CHPRC-1702369

1244844
(0069653H)

DISTRIBUTION
100 & 300 AREA UNIT MANAGERS MEETING
May 18, 2017

DOE/RL
(No hard copy distribution)

EPA

Craig Cameron	A3-46

Ecology

Nina Menard	H0-57

CHPRC

Gretchen Hanson (original)	R3-50
Administrative Record (2)	H6-08
Correspondence Control	H7-08

RECEIVED
JUN 22 2017
EDMC

100 & 300 Area Unit Manager Meeting
Attachments List
May 18, 2017

Attachment 1	**Agenda**
Attachment 2	**Attendee Sign In**
Attachment 3	**Signature Page**
Attachment 4	**Action Items**
Attachment 5	**100K Area Report**
Attachment 6	**Summary Hanford Sampling Program**
Attachment 7	**Documents Submitted to the AR**
Attachment 8	**TPA Change Notices**

100/300 Area Unit Manager Meeting
May 18, 2017
2420 Stevens Center
Richland 99354
Room 153 1:00 p.m.

Administrative:

- Approval and signing of previous meeting minutes
- Update to Action Items List
- Next UMM (07/20/2017) - *2420 Stevens Center, Room 153, 1:00p.m.*

Special Topics

- None
- Special Topics for future meetings include 100 KR-4 Rebound Study, Tracer Test and KE Borehole Investigation Report

Open Session: Project Area Updates - Groundwater, Field Remediation, D4/ISS:

- Summary of Hanford Sampling Program (Len Habel/Bill Webber)
- 100-OL-1 - Orchard Lands (Steve Balone)
- 300 Area - 618-10/11 (Ellwood Glossbrenner, John Neath)
- 100-K Area Soils(Rudy Guercia)
- 100-K Area Groundwater (Steve Balone)
- 100-B/C Area (Steve Balone, Ellen Dagan)
- 100-N Area (Steve Balone, John Neath)
- 100-D & 100-H Areas (Steve Balone, John Neath, Ellen Dagan)
- 100-F & 100-IU-2/6 Areas (John Neath)
- 300 Area (Steve Balone, Rudy Guercia)

Other

- CERCLA Five Year Review (Greg Berlin)

Closing Comments (all)

- All meetings will be held in 2420 Stevens Drive Room 153 from 1:00-3:00pm
- July 20
- September 21
- November 16
- To be discussed in a separate 100-N project meeting, sampling frequency of strontium-90 for 100-N per Alicia Boyd

Adjourn

100/300 Area Unit Managers' Status Meeting
May 18, 2017

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Shelley Gimon	ODOE		(541) 240-0161
Bryan Foley	DOE	FPD/RCDD	(509) 376-7087
Kathy Higgins	DOE		376-3658
Lorin Clements	CHPRC	100K	373 0951
Ellen Dagan	AMRP-DOE	100 BC 100 D/H	376-3811
Laura O'Mara	CHPRC		
Brian Johnson	ECY	100-D,H,N	372-3700
Alicia Boyd	Ecy	100 Areas	

100/300 Area Unit Managers' Status Meeting
May 18, 2017

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
BARRY LAWRENCE	CHPRC		460-8653
Randal Fox	CHPRC	Env	205-0611
Nina Menard	Ecology		372-7941
Stephanie Schlief	Ecology		372-7929
Dib Goswami	Ecology		372-7902
Benjamin Vunnah	DOE	TPA	376 9623
Sean Carr	DOE		376-4199
Leonard Habel	CHPRC		376-6592
Dwayne Crumpler	Ecology		372-7925
Steve Balone	DOE-RL	RC Tech Lead	376-0236
Gretchen M. Hanson	CHPRC		373-7553

100/300 Area Unit Managers' Status Meeting
May 18, 2017

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
JV Borghese	EPSP	TPA	
ROD LOBOS	EPA		
RF Guercia	RL	FF-2	6-5454
[illegible]	RC		
Bill Faught	CHPRC	100-N	376-3139

100/300 UNIT MANAGERS MEETING
APPROVAL OF MEETING MINUTES

May 18, 2017

APPROVAL: for M. French **DATE:** 5/18/17
Mark French, DOE/RL (A3-04)
River Corridor Project Manager

APPROVAL: for M. Cline **DATE:** 5/18/17
Michael Cline, DOE/RL (A5-11)
Groundwater Project Manager

APPROVAL: Nina M. Menard **DATE:** 5/18/17
Nina Menard, Ecology (H0-57)
Environmental Restoration Project Manager

APPROVAL: **DATE:** 5/18/17
Laura Buelow or Rod Lobos, EPA (A3-46)
100 Area Project Manager

HFFACO Action Plan Section 4.1 requires signature of agreements and commitments made during the Project Manager Meeting. Approval of these minutes documents approval of agreements and commitments documented in Attachment 4 and 5 to these minutes. Approval does not apply to any other attachments, which are included in these minutes for informational purposes.

Open (O)/ Closed (X)	Action No.	Co.	Actionee	Project	Action Description	Status
O	100-175		Bill Faught		Sampling frequency of strontium-90 for 100-N to be discussed in a separate 100-N project meeting	as notated on the Agenda May 18, 2017 UMM
	100-176		Bill Faught		Special Topics for future meetings include 100 KR-4 Rebound Study, Tracer Test and KE Borehole Investigation Report	as notated on the Agenda May 18, 2017 UMM

100K Area Report
100/300 Area Unit Manager Meeting
May 18 2017

Progress Report for March and April 2017

RL-0012 Sludge Treatment Project

TPA Milestone **M-016-177**, *Complete 105-KW sludge transfer equipment installation.* **(9/30/17)** – Completed April 19, 2017

TPA Milestone **M-016-175**, *Begin sludge removal from 105-KW Fuel Storage Basin* **(9/30/18)** – On Schedule

- Commenced K Basin Preoperational Acceptance Testing on April 20, 2017. This test is forecast to complete in September 2017.
- Incorporated DOE RL comments on the Documented Safety Analysis/Technical Safety Requirements and resubmitted the documents to DOE RL for approval on April 12, 2017. These documents combined the ECRTS PDSA R2 and the current KW Basin safety basis documents into an integrated safety basis set. Approval of these documents by DOE-RL is forecast in July, 2017.
- Completed incorporation of DOE RL comments on the One Time Request for Shipment (OTRS) that will be used for shipping the sludge from 100K Area to T Plant. Approval of this document is forecast in July, 2017.
- Continued development of Training Lesson Guides and Exam Banks.
- Completed Training ECRTS Subject Matter Expert (SME) at MASF. Additional training activities continue at MASF on the ECRTS Test Loop.
- Continued to develop ECRTS operations, radiation protection, and maintenance procedures
- Advanced 100K Area Readiness Activities
    - ECRTS K Basin Preoperational Acceptance Testing
        - Startup Notification Report Technical Description has been developed and is in CHPRC approval cycle. Initial determination is a Checklist Readiness Assessment should be conducted prior to pumping basin water into the 105K West Annex during the test.
        - An Activity Readiness Plan (ARP) and Readiness Self-Assessments (RSAs) have been drafted and are out for review/comment.
        - The Plan of Action (POA) and Implementation Plan (IP) will be developed in June.
    - ECRTS Sludge Removal Project Campaign
        - ARP and RSAs are complete with formal approval forecast in May, 2017.
        - The POA has been internally approved and will be transmitted to DOE RL review/approval in May, 2017.Commenced installation of Nitrogen Purge System. Completion of Construction Acceptance Testing is forecast in May, 2017.
- Advanced T Plant Readiness Activities

  - Completed development of ARP and the majority of RSAs - formal approval forecast in March, 2017
  - Prepared POA, obtained internal review/comments, and are incorporating comments. Formal CHPRC approval is forecast in April, 2017.
- Completed installation of T Plant Nitrogen Purge System. Completion of Acceptance Testing is forecast in May, 2017.
- Training documentation is under development.
- T Plant Operating Procedures have been drafted and are awaiting Safety Basis Documentation approval by DOE RL.
- The Master Documented Safety Analysis (MDSA)/Technical Safety Requirements (TSR) document revisions were approved and submitted to DOE RL for review/approval. DOE RL comments have been subsequently addressed and the document revisions resubmitted for review/approval in April. DOE RL approval is forecast in June, 2017.
- Advanced T Plant Readiness Activities
  - Completed and approved the ARP and RSAs. SMEs are currently working on drafting RSA responses and completing support documentation.
  - The POA was internally approved and is with the CHPRC President for approval. Formal CHPRC approval is forecast in May, 2017.

TPA Milestone **M-016-176,** *Complete sludge removal from 105-KW Fuel Storage Basin* **(12/31/19)** – On Schedule

- Initiation of this milestone follows completion of Milestone M-016-175

TPA Milestone **M-016-173,** *Select K Basin sludge treatment and packaging technology and propose new interim sludge treatment and packaging milestones.* **(9/30/22)** – On Schedule

- DOE/RL-2011-15, *Remedial Design/ Remedial Action Work Plan for the K Basins Interim Remedial Action: Treatment and Packaging of K Basins Sludge* was revised to include specific provisions for the safe storage of sludge at T-Plant.

RL-0041 100K Closure Project

Revegetation:

600-403 and 600-393 are the only two sites currently identified for revegetation under RL41 in FY18. Revegetation of the two sites is required per 300-FF-2 ROD, ESD #1 and #2.

A brief summary for each is included below:

600-403
Thorium contaminated soil will remediated at the 600-403 site from an area approximately 20' x 20'. A radiological survey is being planned for later this FY to delineate the contaminated area to support remediation planning. The area will be backfilled as necessary depending on the size/depth of the remediated area prior to revegetation.

600-393
Lead pieces from deteriorated batteries visible on the surface will be removed from an old dumping ground. The soil immediately surrounding and under the batteries will also be removed for disposal. The total area remediated is expected to be approximately 20' x 20' and will be achieved through potholing rather than scraping the entire area due to cultural restrictions on the use of heavy equipment in the area.

Due to the small size of the two sites and the heavy equipment restriction at 600-393 CHPRC proposes that revegetation at both of the sites be limited to hand broadcasting of seed and hand raking the seeded area. We would utilize locally derived and adapted grass, forb and shrub seeds in alignment with the guidance provided in the Hanford Revegetation Manual. Currently there is no plan to issue a new revegetation subcontract based on the limited amount of FY18 work. The revegetation contract is expected to be rebid in FY18 for the FY19 scope which will include 618-10 and associated neighboring sites.

RL-0041 100K Closure Project

TPA Milestone **M-016-143**, *Complete the interim response actions for 100 K Area within the perimeter boundary and to the Columbia River for Phase 2 actions. Phase 2 is defined in the 100 K Area RD/RA Work Plans.* **(9/30/24)** – On Schedule

- **100-K AB Waste Site Area**
  - Remaining Site Verification Package and closure of waste sites 100-K-25, 100-K-27, 100-K-35, 100-K-50, 100-K-79, 100-K-98, 100-K-101, 120-KE-1, 120-KE-2, 120-KE-3, 120-KE-4, 120-KE-5, 120-KE-6, 120-KE-9, 100-K-14, 126-KE-2, and 1607-K2 in review for approval.
  - Remediation Site Verification Package and closure of waste sites 126-KE-2, 100-K-14, 100-K-50 and 1607-K2 EPA approved.

- **100-K AF Waste Site Area**
  - Completed additional excavation of waste site 100-K-103 after final in-process sampling identified localized PAH contamination. Verification Sample Instruction in preparation.

- **100-K AH Waste Site Area**
  - Began excavation of waste site 1607-K5.

TPA Milestone **M-093-28**, *Submit a change package for proposed interim milestones for 105-KE and 105-KW Reactor Interim Safe Storage*
(12/31/19) - On Schedule

TPA Milestone **M-093-27**, *Complete 105-KE and 105-KW Reactor Interim Safe Storage in Accordance with the Removal Action Work Plan.*
(9/30/24) - On Schedule

TPA Milestone **M-016-00C**, *Complete all response actions for the 100 K Area*
(9/30/24) - On Schedule

TPA Milestone **M-016-178,** *Initiate deactivation of 105-KW Fuel Storage Basin.* **(12/31/19)** – On Schedule

- A gamma ray spectrometer (gamma camera) has been procured and gamma camera setup survey plan prepared. A contract has been approved for PNNL to perform isotopic analysis of floor paint samples from the floor of the East Bay of the basin.

TPA Milestone **M-016-181,** *Complete deactivation, demolition and removal of 105-KW Fuel Storage Basin* **(9/30/23)** – On Schedule

- The Basis of Estimate, work breakdown structure dictionary, and project schedule for the 105-K West Fuel Storage Basin deactivation and demolition are being uploaded to the CHPRC Long Range Plan file (TPA-M-16-178 and TPA-M-16-181).

TPA Milestone **M-016-186,** Initiate soil remediation under the 105-KW Fuel Storage Basin. (12/31/23) – On Schedule

300 Area Demolition and Soil Remediation

TPA Milestone **M-016-85A**, *Complete remote excavation of the 300-296 waste site in accordance with an approved RD/RA Work Plan.*

300-296 Soil Remediation Activity:

- Contracts were awarded for two of the three main soil removal systems to be installed in the mockup (Remote Excavation Arm System and the Cameras and Lighting System) and the source selection process was completed for the third system (Transfer Mechanism) with the contract award expected during the first week of May.
- The floor saw test was successfully completed with a total of 52 test cuts, including test situations intended to challenge the saw based on anticipated conditions in B-Cell (e.g. gravel on the floor and off level cuts). The test report will be issued in May to support the development of the functional requirements and performance specifications for the floor saw system that will be procured for use in the mockup.
- The initial Radiochemical Engineering Complex (REC) Airlock entry, signaling the start of the physical work to clean out the airlock and cells in support of the project, was safely and successfully conducted on 10 April 2017. The objective of the entry was to gather data to assist in planning further entries in support of cleanout activities.
- Equipment deliveries in April, in support of the project plan, included Master Slave Manipulators (four units, two planned for installation in the mockup and two as spares for the 324 bldg.) and the Airlock Track and Cart System (required for installation in the airlock for planned cleanout activities). Additionally, twelve prototype waste bins and two lifting devices finished fabrication and will be delivered for use during planning and training in the future.

Summary Hanford Sampling Program

Hanford's overall Site groundwater monitoring program managed by CHPRC (River Corridor and Central Plateau) coordinates collection of groundwater samples from wells and aquifer tubes, as well as surface water samples from springs. Sample trips are scheduled by target month and prioritized based on project needs. Target sample dates (months) are chosen to minimize the number of sample trips by temporally aligning requests from multiple activities for a single location into a single trip where practical.

FY 2016 Sample Trip Status by Month Scheduled

For Fiscal Year 2016 Hanford's overall Site groundwater monitoring program had 2,804 sample trips scheduled for collection. Prior to March 2017 the program had successfully completed 2,798 of the FY 2016 sample trips. No additional FY 2016 sample trips were collected in March or April 2017.

FY 2017 Sample Trip Status by Month Scheduled (March and April 2017)

For Fiscal Year 2017 Hanford's overall Site groundwater monitoring program has 2,657 sample trips scheduled for collection.

During March 2017 (FY 2017, month six) the program successfully completed 3 sample trips scheduled for November 2016, 1 sample trip scheduled for December 2016, 14 sample trips scheduled for January 2017, 24 sample trips scheduled for February and 159 sample trips scheduled for March 2017. This brings the total number of Fiscal Year 2017 sample trips scheduled through February 2017 completed to 1,255 of 1,318 scheduled. And the total number of sample trips scheduled for March 2017 completed to 159 of 172 scheduled.

During April 2017 (FY 2017, month seven) the program successfully completed 6 sample trips scheduled for October 2016, 1 sample trip scheduled for November 2016, 2 sample trips scheduled for December 2016, 1 sample trip scheduled for February 2017, 6 sample trips scheduled for March 2017, and 138 sample trips scheduled for April 2017. This brings the total number of Fiscal Year 2017 sample trips scheduled through March 2017 completed to 1,430 of 1,490 scheduled. And the total number of sample trips scheduled for April 2017 completed to 138 of 152 scheduled.

The total number of Fiscal Year 2017 sample trips completed at the end of April 2017 is 1,568.

FY 2017 Sample Trip Status by Month Collected (March and April 2017)

During March 2017, 201 Fiscal Year 2017 sample trips were successfully completed of which 42 were scheduled prior to March 2017 and 159 were scheduled for March 2017.

During April 2017, 154 Fiscal Year 2017 sample trips were successfully completed of which 16 were scheduled prior to April 2017 and 138 were scheduled for April 2017.

The specific wells, aquifer tubes, and springs sampled in the river corridor areas during March 2017 are listed in Table 1. The specific wells, aquifer tubes, and springs sampled in the river corridor areas during April 2017 are listed in Table 2.

Awaiting Sample Trips

Of the Fiscal Year 2016 and 2017 sample trips scheduled for April 2017 and prior, there are 83 that are awaiting collection. Of these, 3 are being reviewed for cancellation, 13 were unsuccessful, 2 are awaiting drilling, and 65 are awaiting collection at the month end.

Table 3 presents the sample trips for only the river corridor that were not successfully completed as of April. Sample trips in Table 2 are grouped by fiscal month scheduled and groundwater interest area. This table clearly shows that the number of awaiting well trips decreases with time from the schedule date. Reasons for sample

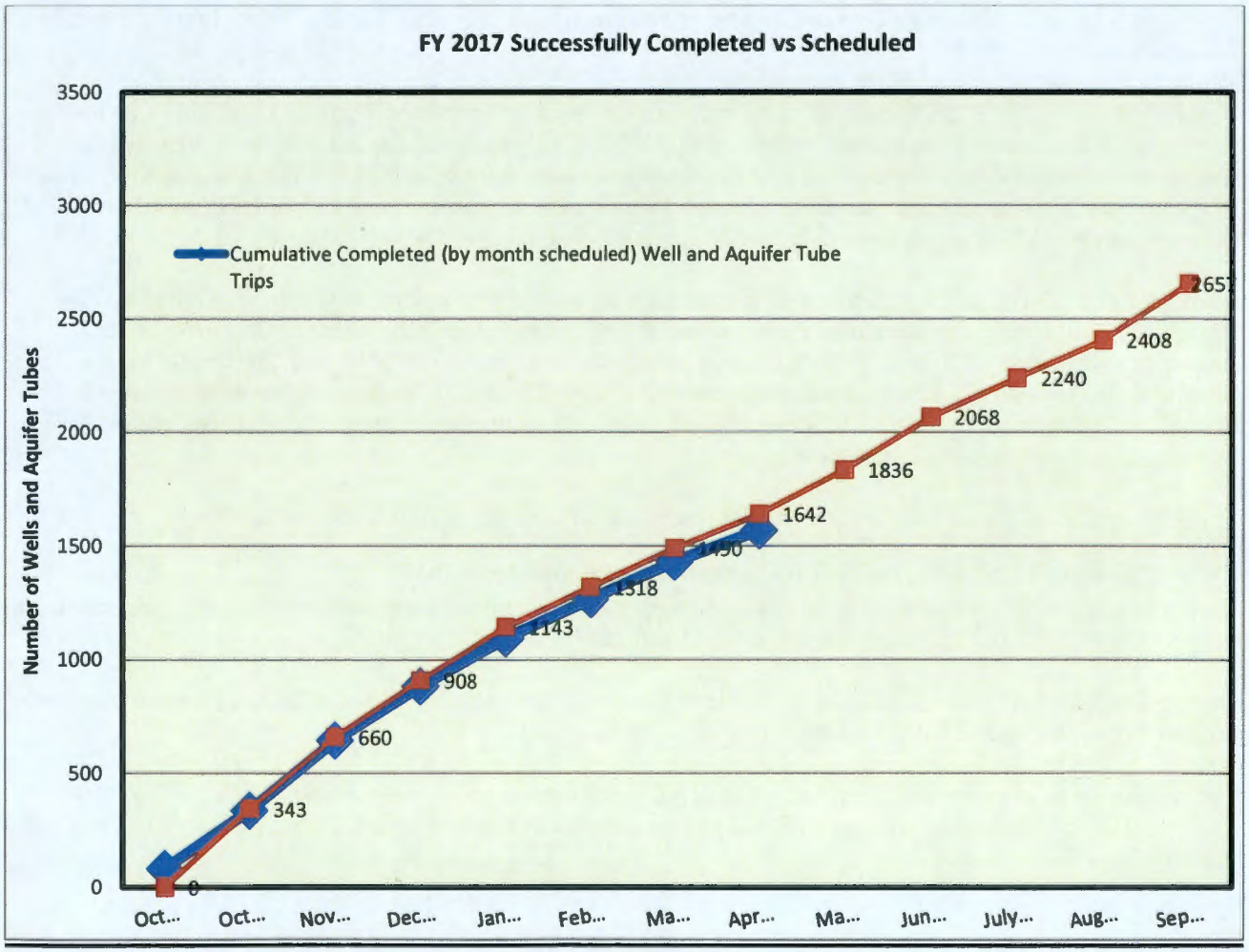
trips to be awaiting include but are not limited to issues such as well maintenance, weather conditions, access restrictions, and resource limitations.

Upcoming Sample Trips

Sample trips for the river corridor only, scheduled for collection in May 2017 and June 2017 (and not collected before the target sample month) are listed in Table 4 and Table 5, respectively.

Data Access

The sampling results are available in HEIS and can be accessed from the Environmental Dashboard Application which can be accessed from the HLAN at https://ehs.chprc.rl.gov/eda/ or from the internet at https://ehs.hanford.gov/eda/.



Approved Change Notices

- TPA-CN-0729
- TPA-CN-0730
- TPA-CN-0731
- TPA-CN-0732
- TPA-CN-0733
- TPA-CN-0734
- TPA-CN-0736
- TPA-CN-0741
- TPA-CN-0755
- TPA-CN-0760
- TPA-CN-0762
- TPA-CN-0778
- TPA-CN-0779

Operable Unit Specifics

100-KR-4 Groundwater Operable Unit - Mike Drewett/Jason Hulstrom

- CERCLA Process Implementation:
- The RI/FS and PP re-write decision document process was restarted in February 2017.
  - ✓ The KW pump and treat system, which was shut down May 16, 2016 for a rebound study, was restarted in April 2017 to extract hexavalent chromium which rebounded between the 105-KW Reactor and the 183-KW Head house area.
  - ✓ Submitted draft Phase 1 Tracer Study report to RL on March 22, 2017.
  - ✓ Submitted K East Borehole Investigation Report, Rev 0 to RL in April 2017.
- Monitoring & Reporting:
  - ✓ Initiated drilling activities at two new monitoring well locations on April 3, 2017. One well is located just north of the 100-K East electrical substation. The second well is located between the 105-KE and KW Reactors towards the Columbia River.
- Remedial Actions & System Modifications:
  - ✓ Completed 2 FY17 P&T Optimization activities in March 2017.
    - o Completed sampling activities under the KW Rebound Study
    - o Submitted the draft Phase 1 Tracer Study report
  - ✓ The volume of groundwater treated and mass of Cr(VI) removed for the 100-K P&T systems (KX, KR-4, and KW) during March and April are:

Month	Gallons Treated (mgal)	Hexavalent Chromium Removed (kg)
March	51.0	2.3
April	53.5	2.8

  - ✓ FY 2017 (October. 2016 through April. 2017) P&T performance to date:

P&T System	Treated (mgal)	Removed (kg)
KR-4	89.0	1.0
KW	3.5	0.9
KX	248	14.9
Total	341	15.7

  - ✓ The influent and effluent Cr(VI) concentrations (measured weekly) for the three 100-K P&T systems during March and April are presented in Table K-1.

Table K-1. Monthly Summary of Influent and Effluent Concentrations at the 100-KR-4 P&T Systems

System	Month	Weekly Influent Concentrations[a] (µg/L)	Average Monthly Influent Concentration (µg/L)	Weekly Effluent Concentrations[ab] (µg/L)	Average Monthly Effluent Concentration[b] (µg/L)
100-KR4	March	3, 4, 4, 2, 3	3	1, 0, 0, 1.5, 1.5, -1	0.5
	April	3, 5, 6, 2	4	0, 2, 0, 0	0.5
100-KW[c]	March	--	--	--	--
	April	53, 52, 56, 55, 51, 39, 37	47	-1, -4, 1, 1, 1, 1, 3, -1	1.4
100-KX	March	13, 21, 15, 13, 13, 13, 16	15	0, 2, 0, 0, 1.5, 3	1
	April	14, 14, 16, 15	15	-1, 3, 3, 1	1.5

a. Concentrations provided represent samples taken during the current month and loaded into HEIS as of the publication of the UMM.

b. Concentrations reported are below detection and represent the actual instrument reading on the sample(s). The detection limit is approximately 2 µg/L hexavalent chromium. The negative readings indicate that the measured concentration is indistinguishable from the blank.

c. The 100-KW P&T System was shutdown May 16, 2016 to initiate the rebound study; KW P&T system was restarted in April 2017.

- ✓ In March 2017, the average pumping rates were 306, 0, and 831 gpm for the KR-4, KW, and KX systems, respectively.
- ✓ In April 2017, the average pumping rates were 324, 35, and 804 gpm for the KR-4, KW, and KX systems, respectively. Table K-2 shows the current number of 100-KR-4 OU P&T wells available for use versus the wells that operated during April. Figure K-2 illustrates the monthly average pumping rates for operating extraction wells across the 100-KR-4 system.
- ✓ Figures K-3 through K-5 present the monthly volume of groundwater treated and mass of hexavalent chromium removed though April 2017.

Table K-2. April 2017 100-KR-4 OU P&T Well Summary

Operable Unit	Well Configuration	Current OU Total	Total Operating in April 2017*
100-KR-4	Extraction	35	34[ac]
	Injection	19	19

*Based on the monthly average rate for a given well greater than zero; A change in the total number of operational wells could be caused by:

a. Well is off for well maintenance (well 199-K-145)

b. Well is off for plume management purposes

c. Well is off based on the operational configuration (Well 199-K-225)

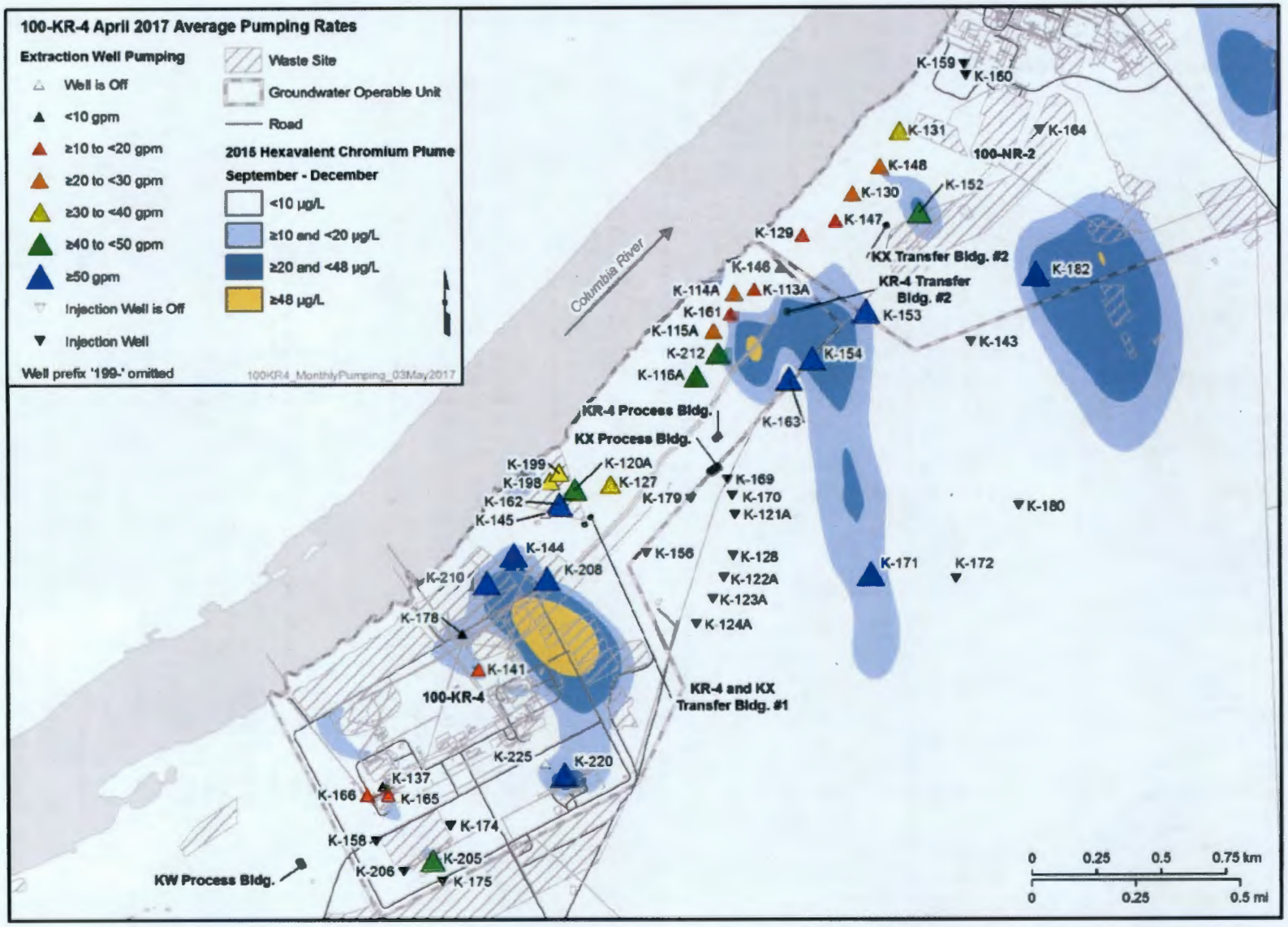


Figure K-2. April 2017 Average Pumping Rates for the 100-KR-4 P&T System

Figure K-3. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-KR-4 Pump-and-Treat, September 2011 through April 2017

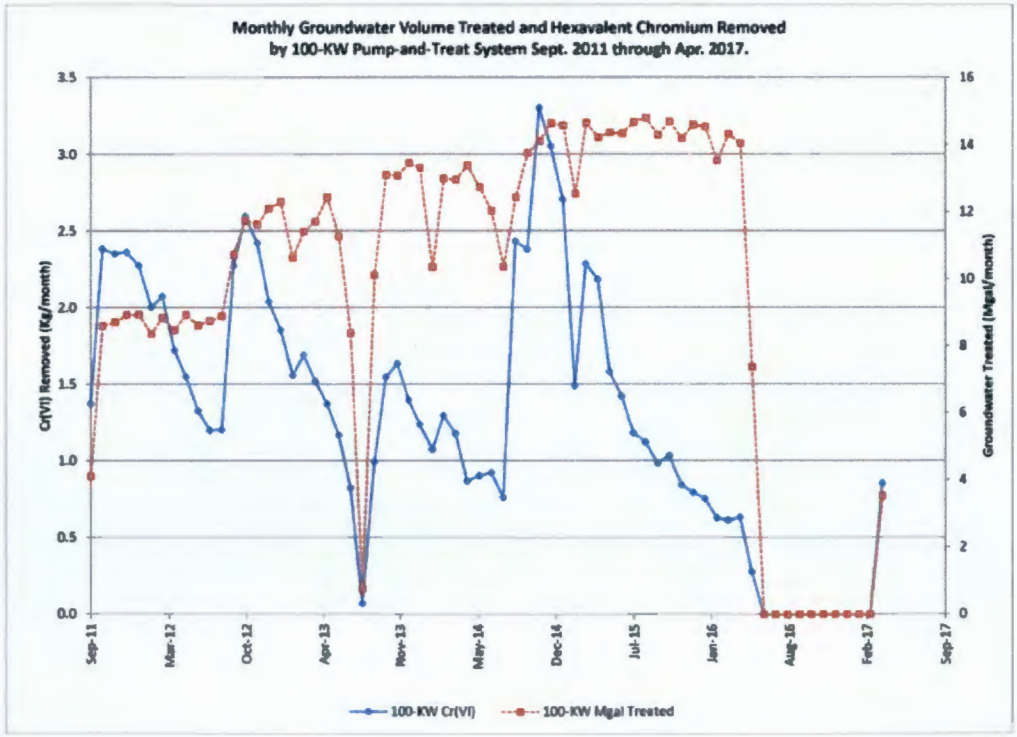


Figure K-4. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-KW Pump-and-Treat, September 2011 through April 2017.

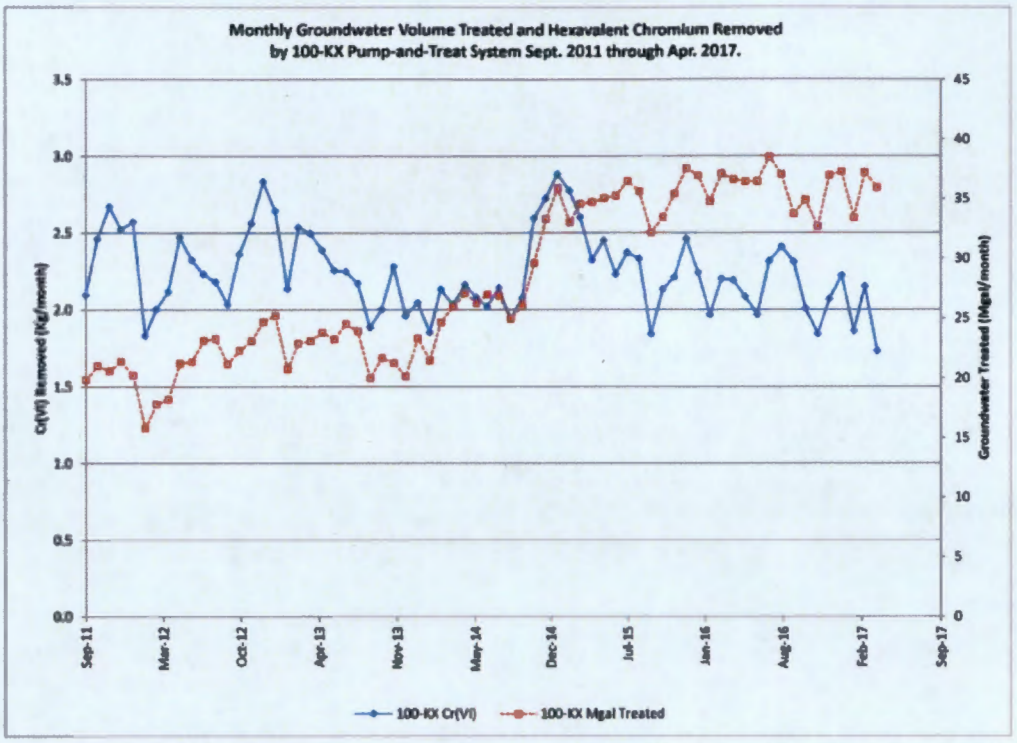


Figure K-5. Monthly Cr(VI) removed and groundwater volume treated by 100-KX pump-and-treat, September 2011 through April 2017.

100-BC-5 Groundwater Operable Unit – Robert Evans/Mary Hartman

- CERCLA Process Implementation:
  - ✓ EPA continues with their review of the Draft A, RI/FS Report and Proposed Plan for 100-BC-1, 100-BC-2 and 100-BC-5. Comments were due January 31, 2017.
- Monitoring & Reporting:
  - ✓ Nothing new to report. Five wells are scheduled for sampling in June 2017.

100-NR-1/100-NR-2 Operable Unit – Bill Faught/Virginia Rohay/Art Lee

- CERCLA Process Implementation
  - ✓ The third round of quarterly groundwater samples was completed in March with data loaded in HEIS. This data will be included in the supplemental groundwater baseline risk assessment.
  - ✓ CHPRC, RL, and Ecology met in April to discuss path forward for the 100-N RI/FS. Consensus on the path forward was to prepare a Draft B RI/FS Report for updating the risk assessment and adding the current groundwater data.
  - ✓ Preparing white paper on applicable PRG cleanup value for shoreline based on biota concentration guides (BCGs) limiting radionuclide concentration in an environmental medium that would not result in exceeding recommended dose standards.
- Remedial Actions:

100-NR-1 Bioventing –

- ✓ Figure NR-1 presents historic monthly bioventing well gas sample results for monitoring wells 199-N-171 and 199-N-169 and the measurement data are presented in Table NR-1.
- ✓ The low river stage respirometry test was conducted from November 14, 2016 through December 28, 2016, as planned. The respirometry test report was prepared and will be included in the annual bioventing performance report currently being prepared. The report is anticipated to be provided to RL for review in June.

Product Recovery

- ✓ A smart sponge assembly was inserted in well 199-N-183 in addition to the smart sponge use in well 199-N-18, on February 21, 2017. The sponge assemblies in both wells were replaced on April 25, 2017. A total of 200 g of TPH was removed from groundwater from each well. Assuming that the TPH is diesel, with a density of 0.85 g/mL, a combined 0.48 L of diesel was removed.
- ✓ Petroleum hydrocarbon values (total and EPH fractions) are higher in well 199-N-18 than 199-N-183 from groundwater samples collected during the respirometry test. Additional analysis is being considered to analyze the hydrocarbon fractions that are absorbed by the sponges in both wells to compare with groundwater samples results.

Aquifer Tubes

- ✓ Tubes C7934, C7935, and C7936 are located adjacent to one another (Figure NR-2), with screens at depths of 14.41 ft. (C7934), 18.75 ft. (C7935), and 29.19 ft. (C7936). All three aquifer tubes were sampled on February 28, 2017, March 21, 2017, and April 24, 2017. Tritium and strontium-90 concentration trends for all three aquifer tubes through March 21, 2017 are shown in Figures NR-4 and NR-5, respectively. Results for the April 24, 2017 samples are not yet available. Samples could not be collected at these aquifer tubes in January 2017 because of adverse weather. These aquifer tubes are scheduled for sampling again in May 2017.
  - Tritium concentration trends have been steadily decreasing since the large spike that started in the first quarter of 2013 and peaked in the spring of 2015, and the declining trends indicate that the mass of tritium flushed to groundwater during waste site soil remediation is receding.
  - The sample results were compared to specific conductance measurements, and the finding is that the samples are from groundwater and not river water. The samples have no lab qualifiers that would indicate any analytical anomalies in the tritium and strontium-90 results.

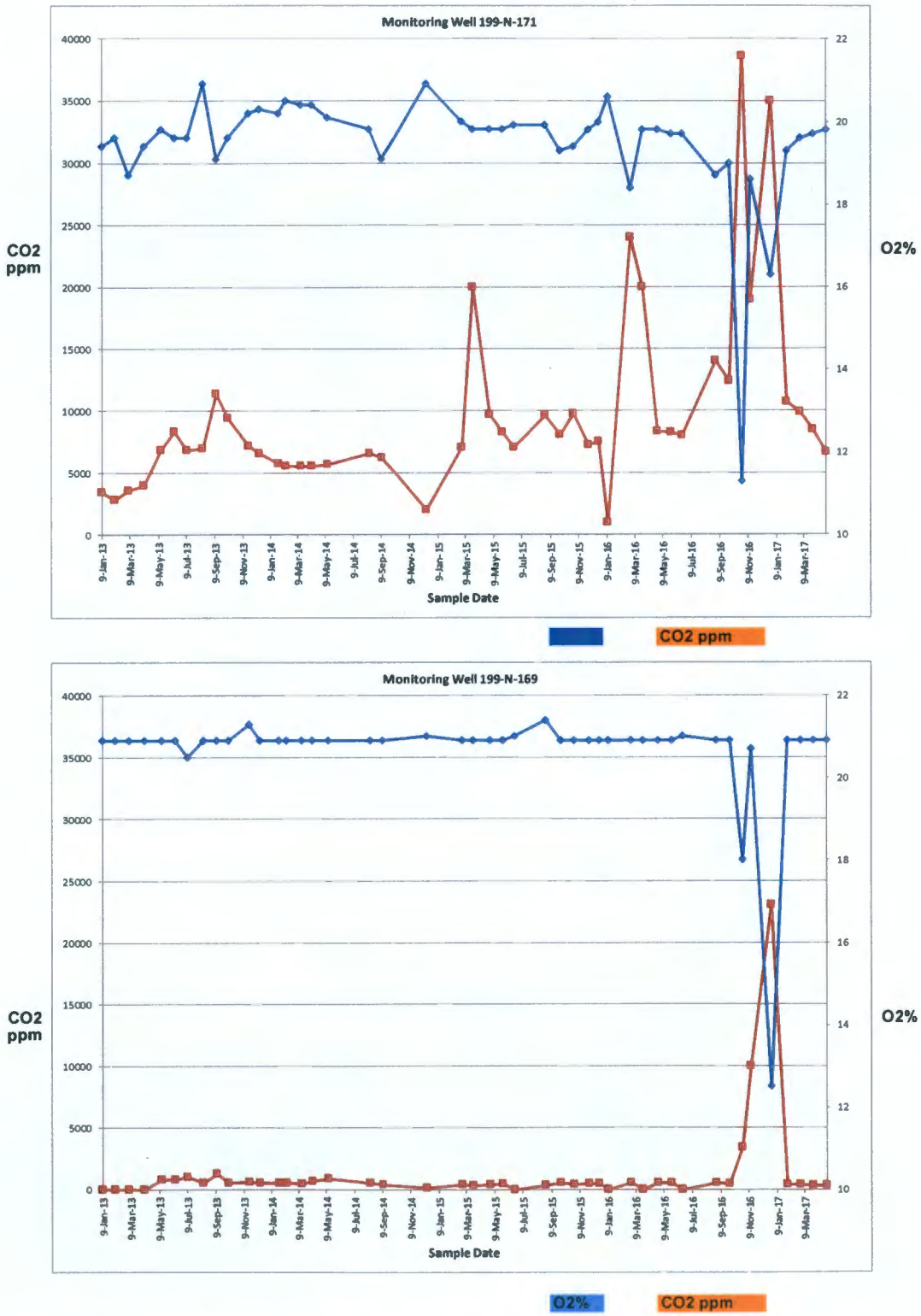


Figure NR-1. Bioventing Wells 199-N-169 and 199-N-171 Monthly Sampling Trends.

Table NR-1. Bioventing Wells 199-N-169 and 199-N-171 Monthly Sampling Results

Date	199-N-171		199-N-169	
	O2%	CO2 ppm	O2%	CO2 ppm
9-Jan-13	19.4	3400	20.9	0
5-Feb-13	19.6	2840	20.9	0
6-Mar-13	18.7	3570	20.9	0
8-Apr-13	19.4	3960	20.9	0
15-May-13	19.8	6820	20.9	800
12-Jun-13	19.6	8290	20.9	780
10-Jul-13	19.6	6800	20.5	1020
14-Aug-13	20.9	6940	20.9	530
11-Sep-13	19.1	11400	20.9	1250
8-Oct-13	19.6	9380	20.9	550
21-Nov-13	20.2	7160	21.3	600
16-Dec-13	20.3	6520	20.9	530
27-Jan-14	20.2	5720	20.9	500
11-Feb-14	20.5	5520	20.9	550
17-Mar-14	20.4	5520	20.9	470
9-Apr-14	20.4	5560	20.9	660
14-May-14	20.1	5670	20.9	840
13-Aug-14	19.8	6520	20.9	520
10-Sep-14	19.1	6180	20.9	410
15-Dec-14	20.9	2000	21	100
1-Mar-15	20	7020	20.9	360
25-Mar-15	19.8	20000	20.9	325
29-Apr-15	19.8	9650	20.9	410
26-May-15	19.8	8260	20.9	460
22-Jun-15	19.9	7000	21	0
27-Aug-15	19.9	9620	21.4	330
30-Sep-15	19.3	8070	20.9	530
29-Oct-15	19.4	9770	20.9	360
30-Nov-15	19.8	7200	20.9	460
22-Dec-15	20	7510	20.9	490
11-Jan-16	20.6	1000	20.9	0
29-Feb-16	18.4	24000	20.9	520
25-Mar-16	19.8	20000	20.9	15.6
28-Apr-16	19.8	8290	20.9	520
26-May-16	19.7	8220	20.9	550
20-Jun-16	19.7	8000	21	0
31-Aug-16	18.7	14000	20.9	530
29-Sep-16	19	12400	20.9	430
27-Oct-16	11.3	38600	18	3400
14-Nov-16	18.6	19000	20.7	0
28-Dec-16	16.3	35000	12.5	23000
30-Jan-17	19.3	10700	20.9	390
28-Feb-17	19.6	9860	20.9	390
28-Mar-17	19.7	8480	20.9	290
26-Apr-17	19.8	6630	20.9	320

Figure NR-2. Locations of Aquifer Tubes C7934, C7935, and C7936

- Monitoring & Reporting:
  - ✓ Analytical results from groundwater assessment samples collected in December 2016 from the RCRA TSD sites 1301-N, 1325-N, and 1324-N/NA were transmitted to Ecology on March 31, 2017. An assessment report has been sent to DOE/RL for their review. The report determined that the detected Appendix 5 constituents are not associated with the RCRA TSD units based on comparison to background, laboratory quality control data limits, and spatial distribution in relationship to past and present groundwater flow direction.

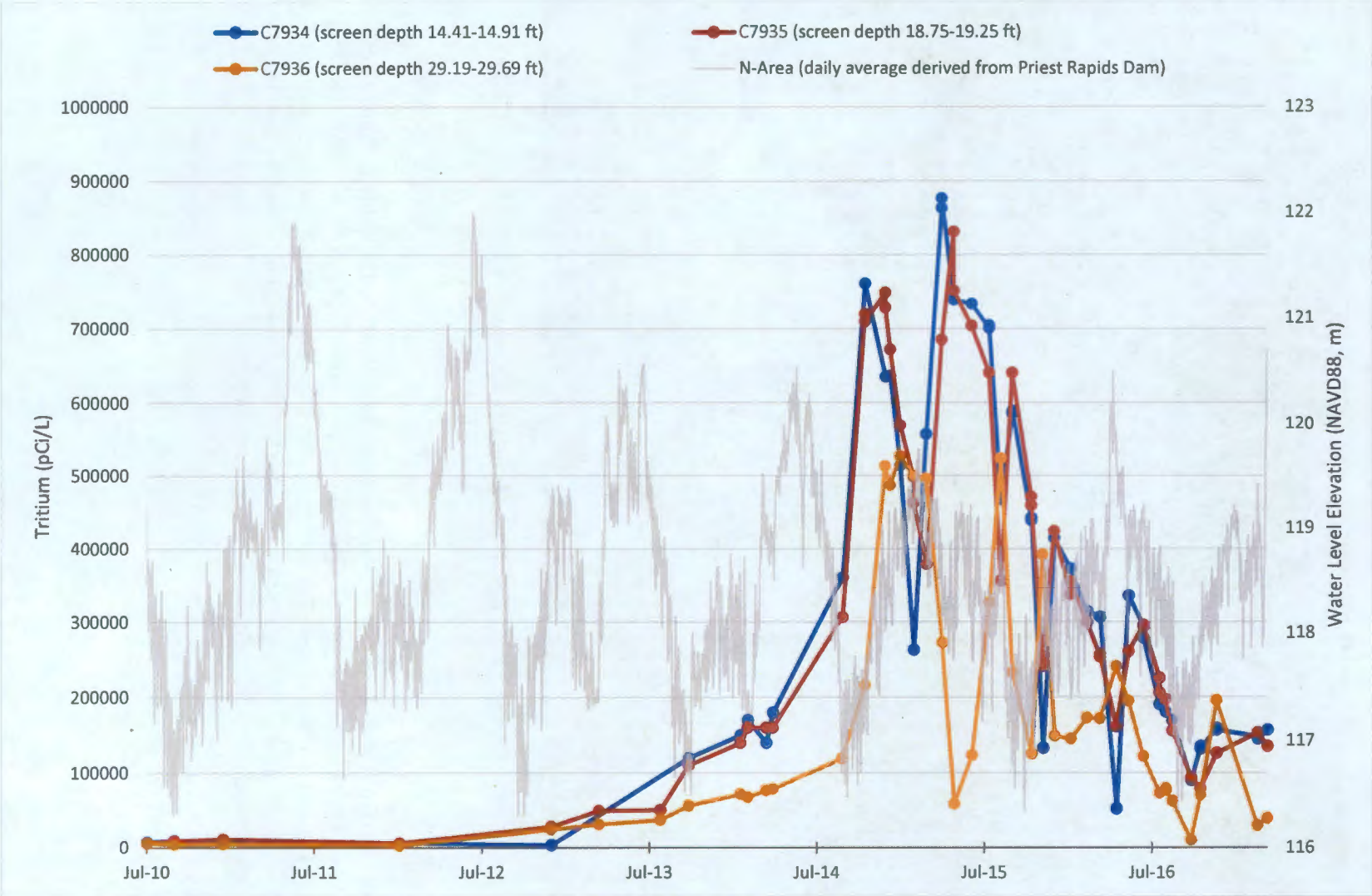


Figure NR-3. Tritium Trends through March 2017 at Aquifer Tubes C7934, C7935, and C7936.

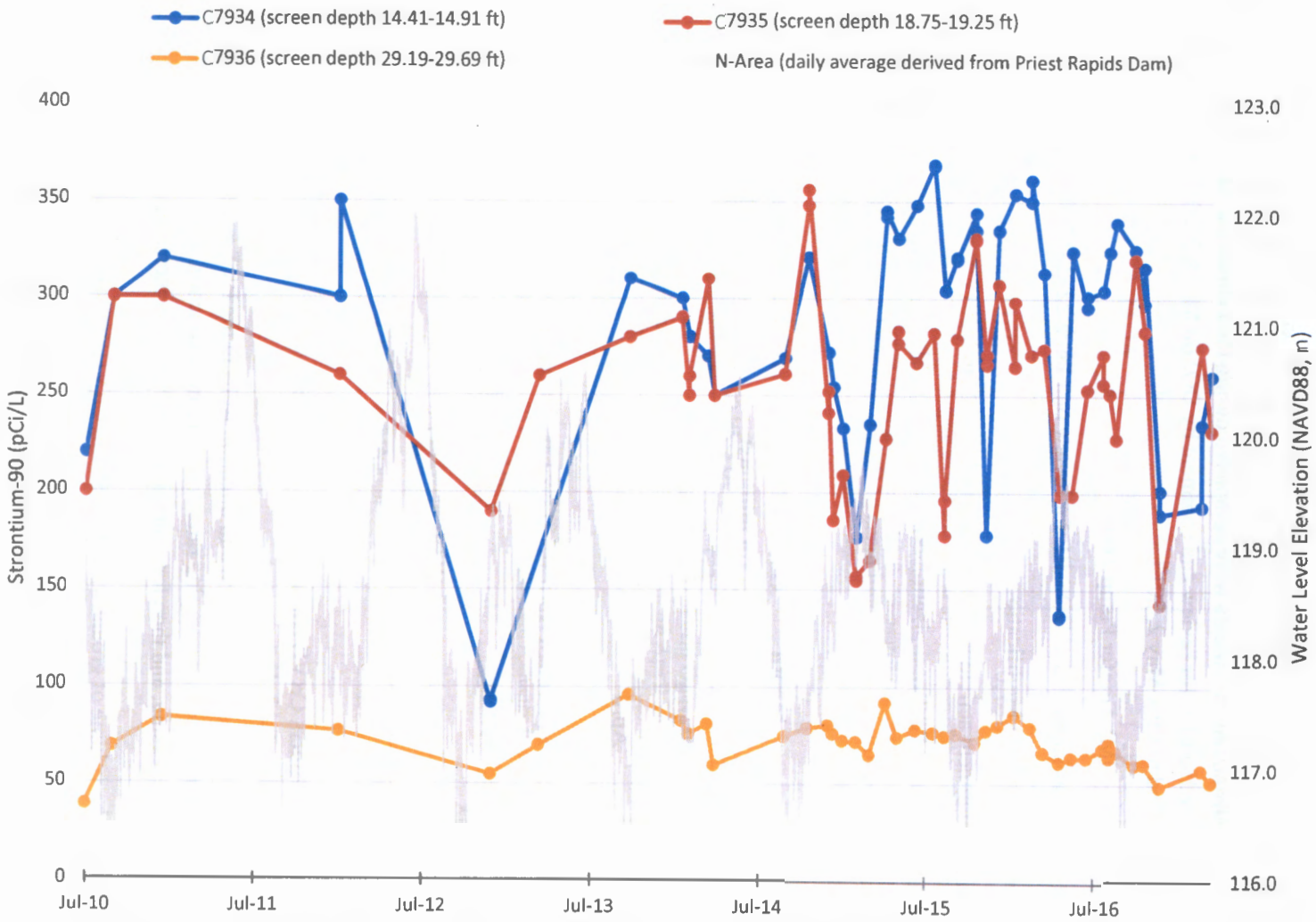


Figure NR-4. Strontium-90 Trends through March 2017 at Aquifer Tubes C7934, C7935, and C7936.

100-HR-3 Groundwater Operable Unit – Mike Drewett/Rob Mackley

- CERCLA Process Implementation:
  - ✓ The Rev. 0 Proposed Plan was submitted for public comment on July 26, 2016. An extension to the public comment period was granted. The review period ended on September 16, 2016. DOE-RL, Ecology and EPA are currently responding to comments on the draft Record of Decision (ROD) and responsiveness summary. Resolution of outstanding comments were completed during the February 27-28, 2017 meetings. The Revised ROD was provided to EPA for review and comment by DOJ on March 2, 2017. Revised ROD incorporating DOJ comments provided to EPA May 2, 2017.
- Ringold Upper Mud (RUM) Aquifer Pump Test
  - ✓ The draft report was submitted to DOE-RL for review on March 22, 2017.
- Remedial Actions & System Modifications
  - ✓ Completed realignment activities at six locations during March 2017.
  - ✓ Completed four FY17 P&T optimization criteria actions in March 2017 and two in April 2017.
  - ✓ The volume of groundwater treated and mass of Cr(VI) removed from the 100-HR-3 P&T systems during March and April 2017 are:

Month	Gallons Treated (in millions)	Hexavalent Chromium Removed (kg)
March	66	5.0
April	76	5.1

  - ✓ FY 2017 (October. 2016 through April 2017) P&T performance to date:

P&T System	Treated (mgal)	Removed (kg)
DX	225	21.2
HX	194	15.1
Total	419	36.3

  - ✓ The influent and effluent Cr(VI) concentrations (measured weekly) for the 100-HR-3 systems during March and April are presented in Table H-1.
  - ✓ A summary of the number of extraction and injection wells in the P&T systems is shown in Table H-2. Figure H-1 illustrates the monthly average pumping rates for operating extraction wells across the DX and HX P&T systems. River levels are increasing, and therefore pumping rates have also increased.
  - ✓ Summaries of the volume of groundwater treated and Cr(VI) removed for the 100-DX and 100-HX pump and treat systems are shown in figures H-2 and H-3, respectively. A general reduction in Cr(VI) mass removal over time, a function of progress of remediation with associated reduction in groundwater contaminant concentration, is exhibited at both DX and HX. The drop in concentrations is more pronounced at DX, where concentrations were previously at very high levels. Influent concentrations at DX continue to decline as remediation progresses.

Table H-1. Monthly Summary of Influent and Effluent Concentrations at the 100-HR-3 P&T Systems

System	Month	Weekly Influent Concentrations[a] (µg/L)	Average Monthly Influent Concentration (µg/L)	Weekly Effluent Concentrations[ab] (µg/L)	Average Monthly Effluent Concentration[b] (µg/L)
100-DX	March	22, 25, 17, 23	22	3, 4, 1, 1.5, 1	2
	April	24, 20, 23, 14	20	0, 0, 1, -1	0
100-HX	March	14, 17, 19, 20, 19	17	0, 1, 0, 1.5	1
	April	17, 15, 13, 13	15	0, 0, 0, 0	0

a. Concentrations provided represent samples taken during the current month and loaded into HEIS as of the publication of the UMM.

b. Concentrations reported are below detection and represent the actual instrument reading on the sample(s). The detection limit is approximately 2 µg/L hexavalent chromium. The negative readings indicate that the measured concentration is indistinguishable from the blank.

Table H-2. April 2017 100-HR-3 OU P&T Well Summary

Operable Unit	Well Configuration	Current OU Total	Total Operating in April 2017*
100-HR-3	Extraction	85	84[a]
	Injection	28	25[b]

*Based on the monthly average rate for a given well greater than zero; A change in the total number of operational wells could be caused by:

a. Well is off for well maintenance (Well 199-D4-34)

b. Well is off for plume management purposes (Wells 199-H4-71, 199-H4-72, and 199-H4-73)

c. Well is off based on the operational configuration

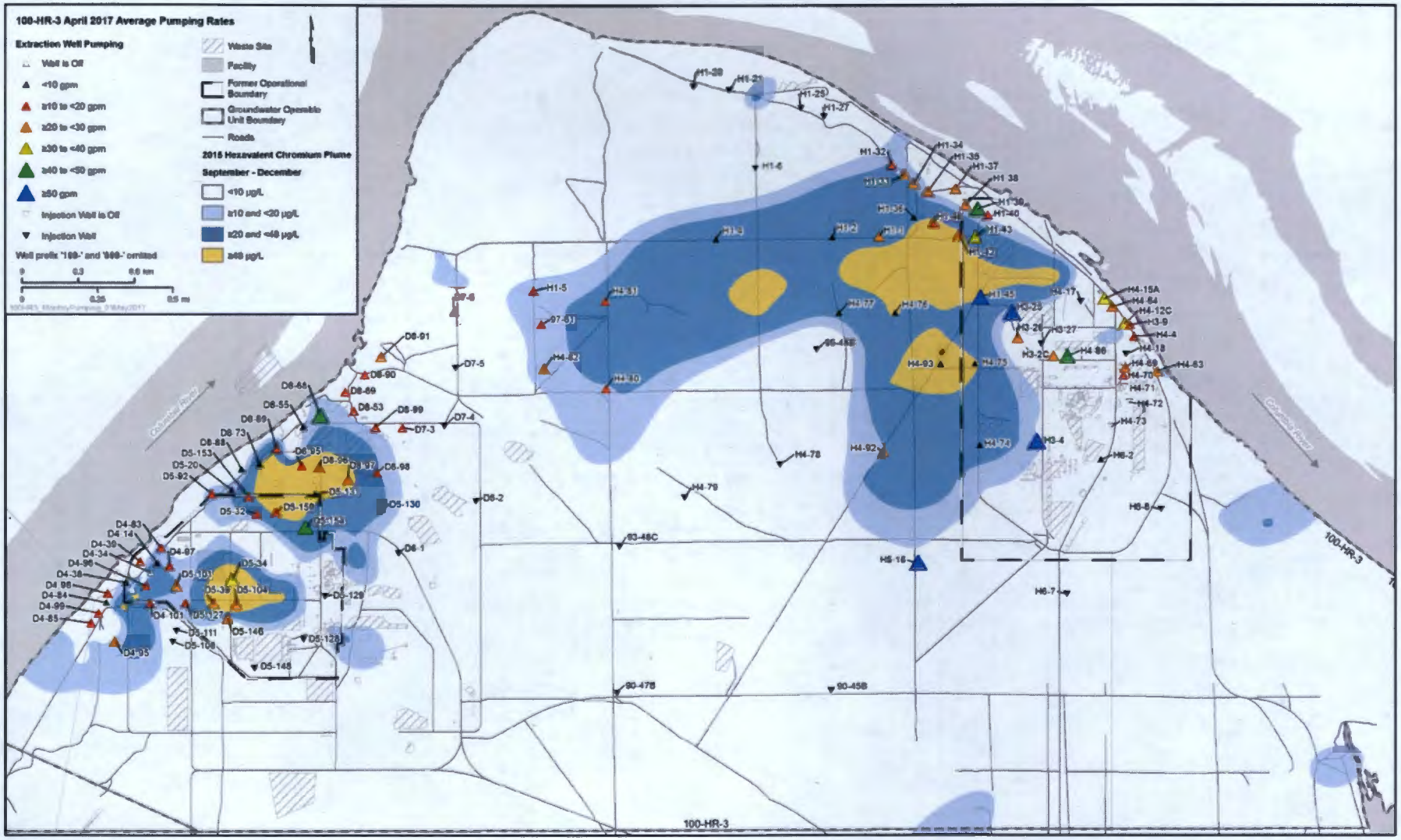


Figure H-1. April 2017 Average Pumping Rates for the 100-HR-3 P&T System.

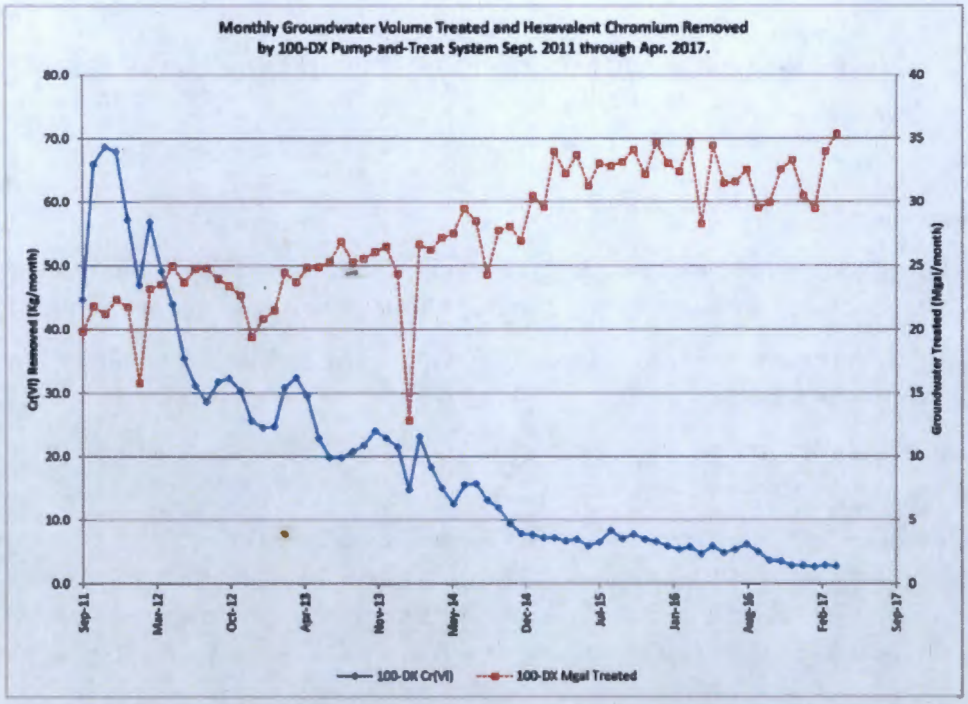


Figure H-2. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-DX Pump-and-Treat, September 2011 through April 2017.

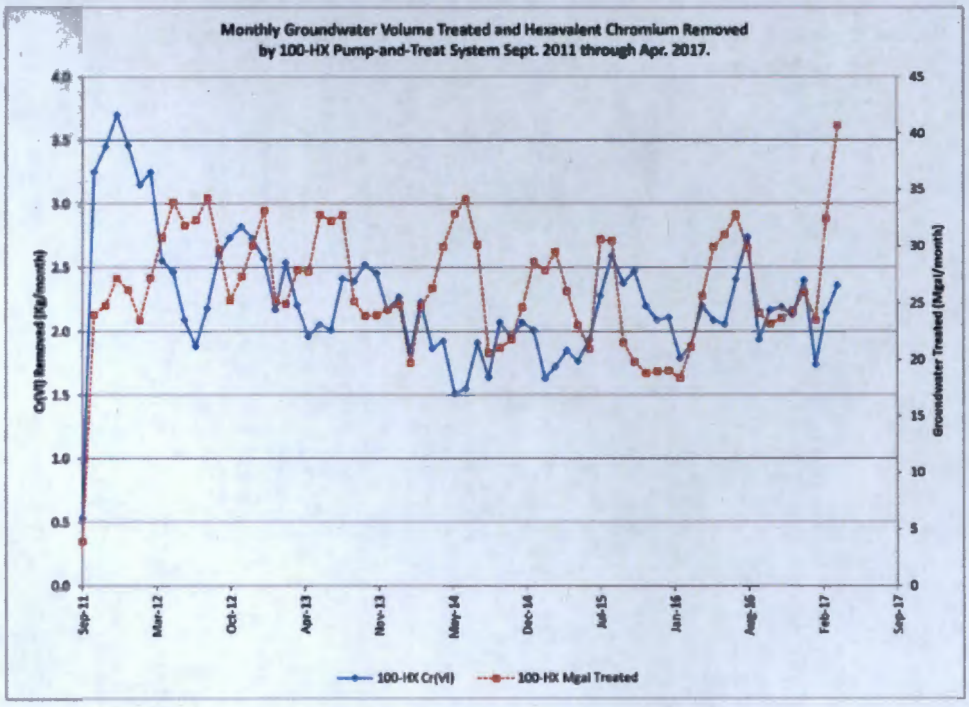


Figure H-3. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-HX Pump-and-Treat, September 2011 through April 2017.

100-FR-3 Groundwater Operable Unit – Robert Evans/Mary Hartman

- CERCLA Process Implementation:
  - ✓ Nothing new to report
- Monitoring & Reporting:
  - ✓ A DQO workshop has been scheduled for early June to select locations for Phase 2 monitoring wells scheduled for drilling in 2018, and to consider whether other changes to the monitoring program are warranted.
  - ✓ The six new monitoring wells (locations shown in Figure F-1) were sampled as scheduled in March. The new wells will be sampled again in June.
  - ✓ Data for the new wells from the delayed January sampling event were loaded into HEIS, as were the data from the March sampling event.
  - ✓ The general chemistry of new well 699-66-32 differs from all the other wells; sulfate is the major anion rather than bicarbonate. The hydraulic head in this well is 5 to 6 meters higher than the current regional water table, the elevation of the top of the RUM is higher than the historical maximum water table, and the well probably monitors perched water. The use of this well for monitoring 100-FR-3 will be discussed in the DQO session described above.
  - ✓ Anion data in three of the wells sampled in March were far off trend and are being reviewed as potential errors. Other data were consistent with previous results.
  - ✓ Well 199-F5-45 was sampled in March to verify an increase in TCE in the October 2016 sample. The concentration remained at about the same level as in October 2016 (11 μg/L in March), see Figure F-2.

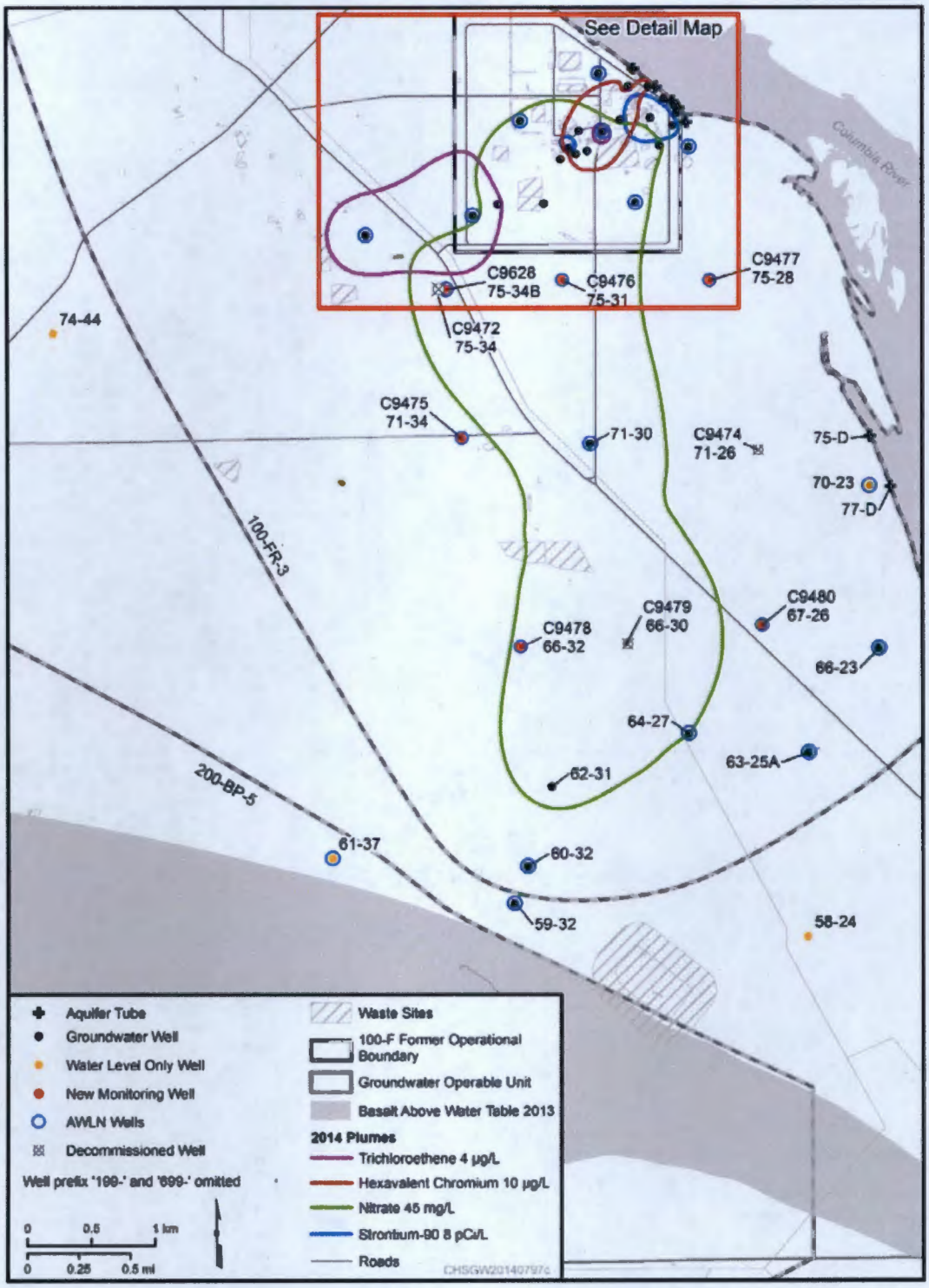


Figure F-1. Locations of 100-FR-3 Monitoring Wells

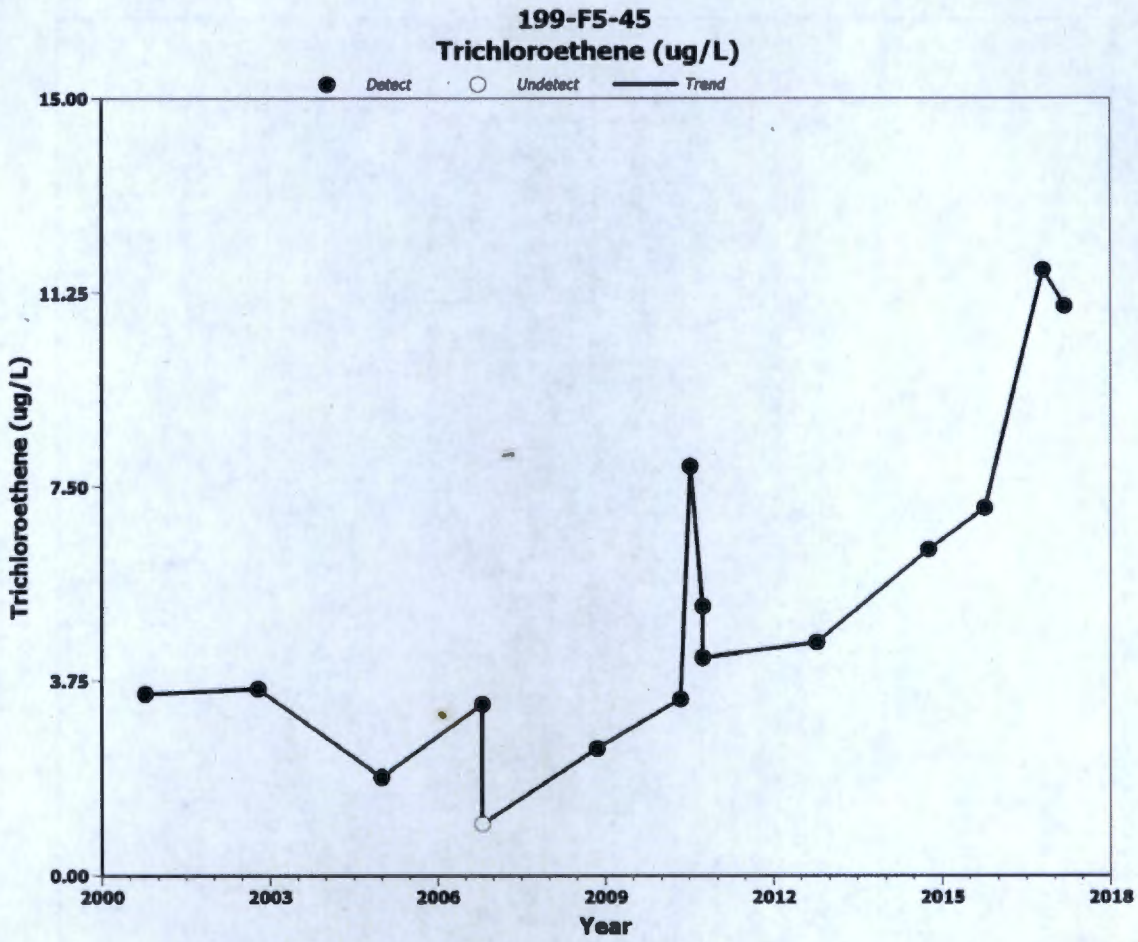


Figure F-2. Trichloroethene in Well 199-F5-45 in Central 100-F Area

300-FF-5 Groundwater Operable Unit – Patrick Baynes/Virginia Rohay/Farah Elloy

- CERCLA Process Implementation:
  - ✓ Nothing new to report
- Remedial Actions:
  - ✓ Sequestration – Stage B Project:
    - Office and restroom trailer installation is complete
    - Chemical Delivery System Design is complete
    - Chemical Procurement contract has been placed

Drilling – 59 of the 67 new injection and monitoring wells have been drilled At 300-FF-5 Stage B – current as of 17-May-17 … 65 wells of 67 total Stage B wells have been drilled to Total Depth (TD); 55 of the 67 total have the concrete surface completions finished, and 33 of the 67 total have been successfully developed.

- (see Figure FF-1 below).
- Chemical Injections still on schedule for August/September 2017
- Monthly monitoring of six groundwater wells was initiated in January 2017.

- Monitoring & Reporting:
  - ✓ 300 Area Industrial Complex: The one well scheduled for CERCLA sampling in March 2017 was sampled as planned. The next CERCLA sampling event is scheduled for June 2017.
  - ✓ 300 Area Industrial Complex: 50 of the 52 AEA wells scheduled for sampling in December 2016 have been sampled: 47 were sampled in December 2016, 2 were sampled in January 2017, and 1 was sampled in April 2017. As of May 8, the one well scheduled for sampling in April 2017 has not been sampled. The next AEA sampling event is scheduled for June 2017.
  - ✓ 618-10 Burial Ground/316-4 Crib: The three CERCLA wells were sampled as scheduled in November 2016, prior to remediation of the 316-4 Crib. The samples scheduled for January 2017 during remediation of the crib were collected in February at two of the wells and March at the third well. The next CERCLA sampling event is scheduled for June 2017, following remediation of the 316-4 Crib.
  - ✓ 618-10 Burial Ground/316-4 Crib: The four wells scheduled for AEA monitoring in December 2016 have been sampled: 2 in November 2016 and 2 in December 2016. The next AEA sampling event is scheduled for December 2017.
  - ✓ 618-11 Burial Ground: The next CERCLA sampling event is scheduled for October 2017. Six wells scheduled for AEA monitoring in October 2016 were sampled in April 2017. One of two wells scheduled for AEA monitoring in February 2017 was sampled as scheduled. One well scheduled for AEA monitoring in March 2017 was sampled as scheduled.
  - ✓ 300 Area Process Trenches (316-5) RCRA Monitoring: All 8 wells scheduled for sampling in March 2017 were sampled on March 3, 2017. The next RCRA sampling event is scheduled for June 2017. *Note, the 8 wells are sampled semiannually with 4 independent samples collected per semiannual period; the 4 independent samples are collected on a monthly interval. As a result, the 8 wells are sampled 8 months per year.*

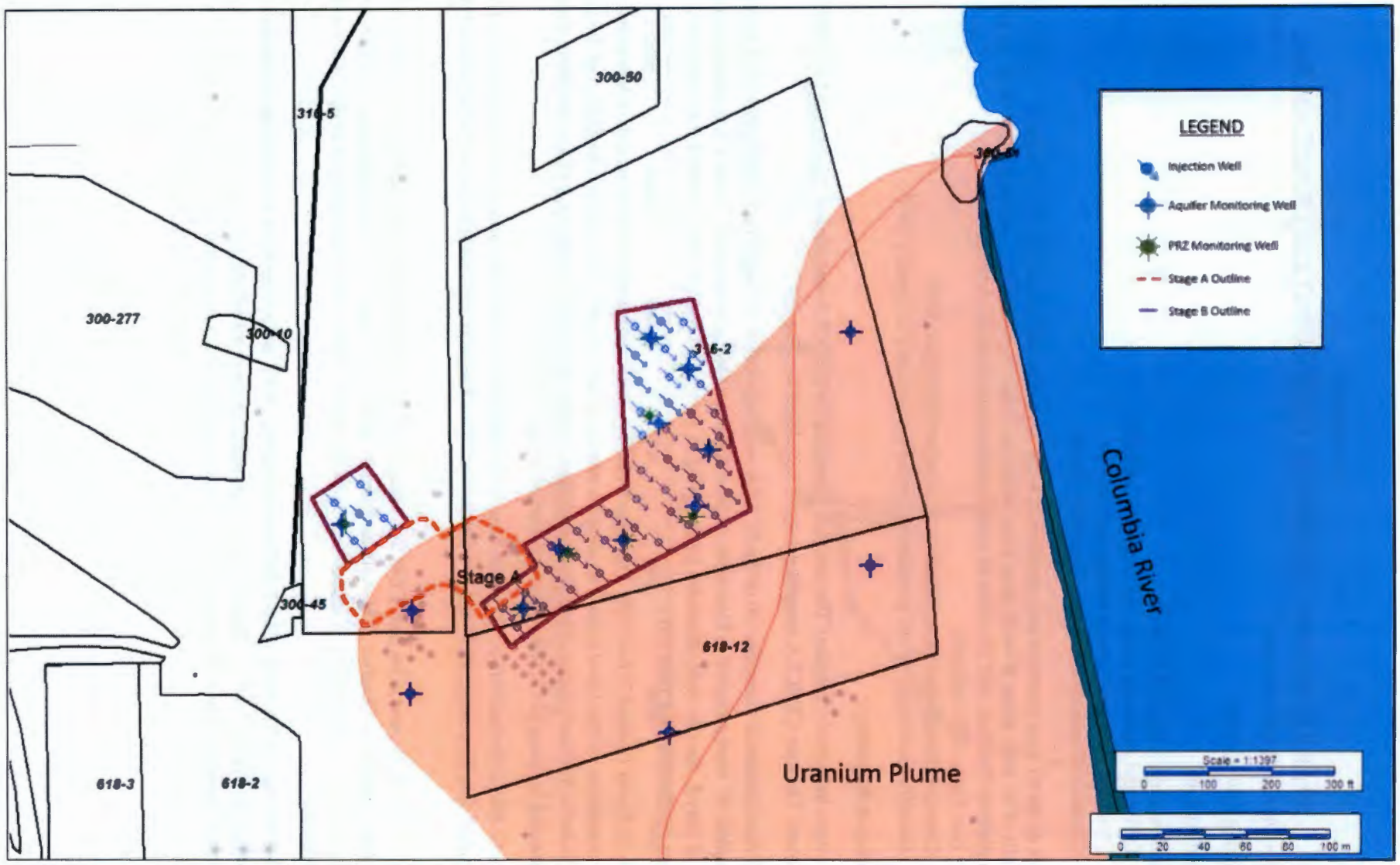


Figure FF-1. New Injection and Monitoring Wells

Hanford Sampling Program Information

Table 1 Wells, Aquifer Tubes, and springs in the River Corridor Areas Successfully Sampled In March 2017

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
	199-F5-45	199-D4-38	199-H1-1	199-K-106A	199-N-105A		399-1-10A
	699-66-32	199-D4-84	199-H1-2	199-K-107A	199-N-165		399-1-10B
	699-67-26	199-D4-85	199-H1-32	199-K-132	199-N-2		399-1-16A
	699-67-26	199-D5-151	199-H1-33	199-K-137	199-N-28		399-1-16B
	699-71-34	199-D5-152	199-H1-34	199-K-141	199-N-3		399-1-17A
	699-75-28	199-D5-160	199-H1-36	199-K-146	199-N-32		399-1-17B
	699-75-31	199-D5-92	199-H1-37	199-K-153	199-N-34		399-1-18A
	699-75-34B	199-D8-102	199-H1-38	199-K-165	199-N-371		399-1-18B
		199-D8-55	199-H1-39	199-K-171	199-N-372		399-1-23
		199-D8-6	199-H1-4	199-K-173	199-N-373		399-1-55
		199-D8-88	199-H1-40	199-K-173	199-N-374		399-1-7
		199-D8-89	199-H1-42	199-K-185	199-N-376		399-2-2
		199-D8-99	199-H1-43	199-K-204	199-N-377		399-4-14
		199-H1-5	199-H1-45	199-K-205	199-N-41		699-9-E2
		199-H4-80	199-H1-46	199-K-205	199-N-57		699-S6-E4K
		199-H4-81	199-H3-25	199-K-223	199-N-71		
		199-H4-82	199-H3-26	199-K-223	199-N-72		
			199-H3-2C	199-K-224	199-N-73		
			199-H4-64	199-K-224	199-N-74		
			199-H4-69	199-K-34	199-N-77		
			199-H4-70		199-N-81		
			199-H4-74		C7934		
			199-H4-75		C7935		
			199-H4-77		C7936		
			199-H4-84				
			199-H4-88				
			199-H4-93				
			199-H5-16				

Table 2 Wells, Aquifer Tubes, and springs in the River Corridor Areas Successfully Sampled In April 2017

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
		199-D4-95	199-H4-84	199-K-173	C7934		399-1-16A
		199-D4-96	199-H4-88	199-K-220	C7935		399-1-17A
		199-D4-97	199-H4-92		C7936		399-1-23
		199-D5-101	199-H4-93				399-1-55
		199-D5-103	699-88-41A				399-1-7
		199-D5-127	699-93-37A				399-2-2
		199-D5-130					399-6-3
		199-D5-151					399-6-5
		199-D5-152					699-12-2C
		199-D5-153					699-13-0A
		199-D5-154					699-13-1C
		199-D5-159					699-13-1E
		199-D5-160					699-13-2D
		199-D5-20					699-13-3A
		199-D5-32					
		199-D7-3					
		199-D7-6					
		199-D8-102					
		199-D8-73					
		199-D8-90					
		199-D8-91					
		199-D8-95					
		199-D8-96					
		199-D8-97					
		199-D8-98					
		699-97-61					

Table 3 Fiscal Year 2016 and 2017 Sample Trips in the River Corridor Areas awaiting at the end of April 2017

Quarter Scheduled	GWIA	SAMP SITE TYPE	SITE_NAME	SCHEDULE DATE	Frequency	Months Remain	Status	Comment
FY 2016 Q4	100-NR	AQUIFER TUBE	C9586	9/1/2016	2 Times Annually	1		
FY 2017 Q1	100-HR-D	WELL	199-D4-20	11/1/2016	3 Times Annually	0	Late	Review for Cancelation
		WELL	199-D4-29	12/1/2016	Annual	7		
		WELL	199-D4-50	12/1/2016	Annual	7		
		WELL	199-D5-18	11/1/2016	Annual	6		
	100-HR-H	AQUIFER TUBE	43-M	11/1/2016	Annual	6		Unsuccessful 10/11/2016
		AQUIFER TUBE	51-D	11/1/2016	Annual	6		
		SPRING	SH-144-1	11/1/2016	Annual	6		
	100-KR	SPRING	100-K SPRING 68-1	10/1/2016	Annual	5		
		WELL	199-K-178	11/1/2016	Annual	6		
	1100-EM	WELL	699-S30-E15A	12/1/2016	Annual	7		
		WELL	699-S31-E10A	12/1/2016	Annual	7		
		WELL	699-S32-E13B	12/1/2016	Annual	7		
	300-FF	WELL	399-4-12	12/1/2016	Annual	7		
		WELL	699-S29-E16A	12/1/2016	Annual	7		
FY 2017 Q2	100-HR-D	WELL	199-D5-161	1/1/2017	Annual	8		Proposed Site
	100-HR-H	WELL	199-H4-63	3/1/2017	Quarterly	1		Unsuccessful 3/22/2017
		WELL	199-H4-76	3/1/2017	Quarterly	1		Unsuccessful 3/22/2017
	100-KR	AQUIFER TUBE	22-D	3/1/2017	Annual	10		
		AQUIFER TUBE	AT-K-1-D	1/30/2017	Other	5		
		AQUIFER TUBE	AT-K-1-M	1/30/2017	Other	5		
		AQUIFER TUBE	AT-K-1-S	1/30/2017	Other	5		
		AQUIFER TUBE	C7641	1/1/2017	Other	5		
		AQUIFER TUBE	C7641	1/30/2017	Other	5		
		AQUIFER TUBE	C7642	1/1/2017	Other	5		
		AQUIFER TUBE	C7642	1/30/2017	Other	5		
		AQUIFER TUBE	C7643	1/1/2017	Other	5		
		AQUIFER TUBE	C7643	1/30/2017	Other	5		
	300-FF	WELL	699-11-E4F	2/1/2017	Annual	9		
FY 2017 Q3	100-HR-D	WELL	199-D5-131	4/1/2017	Quarterly	2		
	300-FF	WELL	699-S29-E16C	4/1/2017	Annual	11		

Table 4 Groundwater Sampling Locations in the River Corridor Areas Scheduled to be sampled in May 2017

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
		199-D3-2	199-H1-32	199-K-106A	C7934		399-1-16A
		199-D4-101	199-H1-33	199-K-107A	C7935		399-1-17A
		199-D4-102	199-H1-35	199-K-108A	C7936		399-1-23
		199-D4-103	199-H1-37	199-K-11			399-1-55
		199-D4-14	199-H1-38	199-K-110A			399-1-7
		199-D4-15	199-H1-40	199-K-111A			399-2-2
		199-D4-19	199-H2-1	199-K-116A			699-S6-E4B
		199-D4-20	199-H3-2A	199-K-119A			699-S6-E4E
		199-D4-22	199-H3-4	199-K-125A			699-S6-E4K
		199-D4-34	199-H3-6	199-K-127			
		199-D4-38	199-H3-9	199-K-13			
		199-D4-83	199-H4-11	199-K-132			
		199-D4-84	199-H4-12A	199-K-137			
		199-D4-85	199-H4-12C	199-K-138			
		199-D4-98	199-H4-13	199-K-139			
		199-D4-99	199-H4-15A	199-K-140			
		199-D5-103	199-H4-4	199-K-141			
		199-D5-104	199-H4-8	199-K-142			
		199-D5-132	199-H4-83	199-K-144			
		199-D5-133	199-H4-84	199-K-157			
		199-D5-14	199-H4-85	199-K-165			
		199-D5-142	199-H4-86	199-K-166			
		199-D5-145	199-H4-87	199-K-168			
		199-D5-146	199-H4-88	199-K-173			
		199-D5-149	199-H4-89	199-K-181			
		199-D5-150	199-H4-90	199-K-184			
		199-D5-151	199-H4-91	199-K-185			
		199-D5-152	699-97-43B	199-K-186			
		199-D5-160	699-97-43C	199-K-188			
		199-D5-34	699-97-45B	199-K-189			
		199-D5-39	699-97-47B	199-K-19			
		199-D5-42	699-97-60	199-K-190			
		199-D5-92	699-98-46	199-K-196			
		199-D5-97	699-99-42B	199-K-20			
		199-D8-102		199-K-200			
		199-D8-4		199-K-201			
		199-D8-53		199-K-202			
		199-D8-55		199-K-203			
		199-D8-6		199-K-204			

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
		199-D8-68		199-K-205			
		199-D8-69		199-K-207			
		699-97-48C		199-K-21			
		699-97-61		199-K-22			
		699-98-51		199-K-220			
				199-K-221			
				199-K-222			
				199-K-223			
				199-K-224			
				199-K-225			
				199-K-226			
				199-K-23			
				199-K-32A			
				199-K-34			
				199-K-36			
				699-78-62			

Table 5 Groundwater Sampling Locations in the River Corridor Areas Scheduled to be sampled in June 2017

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
199-B3-1	199-F5-1	199-D5-103	199-H1-1		199-N-122		399-1-10A
199-B3-46	199-F5-4	199-D5-151	199-H1-2		199-N-123		399-1-10B
199-B3-47	199-F5-46	199-D5-152	199-H1-34		199-N-136		399-1-16A
199-B3-52	199-F5-55	199-D5-160	199-H1-36		199-N-146		399-1-16B
199-B5-2	199-F5-6	199-D8-102	199-H1-39		199-N-147		399-1-17A
	699-66-32	199-D8-73	199-H1-4		199-N-173		399-1-17B
	699-67-26	199-D8-88	199-H1-42		199-N-200		399-1-18A
	699-71-34	199-D8-89	199-H1-43		199-N-210		399-1-18B
	699-75-28	199-D8-99	199-H1-45		199-N-229		399-1-23
	699-75-31	199-H1-5	199-H1-46		199-N-247		399-1-55
	699-75-34B	199-H4-80	199-H3-25		199-N-268		399-1-63
		199-H4-81	199-H3-26		199-N-280		399-1-7
		199-H4-82	199-H3-2C		199-N-297		399-2-1
			199-H4-63		199-N-315		399-2-2
			199-H4-64		199-N-332		399-4-14
			199-H4-69		199-N-342		
			199-H4-70		199-N-346		
			199-H4-74		199-N-347		
			199-H4-75		199-N-348		
			199-H4-76		199-N-349		
			199-H4-77		199-N-350		
			199-H4-84		199-N-351		
			199-H4-88		199-N-352		
			199-H5-16		199-N-353		
					199-N-354		
					199-N-355		
					199-N-356		
					199-N-357		
					199-N-358		
					199-N-359		
					199-N-360		
					199-N-361		
					199-N-362		
					199-N-363		
					199-N-364		
					199-N-365		
					199-N-366		
					199-N-367		
					199-N-371		

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
					199-N-372		
					199-N-373		
					199-N-374		
					199-N-376		
					199-N-377		
					199-N-92A		
					199-N-96A		
					APT1		
					APT5		
					C6132		
					C6317		
					C6318		
					C6319		
					C6320		
					C6324		
					C7881		
					C7934		
					C7935		
					C7936		
					C7937		
					C7938		
					C7939		
					C9586		
					C9587		
					C9588		
					C9589		
					C9590		
					N116mArray-0A		
					N116mArray-10A		
					N116mArray-11A		
					N116mArray-15A		
					N116mArray-2A		
					N116mArray-3A		
					N116mArray-4A		
					N116mArray-6A		
					N116mArray-8A		
					N116mArray-9A		
					NVP2-116.0		

Documents Submitted to the AR

Number	Title	Referencing Document
SGW-46279, R3	Conceptual Framework and Numerical Implementation of 100 Areas Groundwater Flow and Transport Model	cleared May 2016
SGW-60338, R0	Historical Changes in Water Table Elevation and Groundwater Flow Direction at Hanford: 1944 to 2014	cleared Feb. 2017, request sent to RL for approval by Brouillard
CHPRC-00189, Rev. 12	CH2M HILL Plateau Remediation Company Environmental Quality Assurance Program Plan	DOE/RL-2016-67
16-DOE/RL-2014-42-ADD1	300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan Addendum 1 for Stage B Uranium Sequestration	DOE/RL-2016-67
SGW-59494, 2016, R0	Borehole Summary Report for the Installation of Two Characterization, Monitoring, and Extractions Wells in the 100-KR-4 Groundwater Operable Unit, FY 2015	SGW-60149, R0
ECF-100KR2-16-0127, 2016, R0	Evaluation of Strontium-90 Leaching Characteristics from Borehole Sediment Samples Collected at UPR-100-K-1 and 116-KE-3 Crib within the 100-K Area of the Hanford Site	SGW-60149, R0
ECF-Hanford-10-0429, 2016, R2	Documentation of Preliminary Remediation Goals (PRGs) for Radionuclides Using the IAROD Exposure Scenario for the 100 and 300 Area Remedial Investigation/Feasibility Study (RI/FS) Report	SGW-60149, R0
WHC SD NR-SA-024, 1991, R0	105-KE/105-KW Irradiated Fuel Storage Basins Seismic Qualification	SGW-60149, R0

TPA Compliance Note:

The DOE Project Managers have not identified outstanding issues with the preceding month's Environmental Performance Report for this scope.

Number	Title	Referencing Document
SGW-46279, R3	Conceptual Framework and Numerical Implementation of 100 Areas Groundwater Flow and Transport Model	cleared May 2016
SGW-60338, R0	Historical Changes in Water Table Elevation and Groundwater Flow Direction at Hanford: 1944 to 2014	cleared Feb. 2017, request sent to RL for approval by Brouillard
CHPRC-00189, Rev. 12	CH2M HILL Plateau Remediation Company Environmental Quality Assurance Program Plan	DOE/RL-2016-67
16-DOE/RL-2014-42-ADD1	300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan Addendum 1 for Stage B Uranium Sequestration	DOE/RL-2016-67
SGW-59494, 2016, R0	Borehole Summary Report for the Installation of Two Characterization, Monitoring, and Extractions Wells in the 100-KR-4 Groundwater Operable Unit, FY 2015	SGW-60149, R0
ECF-100KR2-16-0127, 2016, R0	Evaluation of Strontium-90 Leaching Characteristics from Borehole Sediment Samples Collected at UPR-100-K-1 and 116-KE-3 Crib within the 100-K Area of the Hanford Site	SGW-60149, R0
ECF-Hanford-10-0429, 2016, R2	Documentation of Preliminary Remediation Goals (PRGs) for Radionuclides Using the IAROD Exposure Scenario for the 100 and 300 Area Remedial Investigation/Feasibility Study (RI/FS) Report	SGW-60149, R0
WHC SD NR-SA-024, 1991, R0	105-KE/105-KW Irradiated Fuel Storage Basins Seismic Qualification	SGW-60149, R0

100 & 300 Area Unit Manager Meeting
TPA-CN List
May 18, 2017

- **TPA-CN-0729 Interim Action Monitoring Plan for the 100-HR-3 and 100-KR-4 Operable Units, Revision 0**
- **TPA-CN-0730 DOE/RL-2000-59, Sampling and Analysis Plan for Aquifer Sampling Tubes, Revision 1**
- **TPA-CN-0731 Remedial Design Report and Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit In Situ Redox Manipulation, Revision 1**
- **TPA-CN-0732 DOE/RL-2003-63, Sampling an Analysis Plan for In Situ Redox Manipulation Project, Revision 0**
- **TPA-CN-0733 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, Revision 0 and 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, Revision 0A**
- **TPA-CN-0734 DOE/RL-2003-38, Revision 2, 100-BC-5 Operable Unit Sampling and Analysis Plan**
- **TPA-CN-0736 DOE/RL-2014-44-ADD2, Rev. 0, Remedial Design Report/Remedial Action Work Plan Addendum for 100-F/IU Groundwater**
- **TPA-CN-0741 DOE/RL-2000-59, Revision 1, Sampling and Analysis Plan for Aquifer Sampling Tubes**
- **TPA-CN-0755 DOE/RL-2000-56, Waste Management Plan for 300-FF-5 Operable Unit, Revision 2**
- **TPA-CN-0760 DOE/RL-97-01, Interim Action Waste Management Plan for the 100-HR-3 and 100-KR-4 Operable Units, Revision 6**
- **TPA-CN-0762 DOE/RL-2014-42, 300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan, Revision 0**
- **TPA-CN-0778 DOE/RL-2004-18, Waste Control Plan for the 200-PO-1 Operable Unit, Revision 1**
- **TPA-CN-0779 DOE/RL-2009-80, Investigation Derived Waste Purgewater Management Work Plan, Revision 0**

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0729	TPA CHANGE NOTICE FORM	Date: July 14, 2016
Document Number, Title, and Revision: DOE/RL-96-90, *Interim Action Monitoring Plan for the 100-HR-3 and 100-KR-4 Operable Units*, Rev. 0		Date Document Last Issued: September 1996
Approved Change Notices Against this Document: TPA-CN-298, TPA-CN-330		
Originator: J. Virgin		Phone: 373-3053

Description of Change:
Insertion of a preamble to DOE/RL-96-90, *Interim Action Monitoring Plan for the 100-HR-3 and 100-KR-4 Operable Units*, Rev. 0. This insertion is to clarify that CERCLA requirements and remaining activities specific to the 100-HR-3 groundwater operable unit are now replaced by the requirements and activities in DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0. The preamble will also clarify that RCRA requirements and activities for the 100-HR-3 OU and requirements and activities for the 100-KR-4 groundwater operable unit will remain in effect.

M.W. Cline (DOE) and N.M. Menard/R.A. Lobos (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

A new preamble is added prior to the existing Cover and Executive Summary. A new page P-1 is being added prior to the existing Page 1 of the document.

Note: Because the entire text of the preamble is new, no underlining is used.

Note: Include affected page number(s) New page number P-1

Justification and Impacts of Change:
DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0, was published in June, 2016. DOE/RL-2013-30 incorporates all CERCLA requirements and remaining activities from DOE/RL-96-90, Rev. 0 for the 100-HR-3 groundwater operable unit. Beginning August 1, 2016, DOE/RL-96-90 no longer applies to CERCLA monitoring for the 100-HR-3 groundwater operable unit. Requirements and activities remain in effect for RCRA monitoring in the 100-HR-3 groundwater operable unit and for CERCLA monitoring in the 100-KR-4 groundwater operable unit.

DOE/RL-96-90 was developed to provide the plan and schedule to implement sampling and analysis requirements of the interim action ROD (EPA/ROD/R10-96/134) for cleanup of groundwater in the 100-HR-3 OU. DOE/RL-2013-30 has been developed to provide a single controlling document that includes the plan and schedule to implement sampling and analysis for the interim remedial actions selected to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) for cleanup of groundwater in the 100-HR-3 OU.

Approvals:

Michael W. Cline DOE Project Manager	7/25/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved
Nina M. Menard Ecology Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved

Interim Action Monitoring Plan for the 100-HR-3 and 100-KR-4 Operable Units

DOE/RL-96-90, Rev. 0

PREAMBLE

This document was prepared to meet requirements of the interim action record of decision (ROD) (EPA/ROD/R10-96/134), issued in April 1996. The interim action ROD required development of a compliance monitoring plan as part of the remedial design report/remedial action work plan (RDR/RAWP).

The interim remedial actions for both the 100-HR-3 and 100-KR-4 operable units (OUs) have changed since the development of this plan. In response to these changes, Department of Energy (DOE) Richland Operations office (RL) and Washington State Department of Ecology (Ecology) developed an updated monitoring plan, DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0. The updated monitoring plan (DOE/RL-2013-30) meets requirements from the interim action ROD and interim action ROD amendment (EPA/AMD/R10-00/122) for implementing the interim actions in the 100-HR-3 OU.

For the 100-HR-3 OU only, this change notice retires the CERCLA requirements and remaining activities in DOE/RL-96-90, Rev. 0, and replaces them with the requirements and remaining activities in DOE/RL-2013-30, Rev. 0, beginning August 1, 2016. The RCRA requirements and remaining activities for the 100-HR-3 OU and all requirements and remaining activities for the 100-KR-4 OU in DOE/RL-96-90, Rev. 0, remain in effect.

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0730	TPA CHANGE NOTICE FORM	Date: July 14, 2016
Document Number, Title, and Revision: DOE/RL-2000-59, *Sampling and Analysis Plan for Aquifer Sampling Tubes*, Rev. 1		Date Document Last Issued: February 2009

Approved Change Notices Against this Document: TPA-CN-327, TPA-CN-353, TPA-CN-556, TPA-CN-612, TPA-CN-676

Originator: J. Virgin | Phone: 373-3053

Description of Change:
Insertion of a preamble to DOE/RL-2000-59, *Sampling and Analysis Plan for Aquifer Sampling Tubes*, Rev. 1, U.S. Department of Energy. This insertion is to clarify that requirements and remaining activities specific to the 100-HR-3 groundwater operable unit are now replaced by the requirements and activities in DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0. The preamble will also clarify that requirements and activities for the 100-BC-5, 100-FR-3, 100-KR-4, 100-NR-3, 200-PO-1, and 300-FF-5 groundwater operable units will remain in effect.

M.W. Cline (**DOE**) and N.M. Menard/R.A. Lobos (**Lead Regulatory Agency**) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

A new preamble is added prior to the existing Cover and Executive Summary. A new page P-1 is being added prior to the existing Page 1 of the document.

Note: Because the entire text of the preamble is new, no underlining is used.

Note: Include affected page number(s): New page number P-1

Justification and Impacts of Change:
DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0, was published in June, 2016. DOE/RL-2013-30 incorporates all requirements and remaining activities from DOE/RL-2000-59, Rev. 1 for the 100-HR-3 groundwater operable unit. Beginning August 1, 2016, DOE/RL-2000-59 no longer applies to the 100-HR-3 groundwater operable unit. Requirements and activities remain in effect for the 100-BC-5, 100-FR-3, 100-KR-4, 100-NR-3, 200-PO-1, and 300-FF-5 groundwater operable units.

DOE/RL-2000-59 was developed to implement the plan and schedule to implement sampling and analysis for the interim remedial actions selected to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122). DOE/RL-2013-30 has been developed to provide a single controlling document that includes the plan and schedule to implement sampling and analysis for the interim remedial actions selected to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU.

Approvals:

DOE Project Manager	7/25/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved
Ecology Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved

Sampling and Analysis Plan for Aquifer Sampling Tubes

DOE/RL-2000-59, Rev. 1

PREAMBLE

This sampling and analysis plan was prepared to identify requirements for collection and analysis of groundwater samples from aquifer tubes along the Hanford Site shoreline of the Columbia River. The results are intended to provide information on concentrations of contaminants in groundwater discharges to the Columbia River.

Department of Energy (DOE) Richland Operations office (RL) and Washington State Department of Ecology (Ecology) have developed an updated monitoring plan, DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0, which integrates aquifer tube sampling and analysis with upland groundwater monitoring. The updated monitoring plan (DOE/RL-2013-30) meets requirements from the interim action ROD and interim action ROD amendment (EPA/AMD/R10-00/122) for implementing the interim actions in the 100-HR-3 OU.

For the 100-HR-3 OU only, this change notice retires the requirements and remaining activities in DOE/RL-2000-59, Rev. 1, and replaces them with the requirements and remaining activities in DOE/RL-2013-30, Rev. 0, beginning August 1, 2016. The requirements and remaining activities in DOE/RL-2000-59, Rev. 1, remain in effect for the 100-BC-5, 100-FR-3, 100-KR-4, 100-NR-3, 200-PO-1, and 300-FF-5 groundwater operable units.

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0731	TPA CHANGE NOTICE FORM	Date: July 14, 2016
Document Number, Title, and Revision: DOE/RL-99-51, *Remedial Design Report and Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit In Situ Redox Manipulation*, Rev. 1.		Date Document Last Issued: June 2000
Approved Change Notices Against this Document: N/A		
Originator: J. Virgin		Phone: 373-3053

Description of Change:
Retire use of:

DOE/RL-99-51, *Remedial Design Report and Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit In Situ Redox Manipulation*, Rev. 1.

M.W. Cline (**DOE**) and N.M. Menard (**Lead Regulatory Agency**) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Retire DOE/RL-99-51 which is superseded by DOE/RL-2013-31, *Remedial Design/Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit*, Rev. 0. All requirements and remaining activities from the work plan have been incorporated into DOE/RL-2013-31.

Note: Include affected page number(s): N/A

Justification and Impacts of Change:
DOE/RL-99-51 implemented the interim remedial actions to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU. DOE/RL-2013-31 provides a single controlling document that implements the interim remedial actions to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU.

Approvals:

Michael W. Cline DOE Project Manager	7/25/2016 Date	[X] Approved [ ] Disapproved
N/A EPA Project Manager	Date	[ ] Approved [ ] Disapproved
Nina M. Menard Ecology Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0732	TPA CHANGE NOTICE FORM	Date: July 14, 2016
Document Number, Title, and Revision: DOE/RL-2003-63, *Sampling and Analysis Plan for In Situ Redox Manipulation Project*, Rev. 0		Date Document Last Issued: October 2004
Approved Change Notices Against this Document: N/A		
Originator: J. Virgin		Phone: 373-3053

Description of Change:
Retire use of:

DOE/RL-2003-63, *Sampling and Analysis Plan for In Situ Redox Manipulation Project*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington

M.W. Cline (**DOE**) and N.M. Menard/R.A. Lobos (**Lead Regulatory Agency**) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Retire DOE/RL-2003-63 which is superseded by DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0. All requirements and remaining activities from the work plan have been incorporated into DOE/RL-2013-30.

Note: Include affected page number(s): N/A

Justification and Impacts of Change:
DOE/RL-2003-63 was developed to implement sampling and analysis activities to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU. DOE/RL-2013-30 provides a single controlling document that implements sampling and analysis activities to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU.

Approvals:

DOE Project Manager	7/25/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved
Ecology Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0733	TPA CHANGE NOTICE FORM	Date: July 14, 2016
Document Number, Title, and Revision: 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*, Rev. 0, and 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*, Rev. 0A		Date Document Last Issued: September 1996 April 2003
Approved Change Notices Against this Document: TPA-CN-197, TPA-CN-657		
Originator: J. Virgin		Phone: 373-3053

Description of Change:
Insertion of a preamble to 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*, Rev. 0 and 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*, Rev. 0A. This insertion is to clarify that requirements and remaining activities specific to the 100-HR-3 groundwater operable unit are now replaced by the requirements and activities in DOE/RL-2013-31, *Remedial Design/Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit, Rev. 0*. The preamble will also clarify that requirements and activities for the 100-KR-4 groundwater operable unit will remain in effect.

M.W. Cline (**DOE**) and N.M. Menard/R.A. Lobos (**Lead Regulatory Agency**) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

A new preamble is added prior to the existing Cover and Executive Summary. A new page P-1 is being added prior to the existing Page 1 of the document.

Note: Because the entire text of the preamble is new, no underlining is used.

Note: Include affected page number(s): New Page number P-1

Justification and Impacts of Change:
DOE/RL-2013-31, *Remedial Design/Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit*, Rev. 0, was published in June, 2016. DOE/RL-2013-31 incorporates all requirements and remaining activities from DOE/RL-96-84, Rev. 0 and Rev 0A for the 100-HR-3 groundwater operable unit. Beginning August 1, 2016, DOE/RL-96-84 no longer applies to the 100-HR-3 groundwater operable unit. Requirements and activities remain in effect for the 100-KR-4 groundwater operable unit.

DOE/RL-96-84 implemented the interim remedial actions selected to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU. DOE/RL-2013-31 has been developed to provide a single controlling document that includes the plan and schedule to implement the interim remedial actions selected to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater in the 100-HR-3 OU.

Approvals:

Michael W. Cline DOE Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved
Nina M. Menard Ecology Project Manager	7/28/2016 Date	[X] Approved [ ] Disapproved

Remedial Design and Remedial Action Work Plan for the 100-HR-3 and 100-KR-4 Groundwater Operable Units Interim Action
DOE/RL-96-84, Rev 0

And

Remedial Design and Remedial Action Work Plan for the 100-HR-3 and 100-KR-4 Groundwater Operable Units Interim Action
DOE/RL-96-84, Rev 0A

PREAMBLE

These documents were prepared to meet requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122). The interim action ROD identified requirements for groundwater pump and treat (P&T) as part of the interim remedial action for both the 100-HR-3 and 100-KR-4 groundwater operable units (OUs). Since installation of the HR-3, DR-5, and KR-4 P&T systems under this work plan, modifications to the interim action have included:

- Installation of an in situ redox manipulation barrier at 100-HR-3
- Expansion of the HR-3 and DR-5 pump and treat (P&T) systems to the HX and DX P&T systems at the 100-HR-3 OU
- Addition of the KW P&T system to the original KR4 P&T system at the 100-KR-4 OU
- Addition of the KX expansion for the P&T systems at the 100-KR-4 OU.

Department of Energy (DOE) Richland Operations Office (RL) has updated documents implementing the interim actions separately for the 100-HR-3 and 100-KR-4 OUs based on the difference in timing for cleanup of the 100-D/H and 100-K Areas. DOE-RL issued *Remedial Design/Remedial Action Work Plan for the 100-HR-3 Groundwater Operable Unit*, DOE/RL-2013-31, Rev. 0, in June, 2016. DOE/RL-2013-31 provides a single controlling document for the plan and schedule for successful implementation of the interim remedial actions selected to meet the requirements of the interim action ROD (EPA/ROD/R10-96/134) and interim action ROD amendment (EPA/AMD/R10-00/122) for cleanup of groundwater.

For the 100-HR-3 OU only, this change notice retires the requirements and remaining activities in DOE/RL-96-84, Rev. 0 and Rev. 0A and replaces them with the requirements and remaining activities in DOE/RL-2013-31, Rev. 0, beginning August 1; 2016. The requirements and remaining activities in DOE/RL-96-84, Rev. 0 and Rev. 0A remain in effect for the 100-KR-4 OU.

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0734	TPA CHANGE NOTICE FORM	Date: 8/22/2016
Document Number, Title, and Revision: DOE/RL-2003-38, Rev. 2,100-BC-5 Operable Unit Sampling and Analysis Plan		Date Document Last Issued: December 2015
Approved Change Notices Against this Document: None		
Originator: M.J. Hartman		Phone: 509-376-4385

Description of Change:
Update groundwater SAP to include chloroform and trichloroethene as groundwater contaminants of potential concern and tritium in a well downgradient of a potential residual source.

M.W. Cline (DOE) and L.C. Buelow (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Changes made throughout the document to incorporate chloroform and trichloroethene as groundwater contaminants of potential concern and to add tritium in a well downgradient of a potential residual source. Adding Appendix B, which includes the DQO for the contaminants being added.

Added text is denoted by double underline. Struck text is denoted by ~~strikeout~~. For ease in reading, Appendix B is not shown with double underline because it is entirely new.

Note: Include affected page number(s): 1-1, 1-3, 1-5, 1-6, 1-8, 2-16, 2-18, 2-19, 3-1, 3-7 through 3-10, A-5, A-11, A-18, and A-28.

Justification and Impacts of Change:
A groundwater risk assessment in 2016 identified two additional groundwater contaminants of potential concern: chloroform and trichloroethene. Affected pages of chapters 1, 2, and 3 are modified to add the new contaminants of potential concern. Appendix B presents the results of a data quality objectives evaluation for the new contaminants.

The groundwater risk assessment also concluded that waste site 118-B-1 may contain residual tritium contamination in the vadose zone. Affected pages of Chapter 3 and Appendix A are modified to add downgradient well 199-B8-6 to the monitoring network.

Approvals:

DOE Project Manager	Date 8/23/2016	[X] Approved [ ] Disapproved
EPA Project Manager	Date 8/29/2016	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

1 Introduction

This document presents the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) sampling and analysis plan (SAP) for groundwater monitoring of the 100-BC-5 Groundwater Operable Unit (OU) (Figure 1-1). The OU is located adjacent to the Columbia River on the U.S. Department of Energy (DOE) Hanford Site.

The B Reactor was the first of its kind and operated from 1944 to 1968. Its primary mission was plutonium production for the development of an atomic bomb during World War II. The C Reactor operated from 1952 to 1969. Groundwater contamination in the 100-BC-5 OU is mainly associated with waste produced by these reactors and related processes. DOE has remediated waste sites under an interim record of decision (ROD) (EPA/ROD/R10-99/039, *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (100 Area Remaining Sites)*), and there are no known remaining sources of significant contamination that could migrate to groundwater.

DOE is conducting a remedial investigation (RI) of the 100-BC-5 groundwater OU, along with the 100-BC-1 and 100-BC-2 source OUs (DOE/RL-2009-44, *Sampling and Analysis Plan for the 100-BC-1, 100-BC-2, and 100-BC-5 Operable Units Remedial Investigation/Feasibility Study*). DOE and the U.S. Environmental Protection Agency (EPA) agreed that completion of the RI/feasibility study (FS) report and decisions about remedial action should be delayed in order to conduct additional RI studies to reduce various uncertainties. The uncertainties relate to the completion of waste site remediation, short-term changes in groundwater contaminants related to waste site remediation, modeling results predicting that it will take a long time for the hexavalent chromium (Cr(VI)) plume to attenuate, and the level of risk associated with variable contaminant concentrations in Columbia River pore water. Those additional studies, described in DOE/RL-2009-44 and related change notices, began in 2013 and will conclude around January, 2016. After that, DOE will revise the Working Draft A RI/FS report (DOE/RL-2010-96, *Remedial Investigation/Feasibility Study for the 100-BC-1, 100-BC-2, and 100-BC-5 Operable Units*) and prepare a proposed plan for remediation, and EPA will issue a ROD selecting a preferred alternative.

Monitoring under this SAP will begin after the conclusion of the RI studies in early 2016 and will remain in effect until a performance monitoring plan is implemented following implementation of the groundwater remediation alternative selected under the ROD. This SAP supersedes other groundwater SAPs listed in Table 1-1.

The remainder of this chapter addresses the project scope and objectives, conceptual site model (CSM), summary of data quality objectives (DQOs), contaminants of concern (COCs), and project schedule. Chapter 2 discusses quality assurance (QA) requirements, and Chapter 3 provides the field sampling plan. Chapters 4 and 5 address waste management and health and safety requirements. Appendix A contains the DQO documentation, which includes construction information for wells and aquifer tubes.

1.1 Project Scope and Objective

The objective of this SAP is to present the requirements for monitoring groundwater in the 100-BC-5 OU during the period of time after the supplemental RI studies are completed (fall 2015) and before implementation of remedial actions under the final ROD.

Section 8.1.1 of the draft RI/FS report (DOE/RL-2010-96) identified Cr(VI), strontium-90, and tritium as COCs for groundwater. In 2016, trichloroethene and chloroform were identified as contaminants of potential concern in deep wells 199-B3-51, 199-B5-5 and 199-B5-6. This SAP will ~~also~~ monitor those ~~three~~ five contaminants.

grounds, have been remediated under interim action RODs. This remediation typically involved excavation of contaminated material, eliminating significant ongoing sources of groundwater contamination.

Remediation of liquid effluent sites began in the 1990s and was completed by 2000. Remediation of other sites, including pipelines, unplanned releases, and burial grounds, continued for another 15 years. The largest excavations were the 100-C-7 and 100-C-7:1 sites in southern 100-BC Area. These sites were sources of Cr(VI) contamination, and the excavations in 2012 extended to the water table.

Figure 1-6 shows the locations of Cr(VI) waste sites. Many of these same sites, particularly in the eastern part of 100-BC Area, were also strontium-90 sources.

1.2.4 Groundwater Contaminants

This subsection describes groundwater COCs, Cr(VI), strontium-90, and tritium. Appendix B describes chloroform and trichloroethene contamination in groundwater.

1.2.4.1 Contaminants of Concern

Section 8.1.1 of the draft RI/FS report (DOE/RL-2010-96) identified Cr(VI), strontium-90, and tritium as COCs in groundwater. Figure 1-7 shows chromium in the upper part of the aquifer in 2012, 2013, and 2014. Chromium is present in the lower part of the aquifer in some locations (Figures 1-2 and 1-3). Contamination is present in both the Hanford formation and the thicker Ringold unit E.

Excavation of waste sites 100-C-7 and 100-C-7:1 mobilized chromium in 2012, seen as a spike in concentration in a downgradient well (Figure 1-8). The inverse relationship with water levels indicates that concentrations vary seasonally, as the direction of groundwater flow changes, but peaks have declined each year. The 48 µg/L contour of this chromium plume migrated toward the northeast during 2012, 2013, and 2014 (Figure 1-7). The southernmost tail of the 48 µg/L contour migrated approximately 1,000 m (3,280 ft) between fall 2012 and fall 2014, which equates to an average flow rate of approximately 1.4 m/day (4.6 ft/day). The eastern boundary of the chromium plume (at 10 µg/L) appears to have migrated eastward ~300 m (984 ft) between 2013 and 2014, based on trends in wells and aquifer tubes.

In the northern 100-BC Area, another region of contamination at concentrations above 48 µg/L is observed around a single well (199-B3-47 [Figures 1-2 and 1-7], where the aquifer is all in Ringold unit E). This contamination has been present since 1995, and concentrations are not declining.

Figure 1-9 shows the distribution of strontium-90. In some wells, concentrations are not attenuating as rapidly as expected due to radioactive decay with a 29-year half-life. Strontium-90 concentrations decline with depth in the aquifer.

Tritium concentrations are >10,000 pCi/L in a narrow plume in eastern 100-BC-5. Levels were below the 20,000 pCi/L drinking water standard (DWS) in 2013 and 2014. Tritium ~~likely~~ will remain a groundwater COC ~~when the RI/FS report is written in 2016~~ because concentrations were above the DWS in 2012 and earlier.

Fate and transport models, as described in Chapter 5 of the draft RI/FS, estimated that Cr(VI) may persist in 100-BC groundwater for between 100 and 150 years, and strontium-90 may persist for between 50 and 100 years.

(to no more than 60 µg/L) in some wells and HSPs. After this time, the overall chromium plume is expected to diminish because of the source reduction actions. If chromium concentrations remain stable around well 199-B3-47 (where the aquifer is all in Ringold unit E), while the remainder of the plume declines. This information may indicate that the well is sampling an isolated lower-permeability zone, or there is a continuing source in that area.

- Chromium concentrations in the upper part of the aquifer in southern 100-BC will continue to decline overall due to source reduction actions and inflow of clean upgradient groundwater.
- Chromium concentrations in the lower part of the unconfined aquifer will remain stable or change slowly. Concentrations in some wells may decline slowly due to slow movement of the groundwater. Concentrations in downgradient wells may increase slowly as the deep plume migrates.
- The eastward migration of the chromium plume east of 100-BC will slow because of regional groundwater flow patterns, and dispersion of the plume will reduce concentrations as it spreads.
- Because strontium-90 has low mobility, distribution of the plume will not change significantly, although concentrations will decline due to radioactive decay.
- Strontium-90 samples collected during high river stage will not show increases in concentrations because no vadose zone sources remain.
- Tritium concentrations will remain below the action level and will continue to decline gradually due to radioactive decay and dispersion.
- Strontium-90 concentrations in HSPs will remain below action levels.

1.3 Data Quality Objective Summary

In association with development of this SAP, the DQO process (EPA/240/B-06/001 *Guidance on Systematic Planning Using the Data Quality Objectives Process* [EPA QA/G-4]) was applied to support identification of appropriate sampling requirements. Appendix A provides the outcome of the DQO process which is summarized in this section. Appendix B provides DQO information for trichloroethene and chloroform.

The DQO identified the following problem statement: Due to recently completed source remediation and plume dynamics, continued monitoring is necessary to confirm the CSM used for the RI/FS evaluations. Data collected will be used to support the design of remedial alternatives, such as monitored natural attenuation (MNA), pump and treat technology, or other alternatives considered in the FS.

This SAP addresses a single principal study question: Are Cr(VI), strontium-90, and tritium plumes and discharges to the Columbia River changing as expected in accordance with the CSM? The following parameters will be evaluated:

- Spatial distribution of contaminants
- Concentration trends of contaminants
- Hydraulic gradients
- River stage

The decision rule is as follows: If the body of evidence indicates that Cr(VI), strontium-90, and tritium plumes and discharges to the Columbia River are not changing as expected in accordance with the CSM,

then refine the CSM and incorporate the new information into design of remedial action alternatives, or consider new alternatives. Otherwise, proceed with the design as indicated by the established CSM. Evaluation methods for this decision rule include contaminant plume maps, contaminant cross sections, concentration graphs, hydraulic gradient calculations, water table maps, groundwater model simulations, and river stage graphs.

1.4 Groundwater Contaminants

Table 1-2 provides specific contaminants for CERCLA groundwater monitoring in the 100-BC-5 OU. ~~CERCLA COCs are those identified in the draft RI (DOE/RL-2010-96).~~

1.5 Project Schedule

This SAP will direct CERCLA groundwater monitoring activities needed for the 100-BC-5 OU until it is replaced by a monitoring plan for the remedial action identified in an upcoming ROD. Sampling of wells, conventional aquifer tubes, and HSPs under this SAP will begin according to the schedule indicated in Table 1-1.

The Sample Management and Reporting (SMR) organization will establish the yearly sampling schedule, consistent with the requirements and data quality objectives described in this SAP. SMR uses processes and software applications such as *Sample Management Integrated Lifecycle Environment*, which optimizes the overall number of sampling trips and limits schedule redundancy. SMR tracks overlapping requirements, so single sampling events can co-sample wells and optimize schedules.

Table 1-2. Analytes for 100-BC-5 OU Groundwater Monitoring

Contaminant	CAS Number
Laboratory Analyses ~~COC~~	
Chromium (Hexavalent)	18540-29-9
Strontium-90	10098-97-2
Tritium	10028-17-8
Chloroform	67-66-3
Trichloroethene	79-01-6
Field Measurements	
Dissolved Oxygen	Not applicable
pH	Not applicable
Specific Conductance	Not applicable
Temperature	Not applicable
Turbidity	Not applicable
Depth to Groundwater	Not applicable

CAS = Chemical Abstracts Service
~~COC= contaminant of concern~~
OU = operable unit

Table 2-3. Performance Requirements for Groundwater Analysis

Constituent	CAS Number	Action Level[a]	Analytical Method	Highest Allowable PQL[b]	Precision	Accuracy
Radionuclides (pCi/L)						
Strontium-90	10098-97-2	8	Gas proportional counting	2	≤20% RPD	70 to 130%
Tritium	10028-17-8	20,000	Tritium liquid scintillation (mid-level)	400		
Organics (µg/L)						
Chloroform	67-66-3	TBD	EPA 8260	1	≤20% RPD	80 to 120%
Trichloroethene	79-01-6	TBD	EPA 8260	1	≤20% RPD	80 to 120%
Inorganics – Metals (µg/L)						
Hexavalent Chromium (Low Level)	18540-29-9	10/48[c]	EPA 7196[d]	5[e]	≤20% RPD	80 to 120%

a. See ~~Appendix A~~ Appendices A and B for action level basis.

b. Highest allowable PQLs are specified in contracts with analytical laboratories. Actual quantitation limits vary by laboratory and may be lower. Method detection limits are three to five times lower than quantitation limits. For radionuclides, values in this column are the highest allowable minimum detectable concentrations.

c. 10 µg/L where groundwater discharges to surface water; 48 µg/L in upland areas.

d. SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update V*. Equivalent methods may be substituted.

e. A low-level hexavalent chromium PQL of 5 µg/L is applicable to River Corridor where groundwater discharges to surface water.

CAS = Chemical Abstracts Service
EPA = U.S. Environmental Protection Agency
PQL = practical quantitation limit
RPD = relative percent difference
TBD = to be determined

Table 2-5. Field and Laboratory QC Elements and Acceptance Criteria

Analyte[a]	QC Element	Acceptance Criteria	Corrective Action
General Chemical Parameters			
Hexavalent Chromium	MB	<MDL <5% Sample Concentration	Flagged with "C"
	LCS	80 to 120% Recovery	Data reviewed[b]
	Laboratory Duplicate	≤20% RPD[c]	Data reviewed[b]
	MS	75 to 125% Recovery	Flagged with "N"
	EB	<2 × MDL	Flagged with "Q"
	Field Duplicate	≤20% RPD[c]	Flagged with "Q"
Volatile Organic Compounds			
Chloroform Trichloroethene	MB	≤MDL ≤5% Sample Concentration	Flagged with "B"
	LCS	Statistically Derived[c]	Data reviewed[b]
	Laboratory Duplicate	≤ 20% RPD[c]	Data reviewed[b]
	MS, MSD	% Recovery Statistically Derived[c]	Flagged with "T" if analyzed by GC/MS, otherwise "N" based on FEAD
	Surrogate	Statistically Derived[c]	Data reviewed[b]
	EB, FTB, FXR	≤2 × MDL	Flagged with "Q"
	Field Duplicate	≤20% RPD[c]	Flagged with "Q"
Radiochemical Analyses			
Strontium-89/90 Tritium	MB	<MDA <5% Sample Concentration	Flagged with "B"
	LCS	70 to 130% Recovery	Data reviewed[b]
	Laboratory Duplicate	≤ 20% RPD[c]	Data reviewed[b]
	MS[d]	60 to 140% Recovery	Flagged with "N"
	Tracer (where applicable)	20 to 105% Recovery	Data reviewed[b]
	Carrier (where applicable)	30 to 105% Recovery	Data reviewed[b]
	EB, FTB	<2 × MDA	Flagged with "Q"
	Field Duplicate	≤20% RPD[c]	Flagged with "Q"

a. Specific analytes and methods for determination are available from the SMR organization.

b. After review, corrective actions are determined on a case-by-case basis.

c. Applies only in cases where both results are greater than 5 times the minimum detectable concentration.

d. Applies only to tritium.

EB = equipment blank
FEAD = format for electronic analytical data
MDA = minimum detectable activity
MDL = method detection limit

Table 2-5. Field and Laboratory QC Elements and Acceptance Criteria

Analyte[a]	QC Element	Acceptance Criteria	Corrective Action

FTB = full trip blank
FXR = field transfer blank
GC/MS = gas chromatagraphy/mass spectrometry
LCS = laboratory control sample
MB = method blank
MDA = minimum detectable activity
MDL = method detection limit

MS = matrix spike
MSD = matrix spike duplicate
QC = quality control
RPD = relative percent difference
SMR = Sample Management and Reporting

Data Flags:

B (radionuclides)/C (inorganics/wetchem) = analyte was detected in both the associated QC blank and the sample).

N = ~~MS outlier~~ Spike or spike duplicate sample recover out of limits

Q = associated QC sample is out of limits

Table 2-6. Preservation, Container, and Holding Time Guidelines

Constituent/ Parameter	Minimum Volume	Container Type[a]	Preservation[b]	Holding Time
~~**Miscellaneous Inorganic**~~				
Hexavalent Chromium	500 mL	Poly or glass	Store ≤6°C	24 hours
~~**Radiochemical Analyses**~~				
Volatile Organic Compounds by EPA 8260	40 mL	Amber glass volatile organic analysis vial with Teflon® lined septum	Cool <6°C, hydrochloric acid to pH <2	14 Days
Strontium-90 (Total Beta Radiostrontium)	2 × 1 L	Wide-mouth poly or glass	Adjust pH to <2 with HNO_3	6 months
Tritium	250 mL	Narrow-mouth glass	None	6 months

Note: Information in this table does not represent EPA requirements but is intended solely as guidance. Selection of container, preservation techniques, and applicable holding times should be based on the stated project-specific DQOs.

a. Under the Container Type heading, the term poly stands for EPA clean polyethylene bottles.

b. For preservation identified as store at ≤6°C, the sample should be protected against freezing unless it is known that freezing will not impact the sample integrity.

DQO = data quality objective
EPA = U.S. Environmental Protection Agency
HNO_3 = nitric acid

3 Field Sampling Plan

This chapter lists the groundwater wells and aquifer tubes to be monitored, the sampling frequency, and the constituents to be analyzed.

1.6 Sampling Objectives

Due to recently completed source remediation and plume dynamics, continued monitoring is necessary to confirm the CSM used for the RI/FS evaluations. Data collected under this SAP will be used to support the design of remedial alternatives such as MNA, pump and treat, or other alternatives considered in the FS. ~~Appendix~~ Appendices A and B provides details of sampling objectives, goals of the study, and the analytical approach.

1.7 Sample Location, Frequency, and Constituents To Be Monitored

Table 3-1 lists the monitoring wells, aquifer tubes, and HSPs selected for the 100-BC-5 monitoring network. It also specifies analytes and sampling frequency. The monitoring network includes 28 wells, 14 conventional aquifer tubes, and 9 HSPs (Figure 3-1). Appendix A contains the criteria used to identify the wells and aquifer tubes needed to answer the principal study question and to determine the sampling frequency to be employed. Table A-4 of Appendix A provides information on the hydrogeologic unit monitored by the wells, aquifer tubes, and HSPs. Table 3-2 lists wells for water level monitoring.

HSPs are subject to breakage, and can only be repaired by divers during periods of low river flow. If an HSP is found to be broken when sampling is attempted, another HSP (either a different depth in the same cluster, or a nearby HSP) may be sampled instead and EPA will be informed of the change. If no nearby HSP is available, the sample will be skipped. DOE will consult with EPA to determine if repair or replacement is required at a later date. Conventional aquifer tubes are less prone to breakage, but also occasionally cannot be sampled. A similar process will be followed.

1.8 Sampling Methods

Sampling methods may include, but are not limited to, the following:

- Field screening measurements
- Groundwater sampling
- Aquifer tube and HSP sampling
- Water level measurements

Water samples will be collected according to the current revision of applicable operating methods. Water samples are collected after field measurements of purged groundwater have stabilized:

- pH – two consecutive measurements agree within 0.2 pH units
- Temperature – two consecutive measurements agree within 0.2°C
- Conductivity – two consecutive measurements agree within 10 percent of each other
- Turbidity – less than 5 nephelometric turbidity units prior to sampling (or project scientist's recommendation)

Dissolved oxygen also will be measured in the field, but stabilization of dissolved oxygen is not required under sampling procedures.

Dangerous Goods Regulations (current edition), shall also be used when preparing sample shipments conveyed by air freight providers.

Samples containing hazardous constituents shall be considered hazardous material in transportation and transported according to DOT/IATA requirements. If the sample material is known or can be identified, then it will be packaged, marked, labeled, and shipped according to the specific instructions for that material.

Materials are classified by DOT/IATA as radioactive when the isotope-specific activity concentration and the exempt consignment limits described in 49 CFR 173, "Shippers—General Requirements for Shipments and Packagings," are exceeded. Samples shall be screened, or relevant historical data will be used, to determine if these values are exceeded. When screening or historical data indicate that samples are radioactive, they shall be properly classified, described, packaged, marked, labeled, and transported according to DOT/IATA requirements.

Prior to shipping radioactive samples to the laboratory, the organization responsible for shipping shall notify the laboratory of the approximate number of and radiological levels of the samples. This notification is conducted through the SMR project coordinator. The laboratory is responsible for ensuring that applicable license limits are not exceeded. The laboratory shall provide SMR with written acceptance for samples with elevated radioactive contamination or dose.

Table 3-1. 100-BC-5 Groundwater Monitoring Network

Well, Aquifer Tube, or HSP	Zone Monitored	Monitoring Rationale	Field	Cr(VI)[a]	Sr-90	Tritium	VOCs
Monitoring Wells							
199-B2-13	Top unconfined	Northwest of 100-BC; Cr(VI) >ambient water quality criterion 2014; confirm general attenuation of Cr(VI).	A	A			
199-B2-14	Top unconfined	Define Cr(VI) plume and delimit Sr-90.	A	A	A		
199-B2-16	Bottom unconfined	Monitor deep Cr(VI) and VOCs.	A	A			A
199-B3-1	Top unconfined	Monitor passage of Cr(VI) plume and Sr-90 variability; tritium is elevated and increasing.	S	S	S	S	
199-B3-46	Top unconfined	Monitor passage of Cr(VI) plume and Sr-90 variability.	S	S	S		
199-B3-47	Top unconfined	Monitor passage of Cr(VI) plume and Sr-90 variability; tritium is elevated.	S	S	S	S	
199-B3-50	Top unconfined	Cr(VI) >20 µg/L and increasing; monitor eastward migration; Sr-90 is consistently low.	A	A			
199-B3-51	Bottom unconfined	Monitor deep Cr(VI) and VOCs.	A	A			A
199-B3-52	Top unconfined	Monitor passage of southern Cr(VI) plume and Sr-90 variability.	S	S	S		
199-B4-1	Top unconfined	Monitor Cr(VI) plume; redundant for Sr-90.	A	A			

Table 3-1. 100-BC-5 Groundwater Monitoring Network

Well, Aquifer Tube, or HSP	Zone Monitored	Monitoring Rationale	Field	Cr(VI)[a]	Sr-90	Tritium	VOCs
199-B4-4	Top unconfined	Monitor Cr(VI) plume; southern extent Sr-90 plume.	A	A	A		
199-B4-7	Top unconfined	Monitor migration of Cr(VI); tritium is elevated; Sr-90 is consistently <DWS.	A	A		A	
199-B4-8	Top unconfined	Monitor migration of Cr(VI); tritium is elevated; Sr-90 is consistently <DWS.	A	A		A	
199-B4-14	Top unconfined	Monitor Cr(VI) plume near 100-C-7:1.	S[b]	S[b]			
199-B4-16	Top unconfined	Monitor east part of Cr(VI) plume.	A	A			
199-B4-18	Bottom unconfined	Monitor deep Cr(VI), possible VOCs.	A	A			A
199-B5-2	Top unconfined	Monitor passage of southern Cr(VI) plume; in Sr-90 plume; elevated tritium.	S	S	A	S	
199-B5-5	Middle/bottom unconfined	Monitor deep Cr(VI) and VOCs.	A	A			A
199-B5-6	Bottom unconfined	Monitor deep Cr(VI) and VOCs.	A	A			A
199-B5-9	Bottom unconfined	Monitor deep Cr(VI), possible VOCs.	A	A			A
199-B5-10	Top unconfined	Monitor Cr(VI) adjacent to 100-C-7:1.	A	A			
199-B5-11	Bottom unconfined	Monitor deep Cr(VI), possible VOCs.	A	A			A
199-B5-12	Top unconfined	Monitor Cr(VI) adjacent to 100-C-7; tritium is redundant with nearby wells.	A	A			
199-B5-13	Middle unconfined	Monitor deep Cr(VI), possible VOCs.	A	A			A
199-B8-6	Top unconfined	Monitor tritium downgradient of 118-B-1	A			A	
199-B8-9	Top unconfined	Monitor southern edge of Cr(VI) plume; elevated tritium.	A	A		A	
199-B9-3	Top unconfined	Monitor southern edge of Cr(VI) plume; tritium is increasing.	A	A		A	
699-71-77	Top unconfined	Monitor eastward migration Cr(VI).	A	A			
699-72-73	Top unconfined	Monitor eastward migration Cr(VI).	A	A			
Conventional Aquifer Tubes							
03-D	Upper unconfined	Monitor upstream deep hyporheic zone.	A	A			
05-M	Upper unconfined	Define upstream edge of Sr-90; monitor Cr(VI).	A	A	A		
06-M	Upper unconfined	Monitor Cr(VI), Sr-90 (>DWS), and tritium (formerly >DWS).	A	A	A		

Table 3-1. 100-BC-5 Groundwater Monitoring Network

Well, Aquifer Tube, or HSP	Zone Monitored	Monitoring Rationale	Field	Cr(VI)[a]	Sr-90	Tritium	VOCs
11-D	Upper unconfined	Delimit downstream edge of plume; has not been sampled since 2007 and may no longer be useable.	A	A			
12-D	Upper unconfined	Delimit downstream edge of plume.	A	A			
AT-B-2-D	Upper unconfined	2014 data point is anomalously high; monitor for trend.	A	A			
AT-B-3-S	Upper unconfined	Cr(VI) and Sr-90 are elevated and rising.	A	A	A		
AT-B-5-D	Upper unconfined	Monitor downstream migration of Cr(VI).	A	A			
AT-B-7-M	Upper unconfined	Monitor Cr(VI); Sr-90 is historically undetected.	A	A			
C6230	Upper unconfined	Highest Sr-90 in aquifer tube; Cr(VI) is also elevated.	A	A	A		
C6234	Upper unconfined	Monitor Cr(VI).	A	A			
C7719	Upper unconfined	Maximum Cr(VI) in this cluster; no significant Sr-90.	A	A			
C7725	Upper unconfined	Monitor Cr(VI) and Sr-90.	A	A	A		
C7781	Upper unconfined	Monitor Cr(VI) and Sr-90.	A	A	A		
Hyporheic Sampling Points							
C8841	Hyporheic zone	Monitor upstream shallow hyporheic zone	A	A			
C8842	Hyporheic zone	Monitor hyporheic zone near AT-B-2-D.	A	A			
C8847	Hyporheic zone	Upstream edge of Cr(VI) in shallow hyporheic zone	A	A	A		
C8851	Hyporheic zone	Monitor shallow hyporheic zone.	A	A	A		
C8853	Hyporheic zone	Monitor shallow hyporheic zone adjacent to 06-M; flow is too low for Sr-90.	A	A			
C8855	Hyporheic zone	Monitor Cr(VI) in shallow hyporheic zone; flow is too low for Sr-90.	A	A			
C8860	Hyporheic zone	Monitor shallow hyporheic zone.	A	A			
C8861	Hyporheic zone	Monitor shallow hyporheic zone.	A	A			
C9442	Hyporheic zone	Monitor Cr(VI) in shallow hyporheic zone.	A	A			

Note: Field column indicates specific conductance, pH, temperature, turbidity, and dissolved oxygen.

a. Filtered samples

b. Semiannual on a different schedule from others (low river stage and January or February)

Cr(VI) = hexavalent chromium

DWS = drinking water standard

HSP = hyporheic sampling point

Table 3-1. 100-BC-5 Groundwater Monitoring Network

Well, Aquifer Tube, or HSP	Zone Monitored	Monitoring Rationale	Field	Cr(VI)[a]	Sr-90	Tritium	VOCs

Sr-90 = strontium-90

VOC = volatile organic compounds (chloroform and trichloroethene)

Sampling frequencies:

A = annual (low river stage, September to October)

S = semiannual (low and high river stage, mid-May to early July)

A5 Step 4: Define the Boundaries of the Study

Step 4 of the DQO process identifies spatial and temporal features pertinent for decision making and practical constraints. Spatial boundaries include the following:

- Unconfined aquifer in the 100-BC-5 OU, which ranges from 32 to 48 m (105 to 157 ft) thick
- Hyporheic zone adjacent to 100-BC

Spatial boundaries delimit plumes at the following levels:

- Cr(VI) plume boundaries at >10 µg/L
- Strontium-90 plume boundaries at >8 pCi/L
- Tritium concentrations in area formerly >20,000 pCi/L and downgradient of the 118-B-1 Burial Ground, a potential residual source

The DQO team discussed whether there is a need to monitor Cr(VI) in the lower part of the unconfined aquifer where concentrations are stable. The team concluded that it would be of value to continue monitoring because no monitoring wells were in this unit until 2009 with very few until 2014. Early results from some 2014 wells showed changes that are related to either (a) migration of the deep plume, or (b) the chemistry of the new wells settling in as drilling effects dissipate. There is a need to continue monitoring these wells to see if the deep contamination is really changing or not and to verify the CSM.

The time period for this study begins when RI monitoring concludes (October 2015 for HSPs and annual wells; January 2016 for quarterly wells) and ends when performance monitoring for the groundwater remedial action begins (3 to 5 years).

The following practical constraints are identified:

- Resource availability for sample collection and laboratory analysis (funding)
- Analytical detection limits
- Seasonal variability of river stage and water table
- Limitations on pumping rates of HSPs (Table A-3)
- Aquifer tubes that must be sampled when river stage is low because some of them become submerged when the river is higher

A8 Step 7: Develop the Plan for Obtaining Data

The goal of Step 7 is to develop a resource-effective design for collecting data to address the identified problems. This section provides the methodology used to select the final list of groundwater monitoring locations and sampling frequencies that adequately meet the data needs associated with the principal study question.

A8.1 Analytes

Water samples will be analyzed for the following elements:

- Cr(VI)
- Strontium-90
- Tritium
- Field parameters (specific conductance, pH, turbidity, temperature, and dissolved oxygen)

A8.2 Monitoring Network

Table A-4 lists monitoring wells in and around 100-BC. It includes wells monitored under the previous routine plan, some of which lie west of the 100-BC Area and some in 100-BC that are not currently monitored. It also includes a few wells in the adjacent 200-BP-5 OU to the east of 100-BC-5. Most of the wells monitor the upper part of the unconfined aquifer and are screened across the water table. Eight wells are screened at the base of the unconfined aquifer or elsewhere in the lower part of the unconfined aquifer. Two wells are screened in water-bearing units of the Ringold Formation upper mud (RUM) unit. The cross sections in Chapter 1 of the SAP illustrate screen depths of the wells. Well locations are illustrated on Figure 1-1 in the SAP main text.

Table A-5 lists aquifer tubes and HSPs, which monitor various depths in the aquifer near or under the Columbia River. The top panel of Figure A-5 shows the screen depths plotted versus distance along the shoreline, west to east. The bottom panel of the figure shows the same screen information adjusted for differences in surface elevation at the aquifer tube or HSP location. These elevations all equate to the upper part of the unconfined aquifer (compare to cross sections in Chapter 1 of the SAP). Locations of aquifer tubes and HSPs are illustrated on Figure 1-1 in Chapter 1 of the SAP main text.

A8.3 Rationale for Well Selection

The well network was selected to define plumes at the following action levels and other levels of interest:

- Cr(VI) at 10, 20, and 48 μg/L
- Strontium-90 at 8, 20, and 40 pCi/L
- Tritium at 10,000 and, if present, 20,000 pCi/L

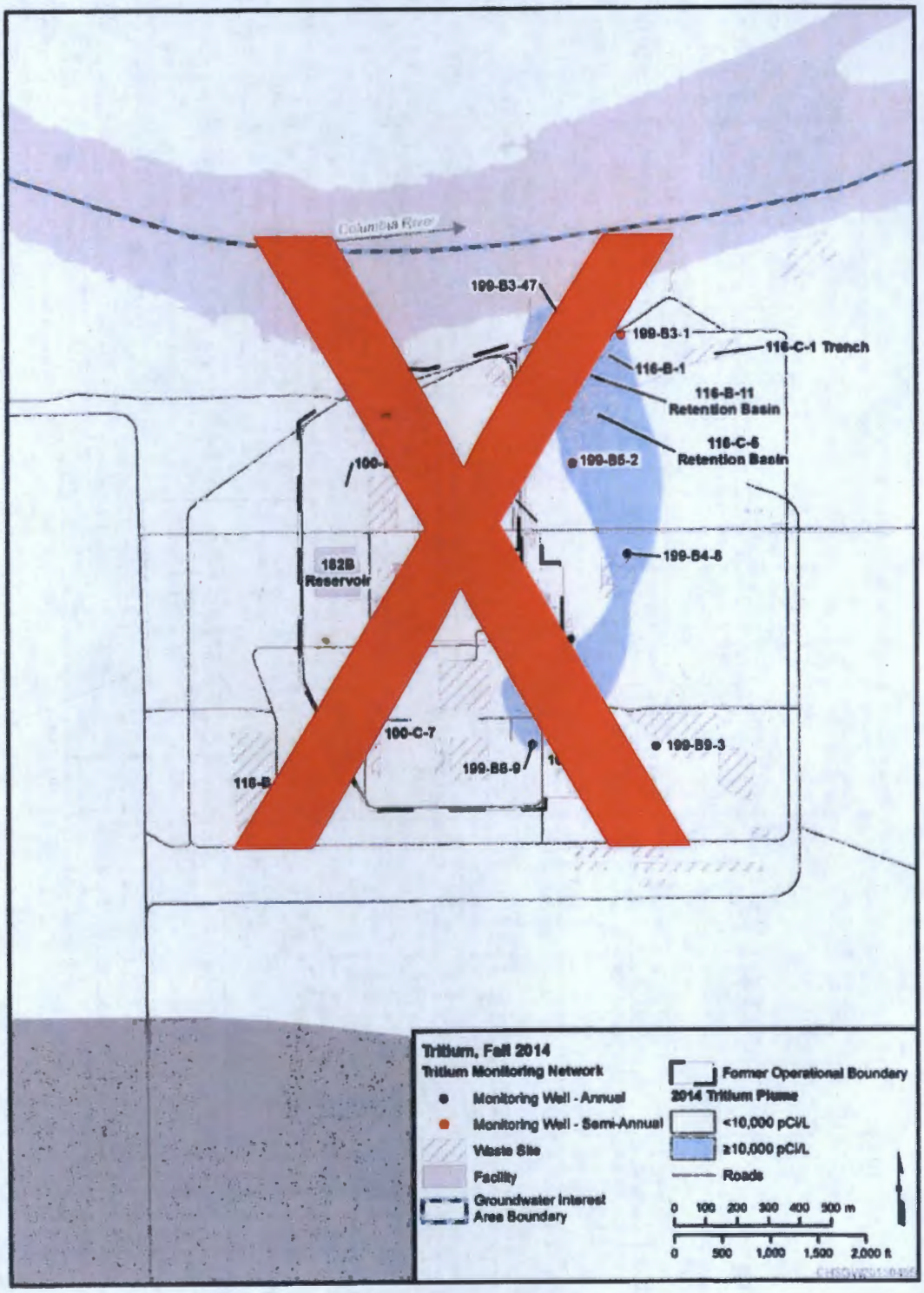
Additional wells were selected to monitor groundwater downgradient of plumes or potential residual sources.

Figures A-6, A-7, and A-8 show 2014 contaminant plumes with wells in the proposed networks highlighted. Table A-4 provides rationale for sampling or not sampling each well.

The network to be analyzed for Cr(VI) (Figure A-6) includes most wells in the 100-BC Area screened at the top of the aquifer and all of the wells completed in the lower part of the unconfined aquifer. The western extent of the plume has previously been defined by wells 199-B8-6 and 199-B5-1. Contamination is migrating to the northeast, so these wells, along with 199-B5-14, 699-67-86, and

Table A-4. Groundwater Monitoring Wells in 100-BC and Vicinity

Well Name	Well ID	Installed	Construction	Diameter (in.)	Elev. Top Screen or Perf. (m)	Elev. Bottom Screen or Perf. (m)	Water Level (m)	Water Level Date	Effective Open Interval (m)	Elev. Ringold E (m)	Elev. RUM (m)	Thickness Upper Aquifer (m)	Saturated Hanford (m)	Construction Comments	Monitoring Rationale	Sample?	Cr(VI)	Sr-90	Tritium
199-B4-18	C8778	2013	SS, screen	4	95.6	88.0	121.61	3/24/2014	7.6	113.1	87.8	33.8	8.5	Bottom of unconfined	Monitor deep Cr(VI).	Y	A		
199-B5-1	A4561	1962	CS, perf	8	127.0	108.7	121.40	2/28/2014	3.6	123.9	<93.0	ND	ND		Cr(VI) and Sr-90 are consistently low and unlikely to migrate west.	N			
199-B5-2	A4562	1992	SS, screen	4	123.3	117.2	121.33	2/28/2014	4.1	<117.2	<116.9	ND	ND		Monitor passage of southern Cr(VI) plume; in Sr-90 plume; elevated tritium.	Y	S	A	S
199-B5-5	C7505	2010	SS, screen	6	99.1	79.3	120.78	2/28/2014	19.8	119.3	74.8	46.0	1.5	Middle/bottom of unconfined	Monitor deep Cr(VI).	Y	A		
199-B5-6	C7507	2010	SS, screen	6	94.7	87.1	121.46	2/28/2014	7.7	116.6	88.6	32.9	4.8	Bottom of unconfined	Monitor deep Cr(VI).	Y	A		
199-B5-8	C8244	2011	SS, screen	6	123.1	117.0	121.62	2/28/2014	4.6	94.2	86.9	34.7	27.4		Cr(VI) >AWQC, but that standard is not applicable so far inland.	N			
199-B5-9	C8779	2013	SS, screen	4	96.3	88.7	121.64	3/24/2014	7.6	113.4	86.6	35.1	8.3	Bottom of unconfined	Monitor deep Cr(VI).	Y	A		
199-B5-10	C8780	2014	SS, screen	4	122.6	116.5	121.58	3/24/2014	5.1	<114.7	<114.7	ND	ND		Monitor Cr(VI) adjacent to 100-C-7:1.	Y	A		
199-B5-11	C8781	2013	SS, screen	4	92.2	86.1	121.67	3/24/2014	6.1	115.6	87.3	34.4	6.0	Bottom of unconfined	Monitor deep Cr(VI).	Y	A		
199-B5-12	C8782	2014	SS, screen	4	122.8	116.7	121.34	3/24/2014	4.6	<115.7	<115.7	ND	ND		Monitor Cr(VI) adjacent to 100-C-7; tritium is redundant with nearby wells.	Y	A		
199-B5-13	C8783	2013	SS, screen	4	95.3	87.7	121.49	3/24/2014	7.6	121.2	76.7	44.8	0.3	Middle of unconfined	Monitor deep Cr(VI).	Y	A		
199-B5-14	C8784	2013	SS, screen	4	122.5	116.4	121.64	3/24/2014	5.3	118.8	71.6	50.0	2.8		No monitoring objective	N			
199-B8-6	A4563	1992	SS, screen	4	124.1	118.0	121.62	2/28/2014	3.6	<117.3	<117.3	ND	>4.3		Cr(VI) is consistently low and unlikely to migrate west. Downgradient of potential residual tritium source.	Y N			A
199-B8-9	C7508	2010	SS, screen	6	123.5	117.4	121.62	2/28/2014	4.2	107.1	86.5	35.1	14.5		Monitor southern edge of Cr(VI) plume; elevated tritium.	Y	A		A
199-B9-2	A4565	1992	SS, screen	4	124.2	118.1	121.86	10/23/2013	3.8	<115.8	<115.8	ND	>5.5		Redundant with B9-3	N			
199-B9-3	A4566	1992	SS, screen	4	124.4	118.3	121.62	2/28/2014	3.3	<117.2	<117.2	ND	>4.4		Monitor southern edge of Cr(VI) plume; tritium is increasing.	Y	A		A
699-63-90	A5293	1948	CS, perf	8	127.3	111.5	122.20	2/28/2014	10.7	115.1	113.3	ND	7.1		Far west; no monitoring objective	N			
699-63-92	A5294	1973	CS, open	6	106.1	95.1	122.18	3/2/2009	9.4	Not ID'd	Absent	ND	ND	46 m (150 ft) to basalt	No monitoring objective for basalt	N			
699-63-95	A8958	1973	CS, open	3	-11.4	-67.2	121.99	2/28/2014		Not ID'd	Absent	ND	ND	Deep basalt well	No monitoring objective for basalt	N			
699-65-72	A5302	?	CS, perf	12	110.6	104.5	121.64	3/13/2014	6.1	Not ID'd	No log	ND	ND		No monitoring objective	N			



~~Figure A-8. Proposed Monitoring Network for Tritium~~

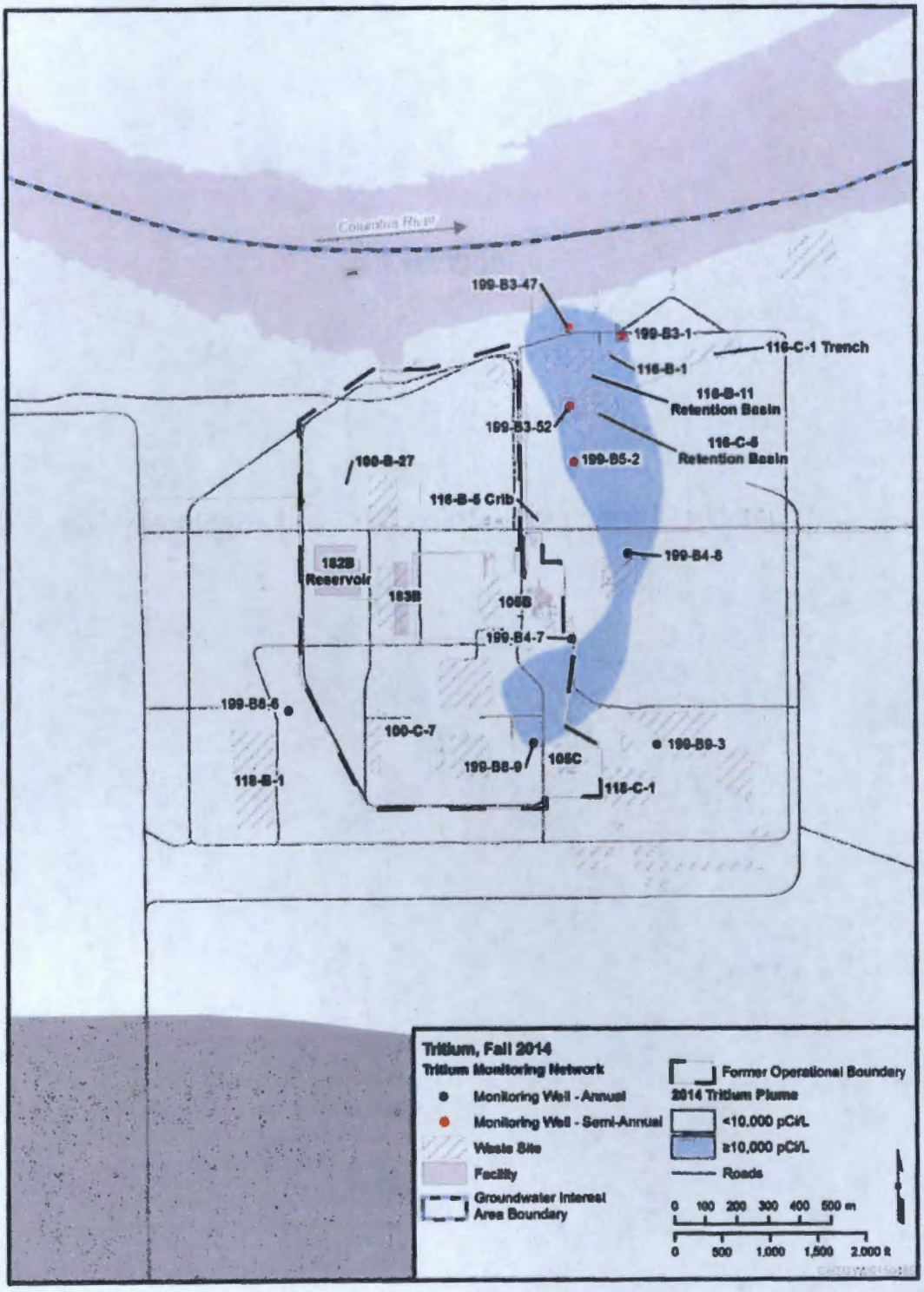


Figure A-8. Proposed Monitoring Network for Tritium [replacement figure]

Appendix B

Data Quality Objectives for Chloroform and Trichloroethene

This page intentionally left blank.

B1 Introduction

An updated groundwater risk assessment in 2016 identified chloroform and trichloroethene as additional groundwater contaminants of potential concern (COPCs) in deep wells 199-B3-51, 199-B5-5, and 199-B5-6. An abbreviated data quality objectives (DQO) process was applied to determine appropriate monitoring for the additional contaminants.

B2 Available Data

Wells were analyzed for volatile organic compounds (VOCs) during spatial and temporal sampling in 2010; the detection limit for most of these analyses was 1 µg/L for both trichloroethene and chloroform.

In the upper part of the unconfined aquifer, most results were near or below detection limits for chloroform and trichloroethene. Of 25 shallow wells with volatile organic compound (VOC) data, 7 wells had trichloroethene detections greater than 1 µg/L in at least one sample with the highest concentration of TCE estimated as 2.2 µg/L at well 199-B5-8. (Table B-1). Chloroform concentrations were less than 1 µg/L in the upper part of the unconfined aquifer. The highest chloroform detection (excluding those associated with out-of-range a quality control results) was an estimated 0.59 µg/L in well 199-B2-13.

Characterization samples were collected through the entire aquifer thickness in 8 wells installed in between 2009 and 2011. These characterization data were not included in the risk assessment to determine contaminants of concern (COCs). In the lower part of the unconfined aquifer, trichloroethene concentrations above 1 µg/L were detected in 7 wells and chloroform concentrations above 1 µg/L were detected in 5 wells (Table B-1).

Four of the wells installed in 2009-2011 were completed with screens in the lower part of the aquifer and were sampled at least once for VOCs after completion (Figure B-1). Those data were included in the risk assessment for the RI/FS. The combined concentrations of trichloroethene and chloroform in wells 199-B5-5, 199-B5-6, and 199-B3-51 exceeded the cumulative risk threshold of 10^{-5}. Well 199-B3-51 had a single sample and the results were not consistent with characterization data, which were nondetects. Trichloroethene and chloroform also were detected in routine samples from 199-B2-16, but levels did not exceed the cumulative risk threshold.

Wells installed in 2013 through 2014 were not sampled for VOCs during or after drilling.

B3 DQO Steps

B3.1 Step 1: State the Problem

The problem statement is as follows:

Chloroform and trichloroethene have been identified as groundwater COPCs in three wells screened in the lower part of the unconfined aquifer. One additional deep well had detections but levels were not high enough to make these COPCs in that well. Other deep wells have not been sampled for chloroform and trichloroethene. Monitoring is necessary to confirm the CSM used for the RI/FS evaluations.

B3.2 Step 2: Identify the Goal of the Study

The principal study question is as follows:

Are concentrations of chloroform and TCE in the lower part of the aquifer consistent with the CSM?

B3.3 Step 3: Identify Information Inputs

The primary source of information will be groundwater samples from wells screened in the lower part of the aquifer, which will be analyzed for chloroform and trichloroethene.

Chloroform and trichloroethene are COPCs because the cumulative risk level is greater than 1×10^{-5}. Detection limits of 1 μg/L or less will provide data to meet this cumulative action level.

B3.4 Step 4: Define the Boundaries of the Study

The 2016 risk assessment concluded that chloroform and trichloroethene are COPCs only in the lower part of the unconfined aquifer. Although the assessment identified these as COPCs in only three wells, four other deep wells lack chloroform and trichloroethene data. Given the widespread detections of these contaminants beneath 100-BC during characterization, study boundaries will include all 8 wells screened in the deep part of the aquifer (Table B-2).

The time period for this study begins with the planned fall 2016 sampling event and ends when performance monitoring for the groundwater remedial action begins.

B3.5 Step 5: Develop the Analytic Approach

The decision rule for this study is as follows:

If chloroform and trichloroethene concentrations are not within or near previously established ranges in the lower part of the unconfined aquifer, then incorporate the new information into the design of remedial action alternatives or consider new alternatives. Otherwise, proceed with the design as indicated by the established CSM.

Evaluation methods for the decision rule include the following:

- Contaminant distribution maps
- Concentration versus time graphs

B3.6 Step 6: Specify Performance or Acceptance Criteria

Analytical criteria for chloroform and trichloroethene will be consistent with established criteria for the groundwater project.

B3.7 Step 7: Develop the Plan for Obtaining Data

Analytes include chloroform and trichloroethene. The monitoring network includes 8 wells screened in the lower part of the unconfined aquifer (Table B-2). These wells are also sampled for the COCs hexavalent chromium, strontium-90, and tritium, as described in the main body of this document and in Appendix A. Sampling frequency will be annual in the fall of the year, as defined for the COCs.

Table B-1. Maximum Chloroform and Trichloroethene Concentrations in Selected Wells

Well Name	Maximum Shallow TCE, µg/L	Maximum Deep TCE, 1 µg/L	Maximum Shallow Chloroform, µg/L	Maximum Deep Chloroform, µg/L
199-B2-14	0.84 J (C)	0.37 J (C)	0.36 J (C)	1.4 J (C)
199-B2-16	1.3 J (C)	2.1 J (C)	Not detected (C)	4.8 J (C)
199-B3-46	1.2 (R)	No data	0.39 J (R)	No data
199-B3-50	1.7 J (C)	4.2 J (C)	0.39 J (R)	Not detected (C)
199-B3-51	Not detected (C)	4.0 Y (R)[b]	Not detected (C)	1.9 J (R)
199-B5-5	Not detected (C)	2.5 J (R)	Not detected (C)	4.8 J (C)
199-B5-6	Not detected (C)	3.3 (R)	Not detected (C)	2.2 J (C)
199-B5-8	2.2 J (R)	2.0 J (C)	Not detected (R)	Not detected (C)
199-B8-9	1.3 J (C)[a]	1.1 J (C)	Not detected (R)	Not detected (C)
199-B9-3	1.4 (R)	No data	0.47 (R)[a]	No data
699-65-72	1.3 (R)	No data	0.15 J (R)	No data

Notes:

Maximum values in shallow and deep parts of unconfined aquifer (above or below 100 m elevation), 2009 to 2015

Wells are listed only if at least one detected value of chloroform or trichloroethene was >1 µg/L

C = sample collected during characterization

J = estimated value (result is above detection limit but below quantitation limit)

R = sample collected from completed well during routine monitoring

Y = suspect

a. Excludes T flagged values (T = spike and/or spike duplicate sample recovery out of limits)

b. Flagged as suspect because it was inconsistent with characterization samples; however, there is insufficient evidence to reject the value

Table B-2. Monitoring Network for Chloroform and Trichloroethene

Well Name	Location*	Rationale
199-B2-16	Near river, Northwestern 100-BC	Chloroform and trichloroethene were routinely detected 2010-2014 but the cumulative risk level was below the threshold. Continue to monitor because the well is downgradient of other wells with higher concentrations.
199-B3-51	Near river, Northeastern 100-BC	Chloroform and trichloroethene were undetected during drilling, but exceeded the risk threshold in a single sample after well completion (2010). Continue to monitor to determine whether the detections are repeatable.
199-B4-18	Inland; Southeastern 100-BC	No VOC data collected to date. Monitor to determine if concentrations are within ranges observed in other deep wells.
199-B5-5	Inland, Northwestern 100-BC	Chloroform and trichloroethene routinely detected 2010-2014 at levels that exceed the cumulative risk threshold.
199-B5-6	Inland, Southwestern 100-BC	Chloroform and trichloroethene routinely detected 2010-2014 at levels that exceed the cumulative risk threshold.
199-B5-9	Inland, Southwestern 100-BC	No VOC data collected to date. Monitor to determine if concentrations are within ranges observed in other deep wells.
199-B5-11	Inland, South-central 100-BC	No VOC data collected to date. Monitor to determine if concentrations are within ranges observed in other deep wells.
199-B5-13	Inland, between 199-B5-5 and 199-B5-6	No VOC data collected to date. Monitor to determine if concentrations are within ranges observed in other deep wells.
*Well locations are illustrated in Figure 1-1 of the main text		

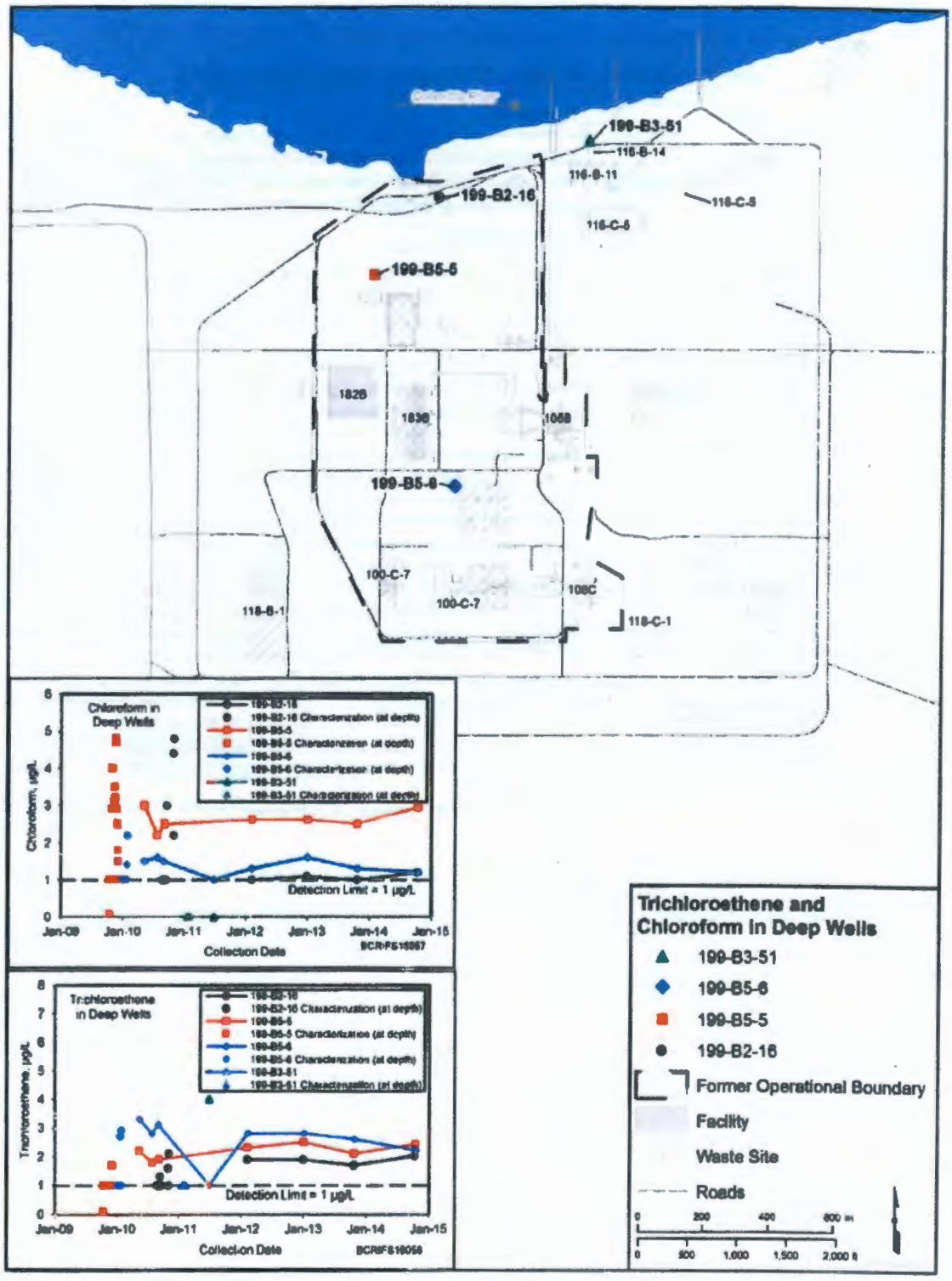


Figure B-1. Chloroform and Trichloroethene Trends in Deep Wells

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0736	TPA CHANGE NOTICE FORM	Date: November 17, 2016
Document Number, Title, and Revision: DOE/RL-2014-44-ADD2, Rev. 0, Remedial Design Report/Remedial Action Work Plan Addendum for 100-F/IU Groundwater		Date Document Last Issued: August 2015
Approved Change Notices Against this Document: TPA-CN-708		
Originator: M.J. Hartman		Phone: 509-376-4385

Description of Change:
Update well network to account for changes caused by drilling conditions.

M.W. Cline (DOE) and R.A. Lobos (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Changes are made throughout the document to modify the sampling and AWLN networks. Three planned wells were not completed (C9472, C9474, and C9479). Two of the wells (C9474 and C9479) were not completed because there was no unconfined aquifer present. Well C9472 was incorrectly installed and has been replaced by C9628. To account for a gap in the network between the nitrate plume and the Columbia River caused by C9474 not being completed, two existing aquifer tubes are added to the network.

One new well and two existing wells will receive AWLN stations in lieu of unsuccessful wells and the river gauging station.

Note: Include affected page number(s) 4-1; A-44; A-47 through A-49; A-51 through A-55; B-2 and B-3; C-3

Justification and Impacts of Change:

It was recognized before drilling began that an unconfined aquifer might not be present at all planned locations, and it was agreed, in that case, that the boreholes would be decommissioned. The aquifer was absent at two locations so the boreholes were decommissioned. Aquifer tubes 75-D and 77-D help fill the objective of the planned, unsuccessful well C9474. No suitable monitoring locations are currently available to replace the other dry well, C9479.

Approvals:

M.W. Cline DOE Project Manager	11/17/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	11-21-2016 Date	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

4 Remedial Action Management and Approach

The Integrated RDR/RAWP (DOE/RL-2014-44) presents a project team and change management approach associated with implementation of the selected remedies. For the groundwater remedy component, CH2M HILL Plateau Remediation Company is responsible for remedial design and RA activities associated with MNA and performance monitoring. RA work tasks specific to the groundwater remedy are described in Section 4.1.

4.1 Remedial Action Work Tasks

RA tasks associated with MNA and ICs are described in the following subsections.

4.1.1 Procurement and Construction

Performance monitoring activities include installation of new wells. Eight locations were identified for Phase 1 new well installation. Additional Phase 2 wells may be identified, depending on evaluation of Phase 1 results.

Procurement activities will include contracts for well drilling and construction, geophysical services, and analytical services. The work will be accomplished using the most efficient combination of onsite resources and service vendors.

Access to the new well locations may require construction of new access roads. The new roads will require maintenance through the monitoring period until the wells are decommissioned. Maintenance of existing roads to existing wells, and other locations within the identified monitoring network, will be required to provide access through the applicable monitoring periods until the wells are decommissioned.

An AWLN will be established and tracked at ~~19~~ 20 wells and the 100-F river gauge station for at least the first 5 years of monitoring. The AWLN includes ~~7~~ 6 new wells and ~~12~~ 14 existing wells. Locations within the AWLN will be equipped, as required, for the automated measurements.

4.1.2 Rehabilitation of Old Wells and River Gauge Station Repairs

Several older wells with missing or unverified construction information were identified for potential use in the monitoring networks. These wells will be investigated to determine suitability in the monitoring network. Investigation includes a review of documentation, where available; camera surveys; borehole geophysics; and field inspections. Table A-10 of the Groundwater SAP (Appendix A) identifies the wells requiring investigation.

Several existing wells identified for use in the monitoring network extend deeper than the base of the unconfined aquifer. Grouting of these wells will be performed to allow sampling within the unconfined aquifer. Table A-10 of the Groundwater SAP (Appendix A) identifies the wells requiring rehabilitation.

Repairs will be made to the existing 100-F river gauge station on the Columbia River to allow safe access and use of station.

4.1.3 Implementation of Institutional Controls

ICs for the 100-FR-3 OU groundwater are presented in Section 2.1.2 of the Integrated RDR/RAWP (DOE/RL-2014-44). ICs to be implemented by DOE include administrative controls that control well drilling through excavation permits and restrict groundwater use until such time as the groundwater achieves levels protective of UU/UE where groundwater is above cleanup levels. These ICs are implemented through DOE/RL-2001-41, *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions and RCRA Corrective Actions*.

meet the project DQOs. For routine groundwater monitoring undertaken through this SAP, the DQA is captured in QC associated with the annual groundwater report (e.g., DOE/RL-2014-32, *Hanford Site Groundwater Monitoring Report for 2013*), evaluating field and lab QC, and usability of data. Further DQAs will be performed at the discretion of the OU Project Manager and documented in a report overseen by SMR.

A3 Field Sampling Plan

This chapter lists the groundwater wells and aquifer tubes to be monitored, sampling frequency, and constituents to be analyzed.

The data will be evaluated as described in Chapter 6 of the Groundwater Addendum.

A3.1 Sampling Objectives

The primary objective of groundwater sampling in the 100-FR-3 OU is to monitor the natural attenuation of groundwater COCs in accordance with the data requirements identified in the DQO report (SGW-58291). Monitoring results will be used to assess the effectiveness of natural attenuation in meeting cleanup levels. Contaminants in groundwater in 100-FR-3 OU that will be managed through MNA are nitrate, Cr(VI), TCE, and strontium-90. Monitoring for TCE degradation products (*cis*-1,2-dichloroethene and vinyl chloride) will also be performed.

Due to analytical uncertainties identified in the 100-F/IU RI/FS (DOE/RL-2010-98), an investigation of antimony, cadmium, and cobalt was identified in the DQO report (SGW-58291) to determine if these analytes are present below the action level. Sampling for these metals will be performed using an analytical method with a sufficiently low detection limit.

These objectives are accomplished in the field by sampling groundwater at designated wells, aquifer tubes, and a riverbank seep and analyzing the samples for the COCs and other identified analytes.

A3.2 Sample Location, Frequency, and Constituents to be Monitored

The DQO process was used to identify sample locations, frequencies for collection, and constituents for monitoring. Problem statements were used to identify PSQs that can be answered using data inputs to satisfy specific data needs. PSQs are discussed in Section A3.2.1 and in the DQO report. (SGW-58291). The locations of the 100-FR-3 OU monitoring network, including wells, aquifer tubes, and a seep, are presented in Figures A-16 and A-17.

Based on the DQO (SGW-58291), eight locations were identified for installation of new Phase 1 monitoring wells. Details on the installation of the wells are presented in Section A3.2.2[1]. The sample locations, frequency, and constituents to be monitored are identified in Table A-8. Additional samples may be collected on an as needed basis.

[1]During the first phase of well installations in 2016, the unconfined aquifer was found to be absent at two of the locations (C9474 and C9479) and wells could not be installed. The lack of a well at C9474 left a gap in the network between the nitrate plume and the river. Existing well 699-70-23 was considered, but appears to be an old dug well cased with a metal culvert. The poor construction and lack of documentation precludes its use for sampling. Instead, aquifer tubes 75-D and 77-D are added to the network to monitor nitrate near the river.

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analytes					Water Level[a]		Data Need							Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium-90	Trace Metals[b]	AWLN	Manual	PSQ 1a, 1b: Contamination Decreasing as expected?	PSQ 1c: Changes in environmental conditions that reduce effectiveness?	PSQ 1d: Unacceptable impacts to river?	PSQ 1e: Evidence of new contaminant releases?	PSQ 2: Trace metals below action levels?	PSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	PSQ 4a, 4b: Remediation objectives achieved?	Year 1	Year 2 to Year 5	Year 6 and Onward
Existing Monitoring Wells																	
199-F5-1			X	X			X	X	X		X			X	A, S[c]	A, S[c]	B
199-F5-4	X	X	X		X		X	X	X		X	X		X	A, S[d]	A, S[d]	B[e]
199-F5-42	X		X	X			X	X	X	X				X	A	A	B
199-F5-43A	X		X	X	X		X	X	X	X		X	X	X	A	A	B[e]
199-F5-44	X		X	X			X	X	X	X				X	A	A	B
199-F5-45	X	X	X			X	X	X	X		X		X	X	A	A	B
199-F5-46	X	X	X	X			X	X	X		X			X	S	S	B
199-F5-47	X		X	X			X	X	X		X			X	A	A	B
199-F5-48	X	X	X		X		X	X	X		X	X		X	A	A	B[e]
199-F5-52	X		X			X	X	X	X	X	X		X	X	A	A	B
199-F5-54	X		X	X			X	X	X		X			X	A	A	B
199-F5-55	X		X	X			X	X	X		X			X	A, S[c]	A, S[c]	B
199-F5-56	X	X	X	X			X	X	X		X			X	A	A	B
199-F5-6	X		X	X			X	X	X	X	X			X	A, S[f]	A, S[f]	B
199-F6-1	X		X	X		X	X	X	X	X	X		X	X	A	A	B
199-F7-1		X	X			X	X	X	X		X		X	X	A	A	B
199-F7-2		X	X			X	X	X	X		X		X	X	A	A	B
199-F7-3		X	X				X	X	X		X			X	A	A	B
199-F8-2	X			X			X	X	X		X			X	A	A	B
199-F8-4			X			X	X	X	X				X	X	A	A	B
199-F8-7		X	X	X	X		X	X	X		X	X		X	A	A	B[e]
699-58-24							X		X						A[g]	A[g]	B[g]
699-59-32[h]			X			X	X	X	X				X	X	A	A	B

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analytes					Water Level[a]		Data Need							Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium-90	Trace Metals[b]	AWLN	Manual	PSQ 1a, 1b: Contamination Decreasing as expected?	PSQ 1c: Changes in environmental conditions that reduce effectiveness?	PSQ 1d: Unacceptable impacts to river?	PSQ 1e: Evidence of new contaminant releases?	PSQ 2: Trace metals below action levels?	PSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	PSQ 4a, 4b: Remediation objectives achieved?	Year 1	Year 2 to Year 5	Year 6 and Onward
699-60-32[h]			X			X	X	X	X				X	X	A	A	B
699-61-37						X	X						X		A[g]	A[g]	B[g]
699-62-31			X				X	X	X				X	X	A	A	B
699-63-25A			X			X	X	X	X				X	X	A	A	B
699-64-27			X			X	X	X	X				X	X	A	A	B
699-66-23			X			X	X	X	X	X			X	X	A	A	B
699-70-23						X	X		X				X		A[g]	A[g]	B[g]
699-71-30		X	X			X	X	X	X				X	X	A	A	B
699-74-44							X		X				X		A[g]	A[g]	B[g]
699-77-36		X	X			X	X	X	X				X	X	A	A	B
New Monitoring Wells (Phase 1)																	
~~C9472~~ C9628 (699-75-34B)[i]		X	X			X	X	X	X				X	X	Q	A	B
~~C9474[i]~~			~~X~~			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~			~~X~~	~~X~~	~~Q~~	~~A~~	~~B~~
C9475 (699-71-34)		X	X			X	X	X	X				X	X	Q	A	B
C9476 (699-75-31)		X	X			X	X	X	X				X	X	Q	A	B
C9477 (699-75-28)			X			X	X	X	X	X			X	X	Q	A	B
C9478 (699-66-32)			X			X	X	X	X				X	X	Q	A	B
~~C9479[k]~~			~~X~~			~~X~~	~~X~~	~~X~~	~~X~~				~~X~~	~~X~~	~~Q~~	~~A~~	~~B~~
C9480 (699-67-26)			X			X	X	X	X	X			X	X	Q	A	B

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analytes					Water Level[a]		Data Need							Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium-90	Trace Metals[b]	AWLN	Manual	PSQ 1a, 1b: Contamination Decreasing as expected?	PSQ 1c: Changes in environmental conditions that reduce effectiveness?	PSQ 1d: Unacceptable impacts to river?	PSQ 1e: Evidence of new contaminant releases?	PSQ 2: Trace metals below action levels?	PSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	PSQ 4a, 4b: Remediation objectives achieved?	Year 1	Year 2 to Year 5	Year 6 and Onward
Aquifer Tubes																	
64-M	X		X	X				X		X					A	A	B
C6302	X		X	X				X		X					A	A	B
C6303	X		X					X		X					A	A	B
C6306	X		X	X				X		X					A	A	B
C6309	X		X	X				X		X					A	A	B
C6315	X		X	X				X		X					A	A	B
75-D			X					X		X					A	A	B
77-D			X					X		X					A	A	B
Riverbank Seep																	
Seep 187-1	X		X					X		X					A	A	B
River Gauge																	
100-F River Gauge						X			X	X			X				

a. Manual water level measurements will be obtained at low, high, and moderate river stage during sample years for the first 10 years of performance monitoring. For wells identified for only manual water level measurements, measurements will be taken each year for the first 5 years, and biennially thereafter. Manual water level measurements will not be obtained from wells within the AWLN during the operational period.

b. Trace metals include antimony, cadmium, and cobalt. These analytes are included for samples collected only during the first 10 years of monitoring until sufficient data are obtained for evaluation (eight samples).

c. Semiannual sample frequency will be performed for strontium-90. Other analytes are sampled at an annual frequency.

d. Semiannual sample frequency will be performed for Cr(VI), TCE, and nitrate. Trace metals sampled at an annual frequency.

e. Antimony, cadmium, and cobalt are not included for analysis after year 10.

f. Semiannual sample frequency will be performed for Cr(VI). Other analytes sampled at an annual frequency.

g. Water level measurements only.

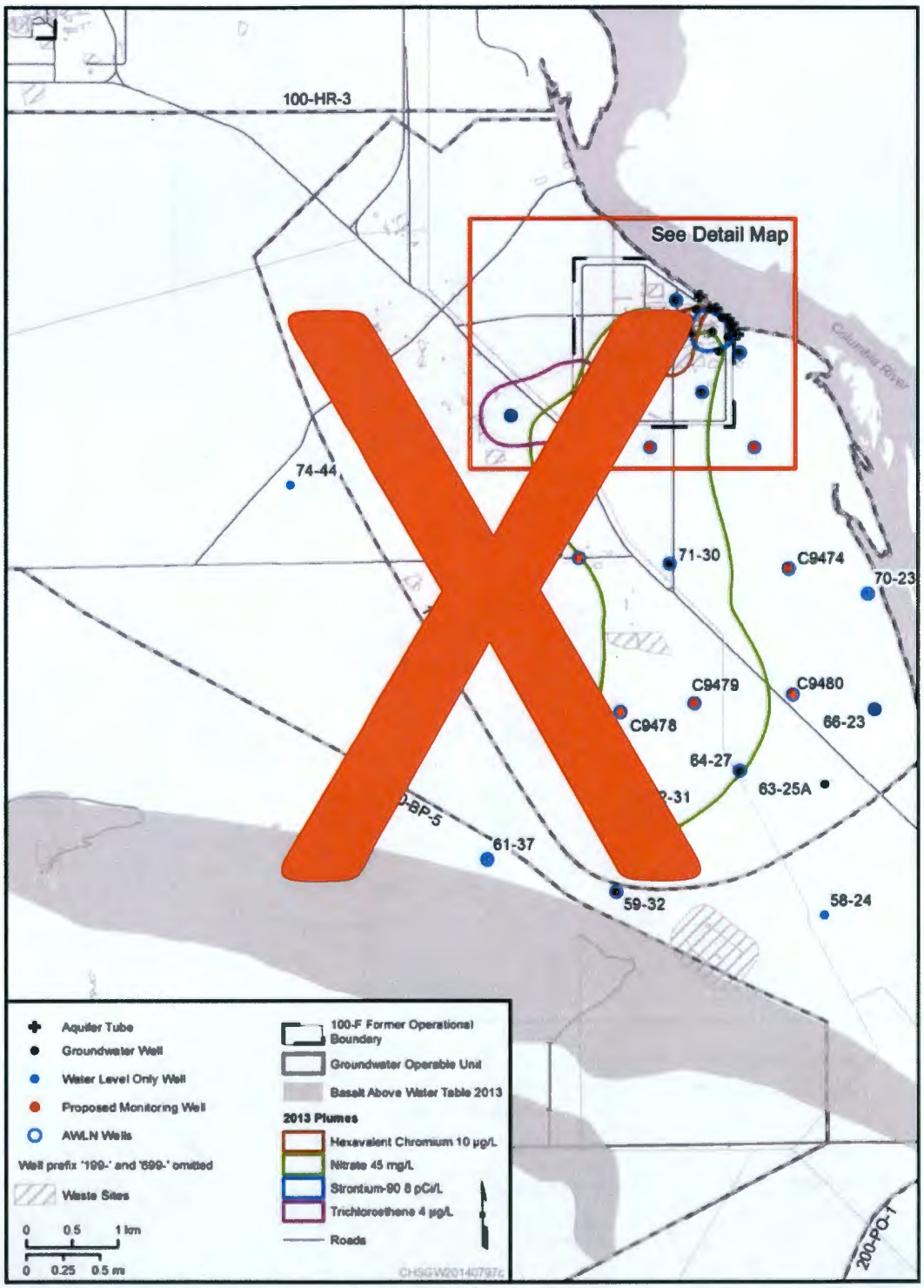
h. Only one of Wells 699-59-32 and 699-60-32 will be included in the monitoring network. The decision of which well to be included will be based on well investigation results.

i. Well C9472 was constructed incorrectly and subsequently decommissioned. It was replaced by C9628 at the same location.

j. The aquifer at the location of borehole C9474 (699-71-26) was too thin to monitor. A water sample was collected (primarily from the Ringold upper mud unit) and the borehole was decommissioned.

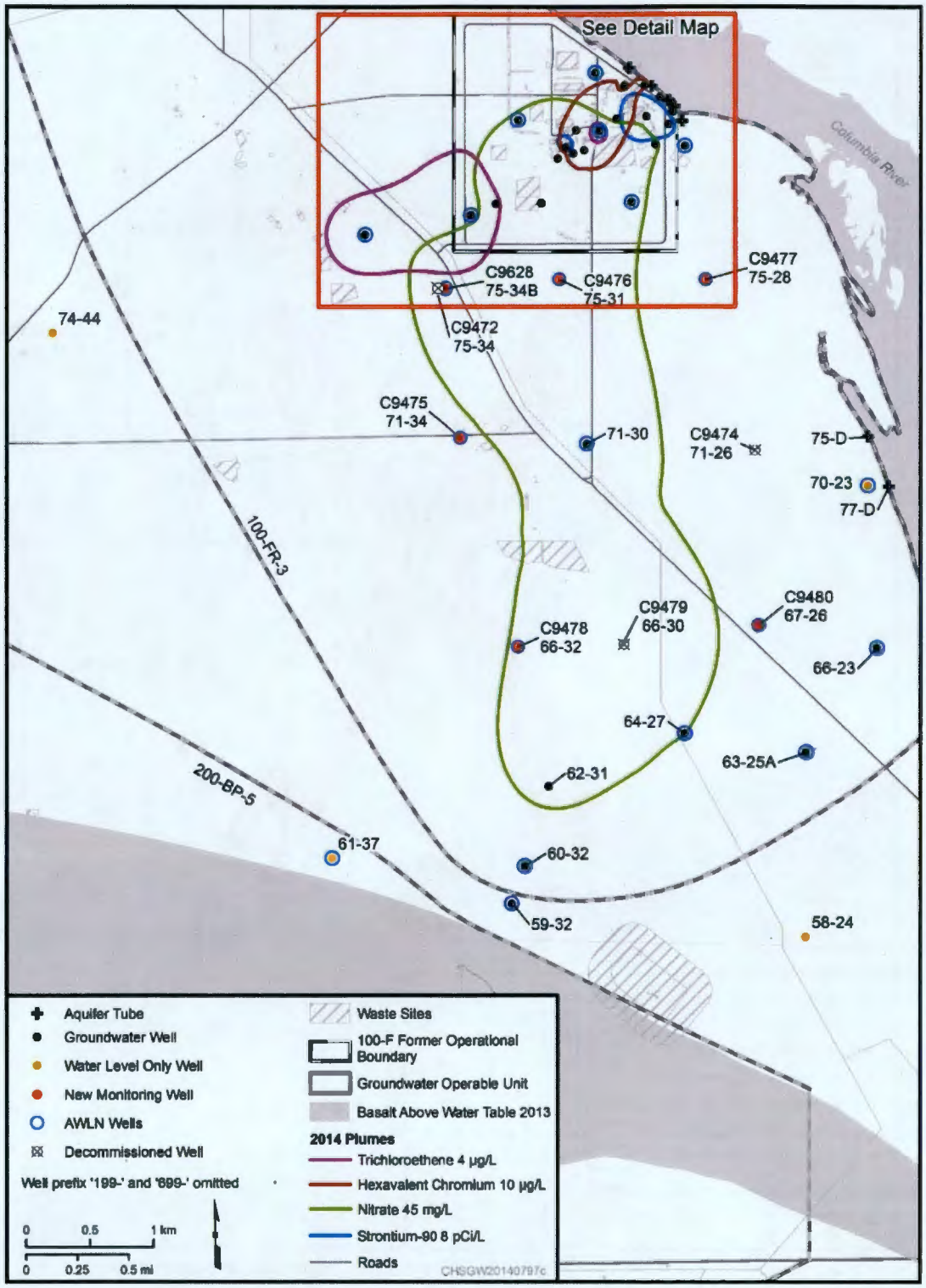
k. Borehole C9479 was dry 10 ft into the Ringold upper mud unit and was decommissioned.

A = annual
B = biennial
AWLN = automated water level network
Cr(VI) = hexavalent chromium
PSQ = principal study question
S = semiannual
TCE = trichloroethene



Note: Either Well 59-32 or 60-32 will be included in the network depending on field investigation results.

Figure A-16. 100-FR-3 Operable Unit Performance Monitoring Network



Note: Either Well 59-32 or 60-32 will be included in the network depending on field investigation results.

Figure A-16. 100-FR-3 Operable Unit Performance Monitoring Network

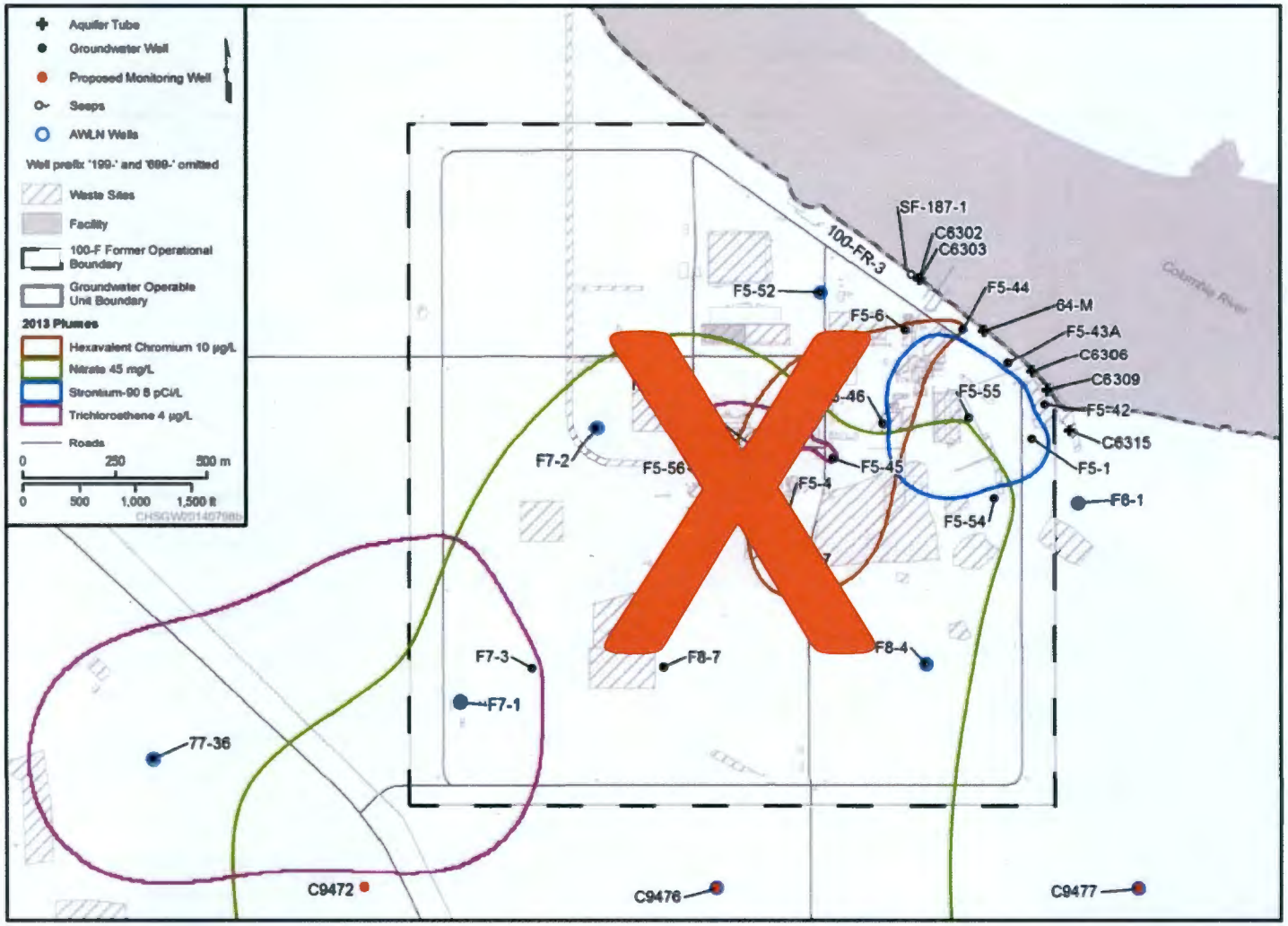


Figure A-17. Detail Map of 100-FR-3 Operable Unit Performance Monitoring Network near 100-F Area

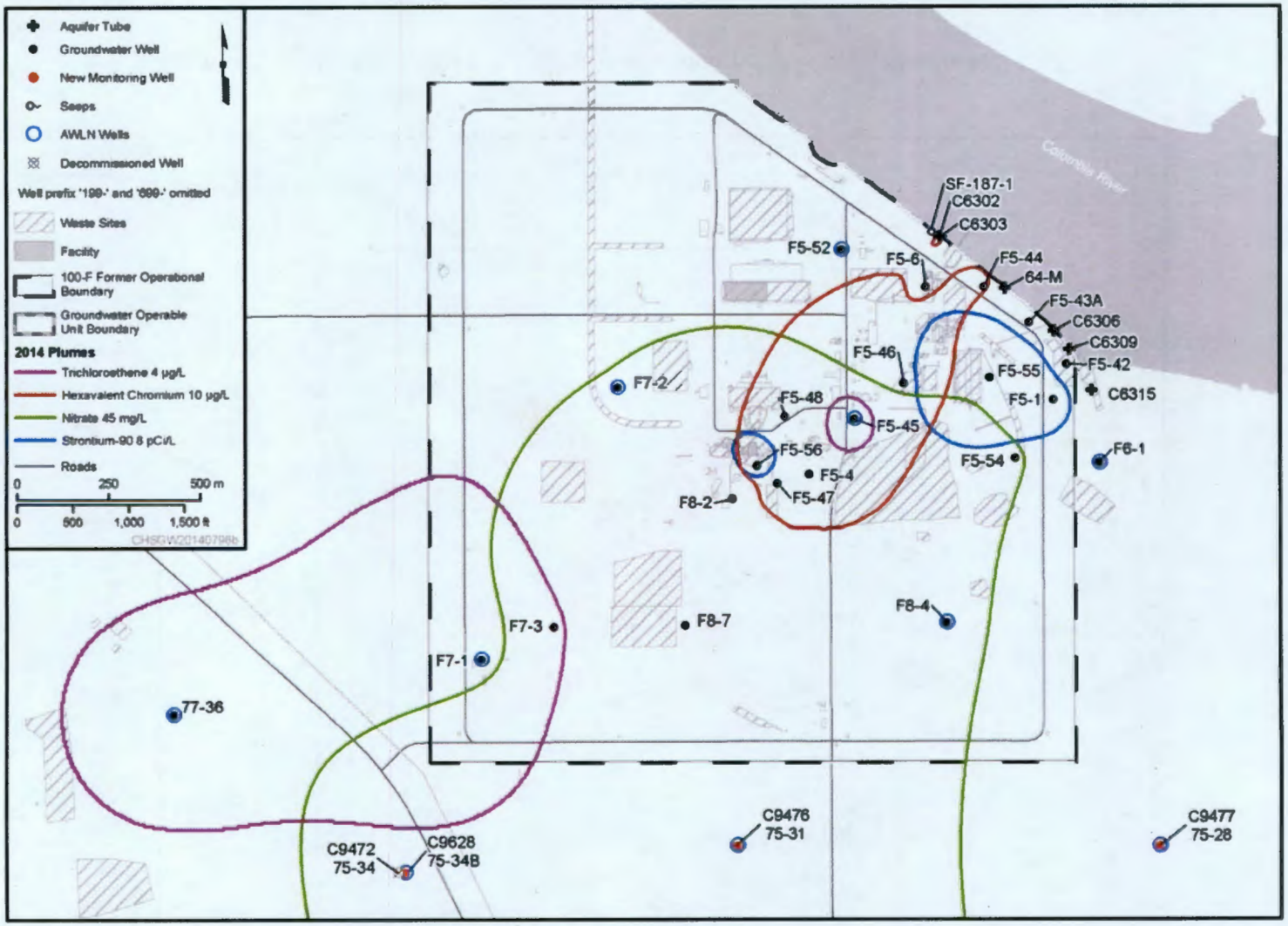


Figure A-17. Detail Map of 100-FR-3 Operable Unit Performance Monitoring Network near 100-F Area

The 100-F river gauge station and 20 ~~19~~ monitoring wells were identified for creating the AWLN for the first 5 years of monitoring. AWLN measurements will be recorded hourly. The need for continuation of the AWLN will be evaluated as part of the 5-year performance reports.

Groundwater levels are measured annually in March across the Hanford Site to construct water table maps that are used to determine the direction and rate of groundwater flow in the unconfined aquifer (SGW-38815, *Water-Level Monitoring Plan for the Hanford Site Soil and Groundwater Remediation Project*). In addition to the March water table map, at a minimum, the high and low river stage maps will be provided in the Phase 1 well report and the comprehensive 5-year performance monitoring reports for as long as the AWLN remains active.

Groundwater measurements also will be recorded at monitoring locations concurrent with collection of groundwater samples.

A3.2.1.4 PSQ 4: Have RAOs been achieved?

PSQ 4a: Are concentrations of COCs below cleanup levels?

PSQ 4b. Will groundwater continue to meet the cleanup levels in the future?

Performance monitoring of the 100-FR-3 OU will produce data usable for determining if groundwater RAOs have been achieved. The following groundwater specific RAOs are identified in the 100-F/IU ROD (EPA and DOE, 2014):

RAO 1: Prevent unacceptable risk to human health from ingestion of and incidental exposure to groundwater containing contaminant concentrations above federal and state standards and risk-based thresholds.

RAO 2: Prevent unacceptable risk to human health and ecological receptors from groundwater discharges to surface water containing contaminant concentrations above federal and state standards and risk-based thresholds.

RAO 7: Restore groundwater impacted from 100-FR-1, 100-FR-2, 100-IU-2, and 100-IU-6 releases to proposed cleanup levels, which include DWSs, within a time frame that is reasonable given the particular circumstances of the site.

Only data from monitoring wells will be used in calculations and evaluation of compliance with cleanup levels. Results from aquifer tubes and the seep will be used to determine changes in plume size and, in the case of aquifer tubes, assess COC concentrations nearest the surface water.

A3.2.2 New Groundwater Monitoring Well Installation

The first phase of new wells to support performance monitoring ~~includes~~ included eight locations, but only six wells were successfully installed (Table A-9). ~~Approximate coordinates for the new well locations are presented in Table A-9.~~ Field walk downs of the identified locations ~~will be~~ were performed prior to drilling. ~~These locations may require adjustment based on accessibility or results of ecological/cultural reviews. Well locations may also require change if the aquifer is not present at the drilling location. If the new location is more than 100 m (330 ft) from the original location, EPA and DOE will be consulted for concurrence prior to drilling.~~

During drilling, a well site geologist ~~will~~ collected drill cutting samples for archive approximately every 1.5 m (5 ft) and completed geologic logs according to project procedures. Samples from the desired screen depth ~~will be~~ were collected for sieve analyses. No other soil or water samples are required during

drilling. ~~When the boreholes reach total depth, project staff will determine whether~~ Borehole geophysical logging was conducted in all boreholes except C9628 (replacement for C9472). ~~is needed~~.

~~After wells are completed and developed, project staff will determine whether~~ Slug tests and/or single-well pumping tests ~~will be~~ were not performed to characterize hydraulic conductivity because the hydrogeology of the region was adequately understood.

Additional Phase 2 monitoring wells may be identified based on evaluation of results from the Phase 1 well samples. Phase 2 wells will be constructed using the same instruction as the Phase 1 wells.

A3.2.2.1 Well Depth and Screen Placement

Each new well ~~will be~~ was drilled approximately 3 m (10 ft) into the RUM unit to facilitate geologic and geophysical interpretations. Table A-9 summarizes depths and construction information. ~~Estimated depths of each well are presented in Table A-9. A 6.1 m (20 ft) screen will be installed at the top of the unconfined aquifer, with approximately 1 to 1.5 m (3 to 5 ft) of screen above the water table.~~

A3.2.2.2 Well Drilling, Completion, and Development

Well drilling and completion ~~will be~~ were performed in accordance with WAC 173-160. The wells ~~will be~~ were drilled using 20 cm (8 in.) diameter ~~(or larger)~~ temporary casing and were ~~Each well will be~~ constructed with 10 cm (4 in.) diameter stainless steel casing and 1.5 to 4.6 m (5 to 15 ft) ~~a 6.1 m (20 ft)~~ long, continuous wire-wrap stainless steel screen, atop a 1.0 to 1.5 m (3 to 5 ft) long stainless steel sump with end cap.

Table A-9. 100-FR-3 Operable Unit Phase 1 Monitoring Well Locations

~~Well Identification~~	~~Northing (m)~~	~~Easting (m)~~	~~Estimated Drill Depth (ft)*~~
~~C9472~~	~~146518.7~~	~~579424.8~~	~~46~~
~~C9474~~	~~145173.9~~	~~581917.5~~	~~49~~
~~C9475~~	~~145292.3~~	~~579601.4~~	~~23~~
~~C9476~~	~~146516.3~~	~~580385.7~~	~~33~~
~~C9477~~	~~146514.8~~	~~581538.1~~	~~43~~
~~C9478~~	~~143589.5~~	~~580059.3~~	~~76~~
~~C9479~~	~~143688.6~~	~~580874.3~~	~~43~~
~~C9480~~	~~143783.7~~	~~581960.7~~	~~62~~

~~* Estimated depth is to top of Ringold Formation upper mud unit plus 3 m (10 ft).~~

Well ID	Well Name	Northing (m)	Easting (m)	Depth to Water (m bgs)	Aquifer Thickness (m)	Total Depth (m bgs)	Elevation Top of Screen (m)	Elevation Bottom of Screen (m)
C9472	699-75-34	146444.09	579477.05	7.28	2.7	13.6	Decommissioned[a]	
C9474	699-71-26	145176.00	581918.55	9.37	0.1	12.4	Decommissioned[b]	
C9475	699-71-34	145271.21	579602.08	6.28	1.6	11.2	116.1	113.0
C9476	699-75-31	146516.19	580385.85	8.87	0.6	12.4	115.3	113.8
C9477	699-75-28	146514.93	581538.22	11.79	2.8	18.0	115.0	110.4
C9478	699-66-32	143628.39	580059.33	7.49	1.0	11.9	119.6	118.0
C9479	699-66-30	143649.79	580895.57	None	0.0	9.6	Decommissioned[b]	
C9480	699-67-26	143798.07	581949.54	8.28	0.9	12.6	113.2	111.6
C9628	699-75-34B	146447.03	579478.30	7.84	2.5	12.6	117.1	112.6

bgs = below ground surface

ID = identification

a. Well constructed incorrectly, decommissioned and replaced by C9628

b. Insufficient aquifer thickness

~~Surface construction consisting of~~ Protective casing, protective guard posts, and cement pad were installed at the completed wells. ~~must be in place before job completion~~.

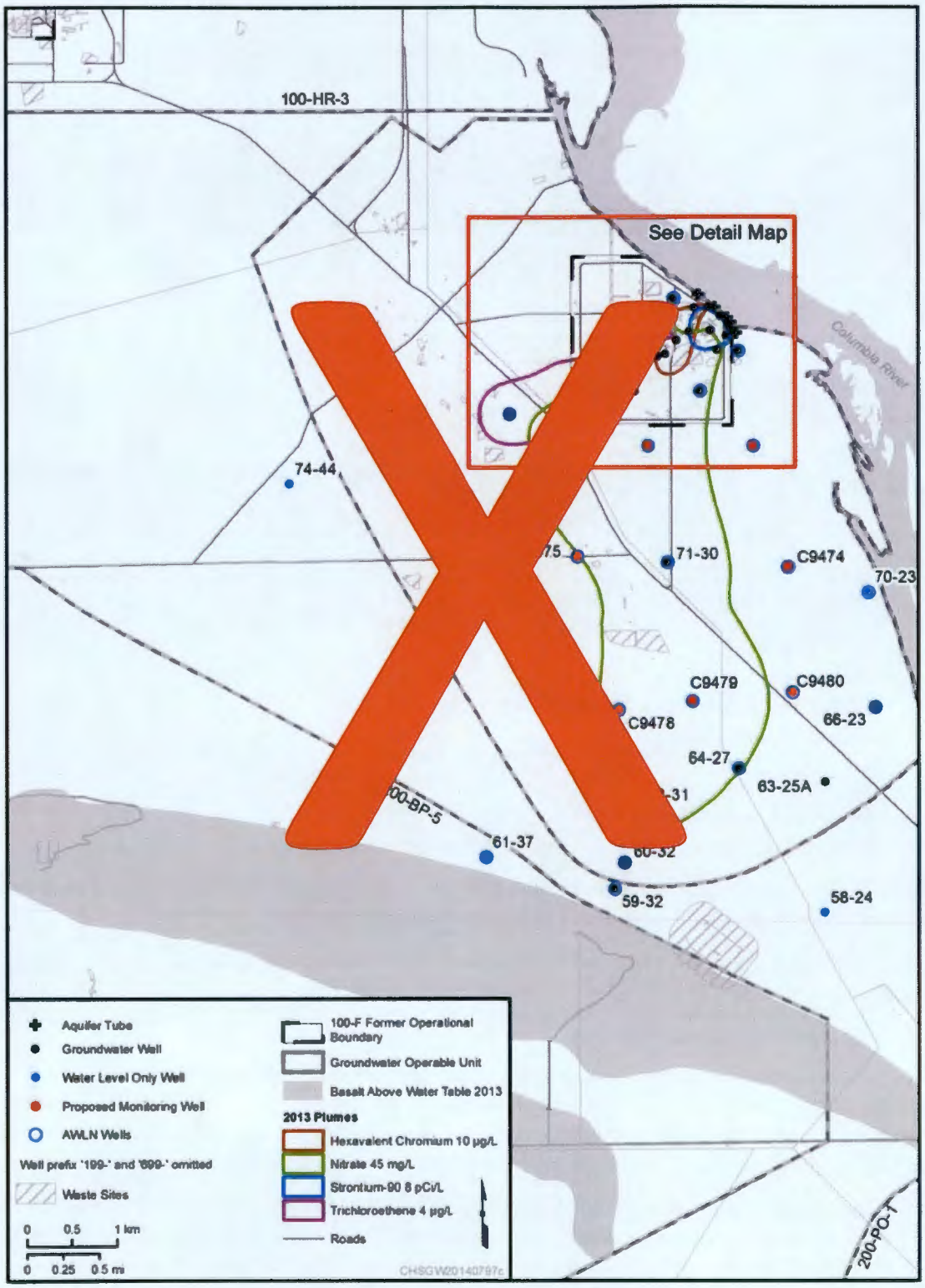
Final well design, including screen placement and length, ~~will be~~ were determined by concurrence of the field geologist, drilling lead, and OU lead based upon field conditions.

Following completion, well locations and elevations will be surveyed, and dedicated sampling pumps will be installed in each well.

A3.2.3 Automated Water Level Network

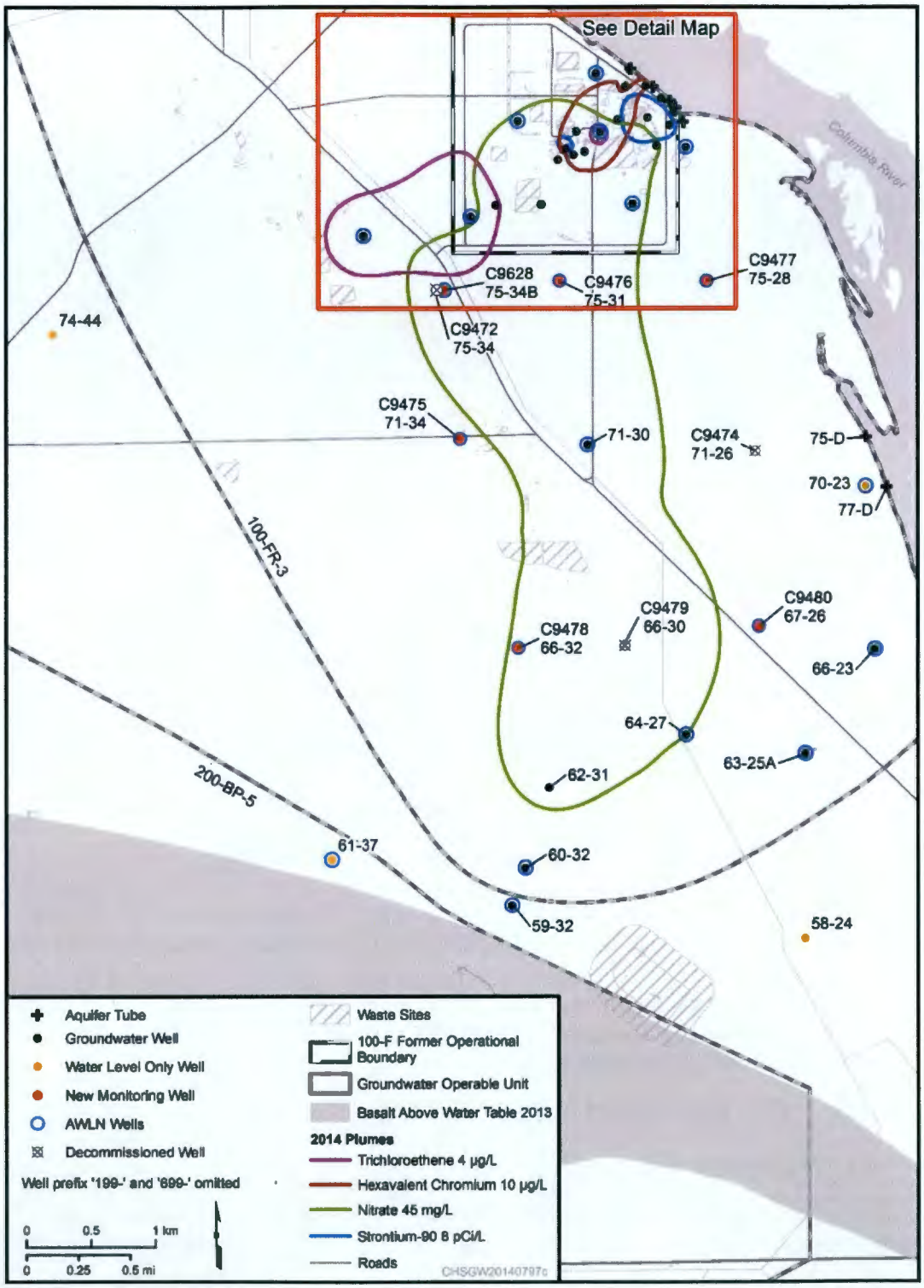
AWLN is the combination of equipment, hardware, and software for the measurement, collection, transmittal, storage, and management of water level data in the aquifer. Water-level data are measured by submersible pressure transducers installed in a network of monitoring locations. The data are then directly transmitted to a base station via telemetry or can be manually downloaded to portable computers.

The 100-F automated river gauge and 20 ~~19~~ monitoring wells will comprise the AWLN for the 100-FR-3 OU (Table A-8). ~~Twelve~~ Fourteen existing wells and ~~seven~~ six new wells will be incorporated into the AWLN and equipped as required for the automated measurements. Two of the existing wells (699-61-37 and 699-70-23) are included in the network for the purpose of the AWLN only. For new wells, equipment necessary for automated measurements will be installed when the wells are completed. The 100-F river



Note: Either Well 59-32 or 60-32 will be included in the network, depending on field investigation results.

Figure B-1. 100-FR-3 Operable Unit Monitoring Network



Note: Either well 59-32 or 60-32 will be included in the network, depending on field investigation results.

Figure B-2. 100-FR-3 Operable Unit Monitoring Network

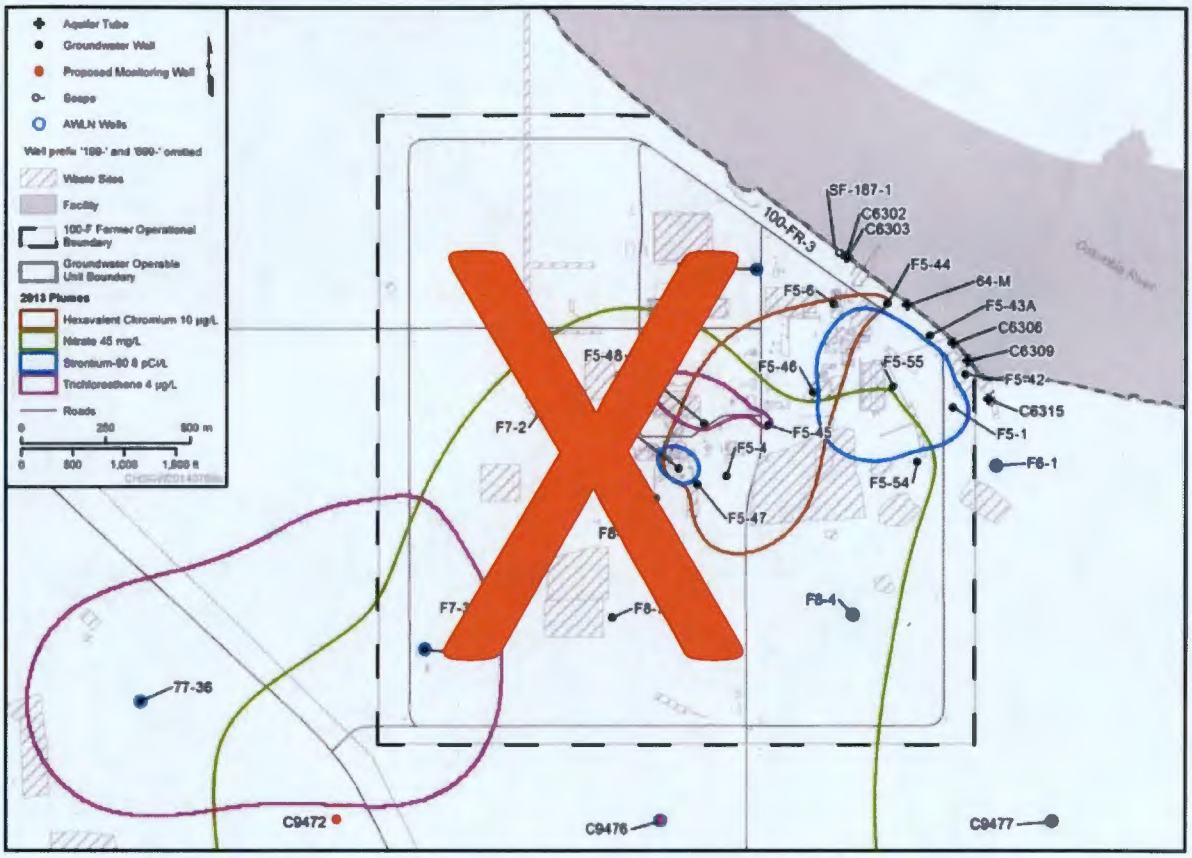


Figure B-2. Detail Map of 100-FR-3 Operable Unit Monitoring Network near 100-F Area

B2 Operations

The operational goal is to sample at designated monitoring wells, aquifer tubes, and the river gauge station during the natural attenuation performance monitoring period. An AWLN will be operated continuously through at least the initial 5 years of monitoring. As the concentrations of COCs are reduced and the plume sizes reduce, the monitoring network will be adjusted. Wells and aquifer tubes will not be arbitrarily removed from service unless they are determined to be no longer needed in the groundwater monitoring network due to decreasing COC plume size. Wells taken out of service due to shrinking of the COC plumes will be scheduled for future decommissioning if it is determined that they are not potentially needed for future monitoring.

B3 Monitoring Network Maintenance

B3.1 Well Maintenance

Well maintenance will be necessary for some wells during the time frame of the MNA remedy. Maintenance includes repair or replacement of pumps and wellhead inspection and maintenance.

Well maintenance will be performed on an as-needed basis. During scheduled sample collection events, sampling crews will inspect the wells. If problems with the wellhead or pump are observed, or if there is a problem obtaining samples (e.g., excessive drawdown or high turbidity), well maintenance will be performed. Well maintenance may also be performed based on unusual sampling results.

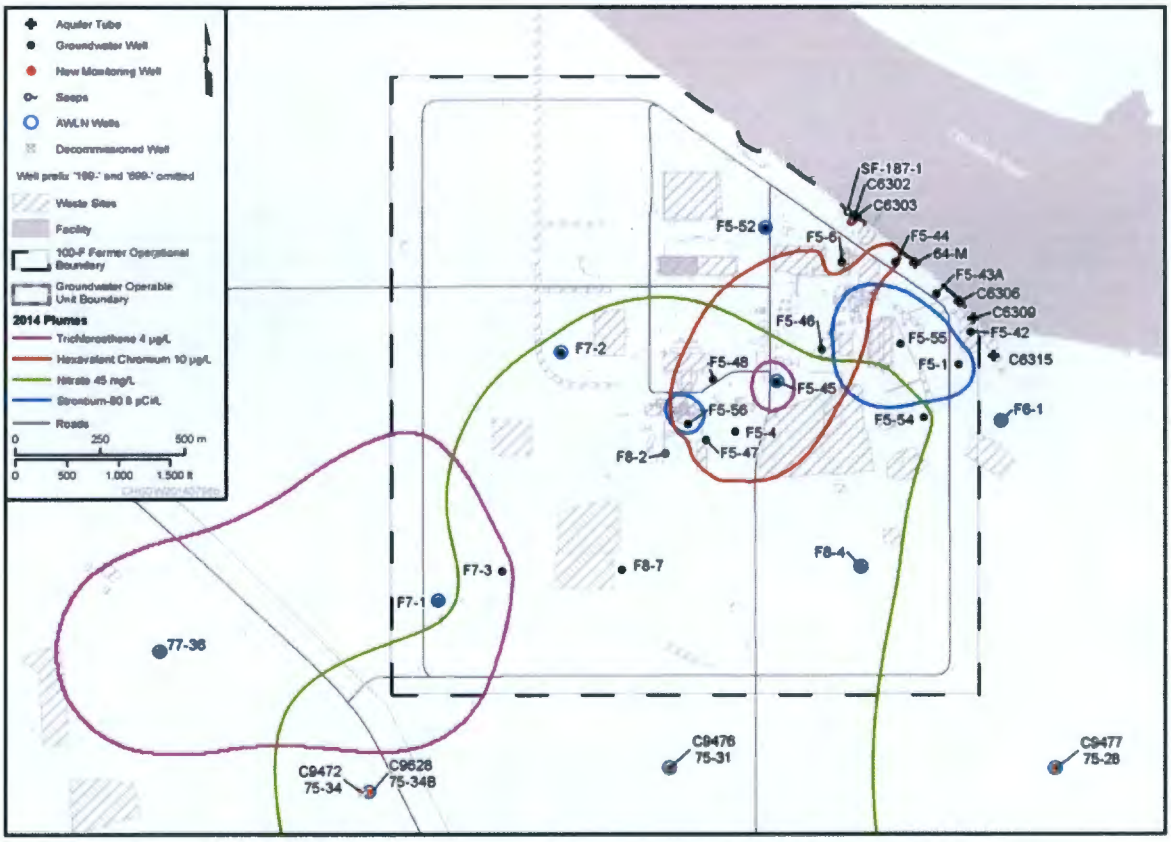


Figure B-2. Detail Map of 100-FR-3 Operable Unit Monitoring Network near 100-F Area

B2 Operations

The operational goal is to sample at designated monitoring wells, aquifer tubes, and the river gauge station during the natural attenuation performance monitoring period. An AWLN will be operated continuously through at least the initial 5 years of monitoring. As the concentrations of COCs are reduced and the plume sizes reduce, the monitoring network will be adjusted. Wells and aquifer tubes will not be arbitrarily removed from service unless they are determined to be no longer needed in the groundwater monitoring network due to decreasing COC plume size. Wells taken out of service due to shrinking of the COC plumes will be scheduled for future decommissioning if it is determined that they are not potentially needed for future monitoring.

B3 Monitoring Network Maintenance

B3.1 Well Maintenance

Well maintenance will be necessary for some wells during the time frame of the MNA remedy. Maintenance includes repair or replacement of pumps and wellhead inspection and maintenance.

Well maintenance will be performed on an as-needed basis. During scheduled sample collection events, sampling crews will inspect the wells. If problems with the wellhead or pump are observed, or if there is a problem obtaining samples (e.g., excessive drawdown or high turbidity), well maintenance will be performed. Well maintenance may also be performed based on unusual sampling results.

Table C-1. Wells Associated with the 100-FR-3 Operable Unit

Well Name	Well Identification	Well Name	Well Identification	Well Name	Well Identification
199-F1-2	A4586	199-F8-2	A4607	699-69-45R	A9761
199-F5-1	A4587	199-F8-3	A4608	699-70-23	A5318
199-F5-4	A4590	199-F8-4	A4609	699-71-30	A5320
199-F5-42	A4591	199-F8-7	C6834	699-71-52	A5321
199-F5-43A	A4592	699-57-29A	A5267	699-74-44	A5328
199-F5-43B	A4593	699-57-29B	A5268	699-77-36	A5330
199-F5-44	A4594	699-58-24	A5275	699-77-54	A5331
199-F5-45	A4595	699-59-32	A5276	699-80-43P	A8993
199-F5-46	A4596	699-60-32	A5279	699-80-43S	A5336
199-F5-47	A4597	699-62-31	A5287	699-81-38	A5337
199-F5-48	A4598	699-63-25A	A5289	699-83-47	A5341
199-F5-52	C7790	699-64-27	A5295	699-84-34B	A9021
199-F5-53	C7791	699-65-22	A5297	699-84-35A	A5342
199-F5-54	C7792	699-66-23	A5306	699-84-35AO	A9769
199-F5-55	C7970	699-66-38	A5307	699-84-35AP	A9770
199-F5-56	C7972	699-66-39	A5308	699-84-35AQ	A9771
199-F5-6	A4600	699-69-38	A5316	699-84-35AR	A9772
199-F6-1	A4602	699-69-45	A8967	699-84-35AS	A9773
199-F7-1	A4603	699-69-45O	A5317	699-86-42	A5344
199-F7-2	A4604	699-69-45P	A9759	699-87-42A	A5345
199-F7-3	A4605	699-69-45Q	A9760	699-61-37	A5283
~~Phase 1~~ New Boreholes or Wells ~~To Be Installed~~					
~~TBD~~ 699-75-34*	C9472	~~TBD~~ 699-75-31	C9476	~~TBD~~ 699-66-30*	C9479
~~TBD~~ 699-71-26*	C9474	~~TBD~~ 699-75-28	C9477	~~TBD~~ 699-67-26	C9480
~~TBD~~ 699-71-34	C9475	~~TBD~~ 699-66-32	C9478	699-75-34B	C9628

Note: Wells identified in Table C-1 are associated with the 100-FR-3 groundwater interest area as of July 2016 ~~January 2015~~.

*Decommissioned

~~TBD = to be determined~~

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0741	TPA CHANGE NOTICE FORM	Date: 8/22/16
Document Number, Title, and Revision: DOE/RL-2000-59, Rev. 1, Sampling and Analysis Plan for Aquifer Sampling Tubes		Date Document Last Issued: Feb. 2009
Approved Change Notices Against this Document: TPA-CN-327, CN-353, -CN-556, -CN-612, -CN-676, -CN-0730		
Originator: M.J. Hartman		Phone: 509-376-4385

Description of Change:
Changes to the Preamble, Appendix A and Appendix B of DOE/RL-2000-59, *Sampling and Analysis Plan for Aquifer Sampling Tubes.*

M.W. Cline (DOE) and L.C. Buelow/N.M. Menard (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records,* and not Chapter 12.0, *Changes to the Agreement.*

Aquifer tubes for the following operable units (OU) are removed from this sampling and analysis plan (SAP) because new OU-specific SAPs supersede requirements for those aquifer tubes:

- 100-BC-5 (DOE/RL-2003-38, Rev. 2)
- 100-NR-2 (DOE/RL-2001-27, Rev. 2)

In Appendix A, all of Table A-1 is replaced with the attached. The table format has been adjusted to remove analytes not required in the remaining aquifer tubes. Appendix B (added under TPA-CN-327 for 100-BC aquifer tubes) is deleted in its entirety. TPA-CN-0730 added a preamble to DOE/RL-2000-59, Rev. 1, removing requirements for 100-HR-3 aquifer tubes. The attached changes incorporates those changes to Table A-1, so the preamble is deleted.

Affected page numbers: P-1; A-3 through A-19; B-I through B-3. Added text is shown with double underline. Deleted text is identified by ~~strikethrough~~.

Justification and Impacts of Change:

Groundwater SAPs for the River Corridor OUs are being revised. The data quality objectives process is applied to determine appropriate sampling programs. If this process determines that aquifer tube data are needed, the aquifer tubes are incorporated into the revised SAP for the individual groundwater OU. As the SAPs are revised, the aquifer tube requirements of DOE/RL-2000-59 are being retired.

For information purposes, the bullets below list the actual or planned date for conversion of aquifer tube requirements into OU-specific SAPs:

- 100-BC-5: fall 2016 (this change notice)
- 100-FR-3: fall 2015 (TPA-CN-676)
- 100-HR-3: fall 2016 (TPA-CN-0730)
- 100-KR-4: planned for spring 2017
- 100-NR-2: fall 2016 (this change notice)
- 200-PO-1: planned for fall 2017
- 300-FF-5: fall 2015 (TPA-CN-676)

Approvals:

DOE Project Manager	Date 8/23/2016	[X] Approved [ ] Disapproved
EPA Project Manager	Date 8/29/2016	[X] Approved [ ] Disapproved
Ecology Project Manager	Date 8/29/2016	[X] Approved [ ] Disapproved

~~*Sampling and Analysis Plan for Aquifer Sampling Tubes*~~
~~DOE/RL-2000-59, Rev. 1~~

~~PREAMBLE~~

~~This sampling and analysis plan was prepared to identify requirements for collection and analysis of groundwater samples from aquifer tubes along the Hanford Site shoreline of the Columbia River. The results are intended to provide information on concentrations of contaminants in groundwater discharges to the Columbia River.~~

~~Department of Energy (DOE) Richland Operations office (RL) and Washington State Department of Ecology (Ecology) have developed an updated monitoring plan, DOE/RL-2013-30, *Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit Monitoring*, Rev. 0, which integrates aquifer tube sampling and analysis with upland groundwater monitoring. The updated monitoring plan (DOE/RL-2013-30) meets requirements from the interim action ROD and interim action ROD amendment (EPA/AMD/R10-00/122) for implementing the interim actions in the 100-HR-3 OU.~~

~~For the 100-HR-3 OU only, this change notice retires the requirements and remaining activities in DOE/RL-2000-59, Rev. 1, and replaces them with the requirements and remaining activities in DOE/RL-2013-30, Rev. 0, beginning August 1, 2016. The requirements and remaining activities in DOE/RL-2000-59, Rev. 1, remain in effect for the 100-BC-5, 100-FR-3, 100-KR-4, 100-NR-3, and 200-PO-1, and 300-FF-5 groundwater operable units.~~

Table A-1. Aquifer Tube Sampling Sites and Analyses

Tube Name	Scheduled Collection Month	Frequency	Field Parameters	Anions	Hexavalent Chromium	Metals (Unfiltered)	Metals (Filtered)	Arsenic	Tritium	Gross Alpha/ Beta	Carbon-14	Iodine-129	Strontium-90	Technetium-99
100-K Segment														
14-D	Oct	A	1	1	1				1	1				1
C6236	Oct	A	1		1									
C6237	Oct	A	1		1									
C6238	Oct	A	1	1	1				1		1			
AT-K-1-D	Oct	A	1	1	1	1	1		1	1	1			1
17-D	Oct	A	1	1	1	1	1		1	1	1			1
C6239	Oct	A	1		1									
C6240	Oct	A	1		1									
C6241	Oct	A	1	1	1				1		1			
C6242	Oct	A	1		1								1	
C6243	Oct	A	1		1								1	
C6244	Oct	A	1	1	1				1		1		1	
AT-K-2-D	Oct	A	1	1	1	1	1		1	1	1			
C6245	Oct	A	1		1								1	
C6246	Oct	A	1		1								1	
C6247	Oct	A	1	1	1				1		1		1	
19-M	Oct	A	1		1								1	
19-D	Oct	A	1	1	1				1	1	1			
AT-K-3-S	Oct	A	1	1	1									
AT-K-3-M	Oct	A	1	1	1								1	
AT-K-3-D	Oct	A	1	1	1	1	1		1		1			
C6248	Oct	A	1		1									
C6249	Oct	A	1		1									
C6250	Oct	A	1	1	1				1		1			
C6251	Oct	A	1		1									
C6252	Oct	A	1		1									
C6253	Oct	A	1	1	1				1		1			
21-S	Oct	A	1		1									
21-M	Oct	A	1	1	1				1				1	
C6254	Oct	A	1		1								1	

Table A-1. Aquifer Tube Sampling Sites and Analyses

Tube Name	Scheduled Collection Month	Frequency	Field Parameters	Anions	Hexavalent Chromium	Metals (Unfiltered)	Metals (Filtered)	Arsenic	Tritium	Gross Alpha/ Beta	Carbon-14	Iodine-129	Strontium-90	Technetium-99
C6255	Oct	A	1		1								1	
C6256	Oct	A	1	1	1				1		1		1	
C6257	Oct	A	1		1								1	
C6258	Oct	A	1		1								1	
C6259	Oct	A	1	1	1				1		1		1	
22-M	Oct	A	1		1								1	
22-D	Oct	A	1	1	1				1					
AT-K-4-S	Oct	A	1		1									
AT-K-4-M	Oct	A	1	1	1				1				1	
23-M	Oct	A	1	1	1								1	
C6260	Oct	A	1	1	1									
C6261	Oct	A	1	1	1				1		1			
AT-K-5-S	Oct	A	1	1	1									
AT-K-5-M	Oct	A	1	1	1								1	
AT-K-5-D	Oct	A	1	1	1			1	1					
DK-04-2	Oct	A	1	1	1			1	1					
25-D	Oct	A	1	1	1				1					
AT-K-6-S	Oct	A	1		1									
AT-K-6-M	Oct	A	1	1	1				1					
AT-K-6-D	Oct	A	1		1									
26-S	Oct	A	1		1									
26-M	Oct	A	1		1									
26-D	Oct	A	1	1	1				1					
C6263	Oct	A	1		1									
C6264	Oct	A	1		1									
C6265	Oct	A	1	1	1				1		1			
200-PO Segment														
85-D	Oct	A	1	1					1	1		1		1
86-D	Oct	A	1	1					1	1		1		1
C6383	Oct	A	1											
C6384	Oct	A	1	1	1				1	1		1		1

Table A-1. Aquifer Tube Sampling Sites and Analyses

Tube Name	Scheduled Collection Month	Frequency	Field Parameters	Anions	Hexavalent Chromium	Metals (Unfiltered)	Metals (Filtered)	Arsenic	Tritium	Gross Alpha/ Beta	Carbon-14	Iodine-129	Strontium-90	Technetium-99
C6353	Oct	A	1	1	1				1	1		1		1
C6356	Oct	A	1	1	1				1	1		1		1
C6359	Oct	A	1	1	1				1	1		1		1
C6362	Oct	A	1	1	1				1	1		1		1
C6368	Oct	A	1	1	1				1	1		1		1
C6371	Oct	A	1	1	1				1	1		1		1
C6374	Oct	A	1											
C6375	Oct	A	1	1	1				1	1		1		1
C6378	Oct	A	1	1	1				1	1		1		1
C6380	Oct	A	1	1	1				1	1		1		1

Frequency: A = annual

Numerals in the constituent columns indicate number of samples to be collected (1 = annual)

Field parameters include dissolved oxygen, pH, specific conductance, temperature and turbidity.

Metals include calcium, chromium, magnesium, potassium, and sodium.

Anions include chloride, fluoride, nitrate, nitrite, and sulfate.

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~100-BC-5 Segment~~																						
~~01-M~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~03-D~~		~~Sep~~	~~A~~	~~1~~		~~1~~					~~1~~											
~~AT-B-1-M~~		~~Sep~~	~~A~~	~~1~~		~~1~~					~~1~~											
~~AT-B-2-D~~		~~Sep~~	~~A~~	~~1~~		~~1~~					~~1~~											
~~04-D~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~											
~~C6227~~	~~S~~	~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6228~~	~~M~~	~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6229~~	~~D~~	~~Sep~~	~~A~~	~~1~~		~~1~~					~~1~~						~~1~~					
~~05-S~~		~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~05-M~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~					~~1~~					
~~05-D~~		~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~AT-B-3-S~~		~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~AT-B-3-M~~		~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~AT-B-3-D~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~					~~1~~					
~~06-S~~		~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~06-M~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~					~~1~~					
~~06-D~~		~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6230~~	~~S~~	~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6231~~	~~M~~	~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6232~~	~~D~~	~~Sep~~	~~A~~	~~1~~		~~1~~					~~1~~						~~1~~					

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~C6233~~	~~S~~	~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6234~~	~~M~~	~~Sep~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6235~~	~~D~~	~~Sep~~	~~A~~	~~1~~		~~1~~					~~1~~						~~1~~					
~~AT-B-7-M~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~					~~1~~					
~~AT-B-5-D~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~					~~1~~	~~1~~				
~~12-D~~		~~Sep~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~							~~1~~				
~~100-KR-4 Segment~~																						
~~14-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~						~~1~~				
~~C6236~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6237~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6238~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~								
~~AT-K-1-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~		~~1~~				~~1~~				
~~17-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~		~~1~~				~~1~~				
~~C6239~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6240~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6241~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~								
~~C6242~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6243~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6244~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~			~~1~~					
~~AT-K-2-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~		~~1~~								
~~C6245~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~C6246~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6247~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~			~~1~~					
~~19-M~~		~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~19-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~		~~1~~								
~~AT-K-3-S~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~AT-K-3-M~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~											~~1~~					
~~AT-K-3-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~			~~1~~								
~~C6248~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6249~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6250~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~								
~~C6251~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6252~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6253~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~								
~~21-S~~		~~Oct~~	~~A~~	~~1~~		~~1~~																
~~21-M~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~						~~1~~					
~~C6254~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6255~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6256~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~			~~1~~					
~~C6257~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6258~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6259~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~			~~1~~					

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~22-M~~		~~Oct~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~22-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~AT-K-4-S~~		~~Oct~~	~~A~~	~~1~~		~~1~~																
~~AT-K-4-M~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~						~~1~~					
~~23-M~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~											~~1~~					
~~C6260~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~C6261~~	~~M~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~								
~~AT-K-5-S~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~AT-K-5-M~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~											~~1~~					
~~AT-K-5-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~				~~1~~	~~1~~											
~~DK-04-2~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~				~~1~~	~~1~~											
~~25-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~AT-K-6-S~~		~~Oct~~	~~A~~	~~1~~		~~1~~																
~~AT-K-6-M~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~AT-K-6-D~~		~~Oct~~	~~A~~	~~1~~		~~1~~																
~~26-S~~		~~Oct~~	~~A~~	~~1~~		~~1~~																
~~26-M~~		~~Oct~~	~~A~~	~~1~~		~~1~~																
~~26-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~C6263~~	~~S~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6264~~	~~M~~	~~Oct~~	~~A~~	~~1~~		~~1~~																
~~C6265~~	~~D~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~			~~1~~								

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~100-NR-2 Segment~~																						
~~C6317~~	~~S~~	~~Dec~~	~~A~~	~~1~~																		
~~C6318~~	~~M~~	~~Dec~~	~~A~~	~~1~~																		
~~C6319~~	~~D~~	~~Dec~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~													~~1~~	
~~C6320~~	~~S~~	~~Dec~~	~~A~~	~~1~~																		
~~C6321~~	~~M1~~	~~Dec~~	~~A~~	~~1~~																		
~~C6352~~	~~M2~~	~~Dec~~	~~A~~	~~1~~																		
~~C6322~~	~~D~~	~~Dec~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~													~~1~~	
~~C6132~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~								~~4~~	~~4~~
~~N116mArray-0A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~4~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~4~~				~~4~~	~~4~~
~~N116mArray-1A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~				~~4~~	~~4~~
~~N116mArray-2A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~4~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~				~~4~~	~~4~~
~~N116mArray-3A~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~	~~4~~		~~4~~	~~4~~	~~4~~			~~4~~	~~4~~		~~4~~		~~4~~					
~~N116mArray-4A~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~	~~4~~		~~4~~	~~4~~	~~4~~			~~4~~	~~4~~		~~4~~		~~4~~					
~~NVP1-1~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP1-2~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~NVP1-3~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP1-4~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP1-5~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP2-116.3~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP2-116.0~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~	~~4~~		~~4~~	~~4~~	~~4~~			~~4~~	~~4~~		~~4~~		~~4~~					
~~NVP2-115.7~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP2-115.4~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~NVP2-115.1~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~N116mArray-6A~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~									~~4~~									
~~N116mArray-8A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~					
~~N116mArray-8.5A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~					
~~N116mArray-9A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~					
~~N116mArray-10A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~					

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~N116mArray-11A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~					
~~N116mArray-13A~~		~~Dec, Mar, Jun, Sep~~	~~Q/A~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~	~~4~~				~~1~~					
~~C6323~~	~~S~~	~~Dec~~	~~A~~	~~1~~													~~1~~					
~~C6324~~	~~M~~	~~Dec~~	~~A~~	~~1~~													~~1~~					
~~C6325~~	~~D~~	~~Dec~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~						~~1~~					
~~N116mArray-15A~~		~~Dec, Mar, Jun, Sep~~	~~Q~~	~~4~~	~~1~~		~~1~~	~~1~~	~~1~~		~~1~~	~~1~~	~~4~~				~~1~~					
~~C6326~~	~~S~~	~~Dec~~	~~A~~	~~1~~																		
~~C6327~~	~~M~~	~~Dec~~	~~A~~	~~1~~																		
~~C6328~~	~~D~~	~~Dec~~	~~A~~	~~1~~		~~1~~	~~1~~	~~1~~			~~1~~											
~~C6329~~	~~S~~	~~Dec~~	~~A~~	~~1~~																		
~~C6330~~	~~M~~	~~Dec~~	~~A~~	~~1~~																		
~~C6331~~	~~D~~	~~Dec~~	~~A~~	~~1~~			~~1~~	~~1~~			~~1~~											
~~C6332~~	~~S~~	~~Dec~~	~~A~~	~~1~~																		
~~C6333~~	~~M~~	~~Dec~~	~~A~~	~~1~~																		
~~C6334~~	~~D~~	~~Dec~~	~~A~~	~~1~~			~~1~~	~~1~~			~~1~~											
~~100-HR-3-D Segment~~																						
~~DD-50-1~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-50-2~~		~~Nov~~	~~A~~	~~1~~		~~1~~																

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~HH~~	~~TOC~~
~~DD-50-3~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~DD-50-4~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-49-1~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-49-2~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-49-3~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-49-4~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~											
~~C6266~~	~~S~~	~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~C6267~~	~~M~~	~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~C6268~~	~~D~~	~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~					~~1~~											
~~C6269~~	~~S~~	~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~C6270~~	~~M~~	~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~C6271~~	~~D~~	~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~					~~1~~											
~~DD-44-3~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~DD-44-4~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~		~~1~~	~~1~~											
~~DD-43-2~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~DD-43-3~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~			~~1~~											
~~DD-42-2~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~DD-42-3~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~DD-42-4~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~			~~1~~											
~~DD-41-1~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~DD-41-2~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~		~~1~~												

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~DD-41-3~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~REDOX-4-3.0~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~REDOX-4-6.0~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~														
~~REDOX-3-3.3~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~REDOX-3-4.6~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~4~~	~~4~~		~~4~~												
~~DD-39-1~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~DD-39-3~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~4~~	~~4~~		~~4~~												
~~REDOX-2-6.0~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~														
~~REDOX-1-3.3~~		~~Nov, May~~	~~S~~	~~2~~		~~2~~																
~~REDOX-1-6.0~~		~~Nov, May~~	~~S~~	~~2~~	~~1[a]~~	~~2~~	~~1~~	~~1~~		~~1~~												
~~AT-D-1-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-D-1-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-D-1-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~														
~~C6272~~	~~S~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~AT-D-4-S~~		~~Nov~~	~~A~~	~~1~~																		
~~AT-D-4-M~~		~~Nov~~	~~A~~	~~1~~																		
~~AT-D-4-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~AT-D-2-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-D-2-M~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~36-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~36-M~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~AT-D-3-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-D-3-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-D-3-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~C6275~~	~~S~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~38-M~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~38-D~~		~~Nov~~	~~A~~	~~1~~																		
~~DD-17-2~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~DD-17-3~~		~~Nov~~	~~A~~	~~1~~		~~1~~	~~1~~	~~1~~									~~1~~					
~~C6278~~	~~S~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~											~~1~~					
~~DD-16-3~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~DD-16-4~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~DD-15-2~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~DD-15-3~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~											~~1~~					
~~DD-15-4~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~DD-12-2~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-12-4~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~AT-D-5-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-D-5-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~DD-06-2~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~DD-06-3~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6281~~	~~S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~C6282~~	~~M~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~100-HR-3-H Segment~~																						
~~C6284~~	~~S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6285~~	~~M~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6286~~	~~D~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5632~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5633~~	~~Horn; M~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5634~~	~~Horn; D~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5635~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5636~~	~~Horn; M~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5637~~	~~Horn; D~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5638~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6287~~	~~S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6288~~	~~M~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~C5641~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5644~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~	~~1~~	~~1~~														
~~44-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5673~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5674~~	~~Horn; M~~	~~Nov~~	~~A~~	~~1~~		~~1~~	~~1~~	~~1~~														
~~C5676~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5677~~	~~Horn; M~~	~~Nov~~	~~A~~	~~1~~		~~1~~																

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~C5678~~	~~Horn; D~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5679~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5680~~	~~Horn; M~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C5681~~	~~Horn; D~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~45-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~45-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~45-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~C5682~~	~~Horn; S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6290~~	~~S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6291~~	~~M~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~C6293~~	~~S~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~											~~1~~	~~1~~	~~1~~			
~~AT-H-1-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-H-1-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~AT-H-1-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~												~~1~~	~~1~~			
~~AT-H-2-S~~		~~Nov~~	~~A~~	~~1~~																		
~~AT-H-2-M~~		~~Nov~~	~~A~~	~~1~~																		
~~AT-H-2-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~												~~1~~	~~1~~			
~~AT-H-3-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~AT-H-3-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~						~~1~~					~~1~~	~~1~~	~~1~~			
~~47-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~47-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~						~~1~~					~~1~~					

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~C6296~~	~~S~~	~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C6297~~	~~M~~	~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~48-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~48-M~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~						~~1~~					~~1~~					
~~C6299~~	~~S~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6300~~	~~M~~	~~Nov~~	~~A~~	~~1~~		~~1~~																
~~C6301~~	~~D~~	~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~49-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~50-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~50-M~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~51-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~51-M~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~51-D~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~52-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~52-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~52-D~~		~~Nov~~	~~A~~	~~1~~	~~1~~	~~1~~																
~~54-S~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~54-M~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~54-D~~		~~Nov~~	~~A~~	~~1~~		~~1~~																
~~200-PO-1 Segment~~																						
~~85-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~						~~1~~	~~1~~				~~1~~		~~1~~				

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~
~~86-D~~		~~Oct~~	~~A~~	~~1~~	~~1~~						~~1~~	~~1~~				~~1~~		~~1~~				
~~C6383~~	~~S~~	~~Oct~~	~~A~~	~~1~~																		
~~C6384~~	~~M~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6353~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6356~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6359~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6362~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6368~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6371~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6374~~	~~S~~	~~Oct~~	~~A~~	~~1~~																		
~~C6375~~	~~M~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6378~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				
~~C6380~~	~~S~~	~~Oct~~	~~A~~	~~1~~	~~1~~	~~1~~					~~1~~	~~1~~				~~1~~		~~1~~				

~~[a] Anions are to be sampled during the November sampling event.~~

~~[b] Horn area sampling and analysis instruction (SGW-33224) specifies frequency of quarterly for one year (last quarter will be November 2008), then review data and determine frequency. Will schedule annually for FY09 (i.e., November). Can add more if Horn area evaluation warrants.~~

~~[c] Sample regardless of specific conductance.~~

~~NOTES:~~

~~Choice of tube depths to sample for full suite of constituents may vary depending on field conditions. See Table A-2 for recommendations of tube depths to sample.~~

~~Notes for tubes installed 2007 or 2008: Horn area tubes in accordance with SGW-33224; others in accordance with SGW-36398. "S," "M," and "D" indicate relative depths of tubes.~~

~~Frequency: A = annual; S = semi-annual; Q = quarterly~~

~~Q/A = quarterly for key constituents; annually (during low river stage) for full suite~~

~~Numerals in the constituent columns indicate number of samples to be collected during FY09 (e.g., 1 = annual, 4 = quarterly).~~

~~FY = fiscal year~~

~~Table A-1. Aquifer Tube Sampling Sites and Analyses. (19 sheets)~~

~~Tube Name~~	~~Note for Tubes Installed 2007 or 2008~~	~~Scheduled Collection Month~~	~~Frequency~~	~~Field Parameters~~	~~Anions~~	~~Hexavalent Chromium~~	~~Metals (Unfiltered)~~	~~Metals (Filtered)~~	~~Alkalinity~~	~~Arsenic~~	~~Tritium~~	~~Gross Alpha/ Beta~~	~~Gross Beta~~	~~Carbon-14~~	~~Gamma Scan~~	~~Iodine-129~~	~~Strontium-90~~	~~Technetium-99~~	~~Total Uranium~~	~~VOA~~	~~TPH~~	~~TOC~~

~~TOC = total organic carbon~~
~~TPH = total petroleum hydrocarbon~~
~~VOA = volatile organic analysis~~

~~Field parameters include the following:~~

~~Dissolved oxygen~~
~~Oxidation-reduction potential~~
~~pH~~
~~Specific conductance~~
~~Temperature~~
~~Turbidity~~

~~Metals analysis includes the following:~~

~~Calcium~~
~~Chromium~~
~~Magnesium~~
~~Potassium~~
~~Sodium~~

~~Anions analysis includes the following:~~

~~Chloride~~
~~Fluoride~~
~~Nitrate~~
~~Nitrite~~
~~Phosphate~~
~~Sulfate~~

~~APPENDIX B~~

~~INSTALLATION AND SAMPLING OF NEW AQUIFER SAMPLING TUBES AT THE 100-BC AREA~~

~~Aquifer sampling tubes are small-diameter polyethylene tubes that have a screen at the lower end. The tubes are implanted into the aquifer by driving temporary steel casing into the ground and inserting a tube into the casing. The end of each tube is fitted with a screended section that acts as the sampling port. The temporary steel casing is driven by either a hydraulic ram attached to a vehicle or by a hand-carried pneumatic or hydraulic hammer. The steel casing is then backpulled, leaving the tube and stainless steel drive point in place. Water is withdrawn from the tube using a peristaltic pump. The tubing exposed at the ground surface is of minimal length (several feet) and is protected from wildlife and the elements by polyvinyl chloride conduit. The new aquifer sampling tubes to be installed in the 100-BC Area are listed in Table B-1 at locations shown on Figure B-1. Table B-2 lists the sampling activities for the new aquifer sampling tubes.~~

~~Table B-1. New Aquifer Sampling Tubes for the 100-BC Area~~

~~C7718~~	~~C7724~~	~~C7780~~
~~C7719~~	~~C7725~~	~~C7781~~
~~C7720~~	~~C7726~~	~~C7782~~

~~*This addition of Appendix B was approved under TPA-CN-327.~~

~~Table B-2. Sampling Activities for New Aquifer Sampling Tubes in the 100-BC Area~~

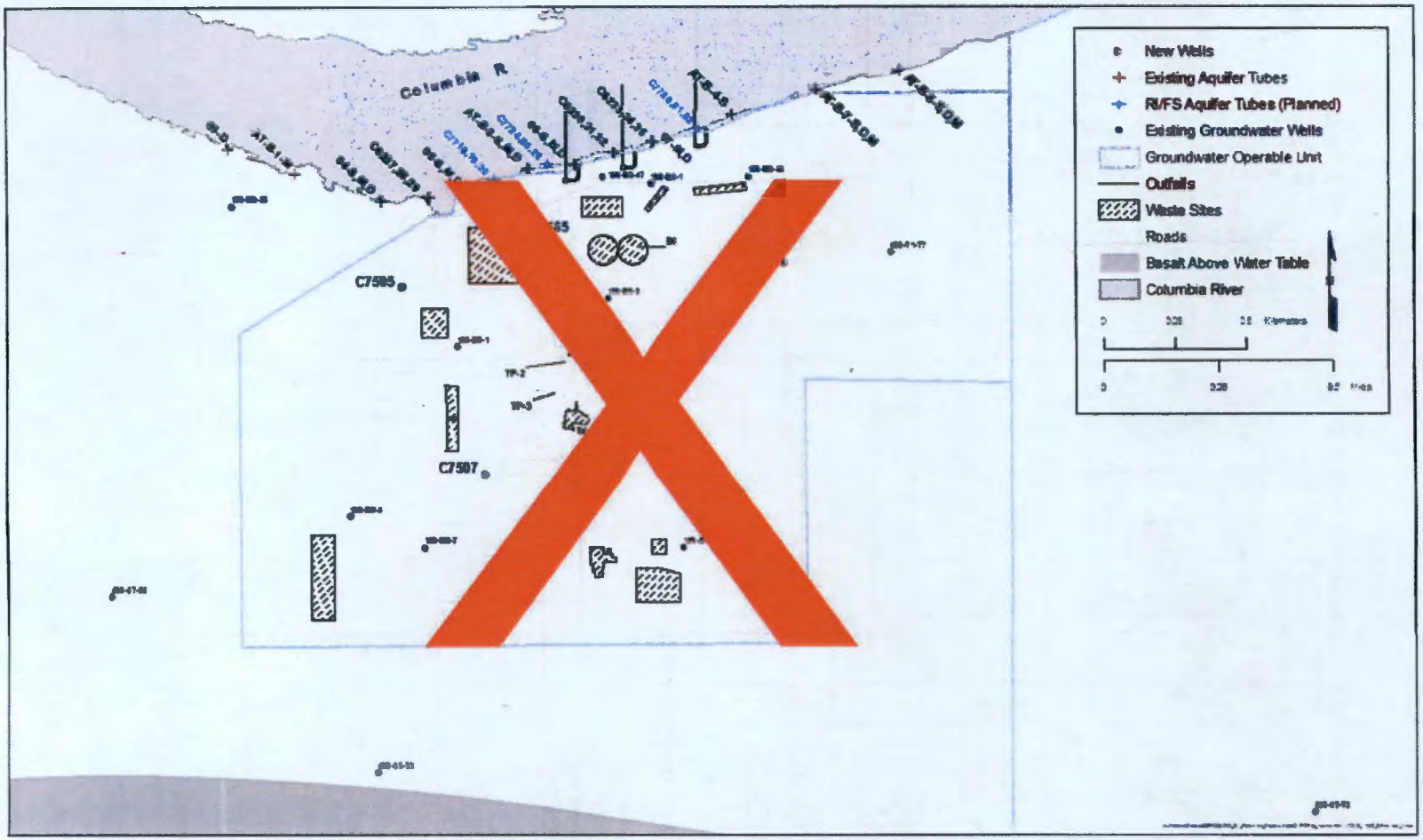
Tube Name	Note for Tube Installed	Frequency	Field Parameters	Anions	Hexavalent Chromium	Metals (Unfiltered)	Metals (Filtered)	Alkalinity	Arsenic	Tritium	Gross Alpha/Beta	Gross Beta	Carbon-14	Gamma Scan	Iodine-129	Strontium-90	Technetium-99	Total Uranium	VOA	TPH	TOC
~~C7718~~	~~S~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C7719~~	~~M~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C7720~~	~~D~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~					~~1~~					
~~C7724~~	~~S~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C7725~~	~~M~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C7726~~	~~D~~	~~A~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~			~~1~~	~~1~~					~~1~~					
~~C7780~~	~~S~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C7781~~	~~M~~	~~A~~	~~1~~		~~1~~											~~1~~					
~~C7782~~	~~D~~	~~A~~	~~1~~		~~1~~					~~1~~						~~1~~					

~~*Sample regardless of specific conductance.~~

~~A = annually~~
~~D = deep~~
~~M = middle~~
~~S = shallow~~

~~TOC = total organic carbon~~
~~TPH = total petroleum hydrocarbons~~
~~VOA = volatile organic compounds~~

~~*This addition of Appendix B was approved under TPA-CN-327.~~



~~Figure B-2. Location of Planned and Existing Aquifer Sampling Tubes for the 100-BC Area~~

~~*This addition of Appendix B was approved under TPA-CN-327.~~

TRI-PARTY AGREEMENT

Change Notice Number	TPA CHANGE NOTICE FORM	Date:
TPA-CN- 0755		12/5/16

Document Number, Title, and Revision:	Date Document Last Issued:
DOE/RL-2000-56, Waste Management Plan for 300-FF-5 Operable Unit, Rev. 2	September 2015

Approved Change Notices Against this Document: TPA-CN-683

Originator: David Becker	Phone: 509-373-6733

Description of Change:
Appendix A is being updated to include 67 new groundwater wells and 9 new boreholes in the 300-FF-5 Operable Unit.

M. W. Cline (DOE) and B. W. Simes (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Sixty-seven new wells are added to the Waste Management Plan for the 300-FF-5 Operable Unit, DOE/RL-2000-56, Rev. 2. Forty-eight six-inch diameter wells will be installed as injection wells and nineteen four-inch diameter monitoring wells installed as piezometers. Nine new boreholes will be installed as characterization boreholes to determine the post-treatment uranium leaching characteristics in the soil from the vadose zone and the periodically rewetted zone.

Well additions and boreholes are indicated by double underlined text on the attached.

Note: Include affected page number(s): A-8 through A-10

Justification and Impacts of Change:
Sixty-seven new groundwater wells are needed to support uranium sequestration activities pursuant to the Hanford Site 300 Area Record of Decision for 300-FF-2 and 300-FF-5 (EPA and DOE, 2013) and being implemented by DOE/RL-2014-42, 300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan. The 67 new groundwater wells and 9 characterization boreholes are added to Appendix A of the Waste Management Plan for the 300-FF-5 Operable Unit, which is attached.

The nine post-treatment boreholes will be advanced for uranium concentration and leachability characterization. Characterization boreholes (C9728, C9729, C9730, C9731, C9732, C9733, C9734, C9735, and C9736) will not be assigned well names as they are not to be constructed as wells.

These changes will be reflected in the next revison of the Waste Management Plan for 300-FF-5 Operable Unit, DOE/RL-2000-56.

Approvals:

DOE Project Manager	12/5/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	12/20/2016 Date	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

Table A-1. 300-FF-5 OU Well List

Hanford Well Name	Hanford Well ID Number	Site Type
399-1-76	C8940	Well
399-1-77	C8941	Well
399-1-78	C8942	Well
399-1-65	C9408	Well
399-1-66	C9409	Well
399-1-79	C9450	Well
399-1-80	C9451	Well
399-1-81	C9452	Well
399-1-82	C9453	Well
399-1-83	C9454	Well
399-1-84	C9455	Well
399-1-85	C9456	Well
399-1-86	C9457	Well
399-1-87	C9458	Well
399-1-88	C9459	Well
399-1-89	C9460	Well
399-1-90	C9461	Well
399-1-91	C9462	Well
399-1-92	C9463	Well
399-1-93	C9464	Well
399-1-94	C9465	Well
399-1-95	C9466	Well
399-1-96	C9467	Well
399-1-97	C9468	Well
Not Applicable	C9580	Borehole
Not Applicable	C9581	Borehole
Not Applicable	C9582	Borehole
399-1-98	C9642	Well
399-1-99	C9643	Well
399-1-100	C9644	Well
399-1-101	C9645	Well
399-1-102	C9646	Well
399-1-103	C9647	Well
399-1-104	C9648	Well
399-1-105	C9649	Well
399-1-106	C9650	Well

Table A-1. 300-FF-5 OU Well List

Hanford Well Name	Hanford Well ID Number	Site Type
399-1-107	C9651	Well
399-1-108	C9652	Well
399-1-109	C9653	Well
399-1-110	C9654	Well
399-1-111	C9655	Well
399-1-112	C9656	Well
399-1-113	C9657	Well
399-1-114	C9658	Well
399-1-115	C9659	Well
399-1-116	C9660	Well
399-1-117	C9661	Well
399-1-118	C9662	Well
399-1-119	C9663	Well
399-1-120	C9664	Well
399-1-121	C9665	Well
399-1-122	C9666	Well
399-1-123	C9667	Well
399-1-124	C9668	Well
399-1-125	C9669	Well
399-1-126	C9670	Well
399-1-127	C9671	Well
399-1-128	C9672	Well
399-1-129	C9673	Well
399-1-130	C9674	Well
399-1-131	C9675	Well
399-1-132	C9676	Well
399-1-133	C9677	Well
399-1-134	C9678	Well
399-1-135	C9679	Well
399-1-136	C9680	Well
399-1-137	C9681	Well
399-1-138	C9682	Well
399-1-139	C9683	Well
399-1-140	C9684	Well
399-1-141	C9685	Well
399-1-142	C9686	Well
399-1-143	C9687	Well
399-1-144	C9688	Well
399-1-145	C9689	Well

Table A-1. 300-FF-5 OU Well List

Hanford Well Name	Hanford Well ID Number	Site Type
399-1-146	C9690	Well
399-1-147	C9691	Well
399-1-148	C9692	Well
399-1-149	C9693	Well
399-1-150	C9694	Well
399-1-152	C9696	Well
399-1-153	C9697	Well
399-1-154	C9698	Well
399-1-155	C9699	Well
399-1-156	C9700	Well
399-1-157	C9701	Well
399-1-158	C9702	Well
399-1-159	C9703	Well
399-1-160	C9704	Well
399-1-161	C9705	Well
399-1-162	C9706	Well
399-1-164	C9708	Well
399-1-165	C9709	Well
399-1-166	C9710	Well
Not Applicable	C9728	Borehole
Not Applicable	C9729	Borehole
Not Applicable	C9730	Borehole
Not Applicable	C9731	Borehole
Not Applicable	C9732	Borehole
Not Applicable	C9733	Borehole
Not Applicable	C9734	Borehole
Not Applicable	C9735	Borehole
Not Applicable	C9736	Borehole
C6341	C6341	Aquifer tube
AT-3-1-D(1)	C4345	Aquifer tube
AT-3-1-M	C4346	Aquifer tube
AT-3-1-S	C4347	Aquifer tube
AT-3-2-M	C4349	Aquifer tube
AT-3-2-S	C4350	Aquifer tube
AT-3-3-D	C4351	Aquifer tube
AT-3-3-M	C4352	Aquifer tube
AT-3-3-S	C4353	Aquifer tube
AT-3-4-D	C4354	Aquifer tube
AT-3-4-M	C4355	Aquifer tube

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0760	TPA CHANGE NOTICE FORM	Date: December 1, 2016
Document Number, Title, and Revision: DOE/RL-97-01, *Interim Action Waste Management Plan for the 100-HR-3 and 100-KR-4 Operable Units*, Rev. 6		Date Document Last Issued: February 2016
Approved Change Notices Against this Document: N/A		
Originator: S.N. Balone		Phone: 509-376-0236

Description of Change:
This change notice adds wells to be drilled during fiscal year 2017 to the 100-HR-3 and 100-KR-4 waste management plan.

M.W. Cline (DOE) and R.A. Lobos/N.M. Menard (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

- For 100-HR-3, add wells 199-H1-47, 199-H1-48, 199-H1-49, 199-H3-28, 199-H3-29, and 199-H3-30 to Appendix Table A-1
- For 100-KR-4, add wells 199-K-227, 199-K-228, 199-K-229, and 199-K-230 to Appendix Table A-3.

Added text is denoted by double underline. Deleted text is denoted by ~~strikethrough~~.

Note: Include affected page number(s) A-1 through A-3; A-5 through A-6

Justification and Impacts of Change:
As defined in SGW-59936, *FY2017 Plume Containment and Remediation Utilization Plan*, a number of new wells were identified for drilling during fiscal year 2017 to address 100-HR-3 and 100-KR-4 project needs. Project specific drilling sampling and analysis plan addendums (DOE/RL-2013-35, *100-HR-3 Groundwater Operable Unit Well Installation Sampling and Analysis Plan*, and DOE/RL-2013-36, *100-KR-4 Groundwater Operable Unit Well Installation Sampling and Analysis Plan*) are being written to address these well installations.

Approvals:

M.W. Cline DOE Project Manager	12/5/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	12-8-16 Date	[X] Approved [ ] Disapproved
Nina M. Menard Ecology Project Manager – Nina Menard	12-19-16 Date	[X] Approved [ ] Disapproved

Table A-1. 100-HR-3 Operable Unit Groundwater Monitoring Wells (December 2015~~5~~6)

Well Name				
199-D2-6	199-D4-70	199-D5-130	199-H1-46	199-H5-3O
199-D2-10	199-D4-71	199-D5-131	199-H1-47	199-H5-3P
199-D2-11	199-D4-72	199-D5-132	199-H1-48	199-H5-4O
199-D2-12	199-D4-73	199-D5-133	199-H1-49	199-H5-4P
199-D3-2	199-D4-74	199-D5-134	199-H2-1	199-H5-5O
199-D3-3	199-D4-75	199-D5-141	199-H3-2A	199-H5-5P
199-D3-4	199-D4-76	199-D5-142	199-H3-2B	199-H5-6
199-D3-5	199-D4-77	199-D5-143	199-H3-2C	199-H5-7
199-D4-1	199-D4-78	199-D5-145	199-H3-4	199-H5-8
199-D4-2	199-D4-79	199-D5-146	199-H3-3	199-H5-9
199-D4-3	199-D4-80	199-D5-147	199-H3-5	199-H5-10
199-D4-4	199-D4-81	199-D5-148	199-H3-6	199-H5-11
199-D4-5	199-D4-82	199-D5-149	199-H3-7	199-H5-12
199-D4-6	199-D4-83	199-D5-150	199-H3-9	199-H5-13
199-D4-7	199-D4-84	199-D5-151	199-H3-10	199-H5-14
199-D4-8	199-D4-85	199-D5-152	199-H3-11	199-H5-15
199-D4-9	199-D4-86	199-D5-153	199-H3-25	199-H5-16
199-D4-10	199-D4-87	199-D5-154	199-H3-26	199-H6-1
199-D4-11	199-D4-88	199-D5-159	199-H3-27	199-H6-2
199-D4-12	199-D4-89	199-D5-160	199-H3-28	199-H6-3
199-D4-13	199-D4-90	199-D5-161	199-H3-29	199-H6-4
199-D4-14	199-D4-91	199-D6-1	199-H3-30	199-H6-7
199-D4-15	199-D4-92	199-D6-2	199-H4-2	199-H6-8
199-D4-16	199-D4-93	199-D6-3	199-H4-4	699-83-47
199-D4-17	199-D4-94	199-D7-3	199-H4-5	699-88-41
199-D4-18	199-D4-95	199-D7-4	199-H4-6	699-88-41A
199-D4-19	199-D4-96	199-D7-5	199-H4-8	699-89-35
199-D4-20	199-D4-97	199-D7-6	199-H4-10	699-90-34
199-D4-21	199-D4-98	199-D8-4	199-H4-11	699-90-37B

Table A-1. 100-HR-3 Operable Unit Groundwater Monitoring Wells (December 20156)

Well Name				
199-D4-22	199-D4-99	199-D8-5	199-H4-12A	699-90-38
199-D4-23	199-D4-101	199-D8-6	199-H4-12B	699-90-45
199-D4-24	199-D4-102	199-D8-53	199-H4-12C	699-90-45B
199-D4-25	199-D4-103	199-D8-54A	199-H4-13	699-90-47B
199-D4-26	199-D5-13	199-D8-54B	199-H4-15A	699-91-46A
199-D4-27	199-D5-14	199-D8-55	199-H4-15B	699-92-49
199-D4-28	199-D5-15	199-D8-68	199-H4-15C	699-93-37A
199-D4-29	199-D5-16	199-D8-69	199-H4-15CP	699-93-48A
199-D4-30	199-D5-17	199-D8-70	199-H4-15CQ	699-93-48C
199-D4-31	199-D5-18	199-D8-71	199-H4-15CR	699-93-50
199-D4-32	199-D5-19	199-D8-72	199-H4-15CS	699-94-41
199-D4-33	199-D5-20	199-D8-73	199-H4-16	699-94-43
199-D4-34	199-D5-32	199-D8-88	199-H4-17	699-95-45
199-D4-35	199-D5-33	199-D8-89	199-H4-18	699-95-45B
199-D4-36	199-D5-34	199-D8-90	199-H4-45	699-95-48
199-D4-37	199-D5-36	199-D8-91	199-H4-46	699-95-51
199-D4-38	199-D5-37	199-D8-93	199-H4-47	699-96-41
199-D4-39	199-D5-38	199-D8-94	199-H4-49	699-96-42
199-D4-40	199-D5-39	199-D8-95	199-H4-63	699-96-43
199-D4-41	199-D5-40	199-D8-96	199-H4-64	699-96-44
199-D4-42	199-D5-41	199-D8-97	199-H4-65	699-96-45
199-D4-43	199-D5-42	199-D8-98	199-H4-69	699-96-52B
199-D4-44	199-D5-43	199-D8-99	199-H4-70	699-97-41
199-D4-45	199-D5-44	199-D8-101	199-H4-71	699-97-43B
199-D4-46	199-D5-92	199-D8-102	199-H4-72	699-97-43C
199-D4-47	199-D5-97	199-H1-1	199-H4-73	699-97-45
199-D4-48	199-D5-101	199-H1-2	199-H4-74	699-97-45B
199-D4-49	199-D5-103	199-H1-3	199-H4-75	699-97-47B
199-D4-50	199-D5-104	199-H1-4	199-H4-76	699-97-47C
199-D4-51	199-D5-106	199-H1-5	199-H4-77	699-97-48B

Table A-1. 100-HR-3 Operable Unit Groundwater Monitoring Wells (December 2015~~6~~)

Well Name				
199-D4-52	199-D5-107	199-H1-6	199-H4-78	699-97-48C
199-D4-53	199-D5-108	199-H1-7	199-H4-79	699-97-51A
199-D4-54	199-D5-109	199-H1-20	199-H4-80	699-97-60
199-D4-55	199-D5-110	199-H1-21	199-H4-81	699-97-61
199-D4-56	199-D5-111	199-H1-25	199-H4-82	699-98-43
199-D4-57	199-D5-112	199-H1-27	199-H4-83	699-98-46
199-D4-58	199-D5-113	199-H1-32	199-H4-84	699-98-49A
199-D4-59	199-D5-114	199-H1-33	199-H4-85	699-98-51
199-D4-60	199-D5-115	199-H1-34	199-H4-86	699-99-41
199-D4-61	199-D5-116	199-H1-35	199-H4-87	699-99-42B
199-D4-62	199-D5-117	199-H1-36	199-H4-88	699-99-44
199-D4-63	199-D5-118	199-H1-37	199-H4-89	699-100-43B
199-D4-64	199-D5-123	199-H1-38	199-H4-90	699-101-45
199-D4-65	199-D5-125	199-H1-39	199-H4-91	699-101-48B
199-D4-66	199-D5-126	199-H1-40	199-H4-92	—
199-D4-67	199-D5-127	199-H1-42	199-H4-93	—
199-D4-68	199-D5-128	199-H1-43	199-H5-1A	—
199-D4-69	199-D5-129	199-H1-45	199-H5-2	—

Table A-2. 100-HR-3 Operable Unit Aquifer Tubes (December 2015)

Aquifer Tube Name (Identification)				
35-S (B8255)	54-M (B8311)	C5637 (C5637)	C6299 (C6299)	DD-41-3 (B8484)
36-D (B8256)	54-S (B8312)	C5638 (C5638)	C6300 (C6300)	DD-42-2 (B8504)
36-M (B8257)	55-D (B8313)	C5641 (C5641)	C6301 (C6301)	DD-42-3 (B8505)
36-S (B8258)	55-M (B8314)	C5644 (C5644)	C6332 (C6332)	DD-42-4 (B8506)
37-D (B8259)	55-S (B8315)	C5673 (C5673)	C6333 (C6333)	DD-43-2 (B8507)
37-M (B8260)	58-D (B8322)	C5674 (C5674)	C6334 (C6334)	DD-43-3 (B8508)
37-S (B8261)	58-M (B8323)	C5676 (C5676)	C7645 (C7645)	DD-44-3 (B8509)
38-D (B8262)	58-S (B8324)	C5677 (C5677)	C7646 (C7646)	DD-44-4 (B8510)

Table A-2. 100-HR-3 Operable Unit Aquifer Tubes (December 2015)

Aquifer Tube Name (Identification)				
54-D (B8310)	C5636 (C5636)	C6297 (C6297)	DD-41-2 (B8483)	—

Table A-3. 100-KR-4 Operable Unit Groundwater Monitoring Wells (December 201~~5~~6)

Well Names				
199-K-11	199-K-124A	199-K-156	199-K-190	199-K-230
199-K-13	199-K-125A	199-K-157	199-K-191	199-N-27
199-K-18	199-K-126	199-K-158	199-K-192	199-N-28
199-K-19	199-K-127	199-K-159	199-K-193	199-N-41
199-K-20	199-K-128	199-K-160	199-K-194	199-N-50
199-K-21	199-K-129	199-K-161	199-K-196	199-N-51
199-K-22	199-K-130	199-K-162	199-K-197	199-N-71
199-K-23	199-K-131	199-K-163	199-K-198	199-N-74
199-K-31	199-K-132	199-K-164	199-K-199	199-N-77
199-K-32A	199-K-133	199-K-165	199-K-200	199-N-80
199-K-32B	199-K-134	199-K-166	199-K-201	199-N-96A
199-K-34	199-K-135	199-K-168	199-K-202	199-N-164
199-K-36	199-K-136	199-K-169	199-K-203	199-N-165
199-K-37	199-K-137	199-K-170	199-K-204	199-N-183
199-K-106A	199-K-138	199-K-171	199-K-205	199-N-189
199-K-107A	199-K-139	199-K-172	199-K-206	199-N-373
199-K-108A	199-K-140	199-K-173	199-K-207	699-70-68
199-K-110A	199-K-141	199-K-174	199-K-208	699-71-52
199-K-111A	199-K-142	199-K-175	199-K-209	699-73-61
199-K-112A	199-K-143	199-K-178	199-K-210	699-74-44
199-K-113A	199-K-144	199-K-179	199-K-212	699-77-54
199-K-114A	199-K-145	199-K-180	199-K-220	699-78-62
199-K-115A	199-K-146	199-K-181	199-K-221	699-81-58
199-K-116A	199-K-147	199-K-182	199-K-222	699-81-62
199-K-117A	199-K-148	199-K-183	199-K-223	699-83-47

Table A-3. 100-KR-4 Operable Unit Groundwater Monitoring Wells (December 201~~5~~6)

Well Names				
199-K-118A	199-K-149	199-K-184	199-K-224	699-87-42A
199-K-119A	199-K-150	199-K-185	199-K-225	699-87-55
199-K-120A	199-K-151	199-K-186	199-K-226	—
199-K-121A	199-K-152	199-K-187	199-K-227	—
199-K-122A	199-K-153	199-K-188	199-K-228	—
199-K-123A	199-K-154	199-K-189	199-K-229	—

Table A-4. 100-KR-4 Operable Unit Aquifer Tubes and Seeps (December 2015)

Aquifer Tube Name (Identification)				
14-D (B8152)	26-D (B8226)	AT-K-4-S (C4338)	C6243 (C6243)	C6257 (C6257)
14-M (B8153)	26-M (B8227)	AT-K-5-D (C4330)	C6244 (C6244)	C6258 (C6258)
15-M (B8156)	26-S (B8228)	AT-K-5-M (C4331)	C6245 (C6245)	C6259 (C6259)
17-D (B8161)	AT-K-1-D (C4339)	AT-K-5-S (C4335)	C6246 (C6246)	C6260 (C6260)
17-M (B8162)	AT-K-1-M (C4340)	AT-K-6-D (C4332)	C6247 (C6247)	C6261 (C6261)
18-S (B8204)	AT-K-1-S (C4341)	AT-K-6-M (C4334)	C6248 (C6248)	C6263 (C6263)
19-D (B8205)	AT-K-2-D (C4328)	AT-K-6-S (C4333)	C6249 (C6249)	C6264 (C6264)
19-M (B8206)	AT-K-2-M (C4327)	C6236 (C6236)	C6250 (C6250)	C6265 (C6265)
21-M (B8212)	AT-K-2-S (C4329)	C6237 (C6237)	C6251 (C6251)	C7641 (C7641)
21-S (B8213)	AT-K-3-D (C4342)	C6238 (C6238)	C6252 (C6252)	C7642 (C7642)
22-D (B8214)	AT-K-3-M (C4343)	C6239 (C6239)	C6253 (C6253)	C7643 (C7643)
22-M (B8215)	AT-K-3-S (C4344)	C6240 (C6240)	C6254 (C6254)	DK-04-2 (B8526)
23-M (B8218)	AT-K-4-D (C4336)	C6241 (C6241)	C6255 (C6255)	DK-04-3 (B8527)
25-D (B8223)	AT-K-4-M (C4337)	C6242 (C6242)	C6256 (C6256)	—
Seep Name				
SK-057-3	SK-063-2	SK-068-1	SK-077-1	SK-082-2
SK-063-1	—	—	—	—

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0762	TPA CHANGE NOTICE FORM	Date: 11/28/2016
Document Number, Title, and Revision: DOE/RL-2014-42, 300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan, Rev. 0		Date Document Last Issued: September 2015

Approved Change Notices Against this Document N/A

Originator: Patrick A. Baynes | Phone: 509-372-3583

Description of Change:
Section 3.5.1.2: The requirement for biennial reporting is being modified to state that inclusion of the 300-FF-5 Operable Unit in the annual site-wide groundwater monitoring report satisfies this requirement.

M.W. Cline (DOE) and B.W. Simes (Lead Regulatory Agency) agree that the proposed change modifies an approved work plan/document and will be processed in accordance with the Tri-Party Agreement Action Plan.

Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

The last paragraph of Section 3.5.1.2 is modified to add the following sentence: Inclusion of the sampling results in the annual site-wide groundwater monitoring report satisfies the requirement for biennial reporting in a publicly available document.

Additions are shown using double underline, deletions are shown using ~~strikeout~~.

Note: Include affected page number(s): 3-12

Justification and Impacts of Change:
The change identifies the annual site-wide groundwater monitoring report as an acceptable document for reporting the performance monitoring results for the 300-FF-5 Operable Unit.

Approvals:

DOE Project Manager	11/28/2016 Date	[X] Approved [ ] Disapproved
EPA Project Manager	11/28/2016 Date	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

The attainment monitoring phase occurs after the remediation monitoring phase is complete. Once the groundwater concentration for a COC is observed to have reached the CUL, data are collected and evaluated to confirm that attainment has been achieved. The attainment monitoring phase at a monitoring well is complete when the data support both of the following conclusions:

- The contaminant CUL for each COC has been met.
- Groundwater will continue to meet the contaminant CUL for each COC in the future (OSWER 9355.0-129).

3.5.1.2 Evaluation of Performance Monitoring

Evaluation methods that will be used to assess progress toward CUL attainment are summarized in Table A-2 (Appendix A) and discussed in detail in Appendix B. These evaluation methods are based on the general guidance and recommendations discussed in EPA 600/R-11/204 as part of a general framework for implementation of MNA.

The primary evaluation method for MNA and EA is statistical analysis. Statistical analysis is summarized in Table A-2 (Appendix A) as follows:

> COC concentrations will be evaluated on a well-by-well basis based on statistical analyses of monitoring data. Fundamental tests will be applied to the remediation and attainment monitoring phases to evaluate performance and determine whether additional actions are required. The strategy for completing site closure is implemented in two phases: remediation monitoring phase and attainment monitoring phase. Attainment monitoring for each COC will commence on a well-by-well basis, as soon as concentrations of a COC have met the CUL at a well, as part of the analyses performed during the remediation monitoring phase.

Evaluations of remediation and attainment monitoring will be provided in 300-FF-5 OU project reports, as needed. Performance monitoring results for the 300-FF-5 OU will be reported biennially, at a minimum, in a publicly available document. Inclusion of the sampling results in the annual site-wide groundwater monitoring report satisfies the requirement for biennial reporting in a publicly available document. The performance monitoring reports will be prepared to support the sitewide five-year review schedule. These reports will be the vehicle by which the well-by-well evaluations for each COC are documented and, ultimately, will support documenting remedial action completion for the 300-FF-5 OU.

3.5.1.3 Time Frames for Restoring Groundwater to Cleanup Levels

The time frame in the 300 Area ROD/ROD Amendment (EPA and DOE, 2013) for restoring uranium to CULs using EA is between 22 and 28 years from 2012. As discussed in Section 1.2.5, the time to achieve the CUL for uranium in the groundwater will be re-evaluated following completion of the uranium sequestration application.

The time frame in the 300 Area ROD/ROD Amendment (EPA and DOE, 2013) for restoring tritium to CULs using MNA is 18 years from 2012. Time frames for restoring nitrate, TCE, and *cis*-1,2-DCE to CULs using MNA were not defined in the 300 Area ROD/ROD Amendment (EPA and DOE, 2013).

3.5.2 Sample Location, Frequency, and Constituents To Be Monitored

The sampling requirements and groundwater monitoring wells comprising the 300-FF-5 OU network for each COC are summarized in this section and also described in more detail in Appendix A. Monitoring locations are shown in Figures 3-4, 3-5, 3-6, 3-7, 3-8, and 3-9. The AWLN is shown in Figure 3-3. Table 3-6 lists the specific constituents to be analyzed and the sampling frequency for the first 5 years for those wells that have been selected for monitoring. After the first 5 years, remediation monitoring will continue at the frequencies indicated in the notes section of Table 3-6. Sampling frequencies for each COC are summarized in Table 3-7.

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 778	TPA CHANGE NOTICE FORM	Date: 4/25/17
Document Number, Title, and Revision: DOE/RL-2004-18, Waste Control Plan for the 200-PO-1 Operable Unit, Revision 1		Date Document Last Issued: June 2008

Approved Change Notices Against this Document: TPA-CN-408, TPA-CN-619, TPA-CN-640

Originator: Jeremy M. Lynn | Phone: 373-6734

Description of Change:
Add four M-024 monitoring wells to the Waste Control Plan for the 200-PO-1 Operable Unit. Three new wells are added east of 216-A-29 Ditch; and one new well north of 216-A-37-1 Crib. Correct typographical errors.

M.W. Cline (DOE) and N.M. Menard (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Four new M-024 monitoring wells are added to Table A-2, 200-PO-1 Waste Control Plan, Well Identification List, DOE/RL-2004-18, *Waste Control Plan for the 200-PO-1 Operable Unit*:

- Well 299-E26-80 east and downgradient of 216-A-29 Ditch
- Well 299-E25-238 east and downgradient of 216-A-29 Ditch
- Well 299-E25-239 east and downgradient of 216-A-29 Ditch
- Well 299-E25-~~90~~ 95 KW MIRC south and downgradient of 216-A-37-1 Crib

Typographical errors in Table A-2 corrected:

- Well 299-E17 changed to 299-E17-1;
- Removed notation reference from well 299-E17-21 identifying inclusion in DOE/RL-2003-04, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*

Deleted text is identified by ~~strikethrough~~. Added text is identified by <u>double underline</u>.

Note: Include affected page number(s): Revised Table A-2 is provided as is a well location plat.

Justification and Impacts of Change:
Listed resource wells for integrated RCRA, CERCLA, and AEA program use, are being added to the waste control plan to facilitate management of investigative derived waste during well installation and monitoring.
This change will be reflected in the next revision to DOE/RL-2004-18, Waste Control Plan for the 200-PO-1 Operable Unit. The attached well list, Table A-2, incorporates all changes from TPA-CN-408, 619, and 640.

Approvals:

Michael W. Cline DOE Project Manager	4/25/2017 Date	[X] Approved [ ] Disapproved
N/A EPA Project Manager	Date	[ ] Approved [ ] Disapproved
FOR NINA MENARD Ecology Project Manager	4/26/17 Date	[X] Approved [ ] Disapproved WITH CORRECTION

Table A-2. 200-PO-1 Waste Control Plan Well Identification List. (2 Pages)

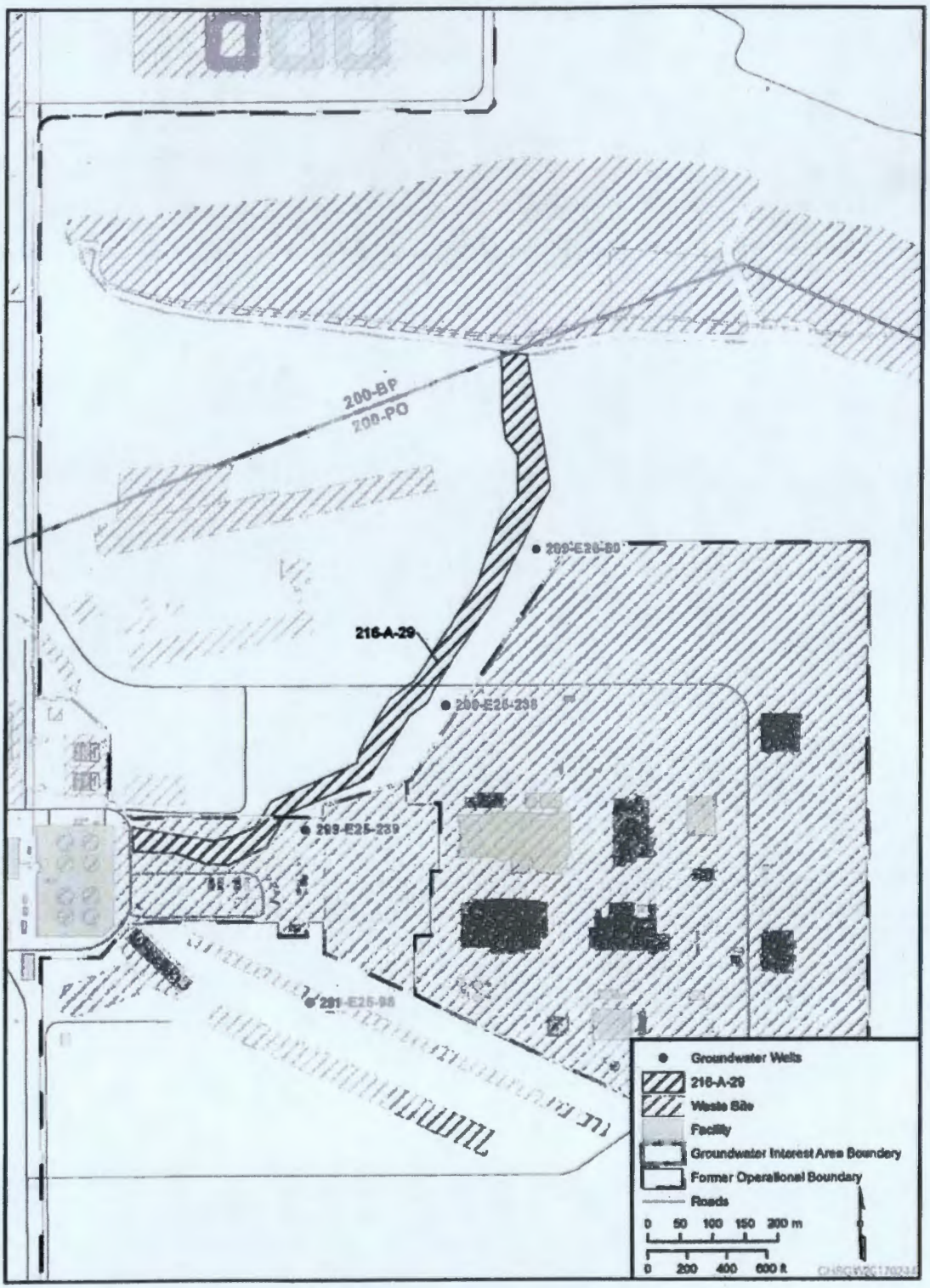
299-E13-l[a]	299-E24-21[a]	299-E25-42[a]	699-14-38[a]
299-E13-3[a]	299-E24-22[a]	299-E25-43[a]	699-15-E13[b]
299-E13-4[a,b]	299-E24-23[b]	299-E25-44[a]	699-16-E3A[b]
299-E13-5[a,b]	299-E24-24[a]	299-E25-47[a]	699-17-5[a]
299-E13-6[a,b]	299-E24-33[a]	299-E25-48[a]	699-18-21[b]
299-E13-7[a]	299-E24-94[a]	299-E25-93[a,b]	699-18-25A[b]
299-E13-8[a,b]	299-E25-l[a]	299-E25-94[a]	699-19- 23[b]
299-E13-9[a,b]	299-E25-2[a]	299-E25-236	699-19-43[a]
299-E13-1I[a,b]	299-E25-3[a]	299-E26-4[a]	699-20-E5A[a]
299-E13-12[a,b]	299-E25-4[a]	299-E26-5[a]	699-20-E8[b]
299-El3-14[a,b]	299-E25-5[a]	299-E26-12[a]	699-20-El20[a,b]
299-E13-16[a,b]	299-E25-6[a]	299-E26-13[a]	699-20-El2S[a]
299-E13-17[a,b]	299-E25-7[a]	499-SO-7[a]	699-20-20[a]
299-E13-18[a,b]	299-E25-8[a]	499-SO-8[a]	699-21-6[a]
299-E13-19[a,b]	299-E25-9[a]	499-S1-8H	699-22-35[a]
299-E16-l[a,b]	299-E25-13[a]	499-S1-8J[a,b]	699-23-33[b]
299-E16-2[a]	299-E25-17[a]	699-2-3[a]	699-23-34A[a]
~~299-El7[a]~~ 299-E17-1[a]	299-E25-18[a]	699-2-6A[a]	699-23-34B[a]
299-E17-12[a]	299-E25-19[a]	699-2-7[a]	699-24-1p[a]
299-E17-13[a]	299-E25-20[a]	699-2-E14[b]	699-24-33[a]
299-E 17-14[a,b]	299-E25-21[b]	699-7-6[b]	699-24-34A[a]
299-E17-16[a]	299-E25-22[a]	699-8-17[a]	699-24-34B[a]
299-E17-18[a]	299-E25-23[b]	699-8-25[a]	699-24-34C[a]
299-E17-19[a]	299-E25-24[b]	699-9-E2[a]	699-24-35[a]
299-E17-21[a,b]	299-E25-25[b]	699-10-3A[b]	699-24-46[a,b]
299-E17-22[a]	299-E25-26[a]	699-10-El2[a,b]	699-25-20[b]
299-E17-23[a]	299-E25-28[a]	699-10-30B[b]	699-25-33A[a,b]
299-E17-25[a]	299-E25-29P[a]	699-10-54A[a,b]	699-25-34A[a]
299-E17-26[a]	299-E25-29Q[a]	699-11-E10[b]	699-25-34B[a]
299-E18-l[a]	299-E25-31[a]	699-12-lB[b]	699-25-34C
299-E23-l[a]	299-E25-32P[a]	699-12-2C[a]	699-25-34D[a]
299-E24-3[b]	299-E25-32Q[a]	699-12-4D[a]	699-26-15A[a]
299-E24-4[a]	299-E25-34[a]	699-13-0A[a]	699-26-33[a,b]
299-E24-5[a]	299-E25-35[a]	699-13-lA[a]	699-26-34A[a]
299-E24-13[a]	299-E25-36[a]	699-13-1C[a,b]	699-26-34B
299-E24-14[a]	299-E25-37[a]	699-13-1E[a]	699-26-35A[a]
299-E24-16[a]	299-E25-39[b]	699-13-2D[a]	699-26-35C[a]
299-E24-18[a]	299-E25-40[a]	699-13-3A[a]	699-27-8
299-E24-20[a]	299-E25-41[a]	699-13- 26[b]	699-28-40[a]
699-29-4[a]	699-37-E4[a]	699-42-39B[a]	699-S3-El2[a,b]
699-31-8[b]	699-37-43[a]	699-42-40A[a]	699-S3-25[a]
699-31-11[a]	699-37-47A[a]	699-42-40C[a,b]	699-S5-E16A[b]
699-31-17[b]	699-38-15[a]	699-42-42B[a]	699-S5-E16B[b]
699-31-31[a,b]	699-38-19[b]	699-43-3[a]	699-6-4FA[a]
699-31-31P	699-39-23[b]	699-43-18[b]	699-S6-E4B[a]
699-32-18[b]	699-39-39[a]	699-43-40[a]	699-S6-E4C[b]
699-32-22A[a,b]	699-40-l[a]	699-43-41E[a]	699-S6-E4D[a]
699-32-22B[a,b]	699-40-33A[a]	699-43-44[a]	699-S6-E4E[a]
699-32-43[a,b]	699-40-36[a]	699-43-45[a]	699-S6-E4J[b]
699-33-14[b]	699-41-1A[a,b]	699-44-39B[a]	699-S6-E4K[a]
699-33-42[a]	699-41-23[a,b]	699-45-42[a]	699-S6-E4L[a]
699-33-56[a,b]	699-41-25[b]	699-46-4[a,b]	699-S6-E14A[a,b]
699-34-41B[a]	699-41-35[a]	699-46-21B[a,b]	699-S6-E16B[b]
699-34-42[a]	699-41-40[a]	699-47-5[a]	699-S8-19[a]
699-35-9[a]	699-41-42[a]	699-48-7A[a]	699-S11-El2AP[a,b]
699-35-16[b]	699-42-12A[a]	699-49-13E[a]	699-S12-3[a]

Table A-2. 200-PO-1 Waste Control Plan Well Identification List. (2 Pages

699-35-19B[b]	699-42-21[b]	699-50-28B[a]	699-S19-El3[a,b]
699-36-17[b]	699-42-37[a]	699-52-19[a]	699-S19-E14[a]
699-37-El[b]	699-42-39A[a]	699-S2-34B[a,b]	699-25-34E
699-24-36	699-26-38	299-E25-237	699-26-33A
699-25-34F	699-24-34D	699-24-34E	299-E26-80
299-E25-238	299-E25-239	299-E25-95	

a Listed in DOE/RL-2003-04, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit.*

b Listed in DOE/RL-2007-31, *Remedial Investigation/Feasibility Study Work Plan for the 200-PO-1 Groundwater Operable Unit.*



Location Plat for Fiscal Year 2017 Wells

TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0779	TPA CHANGE NOTICE FORM	Date: March 27, 2017
Document Number, Title, and Revision: DOE/RL-2009-80, Investigation Derived Waste Purgewater Management Work Plan, Rev 0.		Date Document Last Issued: September 2009

Approved Change Notices Against this Document: TPA-CN-325, TPA-CN-442, TPA-CN-466, TPA-CN-528, TPA-CN-552, TPA-CN-564, TPA-CN-574, TPA-CN-670

Originator: Bill Barrett **Phone:** 373-3985

Description of Change:
Allow for purgewater managed at the Modular Storage Units to be decanted and shipped to the Effluent Treatment Facility for treatment and disposal.

M.W. Cline (DOE) and E. Laija (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records,* and not Chapter 12.0, *Changes to the Agreement.*

The following text to be added to page 9, in new section 4.2.7, Removal of Excess Purgewater:

"During particularly wet seasons, or increased well drilling activity, purgewater levels within the Modular Storage Units may rise faster than the normal rate of evaporation. In these instances, in order to maintain the required freeboard of greater than 24.4 cm (9.6 inches), purgewater may need to be decanted and shipped to the Effluent Treatment Facility."

Text to be added is indicated in double underline.

Note: Include affected page number(s) 9

Justification and Impacts of Change:
There may be conditions during the operation of the Modular Storage Units such that the purgewater levels would be higher than the freeboard requirement. The work plan currently allows for decanting to another unit at approximately 12 inches. However, during unseasonably wet weather, or otherwise increased drilling activities generating more purgewater than is typical, purgewater may be sent to the Effluent Treatment Facility for treatment and disposal to maintain the freeboard height greater than 24.4 cm (9.6 inches). This would allow for the levels within the MSUs to be maintained at a safe limit without risk of over-topping and spilling.

Approvals:

DOE Project Manager	Date 3/27/2017	[X] Approved [ ] Disapproved
EPA Project Manager	Date 3/28/2017	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

If a leak is found in the primary liner and/or repairs are required, a pump will be available to transfer purgewater contents from one Modular Storage Unit to another. Piping and hoses will be capable of extending from one Modular Storage Unit to any one of the other units.

4.2.5 Tank Truck Transfers

Purgewater is transferred, by gravity through a drain hose, from the tanker truck to the Modular Storage Units. A splash pan will be used to support purgewater discharges into each Modular Storage Unit. After transfer of purgewater, tanker trucks are either directly returned to be used in support of well activities or they are parked in established areas. Tanker trucks that are not directly returned to be used in support of well activities and that contain quantities of dangerous or mixed waste that exceed those identified in WAC 173-303-160 will be parked in established areas that provide containment capable of collecting and holding spills and leaks. Containment will be provided for such tanker trucks with sufficient capacity to collect and hold all liquid remaining within the tank. A plat showing the location of the purgewater truck parking area is attached.

4.2.6 Inter-unit Transfers

Inter-unit transfers between Modular Storage Units may be performed if leaks are detected in the primary liner, or if imminent failure of a unit is detected. An inter-unit transfer will be performed by connecting piping to a system that transfers the contents from the leaking unit to another one unit, as necessary. Inter-unit transfers may also occur for the purpose of removing contaminant residuals from purgewater (e.g. by filter skid).

4.2.7 Removal of Excess Purgewater

During particularly wet seasons, or increased well drilling activity, purgewater levels within the Modular Storage Units may rise faster than the normal rate of evaporation. In these instances, in order to maintain the required freeboard of greater than 24.4 cm (9.6 inches), purgewater may need to be decanted and shipped to the Effluent Treatment Facility.

5 Safety and Health Management and Controls

All emergency planning and preparedness activities for this project will be consistent with planning and preparedness actions taken by other Hanford Site contractors and similar projects. Activities will be in a manner that ensures the health and safety of workers and the public and the protection of the environment in the event of an abnormal incident during removal action activities.

5.1 Emergency Management

The contractor's Emergency Management Program (including preparedness, planning, and response) contains the administrative responsibilities for compliance with DOE/RL-94-02, *Hanford Emergency Response Plan,* and all applicable DOE Orders. The Emergency Management Program establishes a coordinated emergency response organization capable of planning for, responding to, and recovering from industrial, security, and hazardous material incidents. Emergency action plans for contractor-managed hazardous facilities identify the capabilities necessary to respond to emergency conditions, provide guidance and instruction for initiating emergency response actions, and serve as a basis for training personnel in emergency actions for each facility.

The emergency response actions within the emergency action plan are provided for recognizing incidents and/or abnormal conditions, initiating protective actions, and making the proper notifications. Emergency response for this project will include Nuclear Regulatory Commission notification for reportable quantity releases and On-Scene Coordinator notification for other emergency situations.