SGW-52135
Revision 0

First Semiannual Report for 2011 Post-Closure Corrective Action Groundwater Monitoring at the 183-H Solar Evaporation Basins and 300 Area Process Trenches: January - June 2011

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

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Executive Summary

This is the first semiannual report on post-closure corrective action groundwater monitoring for the 183-H Solar Evaporation Basins and the 300 Area Process Trenches. It fulfills the requirement of *Washington Administrative Code* (WAC) 173-303-645(11)(g) to report twice each year on the effectiveness of the corrective action program. This report covers the period from January through June 2011. Environmental data used to generate this report are available at http://environet.hanford.gov/eda/. Ongoing validation, verification, and technical review efforts may result in differences between the data used for this publication and those available after publication of this report, via the environmental data access tool.

During the reporting period, concentrations of 183-H Solar Evaporation Basins contaminants remained below permit concentration limits in the unconfined aquifer, though hexavalent chromium contamination from other sources was present in the Ringold Upper Mud at concentrations above the permit compliance limit at Well 199-H4-12C. This well has been added to the pump and treat extraction system, and it continues to extract contaminated groundwater for treatment. Corrective action through the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) interim action remains effective.

Concentration of uranium in groundwater downgradient of the 300 Area Process Trenches remained above the 20 µg/L concentration limit in the three wells screened at the water table. Changing river stage causes fluctuations in the measured uranium concentrations. Cis-1,2-dichloroethene concentrations remained above the 70 µg/L concentration limit in one deep well (399-1-16B). Concentrations are relatively steady at this well and are not affected by river stage. Trichloroethene (TCE) concentrations were measured slightly above the detection limit in deep well 399-1-16B, and not reported in the remaining wells during the reporting period. Corrective actions through the CERCLA interim action (attenuation and institutional controls) have been effective for TCE, and moderately effective for uranium. The CERCLA RI/FS for the 300-FF-5 Operable Unit will further evaluate the feasibility of remedies for these constituents.

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TERMS

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DWS	drinking water standard
OU	operable unit
RCRA	*Resource Conservation and Recovery Act of 1976*
TCE	trichloroethene
WAC	*Washington Administrative Code*

1. Introduction

This semiannual report for post-closure corrective action groundwater monitoring describes the effectiveness of corrective action at the 183-H Solar Evaporation Basins (waste site 116-H-6) and the 300 Area Process Trenches. It fulfills the requirement of *Washington Administrative Code* (WAC) 173-303-645(11)(g) to report twice each year on the effectiveness of the corrective action program. This report covers the period from January through June 2011. Chapter 2.0 presents information for the 183-H Solar Evaporation Basins, and Chapter 3.0 presents information for the 300 Area Process Trenches.

Environmental data used to generate this report are available at http://environet.hanford.gov/eda/. Ongoing validation, verification, and technical review efforts may result in differences between the data used for this publication and those available after publication of this report via the environmental data access tool.

2. 183-H Solar Evaporation Basins

Formerly located in the 100-H Area of the Hanford Site, the 183-H Solar Evaporation Basins were four concrete basins used for waste treatment and disposal from 1973 to 1985. The waste discharged to the basins originated in the 300 Area Fuel Fabrication Facility and included solutions of neutralized chromic, hydrofluoric, nitric, and sulfuric acids. The waste solutions contained various metallic and radioactive constituents (e.g., chromium, technetium-99, and uranium). Between 1985 and 1996, the remaining waste was removed, the facility was demolished, and underlying contaminated soil was removed and replaced with clean fill. The site is a post-closure unit in the Hanford Facility RCRA Permit (WA7890008967, *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste*). Groundwater is monitored in accordance with WAC 173-303-645(11) and Part VI, Chapter 2 of the Hanford Facility RCRA Permit.

The regulations in WAC 173-303-645(11) require implementation of a corrective action program to reduce contaminant concentrations in groundwater. The post-closure plan (DOE/RL-97-48, *183-H Solar Evaporation Basins Postclosure Plan*), which was incorporated into Part VI of the Hanford Facility RCRA Permit in February 1998, deferred further groundwater corrective action at the basins (also known as waste site 116-H-6) to the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) interim action for the 100-HR-3 Groundwater Operable Unit. The post-closure plan also requires monitoring to be conducted as described in the RCRA permit groundwater-monitoring plan for this facility (PNNL-11573, *Groundwater Monitoring Plan for the 183-H Solar Evaporation Basins*).

2.1 100-HR-3 CERCLA Interim Remedial Action

The interim remedial action for groundwater contamination in the 100-HR-3 Groundwater Operable Unit is implemented under the authority of a CERCLA Interim Record of Decision (EPA 1996a, *Declaration of the Record of Decision for the 100-HR-3 and 100-KR-4 Operable Units, Hanford Site, Benton County, Washington*). The objective of the interim remedial action is to reduce the amount of chromium entering the Columbia River, where it is a potential hazard to the ecosystem. The interim action is implemented by a pump-and-treat system, which extracts groundwater, treats it to remove chromium, and then injects it back into the aquifer. Figure 1 illustrates the nearby active extraction and injection wells. Details of the pump-and-treat system are specified in DOE/RL-96-84, *Remedial Design and Remedial Action Work Plan for the 100-HR-3 and 100-KR-4 Groundwater Operable Units' Interim Action*.

Construction of the new 800-gpm HX pump and treat system was underway during the reporting period. The new system will replace the aging 300-gpm HR-3 pump and treat system. Together with the 600-gpm

DX pump and treat system started in December 2010, the 100-HR-3 Operable Unit interim remedial action will have the expanded capacity to hydraulically contain and remediate hexavalent-chromium contaminated groundwater throughout the operable unit. In May 2011, the original HR-3 pump and treat system ceased operations in order to connect the extraction and injection wells on that system to the new HX system. The new HX system was started in September of 2011.

A Remedial Investigation/Feasibility Study is being conducted, and a Draft A RI/FS report will be issued during 2012. As part of the RI/FS field activities, a new borehole was installed through the former 183-H Solar Evaporation Basins and completed as a temporary well. Data from this well will be available in the summer of 2011 and discussed in the forthcoming July through December 2011 Semiannual Report.

Groundwater is sampled to monitor the performance of the interim remedial action and the 100-HR-3 Groundwater Operable Unit (DOE/RL-96-90, *Interim Action Monitoring Plan for the 100-HR-3 and 100-KR-4 Operable Units*). Activities for CERCLA and RCRA monitoring are coordinated. A revision of the Remedial Design/Remedial Action Work Plan and the Interim Action Monitoring Program are underway to address the new DX and HX systems.

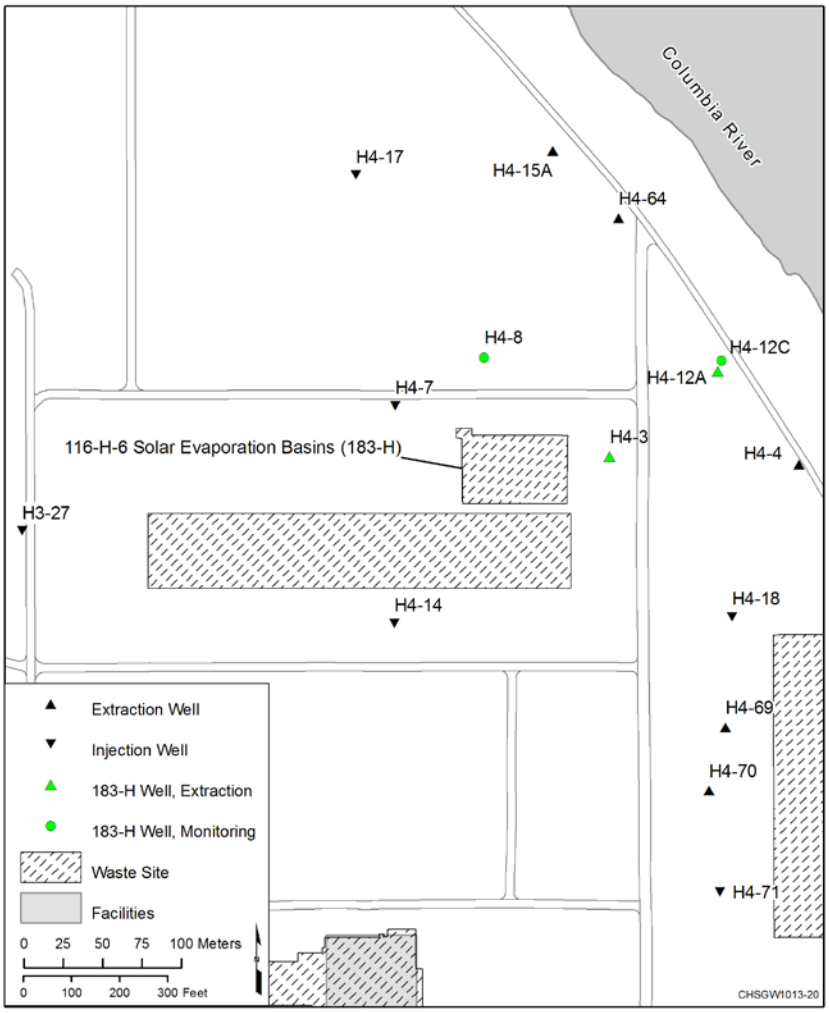

Figure 1. Monitoring Well Locations for 183-H (116-H-6) Basins

2.2 183-H Basins RCRA Groundwater Monitoring Program

During the CERCLA interim remedial action, RCRA corrective action monitoring will continue to evaluate new analytical results relative to permit concentration limits (Table 1). Additionally, fluoride results will be evaluated relative to established trends and the drinking water standard (DWS) for fluoride[1] (Hanford Facility RCRA Permit, Part VI, Chapter 2).

Table 1. Permit Concentration Limits for 183-H Solar Evaporation Basins

Dangerous Waste Constituents	Concentration Limit
Chromium (total; filtered sample)	122 µg/L – local background when compliance monitoring plan written (1996); upgradient sources
Nitrate	45 mg/L – DWS (as NO_3)
Other 183-H Waste Indicators	**Concentration Limit**
Technetium-99	900 pCi/L – DWS
Uranium (total; chemical analysis)	20 µg/L – proposed DWS when monitoring plan written (1996)

DWS = drinking water standard

The RCRA groundwater-monitoring network includes wells 199-H4-3, 199-H4-8, 199-H4-12A, and 199-H4-12C (Figure 1). The conditions in the Hanford Facility RCRA Permit, Part VI, Post-Closure Unit 2, provide for groundwater sample collection annually in these wells (generally in November). The wells were not scheduled for sampling of RCRA constituents during the reporting period. Wells 199-H4-12A and 199-H4-12C were sampled to measure chromium and hexavalent chromium concentrations in support of the 100-HR-3 interim action.

Wells 199-H4-3 (not in service) and 199-H4-12C (in service) are extraction wells. Though it is still sampled, well 199-H4-3 was removed from extraction service because low production and impending waste site remediation activities. After the 100-H aquifer test and rebound study (described in SGW-47776), well 199-H4-12C was added to the extraction network, replacing well 199-H4-12A. Well 199-H4-8 has been part of the RCRA network since 2006; it replaced well 199-H4-7, which was converted to an injection well for the 100-HR-3 Pump-And-Treat System. Wells 199-H4-3, 199-H4-8, and 199-H4-12A are completed at the top of the unconfined aquifer. Well 199-H4-12C is located adjacent to well 199-H4-12A and is completed deeper within the Ringold Upper Mud.

2.3 183-H Basins Contaminant Trends

This section discusses the concentrations of chromium, fluoride, nitrate, technetium-99, and uranium in the groundwater. During the reporting period, two wells were scheduled for sampling (199-H4-12A and 199-H4-12C). Results from the sampling are presented in Table 2, and pertinent results are discussed in the following paragraphs.

1 The RCRA Permit gives the value 1,400 µg/L as the U.S. Environmental Protection Agency maximum contaminant level (DWS) for fluoride. The actual limit is 4,000 µg/L.

Chromium[2] concentrations ranged from below detection limits to 148 µg/L (Table 2; Figures 2, 3, and 4). In well 199-H4-12A, the January sample was analyzed for both total chromium by the laboratory, and hexavalent chromium using the colorimetric method (at the pump and treat facility). Discrepancies between the results reported by each method are within 6 µg/L, and reflect differing reporting limits. In the unconfined aquifer, chromium concentrations have remained below the 122 µg/L concentration limit in all four wells since 2003.

The high concentrations measured in 199-H4-12C (134 to 148 µg/L during the reporting period) reflect contamination from past releases that entered the RUM. The levels in this well have declined from ~300 µg/L in the early 1990s, and were stable until 2009, when the well was connected to the HR-3 pump and treat system (refer to Figure 4). Since connection, hexavalent chromium concentrations have climbed, as contaminated groundwater is pulled towards this extraction well.

The hexavalent chromium concentrations observed in 199-H4-12C are from historical releases at other sources, not releases from the 183-H Solar Evaporation Basin. This conclusion is supported by observation that basin co-contaminants (i.e., nitrate, technetium-99, and uranium) are not elevated in Well 199-H4-12C (see Figure 5, 6, and 7), and that the 100-H aquifer test and rebound study suggests that there is low communication between the unconfined aquifer and the confined aquifer at this location (SGW-47776). This exceedance of the CERCLA remedial action objectives (20 µg/L) and permit concentrations (122 µg/L) were addressed by connecting well 199-H4-12C to the pump and treat system.

The source, nature, and extent of hexavalent chromium in the confined aquifer at 100-HR-3 Operable Unit are being addressed in the forthcoming CERCLA RI/FS Report.

Table 2. Groundwater Data for 183-H Basins, January through June 2011.

Well	Date	Hexavalent Chromium (µg/L)	Chromium, total (µg/L)		Fluoride (µg/L)	Nitrate (mg/L)	Technetium-99 (pCi/L)	Uranium (µg/L)
Concentration Limit*		***122***	***122***		***1400***	***45***	***900***	***20***
199-H4-12A	1/24/2011[a]	—	14	U	—	—	—	—
199-H4-12A	1/24/2011[a]	8.4	—		—	—	—	—
199-H4-12C	1/5/2011[a]	**138**	—		—	—	—	—
199-H4-12C	2/3/2011[a]	**136**	—		—	—	—	—
199-H4-12C	3/7/2011[a]	**148**	—		—	—	—	—
199-H4-12C	4/4/2011[a]	**138**	—		—	—	—	—
199-H4-12C	5/2/2011[a]	**134**	—		—	—	—	—

* Concentration limits defined in the Hanford Facility RCRA Permit, Part VI, Post-Closure Unit 2

a These samples were collected to monitor the performance of the CERCLA interim action

U = below detection limit

Analyses are from unfiltered samples unless otherwise noted. Shading indicates filtered samples.

Bold emphasis added where the result exceeded the permit concentration limit.

2 Chromium results discussed here represent hexavalent chromium, which can be measured either by analyses specifically for the hexavalent species or from total chromium measured in filtered samples. Dissolved chromium in Hanford Site groundwater is nearly all hexavalent.

2.4 183-H Basins Conclusions

From January through June 2011, contaminant concentrations in the unconfined aquifer remained below permit concentration limits. Concentrations of hexavalent chromium in 199-H4-12C result from historical releases, and remain above permit concentration limits and CERCLA remedial action objectives. With addition of 199-H4-12C to the pump and treat system, corrective action through the CERCLA interim action remains effective.

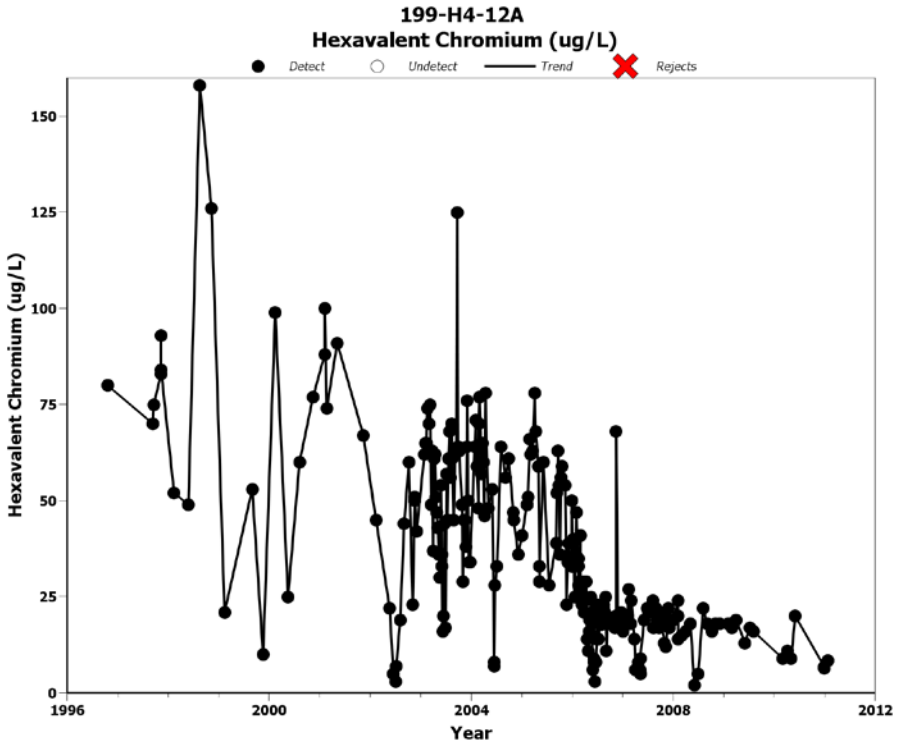

Figure 2. Hexavalent Chromium Concentrations in Well199-H4-12A

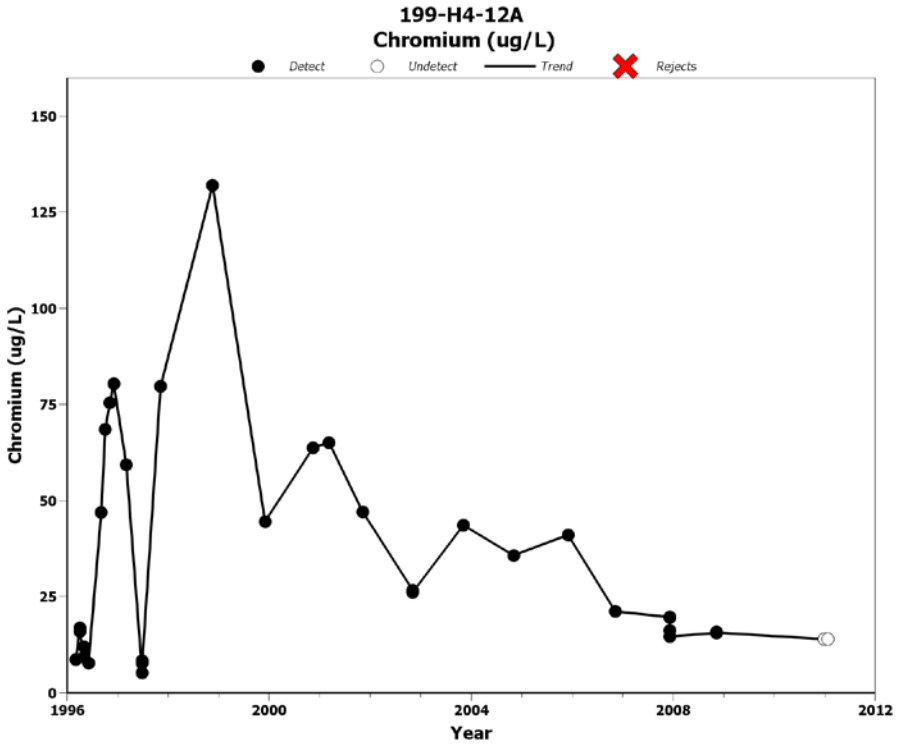

Figure 3. Filtered Total Chromium Concentrations in Well 199-H4-12A

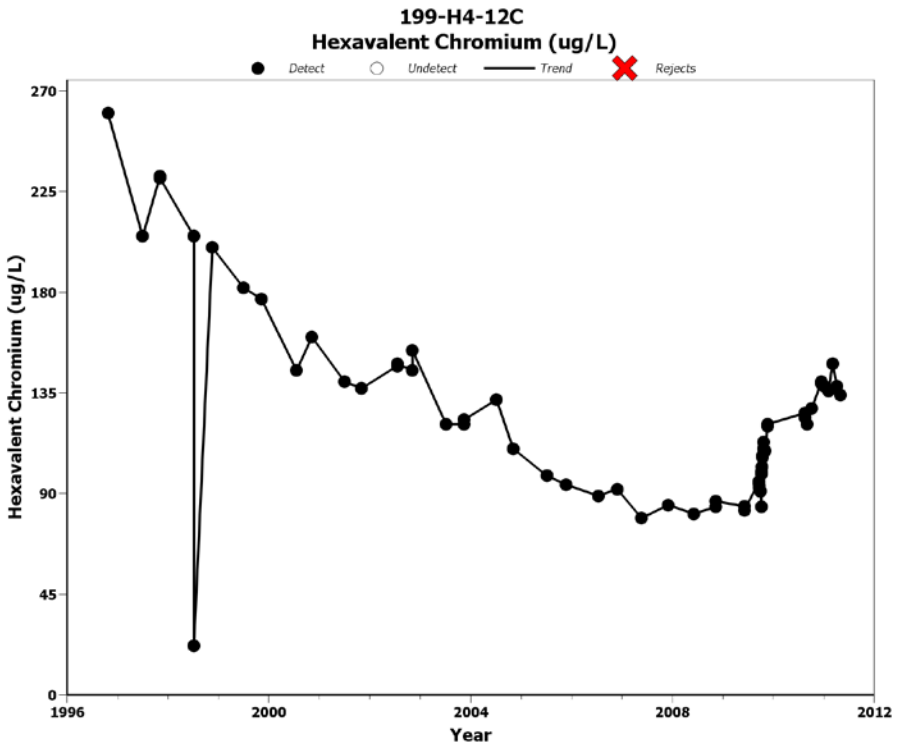

Figure 4. Hexavalent Chromium Concentrations in Well 199-H4-12C. Recent Increasing Concentrations Coincide with the 2009 100-H Aquifer Test, and Addition of the Well to the Pump and Treat System.

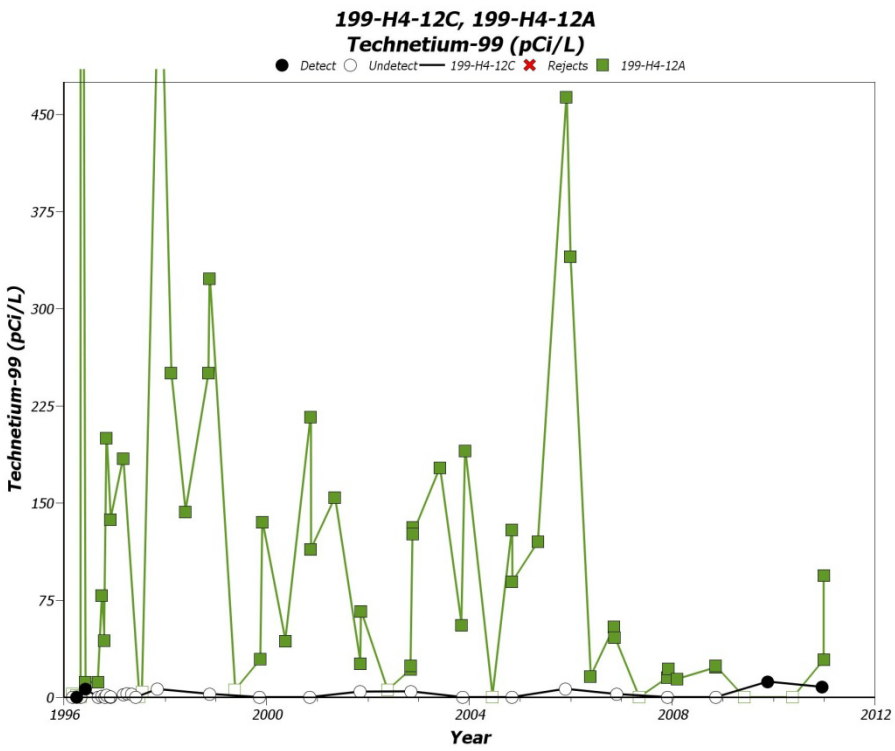

Figure 5. Uncorrelated Technetium Concentrations in Wells 199-H4-12C and 199-H4-12A indicate contamination within the Ringold Upper Mud is not from the 183-H Solar Evaporation Basins

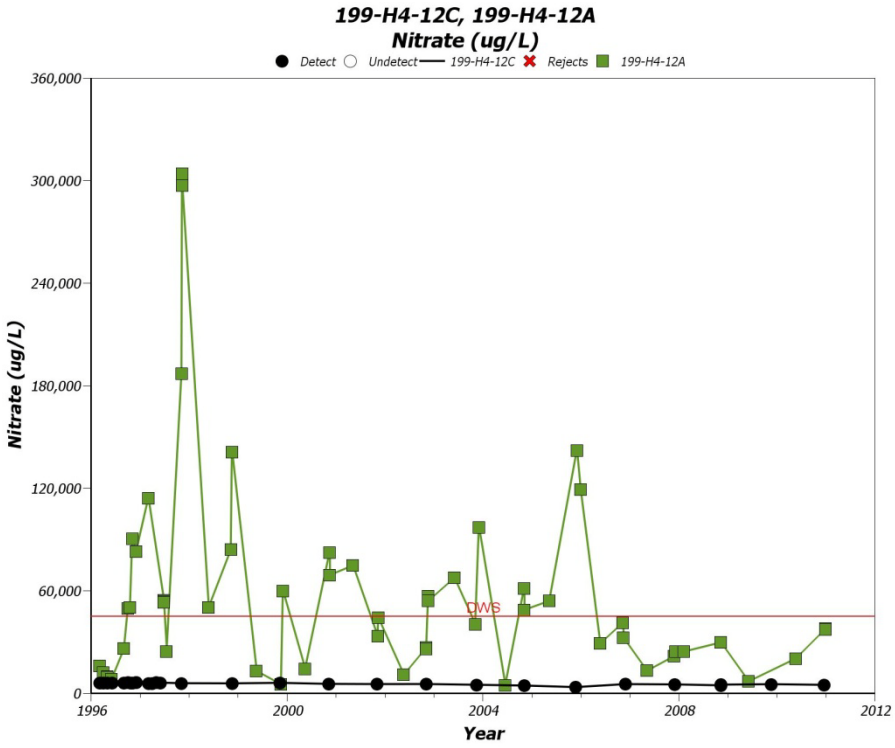

Figure 6. Uncorrelated Nitrate Concentrations in Well 199-H4-12C and 199-H4-12A indicate contamination within the Ringold Upper Mud is not from the 183-H Solar Evaporation Basins

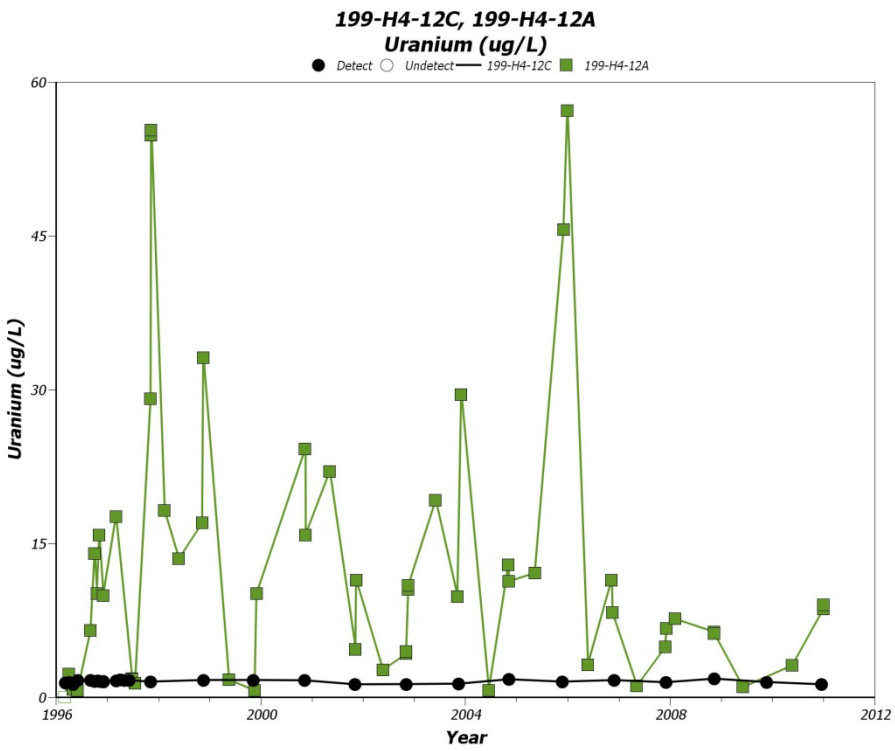

Figure 7. Uncorrelated Uranium Concentrations in Well 199-H4-12C and 199-H4-12A indicate contamination within the Ringold Upper Mud is not from the 183-H Solar Evaporation Basins

3. 300 Area Process Trenches

The 300 Area Process Trenches are permitted as a RCRA treatment, storage, and/or disposal unit in post-closure corrective action monitoring. From 1975 to 1994, the trenches received effluent discharges of dangerous mixed waste from fuel fabrication and research laboratories in the 300 Area. The site was remediated in the 1990s. Groundwater monitoring at the 300 Area process trenches is conducted in accordance with WAC 173-303-645(11) and the Hanford Facility RCRA Permit, Part VI, Chapter 1. The closure plan (DOE/RL-93-73, *300 Area Process Trenches Modified Closure Plan and Part A, Form 3*) indicates groundwater corrective action will be addressed as part of the remediation for the CERCLA 300-FF-5 Groundwater OU. The CERCLA waste site designation is 316-5.

The objective of groundwater monitoring is to demonstrate the effectiveness of the corrective action program by confirming that trends in the data for groundwater constituents reflect natural attenuation, as expected by the CERCLA record of decision (EPA 1996b, *Declaration of the Record of Decision for the 300-FF-1 and 300-FF-5 Operable Units, Hanford Site, Benton County, Washington*). The 300 Area Process Trenches were closed under a modified closure/post closure plan (DOE/RL-93-73) and remain in the groundwater corrective action program because groundwater contamination continues to exceed CERCLA remedial action objectives and RCRA permit concentration limits.

3.1 300 Area Process Trenches RCRA Groundwater Monitoring Program

The permit concentration limits established for the 300 Area Process Trenches are provided in Table 4. RCRA corrective action monitoring will continue to evaluate new analytical results relative to permit concentration limits.

Table 3. Permit Concentration Limits for 300 Area Process Trenches.

Dangerous Waste Constituents	Concentration Limit
cis-1,2-Dichloroethene	70 µg/L – DWS
Trichloroethene (TCE)	5 µg/L – DWS
Other 300 Area Process Trenches Waste Constituent	**Concentration Limit**
Uranium (total; chemical analysis)	20 µg/L – proposed DWS when monitoring plan written (1996)

The groundwater-monitoring network for the 300 Area Process Trenches (WHC-SD-EN-AP-185, *Groundwater Monitoring Plan for the 300 Area Process Trenches*) includes four well pairs (Figure 4). Each of the well pairs has one shallow and one deep well. The shallow wells are screened at the water table, and the deep wells are screened at the bottom of the unconfined aquifer (above the lacustrine and over-bank deposits of the Ringold lower mud unit). One well pair is upgradient and the other three pairs are downgradient. The wells are monitored for the constituents in Table 4. Sampling frequency is semiannual, but during each semiannual sampling period the wells are sampled four times (monthly intervals). As a result, the wells are sampled during the months of December, January, February, March, and June, July, August, September. Data from 300-FF-5 Groundwater Operable Unit sampling are used as supplementary information to construct larger-scale water table and uranium-concentration maps that extend beyond the area of the 300 Area Process Trenches network.

During the January through June 2011 reporting period, the 300 Area Process Trenches post-closure monitoring network wells were sampled during January, February, March, and June. Wells 399-1-10A,

399-1-16A, and 399-17A were sampled in April and May for the CERCLA interim action. Uranium data from those sampling events are included in the discussions of Section 3.2.

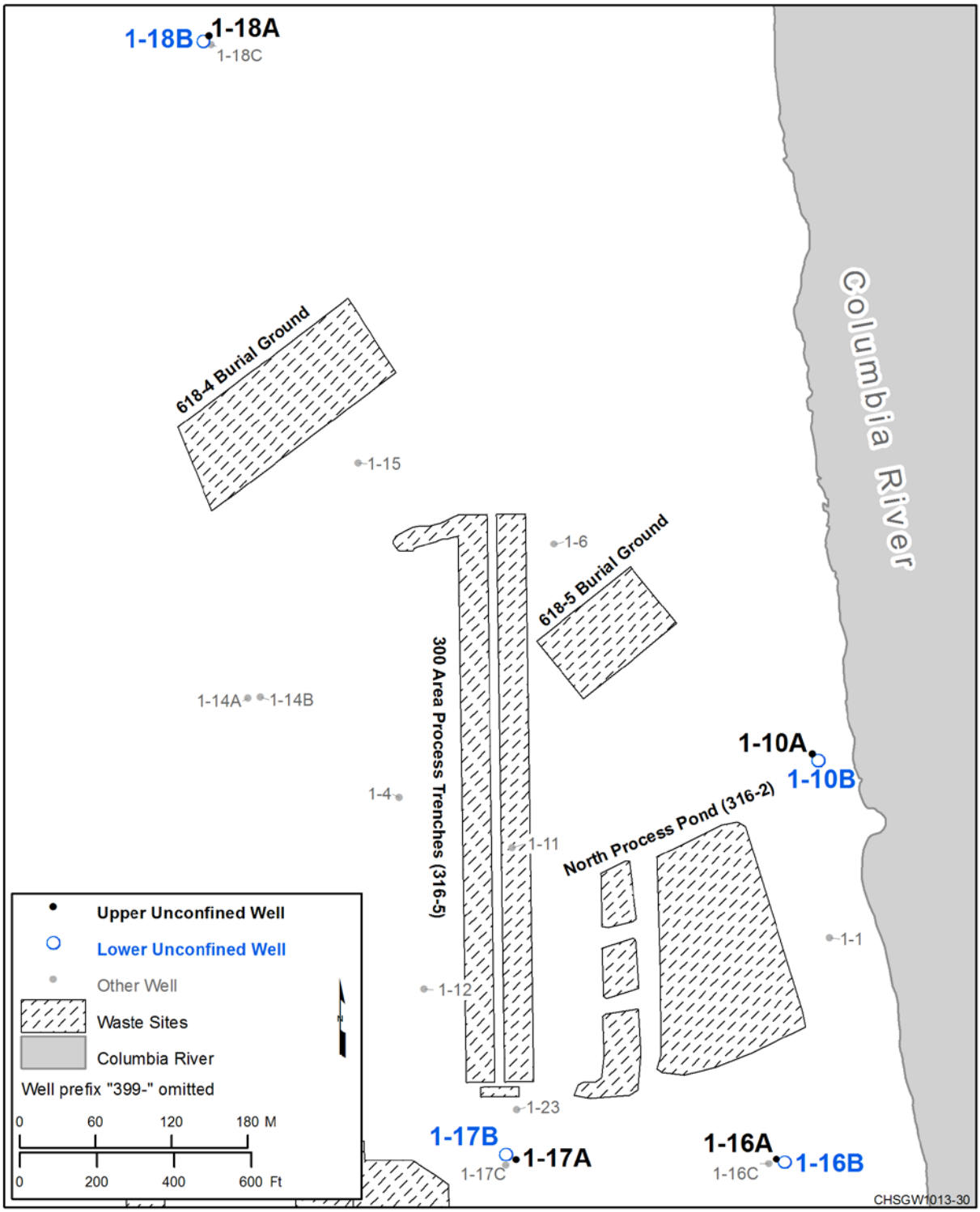

Figure 8. Monitoring Well Locations for the 300 Area Process Trenches (shown in large lettering)

3.2 300 Area Process Trenches Contaminant Trends

This section discusses concentrations of cis-1,2-dichloroethene, TCE, and uranium measured during the reporting period. Table 5 lists the analytical results for contaminants measured in each well.

Cis-1,2-dichloroethene was observed in two wells in the 300 Area Process Trenches network during the reporting period (399-1-16B, and 399-1-17B). The "B" wells are screened in the lower portion of the unconfined aquifer. Only well 399-1-16B had concentrations of cis-1,2-dichloroethene that exceeded the 70 µg/L concentration limit. While slightly higher than last reporting period, the trend at well 399-1-16B (Figure 9) was stable, ranging from 160 to 200 µg/L during this reporting period. Concentrations in well 399-1-17B ranged from undetected to 2.8 µg/L (Figure 10). This observation is flagged "J" by the laboratory, indicating it is an estimate. The current method detection limit is 1 µg/L.

During the reporting period, TCE did not exceed the 5 µg/L concentration limit in any of the network wells. Two measurements (March and June) in Well 399-1-16B observed TCE at 1.2 µg/L (Figure 11). Both of these values were flagged "J" by the laboratory, indicating the reported value is an estimate. The current method detection limit is 1 µg/L.

A persistent uranium plume underlies a large portion of the 300 Area. Uranium concentrations continued to exceed the concentration limit (20 µg/L) at wells 399-1-10A, 399-1-16A, and 399-1-17A. These three downgradient wells are screened at the water table. The highest concentration reported in the network wells was 96.4 µg/L at well 399-1-17A in June 2011.

Uranium concentration trends at wells 399-1-10A and 399-1-16A (Figures 12 and 13, respectively), tend to be highest in the fall and winter when water levels are low, and decline in spring and early summer when water levels are high. This trend is typical for these wells, which are located near the Columbia River.

The uranium concentration at well 399-1-17A (located farther from the river) tends to be lowest in the fall and winter, when water levels are low (Figure 14). The relationship of water levels and uranium concentration in the 300 Area is described in detail in PNNL-17034, *Uranium Contamination in the Subsurface Beneath the 300 Area, Hanford Site, Washington*.

Table 4. Groundwater Data for 300 Area Process Trenches, January through June 2010

Well	Date	Sampling Purpose	cis-1,2-Dichloroethene (µg/L)		Trichloroethene (µg/L)		Uranium (µg/L)	
Concentration Limit*			***70***		***5***		***20***	
399-1-10A	1/28/2011	RCRA	1	U	1	U	**21.4**	D
	2/24/2011	RCRA	1	U	1	U	**24.2**	D
	2/24/2011	RCRA	1	U	1	U	**23.4**	D
	3/23/2011	RCRA	1	U	1	U	**26.7**	D
	4/19/2011	CERCLA	—		—		**21.4**	D
	5/11/2011	CERCLA	—		—		**28.4**	D
	6/14/2011	RCRA	1	U	1	U	**15.2**	D

Table 4. Groundwater Data for 300 Area Process Trenches, January through June 2010

Well	Date	Sampling Purpose	cis-1,2-Dichloroethene (µg/L)		Trichloroethene (µg/L)		Uranium (µg/L)	
399-1-10B	2/07/2011	RCRA	1	U	1	U	0.1	UD
	2/22/2011	RCRA	1	U	1	U	0.1	UD
	3/22/2011	RCRA	1	U	1	U	0.1	UD
	6/14/2011	RCRA	1	U	1	U	0.1	UD
399-1-16A	1/28/2011	RCRA	1	U	1	U	**44**	D
	2/22/2011	RCRA	1	U	1	U	**29.2**	D
	3/22/2011	RCRA	1	U	1	U	**38.3**	D
	4/19/2011	CERCLA	—		—		**25.7**	D
	5/11/2011	CERCLA	—		—		**34.7**	D
	6/14/2011	RCRA	1	U	1	U	**15.3**	D
399-1-16B	1/28/2011	RCRA	**170**		1	U	11.9	D
	2/22/2011	RCRA	**200**		1	U	0.39	BD
	3/22/2011	RCRA	**190**		1.2	J	10.2	
	6/14/2011	RCRA	**160**		1.2	J	9.06	D
399-1-17A	1/20/2011	RCRA	1	U	1	U	**50.8**	D
	2/22/2011	RCRA	1	U	1	U	**77.6**	D
	3/22/2011	RCRA	1	U	1	U	**74**	D
	4/19/2011	CERCLA	1	U	1	U	**63.3**	D
	5/11/2011	CERCLA	—		—		**76.4**	D
	6/10/2011	RCRA	1	U	1	U	**96.4**	DF
399-1-17B	2/10/2011	RCRA	1	U	1	U	0.1	UD
	3/30/2011	RCRA	1	U	1	U	0. 1	UD
	6/13/2011	RCRA	2.8	J	1	U	0.1	UD
399-1-18A	1/20/2011	RCRA	1	U	1	U	5.54	D
	2/22/2011	RCRA	1	U	1	U	6.31	D
	3/23/2011	RCRA	1	U	1	U	5.48	D
	6/10/2011	RCRA	1	U	1	U	7.05	D
399-1-18B	2/10/2011	RCRA	1	U	1	U	0.1	UD
	3/30/2011	RCRA	1	U	1	U	0.1	UD
	6/13/2011	RCRA	1	U	1	U	0.1	UD

* Concentration limits defined in the Hanford Facility RCRA Permit, Part VI, Post-Closure Unit 2

Qualifiers: U = below the detection limit, J = estimated value, D = reported value is from a dilution, F = under technical review

Analyses are from unfiltered samples unless otherwise noted. Shading indicates filtered samples.

Bold emphasis added where the result exceeded the permit concentration limit.

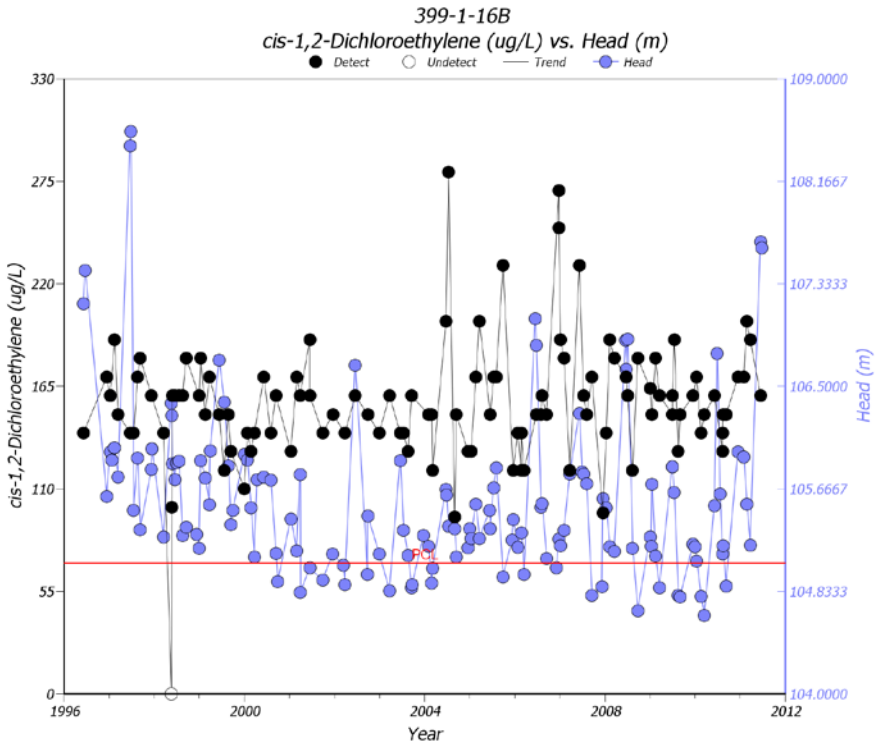

Figure 9. Cis-1,2-Dichloroethene Concentrations and Water Level in Well 399-1-16B are not Correlated.

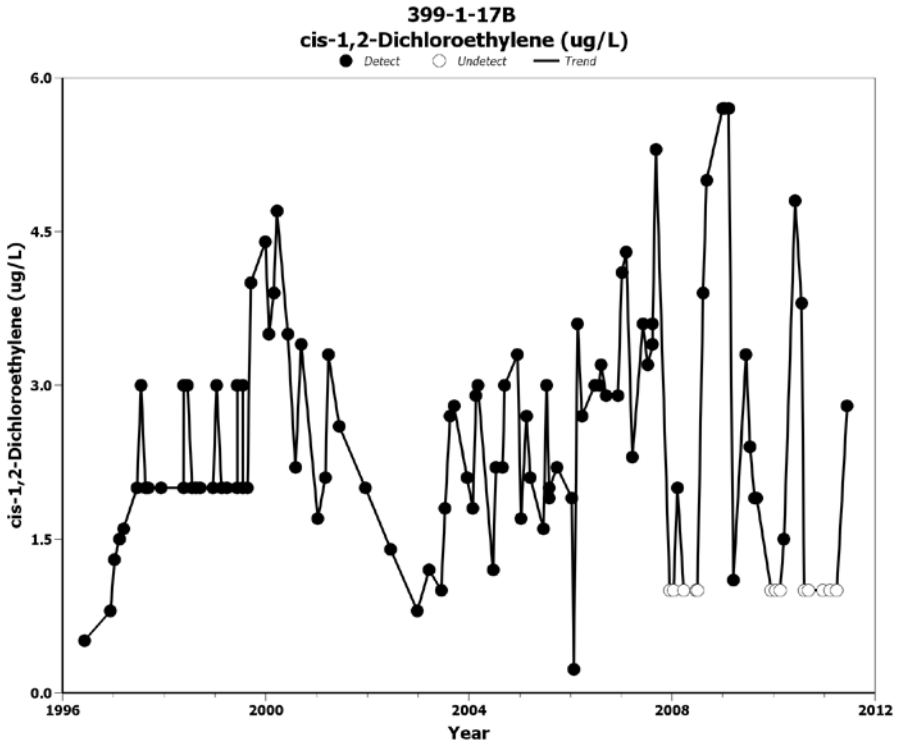

Figure 10. Cis-1,2-Dichloroethene Concentrations in Well 399-1-17B

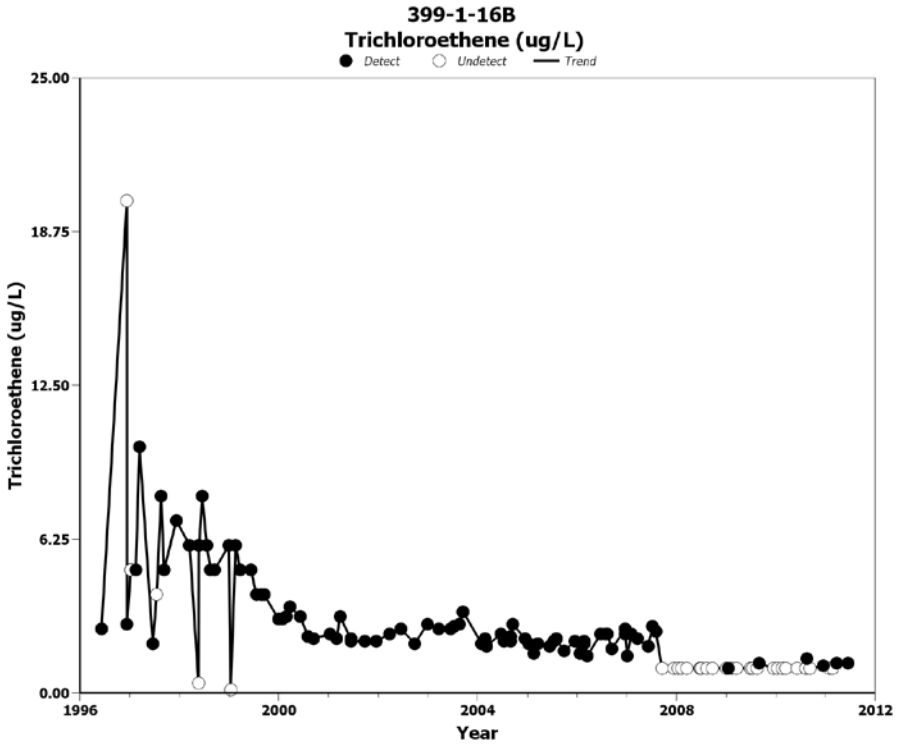

Figure 11. Trichloroethene Concentrations in Well 399-1-16B

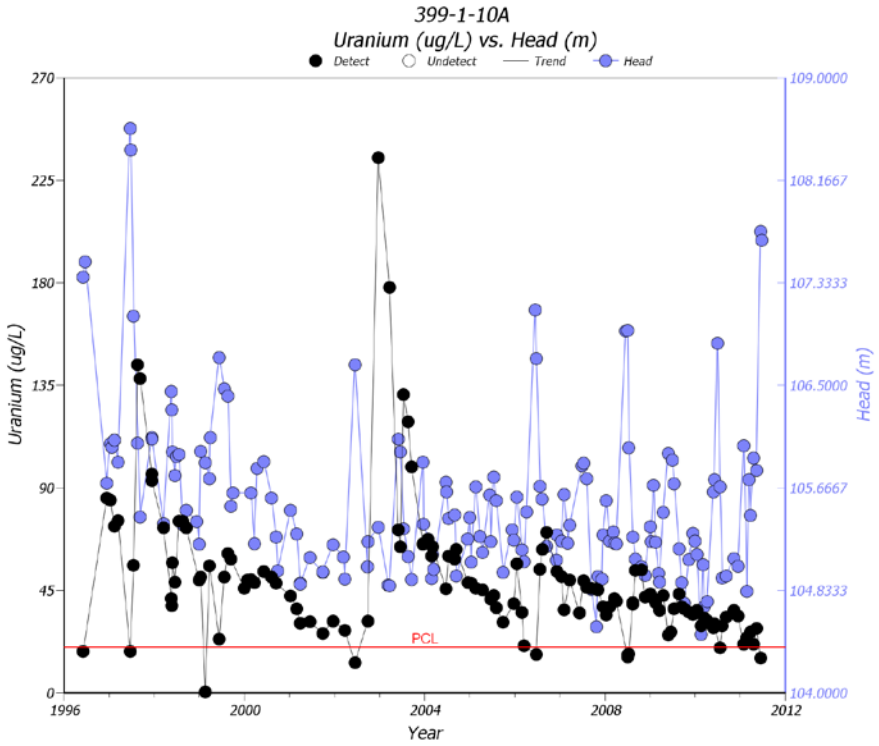

Figure 12. Uranium Concentrations and Water Level in Well 399-1-10A are Inversely Related

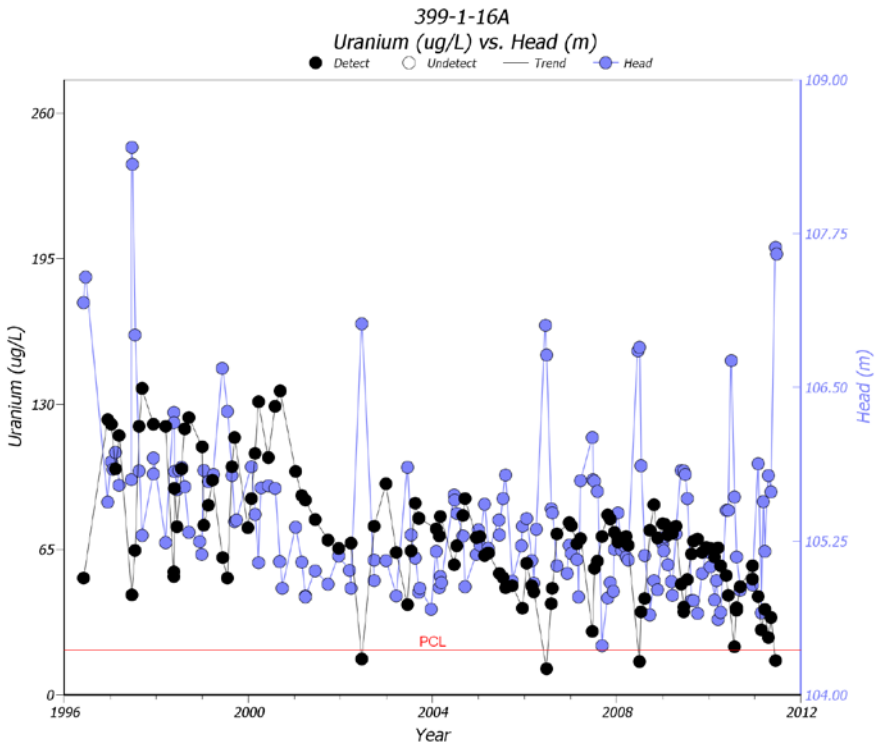

Figure 13. Uranium Concentrations and Water Level in Well 399-1-16A are Inversely Related

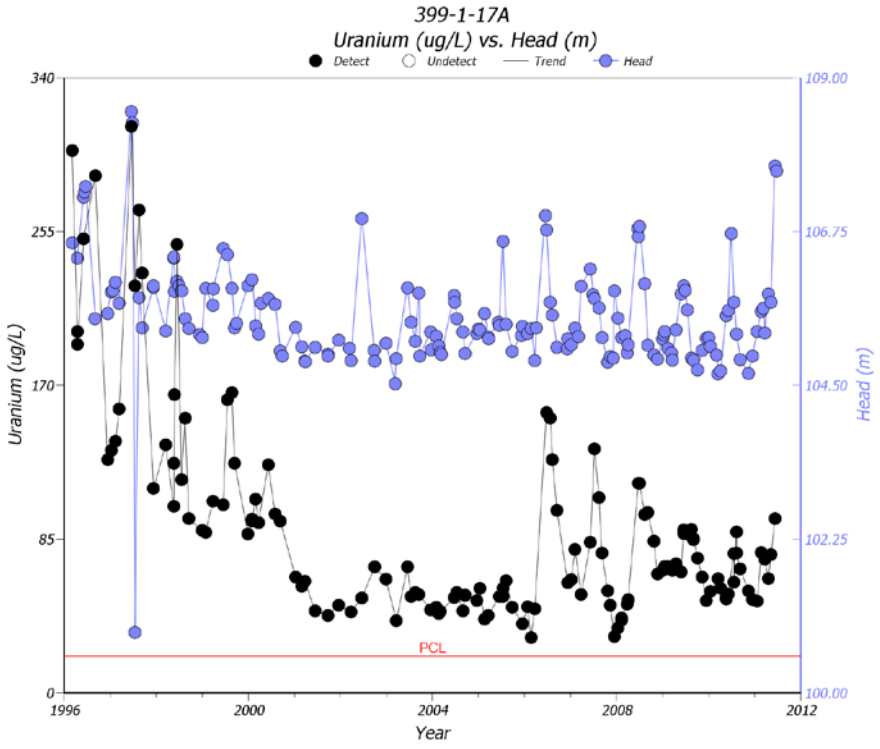

Figure 14. Uranium Concentrations and Water Level in Well 399-1-17A are Directly Related

3.3 300 Area Process Trenches Conclusions

Concentrations of cis-1,2-dichloroethene and uranium have not attenuated as quickly as expected under the CERCLA record of decision. The concentration of cis-1,2-dichloroethene continued at levels above the concentration limit (70 µg/L) in one well (399-1-16B) and is not affected by river stage (Figure 9). Three shallow, downgradient wells from the 300 Area Process Trenches (399-1-10A, 399-1-16A, and 399-1-17A) continued to have uranium concentrations that exceeded the 20 µg/L permit concentration limit. The overall trends at these wells for the last few years are relatively stable, although uranium concentrations occasionally increase or decrease temporarily. These variations are caused by seasonal water table and river-level fluctuations that, in turn, alter groundwater chemistry and affect uranium adsorption in the aquifer.

The TCE concentrations remained below the concentration limit (5 µg/L) during the reporting period. However, monitoring of this volatile organic will continue in compliance with the groundwater-monitoring plan.

Corrective actions through the CERCLA interim action (attenuation and institutional controls) have been effective for TCE, and moderately effective for uranium. The CERCLA RI/FS for the 300-FF-5 Operable Unit will further evaluate the feasibility of remedies for these constituents.

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