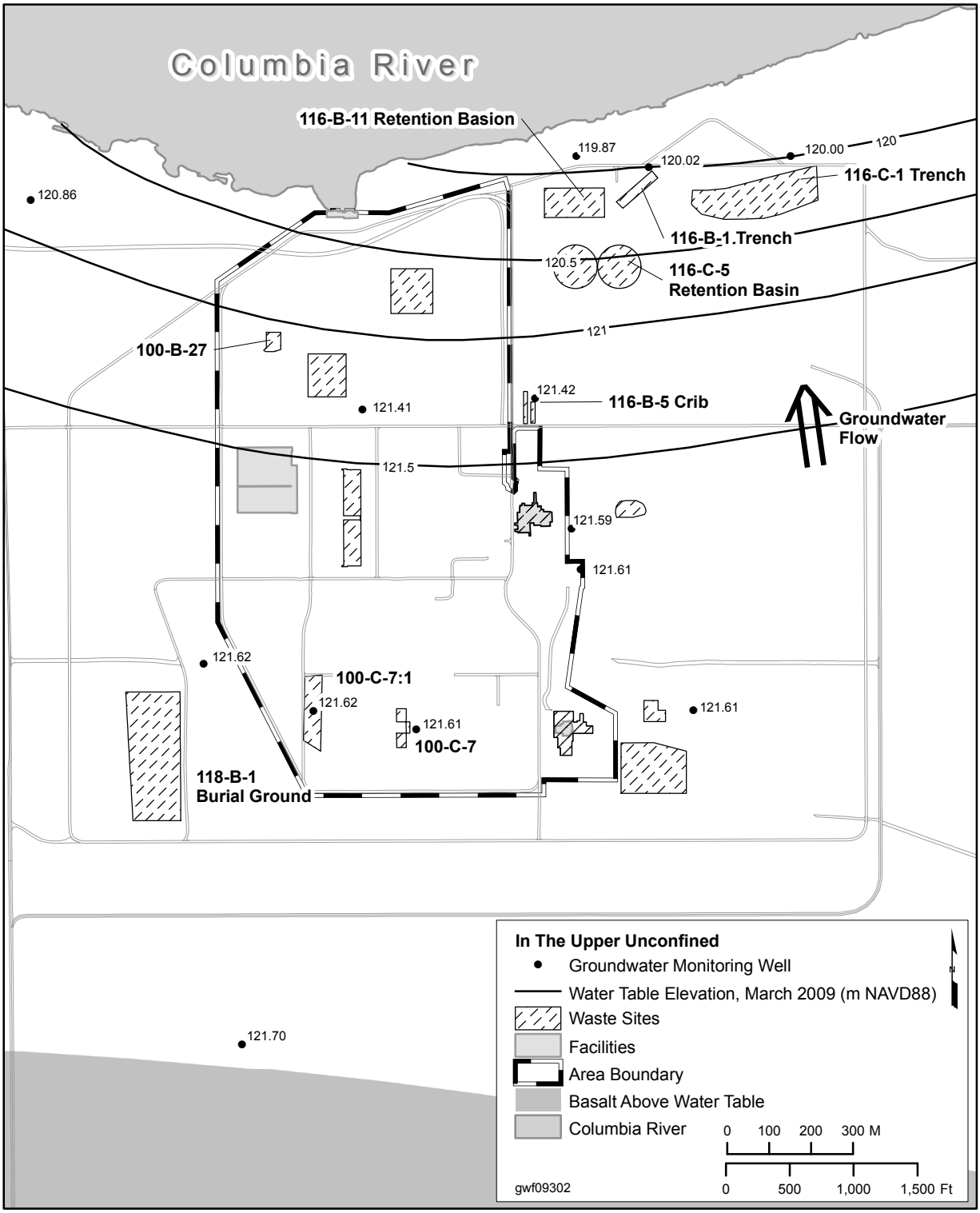


Figure 13-3. Average Strontium-90 Concentrations in the 100-B/C Area, Upper Portion of Unconfined Aquifer.

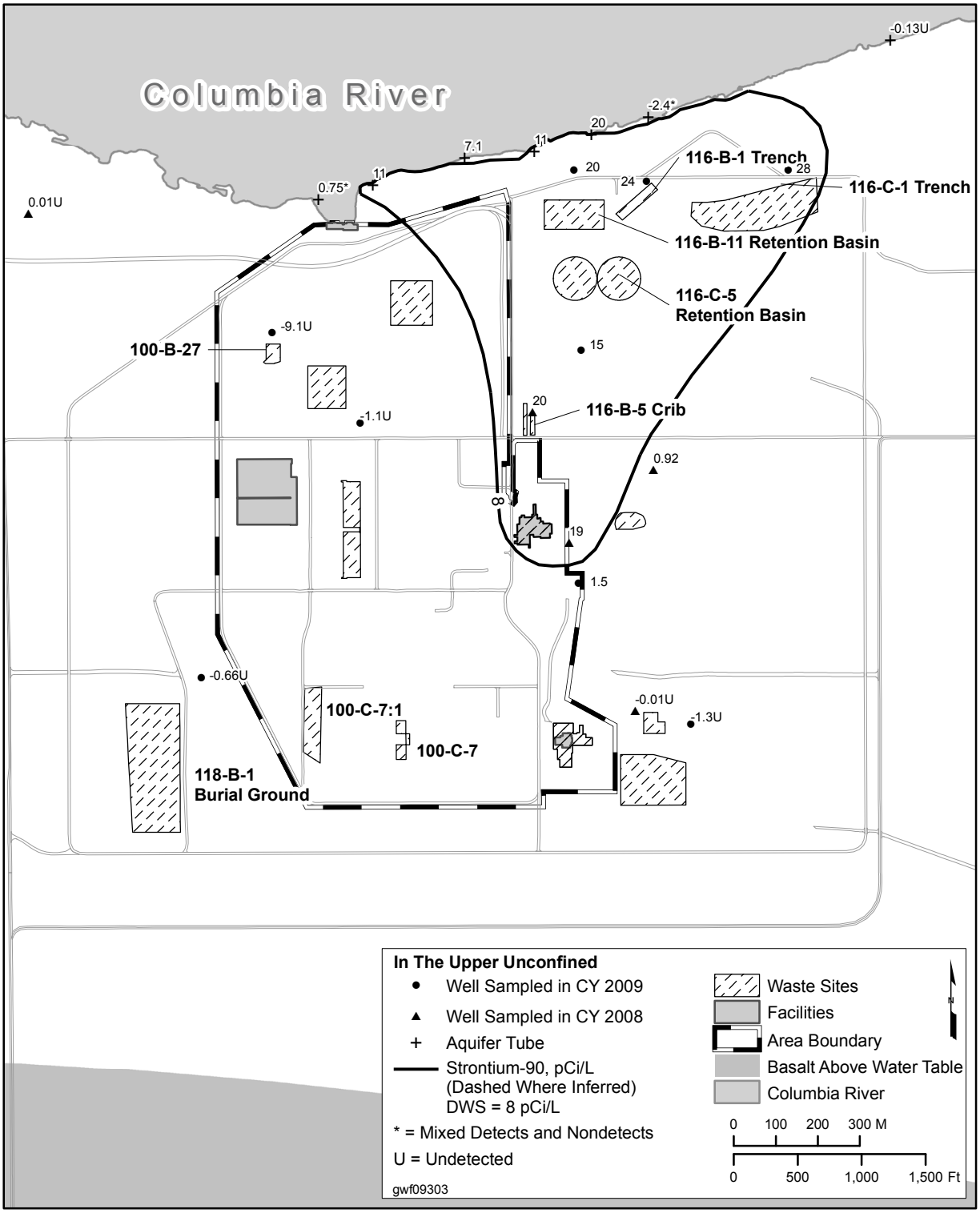


Figure 13-4. Strontium-90 Concentrations in 100-B/C Area Monitoring Wells.

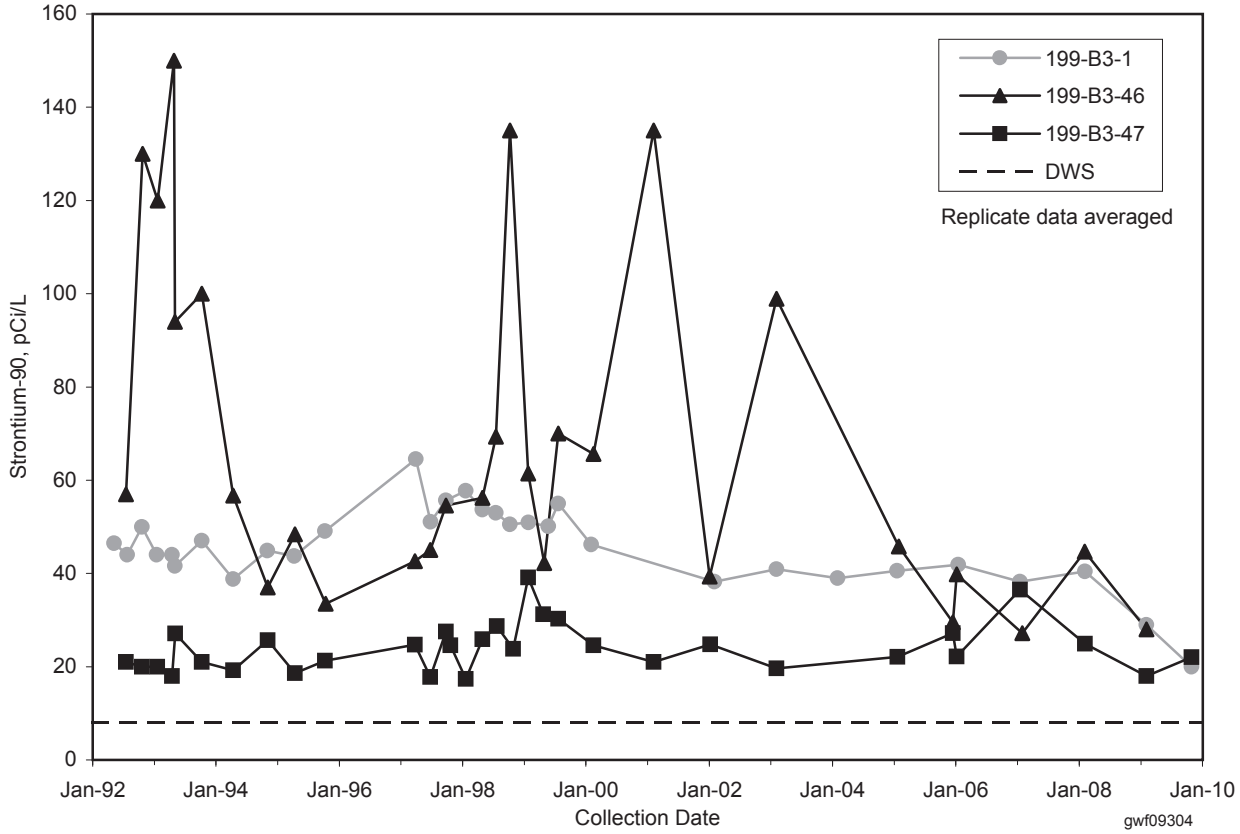


Figure 13-5. Average Tritium Concentrations in the 100-B/C Area, Upper Portion of Unconfined Aquifer.

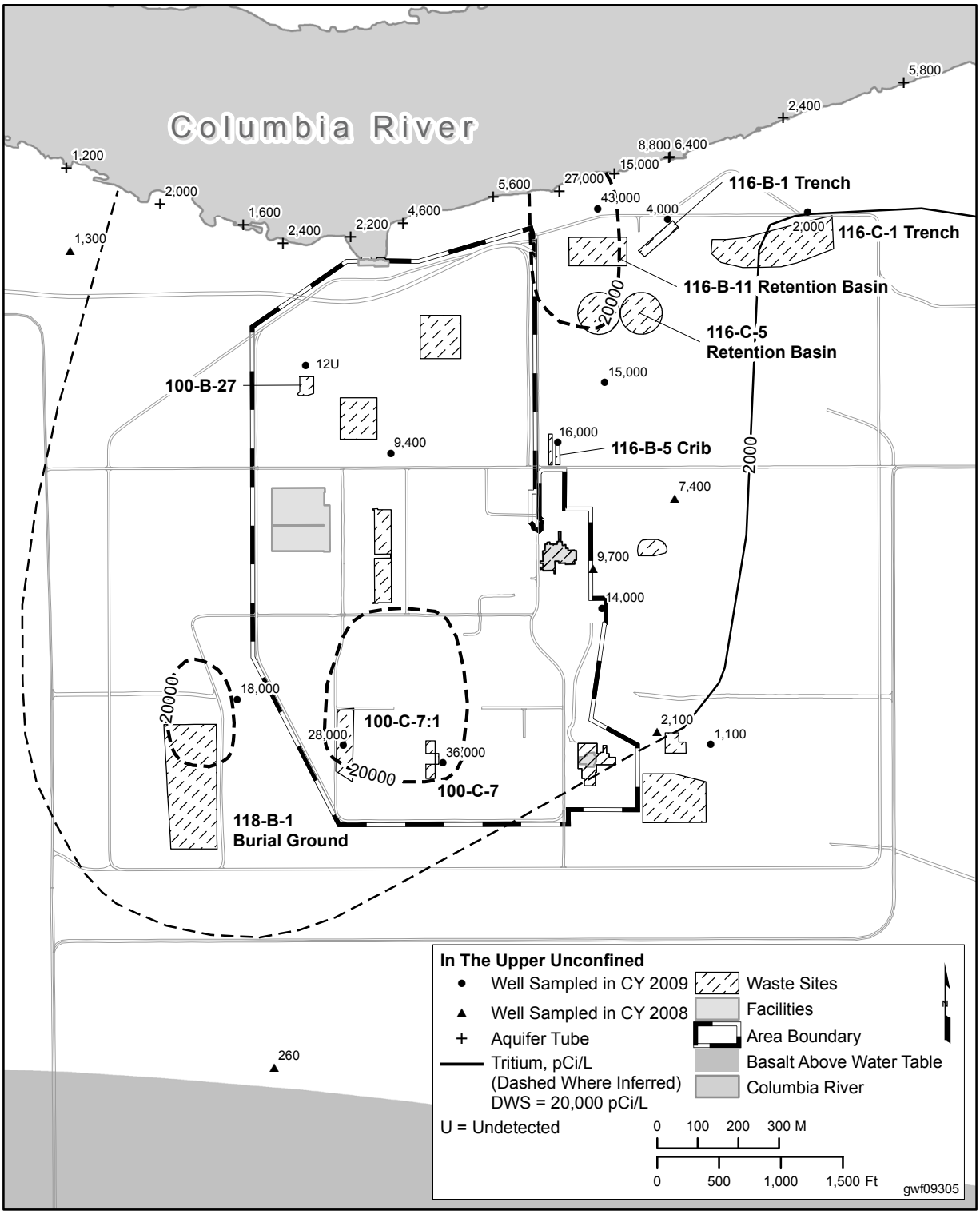


Figure 13-6. Tritium Concentrations in Northern 100-B/C Area Wells.

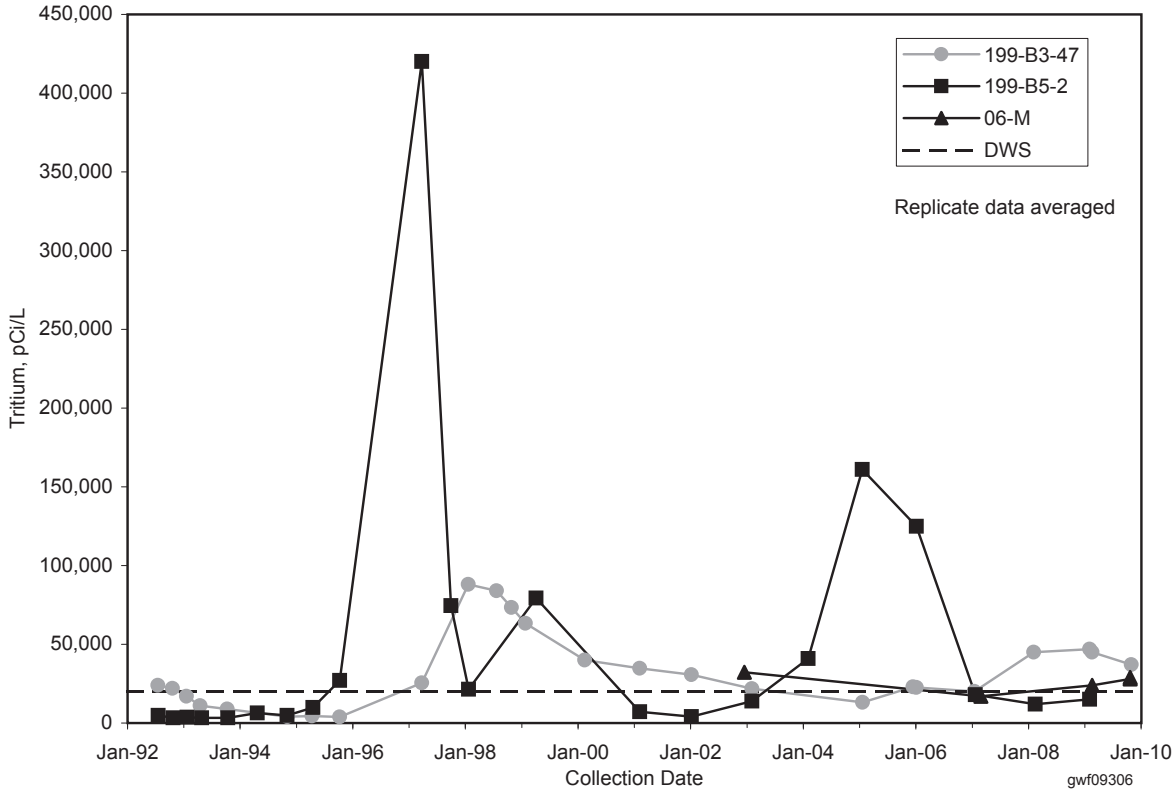


Figure 13-7. Tritium Concentrations in Southern 100-B/C Area Wells.

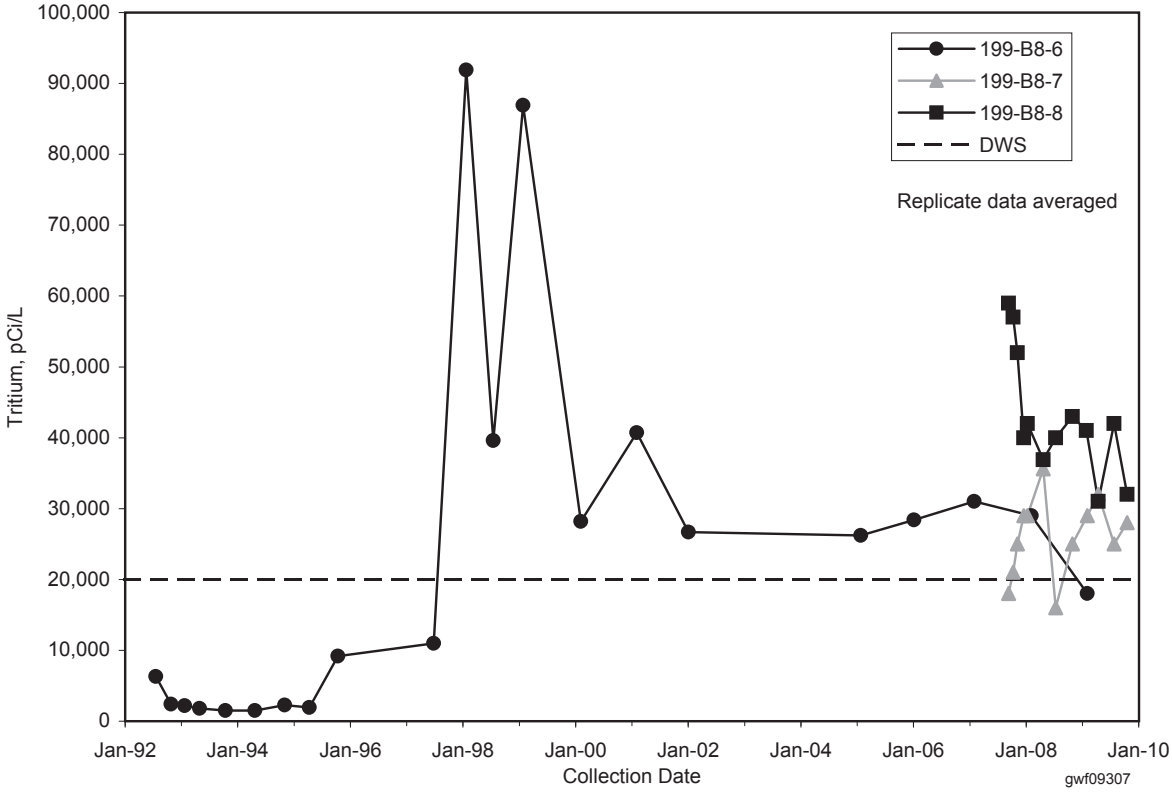


Figure 13-8. Average Chromium Concentrations in the 100-B/C Area, Upper Portion of Unconfined Aquifer.

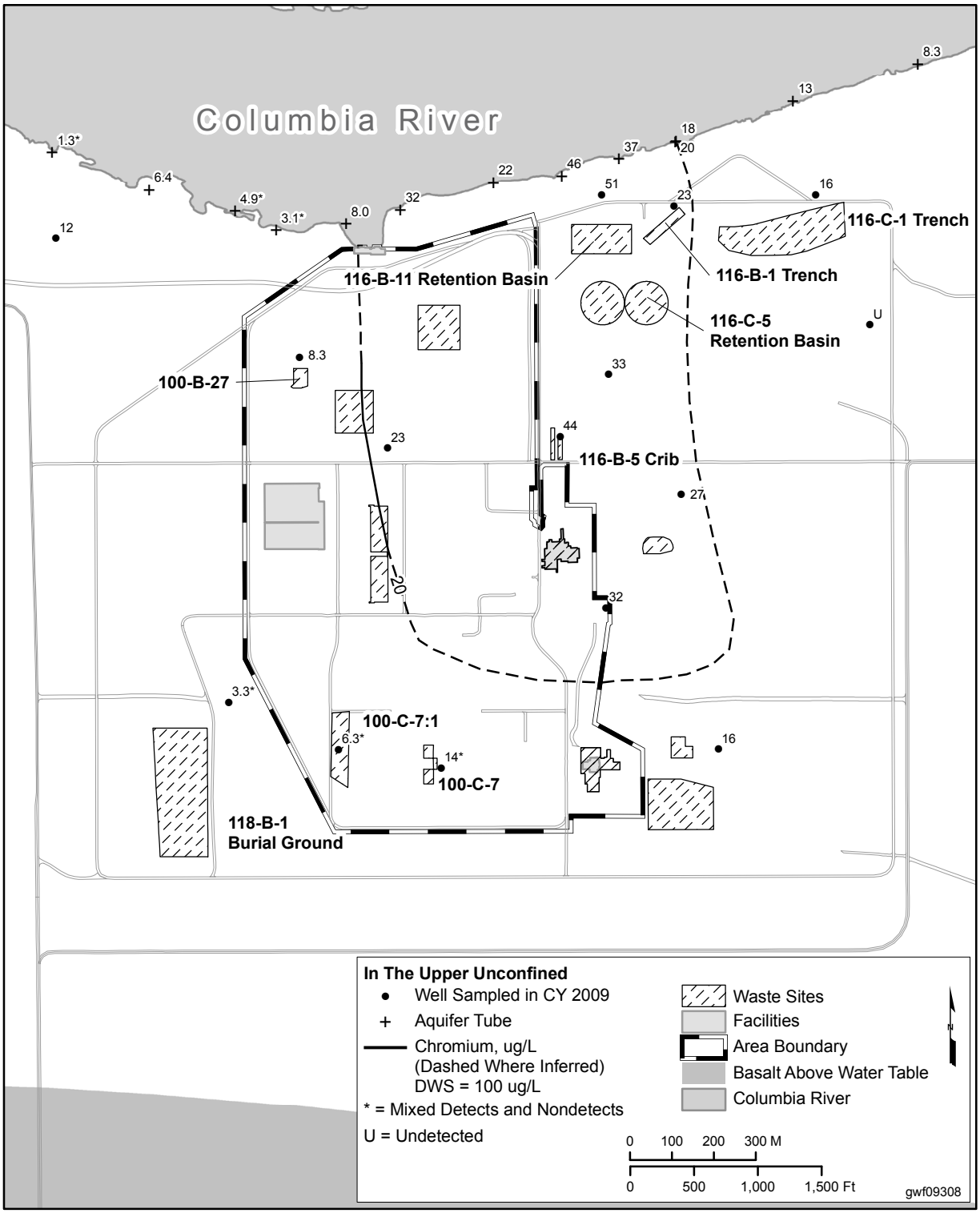


Figure 13-9. Chromium Concentrations in Well 199-B3-47, Northeastern 100-B/C Area.

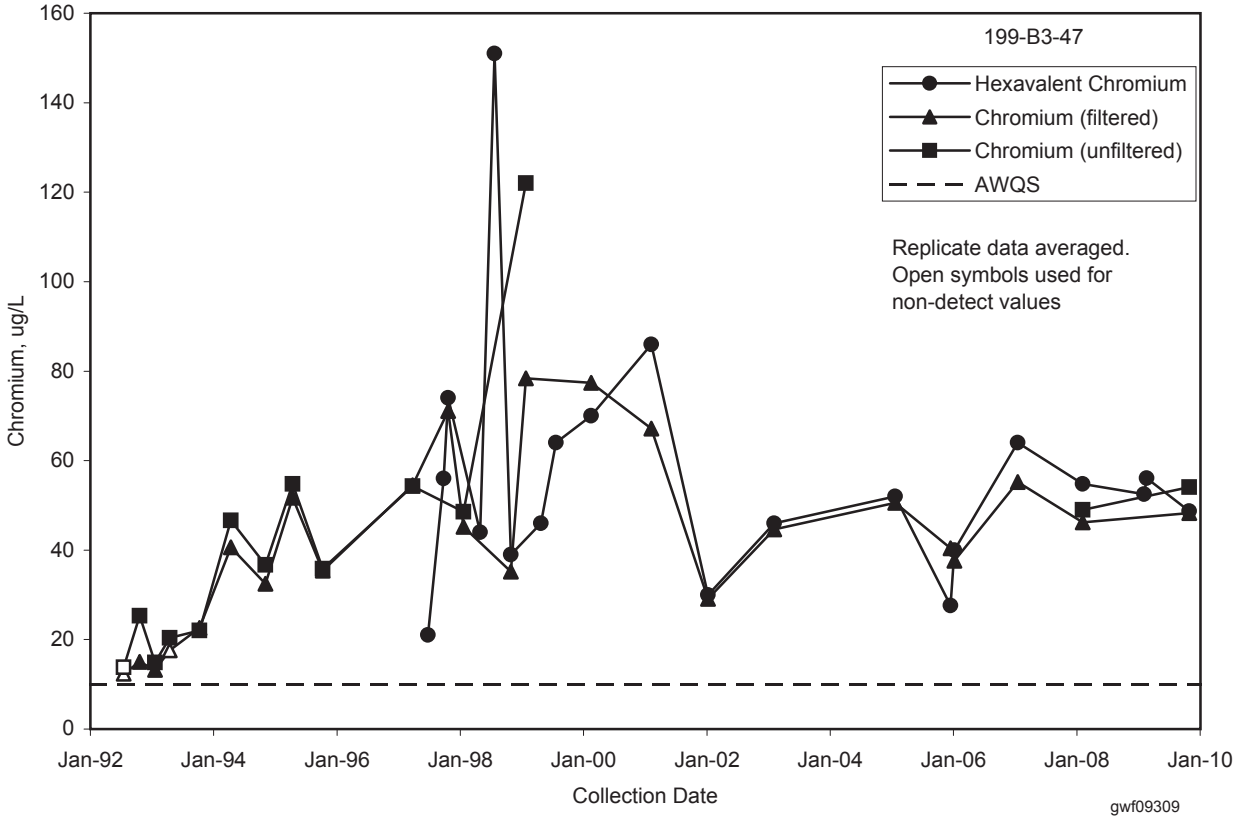


Figure 13-10. Hexavalent Chromium Concentration Profile in New Wells.

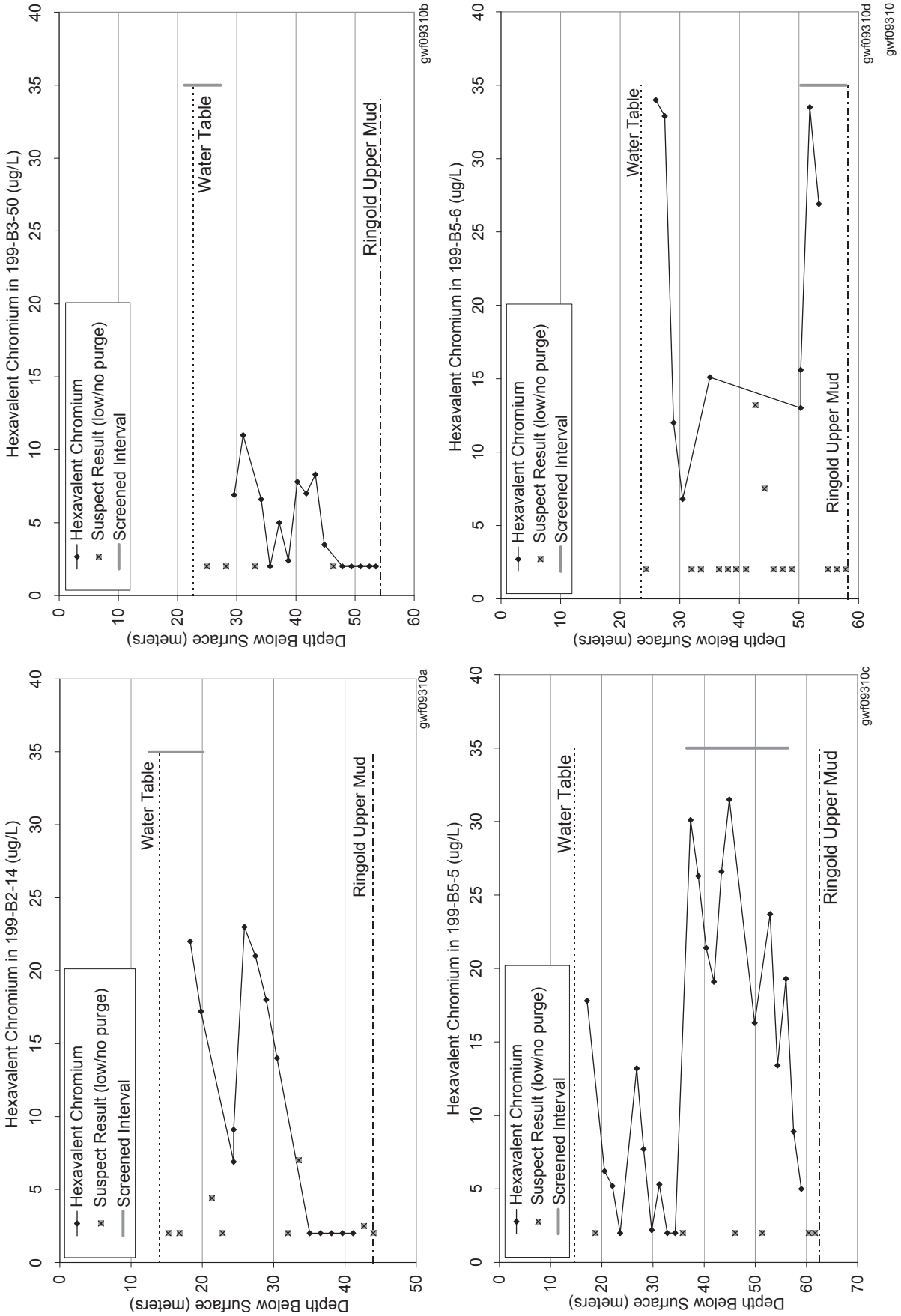
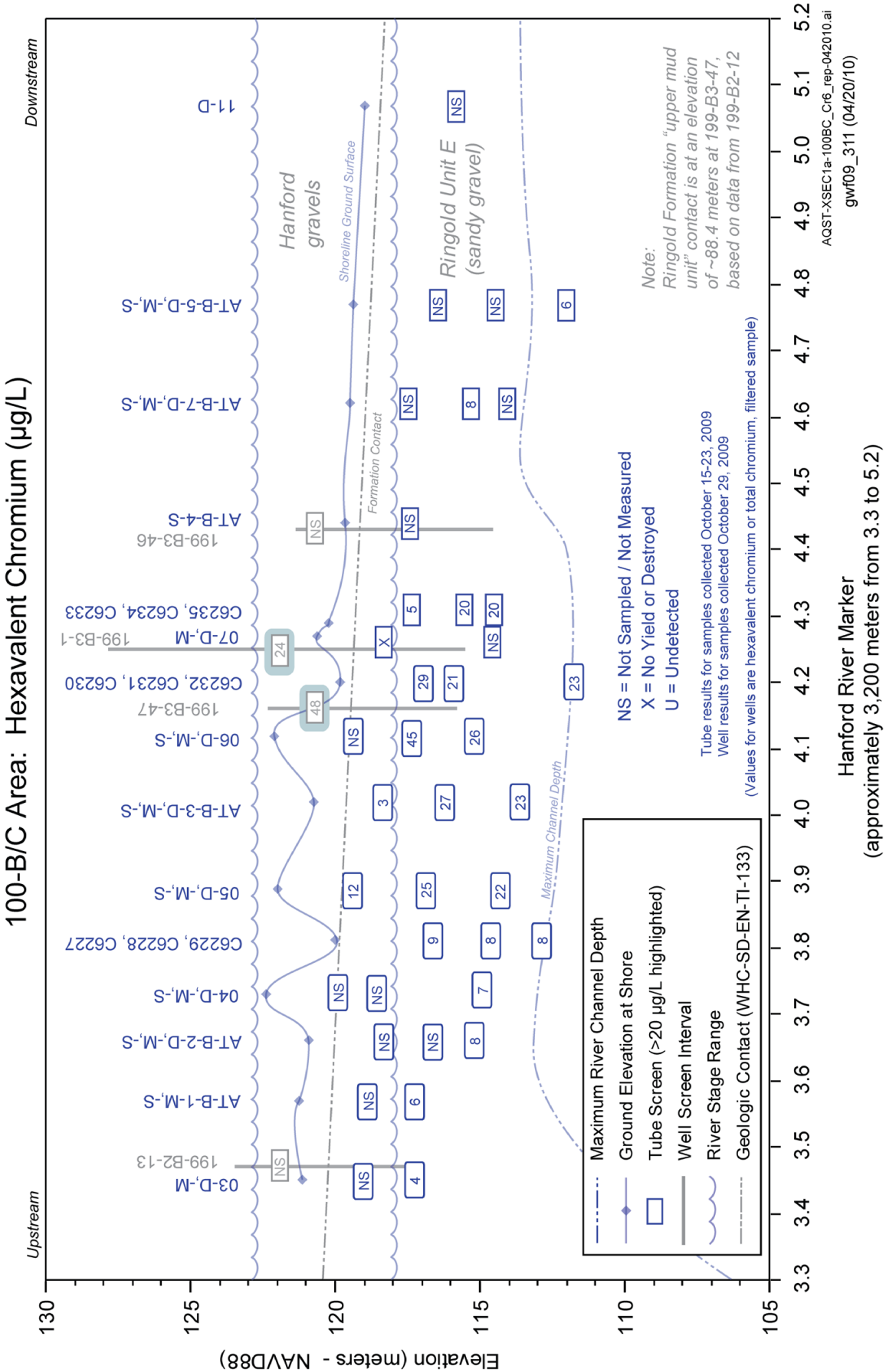


Figure 13-11. Cross-Section of Chromium Concentrations and Screen Elevations in Wells and Aquifer Tubes in the 100-B/C Area.



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