1219497

SGW-53449
Revision 0

Resource Conservation and Recovery Act Groundwater Quarterly Report for Calendar Year January through March 2012

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

CH2MHILL
Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352

RECEIVED
FEB 28 2013
EDMC

Approved for Public Release;
Further Dissemination Unlimited

attached to
1219496+1219498

SGW-53449
Revision 0

Resource Conservation and Recovery Act Groundwater Quarterly Report for Calendar Year January through March 2012

Document Type: TR Program/Project: SGRP

G. M. Hanson
CH2M Hill

Date Published
September 2012

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

CH2MHILL
Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352

APPROVED
By Julia Raymer at 11:41 am, Sep 12, 2012

Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

TRADEMARK DISCLAIMER

Reference herein to any specific commercial product, process, or service by tradename, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy.

Printed in the United States of America

Contents

1 Introduction 1

2 Quality Control and Laboratory Issues 1

3 Sampling and Analysis Status 1

3.1 Missed Sampling 1
3.2 Sampling Completed After Quarter 2
3.3 Stop Work 2

4 Inactive Waste Management Areas 3

4.1 1301-N Liquid Waste Disposal Facility (Interim, Detection) 3
4.2 1324-N/NA Facilities (Interim, Detection) 3
4.3 1325-N Liquid Waste Disposal Facility (Interim, Detection) 4
4.4 183-H Solar Evaporation Basins (Final, Corrective Action) 4
4.5 300 Area Process Trenches (Final, Corrective Action) 4
4.6 216-A-29 Ditch (Interim, Detection) 5
4.7 216-B-3 Pond (Interim, Detection) 5
4.8 216-B-63 Trench (Interim, Detection) 5
4.9 S-10 Pond and Ditch (Interim, Detection) 5
4.10 NRDWL (Interim, Detection) 5
4.11 216-A-36B Crib (Interim, Indicator Evaluation) 6
4.12 216-A-37-1 Crib (Interim, Indicator Evaluation) 6

5 Groundwater Monitoring Single Shell Tank (SST) Farm Waste Management Areas 6

5.1 SST WMA A-AX (Interim, Assessment) 6
5.2 SST WMA B-BX-BY (Interim, Assessment) 6
5.3 SST WMA C (Interim, Detection) 7
5.4 SST WMA S-SX (Interim, Assessment) 8
5.5 SST WMA T (Interim, Assessment) 8
5.6 SST WMA TX-TY (Interim, Assessment) 8
5.7 SST WMA U (Interim, Assessment) 8

6 Active Waste Management Areas 9

6.1 Integrated Disposal Facility (Final, Detection) 9
6.2 Liquid Effluent Retention Facility (Final, Detection) 9
6.3 LLWMA-1 (Interim, Detection) 9
6.4 LLWMA-2 (Interim, Detection) 10
6.5 LLWMA-3 (Interim, Detection) 11
6.6 LLWMA-4 (Interim, Detection) 11

Figures

Figure 1. Wells 199-N-72, 199-N-73 and 199-N-165 Specific Conductance 12
Figure 2. Well 199-N-165 Total Organic Carbon 12
Figure 3. Wells 199-N-71, 199-N-73 and 199-N-165 Total Organic Halides 13
Figure 4. Wells 399-1-10A, 399-1-16A and 399-1-17A Uranium 13
Figure 5. Well 299-E25-93 and 299-E25-236 Antimony 14
Figure 6. Well 299-E25-93 Chromium 14
Figure 7. Wells 299-E33-47, 299-E33-335, and 299-E33-338 Nitrate 15
Figure 8. Wells 299-E33-47, 299-E33-335, and 299-E33-338 Chromium 15
Figure 9. Wells 299-E33-47 and 299-E33-335 Cyanide 16
Figure 10. Wells 299-E33-7, 299-E33-47 and 299-E33-335 Cobalt-60 16
Figure 11. Wells 299-E27-4, 299-E27-24 and 299-E27-155 Technetium-99 17
Figure 12. Well 299-W19-45 Technetium-99 17
Figure 13. Well 299-W17-22 Nitrate 18
Figure 14. Well 299-E33-265 TOC 18
Figure 15. Wells 299-E32-10, 299-E33-34 and 299-E33-35 Specific Conductance 19
This page intentionally left blank 20

Tables

Table 1. Sampling Not Completed 1
Table 2. Sampling Completed After the End of the Quarter 2
Table 3. Sampling Response to 2011 TOC Exceedance at Well 199-N-165 3
Table 4. LLWMA-1 Indicator Parameter Data 10
Table 5. LLWMA-2 Indicator Parameter Data 10
Table 6. LLWMA-3 Indicator Parameter Averages 2010 and 2011 Comparison 11
Table 7. LLWMA-4 Indicator Parameter Data 11

Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CHPRC	CH2M Hill Plateau Remediation Company
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DWS	drinking water standard
Ecology	Washington State Department of Ecology
FLEDG	field logging and electronic data gathering system
HEIS	Hanford Environmental Information System
LLWMA	Low-Level waste management area
RCRA	*Resource Conservation and Recovery Act of 1976*
RDR	request for data review
S&GRP	Soil and Groundwater Remediation program
SST	single Shell Tank
TOX	total organic halides
TOC	total organic carbon
TSD	treatment, storage, and disposal
WAL	well access list
WMA	waste management area
WSCF	Waste Sampling and Characterization Facility

This page intentionally left blank.

1 Introduction

This document describes sampling performed in accordance with the *Resource Conservation and Recovery Act of 1976* (RCRA) during the January through March 2012 reporting period. The Soil and Groundwater Remediation program (S&GRP) presents data in a project document to more efficiently disseminate information not readily presented in the previous presentation format.

Quarterly information is provided to status sampling, summarize recent and pending changes in monitoring, and report statistical exceptions. Analytical data described in this report reflect data available at the end of the reporting period. Outstanding results will be discussed in the next report. Groundwater monitoring result highlights and site maps are provided only if changes are determined to be significant. Data are officially reported and accessed through the Environmental Dashboard Application at http://environet.hanford.gov/EDA/

Sections two and three identify any quality control or laboratory issues, and the sampling and analysis status for the reporting period. Sections four (Inactive Waste Sites), five (Groundwater Monitoring Single Shell Tank Farm Waste Management Areas), and six (Active Waste Management Areas) present a general status update including, sampling activity, any significant results, and applicable site maps and trend charts.

2 Quality Control and Laboratory Issues

Recent nitrite detected results are undergoing further review by the Waste Sampling and Characterization Facility (WSCF) Laboratory and CH2M Hill Plateau Remediation Company (CHPRC) Sample Management group. Further investigation includes CHPRC derived blind standards for analysis by WSCF, WSCF review of analytical instruments, CHPRC review of Oxidation-Reduction and dissolved oxygen field measurements and procedures. Results will be provided in the next quarterly report.

3 Sampling and Analysis Status

Documentation provided for status and effects on sampling resulting from delays or stop work orders.

3.1 Missed Sampling

Table 1 presents samples not collected during the quarter. The table includes the site, scheduled period that was not collected, frequency of sampling, and any comments.

Table 1. Sampling Not Completed

Well	Site	Scheduled	Frequency	Comments
299-W11-45	WMA T	March	Semiannually	Failed pump
299-E33-26	WMA B-BX-BY	February	Quarterly	Pump maintenance to determine if well is sample dry

Notes:

WMA – Waste Management Area

3.2 Sampling Completed After Quarter

Table 2 presents sampling completed after the quarter, including site, scheduled period, frequency of sampling, and any comments.

Table 2. Sampling Completed After the End of the Quarter

Well	Site	Scheduled	Frequency	Comments
299-E33-265	LLWMA 1	March	Semiannually	Stop Work delay – completed in April.
299-W9-2	LLWMA 3	March	Quarterly	Stop Work delay– completed in April.
299-W10-31	LLWMA 3	March	Quarterly	Stop Work delay– completed in April.
299-E27-21	WMA C	March	Quarterly	Stop Work delay– completed in April.
299-E27-25	WMA C	March	Quarterly	Broken pump rod repair delayed sampling – completed in April.
299-E27-23	WMA C	March	Quarterly	Odor response delayed sampling – completed in April.
299-W11-46	WMA T	March	Semiannually	Offline – sampling completed in May.
299-W23-19	WMA S-SX	March	Quarterly	Stop Work delay– completed in April.
399-1-10A	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-10B	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-16A	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-16B	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-17A	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-17B	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-18A	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.
399-1-18B	300 Process Trenches	March	Semiannually	Stop Work delay– completed in April.

Notes:

LLWMA – Low-Level Waste Management Area

3.3 Stop Work

Three stop works were initiated during the quarter. The first stop work was issued for access to all wells resulting from an incomplete response to detected abnormal odors while accessing a well in the 200 Area on 03/02/2012. The stop work was adequately resolved and lifted 03/13/2012. A second stop work was declared to clarify the Well Access List (WAL) process; to ensure accurate information is provided before releasing work and includes all work requiring use of the WAL. The final stop work was initiated on use of the Field Logging and Electronic Data Gathering (FLEDG) system for water level measurements for wells.

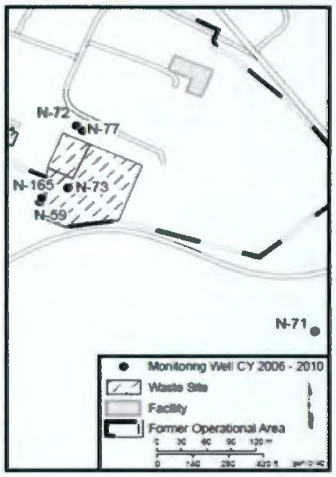
4 Inactive Waste Management Areas

Each inactive, non-operational unit is designated as a treatment, storage, and disposal (TSD) unit because it received nonradioactive dangerous waste regulated by 40 *Code of Federal Regulations* (CFR) 261. Units are monitored under a groundwater contamination indicator evaluation monitoring program that will detect any adverse impact from past operations on groundwater quality and accordingly, update constituents and monitoring based on knowledge gained from recent monitoring data collected. Summary status and monitoring highlights of results by exception are provided for each area.

4.1 1301-N Liquid Waste Disposal Facility (Interim, Detection)

All five samples were collected as scheduled in March. Contamination indicator parameter data were loaded into the Hanford Environmental Information System (HEIS), were within previously established ranges and did not exceed critical mean values for 2012. The next sampling event is scheduled for September.

4.2 1324-N/NA Facilities (Interim, Detection)



All five samples were collected in March, as scheduled. Contamination indicator parameter data were loaded into HEIS. The next sampling event is scheduled for September.

Specific conductance in downgradient wells declined from levels seen in 2010 and 2011, but continued to exceed the critical mean value in downgradient wells (Figure 1). The U.S. Department of Energy (DOE) reported the exceedance to Washington State Department of Ecology (Ecology) previously; the exceedance was caused by non-dangerous constituents sulfate and sodium.

Total organic carbon (TOC) declined sharply in Well 199-N-165, but remained above the calculated 2012 critical mean value of 679µg/L (Figure 2). DOE reported the September 2011 exceedance to Ecology. Organic contaminants were not discharged to 1324-N/NA facilities; therefore, the exceedance did not trigger a RCRA assessment program. However, DOE is conducting additional sampling and analysis to investigate the occurrence.

Average total organic halides (TOX) concentration in downgradient Wells 199-N-73 (15.05µg/L) and 199-N-165 (15.45µg/L) exceeded the 2012 critical mean value (12.93µg/L). Concentrations have increased since 2010 (Figure 3). The change will be investigated along with TOC increase.

In response to the 2011 total organic carbon exceedance at 199-N-165, DOE conducted additional sampling and analyses in March 2012 at the five RCRA wells and two 100-K wells located upgradient (Table 3). Sampling of Well 199-K-152 was delayed until May 17, 2012 because of issues with sampling wells hooked up to pump and treat systems. Results of the sampling will be evaluated after all data are received from the laboratory.

Table 3. Sampling Response to 2011 TOC Exceedance at Well 199-N-165

Wells	Analyses[a]
RCRA: 199-N-71, 199-N-72, 199-N-73, 199-N-77, and 199-N-165	Field parameters (pH, Temp, SpC, Turb)[a], TOC [a], TOX [a], Field parameters (DO, ORP) VOA, SVOA, PAH, TPH-G, TPH-D, Metals, Anions, Alkalinity, Total Coliform

Table 3. Sampling Response to 2011 TOC Exceedance at Well 199-N-165

Wells	Analyses[a]
CERCLA: 199-K-151 and 199-K-152 (Upgradient Well 199-K-164 cannot be sampled as it is an injection well for the K Pump-and-Treats)	

a. March RCRA samples are normally only analyzed for field parameters (pH, temperature, specific conductance, and turbidity), total organic carbon (TOC), and total organic halides (TOX).

DO = dissolved oxygen	ORP = oxidation-reduction potential
VOA = volatile organic analytes	TPH-G = total petroleum hydrocarbons – gasoline range
SVOA = semi-volatile organic analytes	TPH-D = total petroleum hydrocarbons – diesel range
PAH = poly-aromatic hydrocarbons	

4.3 1325-N Liquid Waste Disposal Facility (Interim, Detection)

No samples were scheduled for collection in January or February and all five samples were collected as scheduled in March. Contamination indicator parameter data were loaded into HEIS and were within previously established ranges. Specific conductance in downgradient wells exceeded 2012 critical mean value of 463µS/cm. This is a continuation of previous exceedances caused by non-dangerous constituents from an upgradient facility. Other contamination indicator parameters did not exceed critical mean values. The next sampling event is scheduled for September.

4.4 183-H Solar Evaporation Basins (Final, Corrective Action)

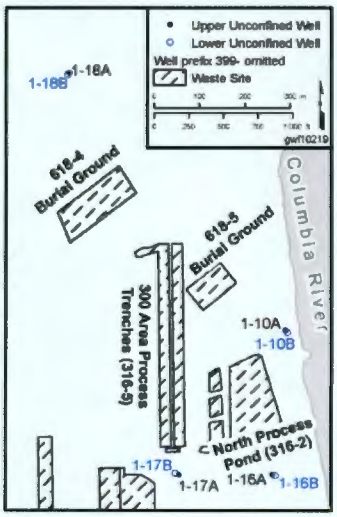
No samples were scheduled for this site in January. Well 199-H4-12C continues to be used as an extraction well in the HX system and will be periodically sampled for hexavalent chromium. Well 199-H4-12A February sample result for hexavalent chromium was 8.7µg/L, below the 10µg/L aquatic standard. Sample pH was 7.85 and specific conductance was 399µS/cm. Well 199-H4-12C is pumping to the HX plant and was not sampled in February. It is anticipated the annual sampling requirement for this well will be met. The next sampling event is scheduled for October/November.

Monitoring Well 199-H4-3 is not WAC 173-160 compliant, and is scheduled to be decommissioned later in 2012 to accommodate source area remediation, after a permit modification request has been submitted to Ecology. Currently, Well 199-H4-8 will not be decommissioned as part of the remediation. Consequently, the sampling schedule will require adjustment to accommodate source area remediation and well replacement.

4.5 300 Area Process Trenches (Final, Corrective Action)

Eight wells were sampled as scheduled in January and February. Scheduled sampling in March was delayed for a stop work requiring clarification to the WAL, and successfully completed April 2nd. The next sampling event is scheduled for June.

Results for monitoring wells closest to the river (399-1-10A, 399-1-16A) and the well at the southern end of process trenches (399-1-17A) show elevated uranium in the upper unconfined aquifer. The uranium increase in these wells is attributed to remobilization of uranium remaining in the lower portion of the vadose zone by the elevated water table in June 2011 (Figure 4). The highest uranium concentration detected in Well 399-1-17A in June 2011 has subsequently declined.



4.6 216-A-29 Ditch (Interim, Detection)

No sampling was scheduled during this quarter. TOX analyses from October and November sampling were loaded into HEIS and are on trend. The next sampling event is scheduled for April.

4.7 216-B-3 Pond (Interim, Detection)

Quadruplet indicator parameter results for pH and specific conductance were received for all four wells sampled for the semiannual January event. None of the indicator parameters exceeded critical mean values, and this site will remain in interim status detection monitoring. The next sampling event is scheduled for July.

4.8 216-B-63 Trench (Interim, Detection)

Quadruplet indicator parameter results for TOC and TOX were received in January for two (299-E27-11 and 299-E34-10) of seven wells sampled for the semiannual October/November event. The highest average TOC and TOX results were compared and average results were below derived critical means, therefore, interim status detection monitoring will continue. The next sampling event is scheduled for April.

4.9 S-10 Pond and Ditch (Interim, Detection)

No wells were scheduled for routine sampling, but verification sampling was conducted at 699-32-76 in response to an exceedance in the specific conductance critical mean during December. Specific conductance measurements were collected with two instruments during January sampling. Results from meters 1 and 2 were 348.5µS/cm and 341µS/cm, respectively (both averages of quad measurements). Both of these values are below the critical mean of 350µS/cm. Further, meter #2 compared better against the standard than meter #1, so the 341µS/cm result is believed to be most representative.

Specific conductance results of January verification sampling, split samples for major anions and cations were collected. Results from WSCF lab were loaded into HEIS, alkalinity was higher at 130mg/L compared to 120mg/L for previous sample results. Other anions and cations were on trend.

Results from Test America St. Louis lab were loaded into HEIS. Alkalinity was on trend at 118mg/L, as were other major anions and cations. The site will remain in detection monitoring. The next sampling event is scheduled for May.

4.10 NRDWL (Interim, Detection)

All wells in the network were sampled successfully, and all field parameters are on trend. Anions in 699-25-34A were extremely high and requests for data review (RDR) were issued. Nitrite readings on most wells are anomalous and are being addressed.

Quadruplicate indicator parameter results for pH, specific conductance, TOC, and TOX were loaded into HEIS for the semiannual sampling event. Specific conductance exceeded critical mean, however; it has been previously noted as caused by nonhazardous groundwater constituents (e. g., calcium and magnesium) thus, did not require verification sampling or regulator notification. The next sampling event is scheduled for July.

4.11 216-A-36B Crib (Interim, Indicator Evaluation)

All network wells were sampled successfully. Quadruplicate indicator parameter results for pH, specific conductance, TOC, and TOX were loaded into HEIS for the semiannual January event. None of the results exceeded critical means. The next sampling event is scheduled for July.

All analyses have been received and most are on trend. Anomalous suspect nitrite readings on all wells are being addressed. TOC and TOX analyses from October sampling of Well 299-E17-19 have been loaded into HEIS and are on trend.

4.12 216-A-37-1 Crib (Interim, Indicator Evaluation)

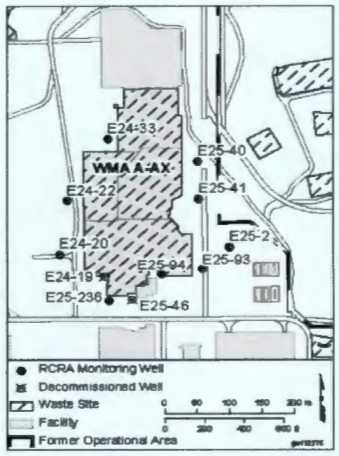
All wells were successfully sampled. Quadruplicate indicator parameter results for pH, specific conductance, TOC, and TOX were loaded into HEIS for the semiannual January event. None of the results exceeded critical means. The next sampling event is scheduled for April.

Analyses received are on trend except RDRs were issued for pH and nitrite in downgradient Well 299-E25-17. TOX analyses from October sampling of Well 299-E25-47 are on trend.

5 Groundwater Monitoring Single Shell Tank (SST) Farm Waste Management Areas

RCRA units not currently incorporated into a permit require interim status monitoring until an approved operating permit for each unit is issued. Single shell tank farms are all monitored under RCRA groundwater assessment and are designated as WMAs. Summary status and monitoring highlights of results by exception are provided for each area.

5.1 SST WMA A-AX (Interim, Assessment)

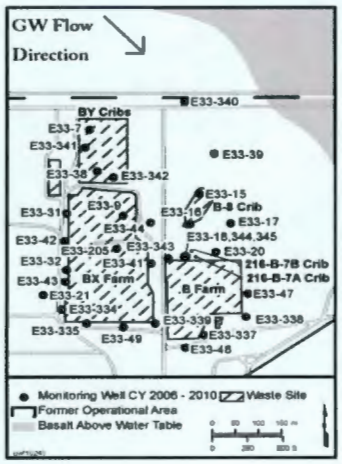


All nine network wells were sampled and analyses have been loaded in HEIS. The next sampling event is scheduled for June.

Antimony results in Wells 299-E25-93 and 299-E25-236 were flagged as above trend (Figure 5). Chromium was flagged for results out of trend in Well 299-E25-93 (Figure 6).

Well 299-E25-2 exhibited elevated turbidity, unfiltered iron, and unfiltered manganese, indicating well casing corrosion. Values will be monitored to determine if replacement is necessary. All other analytes are in trend.

5.2 SST WMA B-BX-BY (Interim, Assessment)



All sampling data from the November/December event was received through January. All network wells were sampled during late January/February as required, except 299-E33-26, and maintenance was requested to determine if it is sample dry. Several results were received in February and March. The next sampling event is scheduled for May.

Groundwater flow direction at WMA-B-BX-BY changed from northwest to south-southeast. Based on low gradient measurements, the flow is east with an azimuth of 81.7. The flow direction has been southeast since July/August 2011 because of high Columbia River

2011 spring stages. The gradient has ranged between 1.98E-05 to 3.52E-05 over this time resulting in an average gradient of 2.888E-05. Stop work prevented March water level measurements from being collected.

As a result of the flow direction change, the BY Crib, 216-B-8 Crib, and 216-B-57 Crib plumes migrated south causing increased contaminant concentrations in wells adjacent these source sites. In addition, contaminant increases of technetium-99 and uranium along the south side of 241-B and 241-BX Tank Farms appear to be associated with contaminant migration from the 241-BX-102 unplanned release. Residual contaminant drainage from the perched water horizon appears to be occurring near Well 299-E33-18; however, elevated uranium and nitrate concentrations can also be explained by contaminant migration within the unconfined aquifer.

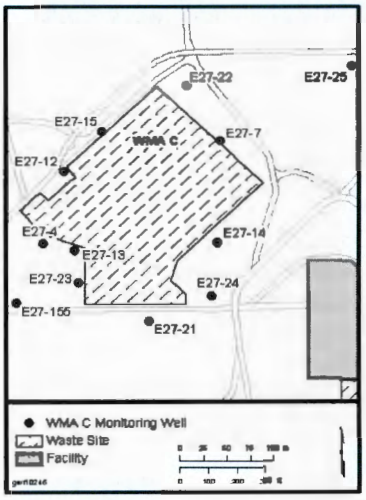
Significant concentrations of nitrate and chromium were seen in Well 299-E33-47 (nitrate 921mg/L and chromium 81.4µg/L) and 299-E33-335 (nitrate 598mg/L and chromium 19.5µg/L). Based on migration of nitrate and chromium in wells to the north, the fronts should not have migrated to these wells. Nitrate and chromium at Well 299-E33-338 are not consistent with the 241-BX-102 unplanned release. They are consistent with increases at Well 299-E33-47. Requested reanalysis for these constituents from Well 299-E33-47 have not yet been received. An alternative explanation for chromium at nearby Wells 299-E33-337 and 299-E33-339 has been attributed to well screen degradation; however, these wells do not exhibit elevated nickel and manganese as other wells did. Reanalysis for metals was requested. Receipt of reanalysis results will allow further review with historical information for source determination of these contaminants (Figures 7 and 8).

The highest cyanide concentrations were seen in Wells 299-E33-7, 299-E33-38, and 299-E33-342 beneath the BY Cribs. Cyanide concentrations diminish to the south and were at levels just above the detection limit along the north side of the 241-B Tank Farm. Concentrations farther south were affected by lab contamination as indicated by the laboratory "C" flag. Elevated cyanide (Figure 9) was received for Wells 299-E33-47 (15.8µg/L) and 299-E33-335 (516µg/L). Based on the migration of cyanide in wells to the north, the cyanide front should not have migrated to these wells. Evaluations will continue to determine if the concentrations persist and are possibly associated with an unknown local source or laboratory issues.

Gamma results were nondetect except for cobalt-60. Cobalt-60 results were highest in Well 299-E33-7 beneath the north portion of the BY Crib and decrease in all directions (Figure 10). Elevated cobalt-60 was reported for Wells 299-E33-47 (40pCi/L) and 299-E33-335 (17pCi/L). Based on the migration of cobalt-60 in other wells to the north the cobalt-60 front should not have migrated to these wells and reanalysis was requested.

5.3 SST WMA C (Interim, Detection)

All December sampling event data required has been received through January. Groundwater flow direction at WMA C is generally southward; however, without water level measurements collected the same day at wells to correct for deviation and barometric response it is not possible to provide an azimuth for flow direction, nor flow rate. Based on cyanide results, the site continues in interim status assessment monitoring. The next sampling event is scheduled for June.



Nine of 12 WMA C monitoring wells were sampled in March. One well, 299-E27-21, was delayed until April due to a stop work. Another well, 299-E27-23, was delayed because of a broken pump rod. The final well,

299-E27-25, was delayed because of an odor response. Well 299-E27-21 was sampled April 5th and Well 299-E27-25 paper work was reprinted sampled April 13th. A broken pump rod in 299-E27-23 was repaired and paper work was submitted to sampling group.

Technetium-99 was above the drinking water standard (DWS) (900pCi/L) in three Wells: 299-E27-4 (4,300pCi/L), 299-E27-24 (2,700pCi/L), and 299-E27-155 (1,000pCi/L), and was only an increase in Well 299-E27-24 (Figure 11). Concentrations have been decreasing at most wells except those south to southeast of Well 299-E27-23. Based on historic data, a source to the north or northwest is not likely. Waste site and unplanned release inventory records indicate the two most likely sources are UPR-200-E-82 and 86; however, recent investigation indicate insufficient inventory. Thus, the technetium-99 plume source is currently uncertain. Concentration increases in Well 299-E27-21 indicate a possible source from the north or northwest.

5.4 SST WMA S-SX (Interim, Assessment)

Sampling of three of four wells scheduled during the month was successful. Sampling of 299-W23-19 was delayed by the stop work and successfully sampled in April. Results from December sampling were loaded into HEIS. The next sampling event is scheduled for June.

Chromium, Nitrate, and Technetium-99 continued to decline, indicating increasing concentrations between 2007 and 2010 were the result of a pulse of contamination from the tank farm, migrating past the well. The increasing concentrations led to the drilling of a pump-and-treat extraction system well (299-W22-90) adjacent to 299-W22-44. This system is planned to startup this year.

Iodine-129 was detected at 2.03pCi/L (above the 1pCi/L DWS) in 299-W23-19, located inside the SX Tank Farm. Iodine-129 had previously been detected during drilling of extraction Well 299-W22-91, located outside the southeast corner of the tank farm. Sample result of 1.16pCi/L collected 10 meters below the water table indicates iodine-129 may be present in groundwater beneath the SX Tank Farm. Additional sampling is scheduled for June to confirm these results and determine the source.

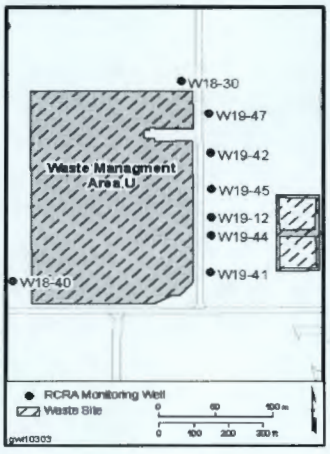
5.5 SST WMA T (Interim, Assessment)

Four of six network wells scheduled for sampling in February were successful. Extraction Well 299-W11-45 was not sampled due to a failed pump and extraction Well 299-W11-46 was offline. All results were on trend. The next sampling event is scheduled for May.

5.6 SST WMA TX-TY (Interim, Assessment)

Six of eight network wells scheduled for sampling in February were successful. Two extraction wells, 299-W15-40 and 299-W15-765, have been offline due to low water levels and are being disconnected from the pump-and-treat extraction well network. All results were on trend. The next sampling event is scheduled for May.

5.7 SST WMA U (Interim, Assessment)



Seven of eight network wells scheduled were sampled successfully during January. The attempt to sample 299-W19-45 was unsuccessful due to a pump problem, which was fixed in early February and sampled later in the month. The next sampling event is scheduled for April.

Metals results for 299-W19-42, 299-W19-44, and 299-W19-47 were off trend, and reanalysis has been requested. pH decreased slightly at

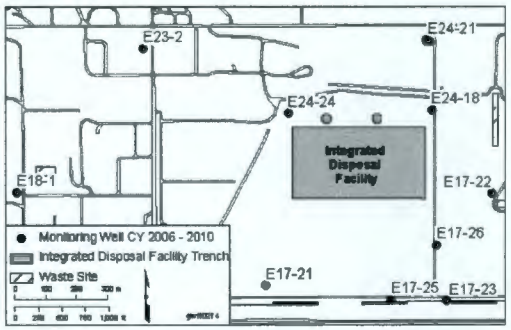
299-W19-41, down to 8.41 from 8.50 in October 2011. pH has been increasing steadily in this well since 2005. pH is increasing in the next well to the north, 299-W19-44, but is stable in upgradient Well 299-W18-40. The cause of the increasing trends remains unknown.

Results from Well 299-W19-45 were loaded into HEIS. Technetium-99 concentration in this well had been increasing rapidly between July 2010 and July 2011, with concentrations from 2,000pCi/L to 3,000pCi/L, indicating the beginning of a more substantial contamination issue at this tank farm. However, results from February sampling (2,800pCi/L), a slight decline, indicate a trend reversal (Figure 12). Future sample results are needed for verification. The next sampling for technetium-99 is scheduled for July.

6 Active Waste Management Areas

Permitted WMAs are monitored to determine whether dangerous waste or dangerous waste constituents from the waste sites have entered the groundwater. Summary status and monitoring highlights of results by exception are provided for each area.

6.1 Integrated Disposal Facility (Final, Detection)



All network wells were sampled successfully and all data has been loaded into HEIS. The next sampling event is scheduled for January.

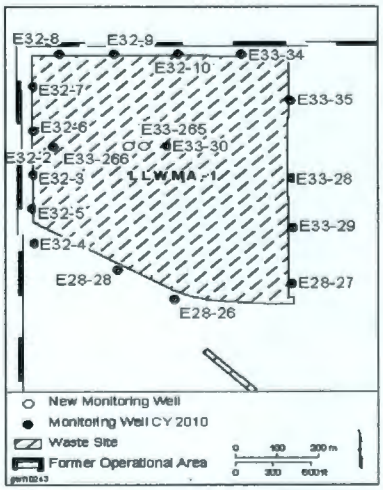
Nitrate concentration exceeded the DWS (45 mg/L) in three wells, the highest being 62.9mg/L in Well 299-E24-24, and results are on trend. Well 299-E17-22 had an unusually high nitrate result 59.9 mg/L and the upward trend will be analyzed to determine cause of increase (Figure 13).

6.2 Liquid Effluent Retention Facility (Final, Detection)

Four wells were successfully sampled in January and one well was sampled in February. Four RDRs were issued on anomalous data. The next sampling event is scheduled for July.

All nitrate concentrations are above DWS (45mg/L), highest value being reported is 53.6mg/L in 299-E26-10. These results are within trend, consistent with the sulfate plume migration. Nitrate concentration was above DWS in Well 299-E26-14, however, this well is new, and the first time sampling, so no trend can yet be established.

6.3 LLWMA-1 (Interim, Detection)



Groundwater flow direction at LLWMA-1 appears to be changing. Based on low gradient measurements, flow is east with an azimuth of 81.7. Flow direction has been southeast since July/August 2011 because of high Columbia River 2011 spring stages. The gradient also decreased to 6.12 E-06 compared with an average gradient of 2.888E-05 over the past 6 months.

Majority of anions and metals results were received in February. Well 299-E32-5 had inconsistent metals results, data was flagged and reanalysis requested. All wells exceeded DWS for nitrate except Well 299-E32-3. Nitrate source is 216-B-12 Crib to the south and

B Complex to the east. Elevated chromium, cyanide, and iron are predominantly detected in wells located along the east and northern boundary of the site. These constituents are associated with waste sites to the east. Chrome, iron, and nickel concentrations in Well 299-E32-4 are characteristic of early well screen corrosion.

Quadruplet indicator parameter results for TOC, TOX, pH and specific conductance were received for wells sampled for January semiannual event. None of the TOX or pH results exceeded critical mean (Table 4). Phenol groundwater quality parameters results were received for thirteen of eighteen wells and were less than detect.

Well 299-E33-265, exceeded critical mean for TOC (Figure 14). A verification sample for this well was requested and splits will be sent to separate laboratories in accordance with 40 CFR 265.93(c)(2). Stop Work in March prevented verification sample collection for TOC and water level measurements. This sample was later collected April 5th and verification results will be provided when received.

Results from three wells exceeded critical mean for specific conductance, 299-E32-10, 299-E33-34, and 299-E33-35 (Figure 15). Cause of critical mean exceedance is due primarily to plumes associated with BY Cribs. Specific conductance exceedance at Well 299-E33-35 was the first exceedance at this well, and is associated with flow direction change. Therefore, interim status detection monitoring continued, and more information and data was collected and will be provided during the next reporting period supporting recent entry into groundwater quality assessment. The next sampling event is scheduled for July.

Table 4. LLWMA-1 Indicator Parameter Data

Indicator Parameter	Critical Mean	Results Range
pH	7.43-8.57	7.67-8.33
Specific Conductance	1,110 µS/cm	429-1,694 µS/cm
TOC	1,330 µg/L	Less than detect - 2,662 µg/L
TOX	11.1 µg/L	Less than detect - 7.27 µg/L

6.4 LLWMA-2 (Interim, Detection)

Quadruplet indicator parameter results for TOC and TOX were received in January for seven of nine wells sampled for the October/November semiannual event. Highest average TOC and TOX results were compared with derived critical mean (Table 5). Average results were below derived critical means therefore, interim status detection monitoring will continue. The next sampling event is scheduled for April.

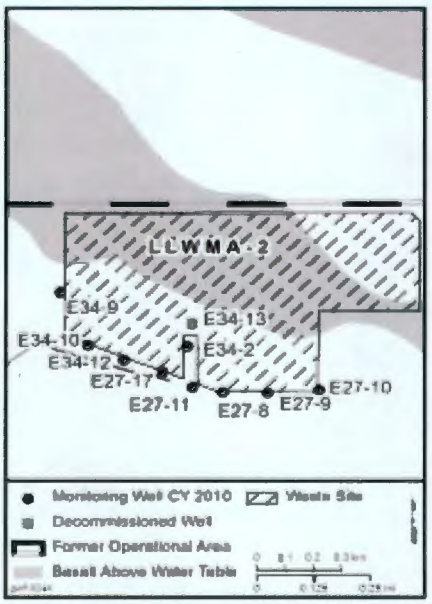


Table 5. LLWMA-2 Indicator Parameter Data

Indicator Parameter	Critical Mean	Results Range
TOC	2,220 µg/L	633 µg/L
TOX	37.1 µg/L	7.88 µg/L

6.5 LLWMA-3 (Interim, Detection)

Newly installed upgradient monitoring Well 299-W9-2 was successfully sampled in January. January results, and results from remaining 2012 and 2013 quarterly samples, will be used to establish background statistical comparison values for this WMA.

Two wells scheduled for indicator parameter sampling, 299-W10-29 and 299-W10-30, were successfully sampled in March. Wells 299-W10-31 and 299-W9-2 were sampled in April. Results were on trend for pH and specific conductivity and show a decrease for TOC and TOX compared to 2010 and 2011 averages (Table 6). The next sampling event is scheduled for September.

Table 6. LLWMA-3 Indicator Parameter Averages 2010 and 2011 Comparison

	pH			Specific Conductance			TOC			TOX		
Well	Mar	2011	2010	Mar	2011	2010	Mar	2011	2010	Mar	2011	2010
299-W10-29	8.01	7.91	7.91	381	386	384	325	436	1766	13	19.1	22.7
299-W10-30	7.94	7.76	7.84	420	419	419	137	1696	2059	9.4	10.7	9.2
299-W10-31	N/A	7.84	8.01	N/A	596	504	N/A	615	463	N/A	36.0	50.0

6.6 LLWMA-4 (Interim, Detection)

All seven wells scheduled for sampling in January were successfully sampled. Sampling results have been received from the laboratory and are on trend (Table 7). All wells were below critical means for TOC, specific conductance, and within pH indicator parameter critical mean range. Well 299-W15-30 exceeded critical mean for TOX (31.9µg/L average), consistent with trending over the last several years from the regional carbon tetrachloride plume. However, TOX concentration is declining in this well.

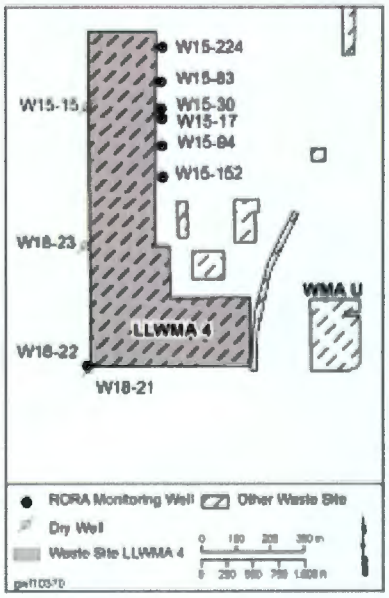


Table 7. LLWMA-4 Indicator Parameter Data

Indicator Parameter	Critical Mean	Results Range	2011 Trend
pH	7.0-8.84	7.55-7.96	Stable
Specific Conductance	750 µS/cm	363-559 µS/cm	Decreasing
TOC	870 µg/L	100-654 µg/L	Decreasing
TOX	24.3 µg/L	5-34.9 µg/L	Decreasing

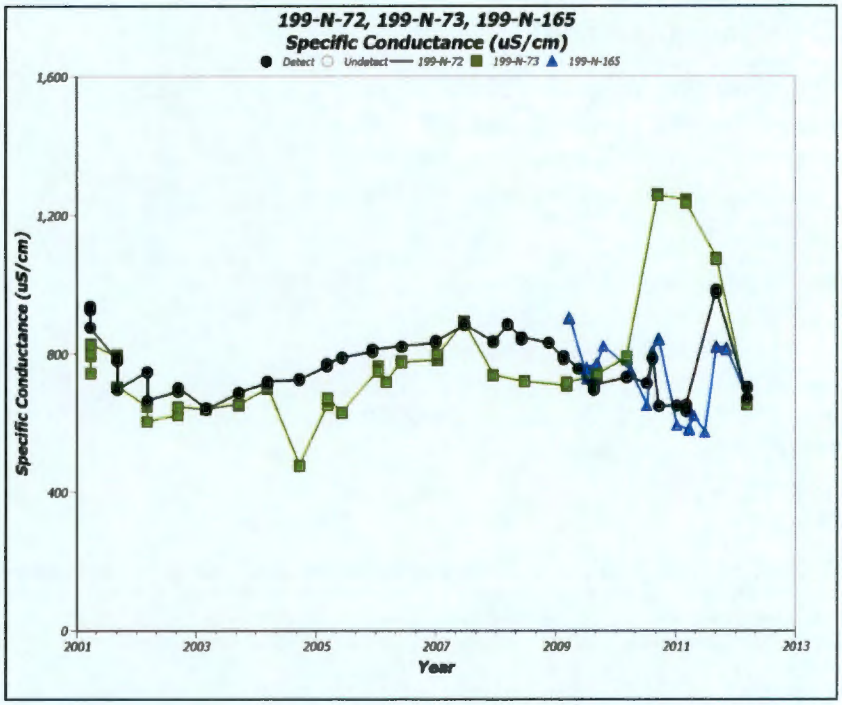


Figure 1. Wells 199-N-72, 199-N-73 and 199-N-165 Specific Conductance

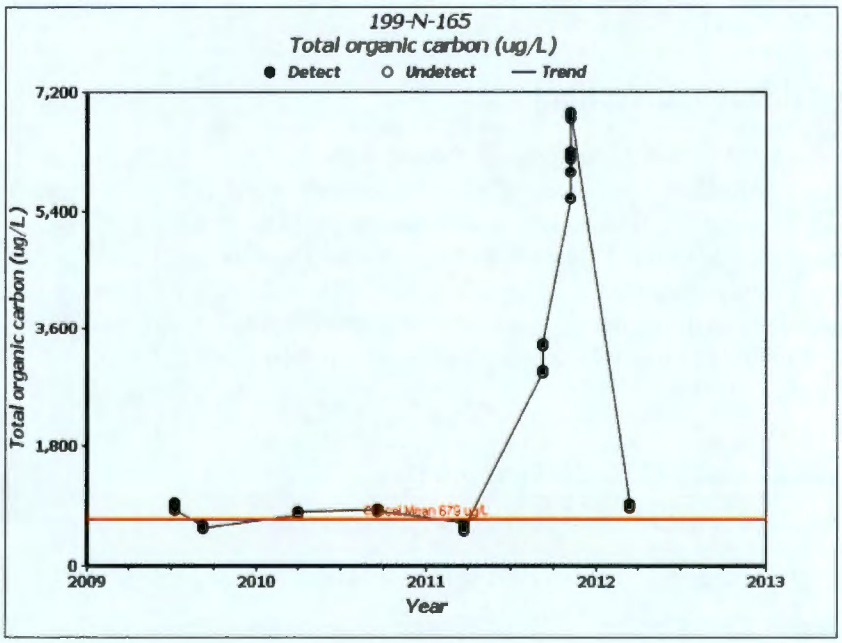


Figure 2. Well 199-N-165 Total Organic Carbon

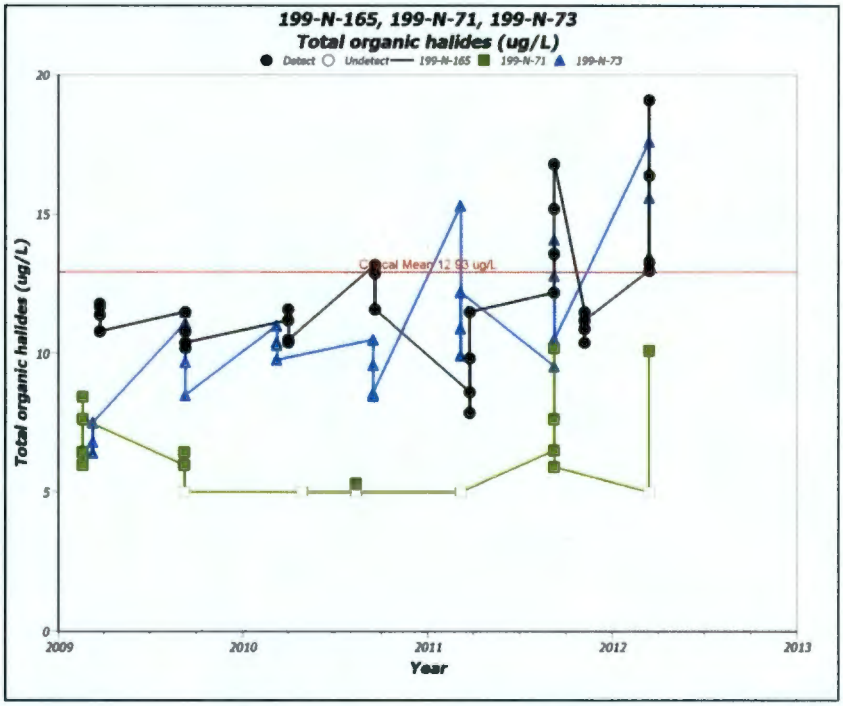


Figure 3. Wells 199-N-71, 199-N-73 and 199-N-165 Total Organic Halides

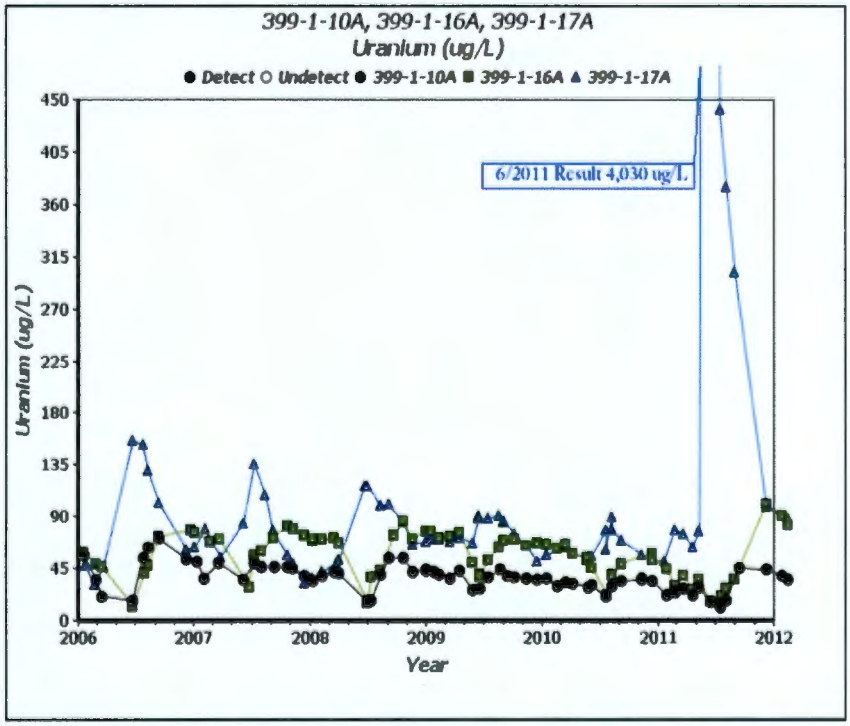


Figure 4. Wells 399-1-10A, 399-1-16A and 399-1-17A Uranium

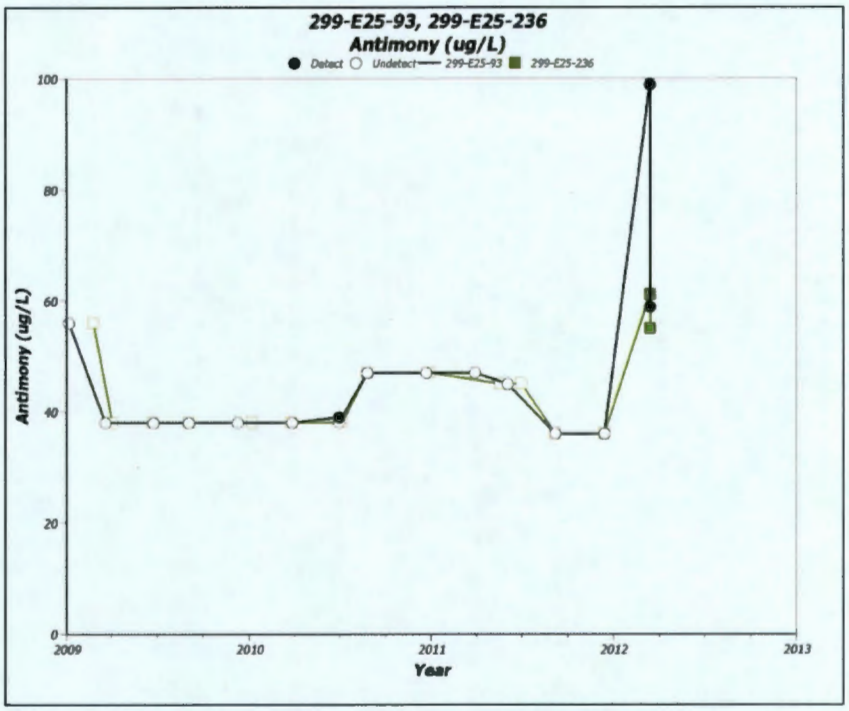


Figure 5. Well 299-E25-93 and 299-E25-236 Antimony

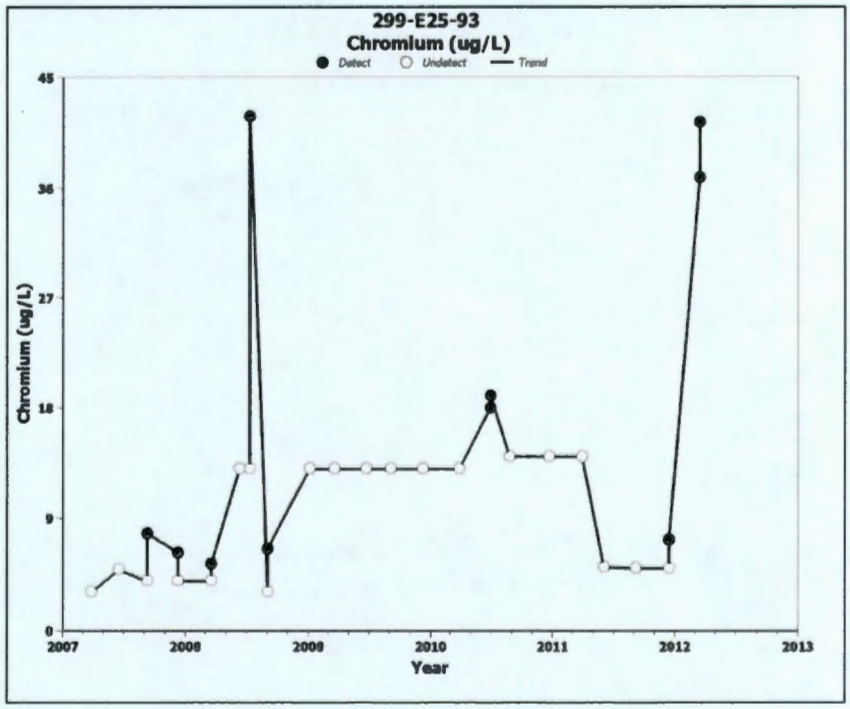


Figure 6. Well 299-E25-93 Chromium

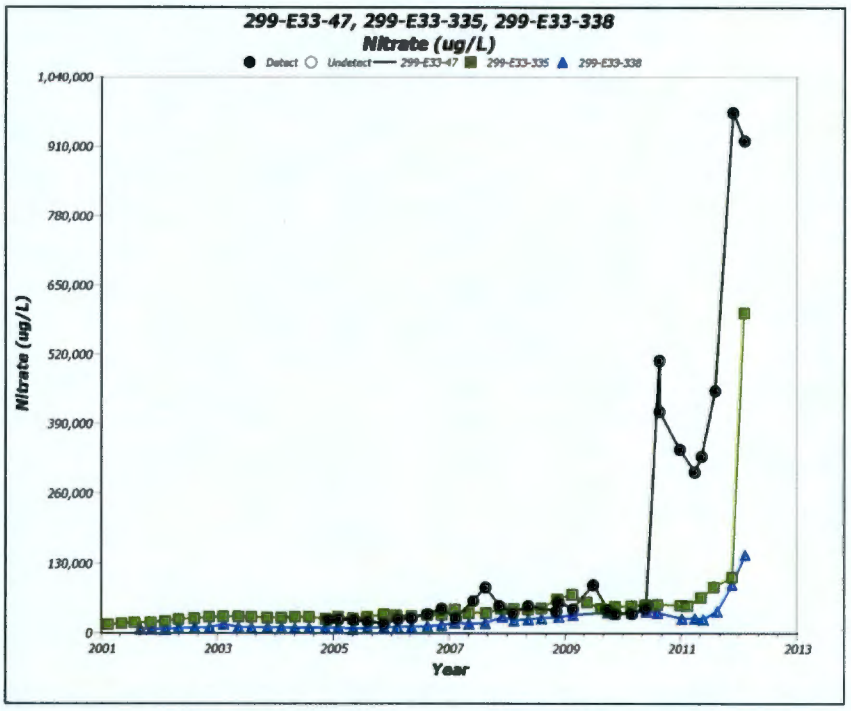


Figure 7. Wells 299-E33-47, 299-E33-335, and 299-E33-338 Nitrate

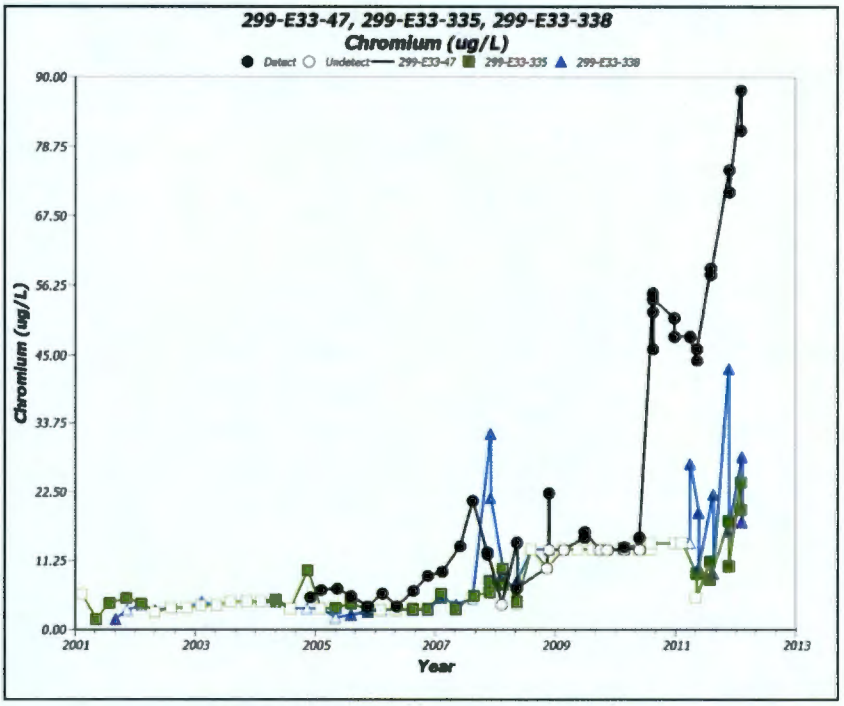


Figure 8. Wells 299-E33-47, 299-E33-335, and 299-E33-338 Chromium

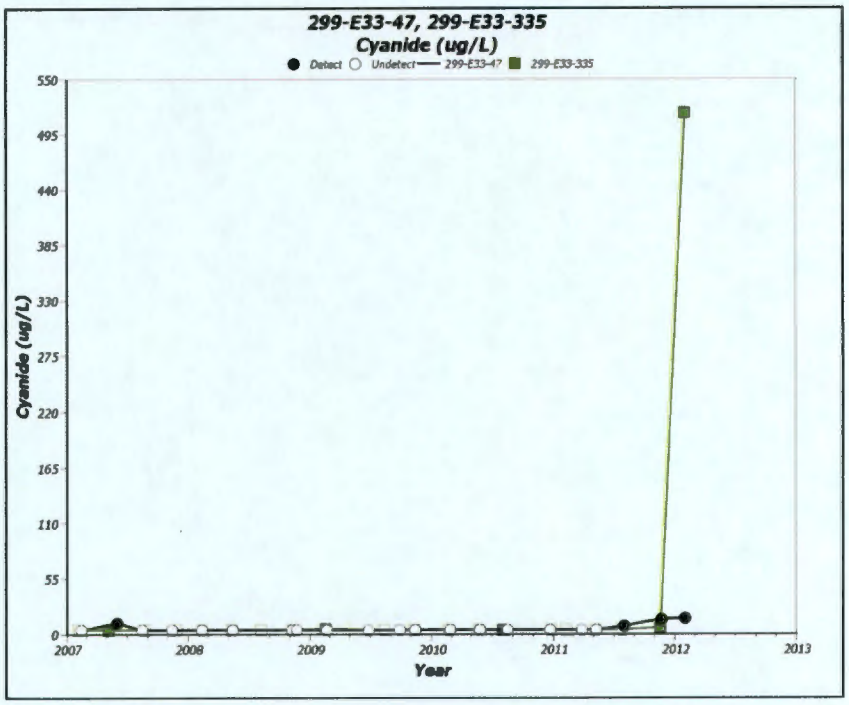


Figure 9. Wells 299-E33-47 and 299-E33-335 Cyanide

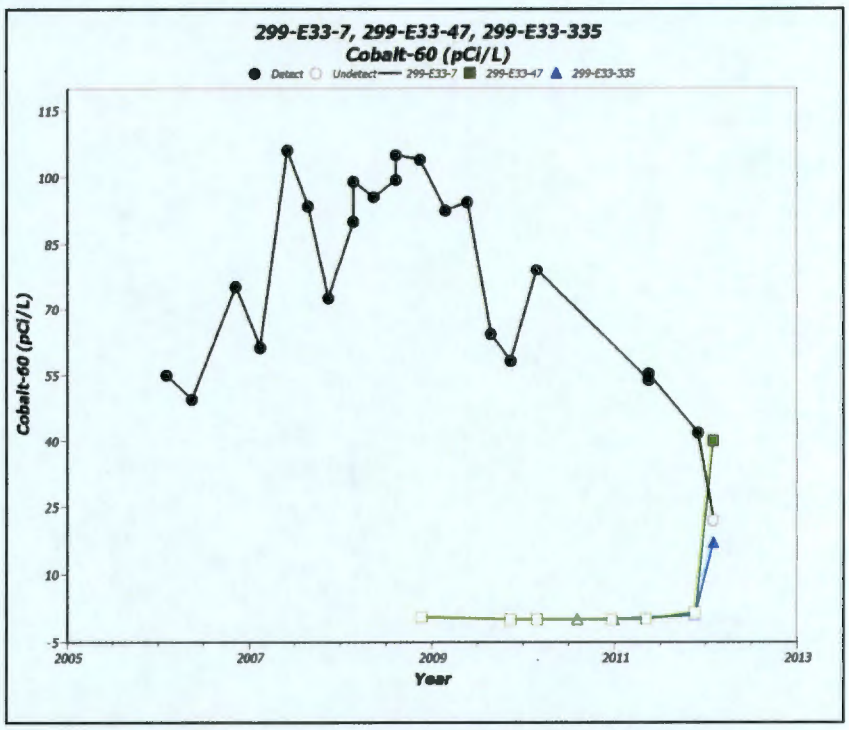


Figure 10. Wells 299-E33-7, 299-E33-47 and 299-E33-335 Cobalt-60

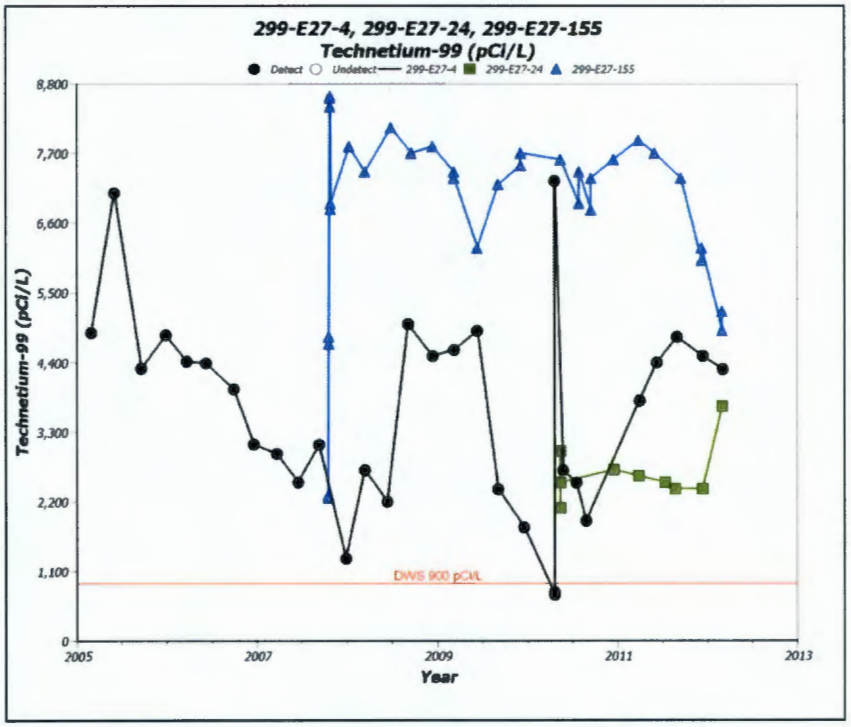


Figure 11. Wells 299-E27-4, 299-E27-24 and 299-E27-155 Technetium-99

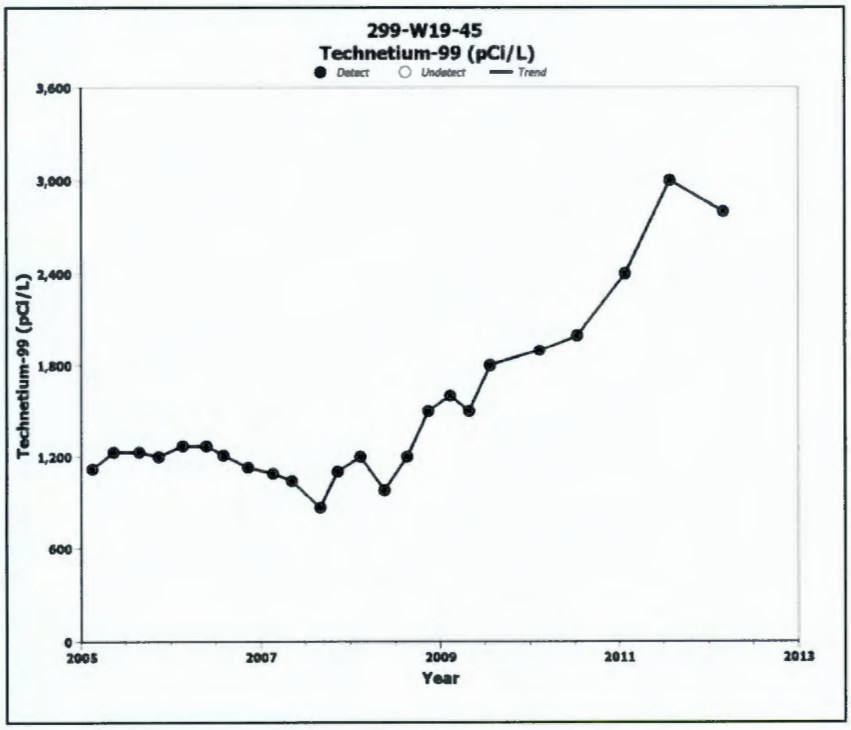


Figure 12. Well 299-W19-45 Technetium-99

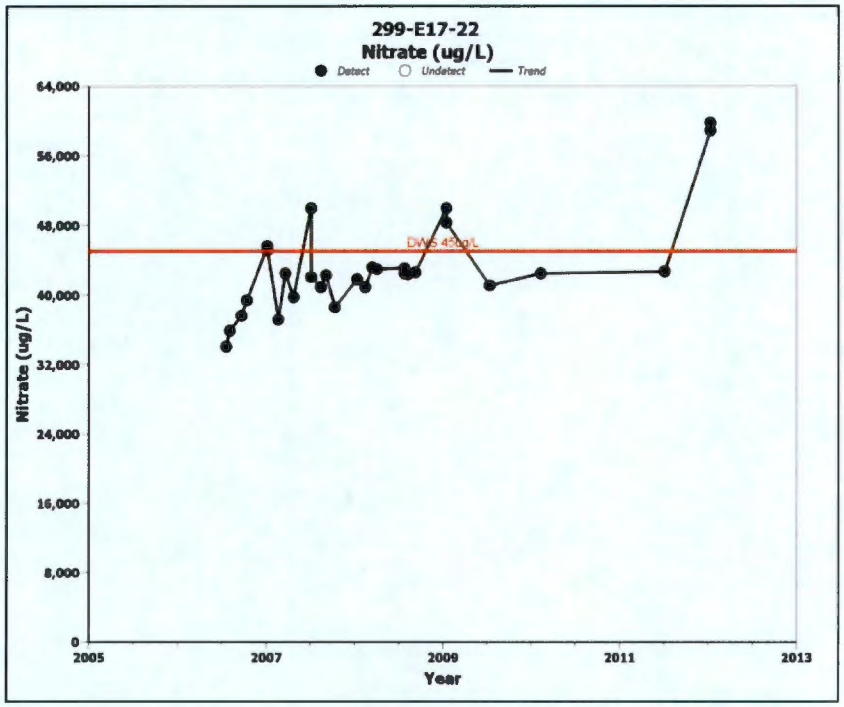


Figure 13. Well 299-W17-22 Nitrate

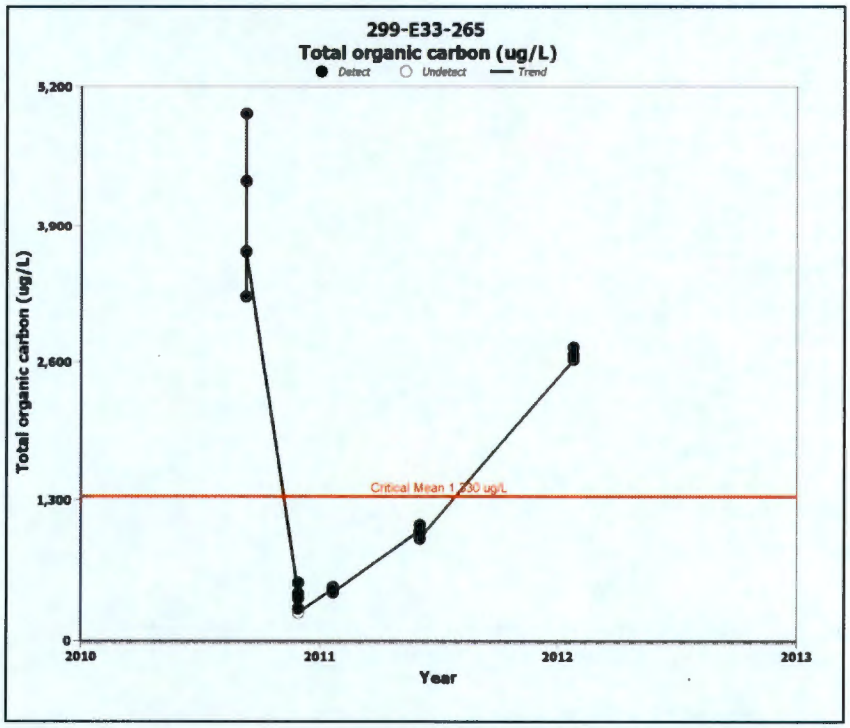


Figure 14. Well 299-E33-265 TOC

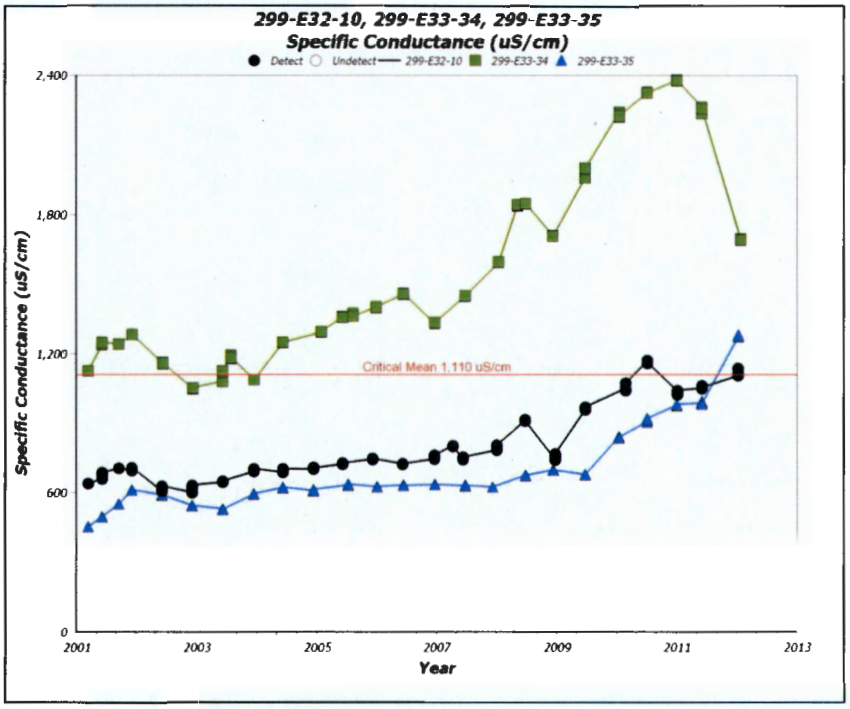


Figure 15. Wells 299-E32-10, 299-E33-34 and 299-E33-35 Specific Conductance

This page intentionally left blank.

Distribution

	MS	Quantity
U.S. Department of Energy, Richland Operations Office		
D. R. Hildebrand	A6-38	1
DOE Public Reading Room	H2-53	1
CH2M HILL Plateau Remediation Company – Electronic Distribution Only		
F. H. Biebesheimer	R3-50	
D. E. Dooley	R3-50	
G. M. Hanson	R3-50	
Washington Closure Hanford – Electronic Distribution Only		
K. A. Hadley	H4-21	
Administrative Record – Electronic Distribution Only	H6-08	
Document Clearance – Electronic Distribution Only	H6-08	

This page intentionally left blank.