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100/300 AREA UNIT MANAGER MEETING
ATTENDANCE AND DISTRIBUTION

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100/300 AREA UNIT MANAGERS MEETING
APPROVAL OF MEETING MINUTES

October 8, 2015

APPROVAL: for Bryan L. Foley Date 11-12-2015
Mark French, DOE/RL (A6-38)
River Corridor Project Manager

APPROVAL: for M. Cline Date 11-12-2015
Mike Cline, DOE/RL (A5-11)
Groundwater Project Manager

APPROVAL: Alicia Boyd Date 11-12-2015
FOR Nina Menard, Ecology (H0-57)
Environmental Restoration Project
Manager

APPROVAL: Date 11-12-2015
Laura Buelow, Rod Lobos, or Christopher
Guzzetti, EPA (B1-46)
100 Area Project Manager

100 & 300 AREA UNIT MANAGER MEETING MINUTES

Groundwater and Source Operable Units; Facility Deactivation, Decontamination, Decommission, and Demolition (D4); Interim Safe Storage (ISS); Field Remediation (FR); Mission Completion; and 100-K Sludge Treatment Project and 100-K Facility Demolition and Soil Remediation Projects

October 8, 2015

ADMINISTRATIVE

- Next Unit Manager Meeting (UMM) – The next meeting will be held November 12, 2015, at the Washington Closure Hanford (WCH) Office Building, 2620 Fermi Avenue, Room C209.

- Attendees/Delegations – Attachment A is the list of attendees. Representatives from each agency were present to conduct the business of the UMM.

- Approval of Minutes – The August 13, 2015, meeting minutes were approved by the U.S. Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), and U.S. Department of Energy, Richland Operations Office (RL). (There was no meeting in September 2015.)

- Action Item Status – The status of action items was reviewed and updates were provided (see Attachment B).

- Agenda – Attachment C is the Regular Session meeting agenda.

EXECUTIVE SESSION (Tri-Parties Only)

An Executive Session was not held by RL, EPA, and Ecology prior to the October 8, 2015, UMM.

100-K AREA (GROUNDWATER, SOILS, D4/ISS)

Attachment 1 provides status and information for groundwater. Attachment 2 provides a status of the 100-K Sludge Treatment Project and the 100-K Facility Demolition and Soil Remediation projects. No issues were identified and no agreements or action items were documented.

100-B/C AREA (GROUNDWATER, SOILS, D4/ISS)

Attachment 1 provides status and information for groundwater. Attachment 3 provides status and information for Washington Closure Hanford (WCH) Closure Operations activities at 100-B/C, 100-D, 100-H, 100-N, 100-IU-2/6, and 618-10. Attachment 4 provides the Field Remediation schedule for 100-B, 100-D, 100-H, 100-N, and 100-IU-2/6. No issues were identified and no agreements or action items were documented.

100-N AREA (GROUNDWATER, SOILS, D4/ISS)

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100-D & 100-H AREAS (GROUNDWATER, SOILS, D4/ISS)

Attachment 1 provides status and information for groundwater. Attachment 3 provides status and information for WCH Closure Operations activities at 100-B/C, 100-D, 100-H, 100-N, 100-IU-2/6, and 618-10 Attachment 4 provides the Field Remediation schedule for 100-B, 100-D, 100-H, 100-N, and 100-IU-2/6. No issues were identified and no action items were documented.

Agreement 1: Attachment 5 provides an Ecology, EPA, and DOE approved Tri-Party Agreement change notice TPA-CN-677 to modify the *Interim Action Waste Management Plan for the 100-HR-3 and 100-KR-4 Operable Unit*, DOE/RL-97-01, Revision 5, to update Appendix A, Table A-1, to add 7 replacement wells.

Agreement 2: Attachment 6 provides an Ecology, EPA, and DOE approved Tri-Party Agreement change notice TPA-CN-659 to modify the *Sampling and Analysis Plan for Installation of 100-HR-3 Groundwater Operable Unit Replacement Wells*, DOE/RL-2012-45, to add 1 well and to add soil sampling to the SAP.

100-F & 100-IU-2/100-IU-6 AREAS (GROUNDWATER, SOILS, D4/ISS)

Attachment 1 provides status and information for groundwater. Attachment 3 provides status and information for WCH Closure Operations activities at 100-B/C, 100-D, 100-H, 100-N, 100-IU-2/6, and 618-10. Attachment 4 provides the Field Remediation schedule for 100-B, 100-D, 100-H, 100-N, and 100-IU-2/6. No issues were identified and no action items were documented.

Agreement 1: Attachment 7 provides EPA's and Ecology's concurrences of a non-contiguous onsite approval request to send sample waste from closure sampling of 600-326 to the container staged at 100-D for spill cleanup waste and other material.

300 AREA – 618-10/11 (GROUNDWATER, SOILS)

Attachment 3 provides status and information for WCH Closure Operations activities at 100-B/C, 100-D, 100-H, 100-N, 100-IU-2/6, and 618-10. No issues were identified and no action items were documented.

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Agreement 2: Attachment 9 provides EPA's approval of an offsite acceptability determination to send a 55-gallon drum containing approximately 12 gallons of waste gasoline with Bio Kleen generated at 618-10 to Burlington Environmental, LLC, in Kent, WA, Ash Grove Cement Company in Foreman, AR, and Lone Star Industries in Cape Girardeau, MO.

300 AREA - GENERAL (GROUNDWATER, SOILS, D4/ISS)

Attachment 1 provides status and information for groundwater. Attachment 10 provides status of the 300 Area Closure Project activities. No issues were identified, and no agreements or action items were documented.

ORCHARD LANDS

Attachment 11 provides a status on the 100-OL-1 Orchard Lands Remedial Investigation. No issues were identified, and no agreements or action items were documented.

OTHER TOPICS

Attachments 12, 13, and 14 are Institutional Control presentations by WCH RCC, MSA, and CHPRC.

OTHER AGREEMENTS

Agreement 1: Attachment 15 provides an EPA and DOE approved Tri-Party Agreement change notice TPA-CN-679 to retire the use of the *Sampling and Analysis Plan Update for Groundwater Monitoring 1100-EM-1 Operable Unit*, PNNL-12220.

100 & 300 AREA UNIT MANAGER MEETING MINUTES

Groundwater and Source Operable Units; Facility Deactivation, Decontamination, Decommission, and Demolition (D4); Interim Safe Storage (ISS); Field Remediation (FR); Mission Completion; and 100-K Sludge Treatment Project and 100-K Facility Demolition and Soil Remediation Projects

October 8, 2015

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Attachment A

100/300 AREA UNIT MANAGER MEETING

ATTENDANCE

October 8, 2015

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Attachment B

100/300 Area UMM
Action List
October 8, 2015

Open (O)/ Closed (X)	Action No.	Co.	Actionee	Project	Action Description	Status

Attachment C

100/300 Area Unit Manager Meeting
October 8, 2015
Washington Closure Hanford Building
2620 Fermi Avenue, Richland, WA 99354
Room C209; 2:00 p.m.

Administrative:

- Approval and signing of previous meeting minutes (August 13, 2015 – note: there was no meeting in September)
- Update to Action Items List
- Next UMM (11/12/2015, Room C209)

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

- 100-K Area (Jim Hanson, Roger Quintero)
- 100-B/C Area (Greg Sinton, Tom Post)
- 100-N Area (Greg Sinton, Rudy Guercia)
- 100-D & 100-H Areas (Jim Hanson, Tom Post)
- 100-F & 100-IU-2/6 Areas (Greg Sinton, Tom Post, Jamie Zeisloft)
- 300 Area - 618-10/11 exclusively (Jamie Zeisloft)
- 300 Area (John Sands/Rudy Guercia)
- Orchard Lands (John Sands)

Special Topics/Other

- Annual Institutional Controls Evaluations (Randy Krekel, Ellen Dagan)

Adjourn

Attachment 1

Unit Managers Meeting – October 2015 – *September 2015 information*

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.

Overall Progress Summary

For Fiscal Year 2015 Hanford's overall Site groundwater monitoring program has 3,140 sample trips scheduled for collection. The groundwater monitoring program successfully completed 2,963 of 3,140 sample trips scheduled for October 2014 through September 2015.

Sample Trip Status

Month Scheduled

Through September 2015 (FY 2015, month twelve) the program successfully completed 293 of the 449 groundwater sampling trips scheduled for September 2015, and 3 FY 2016 trips scheduled for October which were collected in September ahead of schedule. This brings the total number of FY 2015 and FY2016 trips to be collected to 2,966.

Month Collected

During September 2015, 246 sample trips were successfully collected. This includes the 9 trips scheduled for October 2014 through August 2015, 234 trips scheduled for September 2015, and 3 FY 2016 trips scheduled for October 2015. This brings the total number of FY 2015 trips sampled during October 2014 through September 2015 to 2,945. Additionally, 18 trips scheduled for October 2014 were sampled in September which brings the total number of FY 2015 and FY 2016 trips to 2,966.

The specific wells, aquifer tubes, and springs sampled in the river corridor areas during September 2015 are listed in Table 1.

Awaiting Sample Trips

Of the FY 2015 sample trips scheduled for September 2015 and prior, there are 178 that are awaiting collection. Of these, 9 require maintenance, 4 have access restrictions, 2 are not on the Well Access List, 7 are being evaluated for cancelation or rescheduling, 144 are associated with special studies, and 12 are awaiting collection at the month end.

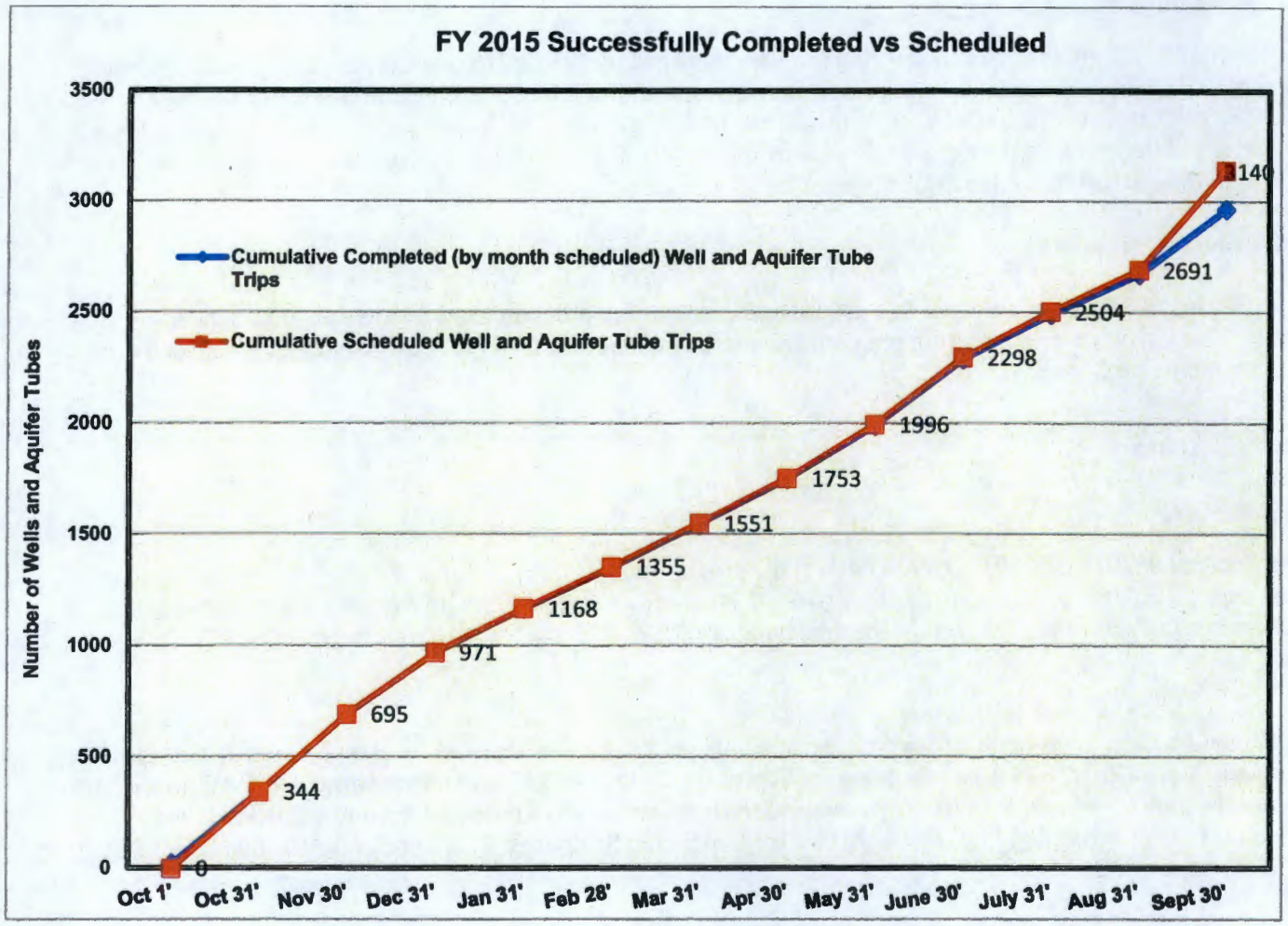
Table 2 presents the sample trips for only the river corridor that were not successfully completed in September. Sample trips in Table 2 are grouped by fiscal month scheduled and groundwater interest area. This table clearly shows that the number of awaiting well trips decreases with time from the schedule 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 October 2015 (and not collected before the target sample month) are listed in Table 3.

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/.



Special Feature(s)

<u>Aquifer Tube Sampling (Bill Faught/Mary Hartman)</u>

As previously reported, CHPRC is preparing a TPA change notice to DOE/RL-2000-59, *Sampling and Analysis Plan for Aquifer Sampling Tubes*, specifying that aquifer tube sampling requirements for 100-FR-3 and 300-FF-5 are contained in the OU SAPs, and there are similar changes anticipated for the other OUs as new BCs are implemented. After RL's review and comments have been addressed, the draft will be sent to EPA and Ecology.

Operable Unit Specifics

100-KR-4 Groundwater Operable Unit (Mike Drewett/Chuck Miller/Jason Hulstrom)

- CERCLA Process Implementation:
  - RI/FS, Proposed Plan and Additional Characterization: The RI/FS and PP documents are on hold pending 100-K East Reactor waste site characterization (wells 116-KE-3 and UPR-100-K-1) and modeling.
  - Monitoring Plan: The Draft A documents (Interim O&M Plan, Interim RD/RAWP, and Interim Groundwater Monitoring Plans) that are being revised, to incorporate applicable 100-HR-3 comments and the pH value engineering evaluation, are nearing completion.

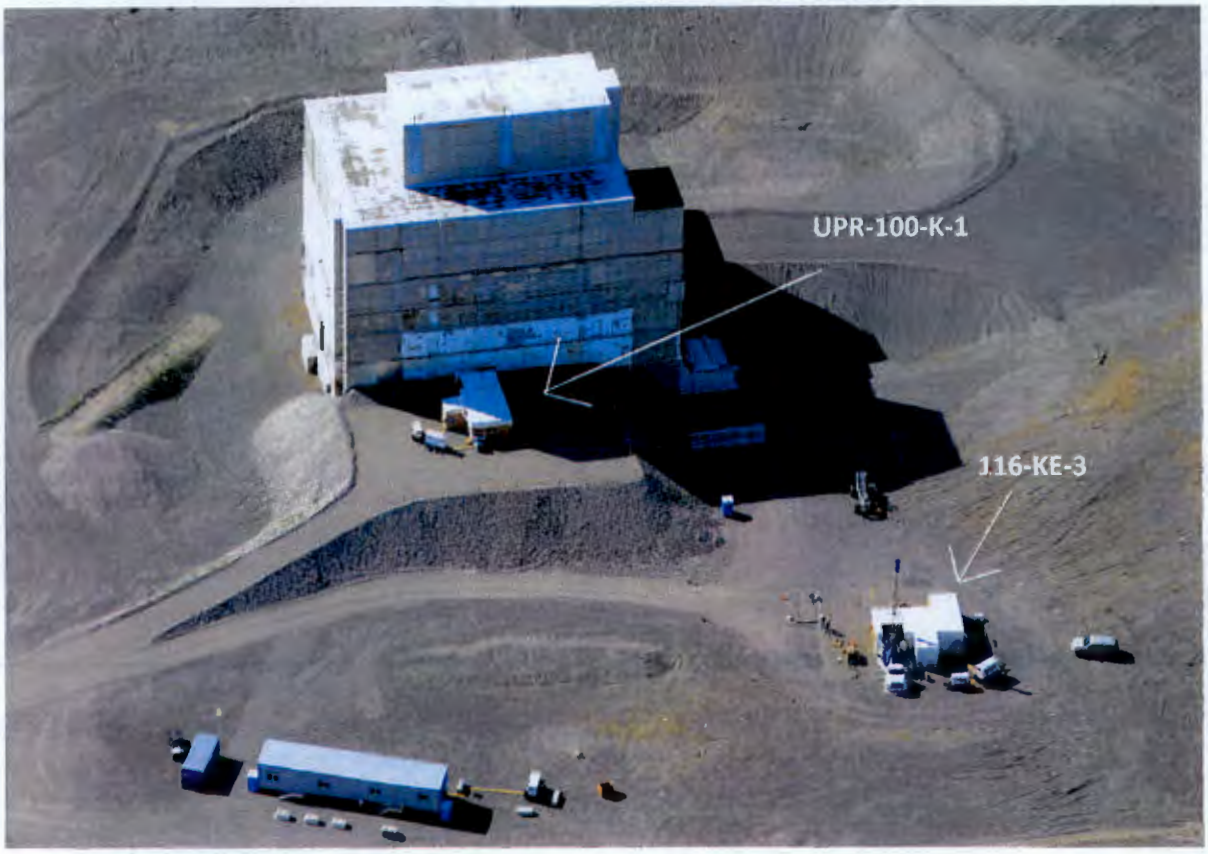


Figure K-1. Location of Drilling at 116-KE-3 and UPR-100-K-1 at KE Reactor

- Remedial Actions & System Modifications:
  - The volume of groundwater treated and mass of Cr(VI) removed for each 100-K P&T system (**KX, KR-4,** and **KW**) during September 2015 are:
    - ✓ Treated 60.0 million gallons (65.6 in August).
    - ✓ Removal 3.13 kg of hexavalent chromium (3.8 in August)
  - The current influent and effluent Cr(VI) concentrations (measure once weekly) for the three K systems (as measured on September 28, 2015) are:

- ✓ 100-KR4 – Influent = 7 μg/L; Effluent = less than detection
- ✓ 100-KW – Influent = 20 μg/L; Effluent = less than detection
- ✓ 100-KX – Influent = 18 μg/L; Effluent = less than detection

- For the month of September 2015, all three pump and treat systems at 100-KR-4 OU operated at 100% (fully on-line) and 30-day average pumping rates of 316 gpm, 331 gpm, and 745 gpm for the KR-4, KW, and KX systems, respectively. A summary of the number of extraction and injection wells in the three systems is shown in Table K-1.

Table K-1. Summary of the Number of Extraction and Injection Wells in the Three Systems

Wells	KR4		KX		KW		TOTAL	
	2014	2015	2014	2015	2014	2015	2015	Current
Number of extraction wells	12	12	18	19	11	11	42	42
Number of injection wells	5	5	9	9	4	4	18	18

- All KR-4 system extraction wells and injection wells are currently in service. The hexavalent chromium concentration in extracted water at the KR-4 system continues to be below site cleanup requirements. The system remains in service to provide hydraulic capture of groundwater inland of the river.
- At the KW system, wells 199-K-132, 199-K-139, and 199-K-166 remain off-line to allow increased pumping rates along the central axis of the plume. Extraction well 199-K-205, located at the former 183-KW Head House vicinity, continues operating at an extraction rate of 120 gpm and provides the highest concentration of hexavalent chromium. All injection wells are in service.
- All KX system extraction wells are in service.
- Figures K-2 through K-4 present the groundwater treatment rate and hexavalent chromium removal information. As indicated in the curves below, Cr(VI) mass removal at KR-4, KW, and KX have generally decreased in recent months due to continued optimization of remedial performance (e.g., increasing the overall system pumping rates, while extracted groundwater concentrations decrease).
- Hexavalent chromium concentration at 199-K-205 has declined to 25 μg/L, although this still represents the highest concentration at 100-KW. This single well continues to account for most of the Cr(VI) entering the KW system due to pumping rate and persistent elevated chromium concentration. Pumping is being currently focused on wells along the axis of the Cr(VI) plume where peripheral wells are exhibiting reduced Cr(VI) concentrations.

- Characterization Activities in Vicinity of 105-KE Reactor

Well 199-K-222 (the second of two subsurface characterization borings near 105-KE Reactor) was completed as a monitoring well. Preliminary observations and initial laboratory analyses indicated that radiological contamination is present over the vadose zone thickness. Notably elevated concentrations of cesium-137 were observed at elevations corresponding with the bottom of the foundation of the former 105-KE Fuel Storage Basin and also within the periodically-rewetted zone above the current water table. A sample of groundwater collected during drilling from a location just beneath the water table exhibited elevated strontium-90, carbon-14, and low level detects of tritium and technetium-99. These measurements are consistent with the historical release of contaminated water from the fuel

storage basin. Elevated strontium-90, carbon-14, and tritium have historically been observed down gradient of 105-KE Reactor, along with periodic detections of low concentrations of technetium-99. When complete, the results of this characterization activity will be incorporated into the 100-K RI/FS report. The newly-completed well 199-K-222, along with recently-completed well 199-K-221(located adjacent to the former 116-KE-3 Crib and Reverse Well) will be placed in monitoring service.

- Soil Remediation in Vicinity of 183-KE Head House

CHPRC staff and selected subcontractors are preparing to begin shallow soil remediation at selected waste sites in the vicinity of 183-KE Head House. These activities will include removal of foundation works and shallow soil excavation (i.e., to about 10 feet below grade). Current plans include keeping existing groundwater monitoring wells in service during the soil excavation.

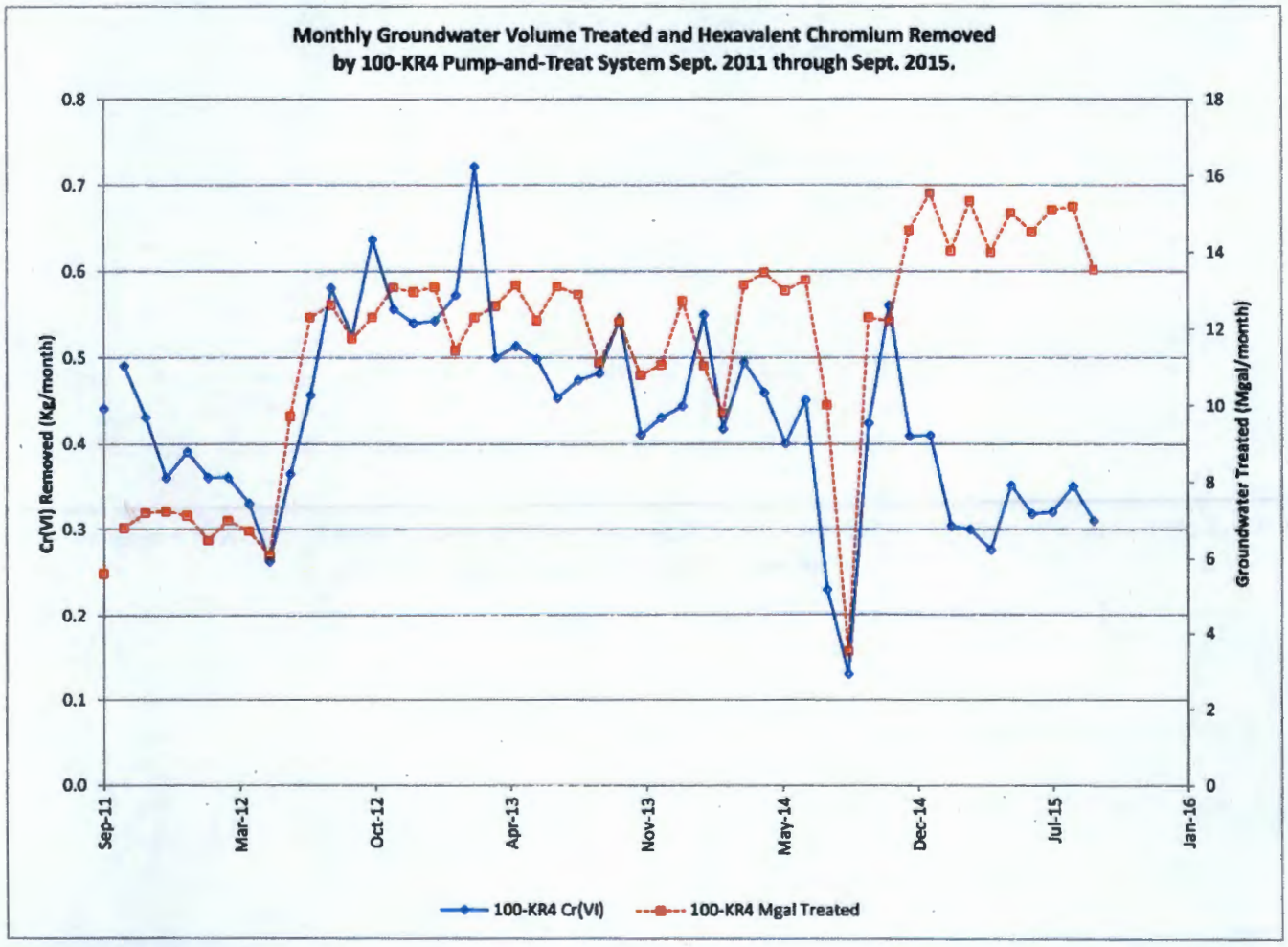


Figure K-2. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-KR-4 Pump-and-Treat, September 2011 through September 2015.

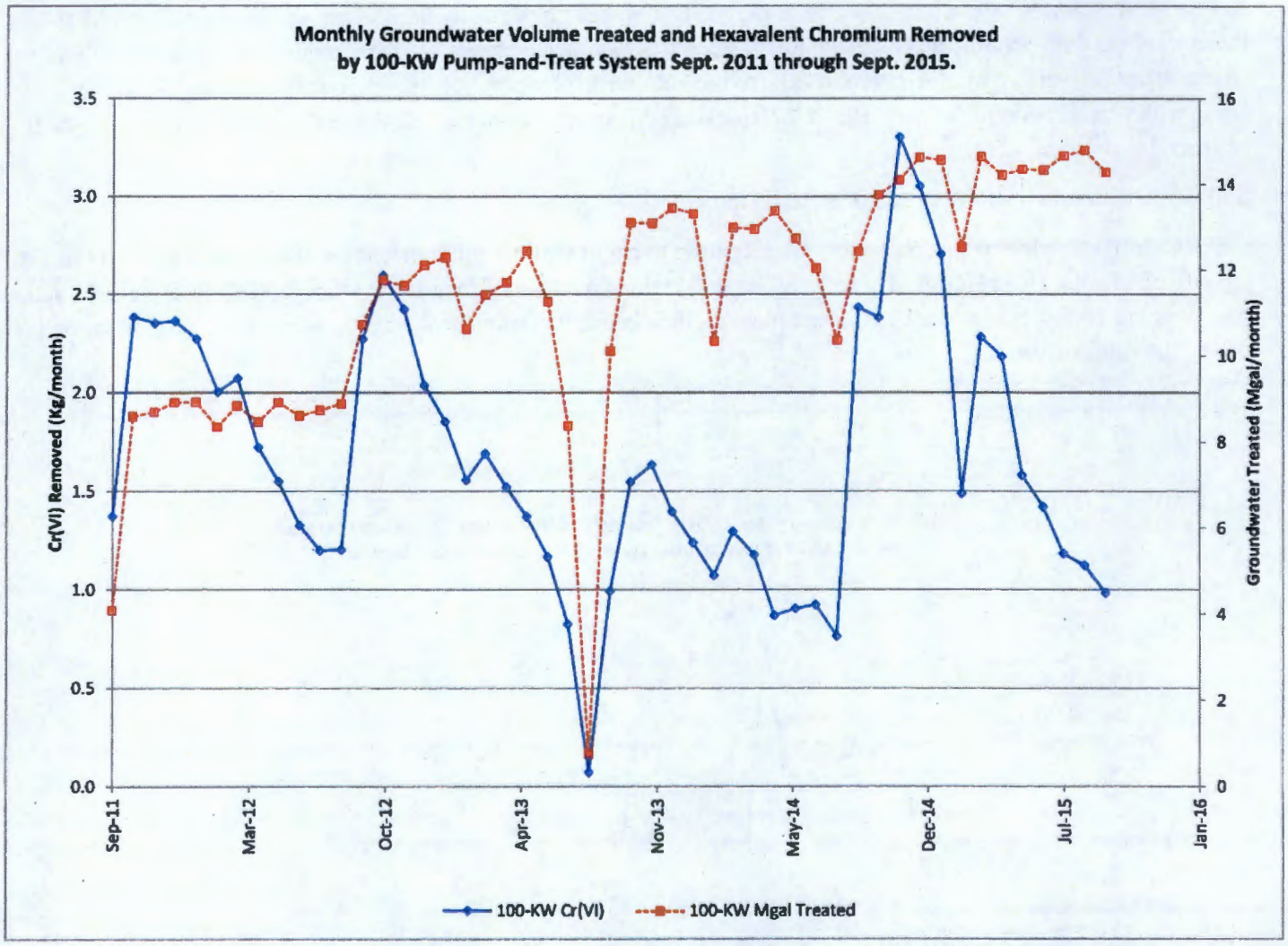


Figure K-3. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-KW Pump-and-Treat, September 2011 through September 2015.

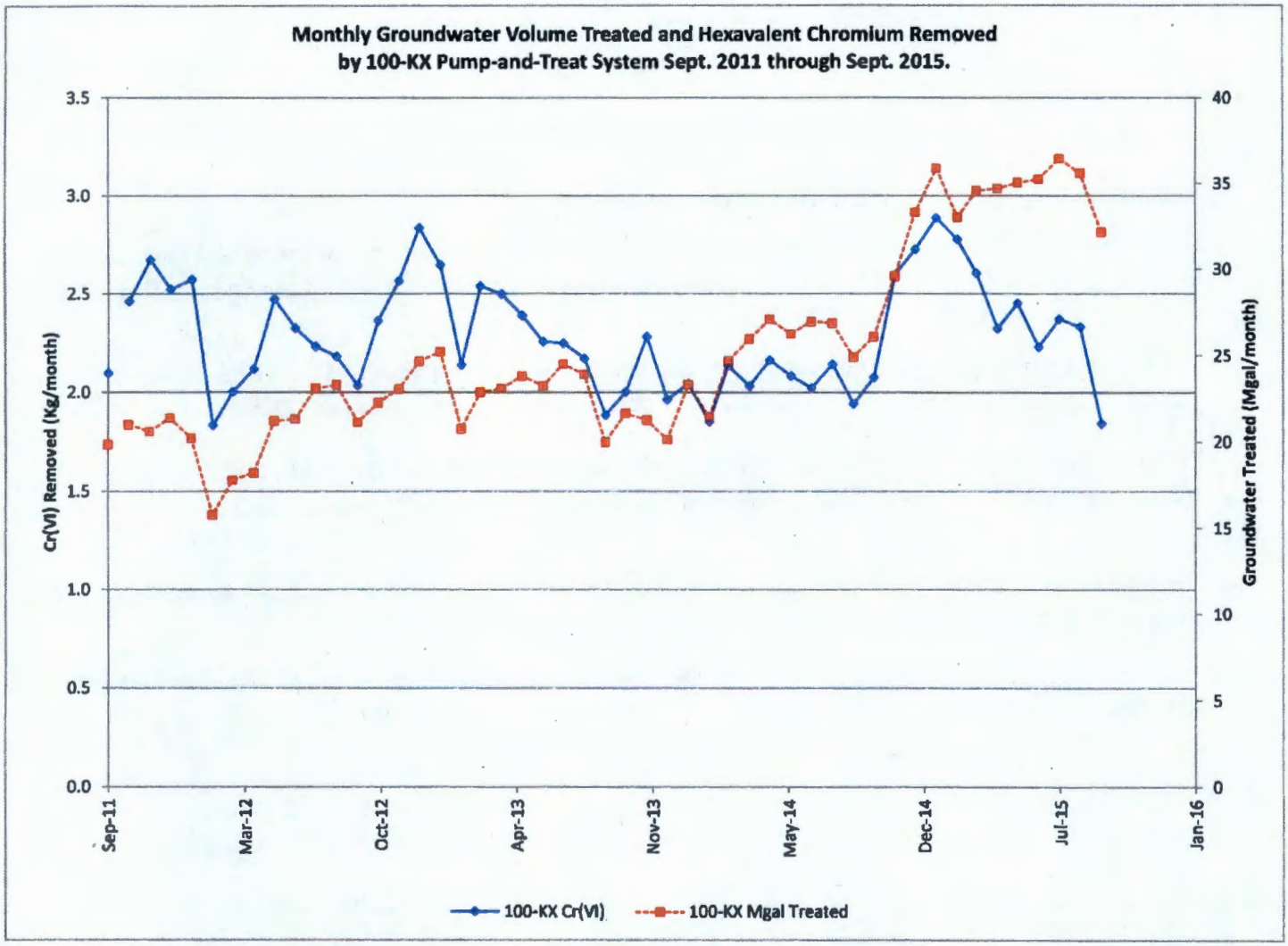


Figure K-4. Monthly Cr(VI) removed and groundwater volume treated by 100-KX pump-and-treat, September 2011 through September 2015.

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

- *Milestone M-015-79:* Due 12/15/2016 for the CERCLA RI/FS Report and Proposed Plan for the 100-BC-1, 100-BC-2 and 100-BC-5 Operable Units
- CERCLA Process Implementation:
  - Continued groundwater monitoring and hyporheic zone sampling.
  - Draft A of the groundwater sampling and analysis plan that will cover the 3-to-5 year period between completion of the RI and groundwater remedy implementation has completed DOE review. The plan was submitted to the regulatory agencies on October 1, 2015.
  - The Project Team held a kick-off meeting in late September to initiate preparation of the RI/FS Report.
- Monitoring & Reporting:
  - The HSPs were sampled in August and September. The last round of HSP sampling under the RI sampling and analysis plan is scheduled for October. A subset of HSPs is included for annual sampling under the plan mentioned above.
  - Conventional aquifer tubes were sampled in September. A subset of aquifer tubes is included for annual sampling under the plan mentioned above.
  - Only one monitoring well was scheduled for sampling during August and September; 199-B4-14 was sampled as scheduled. The full monitoring well network is scheduled for sampling in October.

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

- CERCLA Process Implementation
  - Ecology issued an extension letter to extend the comment resolution period for the Draft A RI/FS Report through December 2015.
  - Revised Chapter 6 red-lines and the associated RCR form (incorporating the new waste sites) were provided to Ecology for review on February 9, 2015. Comments on this revised text arrived from Ecology on May 21, 2015. Responses continue to be shared.
  - Revised Chapter 7 red-lines and the associated RCR form were completed and sent to Ecology February 26, 2015. On June 2, 2015, Ecology closed 2 of the 3 remaining comments on this chapter. RL issued Ecology additional information on the ecological evaluation on September 22, 2015. We anticipate resolving the single remaining comment within the extension period.
  - The numerical modeling performed for Draft A is being revisited. Follow-up FS discussions and workshops will begin once the risk assessment comments are complete.
  - The *Sampling Instruction for the Drilling and Installation of Six Groundwater Monitoring Wells* (SGW-58723) was issued on September 22, 2015, to support drilling and sampling activities following approval of the MOA for this work.
- Remedial Actions
  - ***Bioventing*** - Figure NR-1 provides a chart showing bioventing well gas sample results for monitoring wells 199-N-171 and 199-N-169. Monthly vapor sample measurements were taken on August 27 and September 30, 2015. Monthly measurements do not indicate significant biodegradation activity at well 199-N-169, however, the biodegradation rates calculated for well 199-N-169 based on the two respirometry test completed in 2015 show a biodegradation rate similar to that observed at well 199-N-171 (see Table NR-1).
  - The bioventing system was shut down on June 22, 2015, in support of the summer respirometry testing event. The test duration was six weeks and was completed on August 3, 2015. The bioventing system was restarted on August 3, 2015, following completion of the test.
  - A draft test report for the respirometry test completed in August has been prepared and is going through internal review. Table NR-1 summarizes the calculated biodegradation rates for the respirometry test monitoring wells and compares to the previous two respirometry tests. The oxygen utilization rates (and hence the calculated biodegration rate) are less than observed from the last respirometry test conducted in the winter 2014.

    Biodegradation rates from August 2015 are lower than the rate calculated for the January 2015 data, but higher than the rate calculated from the July 2014 respirometry test. Groundwater sampling at the site indicates that elevations of impacted groundwater vary significantly over time, resulting in a smear zone that is likely to be several feet thick. Bioventing will be most effective when groundwater elevations are low and this smear zone is exposed. The comparison in biodegradation rates between winter and summer, as well as July 2014 (seasonable groundwater levels) and August 2015 (unseasonably low groundwater levels), correlate with the concept that bioventing will be most effective during low groundwater periods.

Table NR-1. Comparison of Biodegradation Rate from Respirometry Testing

Monitoring Location	Biodegration Rate (mg/kg-day)		
	Jul-15	Dec-14	Jul-14
199-N-167	-0.05	-0.05	-0.06
199-N-169	-0.12	-0.23	-0.09
199-N-171	-0.14	-0.23	-0.09
199-N-172	-0.04	-0.05	-0.02
199-N-183	N/A	N/A	N/A
199-N-18	N/A	N/A	N/A

N/A = biodegration rate not calculated because of low oxygen utilization

TPH and EPH analytical results for groundwater samples collected in August from the bioremediation groundwater monitoring wells are shown in Table NR-2. The results indicate that the TPH is primarily in the diesel range (C10-C28 carbon fractions).

Table NR-2: TPH and EPH from Bioventing Monitoring Wells

Well Name *	N-167	N-169	N-171	N-172	N-173	N-183	N-19	N-3	N-56	N-96A
TPH-diesel (µg/L)	927	545	4360	4130	1280	2180	143	47.6	233	161
TPH – gasoline range (µg/L)	16.7 (U)	16.7 (U)	30.8	16.7 (U)	16.7 (U)	16.7 (U)	16.7 (U)	16.7 (U)	16.7 (U)	16.7 (U)
TPH-motor oil (µg/L)	645	425	1340	2040	1230	577	295	130	205	347
Aliphatic Petroleum Hydrocarbons nC8-nC10 (µg/L)	82.4	88.7	112	105	80.9	118	91.5	89.5	94.1	85
Aliphatic Petroleum Hydrocarbons >nC10-nC12 (µg/L)	14.2 (U)	14.3 (U)	60.2	14.3 (U)	14.2 (U)	14.3 (U)	14 (U)	14.2 (U)	14 (U)	14.3 (U)
Aliphatic Petroleum Hydrocarbons >nC12-nC16 (µg/L)	14.2 (U)	14.3 (U)	327	35.9	14.2 (U)	14.3 (U)	17.6	14.2 (U)	14 (U)	14.3 (U)
Aliphatic Petroleum Hydrocarbons >nC16-nC21 (µg/L)	14.2 (U)	14.3 (U)	316	352	14.2 (U)	14.3 (U)	18.2	14.2 (U)	14 (U)	14.3 (U)
Aliphatic Petroleum Hydrocarbons >nC21-nC34 (µg/L)	14.2 (U)	14.3 (U)	45.8	155	53.4	14.3 (U)	33.1	28	155	60.2
Aromatic Petroleum Hydrocarbons nC8-nC10 (µg/L)	22.8	23.2	28.1	23.1	23.1	27.5	26	28.9	24	17.3
Aromatic Petroleum Hydrocarbons >nC10-nC12 (µg/L)	14.2 (U)	14.3 (U)	82	14.3 (U)	14.2 (U)	16.2	14 (U)	14.2 (U)	14 (U)	14.3 (U)
Aromatic Petroleum Hydrocarbons >nC12-nC16 (µg/L)	14.2 (U)	14.3 (U)	178	14.3 (U)	14.2 (U)	44.4	14 (U)	14.2 (U)	14 (U)	14.3 (U)
Aromatic Petroleum Hydrocarbons >nC16-nC21 (µg/L)	14.2 (U)	14.3 (U)	222	131	14.2 (U)	29.4	14 (U)	14.2 (U)	14 (U)	14.3 (U)
Aromatic Petroleum Hydrocarbons >nC21-nC34 (µg/L)	14.2 (U)	14.9	14 (U)	14.3 (U)	14.2 (U)	14.3 (U)	14 (U)	14.2 (U)	14 (U)	14.3 (U)

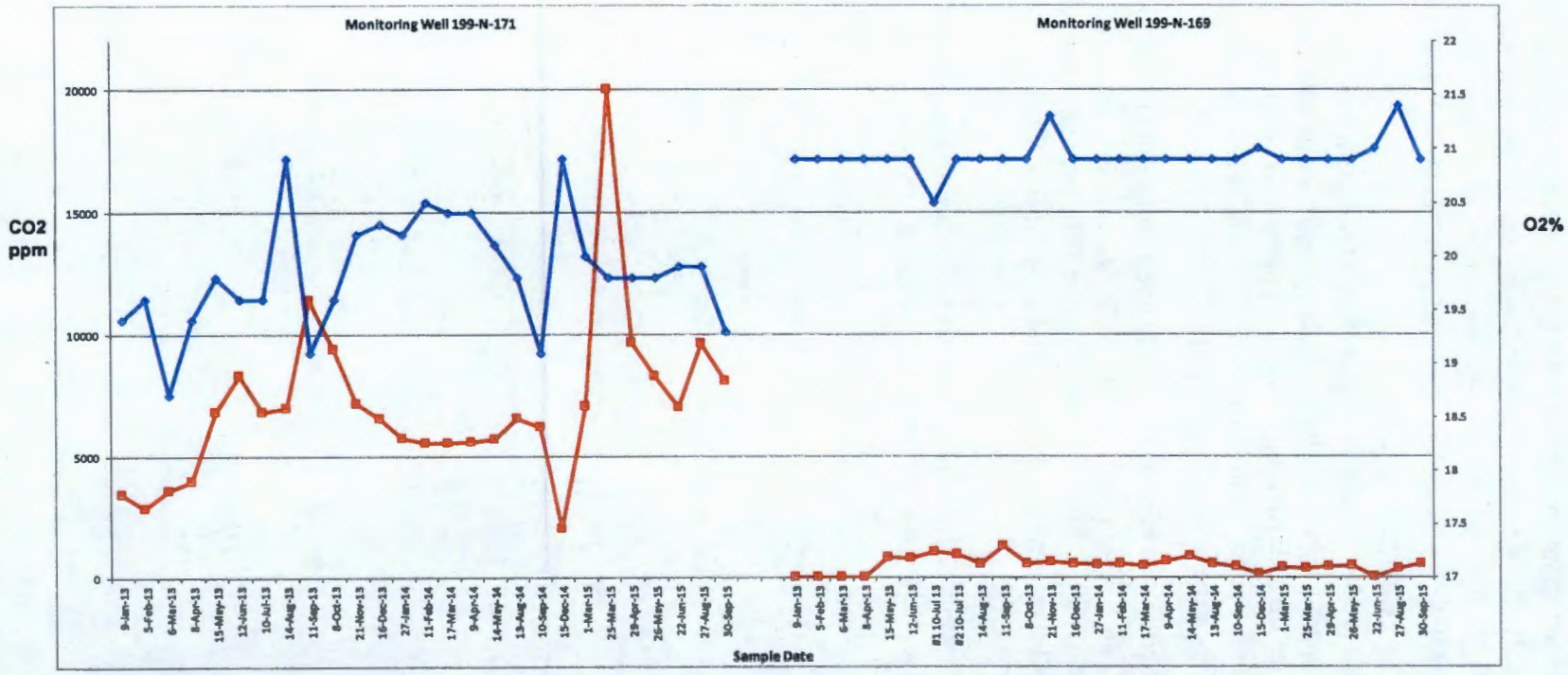
* "199-" Prefix omitted from well names (U) = below reporting limit

- ***Product Recovery*** – the new "smart sponges" configuration was inserted into well 199-N-18 on August 4, 2015, following completion of the respirometry test. The "smart sponge" assembly was removed and changed out on September 29, 2015. A total of 100 g of TPH was removed from groundwater since the last sponge change-out. Assuming that the TPH is diesel with a density of 0.85 g/mL, 0.12 L of diesel was removed. The next change-out is scheduled for October 2015.

  Figure NR-2 shows the petroleum hydrocarbon product absorbed by the sponge. Although no more mass was absorbed than in previous change outs, there appears to be more surface of the sponge material with absorbed hydrocarbons. No liquid indication was detected in the well using a water level meter after the sponge was removed. River elevations have dropped below the bottom of the well screen for extended periods in August and September so if may be that the well was dry for some time during this period.

- ***Aquifer Tubes*** – Tubes C7934, C7935, and C7936 are located adjacent to one another (Figure NR-3), 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 August 21, 2015 and September 15, 2015. Results through August 2015 have been received for all three aquifer tubes. Tritium and strontium-90 concentration trends are shown in Figures NR-4 and NR-5, respectively.

- The RCRA monitoring wells scheduled for September 2015 were sampled on September 14 through 17, 2015, and September 28, 2015. One RCRA monitoring well (199-N-2) still needs to be sampled. The next sampling event is scheduled for March 2016.



BIOVENT WELL SAMPLE RESULTS

Well #	Date	O2%	CO2 ppm
199-N-171	9-Jan-13	19.4	3400
	5-Feb-13	19.8	2840
	6-Mar-13	18.7	3570
	8-Apr-13	19.4	3980
	15-May-13	19.8	6820
	12-Jun-13	19.8	8290
	10-Jul-13	19.8	6800
	14-Aug-13	20.9	6940
	11-Sep-13	19.1	11400
	8-Oct-13	19.8	9380
	21-Nov-13	20.2	7160
	16-Dec-13	20.3	6520
	27-Jan-14	20.2	5720
	11-Feb-14	20.5	5520
	17-Mar-14	20.4	5520
	9-Apr-14	20.4	5560
	14-May-14	20.1	5670
	13-Aug-14	19.8	6520
	10-Sep-14	19.1	6160
	15-Dec-14	20.9	2000
	1-Mar-15	20	7020
	25-Mar-15	19.8	20000
	29-Apr-15	19.8	9850
	26-May-15	19.8	8260
	22-Jun-15	19.9	7000
	27-Aug-15	19.9	9620
	30-Sep-15	19.3	8070

Well #	Date	O2%	CO2 ppm
199-N-169	9-Jan-13	20.9	0
	5-Feb-13	20.9	0
	6-Mar-13	20.9	0
	8-Apr-13	20.9	0
	15-May-13	20.9	800
	12-Jun-13	20.9	780
	#1 10-Jul 13	20.5	1020
	#2 10-Jul 13	20.9	920
	14-Aug-13	20.9	530
	11-Sep-13	20.9	1250
	8-Oct-13	20.9	550
	21-Nov-13	21.3	800
	16-Dec-13	20.9	530
	27-Jan-14	20.9	500
	11-Feb-14	20.9	550
	17-Mar-14	20.9	470
	9-Apr-14	20.9	660
	14-May-14	20.9	640
	13-Aug-14	20.9	520
	10-Sep-14	20.9	410
	15-Dec-14	21	100
	1-Mar-15	20.9	360
	25-Mar-15	20.9	325
	29-Apr-15	20.9	410
	26-May-15	20.9	460
	22-Jun-15	21	0
	27-Aug-15	21.4	330
	30-Sep-15	20.9	530

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

Figure NR-2. Smart Sponge from Well 199-N-18

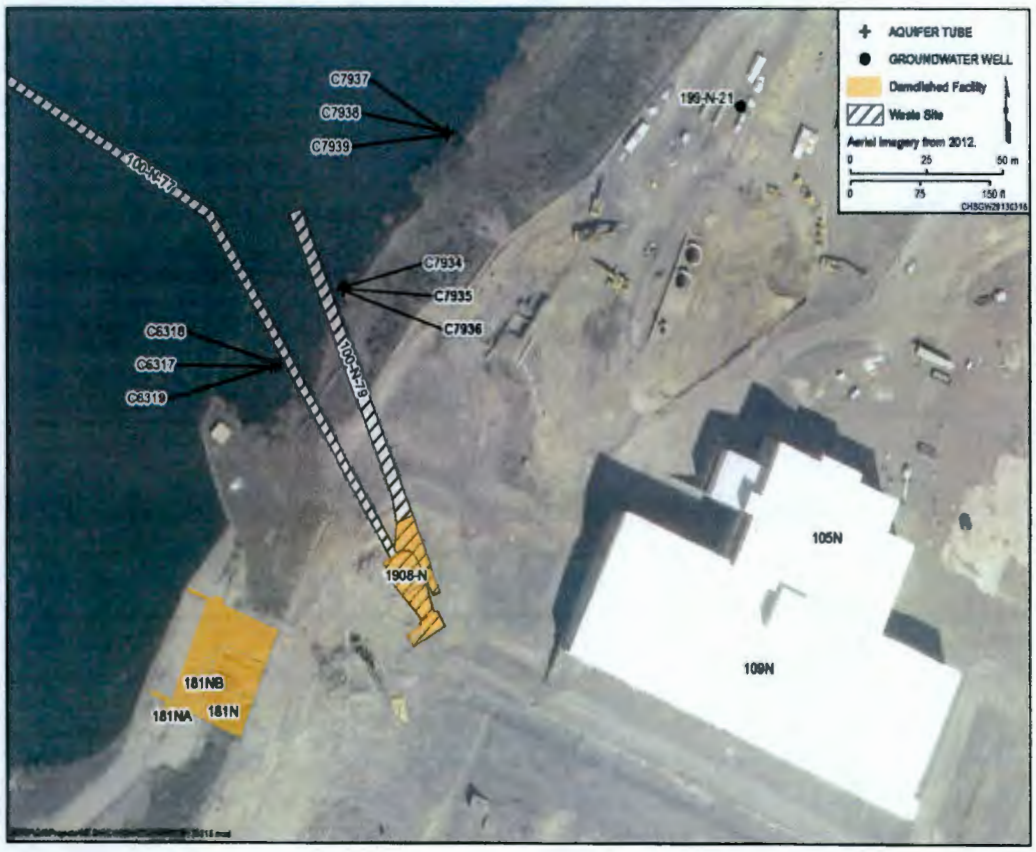


Figure NR-3. Locations of Aquifer Tubes C7934, C7935, and C7936

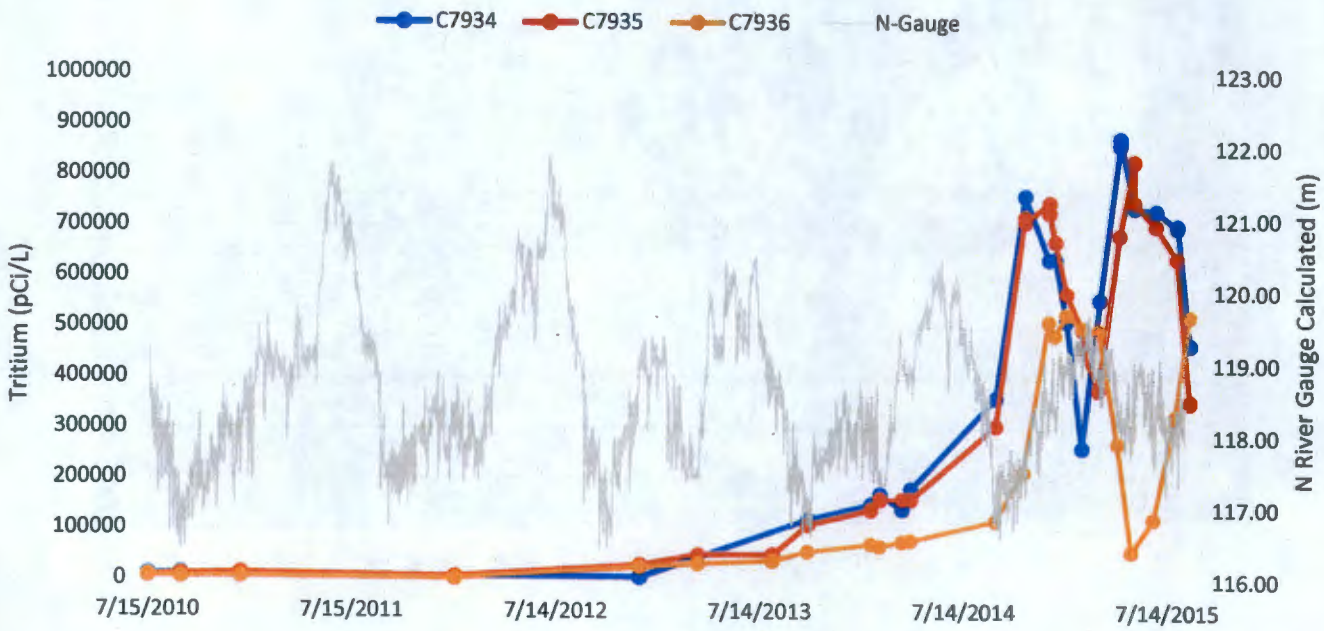


Figure NR-4. Tritium Trends through August 2015 at Aquifer Tubes C7934, C7935, and C7936

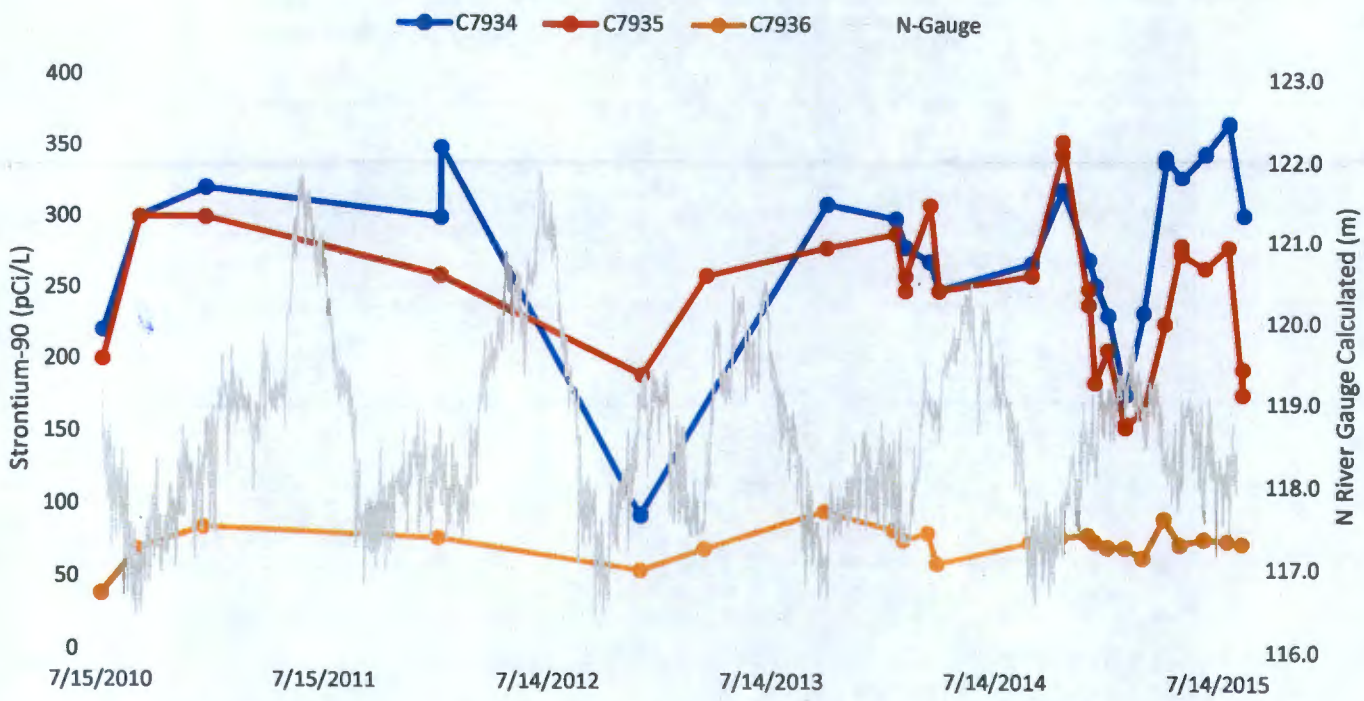


Figure NR-5. Strontium-90 Trends through August 2015 at Aquifer Tubes C7934, C7935, and C7936

100-HR-3 Groundwater Operable Unit – Mike Drewett/Kris Ivarson

- CERCLA Process Implementation:
  - RI/FS: Final Rev. 0 was transmitted to Ecology on October 17, 2014.
  - PP: Reviewed and resolved comments on Rev 0 during a May 28, 2015 meeting between RL, EPA and Ecology. Draft Rev 0 was provided to Ecology on June 2, 2015, and forwarded for legal review on June 9, 2015. Ecology legal comments were originally due on July 10, 2015. Ecology provided comments to RL on August 5, 2015. RL provided proposed responses to Ecology on August 27, 2015. Final comment resolution meeting held on September 2, 2015. Revised draft Rev 0 PP submitted to RL, EPA and Ecology on September 2, 2015, for EPA legal review. EPA legal review is scheduled to be completed on October 2, 2015.
  - Interim RD/RAWP, Interim Monitoring Plan, and Interim O&M Plan, Draft A plans were transmitted to Ecology on September 30, 2014. Received comments from Ecology on April 30, 2015. RL requested a 90-day extension to respond to comments on May 27, 2015. Good progress continues to be made on disposition of outstanding comments, with over 90% of comments resolved. RL requested a second extension to complete comment resolution on August 31, 2015.
- Remedial Actions & System Modifications
  - A summary of the number of extraction and injection wells in the DX and HX P&T systems is shown in Table H-1.
  - All well realignments are completed and operational.

Table H-1. Summary of the Number of Extraction and Injection Wells in the 100-HR-3 Systems

Wells	DX		HX		Total
	2014	2015	2014	2015	Current- as of 8/31/2015
Number of extraction wells	44	46	31	34	80
Number of injection wells	14	11	14	16	27

Notes:
DX system Well 199-D8-55 was not used for injection in 2014, but was operational as an extraction well
Four injection wells for DX are remain connected, but are not counted in 2015 since they are not operating.

  - September 2015 performance for **DX** and **HX** systems:
    - ✓ Treated: 54.7 million gallons (63.33 in August)
    - ✓ Removed: 9.42 kg of Cr(VI) (10.92 in August).

    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-1 and H-2, 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.

- The current influent and effluent Cr(VI) concentrations (measure once weekly) for the two HR-3 systems (as measured on October 5, 2015 for DX and September 28, 2015 for HX) are:
  - ✓ DX – Influent = 66 µg/L; Effluent = 3 µg/L
  - ✓ HX – Influent = 27 µg/L; Effluent = less than detection
- Well realignment activities are continuing, with piping and electrical work ongoing.

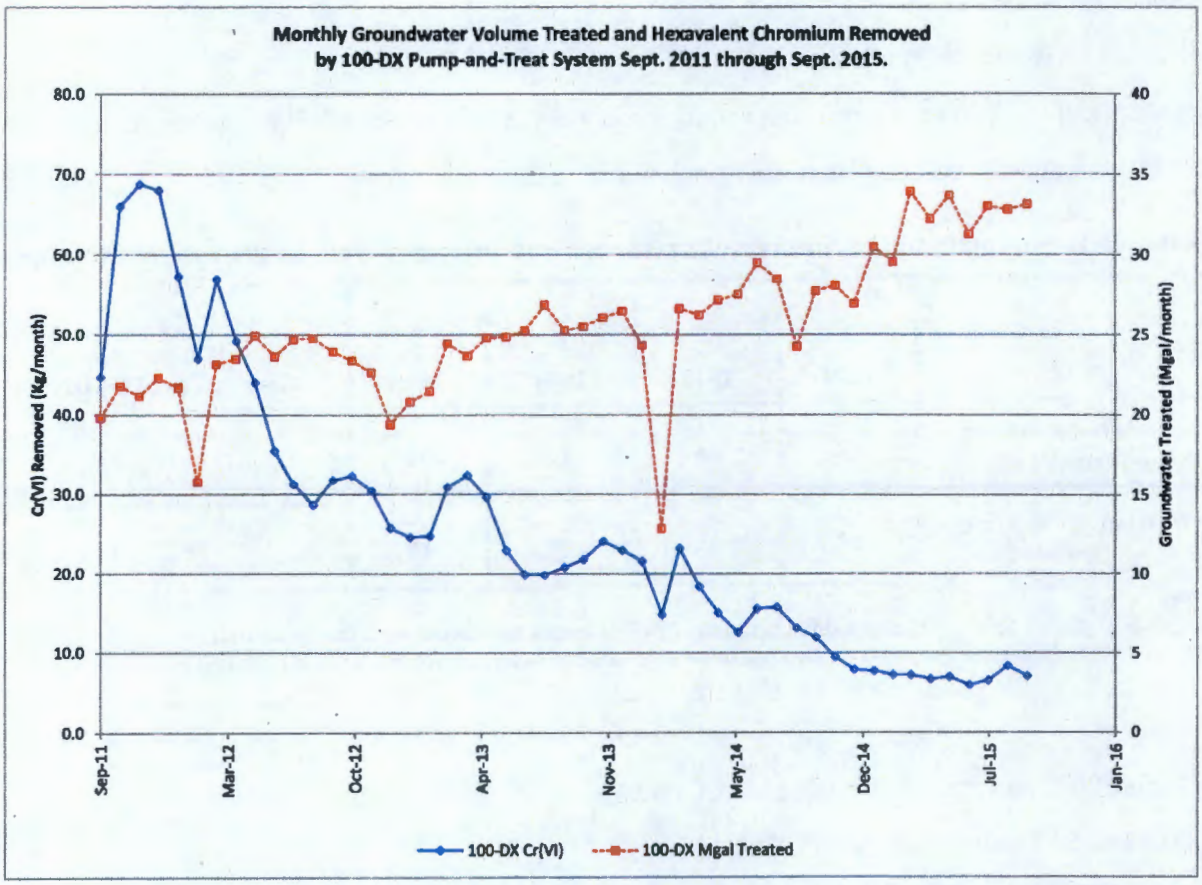


Figure H-1. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-DX Pump-and-Treat, September 2011 through September 2015.

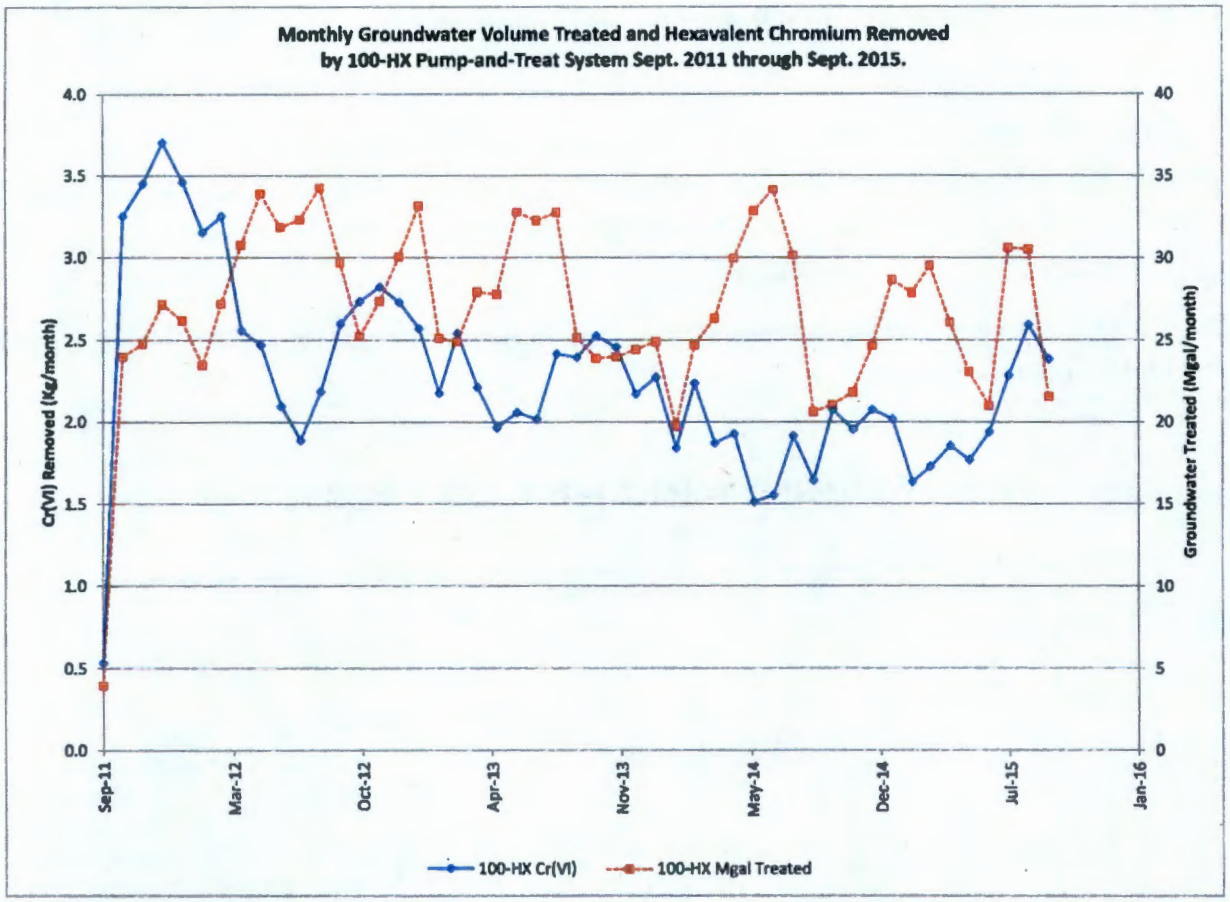
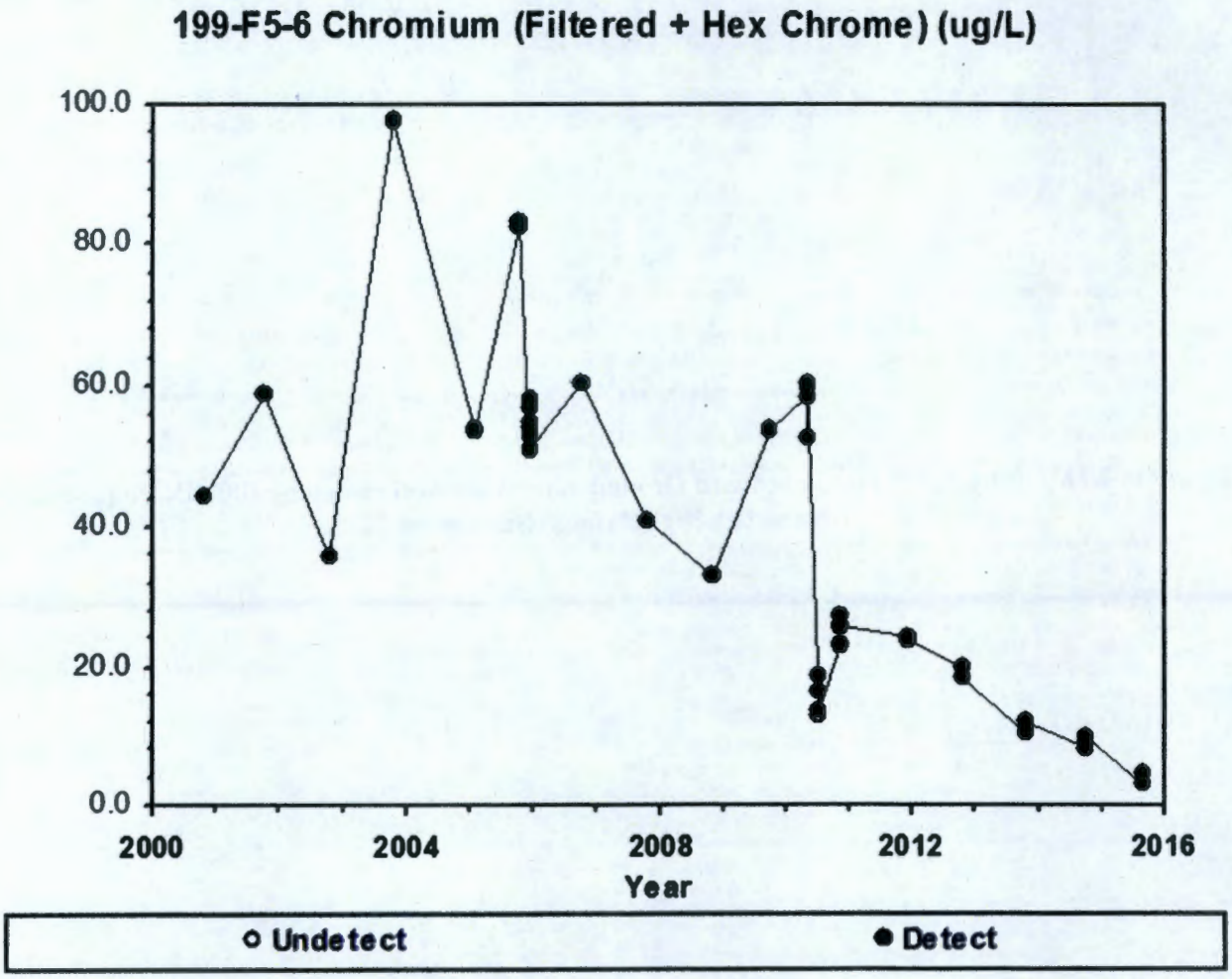


Figure H-2. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-HX Pump-and-Treat, September 2011 through September 2015.

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

- CERCLA Process Implementation:
  - Rev 0 of the RDR/RW WP was delivered to EPA on August 18, 2015.
  - Initiated planning to prepare for mobilization and installation of the monitoring well component of the remedial action. RL, EPA, and CHPRC staked locations for eight new monitoring wells in September.
- Monitoring & Reporting:
  - Well 199-F5-6 was sampled in August (delayed from June because of electrical issues). Chromium concentrations continued to decline in this well.



300-FF-5 Groundwater Operable Unit – Patrick Baynes/Virginia Rohay/Randy Hermann

- CERCLA Process Implementation:
  - The 300-FF-5 Operable Unit Remedy Implementation Sampling and Analysis Plan, DOE/RL-20142, Revision 0, was approved on September 8, 2015, and issued on September 9, 2015.
  - The Waste Management Plan for the 300-FF-5 Operable Unit, DOE/RL-2000-56, Rev. 2 was approved on August 28, 2015, and issued on September 8, 2015.
- Remedial Actions:
  - Completed installation of the infiltration system pipeline.
  - During the excavation for the infiltration system, it was determined the grout seal for well 399-1-95 requires repair. A detailed plan for the excavation, inspection, and repair has been developed and the repair is scheduled to be performed in late September.
  - Operational testing for the mixing skids and river pumps was initiated on September 23, 2015.
- Monitoring & Reporting:
  - Monitoring Overview:
    - ✓ 300 Area Industrial Complex: Samples were collected as scheduled at 10 of the 10 wells scheduled for sampling in September.
    - ✓ 618-10 Burial Ground/316-4 Crib: Samples have been collected at three of the five wells scheduled for sampling in June. One well (699-S6-E4L) was decommissioned on August 26, 2015. The other well is not currently accessible but will be sampled as soon as conditions allow.
    - ✓ 618-11 Burial Ground: The next sampling event is scheduled for October 2015.
    - ✓ 300 Area Process Trenches (316-5) RCRA Monitoring: The wells were sampled on September 9 and 11, 2015. The next sampling event is scheduled for December 2015.

100/300 Areas Unit Managers Meeting
October 8, 2015

Hanford Sampling Program Information

Table 1. Wells, Aquifer Tubes, and Springs in the River Corridor Areas Successfully Sampled In September 2015

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
03-D		199-D4-14	199-H1-25	199-K-188	199-K-150		399-1-10A
06-D		199-D4-38	199-H1-27	22-D	199-N-105A		399-1-10B
06-M		199-D5-103	199-H1-34	22-M	199-N-106A		399-1-16A
199-B4-14		199-D5-125	199-H1-36	AT-K-4-S	199-N-119		399-1-16B
AT-B-1-M		199-D5-126	199-H1-42		199-N-120		399-1-17A
AT-B-2-D		199-D5-142	199-H1-43		199-N-121		399-1-17B
AT-B-3-D		199-D5-145	199-H1-45		199-N-122		399-1-18A
AT-B-3-M		199-D5-34	199-H3-2A		199-N-123		399-1-18B
AT-B-3-S		199-D5-39	199-H3-2C		199-N-136		399-1-21A
AT-B-5-D		199-D8-68	199-H4-45		199-N-14		399-2-1
AT-B-7-M		199-D8-69	199-H4-63		199-N-146		399-3-10
C6230		199-D8-88	199-H4-64		199-N-147		399-3-12
C6231		199-H1-5	199-H4-69		199-N-159		399-3-19
C6232		199-H4-80	199-H4-70		199-N-165		399-3-20
C6233		199-H4-81	199-H4-75		199-N-173		399-3-22
C6234		199-H4-82	199-H4-76		199-N-182		699-S6-E4E
C6235			199-H4-77		199-N-183		
C7718			199-H4-90		199-N-184		
C7719			199-H4-91		199-N-185		
C7720			199-H4-93		199-N-186		
C7724			199-H5-1A		199-N-187		
C7725					199-N-188		
C7726					199-N-189		
C7780					199-N-19		
C7781					199-N-201		
C7782					199-N-21		
C8840					199-N-211		
C8841					199-N-229		
C8842					199-N-248		
C8843					199-N-268		
C8845					199-N-269		
C8847					199-N-27		
C8848					199-N-28		
C8849					199-N-280		
C8851					199-N-281		
C8852					199-N-297		
C8853					199-N-298		

Table 1. Wells, Aquifer Tubes, and Springs in the River Corridor Areas Successfully Sampled In September 2015

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
C8855					199-N-3		
C8856					199-N-315		
C8859					199-N-316		
C8860					199-N-32		
C8861					199-N-332		
C9441					199-N-34		
C9442					199-N-342		
C9443					199-N-343		
C9444					199-N-346		
C9445					199-N-347		
C9446					199-N-348		
					199-N-349		
					199-N-350		
					199-N-351		
					199-N-352		
					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-41		
					199-N-46		
					199-N-50		
					199-N-56		
					199-N-57		
					199-N-64		
					199-N-67		
					199-N-69		
					199-N-70		
					199-N-71		

Table 1. Wells, Aquifer Tubes, and Springs in the River Corridor Areas Successfully Sampled In September 2015

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
					199-N-72		
					199-N-73		
					199-N-74		
					199-N-75		
					199-N-76		
					199-N-77		
					199-N-80		
					199-N-81		
					199-N-92A		
					199-N-96A		
					199-N-99A		
					APT1		
					APT5		
					C6132		
					C7881		
					C7934		
					C7935		
					C7936		
					N116mArray-10A		
					N116mArray-11A		
					N116mArray-1A		
					N116mArray-2A		
					N116mArray-3A		
					N116mArray-4A		
					N116mArray-6A		
					N116mArray-9A		
					NVP2-115.7		
					NVP2-116.3		

Table 2. Fiscal Year 2015 Sample Trips in the River Corridor Areas awaiting (end of September 2015)

Quarter Scheduled	Interest Area	Sample Site	Site Name	Scheduled Date	Frequency	Months Remain	Status	Comment
FY 2015 Q1	100-KR	SPRING	SK-077-1	10/1/2014	Annual	0	Late	Review for Cancelation
FY 2015 Q3	100-HR-D	AQUIFER TUBE	DD-39-1	5/1/2015	Biannual	1		
	300-FF	WELL	699-S6-E4B	6/1/2015	Biannual	2		Access Restricted
FY 2015 Q4	100-HR-D	WELL	199-D5-38	9/1/2015	Quarterly	2		Maintenance Required
		WELL	199-D8-73	9/1/2015	Quarterly	2		
	100-HR-H	WELL	199-H1-39	9/1/2015	Quarterly	2		
		WELL	199-H1-40	8/1/2015	Quarterly	1		
		WELL	199-H1-6	9/1/2015	Quarterly	2		
		WELL	699-90-38	7/1/2015	Annual	9		
	100-KR	WELL	199-K-221	7/1/2015	Quarterly	0	Late	Not on WAL
		WELL	199-K-222	7/1/2015	Quarterly	0	Late	Not on WAL
	100-NR	WELL	199-N-103A	9/1/2015	Annual	11		Maintenance Required
		WELL	199-N-333	9/1/2015	Quarterly	2		Maintenance Required, Unsuccessful 9/18/2015
		WELL	199-N-51	9/1/2015	Annual	11		Maintenance Required
		AQUIFER TUBE	C6134	7/20/2015	Annual	9		
		AQUIFER TUBE	C6331	9/1/2015	Annual	11		
		AQUIFER TUBE	N116mArray-0A	7/20/2015	Quarterly	0	Late	Review for Cancelation
		AQUIFER TUBE	N116mArray-0A	9/1/2015	Quarterly	2		
		AQUIFER TUBE	N116mArray-8A	9/1/2015	Quarterly	2		
	300-FF	WELL	399-1-24	9/1/2015	Annual	11		Special Study
		WELL	399-1-24	9/27/2015	Annual	11		Special Study
		WELL	399-1-25	9/1/2015	Annual	11		Special Study
		WELL	399-1-25	9/27/2015	Annual	11		Special Study
		WELL	399-1-36	9/1/2015	Annual	11		Special Study
		WELL	399-1-36	9/27/2015	Annual	11		Special Study
		WELL	399-1-37	9/1/2015	Annual	11		Special Study
		WELL	399-1-37	9/27/2015	Annual	11		Special Study
		WELL	399-1-65	9/1/2015	Annual	11		Special Study
		WELL	399-1-65	9/11/2015	Annual	11		Special Study
		WELL	399-1-65	9/12/2015	Annual	11		Special Study
		WELL	399-1-65	9/13/2015	Annual	11		Special Study
		WELL	399-1-65	9/14/2015	Annual	11		Special Study
		WELL	399-1-65	9/15/2015	Annual	11		Special Study
		WELL	399-1-65	9/16/2015	Annual	11		Special Study
		WELL	399-1-65	9/17/2015	Annual	11		Special Study
		WELL	399-1-65	9/18/2015	Annual	11		Special Study
		WELL	399-1-65	9/19/2015	Annual	11		Special Study
		WELL	399-1-65	9/20/2015	Annual	11		Special Study
		WELL	399-1-65	9/27/2015	Annual	11		Special Study

Table 2. Fiscal Year 2015 Sample Trips in the River Corridor Areas awaiting (end of September 2015)

Quarter Scheduled	Interest Area	Sample Site	Site Name	Scheduled Date	Frequency	Months Remain	Status	Comment
		WELL	399-1-66	9/1/2015	Annual	11		Special Study
		WELL	399-1-66	9/27/2015	Annual	11		Special Study
		WELL	399-1-67	9/1/2015	Annual	11		Special Study
		WELL	399-1-67	9/11/2015	Annual	11		Special Study
		WELL	399-1-67	9/12/2015	Annual	11		Special Study
		WELL	399-1-67	9/13/2015	Annual	11		Special Study
		WELL	399-1-67	9/14/2015	Annual	11		Special Study
		WELL	399-1-67	9/15/2015	Annual	11		Special Study
		WELL	399-1-67	9/16/2015	Annual	11		Special Study
		WELL	399-1-67	9/17/2015	Annual	11		Special Study
		WELL	399-1-67	9/18/2015	Annual	11		Special Study
		WELL	399-1-67	9/19/2015	Annual	11		Special Study
		WELL	399-1-67	9/20/2015	Annual	11		Special Study
		WELL	399-1-67	9/27/2015	Annual	11		Special Study
		WELL	399-1-69	9/1/2015	Annual	11		Special Study
		WELL	399-1-69	9/27/2015	Annual	11		Special Study
		WELL	399-1-70	9/1/2015	Annual	11		Special Study
		WELL	399-1-70	9/27/2015	Annual	11		Special Study
		WELL	399-1-71	9/1/2015	Annual	11		Special Study
		WELL	399-1-71	9/27/2015	Annual	11		Special Study
		WELL	399-1-72	9/1/2015	Annual	11		Special Study
		WELL	399-1-72	9/27/2015	Annual	11		Special Study
		WELL	399-1-73	9/1/2015	Annual	11		Special Study
		WELL	399-1-73	9/27/2015	Annual	11		Special Study
		WELL	399-1-74	9/1/2015	Annual	11		Special Study
		WELL	399-1-74	9/11/2015	Annual	11		Special Study
		WELL	399-1-74	9/12/2015	Annual	11		Special Study
		WELL	399-1-74	9/13/2015	Annual	11		Special Study
		WELL	399-1-74	9/14/2015	Annual	11		Special Study
		WELL	399-1-74	9/15/2015	Annual	11		Special Study
		WELL	399-1-74	9/16/2015	Annual	11		Special Study
		WELL	399-1-74	9/17/2015	Annual	11		Special Study
		WELL	399-1-74	9/18/2015	Annual	11		Special Study
		WELL	399-1-74	9/19/2015	Annual	11		Special Study
		WELL	399-1-74	9/20/2015	Annual	11		Special Study
		WELL	399-1-74	9/27/2015	Annual	11		Special Study
		WELL	399-1-75	9/1/2015	Annual	11		Special Study
		WELL	399-1-75	9/11/2015	Annual	11		Special Study
		WELL	399-1-75	9/12/2015	Annual	11		Special Study
		WELL	399-1-75	9/13/2015	Annual	11		Special Study

Table 2. Fiscal Year 2015 Sample Trips in the River Corridor Areas awaiting (end of September 2015)

Quarter Scheduled	Interest Area	Sample Site	Site Name	Scheduled Date	Frequency	Months Remain	Status	Comment
		WELL	399-1-75	9/14/2015	Annual	11		Special Study
		WELL	399-1-75	9/15/2015	Annual	11		Special Study
		WELL	399-1-75	9/16/2015	Annual	11		Special Study
		WELL	399-1-75	9/17/2015	Annual	11		Special Study
		WELL	399-1-75	9/18/2015	Annual	11		Special Study
		WELL	399-1-75	9/19/2015	Annual	11		Special Study
		WELL	399-1-75	9/20/2015	Annual	11		Special Study
		WELL	399-1-75	9/27/2015	Annual	11		Special Study
		WELL	399-1-76	9/1/2015	Annual	11		Special Study
		WELL	399-1-76	9/27/2015	Annual	11		Special Study
		WELL	399-1-77	9/1/2015	Annual	11		Special Study
		WELL	399-1-77	9/11/2015	Annual	11		Special Study
		WELL	399-1-77	9/12/2015	Annual	11		Special Study
		WELL	399-1-77	9/13/2015	Annual	11		Special Study
		WELL	399-1-77	9/14/2015	Annual	11		Special Study
		WELL	399-1-77	9/15/2015	Annual	11		Special Study
		WELL	399-1-77	9/16/2015	Annual	11		Special Study
		WELL	399-1-77	9/17/2015	Annual	11		Special Study
		WELL	399-1-77	9/18/2015	Annual	11		Special Study
		WELL	399-1-77	9/19/2015	Annual	11		Special Study
		WELL	399-1-77	9/20/2015	Annual	11		Special Study
		WELL	399-1-77	9/27/2015	Annual	11		Special Study
		WELL	399-1-78	9/1/2015	Annual	11		Special Study
		WELL	399-1-78	9/27/2015	Annual	11		Special Study
		WELL	399-1-79	9/1/2015	Annual	11		Special Study
		WELL	399-1-79	9/27/2015	Annual	11		Special Study
		WELL	399-1-80	9/1/2015	Annual	11		Special Study
		WELL	399-1-80	9/27/2015	Annual	11		Special Study
		WELL	399-1-81	9/1/2015	Annual	11		Special Study
		WELL	399-1-81	9/11/2015	Annual	11		Special Study
		WELL	399-1-81	9/12/2015	Annual	11		Special Study
		WELL	399-1-81	9/13/2015	Annual	11		Special Study
		WELL	399-1-81	9/14/2015	Annual	11		Special Study
		WELL	399-1-81	9/15/2015	Annual	11		Special Study
		WELL	399-1-81	9/16/2015	Annual	11		Special Study
		WELL	399-1-81	9/17/2015	Annual	11		Special Study
		WELL	399-1-81	9/18/2015	Annual	11		Special Study
		WELL	399-1-81	9/19/2015	Annual	11		Special Study
		WELL	399-1-81	9/20/2015	Annual	11		Special Study
		WELL	399-1-81	9/27/2015	Annual	11		Special Study

Table 2. Fiscal Year 2015 Sample Trips in the River Corridor Areas awaiting (end of September 2015)

Quarter Scheduled	Interest Area	Sample Site	Site Name	Scheduled Date	Frequency	Months Remain	Status	Comment
		WELL	399-1-82	9/1/2015	Annual	11		Special Study
		WELL	399-1-82	9/27/2015	Annual	11		Special Study
		WELL	399-1-83	9/1/2015	Annual	11		Special Study
		WELL	399-1-83	9/27/2015	Annual	11		Special Study
		WELL	399-1-84	9/1/2015	Annual	11		Special Study
		WELL	399-1-84	9/27/2015	Annual	11		Special Study
		WELL	399-1-85	9/1/2015	Annual	11		Special Study
		WELL	399-1-85	9/27/2015	Annual	11		Special Study
		WELL	399-1-86	9/1/2015	Annual	11		Special Study
		WELL	399-1-86	9/27/2015	Annual	11		Special Study
		WELL	399-1-87	9/1/2015	Annual	11		Special Study
		WELL	399-1-87	9/11/2015	Annual	11		Special Study
		WELL	399-1-87	9/12/2015	Annual	11		Special Study
		WELL	399-1-87	9/13/2015	Annual	11		Special Study
		WELL	399-1-87	9/14/2015	Annual	11		Special Study
		WELL	399-1-87	9/15/2015	Annual	11		Special Study
		WELL	399-1-87	9/16/2015	Annual	11		Special Study
		WELL	399-1-87	9/17/2015	Annual	11		Special Study
		WELL	399-1-87	9/18/2015	Annual	11		Special Study
		WELL	399-1-87	9/19/2015	Annual	11		Special Study
		WELL	399-1-87	9/20/2015	Annual	11		Special Study
		WELL	399-1-87	9/27/2015	Annual	11		Special Study

Table 3. River Corridor Groundwater Sampling Locations Scheduled for sampling in October 2015

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
199-B2-13	199-F5-1	199-D4-13	199-H1-8	100-K SPRING 63-1	199-K-151		399-1-24
199-B2-14	199-F5-4	199-D4-15	199-H4-15CP	100-K SPRING 68-1	25-D		399-1-24
199-B2-16	199-F5-42	199-D4-19	199-H4-15CQ	100-K SPRING 82-2	26-D		399-1-24
199-B3-1	199-F5-43A	199-D4-20	199-H4-15CR	17-D	26-M		399-1-25
199-B3-46	199-F5-43B	199-D4-26	199-H4-15CS	18-S	26-S		399-1-25
199-B3-47	199-F5-44	199-D4-5	199-H4-6	199-K-117A	699-87-55		399-1-25
199-B3-50	199-F5-45	199-D4-55	199-H4-92	199-K-130	AT-K-6-D		399-1-36
199-B3-51	199-F5-46	199-D4-6	199-H4-93	199-K-152	AT-K-6-M		399-1-36
199-B3-52	199-F5-47	199-D4-65	199-H5-16	199-K-165	AT-K-6-S		399-1-36
199-B4-1	199-F5-48	199-D4-77	199-H6-7	199-K-166	C6263		399-1-37
199-B4-14	199-F5-52	199-D4-78	199-H6-8	199-K-173	C6264		399-1-37
199-B4-16	199-F5-54	199-D4-86	699-100-43B	199-K-18	C6265		399-1-37
199-B4-18	199-F5-55	199-D4-92	699-101-45	199-K-20	C7934		399-1-65
199-B4-4	199-F5-56	199-D4-93	699-88-41	199-K-202	C7935		399-1-65
199-B4-7	199-F5-6	199-D4-95	699-89-35	199-K-205	C7936		399-1-65
199-B4-8	199-F6-1	199-D4-96	699-90-34	199-K-207	River water adjacent to C6317/18/19		399-1-66
199-B5-1	199-F7-1	199-D4-97	699-90-37B	199-K-21	River water adjacent to C7934/35/36		399-1-66
199-B5-10	199-F7-3	199-D4-98	699-90-38	199-K-221	River water adjacent to C7937/38/39		399-1-66
199-B5-11	62-M	199-D4-99	699-90-45	199-K-222			399-1-67
199-B5-12	64-M	199-D5-101	699-91-46A	19-D			399-1-67
199-B5-13	67-M	199-D5-103	699-96-43	19-M			399-1-67
199-B5-14	699-71-30	199-D5-104	699-97-43B	21-M			399-1-69
199-B5-2	699-77-36	199-D5-107	699-97-43C	21-S			399-1-69
199-B5-5	699-86-42	199-D5-108	699-97-45	23-M			399-1-69
199-B5-6	699-87-42A	199-D5-109	699-97-45B	AT-K-1-D			399-1-70
199-B5-8	74-D	199-D5-110	699-97-47B	AT-K-1-M			399-1-70
199-B5-9	75-D	199-D5-114	699-97-60	AT-K-1-S			399-1-70
199-B8-6	76-D	199-D5-115	699-98-43	AT-K-2-D			399-1-71
199-B8-9	77-D	199-D5-127		AT-K-3-D			399-1-71
199-B9-2	C6302	199-D5-13		AT-K-3-M			399-1-71
199-B9-3	C6303	199-D5-130		AT-K-3-S			399-1-72
699-65-83	C6306	199-D5-131		AT-K-4-M			399-1-72
699-71-77	C6309	199-D5-134		AT-K-5-D			399-1-72
C8840	C6315	199-D5-14		AT-K-5-M			399-1-73
C8841	SEEP 187-1	199-D5-141		AT-K-5-S			399-1-73
C8842		199-D5-145		C6239			399-1-73
C8843		199-D5-146		C6240			399-1-74

Table 3. River Corridor Groundwater Sampling Locations Scheduled for sampling in October 2015

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
C8845		199-D5-159		C6241			399-1-74
C8847		199-D5-17		C6242			399-1-74
C8848		199-D5-19		C6243			399-1-75
C8849		199-D5-20		C6244			399-1-75
C8851		199-D5-32		C6245			399-1-75
C8852		199-D5-33		C6246			399-1-76
C8853		199-D5-34		C6247			399-1-76
C8855		199-D5-36		C6248			399-1-76
C8856		199-D5-37		C6249			399-1-77
C8859		199-D5-39		C6250			399-1-77
C8860		199-D7-3		C6251			399-1-77
C8861		199-D7-6		C6252			399-1-78
C9441		199-D8-101		C6253			399-1-78
C9442		199-D8-4		C6254			399-1-78
C9443		199-D8-89		C6255			399-1-79
C9444		199-D8-90		C6256			399-1-79
C9445		199-D8-91		C6257			399-1-79
C9446		199-D8-95		C6258			399-1-80
		199-D8-96		C6259			399-1-80
		199-D8-97		C6260			399-1-80
		199-D8-98		C6261			399-1-81
		699-97-48B		C7641			399-1-81
		699-97-48C		C7642			399-1-81
		699-97-61		C7643			399-1-82
				DK-04-2			399-1-82
				SK-057-3			399-1-82
				SK-077-1			399-1-83
							399-1-83
							399-1-83
							399-1-84
							399-1-84
							399-1-84
							399-1-85
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							399-1-87
							399-1-87

Table 3. River Corridor Groundwater Sampling Locations Scheduled for sampling in October 2015

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
							699-12-2C
							699-13-0A
							699-13-1E
							699-13-2D
							699-13-3A
							699-S3-E12
							C6368
							C6374
							C6378
							C6380

100/300 Areas Unit Managers Meeting
October 8, 2015

Documents for AR Submission

Number	Title	Referencing Doc/Driver
SGW-58600, R1	Post-Closure Corrective Action Groundwater Monitoring Report for the 183H Solar Evaporation Basins and the 300 Area Process Trenches July - December 2014	cleared August 2015
DOE/RL-2014-44 R0, 2015	Integrated Remedial Design Report/Remedial Action Work Plan for the 100-F/IU	cleared August 2015
DOE/RL-2014-44-ADD2, R0, 2015	Remedial Design Report Remedial Action Work Plan Addendum for the 100-F/IU Groundwater	cleared August 2015
SGW-58475 R1, 2015	Post-Closure Corrective Action Groundwater Monitoring Report for the 183H Solar Evaporation Basins and the 300 Area Process Trenches January - June 2014	cleared June 2015
DOE/RL-2015-20 R0, 2015	Annual Operations and Monitoring Report for the UPR-100-N-17: March 2014 - February 2015	cleared August 2015, ref'd in DOE/RL-2015-05 R0
DOE/RL-2015-05, R0, 2015	Calendar year 2014 Annual Summary Report for the 100-HR-3 and 100-KR-4 Pump and Treat Operations, and Groundwater Remediation, REV. 0	cleared August 2015
DOE/RL-2000-56, 2002	Waste Management Plan for the 300-FF-5 Operable Unit, Rev. 2	referenced in DOE/RL-2014-42 R0 SAP for 300-FF-5 OU
SGW-56993, 2014	Sampling Instruction for the 300-FF-5 Operable Unit Supplemental Post ROD Field Investigation, Rev. 0	referenced in DOE/RL-2014-42 R0 SAP for 300-FF-5 OU
SGW-58736, 2015	300-FF-5 Enhanced Attenuation Area Stage A Location Selection, Rev. 0	referenced in DOE/RL-2014-42 R0 SAP for 300-FF-5 OU
SGW-44606, 2010	Apatite Injection Piping Calculation and Model, Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.0
SGW-47614, 2011	Field Test Instruction 100-NR-2 Operable Unit Design Optimization Study for Sequestration of SR-90 Saturated Zone Apatite Permeable Reactive Barrier Extension, Rev. 1, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.1
SGW-47791, 2011	Borehole Summary for the Installation of One Hundred and Seventy One Wells at 100-NR-2 Operable Unit, FY 2009-2010, Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.2
SGW-48225, 2010	Apatite River Pump Skid Analysis, Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.3
SGW-48737, 2011	Apatite Injection System Civil/Structural Calculations, Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.4
BHI-00030, 1995	N Springs Groundwater Pump-and-Treat System Functional and Operational Requirements, Rev. 01, Bechtel Hanford, Inc., Richland, Washington.	referenced in SGW-56970, Rev.4

Documents for AR Submission

Number	Title	Referencing Doc/Driver
DOE/RL-90-38, 1991	Hanford Site Solid Waste Landfill Permit Application, Rev 0	needed to support the 2015 RCRA groundwater monitoring plan updates
DYN-SWL-LWCP-397, 1997	Liquid Waste Certification Plan for the Solid Waste Landfill Leachate, Rev 0	needed to support the 2015 RCRA groundwater monitoring plan updates
SGW-56970	Performance Report for the 2011 Apatite Permeable Reactive Barrier Extension for the 100-NR-2 Operable Unit, Rev. 0	referenced in Annual GW Report DOE/RL-2015-12
SGW-47614, 2011	Field Test Instruction 100-NR-2 Operable Unit Design Optimization Study for Sequestration of SR-90 Saturated Zone Apatite Permeable Reactive Barrier Extension, Rev. 1, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.1
SGW-47791, 2011	Borehole Summary for the Installation of One Hundred and Seventy One Wells at 100-NR-2 Operable Unit, FY 2009-2010, Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.	referenced in SGW-56970, Rev.2
SGW-56993, 2014	Sampling Instruction for the 300-FF-5 Operable Unit Supplemental Post ROD Field Investigation, Rev. 0	referenced in DOE/RL-2014-42 R0 SAP for 300-FF-5 OU
SGW-58723	Sampling Instruction for the Drilling and Installation of Six Groundwater Monitoring Wells in the 100-NR-2 Groundwater Operable Unit	cleared September 2015

Attachment 2

100K Area Report
100/300 Area Unit Manager Meeting
October, 2015

RL-0012 Sludge Treatment Project

TPA Milestone **M-016-177**, *Complete 105-KW sludge transfer equipment installation.* **(9/30/17)** – On Schedule

- Statements of Work for ECRTS equipment procurement are in development, and have been grouped into 20 separate procurement sets. Fifteen procurement sets have been fully developed and are in the formal acquisition process including the Sludge Transport and Storage Container (STSC) Inert Gas and Auxiliary Ventilation System. Three procurements have been completed.
- The first of 24 total STCSs has been fabricated and received.
- Preliminary Documented Safety Analysis Revision 2 has been provided to RL for review and approval.
- Planning in support of in-basin construction continues.

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

- EPA has provided a letter to RL formalizing expectations to satisfy new TPA milestone dates. In accordance with those expectations, a draft Explanation of Significant Difference (ESD) has been informally reviewed by EPA and comments are being incorporated. In preparation for a public comment period on the ESD, the 30-day pre-notice required by the TPA has been issued. The ESD will modify the 100 K Area K Basins Record of Decision to provide for longer storage of K Basins sludge prior to treatment and identify portions of T Plant as being onsite for purposes of implementation of the CERCLA remedy.
- ECRTS tooling and equipment fabrication, testing, and operating procedure and training development continue.

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

- The following pre-deactivation actions are underway:
  - Integrated Water Treatment System garnet filter media removal system design, and Skimmer System sand filter media sampling and characterization activities continue.
  - Radiation Control Engineers continue with dose to curie modeling utilizing data provided by KW Basin operations. This characterization data will become a key input to the calculation to demonstrate compliance with ERDF waste acceptance criteria for 105-KW Basin substructure demolition rubble.

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

- The preliminary treatment and packaging site evaluation report and the remedial design/remedial action work plan (DOE/RL-2011-15) for sludge treatment and packaging have been issued.

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

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

RL-0041 K Facility Demolition and Soil Remediation

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

- Mobilization of equipment and other preparatory actions for remediation of the AB waste site area began in September.

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.*
(9/302024) - On Schedule

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

Other Information and Status Updates

100K Bore Holes

Well construction, final well development, and collection of the post development groundwater sample has been completed at both the 116-KE-3 and the UPR-100-K-1 wells. Final laboratory results have been received for samples from the 116-KE-3 borehole and preliminary results continue to be received for samples from the UPR-100-K-1 borehole. Demobilization activities are underway with removal of drill equipment followed by enclosure tear down and disposal.

Attachment 3

October 8, 2015 Unit Manager's Meeting
Closure Operations Status

100-B/C

- Awaiting revegetation of 100-B-35:1

100-D

- Awaiting revegetation
- Work Order provided to CHPRC for replacement wells

100-H

- Finalizing closure documents for 100-H-59:2
- Completed backfill at 100-H, backfill subcontractor demobilized from site
- Finalizing closure documentation for 100-H-28:2 and 100-H-42
- Work Order provided to CHPRC for replacement wells

100-N

- Awaiting revegetation of 100-N-96

618-10 Trench Remediation

- Continuing processing and load-out of uranium oxide and debris drums
- Continuing primary/secondary sorting and load-out
- Preparations being finalized to re-start concrete drum processing
- Continuing retrieval, overpacking and NDA of drums encountered in trench

618-10 VPU Remediation

- Initiated VPU augering

100-IU-2/6

- Awaiting revegetation of 600-358 and 600-20
- Remediated and verification sampled 600-326

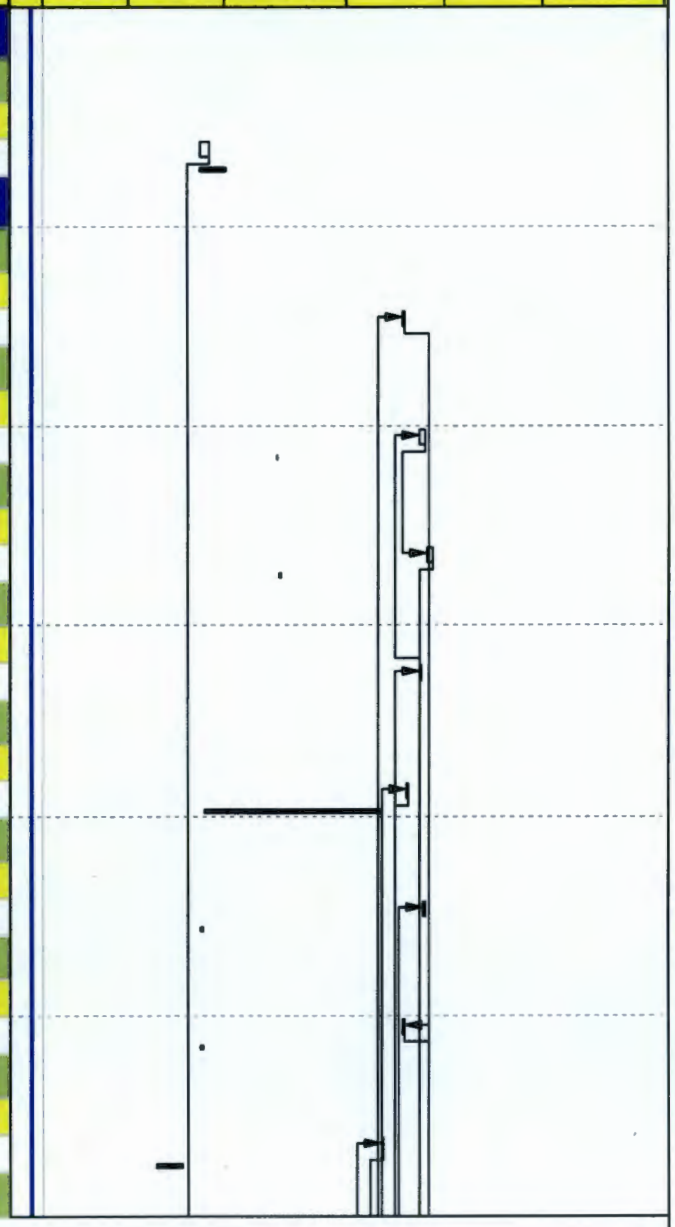
Attachment 4

Data Date: 28-Sep-15

100 Area UMM Schedule

29-Sep-15 11:39

Activity ID	Activity Name	Start	Finish
100 B/C			
100-B-35:1			
Revegetation			
BB524E10	Reveg 100-B-35:1 (11.5 Acres)	16-Nov-15*	18-Nov-15
100 D			
100-D-69			
Revegetation			
CBB0535E	Reveg 100-D-69 (0.25 Acres)	13-Jan-16	13-Jan-16
100-D-85:2			
Revegetation			
CBB0544E	Reveg 100-D-85:2 (9.0 acres)	18-Jan-16	19-Jan-16
100-D-86:1			
Revegetation			
CBB0545E	Reveg 100-D-86:1 (8.0 acres)	20-Jan-16	21-Jan-16
100-D-99			
Revegetation			
CBB0550E	Reveg 100-D-99 (0.5 Acres)	18-Jan-16	18-Jan-16
147-D ISRM Pond			
Revegetation			
CBB0556E	Reveg 147-D ISRM Pond (3.5 acres)	14-Jan-16	14-Jan-16
100-D-75:1			
Revegetation			
CBB0558E	Reveg 100-D-75:1 (6.70 acres)	19-Jan-16	19-Jan-16
100-D-106			
Revegetation			
CBC0518E	Reveg 100-D-106 (1.25 Acres)	13-Jan-16	13-Jan-16
118-D-1			
Revegetation			
CBC0604E	Reveg 118-D-1 (2.51 acres)	07-Jan-16	07-Jan-16
118-D-5			



Current Bar Labels | % Complete | Project Baseline | Milestone

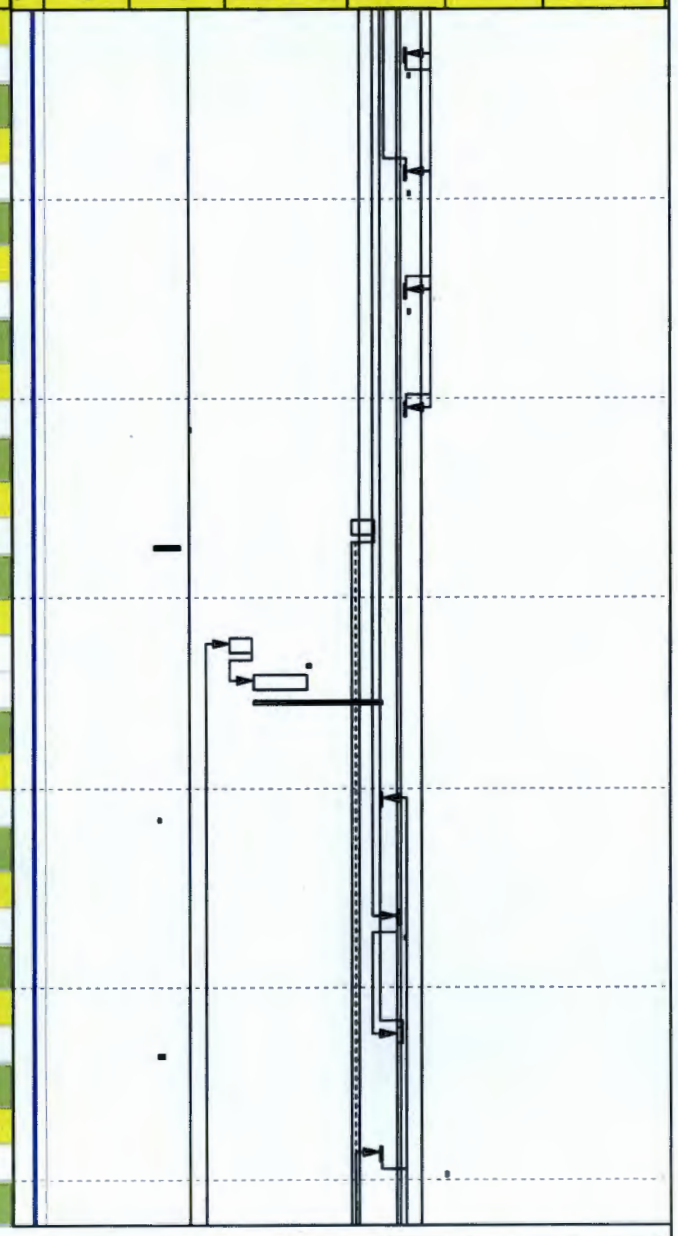
Closure Operations

Data Date: 28-Sep-15

100 Area UMM Schedule

29-Sep-15 11:39

Activity ID	Activity Name	Start	Finish
Revegetation			
CBC0608E	Reveg 118-D-5 (1.0 acres)	13-Jan-16	13-Jan-16
118-DR-1			
Revegetation			
CBC0609E	Reveg 118-DR-1 (1.0 acres)	13-Jan-16	13-Jan-16
120-D-2			
Revegetation			
CBB0404E	Reveg 120-D-2 (0.5 acres)	13-Jan-16	13-Jan-16
100-D-86:3			
Revegetation			
CBB0546E	Reveg 100-D-86:3 (2.0 acres)	13-Jan-16	13-Jan-16
100-D-31:11/:12			
Revegetation			
CBB0516J	Reveg 100-D-31:11/12 (14.43 acres)	29-Dec-15	04-Jan-16
100-D-100			
Revegetation			
100D100A280	Reveg 100-D-100 (10 acres)	24-Nov-15	30-Nov-15
100D100A432	Reveg 100-D-100 (Tied to Tier 3) - 48.86 acres	01-Dec-15	16-Dec-15
100D281			
Revegetation			
CBC0507E	Reveg 100-D-28:1 (0.33 acres) (tied to D-50:6)	06-Jan-16	06-Jan-16
100-D-50:6			
Revegetation			
RD1506500	Reveg 100-D-50:6 (5.0 acres)	11-Jan-16	11-Jan-16
100-D-50:7			
Revegetation			
RD05507140	Reveg 100-D-50:7 (5.74 acres)	11-Jan-16	12-Jan-16
100-D-50:9			
Revegetation			
RD05509140	Reveg 100-D-50:9 (3.0 acres)	06-Jan-16	06-Jan-16
100-D-72			

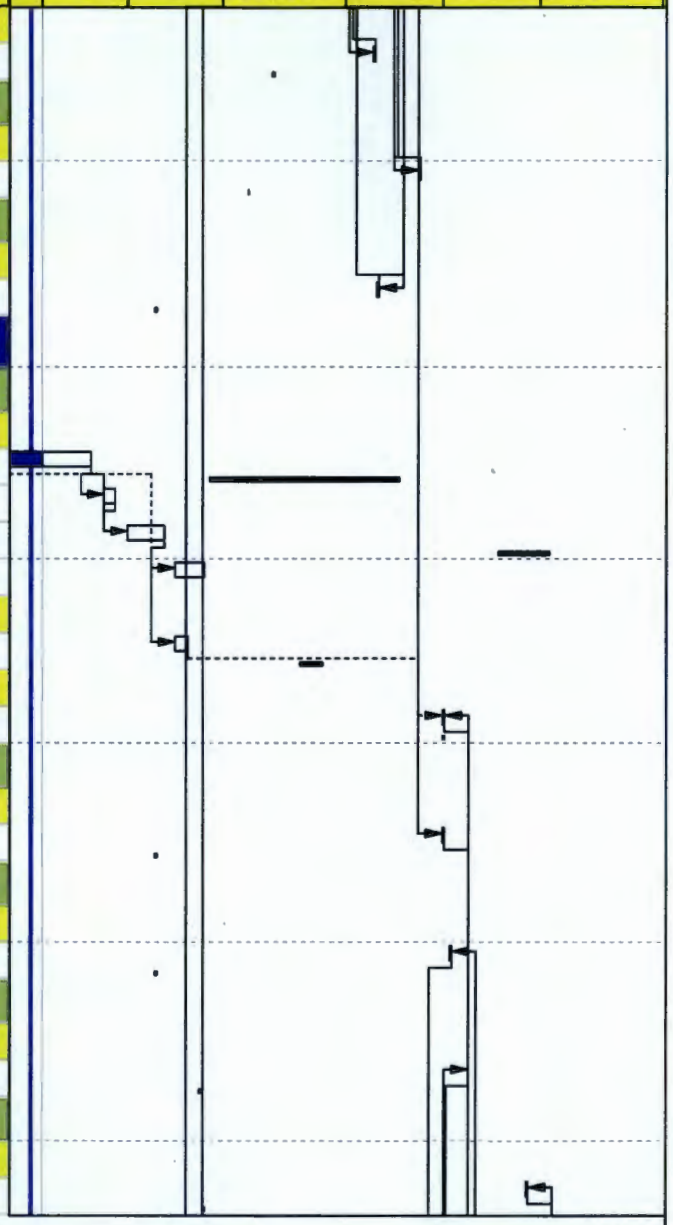


Current Bar Labels ▭ % Complete ■
Project Baseline ▬ ◆ Milestone

Closure Operations

100 Area UMM Schedule

Activity ID	Activity Name	Start	Finish
Revegetation			
CBB0537E	Reveg 100-D-72 (1.57 acres)	05-Jan-16	05-Jan-16
100-D-97			
Revegetation			
CBB0548E	Reveg 100-D-97 (0.5 acres)	18-Jan-16	18-Jan-16
1607-D5			
Revegetation			
RD67D51500	Reveg 1607-D5 (0.10 acres)	06-Jan-16	06-Jan-16
100 H			
100-H-59:2			
Final Project Closeout			
H592081	RL/Reg Review Draft A Closure Doc 100-H-59:2	16-Sep-15 A	15-Oct-15
H592083	Resolve RL/Reg Comments Draft A Clos Doc 100-H-59:2	19-Oct-15	22-Oct-15
H592091	RL/Reg Sign Rev 0 Closure Doc 100-H-59:2	26-Oct-15	05-Nov-15
H592121	Prepare and Issue Rev 0 Closure Doc 100-H-59:2	09-Nov-15	17-Nov-15
Backfill			
H592021	Recontour 100-H-59:2 (1,300 BCMs)	09-Nov-15	12-Nov-15
Revegetation			
H592101	Reveg 100-H-59:2 (2.5 acres)	25-Jan-16	25-Jan-16
116-H-9			
Revegetation			
HB404E20	Reveg 116-H-9 (0.40 acre)	25-Jan-16	25-Jan-16
100-H-51:2			
Revegetation			
HB520E	Reveg 100-H-51:2 (1.25 acre)	27-Jan-16	27-Jan-16
100-H-49:1			
Revegetation			
HB524E	Reveg 100-H-49:1 (0.3 Acres)	01-Feb-16	01-Feb-16
100-H-51:1			
Revegetation			
HB525E	Reveg 100-H-51:1 (0.30 Acres)	18-Feb-16	18-Feb-16



Current Bar Labels ▭ % Complete ■
Project Baseline ▬ ◆ Milestone

Closure Operations

Data Date: 28-Sep-15

100 Area UMM Schedule

29-Sep-15 11:39

Activity ID	Activity Name	Start	Finish
100-H-51:3			
Revegetation			
HB526E	Reveg 100-H-51:3 (0.30 Acres)	23-Feb-16	23-Feb-16
100-H-51:6			
Revegetation			
HB526E10	Reveg 100-H-51:6 (1.60 Acres)	27-Jan-16	27-Jan-16
118-H-4			
Revegetation			
HC604E20	Reveg 118-H-4 (0.22 acre)	18-Feb-16	18-Feb-16
100-H-59:1			
Revegetation			
HB528E	Reveg 100-H-59:1 (1.0 Acres)	27-Jan-16	27-Jan-16
100-H-31			
Revegetation			
HB502E	Reveg 100-H-31 (0.33 acre)	25-Jan-16	25-Jan-16
116-H-5			
Revegetation			
HB503E20	Reveg 116-H-5 (3.0 acres)	25-Jan-16	25-Jan-16
100-H-3			
Revegetation			
HB900F1	Reveg 100-H-3 (0.3 acres) (tied with H-43)	25-Jan-16	25-Jan-16
100-H-4			
Revegetation			
HB910F1	Reveg 100-H-4 (1.2 acres) (tied with H-43)	27-Jan-16	27-Jan-16
100-H-28:2			
Final Project Closeout			
HB511D64	Prepare Draft A Closure Doc for 100-H-28:2	21-May-15 A	06-Oct-15
HB511D67	RL/Reg Sign Rev. 0 Closure Doc for 100-H-28:2	02-Sep-15 A	28-Sep-15
Revegetation			
HB511E07	Reveg 100-H-28:2 (49.0 Acres)	02-Feb-16	18-Feb-16
100-H-28:3			

Current Bar Labels ▭ % Complete ■
Project Baseline ▬ ◆ Milestone

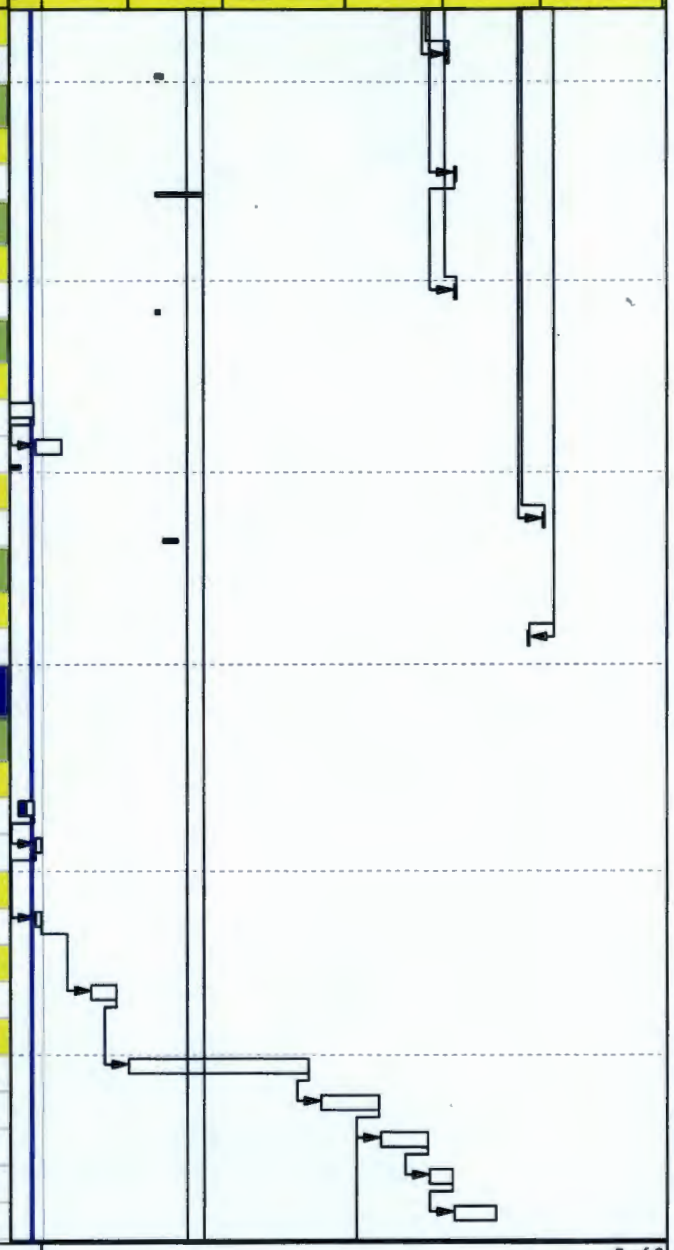
Closure Operations

Data Date: 28-Sep-15

100 Area UMM Schedule

29-Sep-15 11:39

Activity ID	Activity Name	Start	Finish
Revegetation			
HB512E	Reveg 100-H-28:3 (4.0 acres)	26-Jan-16	26-Jan-16
100-H-28:4			
Revegetation			
HB513E50	Reveg 100-H-28:4 (4.25 Acres)	28-Jan-16	28-Jan-16
100-H-28:5			
Revegetation			
HB514E	Reveg 100-H-28:5 (4.0 acre)	28-Jan-16	28-Jan-16
100-H-42			
Final Project Closeout			
HB515D21	RL/Reg Sign Rev. 0 Closure Doc for 100-H-42	02-Sep-15 A	28-Sep-15
HB515D23	Prepare and Issue Rev. 0 Closure Document for 100-H-42	29-Sep-15	06-Oct-15
Revegetation			
HB515E	Reveg 100-H-42 (2.5 acre)	22-Feb-16	22-Feb-16
100-H-44			
Revegetation			
HB517E	Reveg 100-H-44 (1.0 acres)	18-Feb-16	18-Feb-16
IU-2/6			
600-326 *Cultural Review In-Progress			
Excavation			
MOB60326	Mobilize to 600-326	24-Sep-15 A	28-Sep-15
IU222640	Excavation 600-326 (IU-6) (13 BCMs)	29-Sep-15	30-Sep-15
Loadout			
IU222650	Loadout 600-326 (29 tons)	29-Sep-15	30-Sep-15
WI and Closeout Sampling			
IU222710	Closure Sampling and Analysis 600-326	15-Oct-15	22-Oct-15
Final Project Closeout			
IU222720	Prepare Closure Doc 600-326	26-Oct-15	17-Dec-15
IU222730	RL/Reg Review of Draft A Closure Doc 600-326	21-Dec-15	06-Jan-16
IU222735	Resolve RL/Reg Comments Draft A Closure Doc 600-326	07-Jan-16	20-Jan-16
IU222740	RL/Reg Signature Rev.0 Closure Doc 600-326	21-Jan-16	27-Jan-16
IU222745	Prepare and Issue Rev.0 Closure Doc 600-326	28-Jan-16	08-Feb-16



Current Bar Labels ▬ % Complete
Project Baseline ◆ ◆ Milestone

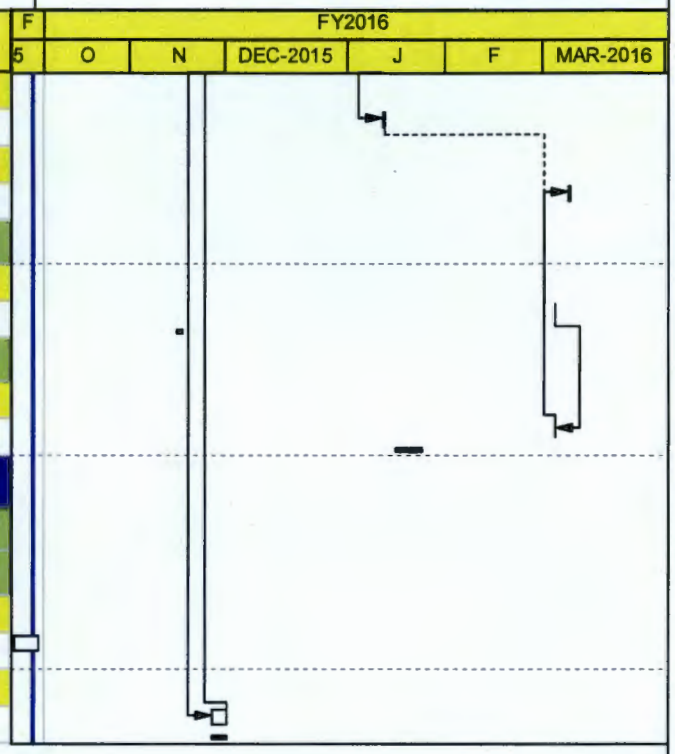
Closure Operations

Data Date: 28-Sep-15

100 Area UMM Schedule

29-Sep-15 11:39

Activity ID	Activity Name	Start	Finish
Backfill			
IU222660	Backfill 600-326 (1 BCM)	07-Jan-16	07-Jan-16
Revegetation			
IU222680	Reveg 600-326 (0.1 acre)	29-Feb-16	29-Feb-16
600-20			
Revegetation			
IU226210	Reveg 600-20 (3.12 acres)	25-Feb-16	25-Feb-16
600-332			
Revegetation			
IU223680	Reveg 600-332 (1 acre)	25-Feb-16	25-Feb-16
100 N			
100-N-83 *Cultural Review In-Progress			
100-N-96			
Final Project Closeout			
NB5C3D05	Prepare Closure Doc - 100-N-96	14-May-15 A	29-Sep-15
Revegetation			
NB5C3E	Reveg 100-N-96 (8.16 Acres)	19-Nov-15	23-Nov-15



Current Bar Labels ▬ % Complete
Project Baseline ◆ ◆ Milestone

Closure Operations

Attachment 5

TRI-PARTY AGREEMENT		
Change Notice Number TPA-CN- 677	**TPA CHANGE NOTICE FORM**	Date: 8/19/2015
Document Number, Title, and Revision: DOE/RL-97-01, *Interim Action Waste Management Plan for the 100-HR-3 and 100-KR-4 Operable Unit*, Revision 5.		Date Document Last Issued: August 2005
Originator: Kris Ivarson		Phone: (509) 376-1941

Description of Change:

Appendix A Table A-1, of the HR-3/ KR-4 Waste Management Plan is being updated to add 7 replacement wells.

M.W. Cline (**DOE**) and Nina Menard/Chris Guzzetti (**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*.

Table A-1 of DOE/RL-97-01, Rev. 5 is revised to add wells 199-D5-149, 199-D5-150, 199-D5-151, 199-D5-152,199-H4-87, 199-H4-88, and 199-H4-89.

Note: Added text is denoted by double underline. Deleted text is denoted by ~~strike-through.~~

Note: *The page numbers from Revision 5 of DOE/RL-97-01 do not directly correspond to the page numbers of the revised tables in the appendices, due to change notice revisions since Revision 5 was issued in 2005. These changes have expanded the length of the tables, changing the corresponding page numbers. This change notice supersedes all previous revisions of Table A-1 and page numbers will be updated when the document is revised. Therefore, no document page numbers are indicated on the attachment.*

Justification and Impacts of Change:

Excavations for remediation of waste sites at 100-D and 100-H Area intersected existing monitoring wells, which were removed as a result. These wells are being replaced with the wells listed in this change notice. A total of 7 replacement wells are listed.

The text incorporates changes from TPA-CN-169, TPA-CN-187, TPA-CN-222, TPA-CN-257, TPA-CN-291, TPA-CN-316, TPA-CN-354, TPA-CN-377, TPA-CN-409, TPA-CN-464, TPA-CN-550, TPA-CN-580, TPA-CN-616, TPA-CN-623, and TPA-CN-643.

Approvals:

Michael W. Cline DOE Project Manager	8/27/2015 Date	[X] Approved [ ] Disapproved
[signature] EPA Project Manager	8/27/15 Date	[X] Approved [ ] Disapproved
Nina M. Menard Ecology Project Manager	8/31/15 Date	[X] Approved [ ] Disapproved

Table A-1. 100-HR-3 Operable Unit Well List

Well Names / Identifier				
199-D2-10	199-D4-35	199-D4-70	199-D5-109	199-D5-153
199-D2-11	199-D4-36	199-D4-71	199-D5-110	199-D5-154
199-D2-12	199-D4-37	199-D4-72	199-D5-111	199-D5-155
199-D2-6	199-D4-38	199-D4-73	199-D5-112	199-D5-156
199-D2-9	199-D4-39	199-D4-74	199-D5-113	199-D5-157
199-D3-2	199-D4-4	199-D4-75	199-D5-114	199-D5-158
199-D3-3	199-D4-40	199-D4-76	199-D5-115	199-D5-159
199-D3-4	199-D4-41	199-D4-77	199-D5-116	199-D5-16
199-D3-5	199-D4-42	199-D4-78	199-D5-117	199-D5-17
199-D3-6	199-D4-43	199-D4-79	199-D5-118	199-D5-18
199-D4-1	199-D4-44	199-D4-8	199-D5-123	199-D5-19
199-D4-10	199-D4-45	199-D4-80	199-D5-125	199-D5-20
199-D4-101	199-D4-46	199-D4-81	199-D5-126	199-D5-32
199-D4-11	199-D4-47	199-D4-82	199-D5-127	199-D5-33
199-D4-12	199-D4-48	199-D4-83	199-D5-128	199-D5-34
199-D4-13	199-D4-49	199-D4-84	199-D5-129	199-D5-36
199-D4-14	199-D4-5	199-D4-85	199-D5-13	199-D5-37
199-D4-15	199-D4-50	199-D4-86	199-D5-130	199-D5-38
199-D4-16	199-D4-51	199-D4-87	199-D5-131	199-D5-39
199-D4-17	199-D4-52	199-D4-88	199-D5-132	199-D5-40
199-D4-18	199-D4-53	199-D4-89	199-D5-133	199-D5-41
199-D4-19	199-D4-54	199-D4-9	199-D5-134	199-D5-42
199-D4-2	199-D4-55	199-D4-90	199-D5-135	199-D5-43
199-D4-20	199-D4-56	199-D4-91	199-D5-136	199-D5-44
199-D4-21	199-D4-57	199-D4-92	199-D5-137	199-D5-92
199-D4-22	199-D4-58	199-D4-93	199-D5-138	199-D5-97
199-D4-23	199-D4-59	199-D4-94	199-D5-139	199-D5-98
199-D4-24	199-D4-6	199-D4-95	199-D5-14	199-D5-99
199-D4-25	199-D4-60	199-D4-96	199-D5-141	199-D6-1
199-D4-26	199-D4-61	199-D4-97	199-D5-143	199-D6-2
199-D4-27	199-D4-62	199-D4-98	199-D5-145	199-D6-3
199-D4-28	199-D4-63	199-D4-99	199-D5-146	199-D7-3
199-D4-29	199-D4-64	199-D5-101	199-D5-147	199-D7-4
199-D4-3	199-D4-65	199-D5-103	199-D5-148	199-D7-5
199-D4-30	199-D4-66	199-D5-104	199-D5-149	199-D7-6
199-D4-31	199-D4-67	199-D5-105	199-D5-15	199-D8-100
199-D4-32	199-D4-68	199-D5-106	199-D5-150	199-D8-4
199-D4-33	199-D4-69	199-D5-107	199-D5-151	199-D8-5
199-D4-34	199-D4-7	199-D5-108	199-D5-152	199-D8-53

Table A-1. 100-HR-3 Operable Unit Well List

Well Names / Identifier				
199-D8-54A	199-H1-4	199-H4-15CQ	199-H4-86	699-90-34
199-D8-54B	199-H1-40	199-H4-15CR	199-H4-87	699-90-37B
199-D8-55	199-H1-42	199-H4-15CS	199-H4-88	699-90-38
199-D8-6	199-H1-43	199-H4-16	199-H4-89	699-90-45
199-D8-68	199-H1-45	199-H4-17	199-H4-90	699-91-46A
199-D8-69	199-H1-46	199-H4-18	199-H4-91	699-92-49
199-D8-70	199-H1-5	199-H4-2	199-H4-92	699-93-48A
199-D8-71	199-H1-6	199-H4-4	199-H4-93	699-93-48C
199-D8-72	199-H1-7	199-H4-45	199-H5-10	699-93-50
199-D8-73	199-H1-8	199-H4-46	199-H5-11	699-94-41
199-D8-88	199-H1-9	199-H4-47	199-H5-12	699-94-43
199-D8-89	199-H2-1	199-H4-49	199-H5-13	699-95-45
199-D8-90	199-H3-10	199-H4-5	199-H5-14	699-95-45B
199-D8-91	199-H3-25	199-H4-6	199-H5-16	699-95-48
199-D8-93	199-H3-26	199-H4-63	199-H5-1A	699-95-51
199-D8-94	199-H3-27	199-H4-64	199-H5-2	699-96-43
199-D8-95	199-H3-2A	199-H4-65	199-H5-3O	699-96-44
199-D8-96	199-H3-2B	199-H4-66	199-H5-3P	699-96-45
199-D8-97	199-H3-2C	199-H4-67	199-H5-4O	699-96-52B
199-D8-98	199-H3-3	199-H4-68	199-H5-4P	699-97-41
199-D8-99	199-H3-4	199-H4-69	199-H5-5O	699-97-43B
199-H1-1	199-H3-5	199-H4-70	199-H5-5P	699-97-43C
199-H1-2	199-H3-6	199-H4-71	199-H5-6	699-97-45
199-H1-20	199-H3-7	199-H4-72	199-H5-7	699-97-47B
199-H1-21	199-H3-8	199-H4-73	199-H5-8	699-97-48B
199-H1-25	199-H3-9	199-H4-74	199-H5-9	699-97-48C
199-H1-27	199-H4-10	199-H4-75	199-H6-1	699-97-51A
199-H1-3	199-H4-11	199-H4-76	199-H6-2	699-97-60
199-H1-32	199-H4-12A	199-H4-77	199-H6-3	699-97-61
199-H1-33	199-H4-12B	199-H4-78	199-H6-4	699-98-43
199-H1-34	199-H4-12C	199-H4-79	199-H6-7	699-98-46
199-H1-35	199-H4-13	199-H4-8	199-H6-8	699-98-49A
199-H1-36	199-H4-15A	199-H4-80	699-101-48B	699-98-51
199-H1-37	199-H4-15B	199-H4-81	699-83-47	699-99-41
199-H1-38	199-H4-15C	199-H4-82	699-88-41	B8255
199-H1-39	199-H4-15CP	199-H4-85	699-89-35	B8256

Attachment 6

TRI-PARTY AGREEMENT		
Change Notice Number TPA-CN- 659	**TPA CHANGE NOTICE FORM**	Date: 9/3/15
Document Number, Title, and Revision: DOE/RL-2012-45, *Sampling and Analysis Plan for Installation of 100-HR-3 Groundwater Operable Unit Replacement Wells*		Date Document Last Issued: November 2012
Originator: Kris Ivarson		Phone: 376-1941

Description of Change:

Modification of well locations for replacement wells at 100-D and 100-H. Adds one well. Soil sampling is also added to the SAP.

R.J. Corey and N. Menard/C. Guzzetti agree that the proposed change
DOE **Lead Regulatory Agency**
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 document is modified throughout to incorporate changes for the replacement wells, adding a well and to add soil sampling to the SAP. An additional change to Table 2-3 is being made to correct a holding time that was incorrect in the original document.

Note: Added text is denoted by double underline. Deleted text is denoted by ~~strike-through.~~
Affected pages 1-1, 1-3 through 1-8, New pages 1-9 through 1-14, 2-6 through 2-8, 2-10 through 2-13, 3-1, 3-2, 3-3, 3-5, and 3-7 through 3-12.

Justification and Impacts of Change:

The Sampling and Analysis Plan (SAP) for Installation of 100-HR-3 Groundwater Operable Unit Replacement Wells (DOE/RL-2012-45, Rev. 0) was approved in 2012. The SAP was prepared for the installation of wells in the 100-D and 100-H Areas to replace wells that were to be decommissioned in support of waste site excavation. In 2012, a total of 13 wells were planned on being replaced, based on the anticipated extent of the excavations. Ultimately, only six of the 13 replacement wells were installed in 2013: 199-H4-86, 199-H4-85, 199-D5-145, 199-D5-146, 199-D5-147 and 199-D5-148.

During remediation activities, persistent contamination levels were identified at 100-D-100. The investigation identified contamination along two edges of the excavation, along the periodically rewetted zone. One area is located along the northeast corner of the excavation area, where waste site 100-D-56 (sodium dichromate supply pipeline) intersects the 100-D-100 waste site excavation footprint. Additional excavation along that sidewall was not feasible due to safety considerations. A second area is located on the western sidewall. A bench in the excavation was present in this area with noticeable chromium discoloration within 10 feet of the water table. The bench and sidewall were excavated to the extent practicable. Additional contamination may be present farther west, within the sidewall and beyond the extent of removal.

In response to the information gained during the waste site excavation activities, several replacement well locations are to be moved and/or soil sampling is being added, as described below.

- Replacement Well 199-D5-150 is to be moved to the east side of the 100-D-100 excavation, and align with the location of decommissioned Well 199-D5-121. This addresses the potential contamination remaining in the vadose zone along the north-eastern sidewall of the excavation.

- Replacement Well 199-D5-151 is to be moved to the west side of the 100-D-100 excavation. The location addresses the potential for remaining contamination in the vadose zone along the western sidewall of the excavation.

- Vadose zone sampling (Table 1-3) is added for wells 199-D5-149, 199-D5-151, and 199-D5-152. The wells are to be placed within an area of suspected contamination within the periodically rewetted zone and aquifer, based on the results of the 100-D-100 excavation sampling.

- Replacement Well 199-H4-88 is to be moved to a location upgradient of the 183-H solar evaporation basin #1. This will assist in determining the extent of the remaining hexavalent chromium plume in that area. Vadose zone sampling (Table 1-3) has been added to determine if contamination is present in the periodically rewetted zone. The addition of soil sampling at Well 199-H4-88 is directly related to moving the well to within the footprint of the excavation. Based on groundwater sampling data and historical information, contamination remains in the vadose zone at the 183-H solar evaporation basins. The magnitude of the contamination remaining has not yet been determined along the western side of the waste site.

- Replacement Well 199-H4-87 is to be moved to a location within the 100-H-46 excavation area. The well will be placed downgradient of where the highest hexavalent chromium concentrations were identified during the waste site remediation. Vadose zone sampling (Table 1-3) has been added to determine if contamination is present in the periodically rewetted zone. Soil sampling was added to Well 199-H4-87 based on its location within the excavation footprint and high levels of contamination in the immediate vicinity. The magnitude of the contamination remaining has not yet been determined at the waste site.

- There is no change to the location of sampling proposed for Well 199-H4-89. The well is located outside the footprint of the excavation area and soil contamination is not expected in this area.

Drilling will target the period of low river stage to meet the data quality objective of characterizing Cr(VI) in the vadose zone immediately above the periodically rewetted zone, through the rewetted zone and 10 ft into the water table. Data is to be collected to a depth consistent with the prior excavation boreholes during low river stage, as specified in the document.

NOTE: Table 1-1 headers are being changed to include the year the well installations are planned.

Approvals:

FOR DOE Project Manager	9.15.15 Date	[X] Approved [ ] Disapproved
EPA Project Manager	9/15/15 Date	[X] Approved [ ] Disapproved
Ecology Project Manager	9/16/15 Date	[X] Approved [ ] Disapproved

1 Introduction

This sampling and analysis plan (SAP) has been prepared for the installation of wells in the 100-D and 100-H Areas to replace wells that ~~are~~ were being decommissioned to support source area remediation. This SAP directs the collection of aquifer and vadose sediment and groundwater data. Aquifer sediment samples will facilitate well design. Groundwater and vadose data will be used to confirm ambient chemical concentrations

The 100-D and 100-H Areas are within the geographic boundary of the 100-HR-3 Operable Unit (OU), which underlies the top, northwest bend of the Columbia River in the 100 Area of the Hanford Site (Figure 1-1). The 100-HR-3 OU contains the 100-D and 100-H Area hexavalent chromium plumes and associated vadose zone sources. Remediation of vadose zone sources is ongoing using Remove, Treat, and Dispose technology and active groundwater remediation is being implemented through ion exchange pump-and-treat technology using the DX and HX pump-and-treat systems and the in situ redox manipulation (ISRM) barrier in 100-D. Together, these actions constitute the integrated interim source and groundwater remedies applied to the 100-DR-1, 100-DR-2, 100-HR-1, and 100-HR-2 source area OUs, and the 100-HR-3 groundwater OU (EPA/ROD/R10-96/134, EPA/AMD/R10-97/044, EPA/ROD/R10-99/039, EPA/ROD/R10-00/121, and EPA/AMD/R10-00/122).

The 13 replacement wells are listed in Table 1-1. Six of these wells ~~are pending replacement (projected for fiscal year 2013), one is in near term replacement (projected for fiscal year 2014),~~ have been installed, and the remaining ~~six~~ wells are scheduled to be replaced in Fiscal Year 2016, ~~an out year~~ after the source area remediation is complete and the excavated areas are backfilled. The locations of the ~~pending~~ now installed replacement wells are shown as yellow dots in Figures 1-2 and 1-3. The remaining replacement wells are shown as orange and magenta dots in Figures 1-2 and 1-3. The schedule for well replacement is based on the evaluation of site priorities and available funding.

A systematic planning process was used to identify data needs for well installation. The project team members attended a planning meeting on September 6, 2012, and finalized the data needs. The planning process identified the type, quantity, and quality of data that will be appropriate for the intended use and to support the sample design presented in this SAP.

Aquifer sediments will be collected during borehole installation to determine screen size and filter pack. A groundwater sample will be collected after well development and analyzed for a subset of 100-HR-3 OU groundwater monitoring analytes (Table 1-2). These samples and groundwater samples collected after well acceptance are identified in the Field Sampling Plan (Chapter 3 of this report). In addition, three water samples will be collected from each well planned in the 100-D Area during drilling to evaluate the vertical distribution of hexavalent chromium, as listed in Table 1-3.

Vadose zone soil samples will be collected during drilling at Well 199-D5-149, 199-D5-150, 199-D5-151, 199-D5-152, 199-H4-87, and 199-H4-88 to determine if contamination remains in the periodically rewetted zone. Soil samples for wells in 100-D Area will be analyzed for the constituents listed in Table 1-4. Soil samples for wells in 100-H Area will be analyzed for constituents listed in Table 1-5. Figures 1-4, 1-5 and 1-6 present the geology and estimated sample depths for each well in 100-D. Depths are adjusted to reflect the modified ground surface. Figures 1-7 and 1-8 present the geology and estimated sample depths for wells in 100-H. Ground surface elevations have not been surveyed, and therefore the figures represent conditions prior to excavation and backfill of the area.

Schedule of drilling and completion activities will be coordinated between the source remediation team and the drilling and sampling team, but will target a period of low river stage.

Table 1-1. Replacement Monitoring Wells in 100-HR-3

Replacement Well Name and Borehole ID	Replacement Well Easting*	Replacement Well Northing*	Historical Purpose	Replacing Well	Easting*	Northing*	Comment
~~Pending Wells for Installation~~ Installed Wells							
199-H4-86 (C8724)	577705.05	152736.21	Injection	199-H4-14	577803.7	152752.4	Relocate injection well to the west away from excavation.
199-H4-85 (C8723)	577980.04	152880.67	RCRA monitoring ~~(Non-WAC compliant)~~	199-H4-3 (Non-WAC compliant)	577940.5	152858.5	Relocate to provide downgradient monitoring for RCRA sampling.
199-D5-145 (C8725)	573215.53	151396.22	D-South plume monitoring	199-D5-102	573428.2	151340.2	Relocate to provide downgradient monitoring of 100-D-100 area.
199-D5-146 (C8726)	573219.75	151345.63	D-South plume monitoring	199-D5-121	573430.2	151399.3	Relocate to provide downgradient monitoring of 100-D-100 area north of 100-D-50:7.
199-D5-147 (C8727)	572993.32	151380.77	D-South plume monitoring	199-D5-119	573306.2	151418.0	Relocate to provide downgradient monitoring of 100-D-100 area.
199-D5-148 (C8728)	573361.55	151083.22	D-South plume monitoring	199-D5-98	573369.6	151272.4	Relocate to provide monitoring of 100-D-100 area and potential location for future injection.

Table 1-1. Replacement Monitoring Wells in 100-HR-3

Replacement Well Name and Borehole ID	Replacement Well Easting*	Replacement Well Northing*	Historical Purpose	Replacing Well	Easting*	Northing*	Comment
Near Term Replacement Well – Planned for 2016							
199-D5-149 (C8729)	573327.7	151461.8	D-South plume monitoring	199-D5-120	573377.2	151406.8	Relocate to area south of 183-D clearwells to provide downgradient monitoring of the northern portion of 100-D-100.
Out-Year Replacement Wells – Planned for 2016							
199-D5-150 (C8730)	~~573150.0~~ 573428.94	~~151513.9~~ 151402.06	RI/FS characterization/ monitoring	199-D5-144	573352.0	151404.8	Relocate after backfilling 100-D-100 along northeast upgradient edge of the 100-D-100 site. Align with former Well 199-D5-121.
199-D5-151 (C8731)	~~573349.6~~ 573312.0	~~151402.0~~ 151392.0	D-South plume monitoring	199-D5-99	573349.6	151402.0	~~Replace at current location on the north side of the 100-D-100 footprint.~~ Relocate to the west of original location.
199-D5-152 (C8732)	573300.3	151349.3	D-South plume monitoring	199-D5-122	573300.3	151349.3	Replace at current location on the east side of the 100-D-100 footprint to provide monitoring at the "former" hotspot.

Table 1-1. Replacement Monitoring Wells in 100-HR-3

Replacement Well Name and Borehole ID	Replacement Well Easting*	Replacement Well Northing*	Historical Purpose	Replacing Well	Easting*	Northing*	Comment
199-H4-87 (C8733)	~~577792.7~~ 577732.3	~~152620.2~~ 152660.0	Monitoring	199-H4-48	577792.7	152620.2	~~Replace at current location.~~ Replace downgradient of highest contamination identified during 100-H-46 waste site remediation.
199-H4-88 (C8734)	~~577804.1~~ 577850.4	~~152890.8~~ 152833.6	~~WAC compliant CERCLA m~~ Monitoring	199-H4-7	577804.1	152890.8	~~Replace in current location.~~ Replace to the south of current location.
199-H4-89 (C8735)	577923.2	152893.9	~~WAC compliant CERCLA m~~ Monitoring	199-H4-9	577923.2	152893.9	Replace in current location next to 183-H Solar Evaporation Basins.

* Coordinate system is NAD83(91) in meters.

WAC = *Washington Administrative Code*

CERCLA = Comprehensive *Environmental Response, Compensation, and Liability Act of 1980*

RCRA = *Resource* Conservation *and Recovery Act of 1976*

Figure 1-2. Location of 100-D Area Replacement Wells

Figure 1-2. Location of 100-D Area Replacement Wells

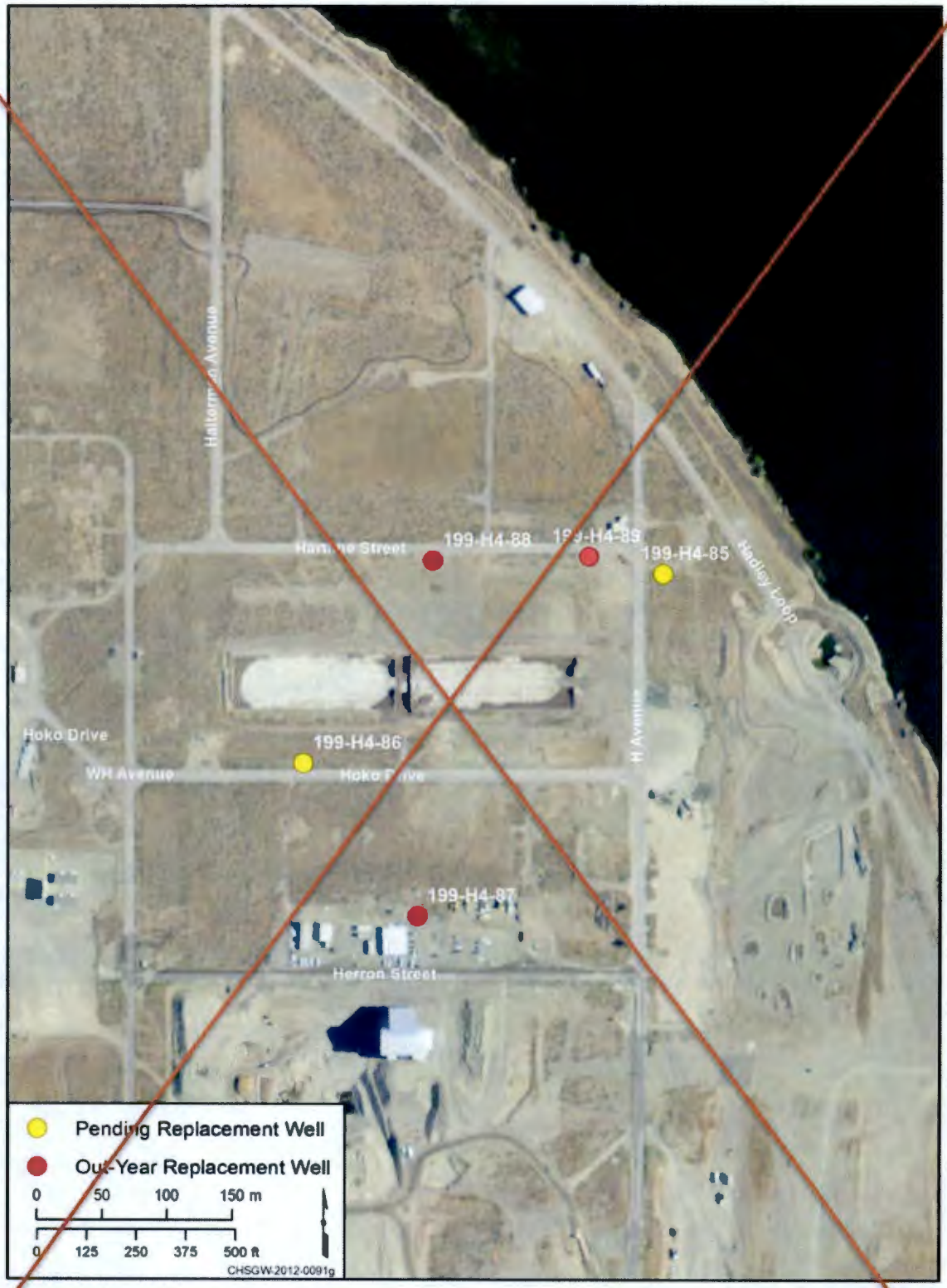


Figure 1-3. Location of 100-H Area Replacement Wells

Figure 1-3. Location of 100-H Area Replacement Wells

Table 1-2. Groundwater Sampling Analytes

Anions	Metals		Radionuclides
Chloride	Antimony	Magnesium	Strontium-90
Fluoride	Barium	Manganese	Total alpha
Nitrate	Beryllium	Potassium	Total beta
Nitrite	Cadmium	Nickel	
Sulfate	Chromium (hexavalent)*	Sodium	
	Chromium (total) filtered	Silver	**Other**
	Copper	Strontium	Alkalinity
Field Parameters	Cobalt	Vanadium	
pH	Iron	Zinc	
Dissolved Oxygen			
Specific Conductivity			
Temperature			
Turbidity			

* Analyzed immediately after well development as a filtered sample.

Table 1-3 Groundwater Sampling During Drilling

Well Numbers	Analytes	Approximate Sample Depth below Water Table
199-D5-149	Chromium (hexavalent)	1.5 m (5ft); 4.5 m (15 ft); 6.7 m (22 ft)
199-D5-150	Chromium (hexavalent)	1.5 m (5ft); 4.5 m (15 ft); 6.7 m (22 ft)
199-D5-151	Chromium (hexavalent)	1.5 m (5ft); 4.5 m (15 ft); 6.7 m (22 ft)
199-D5-152	Chromium (hexavalent)	1.5 m (5ft); 4.5 m (15 ft); 6.7 m (22 ft)
Note: Sample to be collected using field sampling equipment		

Table 1-4. Soil Sampling Analytes (100-D)

Metals	
Antimony	Magnesium
Barium	Manganese
Beryllium	Potassium
Cadmium	Nickel
Chromium (hexavalent)	Sodium
Chromium (total)	Silver
Copper	Strontium
Cobalt	Vanadium
Iron	Zinc

Table 1-5. Soil Sampling Analytes (100-H)

Metals		Radionuclides
Antimony	Magnesium	Strontium-90
Barium	Manganese	Total alpha
Beryllium	Potassium	Total beta
Cadmium	Nickel	Uranium
Chromium (hexavalent)	Sodium	Technetium-99
Chromium (total)	Silver	
Copper	Strontium	**Other**
Cobalt	Vanadium	Fluoride
Iron	Zinc	Nitrate

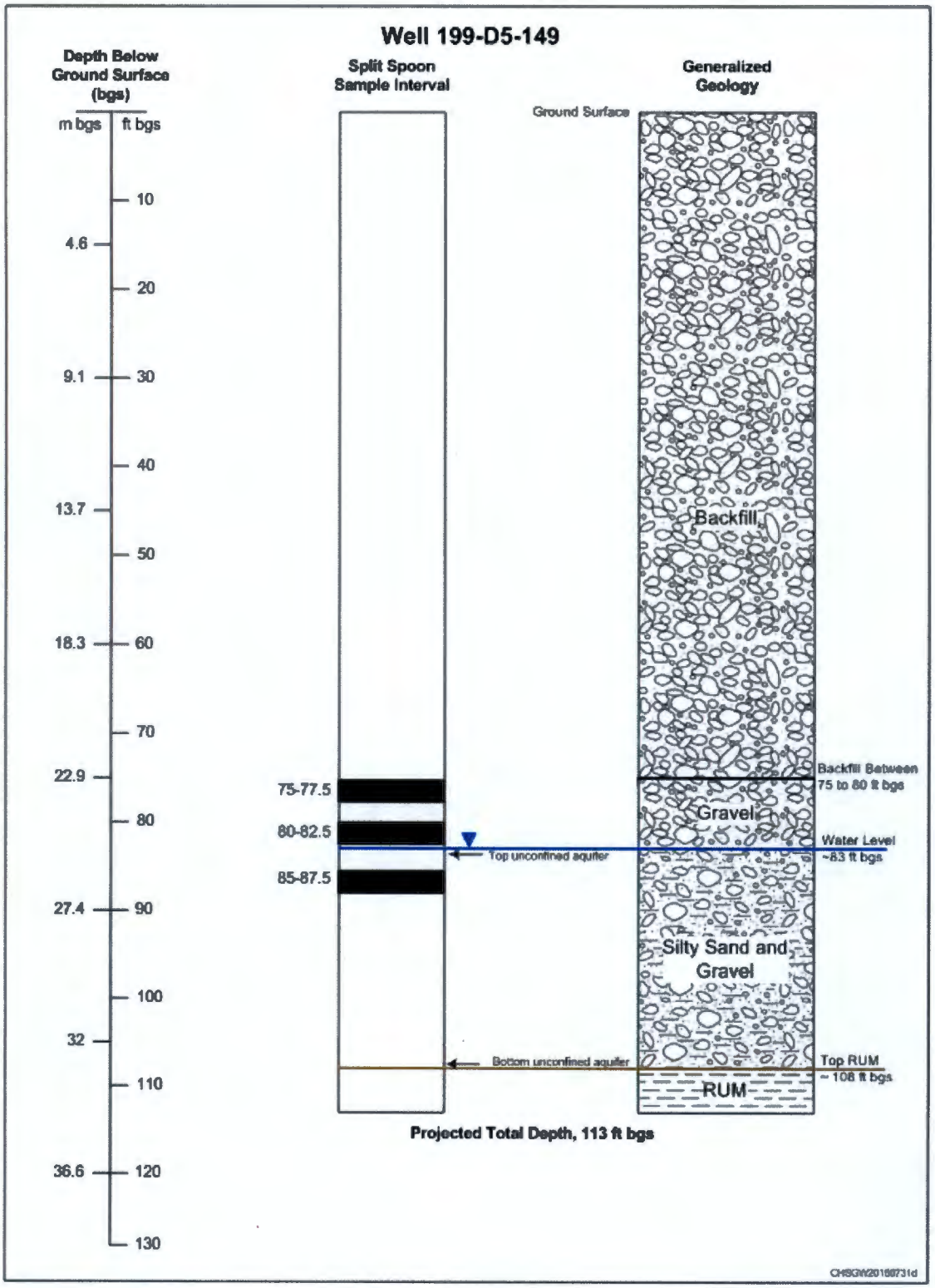


Figure 1-4. Generalized Geology and Approximate Soil Sample Locations – Well 199-D5-149

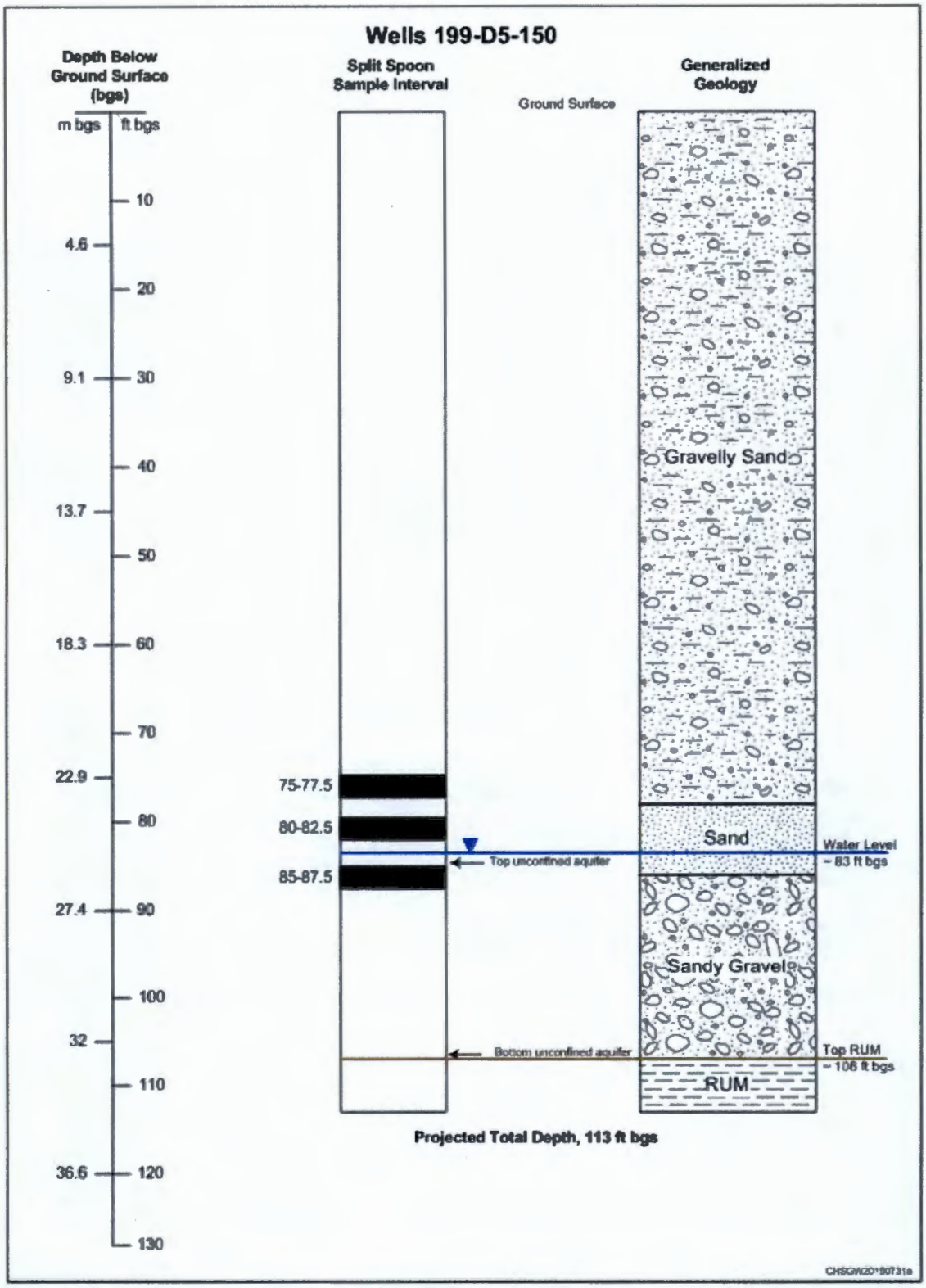


Figure 1-5. Generalized Geology and Approximate Soil Sample Locations – Well 199-D5-150

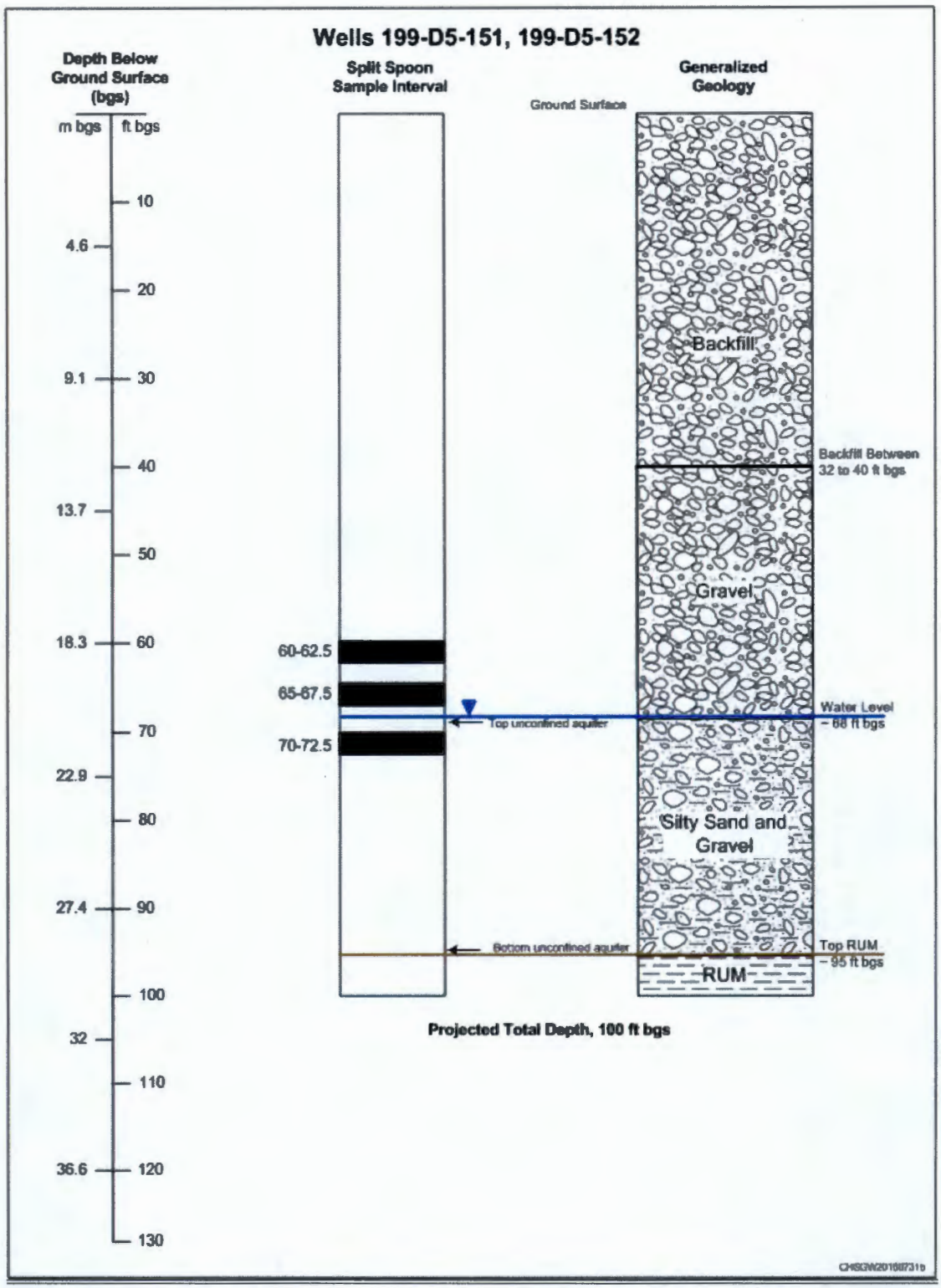


Figure 1-6. Generalized Geology and Approximate Soil Sample Locations – Well 199-D5-151, 199-D5-152

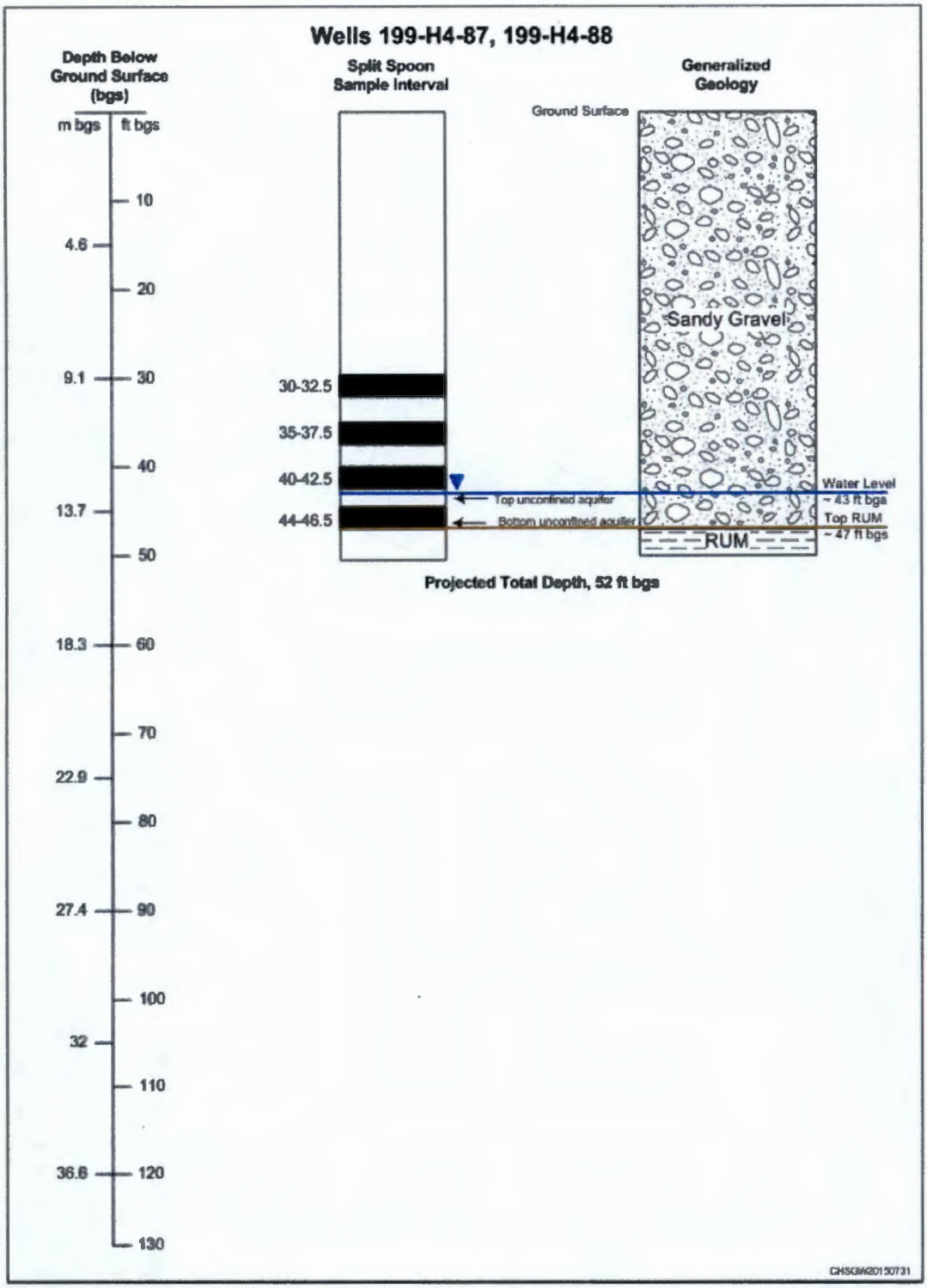
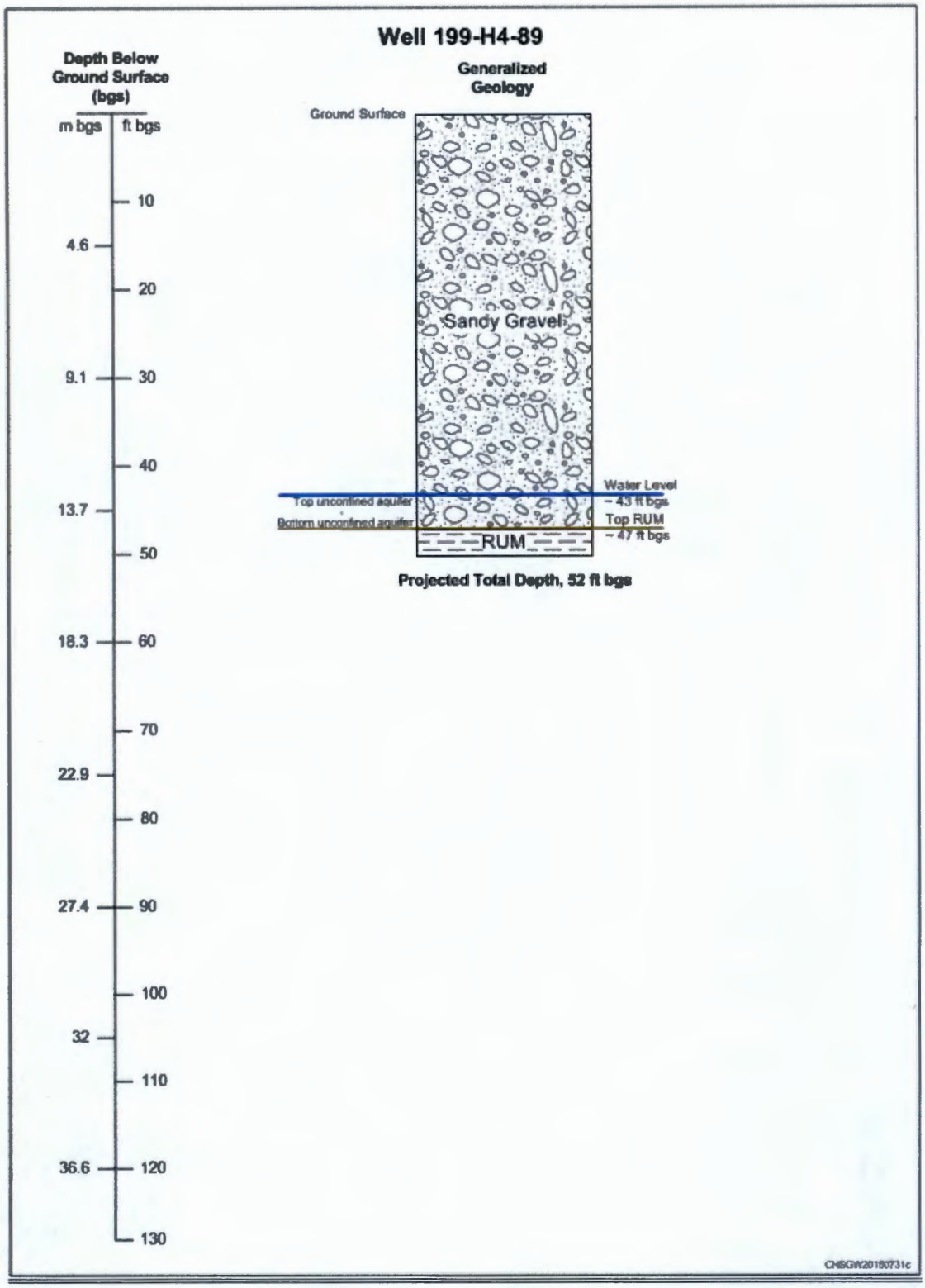


Figure 1-7. Generalized Geology and Approximate Soil Sample Locations – Wells 199-H4-87 and 199-H4-88



Note: Split spoon samples are not planned for this well.

Figure 1-8. Generalized Geology– Well 199-H4-89

Table 2-1. Change Control

Type of Change	Action	Documentation
Temporarily (≤ 1 year) adding constituents, wells, or increasing sampling frequency	OU project management approval; notify regulator.	Project's schedule tracking system
Permanently (>1 year) adding or eliminating constituents, wells, or increasing/decreasing sampling frequency	Revise SAP (or Tri-Party Agreement Change Notice, if appropriate); obtain DOE and regulatory approval; distribute plan.	Letter report documenting changes or revised plan (or approved Tri-Party Agreement Change Notice)

2.2 Data Generation and Acquisition

The following subsections present the requirements for sampling methods, sample handling and custody, analytical methods, and field and laboratory QC. The requirements for instrument calibration and maintenance, supply inspections, and data management are also addressed. The sampling design is presented in Section 3 of this SAP.

2.2.1 Sample Collection, Preservation, Containers, and Holding Times

The requirements for aquifer sediment sieve analysis are listed in Table 2-2. Suggested sample container, preservation, and holding time requirements are specified in Table 2-3 for groundwater samples. Suggested sample container, preservation, and holding time requirements are specified in Table 2-4 for soil samples. These requirements are in accordance with the analytical method specified. The final container type and volumes will be identified on the sampling authorization form and the chain-of-custody form. This SAP defines a "sample" as a filled sample bottle for starting the clock for holding-time restrictions.

Table 2-2. Aquifer Sediment Sieve Analysis Requirements

Method Name	Number of Bottles	Bottle Type	Volume (gram)	Preservation Required	Holding Time
Grain-size distribution (field sieve analysis) in accordance with ASTM D422-63(2007)	1	G/P	250	None	6 months

Source: American Society for Testing and Materials (ASTM) D422-63(2007), *Standard Test Methods for Particle-Size Analysis of Soils.*

Table 2-3. Sample Container, Preservation, and Holding Time Guidelines for Groundwater Samples by Analytical Method

Method Name	Number of Bottles	Bottle Type	Volume (mL)	Preservation Requirement	Holding Time
Strontium-90 CS/GPC or LSC	1	G/P	1,000	HNO_3 to pH <2	6 months
EPA 200.8 – ICP/MS	1	G/P	250	HNO_3 to pH <2	6 months

Table 2-3. Sample Container, Preservation, and Holding Time Guidelines for Groundwater Samples by Analytical Method

Method Name	Number of Bottles	Bottle Type	Volume (mL)	Preservation Requirement	Holding Time
EPA 6010 – ICP	1	G/P	250	HNO_3 to pH<2	6 months
EPA 7196	1	G/P	250	Cool 4°C	~~30 days~~24 hours
IC anions 300.0	1	P	120	Cool 4°C	28 days/ 48 hours[a]
Standard Method 2320 - Alkalinity	1	G/P	250	Cool 4°C	14 days

a. The EPA Method 300.0 nitrate, nitrite, and phosphate holding time is 48 hours after sample collection. The holding time of 28 days applies to all other anions quantified by EPA Method 300.0.

Source: For EPA Method 200.8, see EPA-600/R-94/111, *Methods for the Determination of Metals in Environmental Samples, Supplement 1*.

For EPA Method 300.0, see EPA-600/4-79-020, *Methods for Chemical Analysis of Water and Wastes*.

For the four-digit EPA methods, see SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 3rd Edition; Final Update IV-B*.

For Standard Method 2320, see *Standard Methods for the Examination of Water and Wastewater, 22nd Edition*.

CS = chemical separation
LSC = Liquid Scintillation Counting
EPA = U.S. Environmental Protection Agency
G = glass
GPC = Gas Proportional Counting
IC = ion chromatography
ICP = inductively coupled plasma
MS = mass spectroscopy
P = plastic

Table 2-4. Sample Preservation, Container, and Holding Time for Soil/Aquifer Sediment Samples

Method Name	Number of Bottles	Bottle Type	Volume (g)	Preservation Requirement	Holding Time
Strontium-90 CS/GPC or LSC	1	G/P	20	None	6 months
Gross Alpha/Gross Beta GPC	1	G/P	60	None	6 months
Technitium-99 LSC	1	G/P	60	None	6 months
EPA 6020 – ICP/MS	1	G/P	120	None	6 months
EPA 6010 - ICP	1	G/P	120	None	6 months

Table 2-4. Sample Preservation, Container, and Holding Time for Soil/Aquifer Sediment Samples

Method Name	Number of Bottles	Bottle Type	Volume (g)	Preservation Requirement	Holding Time
IC anions 300.0	1	G/P	120	Cool 4°C	28 days/48 hours[a]

a. The EPA Method 300.0 nitrate, nitrite, and phosphate holding time is 48 hours after sample extraction preparation. The holding time of 28 days applies to all other anions quantified by EPA Method 300.0

For EPA Method 300.0 see EPA-600/4-79-020, *Methods for Chemical Analysis of Water and Wastes.*

For the four-digit EPA methods, see SW-846, *Test Methods for Evaluating Soil Waste: Physical/Chemical Methods, 3rd Edition: Final Update IV-B.*

CS = chemical separation

LSC = Liquid Scintillation Counting

EPA = U.S. Environmental Protection Agency

G = glass

GPC = Gas Proportional Counting

IC = ion chromatography

ICP = inductively coupled plasma

MS = mass spectroscopy

P = plastic

2.2.2 Sampling Methods Requirements

The procedures to be implemented in the field should be in accordance with those presented in Section 3.3 of this SAP.

2.2.3 Sampling Identification

A sample and data tracking database will be used to track the samples from the point of collection through the laboratory analysis process. The HEIS database is the repository for laboratory analytical results. The HEIS sample numbers will be issued to the sampling organization for this project, and the numbers are to be carried through the laboratory data-tracking system.

2.2.4 Sample Handling, Shipping, and Custody Requirements

The processes followed for sample handling, shipping, and custody requirements will be in accordance with those presented in Section 3.3 of this SAP.

2.2.5 Laboratory Sample Custody

Sample custody during laboratory analysis will be addressed in the applicable laboratory's standard operating procedures. Laboratory custody procedures will ensure that sample integrity and identification are maintained throughout the analytical process.

2.2.6 Analytical Methods Requirements

Analytical parameters and methods are presented in Table 2-45 for groundwater samples. Analytical parameters and methods are presented in Table 2-6 for soil samples. Laboratory analysis should be conducted within allowable sample holding times for each analyte tested. Analyses for metals should be performed on unfiltered groundwater samples. This information will be carried through sample and data tracking.

Table 2-45. Analytical Performance Requirements for Groundwater Samples

Class	Analyte[a]	Analytical Method[b]	Detection Limit[c]	Accuracy Requirement (%)	Precision Requirement (%)
RAD	Gross alpha	GPC	3	70-130[g]	≤30[g]
RAD	Gross beta	GPC	4	70-130[g]	≤30[g]

a. The groundwater analytes list is from Table 1-2.

b. Analytical method selection is based on available methods by laboratories currently contracted to the Hanford Site. However, equivalent methods may be substituted.
For EPA Method 300.0, see EPA-600/4-79-020, *Methods for Chemical Analysis of Water and Wastes.*
For the four-digit EPA methods, see SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update IV-B.*

c. Units are in "pCi/L" for radionuclides or "µg/L" for nonradionuclides. The specified detection limit or minimum detectable concentrations are based on current Hanford laboratory contracts.

d. The accuracy criterion shown is the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control, if more stringent. Additional accuracy criteria include analyte-specific evaluations preformed for matrix spike, and surrogate recoveries as appropriate to the method. The precision criterion shown is for batch laboratory replicate matrix spike analysis relative percent differences.

e. Reported sample Method Detection Limits will be used as a limit of detectability.

f. Reported as total radioactive strontium

g. For radionuclides, the accuracy criterion shown is for associated batch laboratory control sample percent recoveries. Except for gamma energy analysis, additional accuracy criteria include analysis-specific evaluations preformed for matrix spike, tracer, and/or carrier recoveries as appropriate to the method. The precision criterion shown is for batch laboratory replicate sample relative percent differences.

CS/LS = chemical separation/liquid scintillation
EPA = U.S. Environmental Protection Agency
GEA = Gamma Energy Analysis
GPC = gas proportional counting
IC = ion chromatography
ICP/MS = inductively coupled plasma/ mass spectrometer
MET = metal parameter
RAD = radiological parameter

Table 2-6. Analytical Performance Requirements for Soil Samples

Class	Analyte[a]	Analytical Method[b]	Detection Limit[c]	Accuracy Requirement (%)	Precision Requirement (%)
		Nonradionuclides			
MET	Antimony	EPA 6020 or 6010 (ICP/MS or ICP)	1.2	70-130[d]	<30[d]
MET	Barium		2	70-130[d]	<30[d]
MET	Beryllium		0.5	70-130[d]	<30[d]
MET	Cadmium		0.5	70-130[d]	<30[d]

Table 2-6. Analytical Performance Requirements for Soil Samples

Class	Analyte[a]	Analytical Method[b]	Detection Limit[c]	Accuracy Requirement (%)	Precision Requirement (%)
MET	Chromium (total)		1.0	70-130[d]	<30[d]
MET	Copper		0.8	70-130[d]	<30[d]
MET	Cobalt		2.0	70-130[d]	<30[d]
MET	Iron		5.0	70-130[d]	<30[d]
MET	Magnesium		75	70-130[d]	<30[d]
MET	Manganese		5.0	70-130[d]	<30[d]
MET	Potassium		400	70-130[d]	<30[d]
MET	Nickel		4.0	70-130[d]	<30[d]
MET	Sodium		50	70-130[d]	<30[d]
MET	Silver		1.0	70-130[d]	<30[d]
MET	Strontium		1.0	70-130[d]	<30[d]
MET	Uranium		1.5	70-130[d]	<30[d]
MET	Vanadium		2.5	70-130[d]	<30[d]
MET	Zinc		1.0	70-130[d]	<30[d]
MET	Chromium (hexavalent)	EPA 7196	0.5	70-130[d]	<30[d]
Anion	Fluoride	EPA IC 300.0	25	70-130[d]	<30[d]
Anion	Nitrate		12.5	70-130[d]	<30[d]
Radionuclides					
RAD	Strontium-90[e]	SR-90 GPC or LSC	1	70-130[f]	<30[f]
RAD	Gross alpha	GPC	5	70-130[f]	<30[f]
RAD	Gross beta	GPC	10	70-130[f]	<30[f]
RAD	Technetium-99	LSC	1.5	70-130[f]	<30[f]

a. The soil analytes list is from Table 1-3 and Table 1-4.

b. Analytical method selection is based on available methods by laboratories currently contracted to the Hanford Site. However, equivalent methods may be substituted.

For EPA Method 300.0, see EPA-600/4-79-020, *Methods for Chemical Analysis of Water and Wastes.*

For the four-digit EPA methods, see SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition: Final Update IV-B.*

c. Units are in "pCi/g" for radionuclides or "mg/kg" for nonradionuclides. The specified detection limit or minimum detectable concentrations are based on current Hanford laboratory contracts.

Table 2-6. Analytical Performance Requirements for Soil Samples

Class	Analyte[a]	Analytical Method[b]	Detection Limit[c]	Accuracy Requirement (%)	Precision Requirement (%)

d. The accuracy criterion shown is the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control, if more stringent. Additional accuracy criteria include analyte-specific evaluations performed for matrix spike, and surrogate recoveries as appropriate to the method. The precision criterion shown is for batch laboratory replicate matrix spike analysis relative percent differences.

e. Reported as total radioactive strontium.

f. For radionuclides, the accuracy criterion shown is for associated batch laboratory control sample percent recoveries. Except for gamma energy analysis, additional accuracy criteria include analysis-specific evaluations performed for matrix spike, tracer, and/or carrier recoveries as appropriate to the method. The precision criterion shown is for batch laboratory replicate sample relative percent differences.

LS = Liquid scintillation

EPA = U.S. Environmental Protection Agency

GPC = gas proportional counting

IC = ion chromatography

ICP/MS = inductively coupled plasma/mass spectrometer

MET = metal parameter

RAD = radiological parameter

2.2.7 Quality Control Requirements

Samples for QC are not required for project soil samples that are tested solely for physical properties. QC samples discussed are for groundwater and soil samples. Trip, equipment, and transfer blank QC samples address sample contamination that does not pertain to physical property analyses. Duplicate QC samples pertain to variability of analysis that is not expected to be significant due to the large size of physical property samples. No QC samples are required for the archived geologic samples.

Field QC samples will be collected during groundwater and soil sampling to evaluate the potential for cross-contamination and laboratory performance to help ensure that reliable data are obtained. Particular care will be exercised to avoid the following common ways in which cross-contamination or background contamination may compromise samples:

- Improperly storing or transporting sampling equipment and sample containers
- Contaminating the equipment or sample bottles by setting the equipment/sample bottle on or near potential contamination sources (e.g., uncovered ground)
- Handling bottles or equipment with dirty hands or gloves
- Improperly decontaminating equipment before sampling or between sampling events

Table 2-~~5~~7 identifies the field QC samples for groundwater and soil sampling. For groundwater samples, one duplicate and one trip blank will be collected from one well in the 100-D Area and one well in the 100-H Area. This number of QC samples is conservatively established based on site procedures that call for approximately one set of QC samples per 20 sampling well trips, with each well representing one sampling well trip. For soil samples, one field duplicate and one trip blank will be collected. The soil will be collected and homogenized before dividing into two separate samples in the field (soil and duplicate).

Table 2-~~5~~7. Field Quality Control Requirements

Sample Type	Frequency	Purpose
Field duplicate	Minimum of 1 sample in 20, *per media sampled*	To determine precision for both sampling and laboratory measurements
Equipment rinsates blanks	As needed or 1 sample in 20, *per media sampled.* If only disposable equipment is used, then an equipment rinsate blank is not required.	To verify adequacy of sampling equipment decontamination
Trip blank	Minimum of 1 sample in 20, *per media sampled.* But at least one for 100-D and one for 100-H	1. To assess contamination from containers or transportation.

2.2.7.1 Field Replicates

Field replicates will be collected at a frequency of one in 20 samples, and at least one per well. Field replicates are used to evaluate laboratory consistency and the precision of field sampling methods.

2.2.7.2 Equipment Rinsates Blanks

Equipment blanks are collected from reusable sampling devices on a 1-in-20 basis, and at least one per well. The drilling leader may request additional equipment blanks be taken. Equipment blanks will consist of silica sand or analyte-free water poured over the decontaminated sampling equipment and placed in containers. Equipment blanks are not needed for disposable sampling equipment.

2.2.7.3 Trip Blanks

Trip blanks are prepared by the sampling team prior to traveling to the sampling site. The preserved bottle set is either for volatile organic analysis only or identical to the set that will be collected in the field. It is filled with reagent water or silica sand, as appropriate to the primary sample media. The bottles are sealed and will be transported, unopened, to the field in the same storage containers used for samples collected the same day. The trip blanks are typically analyzed for the same constituents as the samples from the associated sampling event. Trip blanks are used to evaluate potential contamination of the samples attributable to the sample bottles, preservative, handling, storage, and transportation.

2.2.8 Measurement Equipment

Each user of the measuring equipment is responsible to ensure the equipment is functioning as expected, properly handled, and is calibrated before expiration in accordance with procedures governing control of the measuring equipment. Onsite environmental instrument testing, inspection, calibration, and maintenance shall be recorded in a bound logbook (see Section 3.4.3). Field screening instruments will be used, maintained, and calibrated in accordance with the manufacturer's specifications and other approved procedures.

2.2.8.1 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Onsite environmental instruments shall be tested, inspected, and maintained. Measurement equipment must be inspected before use. Maintenance requirements (e.g., parts lists and documentation of routine maintenance) will be included in the individual laboratory's and onsite organization's QA plan and/or

3 Field Sampling Plan

This field sampling plan identifies activities for installation of new groundwater wells, soil sampling during borehole installation, groundwater sampling following completion of well development, and groundwater sampling following well acceptance. This SAP provides for soil and groundwater sampling to meet the defined sampling objectives.

3.1 Sampling Objectives

The soil and groundwater sampling objectives were identified by the project team during the sample planning process, and reviewed by Ecology. The objectives of the sampling are to confirm the lithology, assist in well design, collect lithologic samples to meet potential future needs, determine if contamination is present in the periodically rewetted zone, and determine groundwater contaminant level. Groundwater samples collected during drilling are to be collected to determine the vertical distribution in contaminant levels. Data will be compared with analytical results from the excavations and from nearby wells.

Lithology will be described and documented during the drilling of each well. Aquifer sediment will be collected from the upper and lower portions of the aquifer to design the filter pack and corresponding well screen. Archive samples will be obtained at 1.5 m (5 ft) intervals and at major lithologic changes. Soil sampling will be conducted to determine if contamination is present in the periodically rewetted zone. Since contamination is anticipated to be present within the periodically rewetted zone in several boreholes, sampling will target low river stage and be focused within the periodically rewetted zone and upper aquifer based on seasonal water table variations in the area (Figures 1-4, 1-5, and 1-6). Groundwater sampling is conducted to define the magnitude and extent of hexavalent chromium contamination in the aquifer and at select locations to track groundwater chemistry near areas of source remediation, as well as the vertical distribution of contamination in 100-D.

3.2 Sampling Design

To meet project sampling objectives, the sampling design identifies the sampling locations, sample intervals, sample processes, target analytes and parameters, and analytical methods. The key features of soil and groundwater sampling design and the sampling rationale are summarized in Table 3-1.

Table 3-1. Key Features of Project Sampling Design

Analytical Methodology	Key Features of Design	Sampling Design Rationale
	Geologic Samples for Archiving	
Geological sampling	**Specific location/area of concern**: The boreholes requiring geologic sampling are located as shown in Figures 1-2 and 1-3. The soil of concern for geologic sampling range from 1.5 m (5 ft) bgs to total borehole depth. **Investigation method**: Geologic samples will be taken beginning at a depth of 1.5 m (5 ft) bgs and continuing at 1.5 m (5-ft) intervals and at major lithologic changes to total borehole depth. **Analytes**: These samples will be archived for possible future analysis, and target analytes would be determined based on data needs identified at that time. If contamination is identified or suspected during drilling, the drilling lead and/or OU Project manager may request analysis for specific analytes.	Geologic samples will be archived in case future data needs are identified. Laboratory analysis may be requested if contamination is identified or suspected during drilling.

Table 3-1. Key Features of Project Sampling Design

Analytical Methodology	Key Features of Design	Sampling Design Rationale
	Geologic Aquifer Soil Samples	
Geological sampling	**Specific location/area of concern**: The soils of the unconfined aquifer are of interest to this investigation. **Investigation method**: Aquifer soil will be investigated by collection of one geologic sample from soil of the upper portion of the aquifer and one sample from soil of the lower portion of the aquifer. **Analytes**: The aquifer soil samples will be tested for the physical property of grain-size distribution (sieve analysis) (Table 2-2).	Soil physical property data are necessary to facilitate well design to maximize well efficiency.
	Soil Samples	
Soil Sampling	**Specific location/area of concern:** The soil in the periodically rewetted zone at Well 199-D5-149, 199-D5-150, 199-D5-151, 199-D5-152, 199-H4-87, and 199-H4-88 are of interest to this investigation. **Investigation method:** Soil will be investigated by collecting three or four samples from each borehole as shown in Figures 1-4 through 1-8. The deepest sample is to be collected from approximately 5 ft into the aquifer. **Analytes:** The aquifer soil samples will be tested for the analytes listed in Table 1-4 and 1-5 for those wells at 100-D and 100-H, respectively.	To determine if contamination is present in the periodically rewetted zone.
	Groundwater Sampling During Drilling	
Groundwater sampling	**Specific location/area of concern**: The groundwater at each location is of concern. **Investigation method**: Three water samples will be collected during drilling at wells 199-D5-149, 199-D5-150, 199-D5-151, and 199-D5-152. Approximate depths for water samples are listed in Table 1-3. **Analytes**: Hexavalent Chromium	Determine hexavalent chromium concentrations vertically within the aquifer.
	Groundwater Sampling During Well Development	
Groundwater sampling	**Specific location/area of concern**: The groundwater at each location is of concern. **Investigation method**: One groundwater sample will be collected from each well location upon completion of well development. **Analytes**: Hexavalent Chromium	Confirm well use and the ambient chromium concentrations that will be used to confirm chromium concentration within the aquifer.

Table 3-1. Key Features of Project Sampling Design

Analytical Methodology	Key Features of Design	Sampling Design Rationale
	Groundwater Sampling Post Well Acceptance	
Groundwater sampling	**Specific location/area of concern**: The groundwater near source site remediation. **Investigation method**: Groundwater samples will be collected from wells as described in Table 3-3. **Analytes**: Table 1-2 identifies the list of groundwater analytes.	Determine and track contaminant concentrations at identified wells during source remediation activities and monitor groundwater plumes.

bgs = below ground surface

3.2.1 Borehole Drilling

Boreholes for the new groundwater wells will be drilled through the upper unconfined aquifer of the 100-D and 100-H Areas to a depth ~~at least~~ of approximately 1.5 m (5 ft) into the RUM. Well locations are shown in Figures 1-2 and 1-3. The penetration into the RUM may be less, depending on the competence of the material encountered. Given the variability of depth to groundwater in the 100-D and 100-H Areas, the aquifer thickness, and the 1.5 m (5-ft) penetration into the RUM, total borehole depths at the 100-D Area could vary from approximately 14 to 30 m (46 to 98 ft) and at the 100-H Area from approximately 14 to 16 m (46 to 52 ft).

3.2.2 Well Installation and Development

Well drilling and completion will be performed in accordance with the requirements of WAC 173-160. If the completion differs from the WAC 173-160 requirements, then variances will be obtained from Ecology.

The wells will be constructed generally (as shown in Figure 3-1) using 15.2 cm (6-in.) diameter (or larger) casing. The drilling method will be determined by the drilling lead and drilling contractor. The wells will be built with Schedule 10, Type 304 or 316, stainless steel, V-slot, continuous wire-wrap screen, on top of a 0.9 m (3-ft) long, stainless steel sump with end cap. The screen will fully penetrate the

aquifer and the top of the screen will be set above the high water level mark. At 100-H wells, the wells will be drilled to a depth adequate to ensure pump operations during low water periods. A schedule 10 stainless steel casing will extend from the top of the well screen to the ground surface. Colorado silica sand or approved equivalent will be used for the sand pack; sodium bentonite pellets and/or natural sodium bentonite chunks, crumbles, or powdered bentonite will be used for bentonite sealing material; and Type I/II Portland cement will be used for cement grout.

Surface construction will consist of a protective casing, protective guard posts, and cement pad. The protective casing shall be a minimum of 5.1 cm (2 in.) larger in diameter than the permanent casing. Protective casing shall rise approximately 0.9 m (3 ft) above the ground surface. Permanent casing shall rise to approximately 0.3 m (1 ft) below the top of the protective casing. Protective casing shall have a lockable well cap extending approximately 38 cm (15 in.) above the top of the protective casing.

3.3 Sampling Locations and Frequencies

Boreholes will be drilled through the unconfined aquifer and at least 1.5 m (5 ft) into the RUM. Figures 1-2 and 1-3 show the approximate well installation locations. The actual well locations could vary, slightly based on a field walkdown of current site conditions in order to avoid Hanford Site National Historic Monument restrictions, roads, and other obstructions. Table 3-2 shows sample collection during drilling. Table 3-3 shows groundwater sample collection after well acceptance.

3.3.1 Soil Sample Locations and Frequencies

During borehole installation, geologic samples will be collected for archiving beginning at 1.5 m (5 ft) bgs and continuing at 1.5 m (5-ft) intervals and at major lithologic changes to total borehole depth. Based on known geologic conditions, it is estimated that 25 samples will be collected at each 100-D well, and 15 at each 100-H well. However, this is subject to change based on conditions encountered during drilling. Additional samples may be required. Figures ~~3-2 and 3-3 are generalized~~ 1-4, 1-5, 1-6, and 1-7 include borehole schematics that identify soil sampling intervals at the 100-D and 100-H Area boreholes. Split spoon samples are not planned for Well 199-H4-89, as shown in Figure 1-8. Soil sample locations will be adjusted to account for water table fluctuation based on time of drilling the well, as determined by nearby wells, with the deepest sample location targeting a depth of 1.5 m (5 ft) into the aquifer.

During installation of Wells 199-D5-149, 199-D5-150, 199-D5-151, 199-D5-152, 199-H4-87 and Well 199-H4-88, soil samples will be collected for analysis from the approximate depths shown on Figures 1-4 through 1-7. Actual depths for soil samples will depend on conditions encountered during drilling.

3.3.2 Groundwater Sample Locations and Frequencies

During borehole installation, three water samples will be collected at each of the following Wells: 199-D5-149, 199-D5-150, 199-D5-151, and 199-D5-152. Groundwater samples are to be collected approximately 5 feet into the aquifer, at approximately 10 to 15 feet into the aquifer, and at the RUM interface at approximately 22 to 25 feet into the aquifer.

One groundwater sample will be collected from the aquifer at each well location following the completion of well development. Groundwater samples during development are summarized in Table 3-2. Groundwater samples to be collected post well acceptance are summarized in Table 3-3. Analytes for groundwater are given in Table 1-2. For those samples collected on an annual basis, the goal is to conduct the annual sampling event in a single month and at the lowest river stage.

3.4 Field-Specific Collection Requirements

Field specific collections requirements are outlined in the following sections.

Table 3-2. Summary of 100-HR-3 Well Sample Collection Requirements During Drilling

100-D Area Wells as Identified on Table 1-1 (per well)					
Sample Type	**Sample Collection Method**	**Sample Depth Intervals**	**No. of Samples Estimated**	**No. of Quality Control Samples**	**Analytical Requirements and Parameters**
Soil (archive)	Grab	1.5 m (5 ft)	25[a]	0	N/A
Soil (sieve)	Grab	~~See Figure 3-2~~27 and 30 m (90 and 100 ft): Wells 199-D5-149 and 199-D5-150 24 and 27 m (80 and 90 ft): Wells 199-D5-151 and 199-D5-152	2	0	N/A
Soil	Split-spoon	See Figure 1-4, 1-5 and 1-6	3	2	Hexavalent chromium and Metals
Groundwater	Pump	Well	~~1~~[b]4[b,c]	2[b,d]	Hexavalent chromium
100-H Area Wells as Identified on Table 1-1 (per well)					
Soil (archive)	Grab	1.5 m (5 ft)	15[a]	0	N/A
Soil (sieve)	Grab	~~See Figure 3-3~~ 13 and 14.3 m (43 and 47 ft)	2	0	N/A
Soil	Split-spoon	See Figure 1-7	4	2	Metals, Hexavalent chromium, Fluoride, Nitrate, Sr-90, Total Alpha/beta, Tc-99, total uranium
Groundwater	Pump	Well	1[b,c]	2[d]	Hexavalent chromium
Sample Type	**Total number of Analytical Samples**		**Total number of Quality Control Samples**		**Total Samples**
Soil (archive)	--[e]		--		--
Soil (sieve)	--f		--		--
Soil	24		4		28
Groundwater	~~13~~ 19		4[g]		~~17~~ 23

Table 3-2. Summary of 100-HR-3 Well Sample Collection Requirements During Drilling

a. Based on a total depth of 30 m (100ft) or 33.5 m (110 ft) for 100-D and 18.3 m (60 ft) for 100-H. The actual depth drilled will depend on conditions found.

b. Three water samples will be collected during drilling at 100-D. Groundwater samples are to be collected during drilling at approximately 5 feet into the aquifer, at approximately 10 to 15 feet into the aquifer, and at the RUM interface, approximately 22 to 25 feet into the aquifer.

c. One groundwater sample will be collected from each well following completion of well development.

d. Groundwater QC samples, composed of one duplicate and one equipment blank, will be collected after well development from one replacement well in the 100-D Area and one well in the 100-H Area for a total of four groundwater QC samples.

e. No archive samples are to be analyzed, but are to be held for later analysis if needed.

f. Sieve analysis is done in the field.

g. Number adjusted for each drilling campaign.

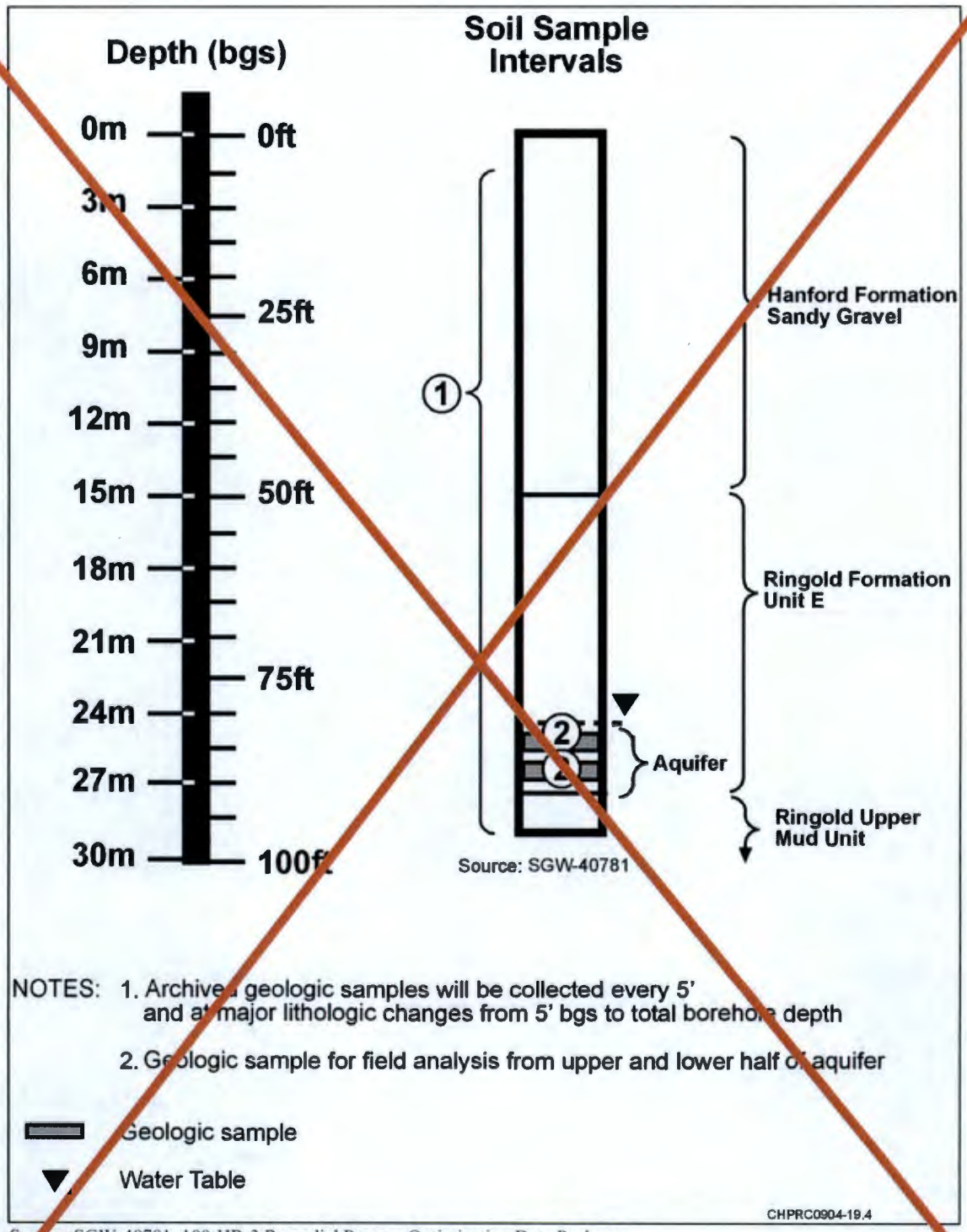
Table 3-3. Analytical Methods and Frequency for Post Well Acceptance Groundwater Samples

Replacement Well	Field Parameters	Alkalinity	Anions	Gross Alpha	Gross Beta	Hexavalent Chromium*	Metals*	Strontium-90	Comment
199-H4-86	A	A	A	A	A	A	A	A	~~Injection Well~~ Extraction Well
199-H4-85	M	M	M	A	A	M	M	A	Well sampled under RCRA
199-D5-145	M	M	M	A	A	M	M	A	Well sampled monthly for 1 year
199-D5-146	M	M	M	A	A	M	M	A	Well sampled monthly for 1 year
199-D5-147	M	M	M	A	A	M	M	A	Well sampled monthly for 1 year
199-D5-148	A	A	A	A	A	A	A	A	Injection Well
199-D5-149	Q	A	A	A	A	Q	A	A	
199-D5-150	A	A	A	A	A	~~A~~ Q	A	A	
199-D5-151	M	M	M	A	A	M	M	A	Well sampled monthly for 1 year
199-D5-152	M	M	M	A	A	M	M	A	Well sampled monthly for 1 year
199-H4-87	Q	A	A	A	A	Q	A	A	
199-H4-88	M	M	M	A	A	M	M	A	Well sampled monthly for 1 year
199-H4-89	A	A	A	A	A	A	A	A	

Note: Alkalinity will also be analyzed. Filtered and unfiltered samples

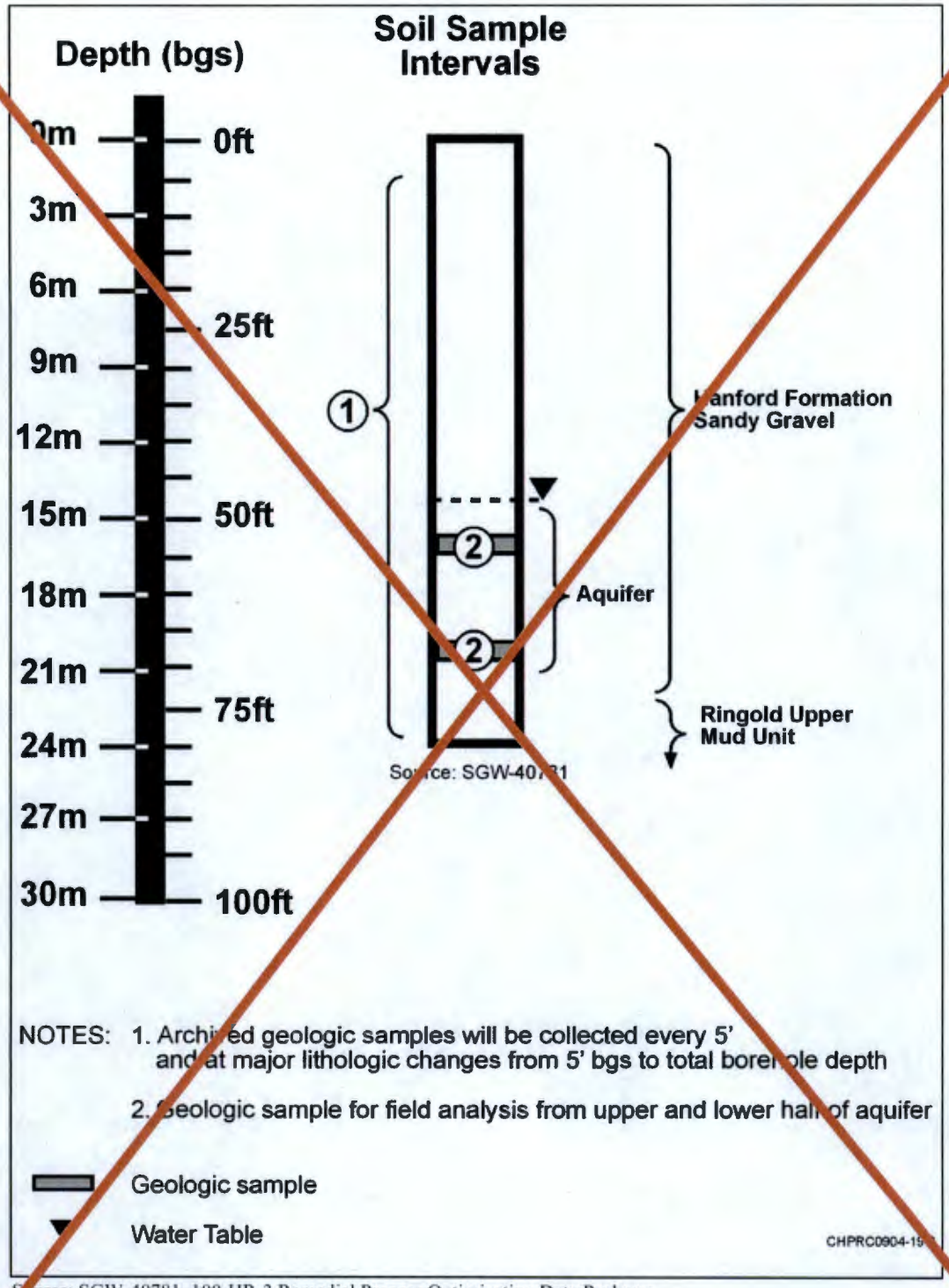
* Filtered and unfiltered samples

A = annual; Q = quarterly; M = monthly



~~Source: SGW-40781, 100-HR-3 Remedial Process Optimization Data Package.~~

~~Figure 3-2. Intervals for 100-D Area Replacement Wells~~



~~Source: SGW-40781, 100-HR-3 Remedial Process Optimization Data Package.~~

~~Figure 3-3. Intervals for 100-H Area Replacement Wells~~

3.4.2 Sample Identification

A sample tracking database will be used to track the groundwater and soil samples through the collection and laboratory analysis process. The HEIS database is the repository for the laboratory analytical results. The HEIS sample numbers will be issued to the sampling organization for this project. The sample location, depth, and corresponding HEIS numbers will be documented in the sampler's field logbook. Each sample container will be labeled with the following information, using a waterproof marker on firmly affixed, water-resistant labels:

- Sampling authorization form number
- Chain-of-custody identification number
- HEIS number
- Sample collection date and time
- Analysis required
- Preservation method (if applicable)

3.4.3 Field Sample Logbook

Information pertinent to sampling and analysis will be recorded in field checklists and logbooks in accordance with existing sample collection protocols. The sampling team will be responsible for recording relevant sampling information (e.g. wind direction, sample color). Entries made in the logbook will be dated and signed by the individual making the entry. Program requirements for managing the generation, identification, transfer, protection, storage, retention, retrieval, and disposition of records will be followed.

3.4.4 Sample Custody

Sample custody will be maintained in accordance with existing Hanford Site protocols. The custody of samples will be maintained from the time that samples are collected until ultimate disposal of the samples, as appropriate. A chain-of-custody record will be initiated in the field at the time of sampling and will accompany each set of samples shipped to the laboratory. Sample shipping procedures will be followed throughout sample shipment. Each chain-of-custody form will include the sample identification number, associated well identification number, and remediation system designation. The analyses requested for each sample will be indicated on the accompanying chain-of-custody form.

Chain-of-custody procedures will be followed throughout sample collection, storage, transfer, analysis, and disposal to ensure that sample integrity and traceability are maintained. Each time the responsibility for the custody of the sample changes, the new and previous custodians will sign the record and note the date and time. A custody seal (i.e., evidence tape) will be affixed to the lid of each sample jar. The container seal will be inscribed with the sampler's initials and the date. Sample custody during laboratory analysis will be addressed in the applicable laboratory's standard operating procedures.

3.4.5 Sample Shipping

Samples will be transported after authorization from the Soil & Groundwater Remediation Project (S&GRP)-authorized shipper. If the wells have a medium or high risk of encountering radiological material, radiological surveys will be required. If radiological materials are not anticipated, RCT surveys may not be required if the RCT field readings show no activity above background. As applicable, the RCT will measure the radioactive contamination levels on the outside of each sample jar and the dose rates on each sample jar. As applicable, the RCT will also measure the radiological activity on the outside of the sample container (through the container) and will document the highest contact radiological reading in millirem per hour (mrem/hr). This information, along with other data, will be used to select proper

Attachment 7

^WCH Document Control

From: Saueressig, Daniel G
Sent: Tuesday, September 29, 2015 3:22 PM
To: ^WCH Document Control
Subject: FW: NON-CONTIGUOUS ONSITE APPROVAL REQUEST

Please provide a chron number, this email documents a regulatory approval.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

From: Boyd, Alicia (ECY) [mailto:aboy461@ecy.wa.gov]
Sent: Tuesday, September 29, 2015 3:22 PM
To: Guzzetti, Chris; Saueressig, Daniel G
Cc: Zeisloft, Jamie; McCurley, Clay D
Subject: RE: NON-CONTIGUOUS ONSITE APPROVAL REQUEST

I have no concerns with the waste transfer to the 100-D area.

Alicia L. Boyd
Washington State Department of Ecology
3100 Port of Benton Blvd
Richland, WA 99352
509-372-7934

From: Guzzetti, Christopher [mailto:Guzzetti.Christopher@epa.gov]
Sent: Tuesday, September 29, 2015 2:55 PM
To: Saueressig, Daniel G <daniel.saueressig@wch-rcc.com>
Cc: Boyd, Alicia (ECY) <aboy461@ecy.wa.gov>; Zeisloft, Jamie <jamie.zeisloft@rl.doe.gov>; McCurley, Clay D <Clay.McCurley@wch-rcc.com>
Subject: RE: NON-CONTIGUOUS ONSITE APPROVAL REQUEST

I concur.

Christopher J. Guzzetti
Project Manager
Hanford Project Office
U.S. Environmental Protection Agency
825 Jadwin Avenue, Suite 210
Richland, WA 99352

Phone: (509) 376-9529
Fax: (509) 376-2396
Email: guzzetti.christopher@epa.gov

From: Saueressig, Daniel G [mailto:daniel.saueressig@wch-rcc.com]
Sent: Tuesday, September 29, 2015 12:53 PM
To: Guzzetti, Christopher
Cc: Boyd, Alicia; Zeisloft, Jamie; McCurley, Clay D
Subject: NON-CONTIGUOUS ONSITE APPROVAL REQUEST

Chris, we will be generating some sample waste (PPE, plastic shovel, booties, etc.) from closure sampling 600-326. I'd like your approval to move the waste to 100-D where we have a container staged for spill cleanup waste and other material. Alicia has been receptive in the past to relocating waste if it makes sense. This is the only place in the 100 Areas set up to store waste.

Let me know if you concur.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

Attachment 8

180757

^WCH Document Control

From: Saueressig, Daniel G
Sent: Wednesday, September 16, 2015 7:34 AM
To: ^WCH Document Control
Cc: Hynes, Robert T
Subject: FW: OFFSITE ACCEPTABILITY DETERMINATION

Please provide a chron number. This email documents a regulatory approval.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

From: Einan, Dave [mailto:Einan.David@epa.gov]
Sent: Tuesday, September 15, 2015 8:11 PM
To: Hynes, Robert T; Saueressig, Daniel G
Cc: Zeisloft, Jamie
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Bob—

From our phone conversation, I understand that in addition to the uranium chips in oil, you have some fines in oil that are going to some combination of DSSI and M&EC in Tennessee. These were to be combined with other oils for shipment to the Tennessee facilities at PermFix NW. Given that these fines drums are not entering the permitted units at PermaFix, and not being treated, an off-site approval is not required for PermaFix NW for that activity. DSSI and M&EC are approved for shipments through 10/21/2015.

I'm glad you only have to delay part of the shipment.

I will let you know when I find out if PermaFix NW is acceptable.

Dave Einan
509-376-3883

From: Einan, Dave
Sent: Tuesday, September 15, 2015 4:32 PM
To: 'Hynes, Robert T'; Saueressig, Daniel G
Cc: Zeisloft, Jamie
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

I do not have an approval yet, so I think you need to postpone.

Dave Einan
509-376-3883

From: Hynes, Robert T [mailto:robert.hynes@wch-rcc.com]
Sent: Tuesday, September 15, 2015 4:27 PM
To: Einan, Dave; Saueressig, Daniel G
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Dave, Dan

The shipment is scheduled to leave to tomorrow morning 9/16/15. Please advise if I need to cancel the shipment.

Bob

From: Einan, Dave [mailto:Einan.David@epa.gov]
Sent: Tuesday, September 15, 2015 2:32 PM
To: Saueressig, Daniel G
Cc: Zeisloft, Jamie; Simes, Benjamin; Hynes, Robert T; Strand, Christopher P; McCurley, Clay D
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Dan—

Thanks for the nudge.

It's Region 10 I'm waiting on. I just called and left another message.

Dave Einan
509-376-3883

From: Saueressig, Daniel G [mailto:daniel.saueressig@wch-rcc.com]
Sent: Monday, September 14, 2015 12:27 PM
To: Einan, Dave
Cc: Zeisloft, Jamie; Simes, Benjamin; Hynes, Robert T; Strand, Christopher P; McCurley, Clay D
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Hi Dave, sorry to pester but have you heard back from your Region 4 contact? We're hoping to start shipping waste later this week.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

From: Saueressig, Daniel G
Sent: Thursday, September 03, 2015 12:40 PM
To: Einan, David R
Cc: Zeisloft, Jamie; Simes, Benjamin; Hynes, Robert T; Strand, Christopher P
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Dave, just checking on the status of this request. Shipment is scheduled for September 17. I'll be on vacation next week so if you hear back from the facilities can you make sure to let Chris Strand and Bob Hynes know?

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

From: Saueressig, Daniel G
Sent: Wednesday, August 05, 2015 1:02 PM
To: Einan, David R
Cc: Zeisloft, Jamie; Simes, Benjamin; Hynes, Robert T
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Dave, I need to renew to offsite acceptability determination for the 3 facilities listed at the bottom of this email string.

Let me know if they are approved.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

From: Einan, Dave [mailto:Einan.David@epa.gov]
Sent: Monday, March 09, 2015 8:23 AM
To: Saueressig, Daniel G
Cc: Zeisloft, Jamie; Simes, Benjamin
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

The three facilities below are acceptable for shipments through May 6, 2015.

Dave Einan
509-376-3883

From: Saueressig, Daniel G [mailto:daniel.saueressig@wch-rcc.com]
Sent: Thursday, February 19, 2015 9:58 AM
To: Einan, Dave
Cc: Zeisloft, Jamie; Simes, Benjamin
Subject: RE: OFFSITE ACCEPTABILITY DETERMINATION

Dave, I believe operations is getting ready to make a chips/oil shipment to Perma-Fix in about 3 weeks and I haven't heard back from you on the request below. Can you check with your counterparts and let me know if the 3 facilities below are acceptable for receiving CERCLA waste from 618-10?

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

From: Saueressig, Daniel G
Sent: Tuesday, November 25, 2014 9:06 AM
To: Einan, David R
Subject: OFFSITE ACCEPTABILITY DETERMINATION

Dave, it's that time again to update our offsite acceptability determinations for waste generated from 618-10.

Can you let me know if Perma-Fix Northwest (EPA ID# WAR000010355), Perma-Fix DSSI (EPA ID# TND982109142) and Materials & Energy Corporation (EPA ID# TNR000005397) are acceptable to receive CERCLA waste from 618-10? I'm including M&EC since the DSSI facility may send some of their portion of the waste there for processing. Both DSSI and M&EC are in Region 4.

Thanks and give me a call if you have any questions.

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

Attachment 9

180530

^WCH Document Control

From: Saueressig, Daniel G
Sent: Monday, August 24, 2015 5:51 AM
To: ^WCH Document Control
Subject: FW: Off-Site Determination

Please provide a chron number. This email documents a regulatory approval.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

-----Original Message-----
From: Einan, Dave [mailto:Einan.David@epa.gov]
Sent: Friday, August 21, 2015 8:48 AM
To: Saueressig, Daniel G
Cc: Simes, Benjamin; Zeisloft, Jamie
Subject: RE: Off-Site Determination

Dan--

I've now heard back and all 3 are acceptable.

Dave Einan
509-376-3883

-----Original Message-----
From: Saueressig, Daniel G [mailto:daniel.saueressig@wch-rcc.com]
Sent: Monday, August 17, 2015 1:02 PM
To: Einan, Dave
Cc: Simes, Benjamin; Zeisloft, Jamie
Subject: RE: Off-Site Determination

Dave, sorry it has taken so long to get back to you. Below are 2 other facilities that the waste could get sent to. Shipment has been delayed until mid-September.

Primary TSD

Lone Star Industries
2524 S Sprigg St
Cape Girardeau MO 63702
EPA ID# MOD981127319

Secondary TSD

Ash Grove Cement Company
4457 Highway 108
Foreman AR 71836
EPA ID# ARD981512270

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

-----Original Message-----
From: Einan, Dave [mailto:Einan.David@epa.gov]
Sent: Tuesday, July 21, 2015 8:47 AM
To: Saueressig, Daniel G
Cc: Simes, Benjamin; Zeisloft, Jamie
Subject: RE: Off-Site Determination

Dan--

Do you know if they are going to process it in Kent or transship to another facility? Burlington does both, so we may need to check a downstream facility as well.

Dave Einan
509-376-3883

-----Original Message-----
From: Saueressig, Daniel G [mailto:daniel.saueressig@wch-rcc.com]
Sent: Monday, July 20, 2015 2:19 PM
To: Einan, Dave
Cc: Simes, Benjamin; Zeisloft, Jamie
Subject: FW: Off-Site Determination

Dave, see below, I'd like to request your approval to send some waste gasoline to Burlington Environmental. Let me know if they are acceptable, shipment is tentatively scheduled for August 18.

Thanks,

Dan Saueressig
Environmental Project Lead
Washington Closure Hanford
521-5326

-----Original Message-----
From: Gibbons, James C
Sent: Monday, July 20, 2015 12:40 PM
To: Saueressig, Daniel G
Cc: Drago, Patricia A

Subject: FW: Off-Site Determination

Dan,

On August 18, 2015 we plan on shipping a 55-gal drum containing approximately 12-gallons of waste gasoline w/ Bio Kleen generated at 618-10. This waste designates as a D001/D018 dangerous waste. This email is a request for an off-site TSDF acceptability determination as required by 618-10's RDR/RAWP (DOE/RL-2014-13-ADD1. Rev 0, Section 5.2.3) and 40 CFR 300.440. The pertinent information for the proposed TSDF is listed below.

Burlington Environmental, LLC
20245 77th Avenue South
Kent, WA 98032

RCRA ID No.: WAD991281767

Facility Contact: John Carpenter, Plant Manager
(253) 872-8030

Please let me know if you need any further information.

Thanks,

Jim Gibbons
Washington Closure Hanford
Waste Services
618-10
(509) 222-0322

Attachment 10

300 Area Closure Project Status
October 8, 2015

- VTC Meeting –

Backfill

- Backfill completed for RLWS, RRLWS, 300-214, 300-15, and 316-3 excavations.
- Backfill completed for the 309 excavation.

Final Revegetation

- Completed for all final remediated waste sites.

TPA Milestone M-016-69

- Completed.

324 Building

- 100% design completed for retrieval.
- Continue S&M (min-safe operations) through FY 16.
- Replacement of Zone 1 HEPA filters pending.

300-277

- Remediation, backfill and revegetation complete.
- Waste Site Reclassification Form and CVP pending.

300-288:2

- Remediation of Phase I initiated, schedule is pulling left.
- Characterization report for Phase II issued.

Site Completion

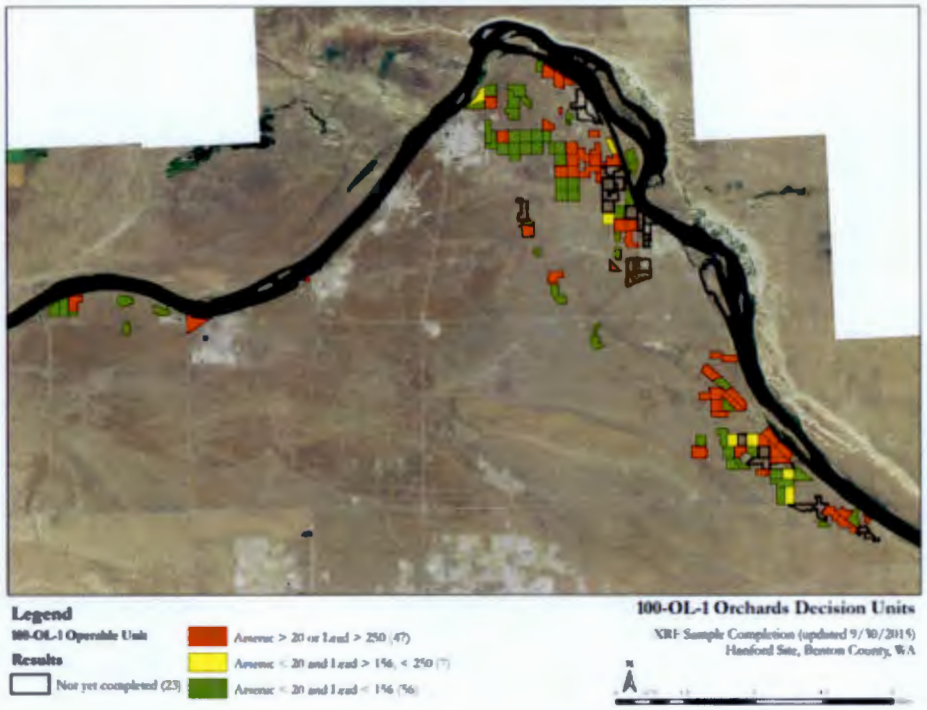
- Demobilization underway security fence repair completed.

Attachment 11

Project Summary for Orchard Lands Characterization

110 of 133 Decision Units (83%) have been completed for surface characterization of lead and arsenic using XRF.

Below is a map that depicts progress through September 23 and general sampling results. The map is provided for information only; not all the results have been through quality assurance protocols. In the map, green is where no samples were detected above 20 ppm for arsenic and 156 ppm lead; yellow is where at least one sample was between 156 and 250 ppm for lead and all arsenic is below 20 ppm; and red is where at least one sample was above the screening level (20 ppm arsenic or 250 ppm lead). 156 ppm for lead is an ecological risk screening level based on CHPRC-01311.



Attachment 12

2015 Annual Sitewide Institutional Controls (IC) Review

River Corridor Contractor (RCC)

2015 RCC Annual IC Review

What did we look at?

- Evaluation of river corridor source waste sites
  - **Trespass events at RCC waste sites**
  - **Access control/entry restrictions**
  - **Excavation control for active waste sites**
  - **Field inspection of ICs**
    - Required roadway signage on entrances to 300 Area Main Complex, 618-10, 100-F, 100-H, 100-N Areas
    - Shoreline signs inspected during August 2015 Columbia River RCRA Inspection

2015 RCC Annual IC Review

- What did we find?

✔ **No public trespass events on WCH managed projects**

✔ **Badging system (access controls) in place and active**

✔ **Approved Excavation Permits in place and current**

✔ **Warning signs in place at roadway entrances**

✔ **Shoreline signage in place**

2015 RCC Annual IC Review

Signage

300 AREA NORTH

100-H

100-D SHORELINE

100-H SHORELINE

618-10

2015 RCC ANNUAL IC REVIEW

- Any suggestions for next year's IC review????

Attachment 13

LTS

BRIDGE TO THE FUTURE

MSA 2015 ANNUAL INSTITUTIONAL CONTROLS ASSESSMENT

Transition of River Corridor to Long Term Stewardship

Transition Area	Year Transitioned to LTS
Segment 1	2012
Segment 2	2012
Segment 3	2012
100-F	2013
Segment 5	2013
ISS Reactors	2014
100-K	2015
IU2/Segment 4A	2015

Long Term Stewardship Segments

- River Corridor Boundary
- Transition Complete
- Transition NOT Complete
- Areas NOT Transitioning
- Central Plateau
- Hanford Reach Nat. Monument
- Hanford Site
- Reactors B KE & KW
- Reactors C, D, DR, F, H, N

Reactors will be placed in Interim Safe Storage and remain in place for approximately 75 years

Region as of 5/24/2015

Miles 0 1 2 4 6

MSA 2014 Annual Institutional Controls Assessment

Operable Units for LTS-Managed Areas

Segment/Area	Operable Unit
Segment 1	100-KR-2, 100-IU-2, 100-BC-1, 200-OA-1
Segment 2	100-IU-2
Segment 3	100-IU-2, 100-IU-6
Segment 4A, 100-IU-2	100-IU-2, 100-IU-5
Segment 5	100-IU-6, 300-FF-2
100-F	100-FR-1, 100-FR-2
100-K	100-KR-1, 100-KR-2

Institutional Controls Associated with OUs

- Entry Restrictions
- Warning Notices
- Groundwater-Use Management
- Land-Use Management
- Miscellaneous Provision

Entry Restrictions & Warning Notices Institutional Controls

- **Entry Restrictions**

  Active badging program and barricades to control unauthorized entries

  No breeches at the fence along SR 240.

- **Warning Notices**

  DOE "No Trespassing" signs every 500 ft

  Warning signs as required by decision documents in place

Other Institutional Controls Associated with OUs

- **Groundwater-Use Management**

  No unauthorized wells were drilled in the 100-K and 100-F Area

  No irrigation over or around 116-F-14

- **Land-Use Management**

  Excavation Permitting process used to control land-use management – No excavation permits issued for 100-F Area and 100-K Areas waste sites requiring institutional controls

- **Miscellaneous Provision**

  One reportable trespassing incident (Oct 13, 2014 - Aug 31, 2015)

300 Area Institutional Controls Assessment

- Lawn irrigation southeast of the fire station has been discontinued.
- Lawn irrigation in other areas is manually controlled to 1-hr a day.
- Truck washings are limited to the driveway on the station's north side.
- Controls comply with fire hydrant discharge restrictions.
- No new groundwater discharges are observed.

Institutional Controls of the 300 Area Fire Station

Lawn Irrigation at the 300 Area Fire Station

Attachment 14

Assessment Checklist
Institutional Controls for 100K

Background and Introduction

The K Basins Interim Remedial Action Record of Decision calls for Institutional Controls that will minimize the potential for human exposure to hazardous substances that will be addressed by the remedial action. The specific controls are identified in the work plans that implement the remedial action decision. This assessment checklist identifies the required controls and provides an evaluation of the whether the control has been implemented and whether the implementation has been effective in minimizing the potential for human exposure to hazardous substances.

Institutional Controls Requirement	Discussion of Implementation and Effectiveness
Continue the current badging program and access controls for the duration of the interim action. Visitors entering the sites associated with this interim action are required to be escorted at all times.	The badging and other entry restrictions remain in place and appear to be effective.
Utilize the onsite excavation permit process to control intrusive activities such as well drilling and excavation of soil.	The excavation permit process remains in place as an effective control.
Maintain existing signs prohibiting public access.	No trespassing signs are in place along the river. Large warning signs are present at the entrance to the 100K area and at the former location of the 181KW and 181KE buildings along the river. The signs are effective controls.
Provide notification to the lead regulator upon discovery of any trespass incidents.	Security forces continue to patrol the area and report trespass. MSA manages this function.
Report trespass incidents to the Benton County Sheriff's Office for investigation and evaluation for possible prosecution.	DOE reports trespass incidents to appropriate authorities.
Take the necessary precautions to add access restriction language to any land transfer, sale, or lease of property that the U.S. Government considers appropriate while institutional controls are compulsory. The lead regulator will have to approve any access restrictions prior to transfer, sale, or lease.	No land transfers have taken place in 100K. The controls remain in place as managed by MSA.

Until final remedy selection, institutional control requirements will not be deleted or terminated unless the lead regulator has provided written concurrence on the deletion or termination and appropriate documentation has been placed in the Administrative Record.	The institutional control requirements were modified by TPA change notice 604, 605, 606, and 607 and have been placed in the Administrative Record.
The implementation and effectiveness of institutional controls will be evaluated and reported in accordance with DOE/RL-2001-41, Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions.	An evaluation was completed in August 2015. Results will be included in the next revision of DOE/RL-2001-41 (Site Institutional Control Plan).
Current access controls include signs along the river, noncontinuous fencing, locked access to buildings containing the primary hazards, and routine security patrols.	Signs along the river are in place, buildings are locked, and there are routine security patrols. A non-continuous fence is in place. Fencing and/or signs are present at locations where access is most likely to occur.

The following pictures were taken August 31, 2015

Main Entrance of 100K

Approaching main entrance of 100K

The South East Entrance of 100K

By the old KE intake structure

Taken by the old KW intake structure

Taken on the North West side of the KW Reactor

Fence line near 189K

Attachment 15

TRI-PARTY AGREEMENT

Change Notice Number

TPA-CN- 679

TPA CHANGE NOTICE FORM

Date:

8/13/2015

Document Number, Title, and Revision:

PNNL-12220, "Sampling and Analysis Plan Update for Groundwater Monitoring 1100-EM-1 Operable Unit"

Date Document Last Issued:

June 1999

Originator: H. B. Hathaway

Phone: 376-6070

Description of Change:

This change notice retires use of PNNL-12220, *Sampling and Analysis Plan Update for Groundwater Monitoring 1100-EM-1 Operable Unit*, issued in June, 1999, and any associated TPA changes notices, for the National Priority List (NPL) delisted 1100-EM-1 Groundwater Operable Unit.

H.B. Hathaway and D.R. Einan agree that the proposed change

DOE

Lead Regulatory Agency

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*.

Justification and Impacts of Change:

Summary

The monitored natural attenuation (MNA) remedy selected for 1100-EM-1 groundwater has been completed and the 1100 Area was delisted from the National Priorities List, but groundwater monitoring was required annually in three wells. Because contaminant concentrations in monitoring wells have continued to meet cleanup goals, groundwater monitoring may be discontinued. The original SAP did not provide an avenue to cease groundwater monitoring, nor did a subsequent change notice.

Background

In 1993 EPA, Ecology, and DOE signed a ROD for the 1100 Area, including the 1100-EM-1 groundwater Operable Unit (EPA/ROD/R10-93/063). The ROD had a groundwater component that relied on MNA for trichloroethene (TCE), with a cleanup level of 5 µg/L at the designated point of compliance. The point of compliance was defined as the George Washington Way diagonal line (Figure 1).

The ROD identified TCE as the risk-driver for groundwater. Vinyl chloride and 1,1-dichloroethene were identified as TCE breakdown products. Nitrate and chromium were not decision drivers but were initially included for monitoring. Groundwater monitoring requirements were described in DOE/RL-95-50, later replaced by PNNL-12220.

In 2006, the second CERCLA 5-year review (DOE/RL-2006-20) concluded that remedies selected for the 1100-EM-1 OU had been completed, that is, the remedial action objectives established in the ROD had been achieved and were considered protective of human health and the environment. As a result, the 1100 Area was removed from the National Priorities List and DOE, EPA, and Ecology agreed to a change (reduction) in groundwater monitoring. The new monitoring requirements were described in TPA-CN-163 and were intended to provide assurance that the remedial action goals had been achieved. TPA-CN-163 also stated that monitoring of nitrate and uranium near the DOE Horn Rapids Landfill would

continue under the environmental monitoring activities performed to meet the AEA objectives, and monitoring associated with the 300-FF-5 OU will continue to evaluate TCE concentrations northeast of 1100-EM-1 near the river.

The third CERCLA 5-year review in 2012 (DOE/RL-2011-56) did not recommend any change to 1100-EM-1 monitoring, simply noting, "Previous groundwater monitoring indicated trichloroethylene contamination; however, recent monitoring has showed that these levels are not over the cleanup standard. Additional cleanup actions have taken place to achieve the cleanup goals and standards."

Currently, monitoring of nitrate and uranium near the landfill, as well as tritium near the City of Richland's water supply wells, is described in DOE/RL-2012-59 (Surveillance Monitoring Plan). TCE is a contaminant of concern for 300-FF-5. The current monitoring requirements in DOE/RL-2012 include annual sampling for Wells 699-S28-E12, 699-S31-E10A, and 699-S31-E10C (Figure 1) for TCE, vinyl chloride, and 1, 2-dichloroethene.

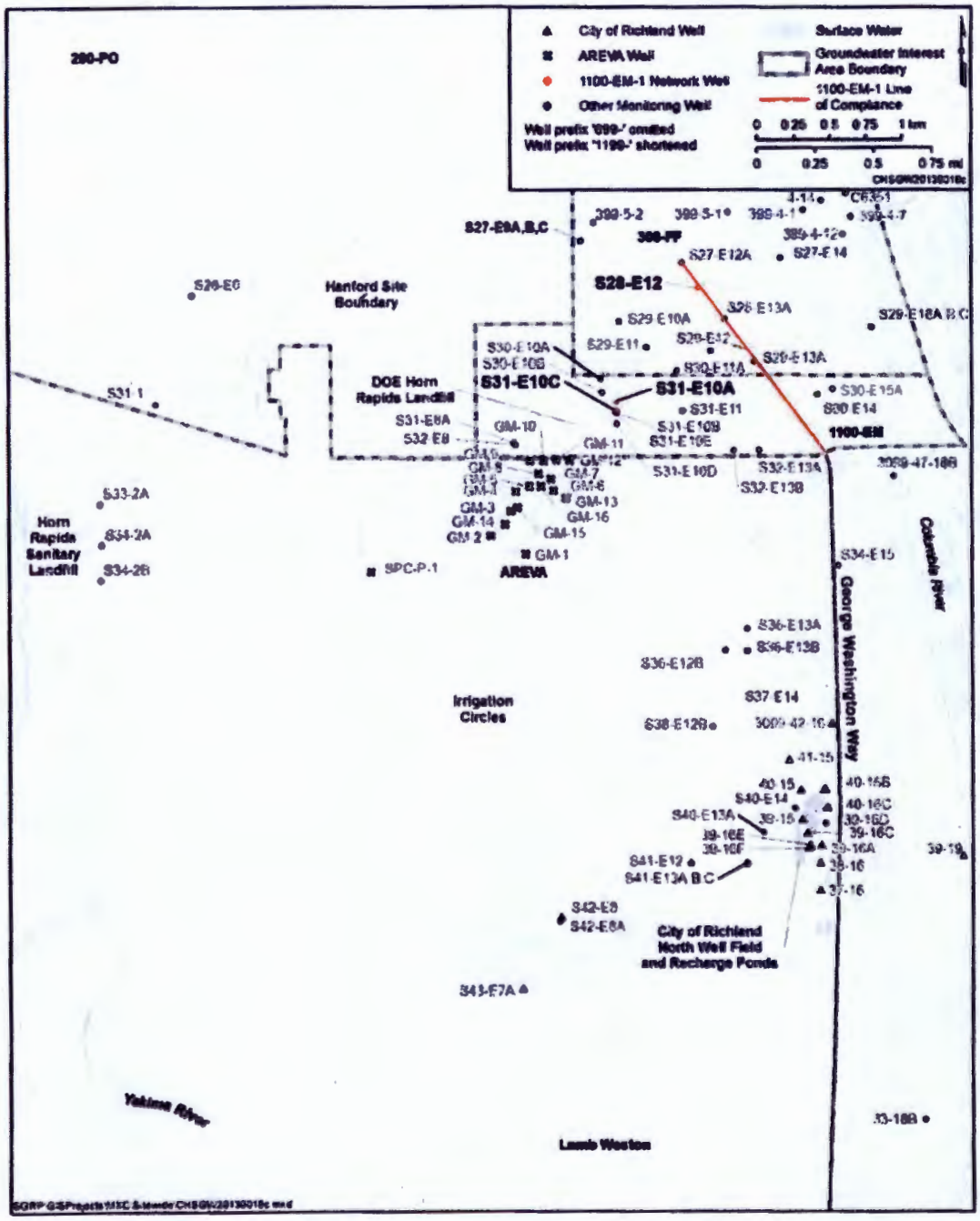


Figure 1. Location of 1100-EM-1 Line of Compliance and Monitoring Wells

Data Evaluation

TCE concentrations in compliance wells have remained below the 5 µg/L cleanup level since 2001 (Table 1). Detection limits in the early 1990s were sometimes greater than the cleanup level, but since the mid-1990s the detection limits have been less than or equal to 1 µg/L. A complete listing of TCE, 1,1-dichloroethene, and vinyl chloride data for the three wells from 1993 through 2014 can be found at the end of this documentation.

The upper panel of Figure 2 illustrates concentrations of TCE from 1993 through 2014. The lower panel shows detail for the period 2006 through 2014. Concentrations declined between 1993 and 2007, and have remained near or below 1 µg/L between 2008 and 2014.

Breakdown products vinyl chloride and 1,1-DCE have been undetected since 1995, with detection limits less than or equal to 1 µg/L. Thus there is no evidence of TCE breakdown products.

Table 1. Summary of Trichloroethene Data in 1100-EM-1 Compliance Wells

Well Name	Number of Data points (1993 through 2014)	Maximum TCE Detection (µg/L)	Date of Max. Detection	Date of Last Exceedance of 5 µg/L Cleanup Level
699-S28-E12	32	7	6/30/1998	6/30/1998
699-S31-E10A	40	61	3/16/1993	10/11/2000
699-S31-E10C	39	57	6/9/1993	6/14/1999

Conclusion

TCE concentrations have met cleanup goals in all three 1100-EM-1 compliance wells since 2001. Data from thirteen years of subsequent sampling confirm that concentrations are stable at levels well below the cleanup goal. No further groundwater monitoring is needed for 1100-EM-1.

DOE performs other groundwater monitoring in and near the southern Hanford Site. This monitoring includes nitrate and uranium from offsite sources, tritium near the City of Richland's water supply wells, and uranium and volatile organics in the 300-FF-5 groundwater OU.

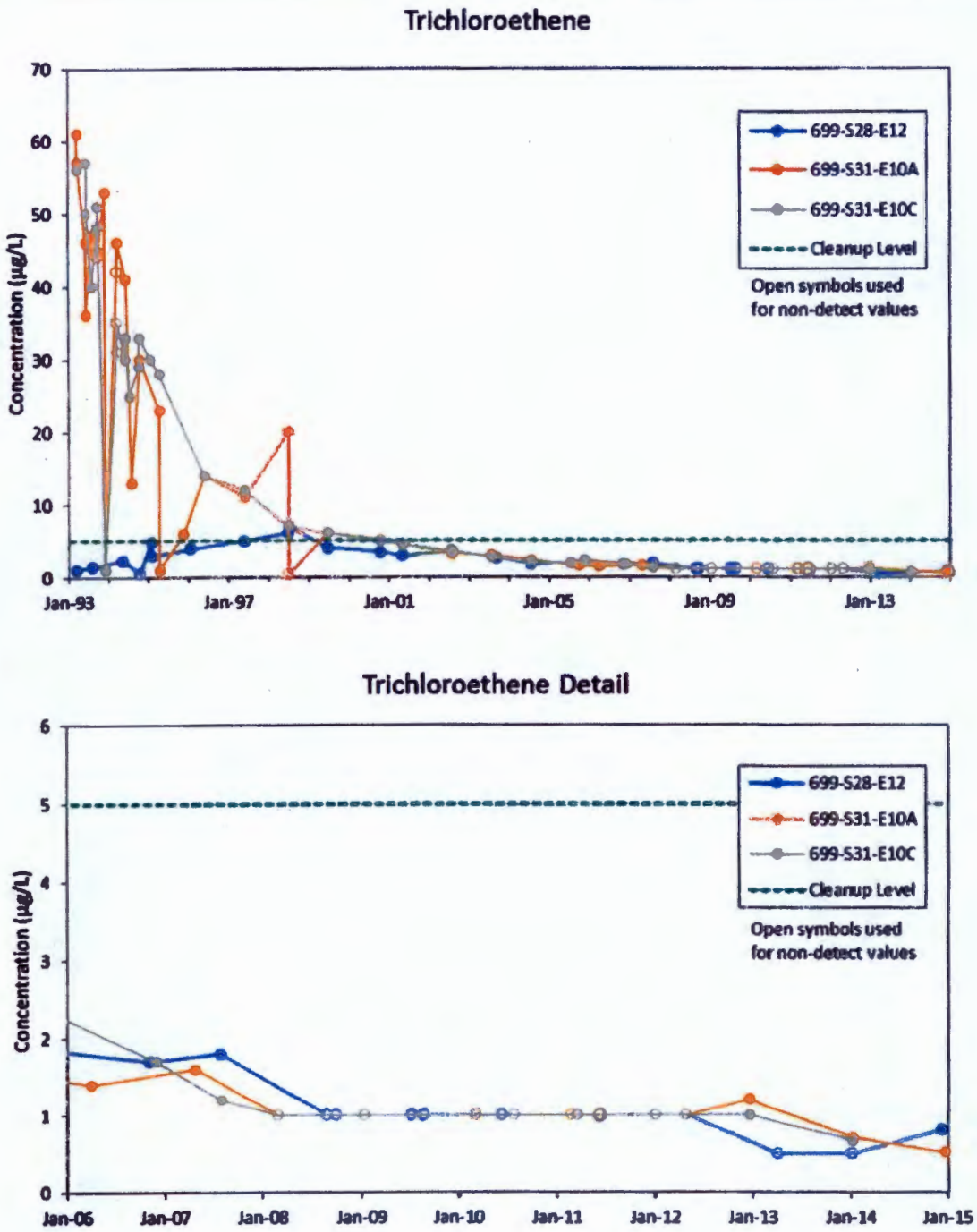


Figure 2. Trichloroethene in 1100-EM-1 Compliance Wells (non-detects are plotted at the detection limit)

References

DOE/RL-95-50, 1995, *Additional Monitoring Well Installation and Field Sampling Plan for Continued Groundwater Monitoring at the Horn Rapids Landfill*, U.S. Department of Energy, Richland, Washington.

DOE/RL-2006-20, 2006, *The Second CERCLA Five-Year Review Report for the Hanford Site, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.* Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=DA04570094.

DOE/RL-2011-56, Rev. 1., 2012, *Hanford Site Third CERCLA Five-Year Review Report, U.S. Department of Energy, Richland, Washington.* Available at: http://www.hanford.gov/files.cfm/DOE-RL-2011-56_Rev%201__2-28-12_.pdf

DOE/RL-2012-59, 2013, *Surveillance Groundwater Monitoring Plan for the Hanford Site*, U.S. Department of Energy, Richland, Washington.

EPA/ROD/R10-93/063, 1993, *Record of Decision for the USDOE Hanford 1100 Area Final Remedial Action,* Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.epa.gov/superfund/sites/rods/fulltext/r1093063.pdf.

PNNL-12220, 1999, Sampling and Analysis Plan Update for Groundwater Monitoring – 1100-EM-1 Operable Unit, Pacific Northwest National Laboratory, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/pdf.cfm?accession=0084082

TPA-CN-163, 2007, *Change Notice for Modifying Approved Documents/Workplans In Accordance with the Tri-Party Agreement Action Plan, Section 9.0, Documentation and Records: PNNL-12220, "Sampling and Analysis Plan Update for Groundwater Monitoring 1100-EM-1 Operable Unit"*, dated April 24, U.S. Environmental Protection Agency and U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=DA05317392.

Monitoring Data for 1100-EM-1

Well Name	Sample Date	Trichloroethene (µg/L)		1,1-Dichloroethene (µg/L)		Vinyl Chloride (µg/L)	
699-S28-E12	3/12/1993			10	U	10	U
	7/30/1993	1.4					
	5/10/1994	2.3					
	10/17/1994	0.5	U				
	1/26/1995	4.8				0	U
	1/26/1995	2.9					
	1/17/1996	3.9				0.25	U
	5/22/1997	5		1	U	1	U
	6/19/1998	6		0.19	U	0.68	U
	6/30/1998	7				0.68	U
	6/14/1999	4	J	0.15	U	0.1	U
	10/11/2000	3.4		0.23	U	0.17	U
	5/2/2001	2.9	J			0.17	U
	7/25/2002	3.5	J	0.39	U	0.32	U
	7/25/2002	3.5	J	0.39	U	0.32	U
	9/10/2003	2.6		0.16	U	0.25	U
	7/13/2004	1.7		0.07	U	0.08	U
	7/14/2005	1.9	B	0.04	U	0.07	U
	11/6/2006	1.7		0.21	U	0.23	U
	7/27/2007	1.8		0.045	U	0.04	U
	8/26/2008	1	U	1	U	1	U
	9/28/2008	1	U	1	U	1	U
	7/9/2009	1	U	1	U	1	U
	8/25/2009	1	U	1	U	1	U
	6/10/2010	1	U	1	U	1	U
699-S28-E12 (cont.)	3/17/2011	1	U	1	U	1	U
	6/8/2011	1	U	1	U	1	U

	6/8/2011	1	U	1	U	1	U
	4/24/2012	1	U	1	U	1	U
	4/4/2013	0.5	U	1	UT	1	U
	1/7/2014	0.5	U	1	U	1	U
	12/10/2014	0.81	J	0.3	U	0.3	U
699-S31-E10A	3/16/1993	61		10	U	10	U
	3/16/1993	57		10	U	10	U
	6/8/1993	46		10	U	10	U
	6/8/1993	36		5	U	10	U
	8/3/1993	47					
	9/22/1993	45	U	5	U	10	U
	9/22/1993	44	U	10	U	10	U
	11/30/1993	53		1		1	
	11/30/1993	1		5	U	5	U
	3/22/1994	42	U	0.6	U	1	U
	3/22/1994	46		1	U	0.5	U
	6/7/1994	41		0.6	U	0.5	U
	7/26/1994	13					
	10/12/1994	30		1	U	1	U
	4/12/1995	23		3	U	1	
	4/12/1995	1		2.6	J	3	
	11/17/1995	5.9				0.25	U
	5/22/1996	14		5	U	10	U
	5/22/1997	11		1	U	1	U
699-S31-E10A (cont.)	6/22/1998	20		0.19	U	0.68	U
	6/22/1998	0.4	U			0.68	U
	6/14/1999	6		0.15	U	0.1	U
	10/11/2000	5.1		0.23	U	0.17	U
	5/1/2001	4.4	J			0.17	U
	7/26/2002	3.1	J	0.39	U	0.32	U

	7/22/2003	2.9		0.16	U	0.25	U
	7/14/2004	2.3		0.07	U	0.08	U
	9/29/2005	1.5		0.04	U	0.07	U
	3/29/2006	1.4		0.21	U	0.23	U
	4/25/2007	1.6		0.045	U	0.04	U
	2/27/2008	1	U	1	U	1	U
	1/13/2009	1	U	1	U	1	U
	3/4/2010	1	U	1	U	1	U
	2/24/2011	1	U	1	U	1	U
	6/8/2011	1	U	1	U	1	U
	1/4/2012	1	U	1	U	1	U
	4/24/2012	1	U	1	U	1	U
	12/18/2012	1.2	J	1	U	1	U
	1/9/2014	0.71	J	1	U	1	U
	12/21/2014	0.52	J	0.08	U	0.08	U
699-S31-E10C	3/15/1993	56		10	U	10	UJ
	6/9/1993	57		5	U	10	U
	6/9/1993	50		5	U	10	U
	8/3/1993	40					
	9/21/1993	48	U	5	U	10	U
699-S31-E10C (cont.)	9/21/1993	51	U	5	U	10	U
	11/30/1993	1		1		1	
	11/30/1993	1		1		1	
	3/21/1994	31	U	1	U	1	U
	3/21/1994	35	U	1	U	1	U
	6/6/1994	30		0.6	U	0.5	U
	6/6/1994	33		0.6	U	0.5	U
	7/8/1994	25					
	10/11/1994	29		1	U	1	U
	10/11/1994	33		1	U	1	U

	1/23/1995	30								
	4/11/1995	28			2.6	J		3		
	5/22/1996	14			5	U		10	U	
	5/20/1997	12	B		1	U		1	U	
	6/19/1998	7			0.19	U		0.68	U	
	6/14/1999	6		G	0.15	U		0.1	U	
	10/11/2000	4.9			0.23	U		0.17	U	
	5/1/2001	4.4	J					0.17	U	
	7/26/2002	3.4	J		0.39	U		0.32	U	
	7/22/2003	2.7			0.16	U		0.25	U	
	7/14/2004	2.1			0.07	U		0.08	U	
	7/19/2005	1.9		G	0.04	U	G	0.07	U	G
	11/18/2005	2.3			0.04	U		0.07	U	
	11/30/2006	1.7			0.21	U		0.23	U	
	8/1/2007	1.2			0.045	U		0.04	U	
	2/27/2008	1	U		1	U		1	U	
699-S31-E10C (cont.)	1/13/2009	1	U		1	U		1	U	
	7/28/2010	1	U		1	U		1	U	
	3/23/2011	1	U		1	U		1	U	
	1/4/2012	1	U		1	U		1	U	
	4/24/2012	1	U		1	U		1	U	
	12/18/2012	1	U		1	U		1	U	
	12/18/2012	1	J		1	U		1	U	
	1/9/2014	0.67	J		1	U		1	U	

Green shading indicated trichloroethene concentrations above 5 µg/L cleanup level.

B = Analyte was detected in both the associated quality control blank and in the sample

G = Record has been reviewed and determined to be correct, or the record has been corrected with laboratory confirmation or other supporting information

J = Estimated value; constituent detected at a level less than the required detection limit or practical quantitation limit, but greater than or equal to the method detection limit

T = Spike or spike duplicate sample recovery outside control limits

U = Undetected (reported value is method detection limit)

Approvals:

H. Boyd Hathaway DOE Project Manager	8/13/15 Date	[X] Approved [ ] Disapproved
[signature] EPA Project Manager	13 Aug 15 Date	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved