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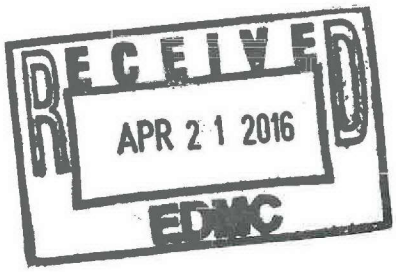
Please distribute to the following:

100/300 AREA UNIT MANAGER MEETING
ATTENDANCE AND DISTRIBUTION

NAME	E-MAIL ADDRESS	MSIN	COMP
Childers, Heather	Original +1 copy	H6-08	ADREC
Cline, Michael	Michael.Cline@rl.doe.gov	A5-11	DOE
French, Mark	Mark.French@rl.doe.gov	A6-38	DOE
Menard, Nina	NMEN461@ECY.WA.GOV	H0-57	ECO
Guzzetti, Chris	Guzzetti.Christopher@epa.gov	A3-46	EPA
Hadley, Karl A	karl.hadley@wch-rcc.com	H4-21	WCH

NOTE FOR ADMIN RECORD:
TPA Milestones
M-015-79
M-016-00C
M-016-143
M-016-173
M-016-175
M-016-176
M-016-177
M-016-178
M-016-181
M-016-186
M-093-27
M-093-28



Operable Units
100-BC-1
100-BC-2
100-BC-5
100-FR-3
100-HR-3
100-IU-2
100-IU-6
100-KR-4
100-NR-2
300-FF-5

182615

100/300 AREA UNIT MANAGERS MEETING
APPROVAL OF MEETING MINUTES

March 10, 2016

APPROVAL: _____ Date 4/14/16
Mark French, DOE/RL (A6-38)
River Corridor Project Manager

APPROVAL: _____ Date 4/14/16
Mike Cline, DOE/RL (A5-11)
Groundwater Project Manager

APPROVAL: _____ Date 4/18/16
Nina Menard, Ecology (H0-57)
Environmental Restoration Project
Manager

APPROVAL: _____ Date 4/14/16
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

March 10, 2016

ADMINISTRATIVE

- Next Unit Manager Meeting (UMM) – The next meeting will be held April 14, 2016, 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 February 11, 2016, 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).
- 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 March 10, 2016, UMM.

PRELIMINARY RESULTS OF THE KE BOREHOLE SUPPLEMENTARY INVESTIGATION

Chuck Miller presented preliminary results of the KE Borehole Supplementary Investigation (see Attachment 1).

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

Attachment 2 provides status and information for groundwater. Attachment 3 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 action items were documented.

> Agreement 1: Attachment 4 provides DOE's and EPA's approval that the Environmental Disposal Restoration Facility (ERDF) Roll-On/Roll-Off (RO/RO) containers are not included in the labeling requirements as identified in SNF-9430, Revision 3, Section 3, paragraph 9. ERDF RO/RO containers comply with ERDF waste acceptance criteria (WCH-191 and Change Notice WCH-00191-04-CN-01) and applicable procedures (PRC-PRO-WM-40332) for waste destined for ERDF.

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

Attachment 2 provides status and information for groundwater. Attachment 5 provides status and information for Washington Closure Hanford (WCH) Closure Operations activities at the 100 Areas, 618-10, and the 300 Area. No issues were identified and no agreements or action items were documented.

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

Attachment 2 provides status and information for groundwater. Attachment 5 provides status and information for WCH Closure Operations activities at the 100 Areas, 618-10, and the 300 Area. No issues were identified and no agreements or action items were documented.

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

Attachment 2 provides status and information for groundwater. Attachment 5 provides status and information for WCH Closure Operations activities at the 100 Areas, 618-10, and the 300 Area. No issues were identified and no agreements or action items were documented.

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

Attachment 2 provides status and information for groundwater. Attachment 5 provides status and information for WCH Closure Operations activities at the 100 Areas, 618-10, and the 300 Area. No issues were identified and no agreements or action items were documented. Attachment 6 contains the minutes from a meeting conducted between DOE and EPA on February 18, 2016, on *Soil Surface and Groundwater Protection Levels for 100-F/IU.*

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

Attachment 5 provides status and information for WCH Closure Operations activities at the 100 Areas, 618-10, and the 300 Area. No issues were identified and no agreements or action items were documented.

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

Attachment 2 provides status and information for groundwater. Attachment 5 provides the 100 Areas, 618-10, and the 300 Area. No issues were identified and no agreements or action items were documented. Attachment 7 contains the minutes from a meeting conducted between DOE and EPA on February 19, 2016, on *Soil Surface and Groundwater Protection Levels for 300 Area.*

ORCHARD LANDS

Alicia Boyd noted that a meeting will be held in two weeks to discuss Ecology's concerns with the Work Plan. No issues were identified and no agreements or action items were documented.

CERCLA FIVE YEAR REVIEW

No new status.

OTHER

Chris Guzzetti announced that he had received a tentative offer (and had tentatively accepted it) for a position in the Emergency Management Program at EPA Region 3 in Philadelphia.

Attachment A

100/300 AREA UNIT MANAGER MEETING
ATTENDANCE
March 10, 2016

NAME	E-MAIL ADDRESS	MSIN	COMP	SIGNATURE
Abenth, Keelan R	keelan.abenth@rl.doe.gov	A5-16	DOE	
Balone, Steven N	steven.balone@rl.doe.gov	A3-04	DOE	
Chance, Joanne C	joanne.chance@rl.doe.gov	A3-04	DOE	
Clark, Clifford E	cliff.clark@rl.doe.gov	A5-19	DOE	
Cline, Michael	michael.cline@rl.doe.gov	A5-11	DOE	
Dagan, Ellen	ellen.dagan@rl.doe.gov	A3-04	DOE	
Foley, Bryan	bryan.foley@rl.doe.gov	A6-38	DOE	
French, Mark	mark.french@rl.doe.gov	A6-38	DOE	
Glossbrenner, Ellwood	ellwood.glossbrenner@rl.doe.gov	A3-04	DOE	
Guercia, Rudolph F	rudolph.guercia@rl.doe.gov	A3-04	DOE	
Hansen, James A	james.hansen@rl.doe.gov	A5-11	DOE	
Hanson, James P	James.Hanson@rl.doe.gov	A5-11	DOE	
Jaschke, Naomi M	Naomi.Jaschke@rl.doe.gov	A5-11	DOE	
Louie, Catherine S	catherine.louie@rl.doe.gov	A3-04	DOE	
Morse, John G	john.morse@rl.doe.gov	A5-11	DOE	
Neath, John P	john.neath@rl.doe.gov	A3-04	DOE	
Teynor, Thomas K	thomas.teynor@rl.doe.gov	A3-04	DOE	
Post, Thomas	thomas.post@rl.doe.gov	A3-04	DOE	
Quintero, Roger	roger.quintero@rl.doe.gov	A3-04	DOE	
Sands, John P	john.sands@rl.doe.gov	A5-11	DOE	
Sinton, Gregory L	gregory.sinton@rl.doe.gov	A6-38	DOE	
Smith, Chris	douglas.smith@rl.doe.gov	A3-04	DOE	
Vannah, Benjamin W	Benjamin.Vannah@rl.doe.gov	A5-11	DOE	
Zeisloft, Jamie	jamie.zeisloft@rl.doe.gov	A3-04	DOE	
Ayres, Jeffrey M	JAYR461@ECY.WA.GOV	H0-57	ECO	
Boyd, Alicia	ABOY461@ECY.WA.GOV	H0-57	ECO	
Crumpler, Dwayne	DCRU461@ECY.WA.GOV	H0-57	ECO	
Elliot, Wanda	WELL461@ECY.WA.GOV	H0-57	ECO	
Gent, Philip M	PGEN461@ECY.WA.GOV	H0-57	ECO	
Goswami, Dib	DGOS461@ECY.WA.GOV	H0-57	ECO	
Jackson-Maine, Zelma	ZJAC461@ECY.WA.GOV	H0-57	ECO	
Johnson, Brian	BRJ0461@ECY.WA.GOV	H0-57	ECO	
Kapell, Arthur	AKAP461@ECY.WA.GOV	H0-57	ECO	

Menard, Nina	NMEN461@ECY.WA.GOV	H0-57	ECO	
Rochette, Elizabeth	BROC461@ECY.WA.GOV	H0-57	ECO	
Smith-Jackson, Noe'l	NSMI461@ECY.WA.GOV	H0-57	ECO	
Varljen, Robin	RVAR461@ECY.WA.GOV	H0-57	ECO	
Welsch, Kim	KIWE461@ECY.WA.GOV	H0-57	ECO	
Whalen, Cheryl	CWHA461@ECY.WA.GOV	H0-57	ECO	
Buelow, Laura	Buelow.laura.epa.gov	B1-46	EPA	
Guzzetti, Christopher	Guzzetti.christopher@epa.gov	B1-46	EPA	
Lobos, Rod	Lobs.rod@epa.gov	B1-46	EPA	
Simes, Benjamin	Simes.Benjamin@EPA.gov		EPA	
Barrett, Bill F	William_F_Barrett@rl.gov	R3-20	CH	
Borghese, Jane V	Jane_V_Borghese@rl.gov	H8-43	CH	
Bowles, Nathan A.	Nathan_Bowles@rl.gov		CH	
Burke, Philip A	Philip_A_Burke@rl.gov	R3-50	CH	
Day, Roberta E	Roberta_E_Day@rl.gov	R3-50	CH	
Dittmer, Lorna M	Lorna_M_Dittmer@rl.gov	H8-45	CH	
Doornbos, Marty H	Martin_H_Doornbos@rl.gov	R3-50	CH	
Dixon, Brian J	Brian_J_Dixon@rl.gov	T4-09	CH	
Faught, William	William_R_Faught@rl.gov	R3-50	CH	
Ford, Bruce H	Bruce_H_Ford@rl.gov	H8-43	CH	
Hartman, Mary J	Mary_J_Hartman@rl.gov	R3-50	CH	
Lee, Art K	Art_K_Lee@rl.gov	R3-50	CH	
McKibben, Jon W	Jon_W_McKibben@rl.gov	X4-01	CH	
Stewart, Meghann	Meghann_K_stewart@rl.gov	H8-43	CH	
Toews, Michelle R	Michelle_R_Toews@rl.gov	R3-60	CH	
Moren, Rick	Rick_Moren@rl.gov	G3-55	MSA	
Shoemake, Joy	Joy_Shoemake@rl.gov	G3-55	MSA	
Turner, Michael J	Michael_J_Turner@rl.gov	A3-01	MSA	
Cimon, Shelley	scimon@oregontrail.net	--	Oregon	
Beers, Dan	Danny.Beers@doh.wa.gov	B1-42	WDOH	
Danielson, Al	Al.danielson@doh.wa.gov	B1-42	WDOH	
Utley, Randy	Randell.Utley@doh.wa.gov	B1-42	WDOH	
Lilligren, Sandra	sandral@nezperce.org	--	TRIBES	
Vanni, Jean	jvynerwm@hotmail.com	--	TRIBES	
Buckmaster, Mark A	mark.buckmaster@wch-rcc.com	N2-05	WCH	
Carlson, Richard A	richard.carlson@wch-rcc.com	H4-22	WCH	

Capron, Jason	jason.capron@wch-rcc.com	H4-23	WCH	
Cearlock, Christopher S	christopher.cearlock@wch-rcc.com	H4-22	WCH	
Darby, John W	john.darby@wch-rcc.com	N2-02	WCH	
Hadley, Karl A	karl.hadley@wch-rcc.com	H4-21	WCH	
Lawrence, Barry L	barry.lawrence@wch-rcc.com	T2-03	WCH	
Lerch, Jeffrey A	jeffrey.lerch@wch-rcc.com	H4-22	WCH	
McCurley, Clay D	clay.mccurley@wch-rcc.com	H4-21	WCH	
Parnell, Scott E	scott.parnell@wch-rcc.com	H4-21	WCH	
Thomson, Jill E	jill.thomson@wch-rcc.com	H4-21	WCH	
Miller, Charles W	Charles_W_Miller@RL.gov		PRC	
Lorin Clements	Lorin_Clements@rl.gov		PRC	

Attachment B

100/300 Area UMM
Action List
March 10, 2016

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

100/300 Area Unit Manager Meeting
March 10, 2016
Washington Closure Hanford Building
2620 Fermi Avenue, Richland, WA 99354
Room C209; 2:00 p.m.

Administrative:

- Approval and signing of previous meeting minutes
- Update to Action Items List
- Next UMM (4/14/2016, Room C209)

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

- Preliminary Results of the KE Borehole Supplementary Investigation (Chuck Miller)
- 100-K Area (Steve Balone, Roger Quintero)
- 100-B/C Area (Greg Sinton)
- 100-N Area (Greg Sinton, John Neath)
- 100-D & 100-H Areas (Steve Balone, John Neath)
- 100-F & 100-IU-2/6 Areas (Greg Sinton, John Neath)
- 300 Area - 618-10/11 exclusively (Jamie Zeisloft)
- 300 Area (John Sands/Rudy Guercia)
- Orchard Lands (John Sands)

Special Topics/Other

- CERCLA Five Year Review

Adjourn

Attachment 1

SGW-59653 -VA
Revision 0

Summary of Soil and Groundwater Contamination Conditions Observed in Borings at UPR 100-K-1 and 116-KE-3 Crib in Vicinity of 105-KE Reactor

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

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

ch2m SM

P.O. Box 1600
Richland, Washington 99352

SGW-59653 -VA
Revision 0

Summary of Soil and Groundwater Contamination Conditions Observed in Borings at UPR 100-K-1 and 116-KE-3 Crib in Vicinity of 105-KE Reactor

Date Published
January 2016

To be Presented at
Summary of Soil and Groundwater Contamination Conditions Observed in Borings at UPR 100-K-1 and 116-KE-3 Crib in Vicinity of 105-KE Reactor

DOE-RL
Richland, WA

01/25/2016

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

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

ch2m SM
P.O. Box 1600
Richland, Washington 99352

APPROVED
By Ashley Jenkins at 10:35 am, Jan 28, 2016

Release Approval | Date

Approved for Public Release;
Further Dissemination Unlimited

LEGAL DISCLAIMER

Summary of Soil and Groundwater Contamination Conditions Observed in Borings at UPR 100-K-1 and 116-KE-3 Crib in Vicinity of 105-KE Reactor

25 January 2016

CW Miller/PRC

ch2m SM

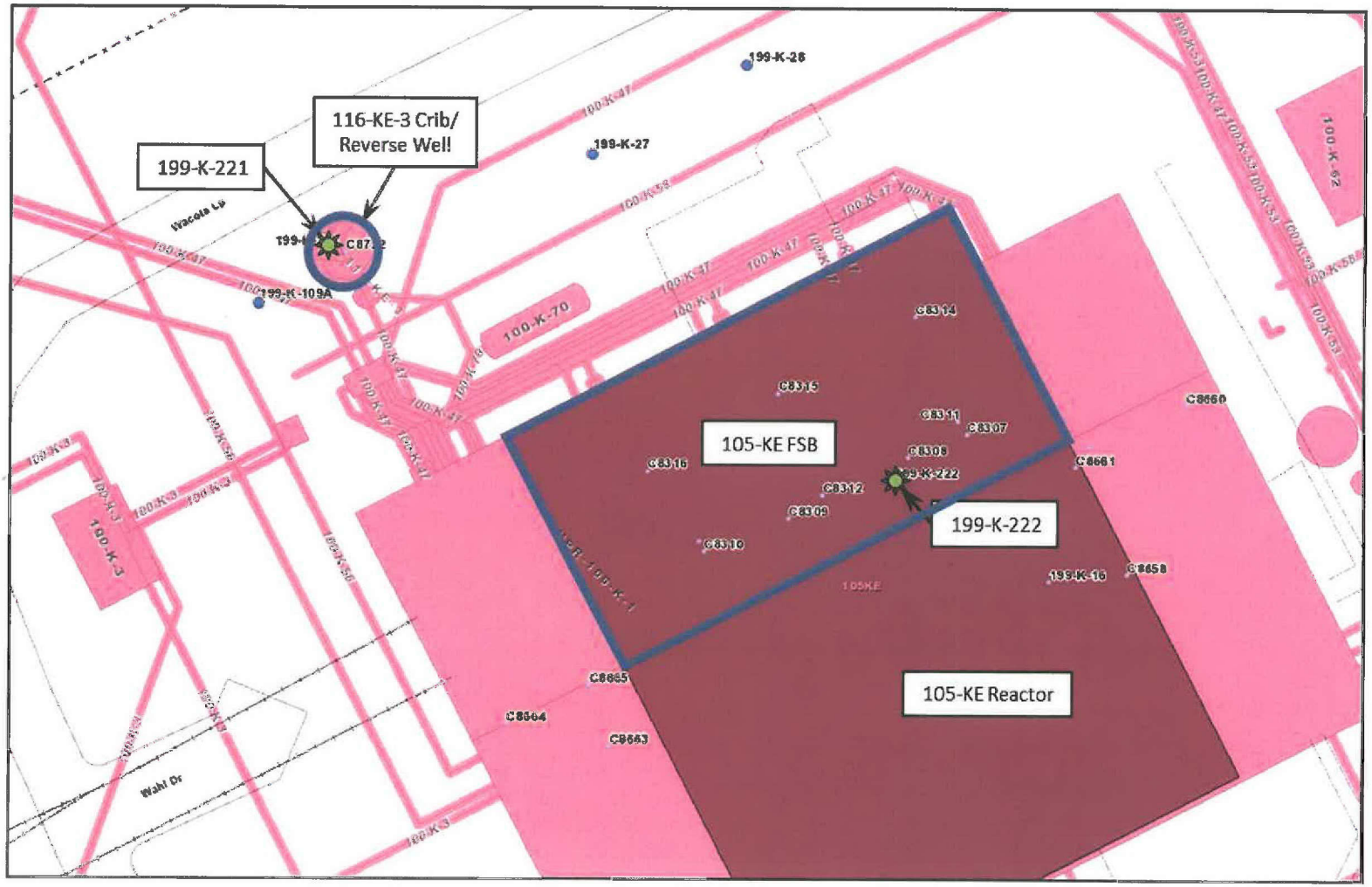
SGW-59653, Rev. 0

U.S. DEPARTMENT OF ENERGY

Introduction

- Two characterization borings were drilled and completed as monitoring wells 199-K-221 (in the footprint of the 116-KE-3 Crib/Reverse Well) and 199-K-222 (in the footprint of the former 105-KE Fuel Storage Basin).
- Both borings encountered subsurface radiological contamination and related groundwater contamination.
- The boring in the Fuel Storage Basin footprint exhibited the highest degree of contamination.

Waste Site and Boring Locations



116-KE-3 Crib/Reverse Well, Release Background

- Designed to receive fuel storage basin waste water from the 105-KE sub-basin drainage system.
- Reconfigured to receive overflow from the FSB water drainage system.
- Water volume discharged to 116-KE-3 is not documented and available information does not support a good estimate of discharge volume.

UPR-100-K-1, Release Background

- The 105-KE Fuel Storage Basin was attached to the 105-KE Reactor and was used for handling and storage of spent nuclear fuel.
- The basin was found to exhibit chronic leakage from a poorly-sealed construction joint adjacent to the reactor structure.
- Estimated variable leakage rates range from 0 to 51 liters per minute over the period from 1970 to 1993.
- Total volume of FSB water released is not well-defined, but could exceed 1E+08 liters.

Primary Source Description

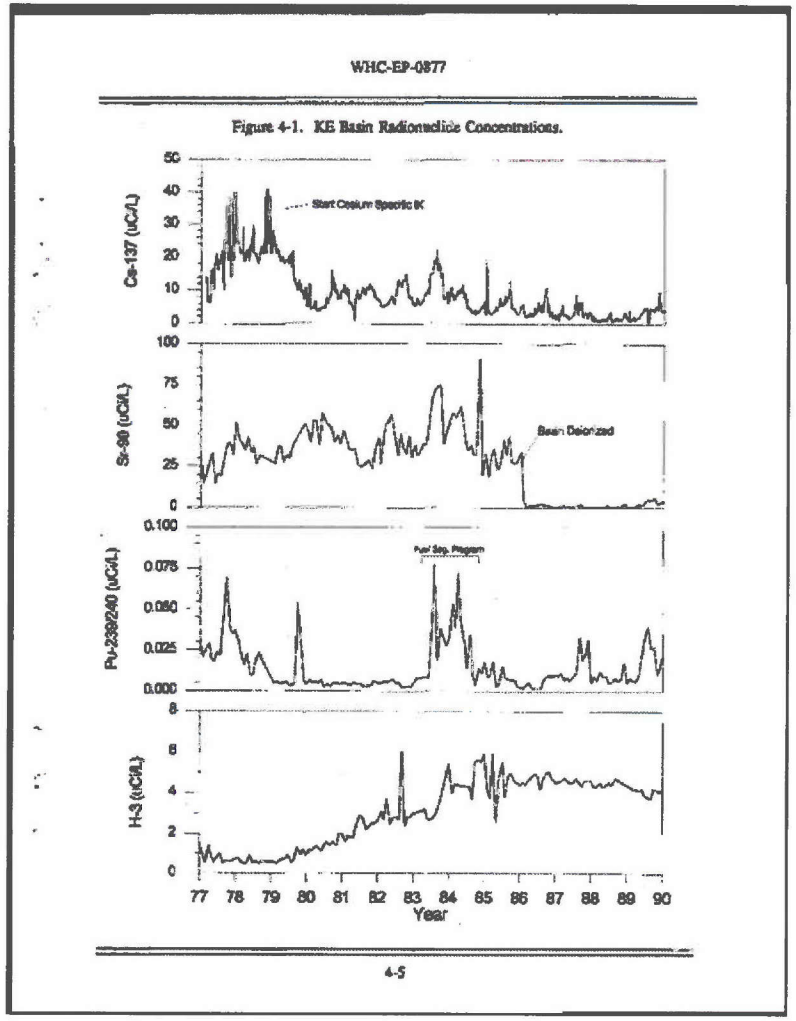

WHC-EP-0877

Figure 4-1. KE Basin Radionuclide Concentrations.

4-5

Radioisotopes in Fuel Storage Basin Water, 1977 to 1990

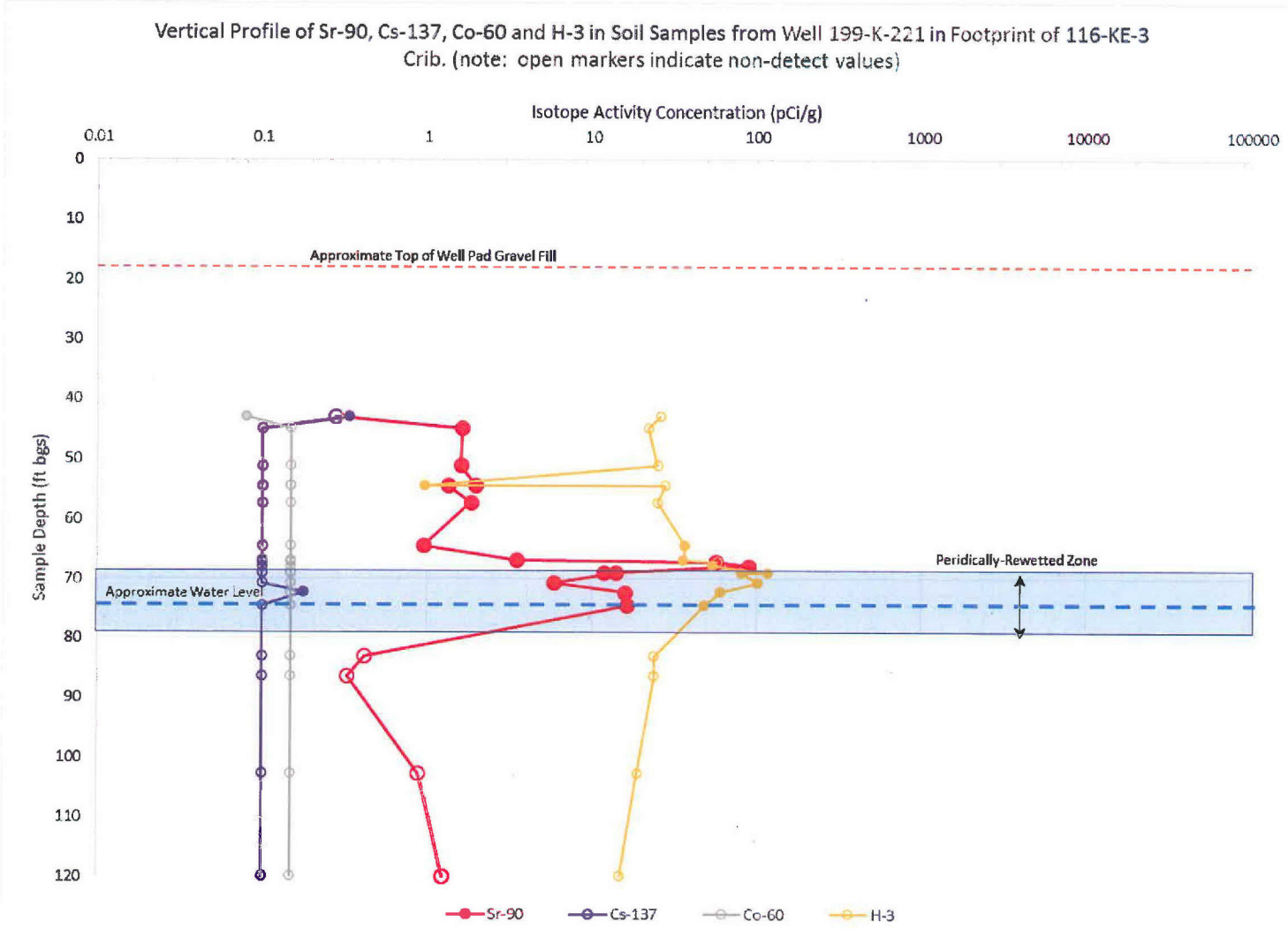
	FSB Water Radioisotope Content 1977 to 1990				Drinking Water Standard
Radioisotope	Low (uCi/L)	low (pCi/L)	High (uCi/L)	High (pCi/L)	pCi/L
Cs-137	2	2.00E+06	40	4.00E+07	200
Sr-90	2	2.00E+06	90	9.00E+07	8
Pu-239/240	0.005	5.00E+03	0.08	8.00E+04	15
H-3	0.5	5.00E+05	6	6.00E+06	20000

Drilling Conditions

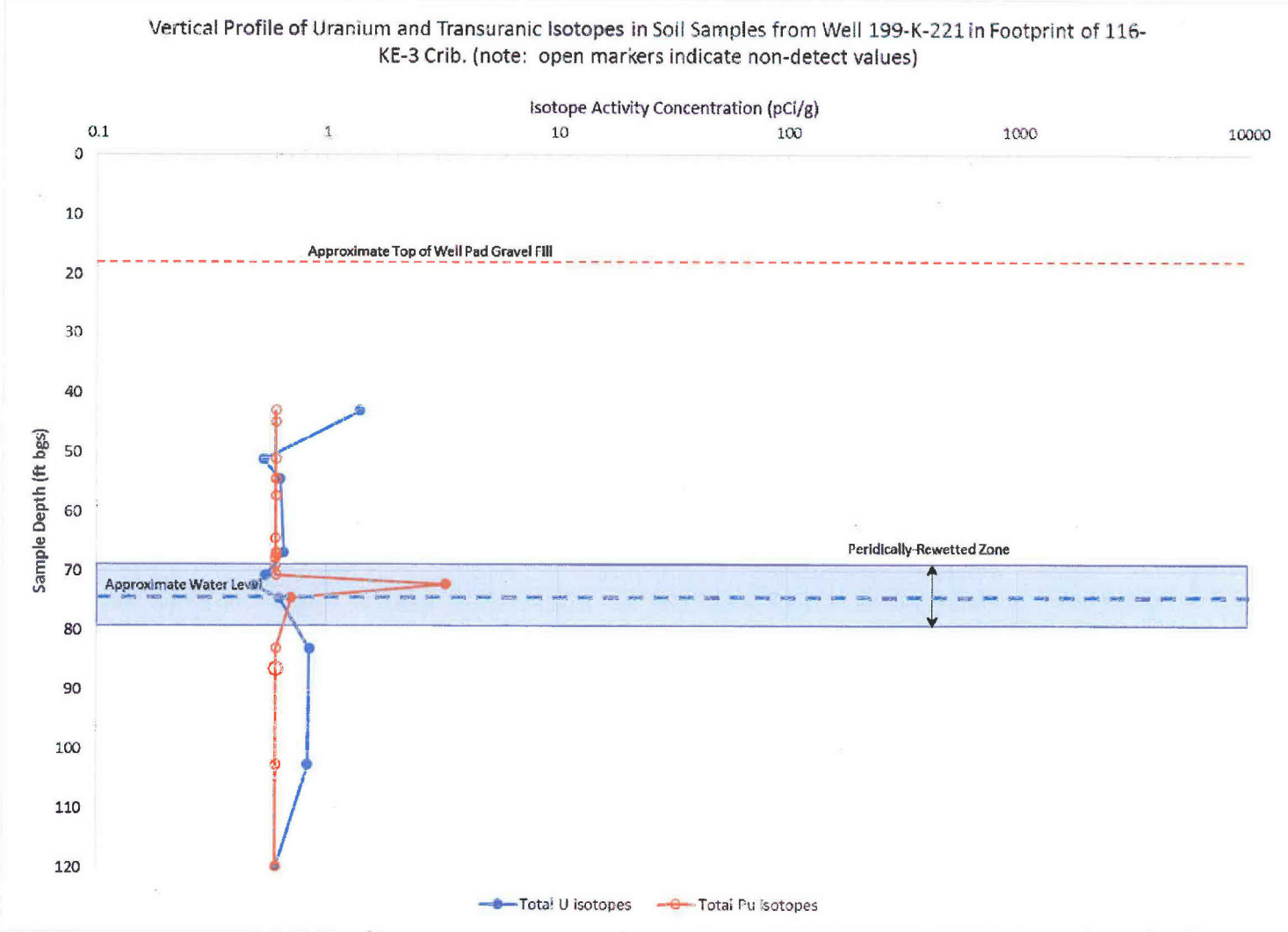
- Drilling was conducted using defined radiological contamination controls and personal protective equipment to minimize exposures.
- Gravel drill pads were placed to provide clean working surfaces and to reduce background radiation.

Drilling Setup

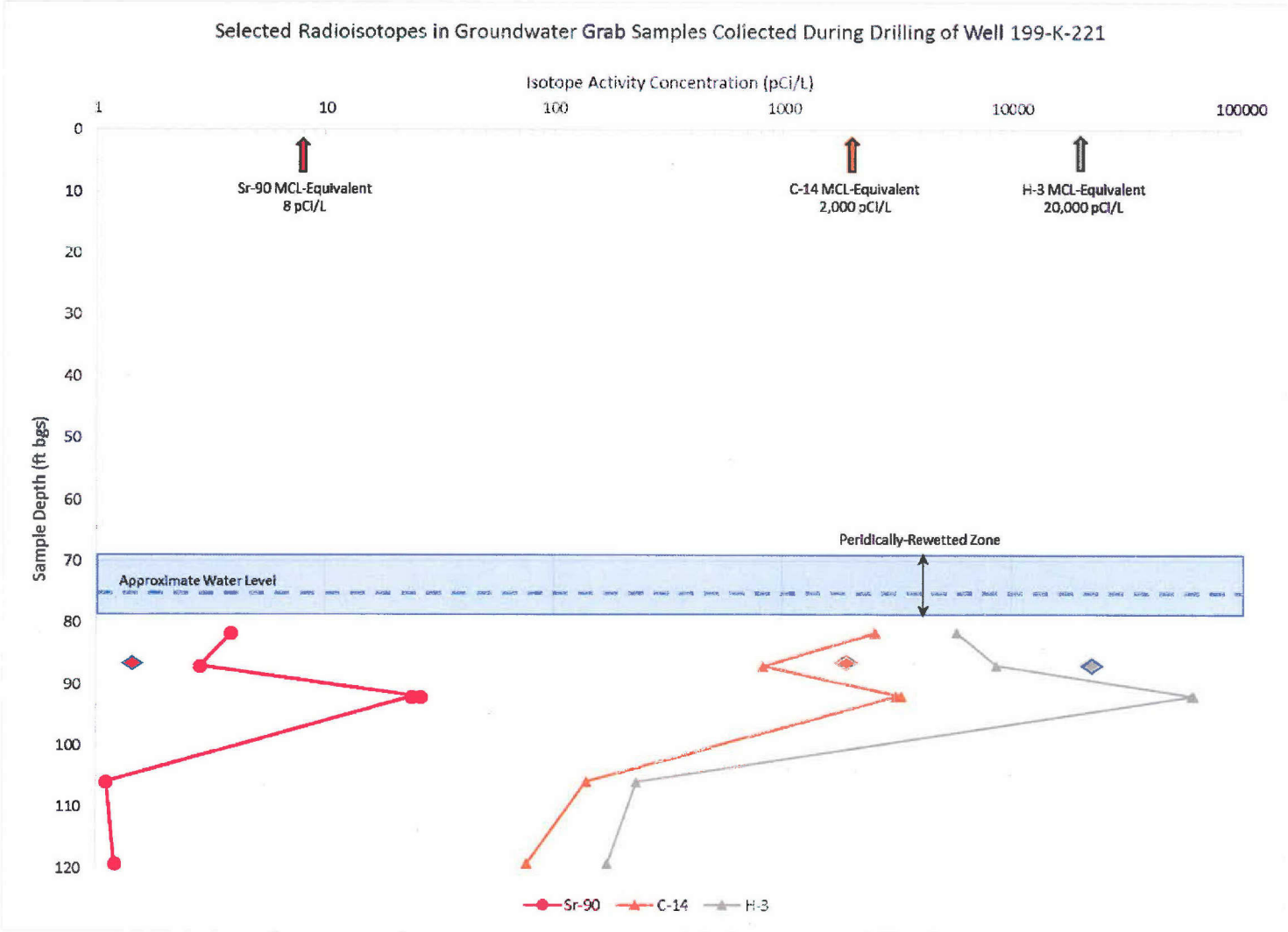
Preliminary Soil Characterization Data, 199-K-221



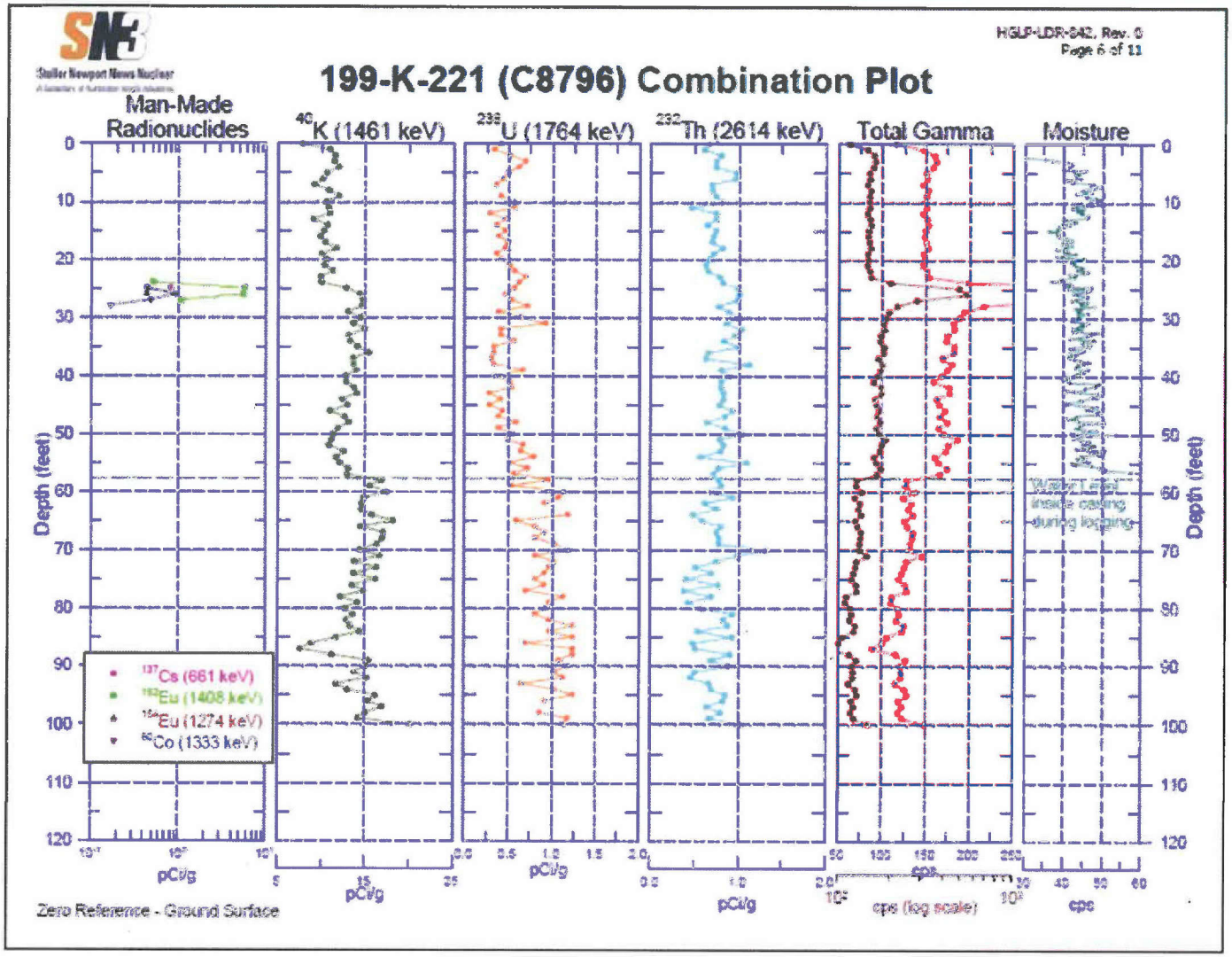
Preliminary Soil Characterization Data, 199-K-221



Preliminary Groundwater Data, 199-K-221



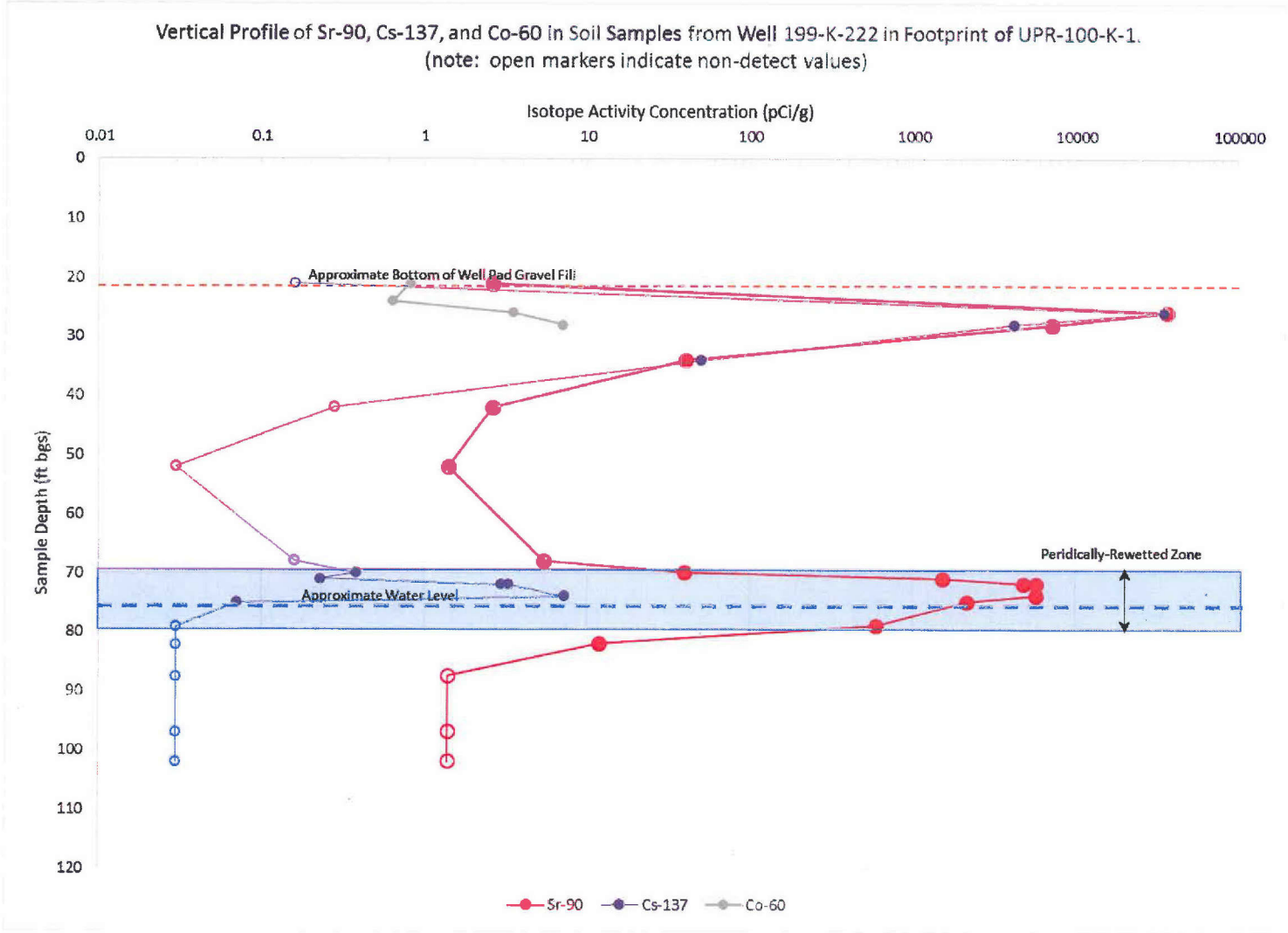
In Situ Gamma and Moisture Log, 199-K-221



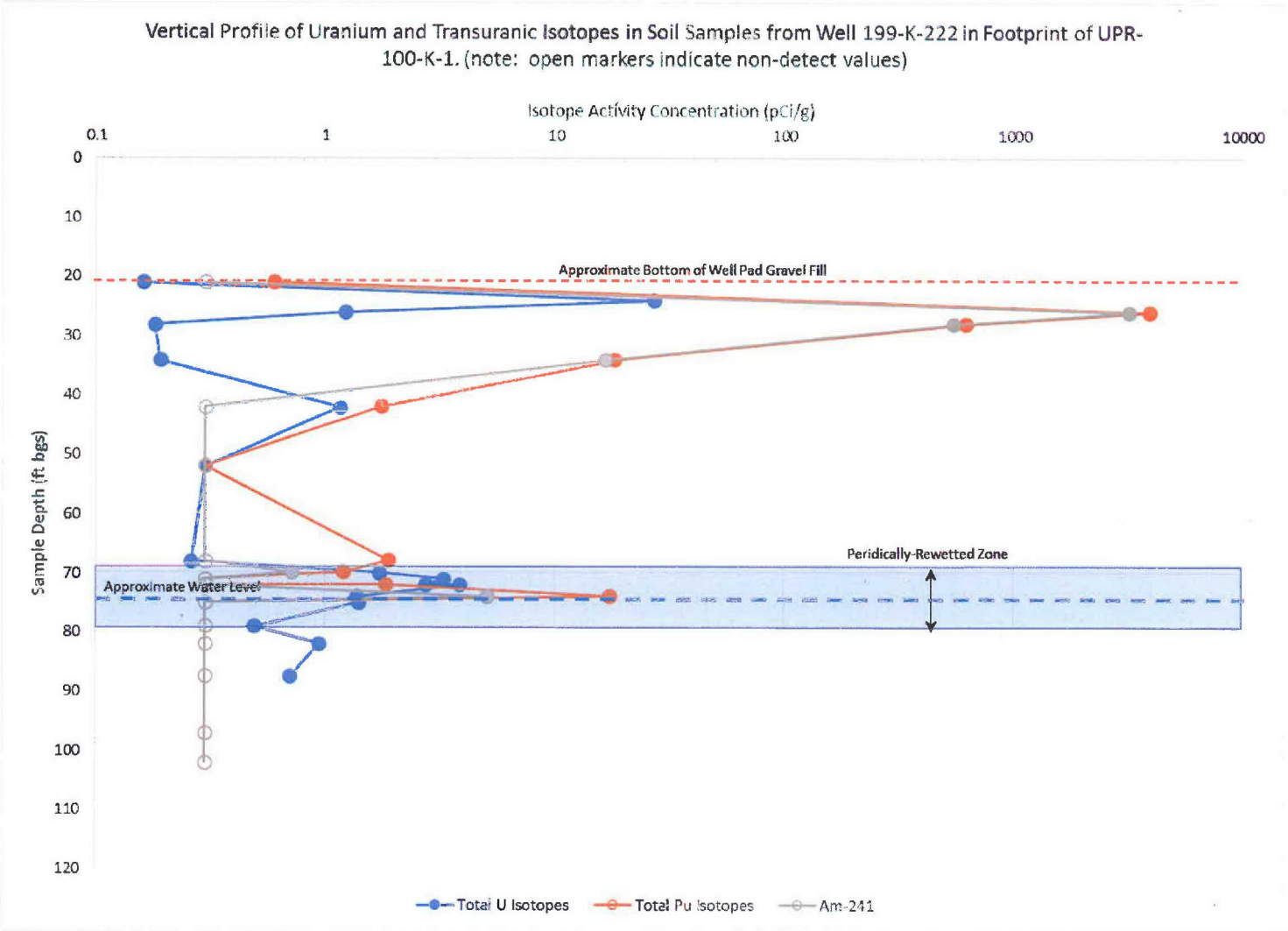
Contaminant Observations, 116-KE-3

- Upper vadose zone exhibited low-level Sr-90, some Cs-137.
- Deep vadose, in periodically-rewetted zone, exhibited higher Sr-90, low level Cs-137, and tritium in soil.
- This deep contamination is consistent with the perforated interval of the reverse well and is present within the periodically-rewetted zone.
- Groundwater exhibited elevated C-14, tritium, and low-level Sr-90. The actual source of observed tritium and C-14 is not immediately apparent.

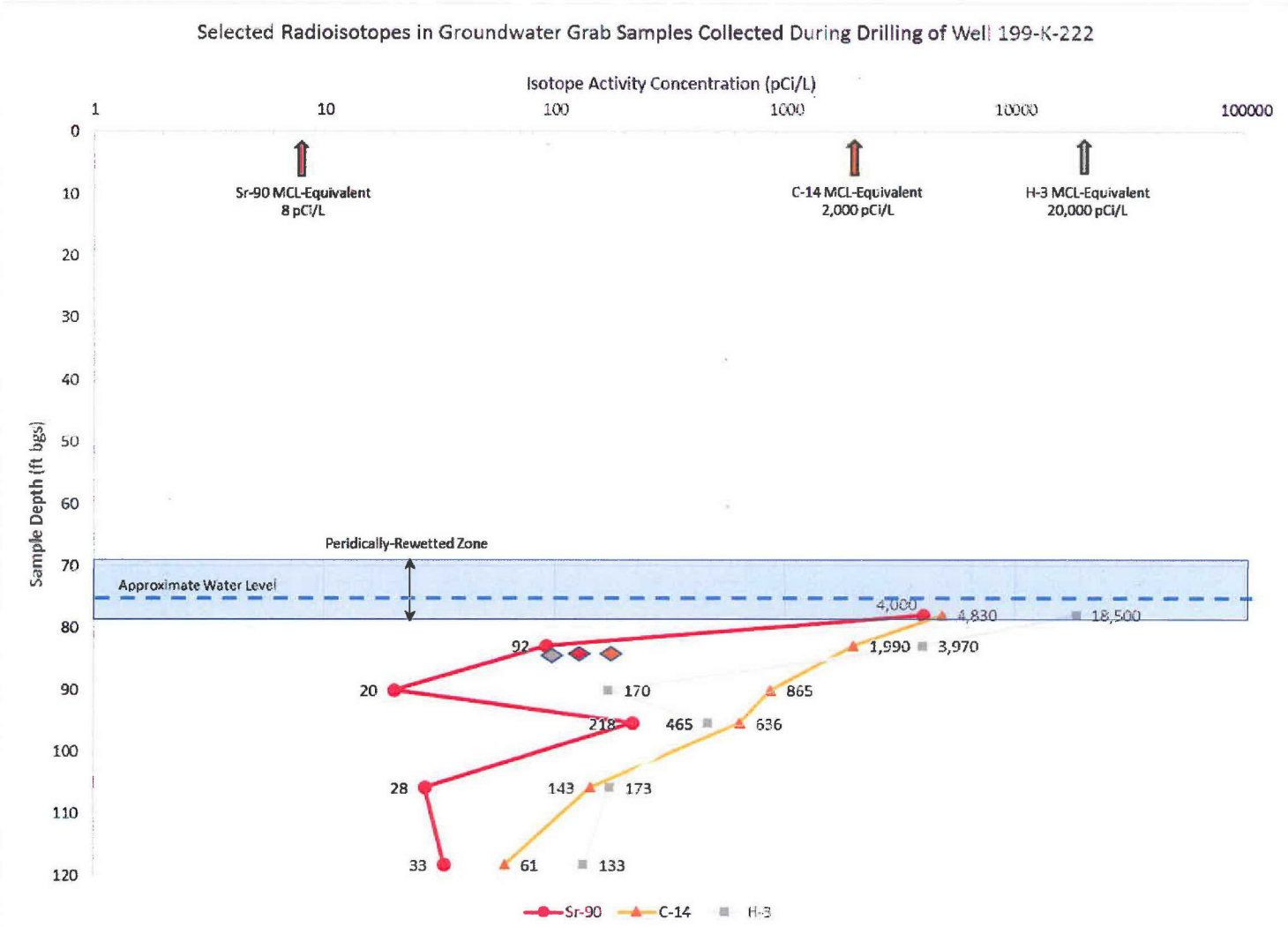
Preliminary Soil Characterization Data, 199-K-222



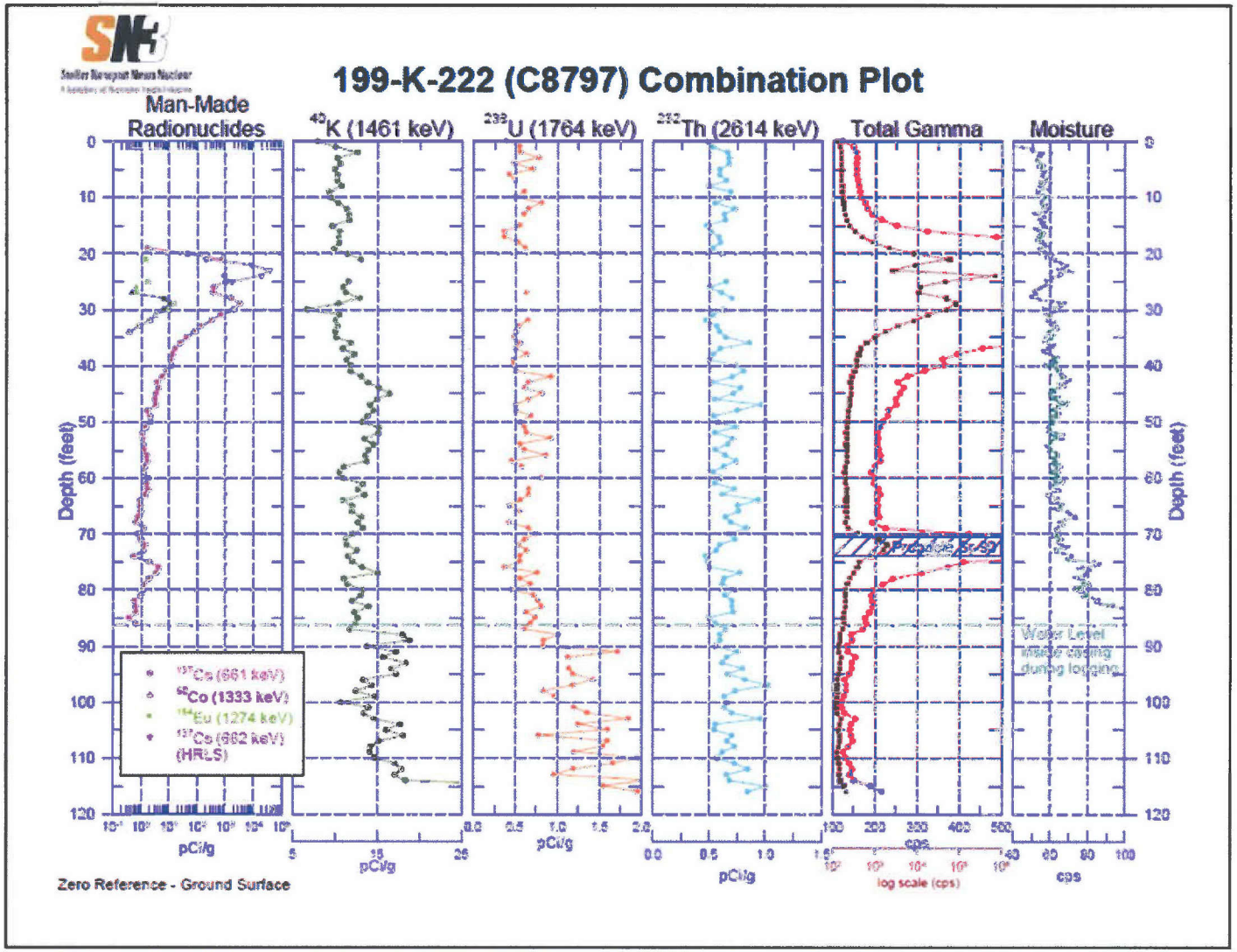
Preliminary Soil Characterization Data, 199-K-222



Preliminary Groundwater Data, 199-K-222



In Situ Gamma and Moisture Log, 199-K-222



Contaminant Observations, UPR 100-K-1

- Upper vadose zone was highly-contaminated by Cs-137, Sr-90, with some Co-60. Substantial Pu-239/240 and Am-241 were present along with some elevated U isotopes. Concentration decreased through mid-portion of the vadose zone.
- Deep vadose, just above water table, exhibited high Sr-90, along with low level Cs-137, Am-241 and Pu-129/240 and U isotopes, and no detectable tritium in soil.
- This contamination is consistent with the historical chronic release of highly-contaminated water from the FSB and may present a continuing source to groundwater.
- Groundwater exhibited elevated Sr-90, C-14, and tritium. C-14 and tritium (not detected in vadose soil) may have originated from another source.

Preliminary Conclusions and Recommendations

- Characterization effort met the sample collection data needs identified in the DQO for this activity.
- Vadose zone contamination at both waste sites is associated with elevated groundwater contamination, particularly by Sr-90.
- Both waste sites likely serve as continuing sources of varying magnitude of groundwater contamination with the UPR exhibiting greater magnitude.
- Recommended Actions:
  - Make preliminary presentation to UMM
  - Complete preparation of technical memorandum/report documenting the characterization effort (anticipated in April 2016).
  - Incorporate the information into the RI/FS to evaluate the need for remedial action and identify alternatives.
  - Continue groundwater monitoring at these new wells.

Attachment 2

100/300 Areas Unit Managers Meeting
March 10, 2016

Summary Hanford Sampling Program

Hanford's overall Site groundwater monitoring program for the River Corridor and Central Plateau requires collection of groundwater samples from wells, aquifer tubes, and 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 for multiple activities from a single location into a single trip, where practical.

For Fiscal Year 2016 the monitoring program has 2,779 sample trips scheduled for collection.

Sample Trip Status

For the year, 1,327 of 1,364 samples have been successfully completed (October 2015 through February 2016). During February 2016, 171 sample trips were successfully collected. One of these was scheduled for December, 13 were scheduled for January, 148 were scheduled for February, and 9 were scheduled for March.

The wells, aquifer tubes, and springs sampled in the river corridor areas during February 2016 are listed in Table 1.

Awaiting Sample Trips

There are 54 sample trips awaiting collection. Of these, 3 require maintenance, 1 has access restrictions, 11 have adjusted schedules, 1 has been canceled, 4 are being evaluated for cancelation, 2 were unsuccessful in February, 5 are late, and 27 are awaiting collection at the month end.

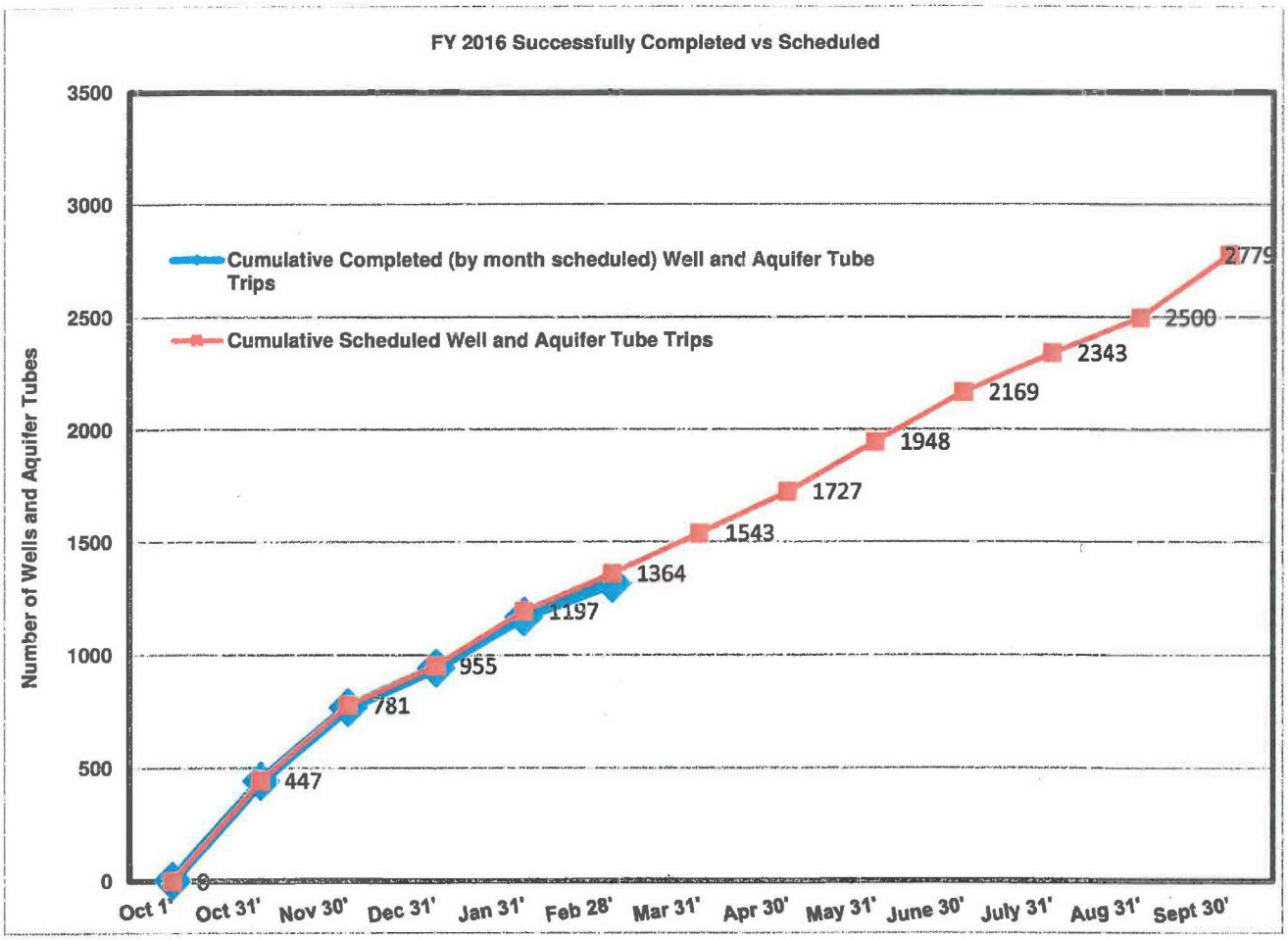
Table 2 presents the sample trips for only the river corridor that were not successfully completed in February. Sample trips in Table 2 are grouped by fiscal month scheduled and groundwater interest area. This table clearly shows that the number of awaiting well trips decreases with time from the schedule date. Reasons for sample trips to be awaiting include; well maintenance, weather conditions, access restrictions, and resource limitations.

Upcoming Sample Trips

Sample trips for the river corridor only, scheduled for collection in March 2016 (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/.


FY 2016 Successfully Completed vs Scheduled
Number of Wells and Aquifer Tubes
3500
3000
2500
2000
1500
1000
500
0
Cumulative Completed (by month scheduled) Well and Aquifer Tube Trips
Cumulative Scheduled Well and Aquifer Tube Trips
0
447
781
955
1197
1364
1543
1727
1948
2169
2343
2500
2779
Oct 1'
Oct 31'
Nov 30'
Dec 31'
Jan 31'
Feb 28'
Mar 31'
Apr 30'
May 31'
June 30'
July 31'
Aug 31'
Sept 30'

Operable Unit Specifics

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

- CERCLA Process Implementation:
  - ✓ The RI/FS and PP documents are on hold pending 100-K East Reactor waste site characterization and modeling (wells 116-KE-3 and UPR-100-K-1). PNNL is conducting leach testing and the final report for this work is scheduled for completion in April 2016.
  - ✓ Monitoring Plans: CHPRC is revising the Draft A Interim O&M Plan and Interim RD/RAWP to incorporate DOE/RL comments. The documents are expected complete RL review and be issued to regulators in April 2016.
- Remedial Actions & System Modifications:
  - ✓ The volume of groundwater treated and mass of Cr(VI) removed for the 100-K P&T systems (**KX, KR-4,** and **KW**) during February 2016 are:
    - o Treated 61.9 million gallons (62.6 in January)
    - o Removal 2.8 kg of hexavalent chromium (3.2 in January)
  - ✓ The influent and effluent Cr(VI) concentrations (measured weekly) for the three K systems during February are presented in Table K-1.

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

System	Weekly Influent Concentrations[a] (µg/L)	Average Monthly Influent Concentration (µg/L)	Weekly Effluent Concentrations[ab] (µg/L)	Average Monthly Effluent Concentration[b] (µg/L)
100-KR4	6, 6, 3, 5, 3	5	1, 0, -1, -1 , -2	-1
100-KW	13, 13, 13, 12	13	0, 0, 1, 0	0
100-KX	16, 18, 14, 18	17	1, 2, 0, 3	2

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

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

✓ FY 2016 (Oct. 2015 through Feb. 2016) P&T performance to date:

P&T System	Treated (mgal)	Removed (kg)
KR-4	65.4	1.4
KW	71.5	4.0
KX	178.1	11.0
100-KR-4 OU TOTAL	315.0	16.5

✓ In February 2016, the 30-day average pumping rates were 327 gpm, 324 gpm, and 832 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-2. Figure K-1 illustrates the monthly average pumping rates for operating extraction wells across all 3 systems at 100-KR-4.

Table K-2. Summary of the Number of Extraction and Injection Wells in the Three Systems

Wells	KR4		KX		KW		TOTAL	
	2015	2016	2015	2016	2015	2016	2016	Current
Number of extraction wells	12	12	19	19	11	11	42	42
Number of injection wells	5	5	9	9	4	4	18	18

- At KR-4, the system operated at full capacity for most of the month. Extraction well 199-K-129 was brought back into service February 8, 2016. Hexavalent chromium concentration in extracted ground water continued to be below site cleanup requirements and the cumulative hexavalent chromium removal is continues to decline. The system remains in service to provide hydraulic capture of inland groundwater.
- At KW, system Wells 199-K-132, 199-K-139, and 199-K-166 remain off-line to allow increased pumping along the central axis of the plume. Based on current field and laboratory measurements in February 2016, all extraction wells exhibited hexavalent chromium concentrations less than 20 µg/L. Cumulative hexavalent chromium removal continues to decline, primarily due to decreases in concentration at well 199-K-205.
- At KX, the system was fully operational with the exception of two wells. Well 199-K-182 was taken out of service for about a week to replace the pump with a larger capacity pump. Before the pump replacement, well 199-K-182 was pumping at 45 gpm. With the new pump this well has been pumping at 75 gpm. The second well is injection well 199-K-160, which requires maintenance to replace the level transducer. At the end of February, 6 of 19 extraction wells had concentrations that exceed 20 µg/L. These include well 199-K-141, 199-K-152, 199-K-154, 199-K-178, 199-K-182, and 199-K-210.

✓ Figures K-2 through K-4 present the February groundwater treatment rates and hexavalent chromium removal information. As indicated in the curves below, Cr(VI) monthly mass removal at KR-4, KW, and KX have generally decreased in recent months due to continued optimization efforts.

- ✓ Assessment of soil and groundwater characterization data from boreholes in the vicinity of 105-KE Reactor continues.
- ✓ Soil remediation (i.e., remove-treat-dispose, or RTD) in vicinity of 183-KE Head House is continuing. The waste sites being remediated include the foundations of former cooling water treatment chemical storage tanks and associated conveyance pipes, and underlying contaminated soil to a depth of about 10 feet below plant grade.

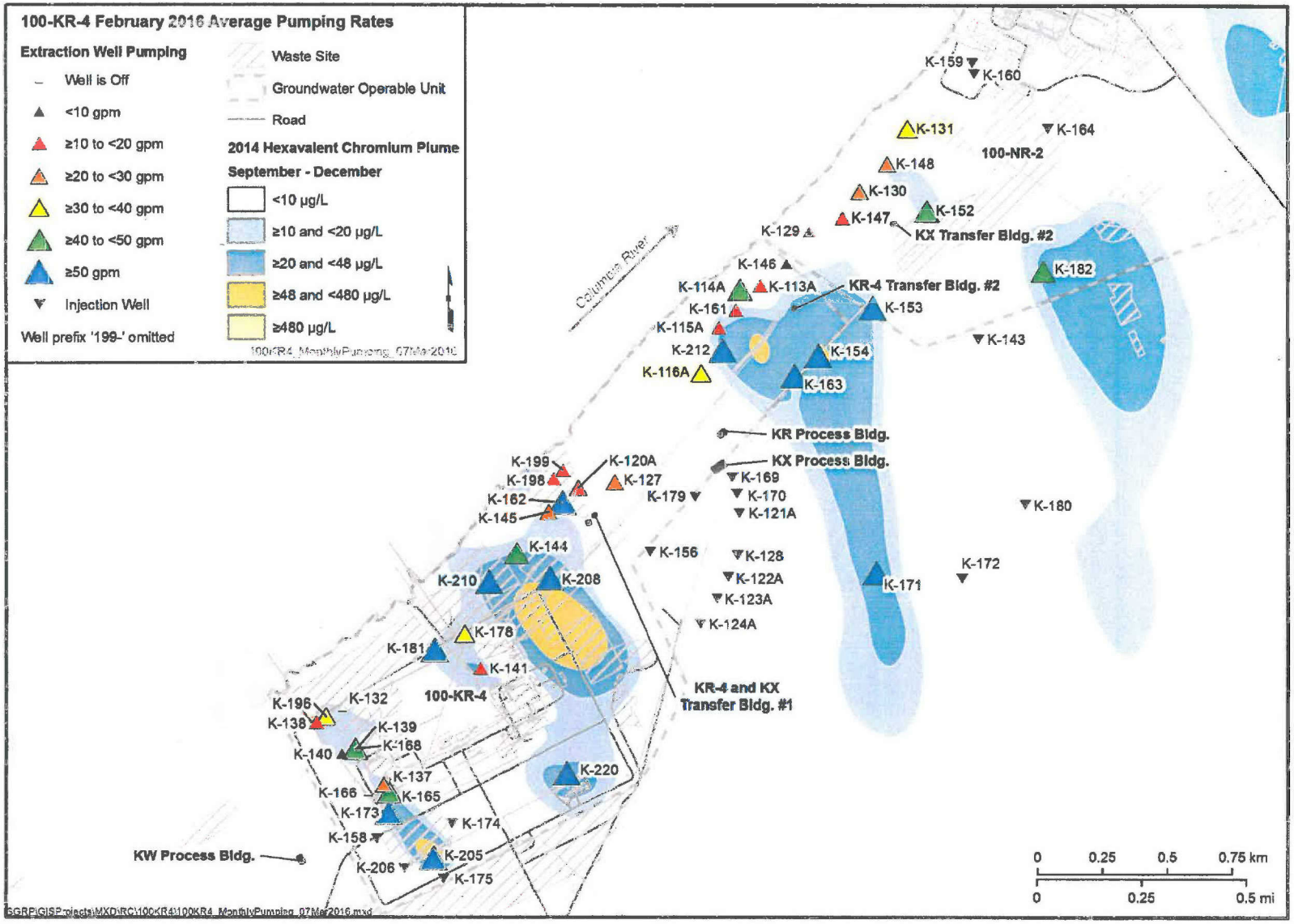


Figure K-1. February 2016 Average Pumping Rates for the 100-KR-4 P&T Systems

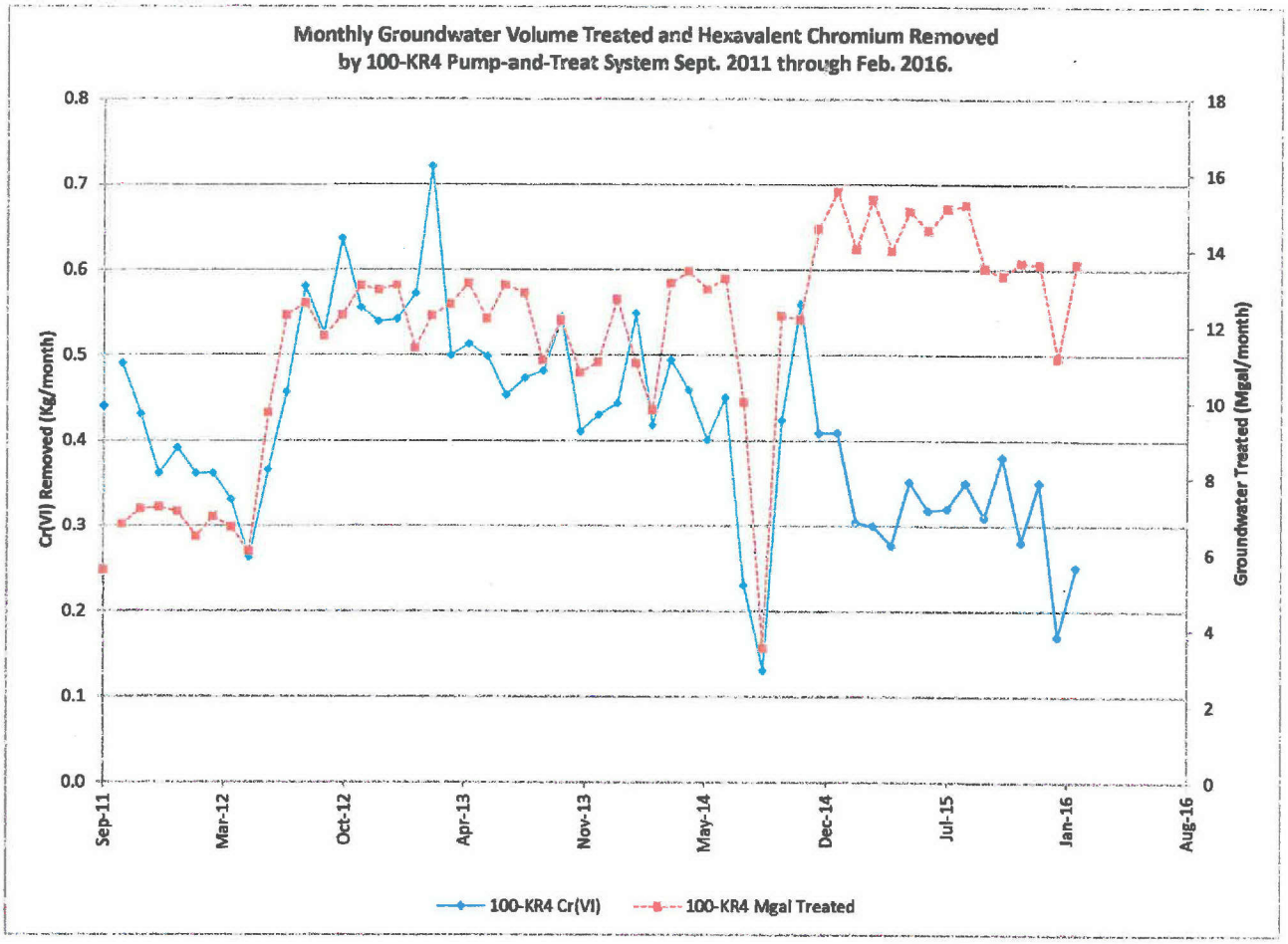


Figure K-2. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-KR-4 Pump-and-Treat, September 2011 through February 2016.

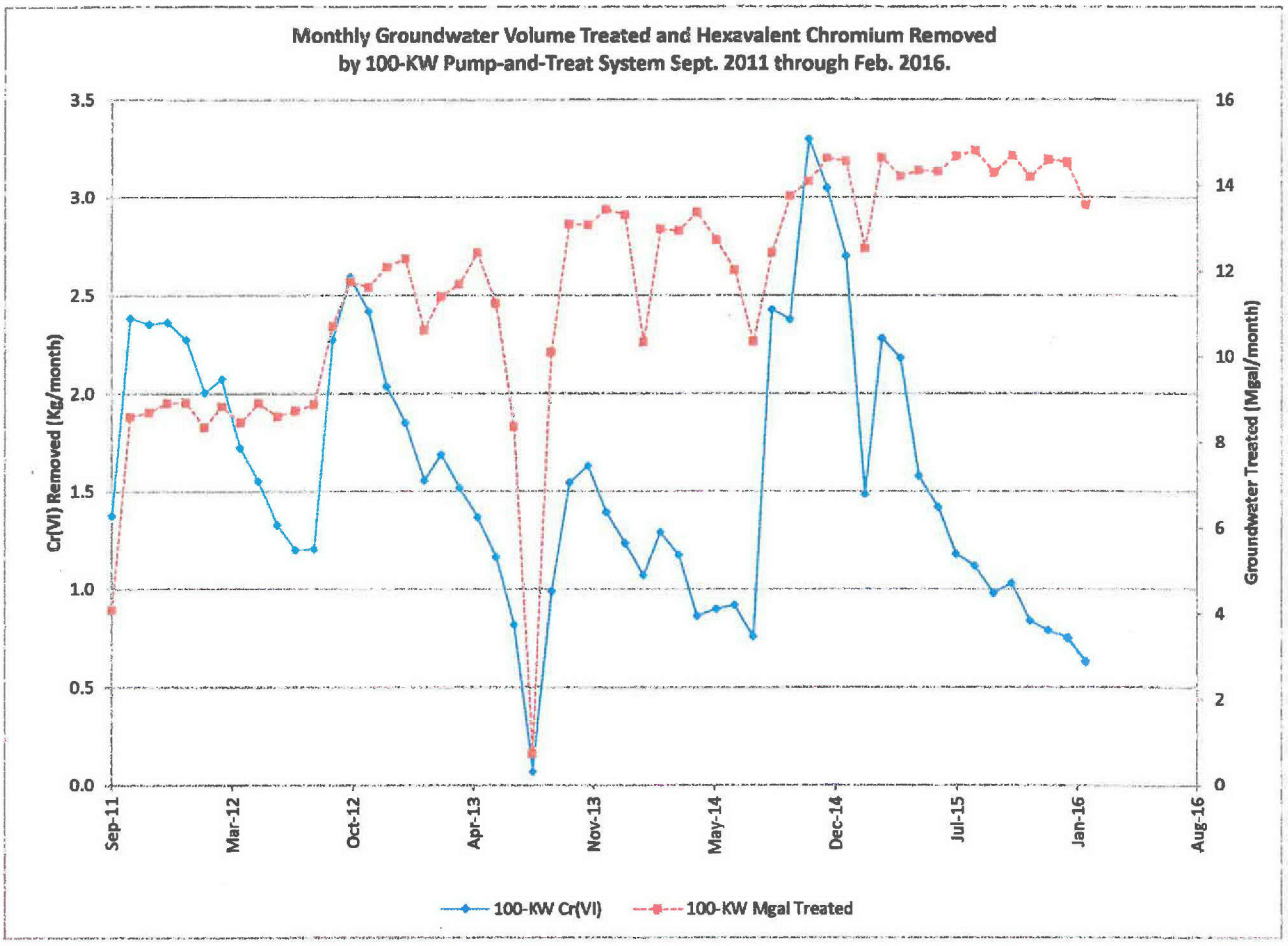


Figure K-3. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-KW Pump-and-Treat, September 2011 through February 2016.

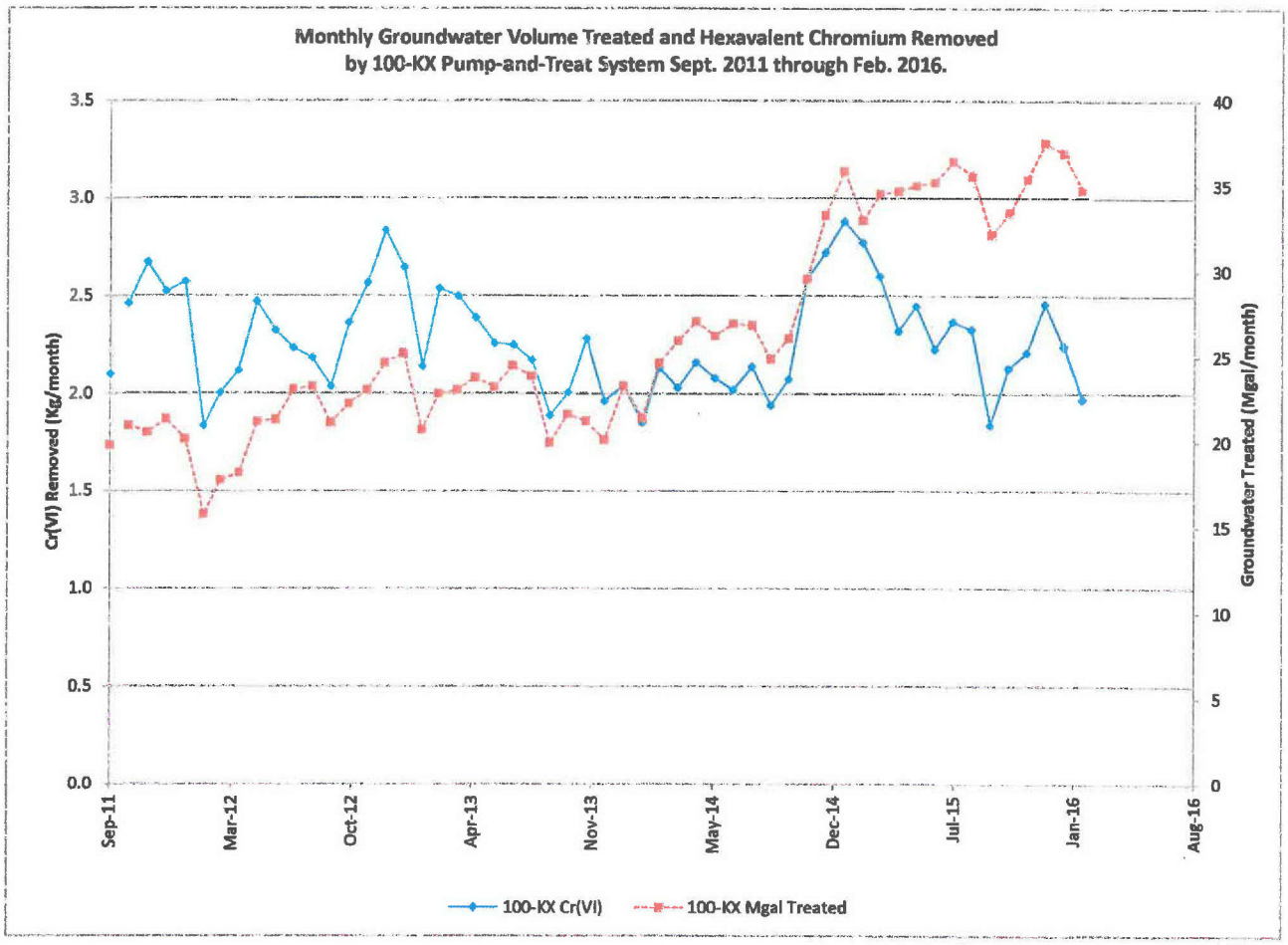


Figure K-4. Monthly Cr(VI) removed and groundwater volume treated by 100-KX pump-and-treat, September 2011 through February 2016.

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:
  - ✓ Efforts continue on developing the Draft A RI/FS report to meet above milestone.
- Monitoring & Reporting:
  - ✓ More data from wells sampled in January were loaded into HEIS. Results were within previously established ranges.

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

- CERCLA Process Implementation
  - ✓ 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. We anticipate resolving the single remaining comment within the extension period (March 2016).
  - ✓ The numerical modeling performed for Draft A has been revised and the ECF completed. Chapter 5 is through publications and is undergoing RL review.
  - ✓ The project extension for comment response runs through March 31, 2016.
  - ✓ The RFP for the 6 monitoring wells has been released, proposals have been received and CHPRC is in final negotiations with the bidders. Drilling is expected to start in the May/June timeframe.
- Remedial Actions

100-NR-1 Bioventing –

- ✓ Figure NR-1 presents bioventing well gas sample results for monitoring wells 199-N-171 and 199-N-169. The bioventing system was shut down on January 11, 2016, in support of the low-river respirometry testing event. The test duration was 6 weeks and was completed on February 22, 2016. The bioventing system was restarted on February 22, 2016, following completion of the test. Monthly vapor sample measurements were collected February 29, 2016.

  Figures NR-2 through NR-7 plot the oxygen concentration for the six respirometry test monitoring wells. Preliminary evaluation of the gas measurements from the respirometry test indicate higher oxygen utilization rates at wells 199-N-169 and 199-N-171 than the other respirometry test monitoring wells (Table NR-1). Biodegration rates were not calculated for 199-N-18 and 199-N-183 because of low oxygen utilization observed at the two wells. The oxygen utilization rates (and hence the calculated biodegradation rate) are slightly higher than observed from the last respirometry test and similar to rates observed during low river stage in December 2014. Oxygen measurements between 19 and 22 percent represent essentially atmospheric conditions indicating insignificant oxygen depletion observed at monitoring wells 199-N-183 and 199-N-18 which are furthest from the area of suspected residual TPH contamination in the vadose zone soils.

  Groundwater samples were collected on February 17, 2016, from the bioremediation groundwater monitoring wells and aquifer tubes while the bioventing system was shut down for the respirometry test.

  - Monitoring wells:
    - 199-N-167
    - 199-N-172
    - 199-N-169
    - 199-N-171
    - 199-N-3
    - 199-N-183
    - 199-N-96A

- 199-N-173
- 199-N-19
- 199-N-56

- Aquifer Tubes:
  - 116mArray-0A
  - C6132

Aquifer tube C6135 could not be sampled and needs to be repaired/replaced. The groundwater sample analyses includes Extractable Petroleum Hydrocarbon (EPH) to partition between soil and groundwater TPH data for the various carbon fractions.

The oil/water interface probe was lowered into each of the groundwater monitoring wells to determine the presence of free product. No discernable product was detected in any of the wells.

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

Monitoring Location	Biodegration Rate (mg/kg-day)		
	Jan-16	Jul-15	Dec-14
199-N-167	-0.07	-0.06	-0.05
199-N-169	-0.12	-0.11	-0.23
199-N-171	-0.19	-0.13	-0.23
199-N-172	-0.04	-0.03	-0.05
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

The respirometry test report is currently being drafted and will be included in the annual bioventing performance report. The draft report is expected to be completed by the end of April for DOE/RL review.

Product Recovery –

✓ The Smart Sponge was removed from well 199-N-18 last month in support of the respirometry test. A new sponge assembly was installed following the respirometry test on February 23, 2016 and will be change-out in late April 2016.

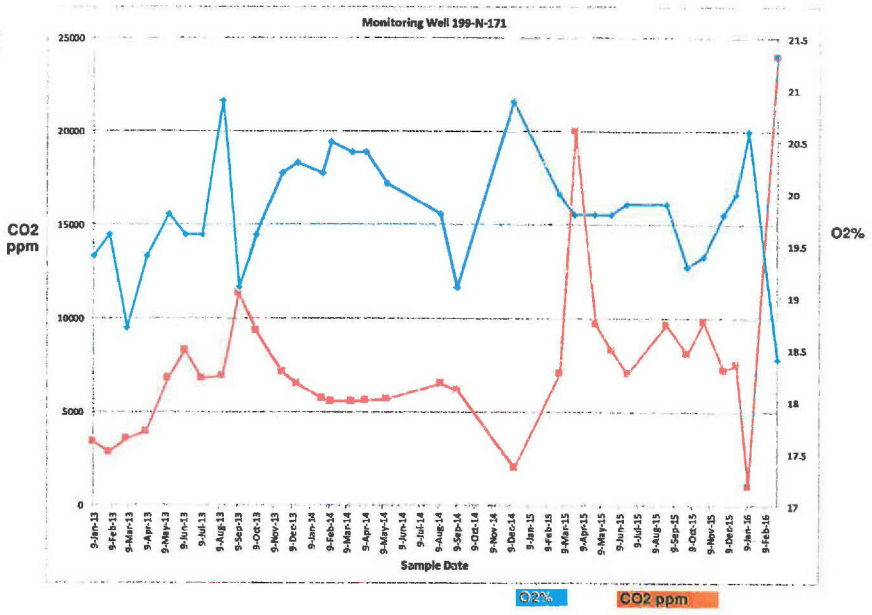
Aquifer Tubes –

✓ Tubes C7934, C7935, and C7936 are located adjacent to one another (Figure NR-2), with screens at depths of 14.41 ft. (C7934), 18.75 ft. (C7935), and 29.19 ft. (C7936). All three aquifer tubes were sampled on February 23, 2016. Tritium and strontium-90 concentration trends through January 19, 2016, are shown in Figures NR-3 and NR-4, respectively. As of March 3, 2016, the February 2016 data are not available in HEIS.

✓ The RCRA monitoring wells scheduled for September 2015 were sampled in September. The next sampling event is scheduled for March 2016.

Well 199-N-171

Well #	Date	O2%	CO2 ppm
199-N-17	9-Jan-13	19.4	3400
	5-Feb-13	19.6	2840
	6-Mar-13	18.7	3570
	8-Apr-13	19.4	3960
	15-May-13	19.8	6820
	12-Jun-13	19.6	8290
	10-Jul-13	19.6	6800
	14-Aug-13	20.9	6940
	11-Sep-13	19.1	11400
	8-Oct-13	19.6	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	6180
	15-Dec-14	20.9	2000
	1-Mar-15	20	7020
	25-Mar-15	19.8	20000
	29-Apr-15	19.8	9650
	26-May-15	19.8	8260
	22-Jun-15	19.9	7000
	27-Aug-15	19.9	9620
	30-Sep-15	19.3	8070
	29-Oct-15	19.4	9770
	30-Nov-15	19.8	7200
	22-Dec-15	20	7510
	11-Jan-16	20.6	1000
	29-Feb-16	18.4	24000



Well 199-N-169

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	600
	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	840
	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
	29-Oct-15	20.9	360
	30-Nov-15	20.9	460
	22-Dec-15	20.9	490
	11-Jan-16	20.9	0
	29-Feb-16	20.9	520

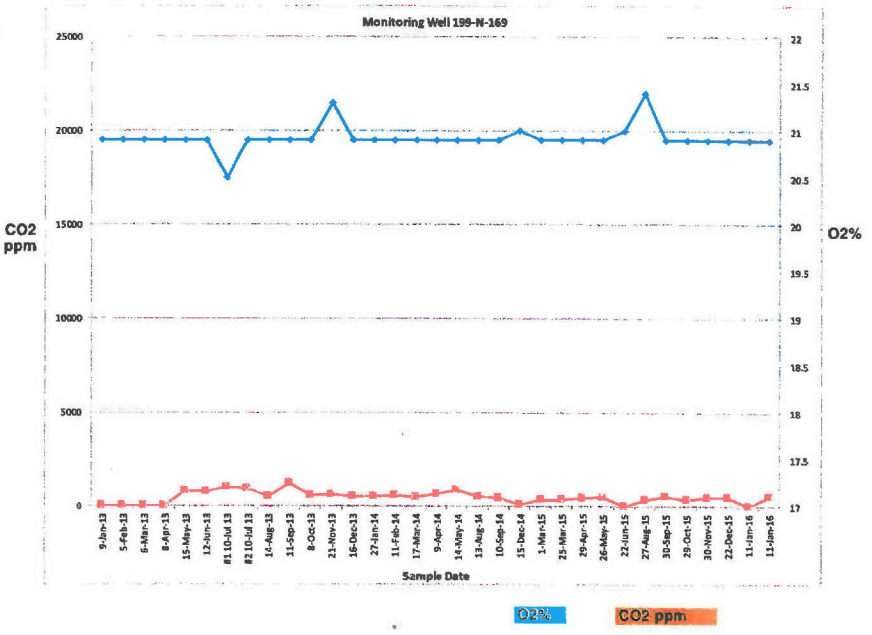


Figure NR-1. Bioventing Wells 199-N-169 and 199-N-171 Monthly Sampling Results.

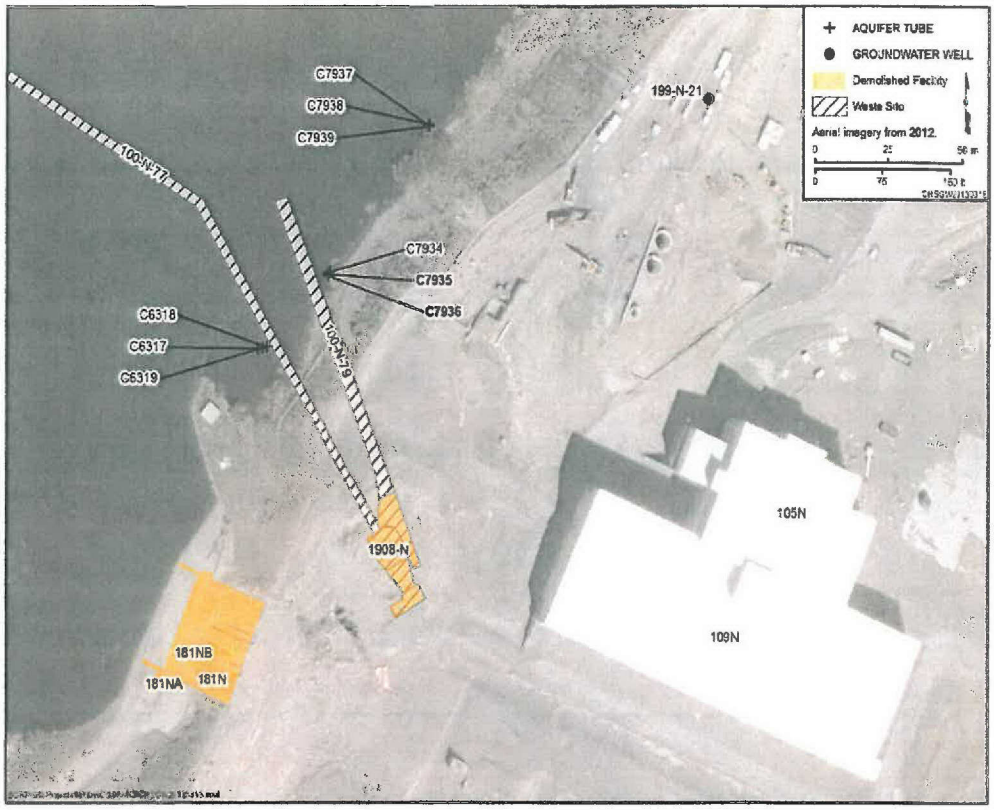


Figure NR-2. Locations of Aquifer Tubes C7934, C7935, and C7936.

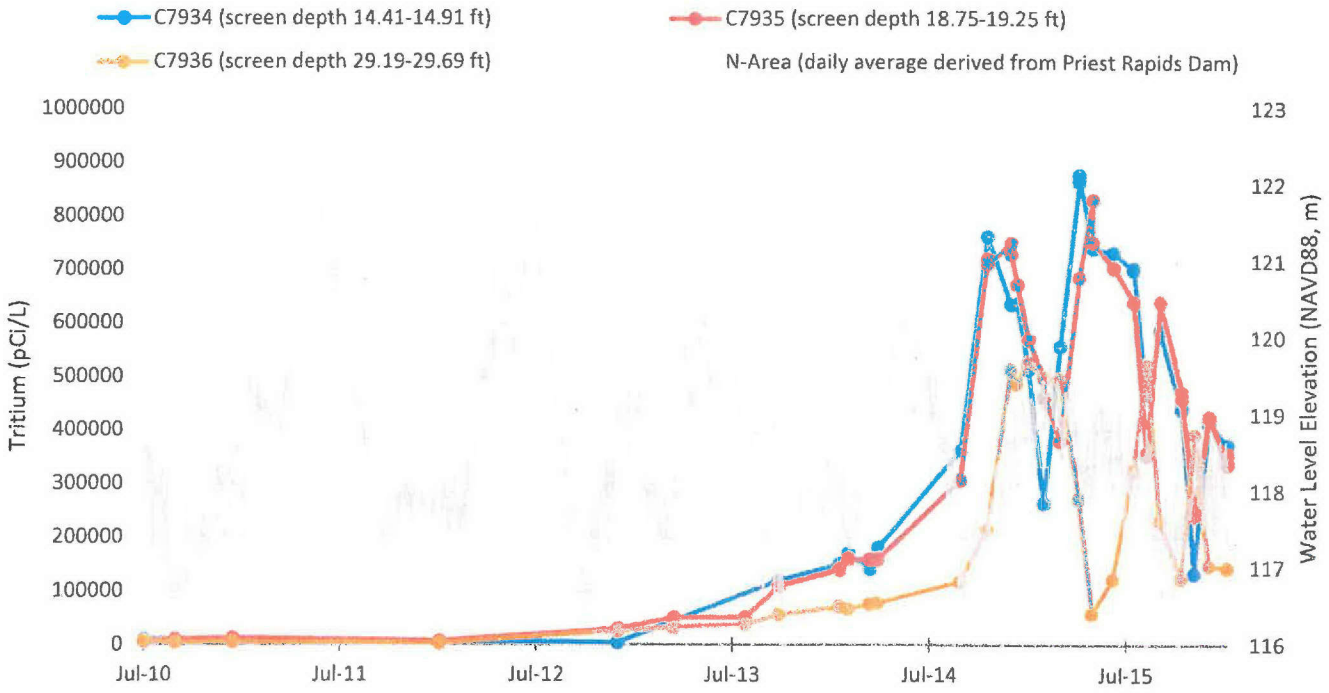


Figure NR-3. Tritium Trends through January 2016 at Aquifer Tubes C7934, C7935, and C7936.

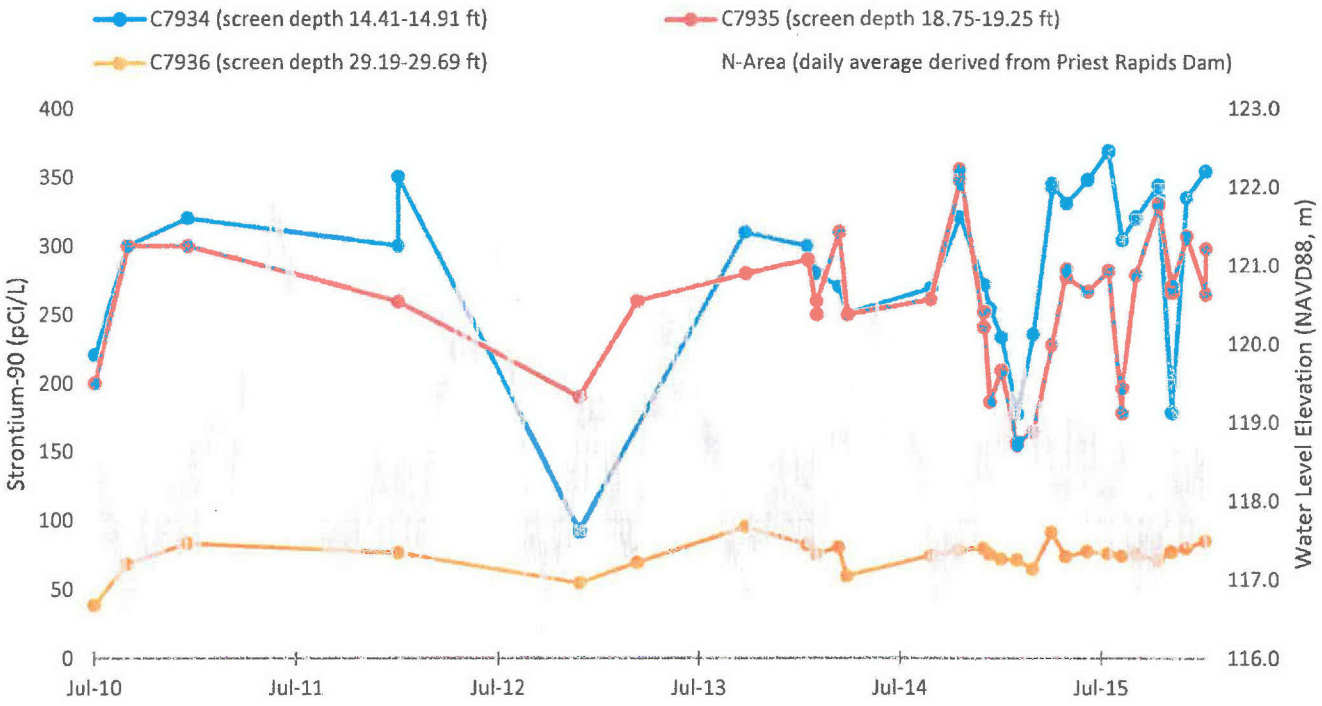


Figure NR-4. Strontium-90 Trends through January 2016 at Aquifer Tubes C7934, C7935, and C7936.

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

- CERCLA Process Implementation:
  - ✓ EPA legal comments on the Proposed Plan were received on November 9, 2015. RL is reviewing comments for required changes/updates. The document will be issued to public later in 2016.
  - ✓ Interim RD/RAWP, Interim Monitoring Plan, and Interim O&M Plan, Draft A plans were transmitted to Ecology on September 30, 2014. The documents (all 3) will be issued in late April 2016 as Rev. 0's.
- FY16 Drilling Progress
  - ✓ Of the 7 replacement well WCH is drilling, four 100-D wells have been constructed. Construction of the three H Area wells is underway.
  - ✓ The cultural reviews for the planned FY-2016 well installation are ongoing, with completion currently anticipated in late April 2016.
- Ringold Upper Mud (RUM) Aquifer Pump Test
  - ✓ Planning for a 30-day aquifer pump test in underway. The instrumentation for collecting water levels and specific conductance ongoing. Approximately 30-days of water level and conductance data will be collected prior to starting the pump testing.
- Remedial Actions & System Modifications
  - ✓ The volume of groundwater treated and mass of Cr(VI) removed from the 100-HR-3 P&T systems during February 2016 are:
    - Treated: 50.8 million gallons (52.1 in January)
    - Removed: 7.2 kg of Cr(VI) (8.0 in January)
  - ✓ FY 2016 (Oct. through Feb.) P&T performance to date:

P&T System	Treated (mgal)	Removed (kg)
DX	167	32.5
HX	95.0	10.7
100-HR-3 OU TOTAL	262	43.2

✓ The influent and effluent Cr(VI) concentrations (measured weekly) for the 100-HR-3 systems during January are presented in Table H-1.

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

System	Weekly Influent Concentrations[a] (µg/L)	Average Monthly Influent Concentration (µg/L)	Weekly Effluent Concentrations[ab] (µg/L)	Average Monthly Effluent Concentration (µg/L)
100-DX	45, 44, 42, 40, 43, 44, 30	41	1, 0, 0, -3, 0, 1, 1	0
100-HX	26, 26, 23, 26	25	0, 1, 0, 0	0

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

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

✓ A summary of the number of extraction and injection wells in the DX and HX P&T systems is shown in Table H-2. Figure H-1 illustrates the monthly average pumping rates for operating extraction wells across the DX and HX P&T systems. River levels remain lower than recorded during this time in 2015.

Table H-2. Summary of the Number of Extraction and Injection Wells in the 100-HR-3 Systems

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

Notes:
Four injection wells for DX remain connected, but are not counted in 2015 totals since they are not operating.

✓ Well realignments for FY2016 are in the planning stage with most of the work pending completion of the cultural resource reviews.

✓ Hexavalent chromium concentrations in groundwater at 100-HR-3 are now below 300 µg/L across the Operable Unit, and below 200 µg/L in all but a few wells.

✓ Summaries of the volume of groundwater treated and Cr(VI) removed for the 100-DX and 100-HX pump-and-treat systems are shown in Figures H-2 and H-3, respectively.

✓ A general reduction in Cr(VI) mass removal over time, a function of progress of remediation with associated reduction in groundwater contaminant concentration, is exhibited at both DX and HX. The drop in concentrations is more pronounced at DX, where concentrations were previously at very high levels. Influent concentrations at DX continue to decline as remediation progresses.

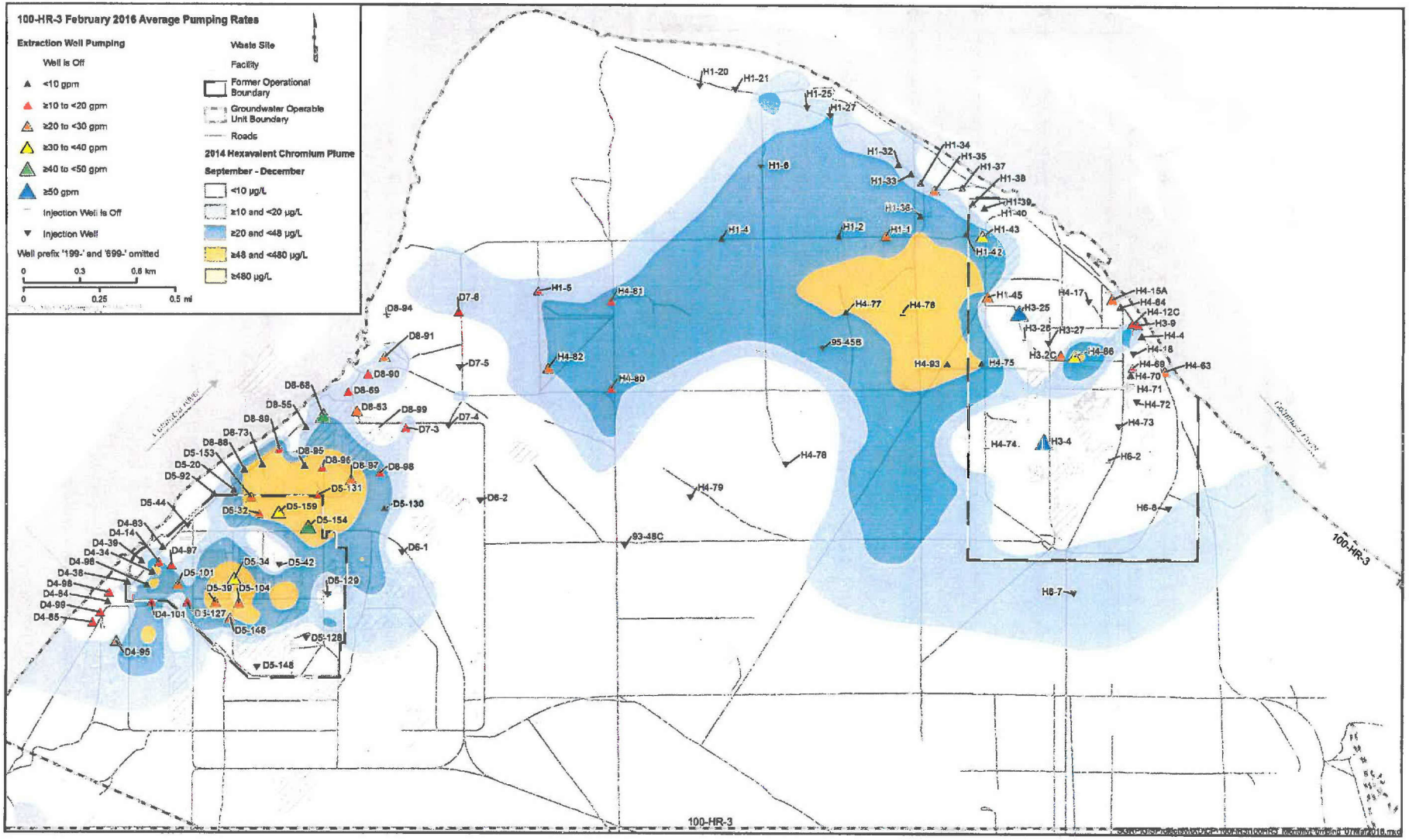


Figure H-1. February 2016 Average Pumping Rates for the 100-HR-3 P&T Systems

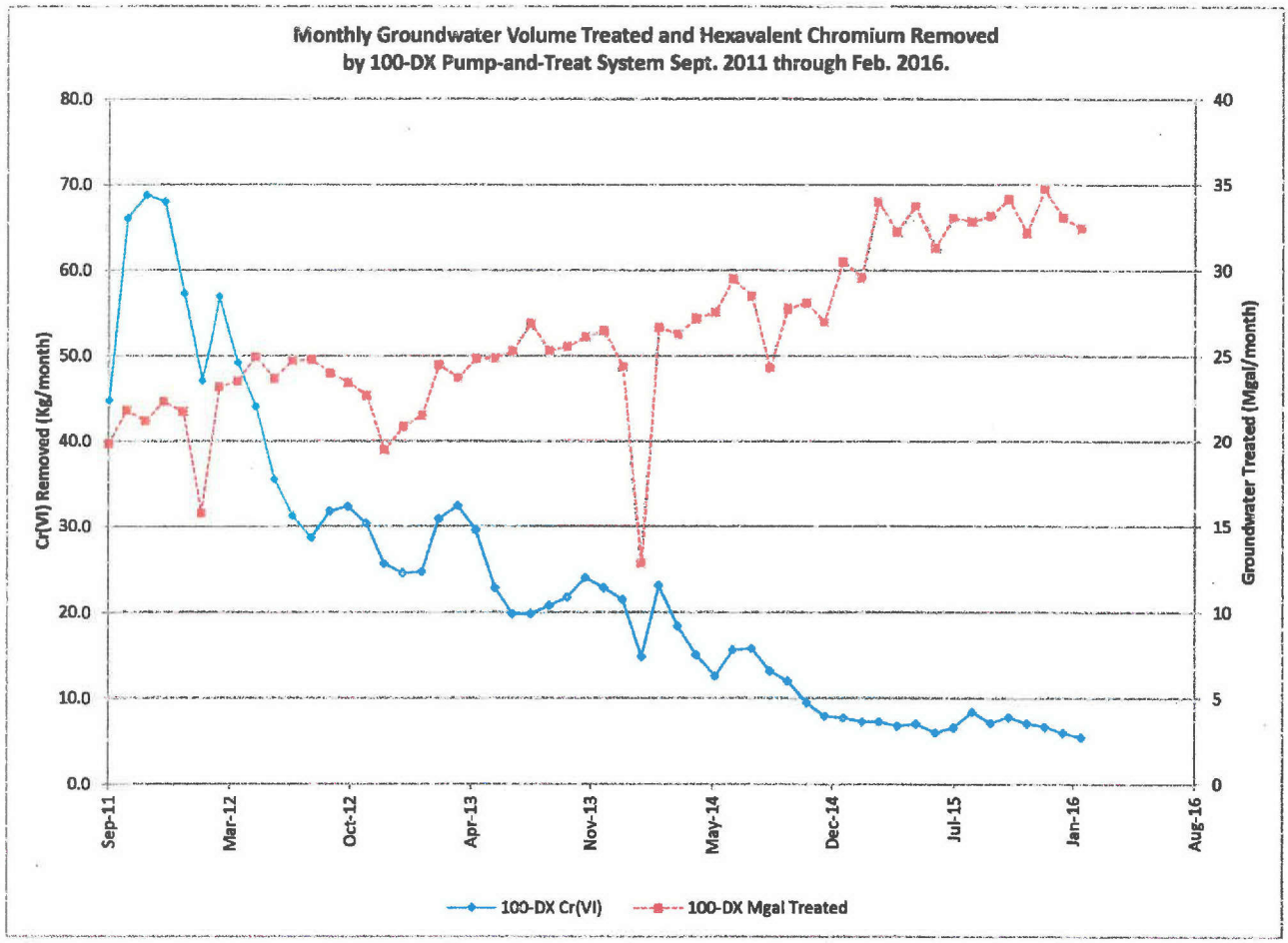


Figure H-2. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-DX Pump-and-Treat, September 2011 through February 2016.

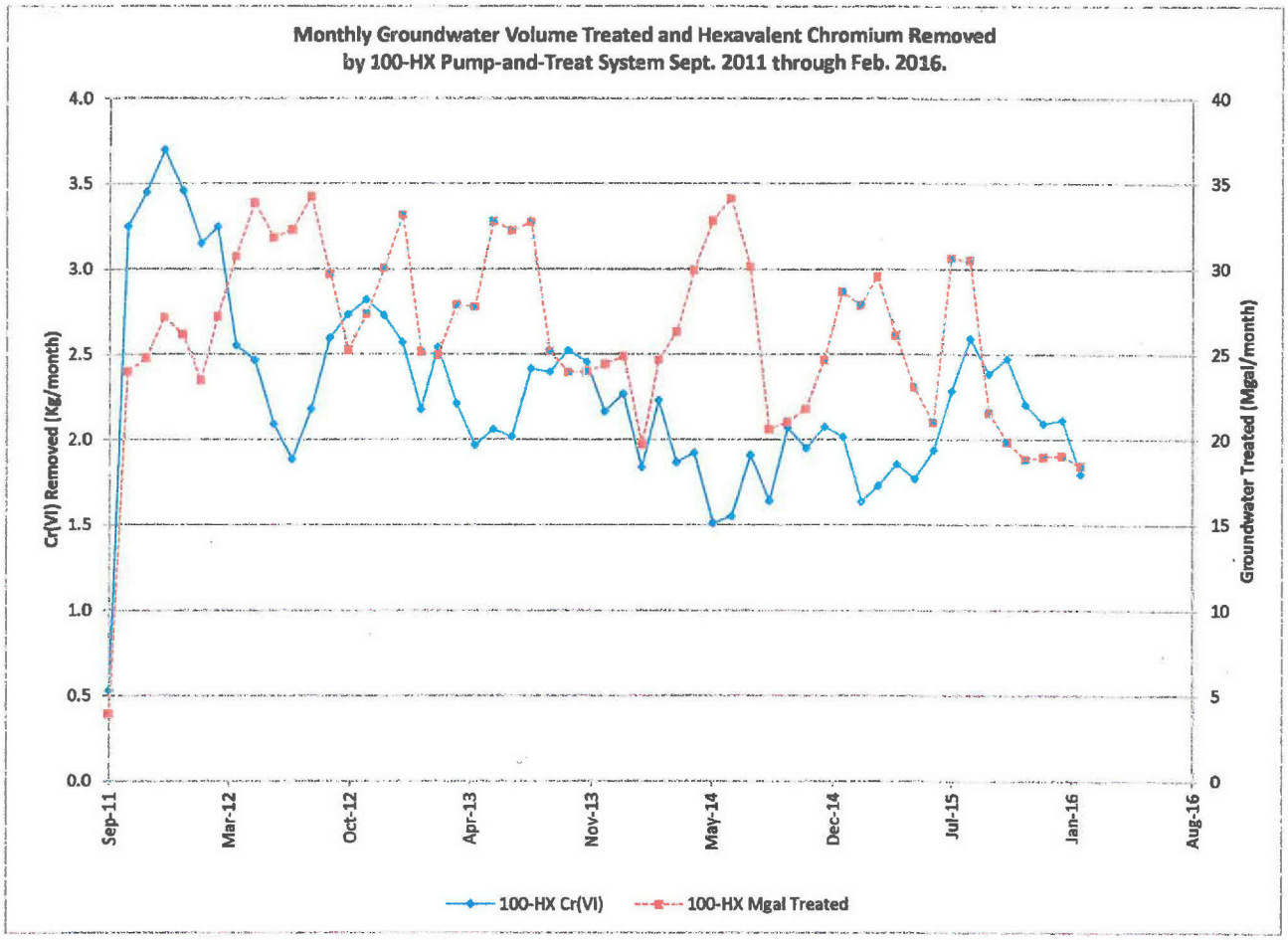


Figure H-3. Monthly Cr(VI) Removed and Groundwater Volume Treated by 100-HX Pump-and-Treat, September 2011 through February 2016.

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

- CERCLA Process Implementation:
  - ✓ Clarifications that were needed in the CERCLA documents pertaining to surface water and groundwater protection Soil Screening Levels, Preliminary Remediation Goals, and Cleanup Values were discussed with EPA on February 18, 2016. EPA agreed that the clarification to the Record of Decision is a Non-Significant change. Meeting minutes have been prepared.
- Monitoring & Reporting:
  - ✓ Construction of roads for new monitoring well sites is underway. Sonic drilling is anticipated to begin in April.
  - ✓ The next sampling event for existing wells is scheduled for June 2016 (5 semiannual wells).

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

- CERCLA Process Implementation:
  - ✓ Well-specific and contaminant-specific evaluations have begun using groundwater data through CY2015 to assess the progress toward, and attainment of, remedial action objectives for the long-term groundwater monitoring network.
  - ✓ Clarifications that were needed in the CERCLA documents pertaining to surface water and groundwater protection Soil Screening Levels, Preliminary Remediation Goals, and Cleanup Values were discussed with EPA on February 19, 2016. EPA agreed that the clarification to the Record of Decision is a Non-Significant change. Meeting minutes have been prepared.
- Remedial Actions:
  - ✓ Initial performance indicators are positive for uranium sequestration after completion of the polyphosphate infiltration and injections in the 0.75 acre Stage A enhanced attenuation area (Figures FF-1 and FF-2). The permanence of the sequestration treatment is dependent on the current meta-stable compounds eventually forming stable minerals, depending on contact time. The efficacy of the sequestration process will be evident after longer-term groundwater results are available.
  - ✓ Stage A summary of preliminary, short-term observations regarding Stage A uranium sequestration:
    - Initial meta-stable amorphous phosphate minerals appear to be sequestering uranium, as expected.
    - Long-term sequestration performance will be evident after stable phosphate minerals have had time to form and will be gauged with future groundwater monitoring events.
    - Higher uranium concentrations within some Stage A EA area wells is attributed to rewetting of the vadose zone from infiltration and leaching of uranium.
    - Effects were local and restricted to the Stage A EA area.
    - Elevated uranium concentrations (i.e., higher than pre-treatment concentrations) were not observed in the aquifer downgradient of the Stage A EA area.
- Monitoring & Reporting:
  - ✓ 300 Area Industrial Complex: The next sampling event is scheduled for March 2016.
  - ✓ 618-10 Burial Ground/316-4 Crib: The next sampling event is scheduled for December 2016.
  - ✓ 618-11 Burial Ground: The next sampling event is scheduled for October 2016.
  - ✓ 300 Area Process Trenches (316-5) RCRA Monitoring: All 8 wells were sampled in February 2016 (6 on February 5 and 2 on February 8). The next sampling event is scheduled for March 2016.

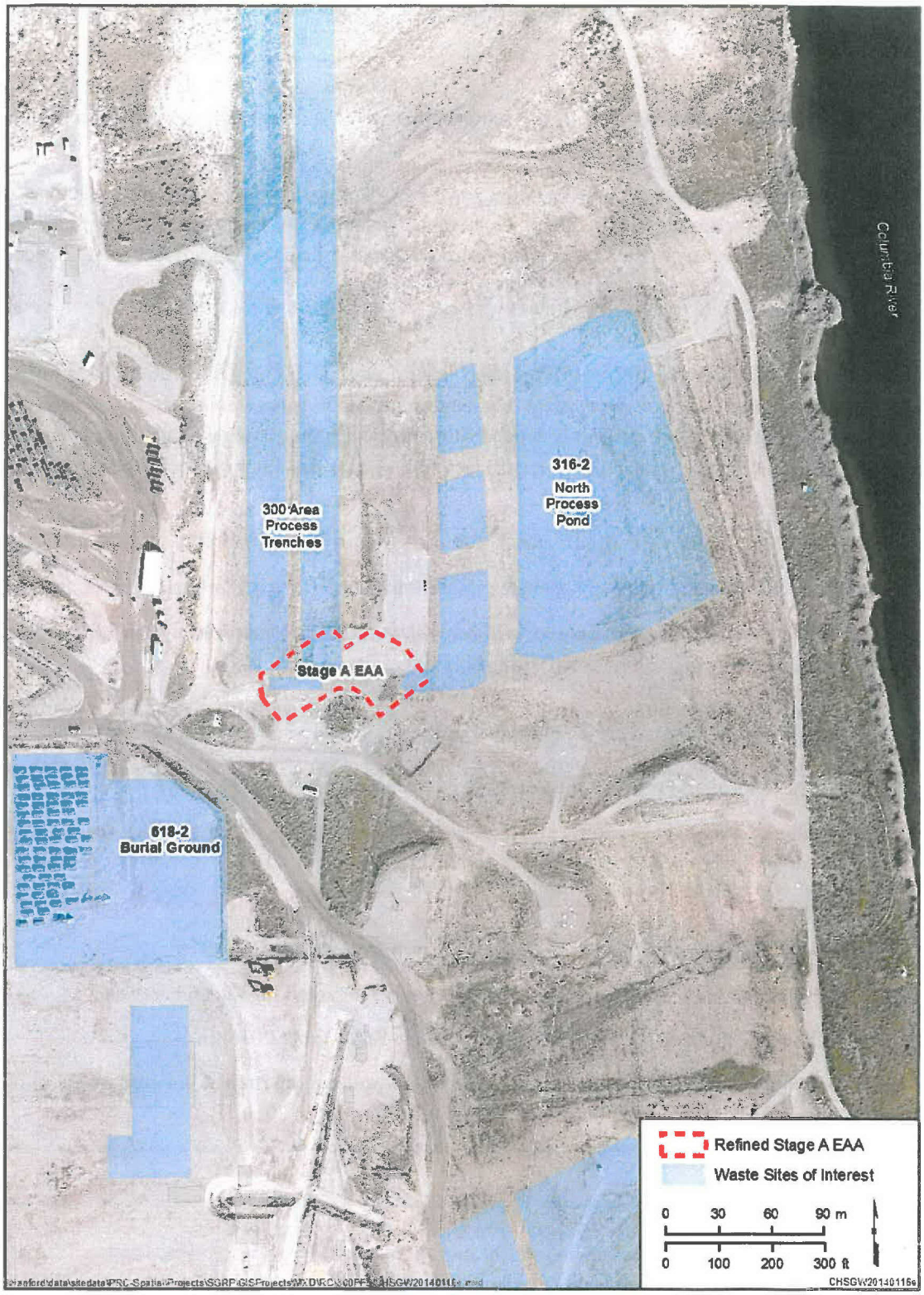


Figure FF-1. Location of the Stage A Enhanced Attenuation Area

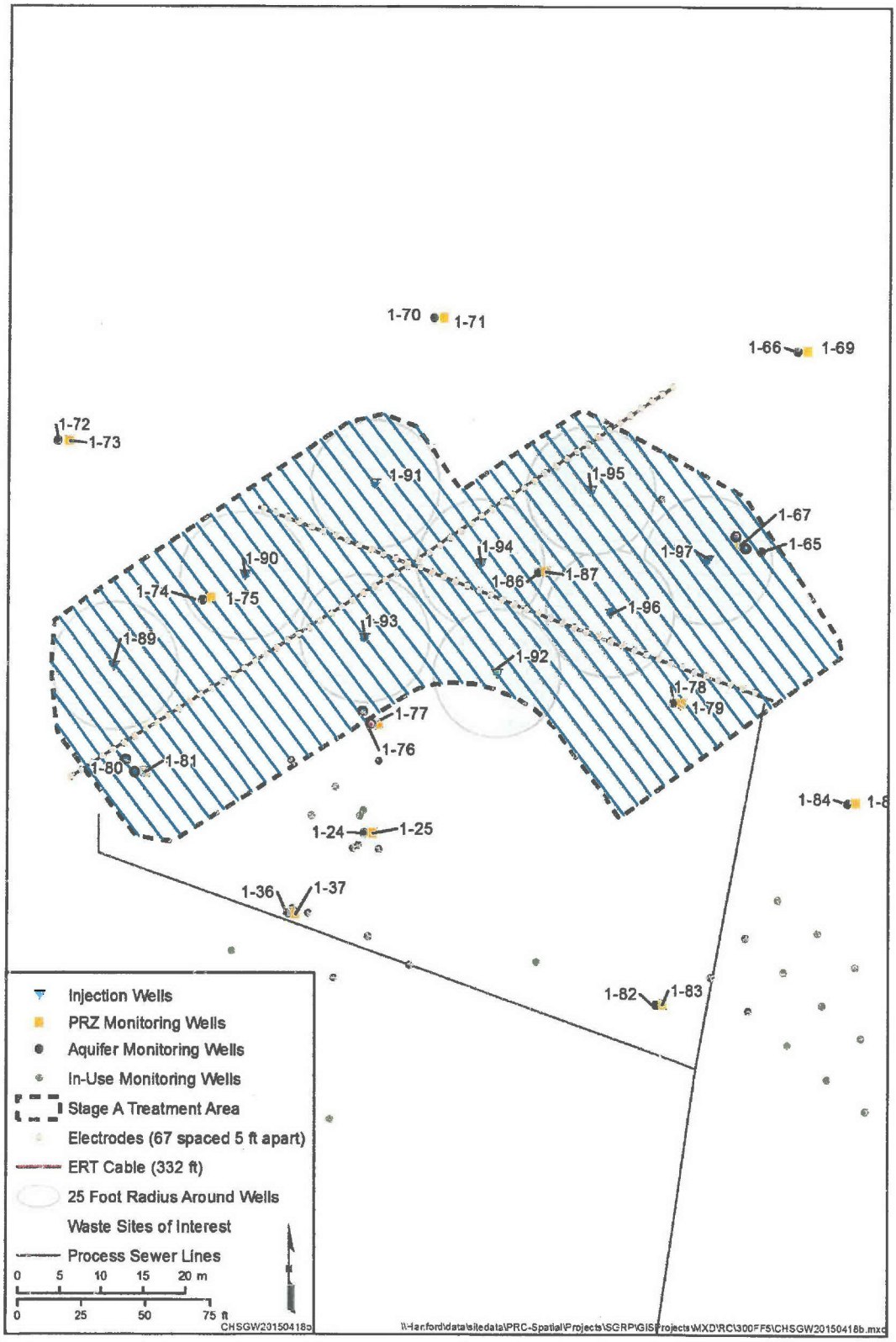


Figure FF-2. Location of the Stage A Enhanced Attenuation Area Injection and Monitoring Wells and Infiltration Lines.

Hanford Sampling Program Information

Table 1 Wells, Aquifer Tubes, and springs in River Corridor Successfully Sampled in February 2016

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
		199-D2-11	199-H1-32	199-K-106A	C7934	699-S30-E15A	399-1-10A
		199-D3-5	199-H1-33	199-K-107A	C7935		399-1-10B
		199-D4-14	199-H1-35	199-K-108A	C7936		399-1-16A
		199-D4-38	199-H1-37	199-K-111A	N116mArray-0A		399-1-16B
		199-D5-103	199-H1-38	199-K-140			399-1-17A
		199-D5-104	199-H1-7	199-K-141			399-1-17B
		199-D5-106	199-H2-1	199-K-157			399-1-18A
		199-D5-132	199-H3-10	199-K-168			399-1-18B
		199-D5-133	199-H3-3	199-K-184			699-10-E12
		199-D5-142	199-H3-4	199-K-185			699-13-1A
		199-D5-143	199-H3-5	199-K-186			699-13-1C
		199-D5-145	199-H3-6	199-K-187			
		199-D5-146	199-H3-7	199-K-189			
		199-D5-147	199-H3-9	199-K-190			
		199-D5-20	199-H4-11	199-K-191			
		199-D5-34	199-H4-12A	199-K-192			
		199-D5-39	199-H4-12C	199-K-193			
		199-D5-40	199-H4-15A	199-K-194			
		199-D5-92	199-H4-16	199-K-196			
		199-D5-97	199-H4-4	199-K-197			
		199-D6-3	199-H4-46	199-K-198			
		199-D8-68	199-H4-47	199-K-199			
		199-D8-69	199-H4-49	199-K-200			
		199-D8-71	199-H4-65	199-K-201			
		199-D8-88	199-H4-84	199-K-208			
		199-H1-5	199-H4-85	199-K-209			
		199-H4-80	199-H4-86	199-K-210			
		199-H4-81	199-H5-1A	199-K-212			
		199-H4-82	699-101-45	199-K-220			
		699-93-48A	699-94-41	199-K-32A			
		699-95-48	699-94-43	199-K-34			
		699-95-51	699-95-45	699-78-62			
		699-96-52B	699-97-41				
		699-97-51A	699-98-46				
		699-98-49A	699-99-41				
		699-98-51	699-99-44				
			699-99-44				

Table 2 Fiscal Year 2015 and 2016 Sample Trips in River Corridor Awaiting at End of February 2016

Quarter Scheduled	GWIA	Sample Site	Site Name	Schedule Date	Frequency	Months Remain	Status	Comment
FY 2015 Q4	100-NR	WELL	199-N-333	9/1/2015	Quarterly	0	Late	Sample Dry, Review for Cancelation
	100-NR	WELL	199-N-343	9/1/2015	Annual	6		Sample Dry, Review for Cancelation
	100-NR	AQUIFER TUBE	C6331	9/1/2015	Annual	6		
FY 2016 Q1	100-HR-D	AQUIFER TUBE	36-M	11/1/2015	Annual	8		
	100-KR	SPRING	100-K SPRING 68-1	10/1/2015	Annual	7		
		WELL	199-K-124A	11/1/2015	Biannual	2		Canceled
		WELL	199-K-188	11/1/2015	Quarterly	0	Late	Review for Cancelation
		WELL	199-K-23	11/1/2015	Biannual	2		
		WELL	199-K-36	11/1/2015	Biannual	2		Bioremediation, Adjusted Schedule
		AQUIFER TUBE	AT-K-4-M	10/1/2015	Annual	7		
	100-NR	SPRING	River water adjacent to C6317/18/19	10/1/2015	Annual	7		
		SPRING	River water adjacent to C7934/35/36	10/1/2015	Annual	7		
		SPRING	River water adjacent to C7937/38/39	10/1/2015	Annual	7		
FY 2016 Q2	100-HR-D	WELL	199-D4-39	2/1/2016	Quarterly	2		
	100-HR-H	WELL	199-H1-40	2/1/2016	Quarterly	2		
		WELL	199-H3-11	2/1/2016	Quarterly	2		
	100-NR	WELL	199-N-167	1/11/2016	Biannual	4		Bioremediation, Adjusted Schedule
		WELL	199-N-169	1/11/2016	Biannual	4		Bioremediation, Adjusted Schedule
		WELL	199-N-171	1/11/2016	Other	3		Bioremediation, Adjusted Schedule
		WELL	199-N-172	1/11/2016	Biannual	4		Bioremediation, Adjusted Schedule
		WELL	199-N-173	1/11/2016	Other	3		Bioremediation, Adjusted Schedule
		WELL	199-N-183	1/11/2016	Biannual	4		Bioremediation, Adjusted Schedule
		WELL	199-N-19	1/11/2016	Biannual	4		Bioremediation, Adjusted Schedule
		WELL	199-N-3	1/11/2016	Other	0	Late	Bioremediation, Adjusted Schedule
		WELL	199-N-56	1/11/2016	Biannual	4		Bioremediation, Adjusted Schedule
		WELL	199-N-96A	1/11/2016	Other	3		Bioremediation, Adjusted Schedule
		AQUIFER TUBE	C6132	1/11/2016	Other	0	Late	Scheduled in Feb, March, June, and Sept.
		AQUIFER TUBE	C6135	1/11/2016	Biannual	4		

Table 3 Groundwater Sampling Locations in River Corridor Scheduled to be sampled in March 2016

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
		199-D3-2	199-H1-1	199-K-203	199-N-105A		399-1-10A
		199-D4-22	199-H1-2	199-K-204	199-N-165		399-1-10B
		199-D4-23	199-H1-25		199-N-2		399-1-16A
		199-D4-25	199-H1-27		199-N-28		399-1-16B
		199-D4-62	199-H1-34		199-N-3		399-1-17A
		199-D5-103	199-H1-36		199-N-32		399-1-17B
		199-D5-123	199-H1-39		199-N-34		399-1-18A
		199-D5-125	199-H1-4		199-N-41		399-1-18B
		199-D5-126	199-H1-42		199-N-57		399-4-14
		199-D5-145	199-H1-43		199-N-71		699-12-4D
		199-D5-15	199-H1-45		199-N-72		699-9-E2
		199-D5-16	199-H1-46		199-N-73		699-S11-E12AP
		199-D5-38	199-H1-6		199-N-74		699-S19-E14
		199-D5-43	199-H3-2A		199-N-77		699-S6-E14A
		199-D8-5	199-H3-2C		199-N-81		
		199-D8-70	199-H4-10		C6132		
		199-D8-72	199-H4-13		C6323		
		199-D8-73	199-H4-45		C7881		
			199-H4-5		C7934		
			199-H4-63		C7935		
			199-H4-64		C7936		
			199-H4-69		C7937		
			199-H4-70		C7938		
			199-H4-75		C7939		
			199-H4-76		N116mArray-0A		
			199-H4-77		N116mArray-10A		
			199-H4-83		N116mArray-11A		
			199-H4-90		N116mArray-15A		
			199-H4-91		N116mArray-1A		
					N116mArray-2A		
					N116mArray-3A		
					N116mArray-4A		
					N116mArray-6A		
					N116mArray-8A		
					N116mArray-9A		
					NVP1-1		
					NVP1-2		
					NVP1-3		
					NVP1-4		
					NVP1-5		

100-BC	100-FR	100-HR-D	100-HR-H	100-KR	100-NR	1100-EM	300-FF
					NVP2-115.1		
					NVP2-115.4		
					NVP2-115.7		
					NVP2-116.0		
					NVP2-116.3		

Documents for AR Submission

Number	Title	Referencing Doc/Driver
DOE/RL-2013-35-ADD6, R0	100-HR-3 Groundwater Operable Unit Well Installation Sampling and Analysis Plan, Addendum 6: Wells 699-97-47B, and 199-H1-46, 2016	cleared February 2016
DOE/RL-2013-36-ADD3, R0	100-KR-4 Groundwater Operable Unit Well Installation Sampling and Analysis Plan, Addendum 3: Wells 199-K-223, 199-K-224, 199-K-225, and 199-K-226, 2016	cleared February 2016
DOE/RL-97-01, Rev. 6	Interim Action Waste Management Plan for the 100-HR-3 and 100-KR-4 OUs, 2016	cleared February 2016
ECF-100NPL-11-0070, Rev. 3	100 Area Stratigraphic Database Development, 2015	supports 100BC5 RI/FS report
ECF-HANFORD-12-0048, R0	Hydraulic Gradients and Velocity Calculations for RCRA Sites in 2011, Rev. 0, 2012	ref'd in ECF-100BC5-15-0121, Rev. 0
MSA-1502630, 2015	Ecological and Cultural Clearance for Columbia River Access and Submersible Pumps in the Columbia River for the 300 Area Sequestration Remedial Activities, Hanford Site, Benton Country, Washington (HCRC# 2014-300-004, ECR 2015 303)" (letter to R.M. Hermann, CHPRC, from A.L. Johnson), Mission Support Alliance, Richland, Washington, June 16.	supports SGW-59455, Rev. 0; 300-FF-5 Operable Unit Stage A Uranium Sequestration System Installation Report
SGW-45889, Rev. 0	Project Report for Sampling of 100-B-27 Excavation Floor, 2010	supports 100BC-5 RI/FS report
SGW-58553, R0	Description of Work for the Installation of Twenty Two Monitoring Wells and Nine Injection Wells in the 300-FF-5 Operable Unit, Rev. 0, 2015	supports SGW-59455, Rev. 0; 300-FF-5 Operable Unit Stage A Uranium Sequestration System Installation Report
SGW-58976, R0	Field Instructions for Uranium Sequestration in the 300 Area, Rev. 0, 2015	supports SGW-59455, Rev. 0; 300-FF-5 Operable Unit Stage A Uranium Sequestration System Installation Report
SGW-59465, R0	Borehole Summary Report for the Installation of Nine Injection Wells and Twenty-one Monitoring Wells in the 300-FF-5 Operable Unit, FY 2015, Rev. 0, 2015	supports SGW-59455, Rev. 0; 300-FF-5 Operable Unit Stage A Uranium Sequestration System Installation Report
WCR-2015-2480, 2014	Endangered Species Act Section 7(a)(2) Concurrence Letter for Installation and Operations of a Uranium Sequestration Groundwater treatment System near the Shoreline of the Columbia River at the 300 Area of the Hanford Site, Benton Country, Washington (HUC 170200160602) City of Richland-Columbia River" letter to K. Flynn, U.S. Department of Energy, Richland, Washington from W.W. Stelle, Jr.), National Marine Fisheries Service, U.S. Department of Commerce, Seattle, Washington, June 9.	supports SGW-59455, Rev. 0; 300-FF-5 Operable Unit Stage A Uranium Sequestration System Installation Report

Attachment 3

100K Area Report
100/300 Area Unit Manager Meeting
March 10, 2016

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 have been grouped into 20 separate procurement sets. Eight procurement sets are in progress, eleven have been completed, and one has been canceled.
- The 1st article STSC assembly was received at MASF and placed into the STS cask.
- Preliminary Documented Safety Analysis (PDSA) Revision 2 has been approved by RL. KW Basin integrated Documented Safety Analysis (DSA) development continues. The integrated DSA combines the ECRTS PDSA and the KW Basin Final Safety Analysis Report into a single safety basis document.
- The K West Basin Annex construction closeout process continues.
- The construction subcontractor completed Engineered Container re-lidding in the K West Basin.

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

- Preparation for MASF Pre-Operational acceptance Test (MPAT) continues. The MPAT is currently scheduled to start in early April.
- Fabrication of sludge storage equipment and preparations for removal of NLOP equipment continues at T Plant.

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 work continues.
    - Sand filter backwash solids sample analyses being performed by PNNL are complete. The final report is scheduled to be provided to CHPRC in mid-February.
    - Dose to curie modeling of basin below-water debris modeling is approximately 50% complete. Characterization activities have re-commenced following completion of Engineered Container re-lidding. This characterization data will become a key input to the calculation to demonstrate compliance with ERDF waste acceptance criteria for 105-KW Basin.

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

- Work is continuing at AB Wastes Sites with focus on 100-K-101. Clean overburden is being removed and stock piled to gain access to both ends of the waste site. In-process samples will be taken of the overburden to verify that it is clean.

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

Attachment 4

Dixon, Brian J

From: Guercia, Rudolph F (Rudy)
Sent: Wednesday, March 09, 2016 12:24 PM
To: Dixon, Brian J; Barnes, Brett M
Subject: FW: AGREEMENT ON ERDF RO/RO CONTAINERS ARE NOT SUBJECT TO SNF-9430, REVISION 3, SECTION 3, PARAGRAPH 9

See below

R. F. Guercia, Field Engineering
US Dept. of Energy, Richland Operations Office
(509) 376-5494

From: Lobos, Rod [mailto:Lobos.Rod@epa.gov]
Sent: Wednesday, March 09, 2016 11:08 AM
To: Guercia, Rudolph F (Rudy)
Cc: Einan, David (EPA)
Subject: RE: AGREEMENT ON ERDF RO/RO CONTAINERS ARE NOT SUBJECT TO SNF-9430, REVISION 3, SECTION 3, PARAGRAPH 9

Rudy,

I ran this by Dave Einan.. we are both comfortable with it..
Lets print this email and enter it into the unit manager meeting minutes.

Rod

From: Guercia, Rudolph F (Rudy) [mailto:rudolph.guercia@rl.doe.gov]
Sent: Tuesday, March 08, 2016 10:00 AM
To: Lobos, Rod <Lobos.Rod@epa.gov>
Cc: Engelmann, Richard H <Richard_H_Engelmann@rl.gov>; Ortiz, Michael L <Michael_L_Ortiz@rl.gov>; Barnes, Brett M <Brett_M_Barnes@rl.gov>; Clements, Lorin <Lorin_Clements@rl.gov>; Dixon, Brian J <Brian_J_Dixon@rl.gov>
Subject: AGREEMENT ON ERDF RO/RO CONTAINERS ARE NOT SUBJECT TO SNF-9430, REVISION 3, SECTION 3, PARAGRAPH 9

Rod: The attached is the proposed interpretation of the newly approved WMP, SNF-9430, Rev 3. Do you agree that this is a correct interpretation?

This agreement documents that the Environmental Restoration Disposal Facility (ERDF) Roll-On/Roll-Off (RO/RO) containers (aka Cans) are not included in the labeling requirements as identified in SNF-9430, Revision 3, Section 3, paragraph 9.

ERDF RO/RO containers comply with ERDF waste acceptance criteria (WCH-191 and Change Notice WCH-00191-04-CN-01) and applicable procedures (PRC-PRO-WM-40223) for waste destined for ERDF. Bulk shipments (All RO/ROs) when loaded, require submittal of form A-6005-414, *PRC ERDF Container Verification Data Sheet*.

This completed form is placed in a pouch attached to the RO/RO container. This form is replaced with form WCH-EE-286, *Onsite Waste Tracking Form* (OWTF) shipping paper prior to ERDF picking up the container.

Each of the forms (A-6005-414 and OWTF) contain information about the contents and hazards of the waste in the RO/RO.

Form A-6005-414 contains a brief description of the waste, radiological information (if radioactive), name of the person filling out the form and the date in which it was filled out.

Thanks

R. F. Guercia, Field Engineering
US Dept. of Energy, Richland Operations Office
(509) 376-5494

Attachment 5

March 10, 2016 Unit Manager's Meeting
Closure Operations Status

100 Area

- Revegetation activities are complete and revegetation equipment has been demobilized.
- 100 D - Making arrangements to install fence around the 183-D Clearwell to provide protection for bats.
- 100-N – Remediation and loadout of 100-N-83 has been completed. Radiological survey using GPERS has been completed and indicates no contamination remains. Verification Work Instruction has been prepared and submitted to Ecology for review. Site visit by DOE, Ecology and WCH is scheduled for March 10 to determine if backfill material is needed. Survey tent has been demolished and surrounding soil has been transferred to ERDF CTA for reuse. 100-N CTA has been visually inspected and, using GPERS, shown to have no radiological contamination. Gravel/soil mixture from CTA is being transferred for reuse at ERDF CTA.
- 100-H – WCH is preparing to mobilize and begin work on March 16 at the 600-385 waste site.

618-10

Trench Remediation

- Continuing primary/secondary sorting, drum retrieval, and load-out.
- Continuing processing concreted waste drums in grout.
- Continuing NDA, drum and anomaly characterization activities.
- Excavation to retrieve drums near the VPU field is on hold so that augering and waste retrieval can be completed in the VPUs nearest the trench in rows 2, 3, 4 and 6.

VPU Remediation

- Thirty two (32) VPUs total have been augered, all in row 2 and now augering in rows 3 and 4. In-situ characterization has been completed.
- Low-Level Waste (LLW) retrieval mockups are in progress. EPA and WDOH have been invited to observe LLW retrieval mockups on March 17th.

300 Area

324 Building

- Continuing with close out of the 300-296 AREVA contract.
- Contract transition with CHPRC expected in April.
- Continuing work with DOE and Ecology on RCRA Part A Permit and Closure Plan.

300-288:2

- Radiological surveys and sample collection on east side is complete. East side Verification Work Instruction has been revised to include remediation of west side and is with DOE for signature. Remediation of west side approximately 25% complete.

300 Area Removal Action Work Plan

- RAWP is complete.

Attachment 6

Meeting Notes

Meeting: *Soil Surface and Groundwater Protection Levels for 100-F/IU*

Where: Federal Building, CR 540N

When: 18 February 2016

Attendees:

Facilitator – Phil Burke

Notes – Will Nichols

DOE-RL – Mike Cline, John Neath, John Sands, Greg Sinton

EPA – Laura Buelow, Chris Guzzetti

CHPRC – Alaa Aly, Phil Burke, Will Nichols

1 Background

The purpose of this meeting was to discuss clarifications required for the 100-F/IU *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) documents pertaining to soil screening levels (SSLs), preliminary remediation goals (PRGs), and cleanup values and the path forward to document the required changes. Footnotes and explanatory text for select values were either missing or lacked sufficient detail. As a result, values were misapplied in the evaluation of waste sites (decision units). Presentations explained the development of cleanup values, proper application of the values, environmental calculation files (ECFs) where the calculations were documented, and the clarifications needed as tables progressed from the ECF to the remedial investigation (RI)/feasibility study (FS), proposed plan (PP), record of decision (ROD) and remedial design/remedial action work plans (RD/RAWPs). An initial reevaluation was performed, applying the correct method of cleanup value comparisons, and results indicate that there are no changes to conclusions made in the RI/FSs, decisions made in the RODs, or waste sites that have been remediated post-ROD. The ROD guidance for post-ROD changes was presented along with options to handle this change. Based on the change criteria, a recommendation was made to consider this ROD change as nonsignificant. Other CERCLA documents will result in changes described in the following sections.

2 Objective

Soil cleanup levels (CULs) for protection of groundwater and surface water at 100-F/IU were discussed.

2.1 Discussion Points

Introduction: Burke – why we are meeting today

Slide 2: Burke – topics to cover

Slide 3: Example table directly from the ROD

- Burke – Values for soil CUL protective of groundwater are unit-length based and need to be scaled by length of waste site decision unit in the direction parallel to direction of groundwater flow.
- Burke – Tables are propagated from ECFs within the RI/FS to PP to ROD to RD/RAWP without proper footnotes and text to clarify use of the values.
- Neath – Interim actions were based on an assumed large size (1/2 acre or so) waste site, so the dimension was implied/built into the CUL used.
- Nichols – Model for PRGs to explain dimensional nature of the PRG calculation was illustrated; clarifying questions were asked by U.S. Environmental Protection Agency (EPA) and answered by Nichols and Aly.

Slide 4: Background

- Burke – Points in slide were covered.

Slide 5: Impacted Documents

- Aly's points:
  - Calculation doesn't change, but it could benefit from better text to explain this concept and application.
  - Calculations that evaluate exposure point concentration to PRGs need to be corrected to apply the dimensional consideration.
  - Table in Chapter 8 has a very cryptic note about this scaling, and the note didn't propagate to later documents. Text explaining how to apply the numbers is needed.

Slide 6: Re-evaluation of 100-F/IU Waste Sites

- All sites (pre-ROD RI analysis and post-ROD cleanup verification package [CVP] analysis) have been re-evaluated; no sites changed status as a result of re-evaluating with dimensional consideration.
- Guzzetti – Who actually did the calculation? Where was the breakdown?
- Burke – CHPRC teams performed the work.
- Nichols – Breakdown was an intercalculation issue; modeling calculation was correct and the math internally to the comparison calculation was correct, but the dimensional aspect of the numbers provided by the modeling calculation when applied was overlooked.
- Burke – Attached EPA guidance on post-ROD change was reviewed, and proceeding as a nonsignificant change was recommended.
- Guzzetti and Laura – First instinct is that nonsignificant change is appropriate; however, Dennis Faulk will need to be briefed on the issue.

Discussion of how to document changes:

- Results of the meetings with EPA will be documented through meeting minutes and provided to the Unit Managers' Meeting to include in their files to document the decisions and path forward for both operable units (OUs).

- RD/RAWP change notices will be prepared to convey clarifications to the cleanup value tables, and additional text will provide further explanation for the use of values and method of calculation for each waste site.
- ECFs will be revised for each OU: one describes the comparison of the waste sites (decision units) to the Groundwater Protection/Surface Water Protection (GWP/SWP) SSLs, the next ECF describes comparisons to PRGs and final ECF describes the STOMP 1-D modeling for determination of SSLs and PRGs.
- To convey ROD changes, a memo will be prepared for the post-ROD site file. Buelow indicated that she had done this before and will be contacted for an example format and content.
- Post-ROD CVPs will require correction. An ECF (for each OU) will be prepared to document the evaluations. Logistics of how the change will be handled and the vehicle to convey it will need to be worked out with Washington Closure Hanford and U.S. Department of Energy-Richland Operations Office. A meeting will be arranged to determine how best to do this, and appropriate documentation will be prepared. Neath – How many changes do you want to sign off on? Batch processing? Need to encompass all those that were incorrectly evaluated in the RI/FS in one batch.
- 100-D/H PP will require a revised footnote to clarify use of the cleanup value and calculation for each waste site. Washington State Department of Ecology (Ecology) will be briefed on the clarification.
- Burke – Proposed footnotes and text language need to be finalized and sent for review and approval.
- Laura – When are you talking to Ben about this? Burke – Time not yet set for that. Neath – Perhaps Monday?
- Neath – Does Ecology need to be involved in discussion for 100-D/H modification?
- Cline – Burke needs to send presentation to John with changes to make 300 Area specific (footnote needs to include uranium as an exception).
- Meeting was adjourned.

100-F/IU Soil Cleanup Levels for Protection of Groundwater and Surface Water

ch2m:

February 18, 2016

U.S. DEPARTMENT OF ENERGY

Today's discussion topics

1. Background
2. Results of reevaluation of waste sites for 100-F/IU using the unit length basis for cleanup values
3. Suggested Path Forward – Document revisions

ROD Table 6. Soil Cleanup Levels for Protection of Groundwater and Surface Water

Media: Soil and Debris
Site Area: 100-FR-1, 100-FR-2, 100-IU-2, and 100-IU-6 OUs

Contaminant of Concern	Soil Cleanup Levels for Protection of Groundwater and Surface Water (Ground Surface to Water Table)		
	100-FR-1 and 100-FR-2	100-IU-2	100-IU-6
Radionuclides (pCi/g)			
Cesium-137	—	—	—
Cobalt-60	—	—	—
Europium-152	—	—	—
Europium-154	—	—	—
Nickel-63	—	—	—
Strontium-90	**24,600**	**64,200**	**104,000**
Chemicals (mg/kg)			
Arsenic	—	—	—
Hexavalent Chromium	2.0	2.0	2.0
Lead	—	—	—
Mercury	—	—	—
Nitrate	**1,790**	**6,360**	**11,300**
Aroclor 1254	—	—	—
Aroclor 1260	—	—	—
Benzo(a)pyrene	—	—	—
TPH–Diesel Range	2,000	2,000	2,000
TPH–Motor Oil (High Boiling)	2,000	2,000	2,000

TPH = total petroleum hydrocarbon
Note: Basis for soil cleanup level for groundwater and surface water protection is the soil leach model in the 100-F/IU RI/FS.

Units should have reflected per meter of waste site parallel to GW flow

Impacted Values

Footnote should have been clearer and provided text on unit length basis

Background

- Two OUs impacted by this issue -- 300-Area and 100-F/IU
- Sr-90 and Nitrate Soil Cleanup Levels in the ROD for Protection of Groundwater and Surface Water in 100-F/IU are based on a 1-m waste site length that is parallel to groundwater flow.
  - Some contaminants have GWP values set by policy and are not impacted: Arsenic, TPH, Cr+6,
- This unit length basis was not footnoted in the table of Cleanup Values described in the PP, ROD or RDR/RA Work Plan.
- Footnotes and information did not propagate from the RI/FS into PP, ROD, and RD/RA WPs
- When properly applied each waste site would calculate a cleanup value specific to that site
- The missing footnotes was discovered on February 8, 2016, during the preparation of the 100-BC RI/FS.

Impacted Documents

- Soil Screening Values (SSLs) and PRG Calculation: ECF Hanford-12-0004 – change is needed for clarity
- Comparison of Waste Sites EPCs to GWP/SWP SSLs and PRGs: ECF-100FR1-11-0085 and ECF-100FR1-11-0086 – comparison needs to be corrected to take into account waste sites (decision units) dimensions
- RI/FS, ROD, PP, RD/RA Work Plan and RSVPs

Reevaluation of Waste Sites for 100-F/IU

- Sites Evaluated in the RI/FS:
  - Initial evaluation complete; no changes to any conclusions in the RI/FS. Documentation can be provided by issuing a revision to ECF-100FR1-11-0085 and 86.
- Sites evaluated post ROD
  - Initial evaluation complete for RSVPs; no changes to any waste site conclusions. Documentation can be provided by issuing an addendum to the RSVP.

Initial evaluations indicate previous decisions stand and will undergo documentation and review

Suggested Path Forward – Document Revisions

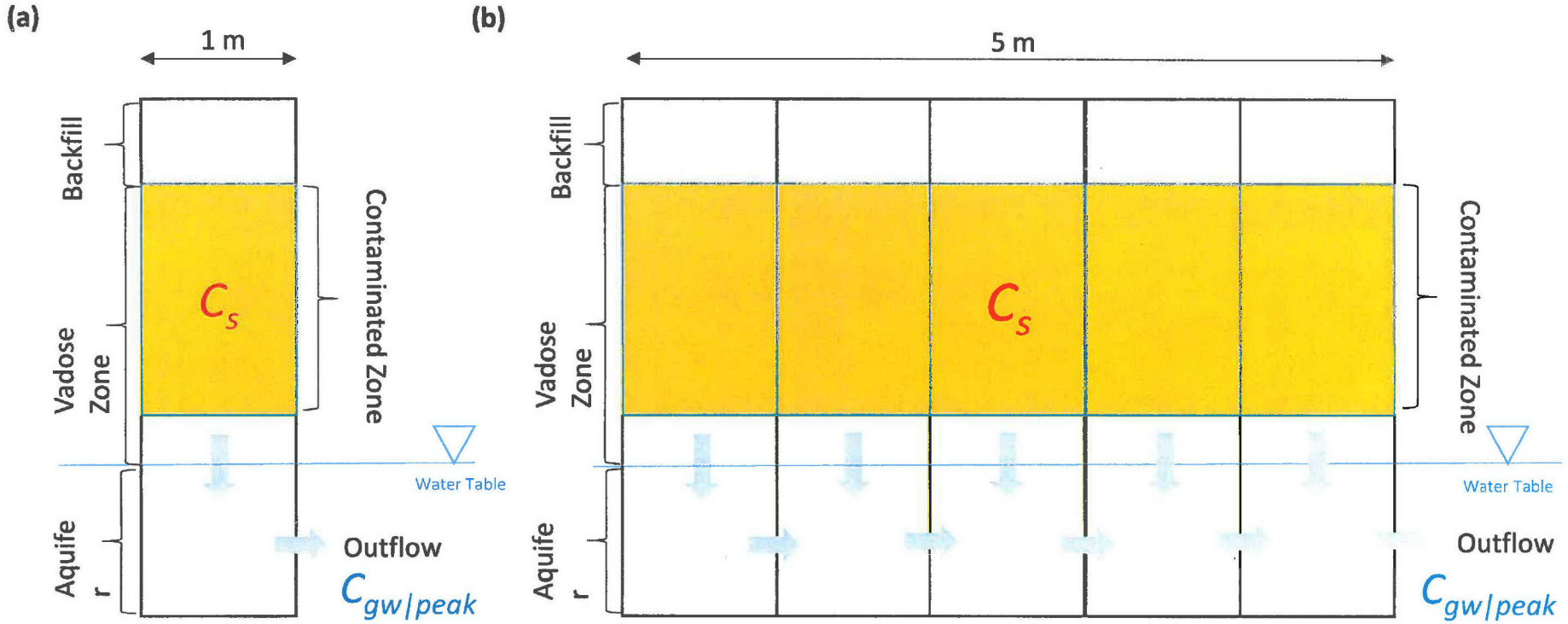
- Document the re-evaluation of Pre- and Post-ROD waste sites for 100-F/IU.
- EPA Guidance (attached) has been reviewed and the correction to the Cleanup value table could fall into one of two categories:
  - **Non-Significant Post-ROD Change**—Recommended approach if the re-evaluation concludes that there is no significant impact on the scope, performance, or cost of the remedy. Modification to the functional specifications of the remedy are handled through a memo to Post-ROD site file, or
  - **Significant Post-ROD Change**—invoives a change to a component of a remedy that does not fundamentally alter the overall cleanup approach. Significant change is handled through an ESD.
- It is recommended that this change be considered non-significant and prepare appropriate documentation for 100-F/IU
  - ROD, and RD/RAWP site file – add footnote to cleanup levels in the ROD; add footnote and text to the RD/RA WP to explain how the cleanup levels should be used.
  - RI/FS: issue change notice with revised ECFs, text and tables.
  - RSVPs: issue change notice with revised text and tables
- Documents currently underway would provide footnotes and detailed explanation of use and calculation of values. (100-DH PP, 100-N RI/FS, 100-BC RI/FS)

Suggested Footnote Language

Soil cleanup levels protective of groundwater and protective of surface water are provided on a unit-length basis. To apply these soil cleanup levels, divide the listed value by a representative length across the waste site decision unit in the general direction of groundwater flow to obtain the cleanup value for evaluation use. (Note that this scaling is not applicable to soil cleanup levels for arsenic, hexavalent chromium, or TPH-diesel.)

Units on tables will also be clarified and revised.

Additional clarifying language will be placed in the RI/FS and RD/RA Work Plan on the proper use of the calculation.



Assume:
C_s = 1 mg/kg
$C_{gw|peak}$ = 1 mg/L
WQS = 1 mg/L
Then SSL = 1 mg/kg

$$SSL_{unit-length} = C_s \frac{WQS}{C_{gw|peak}}$$

Then for the full 5-m site:
C_s = 1 mg/kg
$C_{gw|peak}$ = 5 mg/L
WQS = 1 mg/L
Then SSL = 0.2 mg/kg

7.0 DOCUMENTING POST-ROD CHANGES: MINOR CHANGES, EXPLANATIONS OF SIGNIFICANT DIFFERENCES, AND ROD AMENDMENTS[1]

7.1 EVALUATING POST-RECORD OF DECISION INFORMATION

After a ROD is signed, new information may be received or generated that could affect the implementation of the remedy selected in the ROD, or could prompt the reassessment of that remedy.[1] The information could be identified at any time during, immediately prior to, or after the implementation of the remedy. Where information is submitted by a PRP, the public, or the support agency after a ROD is signed, the lead agency must consider and respond to this information and place such comments and responses in the Administrative Record file when *all* of the following criteria are met (per NCP §300.825(c)):

- Comments contain significant information;
- The new information is not contained elsewhere in the Administrative Record file;
- The new information could not have been submitted during the public comment period; and
- The new information substantially supports the need to significantly alter the response action.

The lead agency also may evaluate whether a remedy change is warranted on its own merits, even where the requirements of NCP §300.825(c) are not triggered.[2]

7.2 TYPES OF POST-RECORD OF DECISION CHANGES

The lead agency's categorization of a post-ROD change to the Selected Remedy is a site-specific determination and must consider the following as set out in NCP §300.435(c)(2).

- *Scope.* Does the change alter the scope of the remedy (*e.g.*, type of treatment or containment technology, the physical area of the response, remediation goals to be achieved, type and volume of wastes to be addressed)?
- *Performance.* Would the change alter the performance (*e.g.*, treatment levels to be attained, long-term reliability of the remedy)?
- *Cost.* Are there significant changes in costs from estimates in the ROD, taking into account the recognized uncertainties associated with the hazardous waste engineering process selected? (Feasibility Study cost estimates are expected to provide an accuracy of +50 percent to -30 percent.)

Based on this evaluation, and depending on the extent or scope of modification being considered, the lead agency must make a determination as to the type of change involved (*i.e.*, nonsignificant or minor, significant, or fundamental change). Remedy changes should fall along a continuum from minor to fundamental. Similarly, an aggregate of nonsignificant or significant changes could result in a fundamental change.

Post-ROD changes fit into one of the three following categories:

- *Nonsignificant or Minor Changes* usually arise during design and construction, when modifications are made to the functional specifications of the remedy to address issues such as performance optimization, new technical informa-

[1] It is EPA's policy to encourage appropriate remedy changes in response to advances in remediation science and technology (*Superfund Reforms: Updating Remedy Decisions,* (EPA 540-F-96-026, September 1996).

[2] Responding to post-ROD comments submitted by PRPs, the public, or the support agency may only require a general overview of the comments and a simple EPA response if no change to the remedy is involved or the change is minor (see *Answers to Comments Submitted After the Superfund ROD Is Signed,* EPA memorandum, October 11, 1995, http://es.epa.gov/oeca/osre/951011. html). However, a formal public comment period may be conducted depending upon whether the change is significant or fundamental (for definitions of these types of changes see Section 7.2).

tion, support agency/community concerns and/or cost minimization (*e.g.*, value engineering process). Such changes may affect things such as the type or cost of materials, equipment, facilities, services, and supplies used to implement the remedy. The change will not have a significant impact on the scope, performance or cost of the remedy.

- *Significant Changes* generally involve a change to a component of a remedy that does not fundamentally alter the overall cleanup approach.
- *Fundamental Changes* involve an appreciable change or changes in the scope, performance, and/or cost or may be a number of significant changes that together have the effect of a fundamentalchange. An example of a fundamental change is one that results in a reconsideration of the overall waste management approach selected in the original ROD.

Highlight 7-1 provides examples of post-ROD changes. (See also NCP preamble, 55 *FR* 8772 for more information.) Please note that the examples presented in Highlight 7-1 are not meant to present strict thresholds for changes in cost, volume, or time.

7.3 DOCUMENTING POST-RECORD OF DECISION CHANGES

The type of documentation required for a post-ROD change depends on the nature of the change. Changes that significantly or fundamentally affect the remedy selected in the ROD will require more explanation and/or opportunity for public comment than those that do not. Each type of post-ROD change is associated with one of three documentation procedures: (1) a memo or note to the post-ROD file for an insignificant or minor change; (2) an explanation of significant differences (ESD) for a significant change, and (3) a ROD amendment for a fundamental change. Sample outlines for ESDs and ROD Amendments are provided in Highlight 7-2.

7.3.1 Documenting Non-Significant (or Minor) Post-ROD Changes: Memo to the Site File

Any non-significant or minor changes should be recorded in the post-ROD site file (*e.g.*, the RD/RA case file). If the lead agency chooses, non-significant changes can also be documented for the public in a Remedial Design Fact Sheet. Although not legally required, a written statement describing the change is generally recommended (See "*Answers to Comments Submitted After the Superfund ROD is Signed*," EPA memorandum, October 11, 1995, http://es.epa.gov/oeca/osre/951011. html).

7.3.2 Documenting Significant Post-ROD Changes: Explanation of Significant Differences

When documenting significant changes made to a remedy, the lead agency must comply with CERCLA §117(c) and NCP §§300.435(c)(2)(i) and 300.825(a)(2). An ESD must describe to the public the nature of the significant changes, summarize the information that led to making the changes, and affirm that the revised remedy complies with the NCP and the statutory requirements of CERCLA.

To describe the nature of the significant changes, it is suggested that a side-by-side comparison of the original and proposed remedy components be used to clearly display the significant differences.

The ESD should provide additional information on changes that have resulted in the remedy as a result of the change (*e.g.*, changes in the cleanup cost estimate or remediation time frame). Generally, a new nine-criteria analysis is not required; however, the ESD should include a statement that the ROD remains protective and continues to meet ARARs (NCP §§300.430(f)(1)(ii)(B)(1) and (2)).[3] It is also generally appropriate to prepare an ESD document when the lead agency decides to exercise a contingency remedy that was previously described in the ROD (see Section 8.3).

While the ESD is being prepared and made available to the public, the lead agency may proceed with the pre-design, design, construction, or operation activities associated with the remedy. The lead agency

[3] An ESD does not generally reopen consideration of ARARs for the remedy since an ESD does not fundamentally change the remedy. However, if an ESD results in the addition of any new components to the remedy, any ARARs that apply to the change that the ESD describes must be discussed and met or waived. For example, if any ARARs apply to an ESD change which adds stabilization of residuals to a thermal treatment remedy, they must be discussed in the ESD and met or waived.

Highlight 7-1: Examples of Post-Record of Decision Changes

(NOTE: Examples are not meant to present strict thresholds for changes in cost, volume, or time.)

Minor Changes

- **Small Increase in Volume:** Remedial design testing shows that the volume of soil requiring treatment is 75,000 cubic yards rather than the 60,000 estimated in the ROD, but the estimated cost of the overall remedy will only increase by a small percentage.

- **Disposal Location:** During remedial design, it is discovered that it is not feasible to construct the on-site landfill (which is part of the Selected Remedy) in the location specified in the ROD. However, another similar location at the site is suitable for a landfill, and this location is chosen.

- **Ground-Water Monitoring:** The Selected Remedy calls for long-term pump and treat of contaminated ground water with monitoring on a quarterly basis. After a period of time, a determination is made that no significant change in data quality or monitoring effectiveness will occur if monitoring contaminant levels in the ground water is less frequent. Ground-water monitoring is changed to semi-annual sampling.

Significant Changes

- **Large Increase in Volume/ Cost Increase:** Sampling during the remedial design phase indicates the need to significantly increase the volume of contaminated waste material to be incinerated in order to meet selected cleanup levels, thereby substantially increasing the estimated cost of the remedy.

- **Disposal Location:** The lead agency determines that it is not feasible to construct an on-site landfill for treated waste in accordance with the remedy selected in the ROD. The treated wastes must be sent to an off-site landfill. Although the overall management approach for the treated waste (landfill disposal) will remain the same, the costs and implementation time will increase significantly.

- **Contingency Remedy:** As part of an active ground-water pump and treat system, contaminant concentrations decrease to an asymptotic level which is close to attainment of the cleanup level. Investigation shows that adding additional wells to pump and treat ground water will not improve the performance of the remedy in attaining the cleanup level. The ROD included contingency language that the pump and treat remedy would continue operating until contaminant levels were reduced by at least 90%. At such time, monitored natural attenuation would be relied upon to attain the cleanup levels specified in the ROD (if performance monitoring data indicated that this would be an effective method of achieving the final cleanup levels). A decision is made to implement the contingency, thus changing the remedy from pump and treat to monitored natural attenuation. This represents a significant change in achieving the cleanup levels at the site.

- **New ARAR Promulgated (Impacts on Cleanup Levels and Other Parameters):** The lead agency determines that the attainment of a newly promulgated requirement is necessary, based on new scientific evidence, because the existing ARAR is no longer protective. Although this new requirement will significantly change the remedy (*i.e.*, cleanup level, timing, volume, or cost), it will not fundamentally alter the remedy specified in the ROD (*i.e.*, the selected technology will not change) and it will not impact the level of protection (*i.e.*, risk reduction) that the remedy will provide.

- **Land Use:** During remedial design, the local zoning board decides to change the current land use from residential to commercial. Although this new requirement will significantly change features of the remedy (*i.e.*, determination of principal or low level threats, reasonable risk scenarios, appropriate cleanup levels), it will not fundamentally alter the remedy specified in the ROD (*e.g.*, the selected technology will not change).

- **Secondary Technology:** The lead agency decides to use a biological treatment method instead of air stripping (which was specified in the ROD) for ex-situ treatment of extracted ground water. The basic pump and treat approach remains unaltered and the cleanup level specified in the ROD will be met by the alternate technology; the change is significant, but not fundamental. [See *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites* (EPA 540-R-96-023, October 1996).]

Highlight 7-1: Examples of Post-Record of Decision Changes (continued)

- **Institutional Controls:** During a five-year review, the lead agency reviews institutional control measures implemented at the site and determines that additional measures, that differ significantly from what was described in the ROD, are necessary to be protective (*e.g.*, need for an easement to replace a deed notice).

- **Change in ARARs:** At a five-year review, it is determined that a cleanup level is not consistent with an updated State cleanup standard, and thus is not protective and needs to be modified. This change will not cause a fundamental change in the volume of waste to be remediated.

Fundamental Changes

- **Change Primary Treatment Method:** The in-situ soil washing remedy selected in the ROD proves to be infeasible to implement after testing during remedial design. A decision is made to fundamentally change the remedy to excavate and thermally treat the waste.

- **Change Primary Treatment Method with Cost Increase:** Additional information obtained during remedial design testing demonstrates that the Selected Remedy for ground water, monitored natural attenuation, will not meet cleanup levels, as had been originally predicted in the RI/FS. The lead agency decides to fundamentally change the remedy from monitored natural attenuation to pump and treat. The estimated cost of the cleanup increases significantly.

- **Change Primary Treatment Method with Cost Decrease:** Pump and treat is the Selected Remedy for ground water. Prior to construction of a pump and treat system, interested parties collect and present ground-water information to the lead agency showing that contaminant concentrations are decreasing due to natural processes (*e.g.*, biodegradation, dilution, adsorption, dispersion). Modeling indicates that monitored natural attenuation will achieve cleanup levels in a time frame comparable to pump and treat at substantially less cost.

- **Change from Containment to Treatment with Cost Increase:** At a five-year review for a small industrial site, tests indicate that the containment remedy will not be protective and now a more active response approach (*e.g.*, treatment) is necessary. A new remedy must be selected that will meet protectiveness requirements, resulting in unanticipated costs for the site.

- **Technical Impracticability Waiver:** While implementing an active pump and treat remedy, the presence of DNAPL is discovered. A determination is made to invoke a Technical Impracticability Waiver of the ARAR because treatment of the DNAPL zone is impracticable from an engineering perspective. Rather than treat the source material (DNAPL) a decision is made to implement a containment approach (*e.g.*, slurry wall) for the DNAPL zone. Pump and treat will continue outside the containment zone. As a result, the scope, performance, and cost of the original remedy is fundamentally changed.

- **Community Preference:** The original remedy selected in the ROD was on-site incineration of contaminated soils with estimated costs of $50 million. The community opposes the building of an incinerator and requests that an alternate remedy be selected. New information received after the ROD was signed demonstrates that thermal desorption can meet the cleanup goals in a reasonable time frame for less cost with no loss in protection. This change is based on the community's preference for an alternative to the original Selected Remedy.

- **Volume Decrease Changes Primary Treatment Method:** The Selected Remedy called for treatment by lead recovery and recycling of lead contaminated materials. Additional investigation in design showed the volume of waste to be smaller than originally presumed. The decrease in volume made recycling uneconomical. The amended remedy calls for treatment and containment such that waste is stabilized and consolidated in a lined and capped on-site containment facility. The scope of the new remedy is more efficient, is cost-effective, and is supported by the State and the community.

should consult with the support agency, as appropriate, before issuing an ESD (NCP §300.435(c)(2)). Although not specifically required by CERCLA §121(f) and NCP §300.435(c)(2)(i), it is also recommended that the lead agency provide the support agency the opportunity to comment, and summarize the support agency's comments in the ESD. The lead agency also must publish a notice of availability and a brief description of the ESD in a major local newspaper of general circulation (as required by NCP §300.435(c)(2)(i)(B)). The ESD must be made available to the public by placing it in the Administrative Record file and information repository (NCP §§300.435(c)(2)(i)(A) and 300.825(a)(2)). A formal public comment periodis *not* required when issuing an ESD.

In some cases, an additional public comment period or public meeting may be held voluntarily on a planned ESD (NCP §300.825(b)). This may be useful where there is considerable public or PRP interest in the matter. The Office of Emergency and Remedial Response (OERR) recommends issuing the ESD in a fact sheet format as outlined in Highlight 7-2. The Regional Administrator (or their designee) must sign an ESD. In such cases it may be appropriate to delay implementation of the remedy relating to the ESD to allow a consideration of possible concerns.

7.3.3 Documenting Fundamental Post-ROD Changes: ROD Amendment

When a fundamental change is made to the basic features of the remedy selected in a ROD with respect to scope, performance, or cost, the lead agency is required to develop and document the change consistent with the ROD process (NCP §§300.435(c)(2)(ii)(A) through (H)). This entails the issuance of a revised Proposed Plan that highlights the proposed changes. An amended ROD that documents the change follows the Proposed Plan. The portion of the ROD being amended is evaluated using the nine criteria, focusing on those central to the rationale for the Selected Remedy.

In general, the introductory sections of the ROD do not need to be readdressed in the ROD Amendment but may be referenced from the previous ROD. The focus of the amendment should be to document the rationale for the amendment and provide assurances that the proposed remedy satisfies the statutory requirements. This is accomplished through an evaluation, utilizing the nine criteria, of the portion of the remedy being changed.

To describe the nature of the changes, it is suggested that a side-by-side comparison of the original and proposed remedy components be used to clearly display the differences.

The information included in a ROD Amendment is a function of the type of change made and the rationale for that change. If the amended ROD addresses the entire response action for the site or a series of operable units (*e.g.*, soil, surface water, ground water), only the portion of the remedy that is being changed (*e.g.*,ground water) requires an amendment. For the portion of the ROD being amended, a new nine-criteria analysis, including a new ARARs analysis, will be necessary (see NCP §300.430(f)(1)(ii)(B)(2)). Portions of the analysis in the original ROD can be cross-referenced, where appropriate. RD/RA activities being conducted on other portions of the site or at operable units not proposed for changes may continue during the amendment process.

When fundamental changes are proposed to the ROD, the lead agency must conduct the public participation and documentation procedures specified in NCP §§300.435(c)(2)(ii) and 300.825(a)(2). This would include issuing a revised Proposed Plan that highlights the proposed changes. The format should follow that of the Proposed Plan described in Chapter 3. The final decision to amend is not made until after consideration of public comment (NCP §300.435(c)(2)(ii)).

If a fundamental change is made after a consent decree has been entered at an enforcement-lead site, the decree may need to be modified to conform to the amended ROD, and perhaps involve the Department of Justice or the Court. RPMs should check with their Regional Counsel on how this may be accomplished.

ROD Amendments, like RODs, must be signed by the Regional Administrator (or their designee). A recommended outline and checklist can be found in Highlight 7-2.

7.4 HEADQUARTERS REVIEW AND FILING OF DECISION CHANGES

Draft ESDs and ROD Amendments (including revised Proposed Plans) should be submitted to EPA Headquarters for review and comment pursuant to *Focus Areas for Headquarters OERR Support for Regional Decision Making* (OSWER 9200.1-17, May 22, 1996). In the event that the remedy change meets the criteria for review by the National Remedy Review Board, the appropriate consultation procedures should be followed. For more information on the National Remedy Review Board, see http://www.epa. gov/superfund/programs/nrrb/index.htm. See also Appendix C, *Consolidated Guide to ConsultationProcedures for Superfund Response Decisions* (EPA 540-F-97-009, May 1997).

A copy of a signed final ESD or ROD Amendment should be submitted within 30 days of signature to the following Headquarters office:

ROD Clearinghouse
Superfund Document Center
U.S. EPA Mail Code 5202G
401 M Street, SW
Washington, DC 20460

Please refer to Appendix D for guidance on submitting decision documents to EPA Headquarters.

Highlight 7-2: Sample Outline and Checklist for ESDs and ROD Amendments

Component	Explanation of Significant Differences	ROD Amendment
Introduction to the Site and Statement of Purpose	• Site name and location. • Identification of lead and support agencies. • Citation of CERCLA §117(c) and NCP §300.435(c)(2)(i). • Include date of ROD signature. • Summary of circumstances that led to the need for an ESD. • Statement that ESD will become part of Administrative Record file (NCP 300.825(a)(2)). • Address of location where the file is available and hours of availability.	• Site name and location. • Identification of lead and support agencies • Citation of CERCLA §117 and NCP §300.435(c)(2)(ii). • Include date of original ROD signature. • Summary of circumstances that led to the need for a ROD Amendment. • Statement that ROD Amendment will become part of Administrative Record file (NCP 300.825(a)(2)). • Address of location where the file is available and hours of availability.
Site History, Contamination, and Selected Remedy	• Brief summary of contamination problems and site history. • Present the Selected Remedy, as originally described in the ROD.	• Brief summary of contamination problems and site history. • Present the Selected Remedy, as originally described in the ROD.
Basis for the Document	• Summarize information that prompted and supports significant differences from the Selected Remedy, including the results of the treatability studies or other information developed or provided during the remedial design process. • Reference any information in the Administrative Record file that supports the need for the change.	• Summarize the information that prompted and supports fundamentally changing the remedy selected in the ROD, including the results of treatability studies or other information developed or provided during the remedial design process that supports the amendment. • Reference any information in the Administrative Record file that supports the need for the amendment.

Description of Significant Differences or New Alternatives	• Describe the significant differences between the remedy as presented in the ROD and the action now proposed, highlighting scope, performance, and cost.
	• Describe any changes in Expected Outcomes that will result from the ESD (e.g., change in time to achieve cleanup objectives).
		• Describe original Selected Remedy and new proposed remedy in the same manner as in a standard ROD, highlighting the following:
		  ◦ Treatment components.
		  ◦ Containment or storage components.
		  ◦ Institutional Control components.
		  ◦ Key ARARs.
		• Explain how the change will affect the Remedial Action Objectives for the site.
		• Describe any changes in Expected Outcomes that will result from the ROD Amendment (e.g., change in land use, change in cleanup levels).

Evaluation of Alternatives	Not Applicable to ESDs.	• Use the nine criteria to compare the original and the new proposed remedies.
Support Agency Comments	• Include a summary of support agency comments on the ESD.	• Include a summary of support agency comments on the ROD Amendment.
Statutory Determinations	• State that the modified remedy satisfies CERCLA §121.	• State that the modified remedy satisfies CERCLA §121.
Public Participation Compliance	• Document that the public participation requirements set out in NCP §300.435(c)(2)(i) have been met.	• Document that the public participation requirements set out in NCP §300.435(c)(2)(ii) have been met.

Attachment 7

Meeting Notes

Meeting: *Soil Surface and Groundwater Protection Levels for 300 Area*

Where: Federal Building, CR 686

When: 19 February 2016

Attendees:

Facilitator – Phil Burke

Notes – Will Nichols

DOE-RL – John Neath, John Sands

EPA – Chris Guzzetti (by teleconference), Ben Simes (by teleconference)

CHPRC – Alaa Aly, Pat Baynes, Phil Burke, Will Nichols

1 Background

The purpose of this meeting was to discuss clarifications required to the 300 Area *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) documents pertaining to soil screening levels (SSLs), preliminary remediation goals (PRGs), and cleanup values and the path forward to document the required changes. Footnotes and explanatory text for select values were either missing or lacked sufficient detail. As a result, values were misapplied in the evaluation of waste sites (decision units). Presentations explained the development of cleanup values, proper application of the values, environmental calculation files (ECFs) where the calculations were documented, and the clarifications needed as tables progressed from the ECF o the remedial investigation (RI)/feasibility study (FS), proposed plan (PP), record of decision (ROD) and remedial design/remedial action work plan (RD/RAWP). An initial re-evaluation was performed, applying the correct method of cleanup value comparisons, and results indicate that there are no changes to conclusions made in the RI/FSs, decisions made in the RODs, or waste sites that have been remediated post-ROD. ROD guidance for post-ROD changes was presented along with options to handle this change. Based on the change criteria, a recommendation was made to consider this ROD change as Non-Significant. Other CERCLA documents will result in changes described in the following sections.

2 Objective

Soil cleanup levels (CULs) for protection of groundwater and surface water at the 300 Area were discussed.

2.1 Discussion Points

Introduction: Burke

Problem statement: CULs provided were per-unit-length in direction of groundwater flow, but the footnote provided did not explain this adequately, and the units specified for the CUL didn't reflect the dimensional basis adequately.

Background: Burke

- Two operable units (OUs) are impacted; 100-F/IU and 300 Area. Covered 100-F/IU yesterday with Chris and Laura.
- CULs for protection of 300 Area surface water and groundwater are impacted by this issue.
- How was this issue discovered? PRC was meeting with U.S. Department of Energy-Richland Operations Office (DOE-RL) and going through the 100-BC RI/FS and questioned the small PRG value for strontium; learned at this time that comparison value was scaled for this decision unit and recognized the potential impacts to the other OUs.
- Nichols provided explanation using slide at end of presentation of simplified model diagrams to illustrate the model construction and how dimensionality enters into CULs.
- Aly discussed:
  - The calculation of PRGs was correct, but the language definitely could be improved upon that explains the use of the derived CULs. However, there was an error in the application of the CULs to compare with measured soil concentrations because of the scaling by waste site distances.
  - RI/FS Chapter 5 language is there but is not clear.
  - RI/FS Chapter 8 footnotes did not have required detail.
  - Through the ROD and RD/RAWP, this information was lost; it would have been good to have added a couple of pages to explain how to apply these values for verification of cleanup.
  - After re-evaluation of all waste sites with the dimensional consideration, no waste sites were found to change disposition. Neath – Documentation to demonstrate this will be produced.
  - More than 40 waste sites were evaluated after the ROD and because the dimensional comparison basis was not explained, these needed to be re-evaluated. This has been done for all sites, and no changes in disposition are made.
  - Some waste sites are evaluated against residential standards and industrial standards; some sites exceeded residential but not industrial.
  - Simes – Do CULs change?
  - Aly – No, it's only how they are applied that changes.
  - Burke – Good news is that while a mistake was made on the application and footnote, there are no changes to the conclusions.
  - Simes – Is the exposure point concentration (EPC) scaled? Nichols – No, scaling is only done on the CUL; then, the scaled CUL is compared to the EPC.
  - Aly clarified that this doesn't apply to uranium CULs because those were developed with a site-specific multidimensional model that already accounts for dimensionality.

Impacts Discussion:

- Simes – Question of significant or nonsignificant change; is this something the public needed to see and comment on in the ROD? Neath pointed out this method results in an even more stringent (lower) standard and would be hard for the public to argue.
- Guzzetti – This is something difficult to explain to the public. Most important thing is to document the re-evaluation. The biggest change needs to take place in the RD/RAWP to ensure that scaling is done correctly. Don't see a need to go back and change the PPs.
- Simes – Technical memorandum could be included for the 300 Area, just to amplify this is part of the ROD. The sampling and analysis plan (SAP) needs to include language with this.
- Aly – SAP doesn't typically get into details of how this is done, but it can be evaluated. RD/RAWP definitely does.
- Guzzetti – Looking at slide 8 again.
- Burke – ECFs would be revised to document the re-evaluation.
- Neath – New signatures will be obtained for final closure to document that sites were acceptable after re-evaluation.
- Guzzetti – Change notice?
- Burke – Yes, that's the vehicle we would use for this.
- Guzzetti – ROD wouldn't change, just an added document?
- Simes – Document in a tech memo, which becomes part of the ROD.
- Burke – How do we proceed?
- Simes – I would like to document this in meeting minutes; definitely want to document this maybe in a brief presentation to the Unit Managers' Meeting (UMM).
- Neath – Could be entered into the minutes, maybe in an UMM executive session.
- Sands – Could just enter the minutes of the UMM.
- Neath – Plan is to document minutes for yesterday's and today's meetings and put them into the UMM meeting; Washington State Department of Ecology (Ecology) does not need to be involved.
- Simes – Does this impact Ecology's sites? Neath and Nichols – No, they will be briefed on this, but 100-D/H and 100-N were already evaluated correctly in this regard (dimensional consideration was applied correctly in those OUs).
- Burke – Is there agreement to proceed with this as a nonsignificant change? (Simes and Guzzetti concurred.)
- Simes – Will this approach will be applied hereafter? Yes.
- Key to treating this as nonsignificant is that no waste sites changes disposition.

- Simes – Changes are good; thanks to Chris for doing a prebrief on this yesterday.
- Simes and Guzzetti signed off.

Path Forward Discussion:

- Burke; to summarize
- Results of the meetings with U.S. Environmental Protection Agency will be documented through meeting minutes and provided to the UMM to include in their files to document the decisions and path forward for both OUs.
- RD/RAWP change notices will be prepared to convey the clarifications to the cleanup value tables and additional text provided to further explain the use of the values and method of calculation for each waste site.
- ECFs will be revised for each OU: one describes the comparison of the waste sites (decision units) to the Groundwater Protection/Surface Water Protection (GWP/SWP) SSLs, and the other one describes comparisons to PRGs.
- To convey the changes to the ROD, a memo will be prepared for the post-ROD site file. Buelow indicated that she had done this before and will be contacted for an example format and content.
- Post-ROD CVPs will require correction. An ECF (for each OU) will be prepared to document the evaluations. The logistics of how the change will be handled and the vehicle to convey it will need to be worked out with Washington Closure Hanford and DOE-RL. A meeting will be arranged to determine how best to do this, and appropriate documentation will be prepared.
- 100-D/H PP will require a revised footnote to clarify the use of the cleanup value and calculation for each waste site. Ecology will be briefed on the clarification.
- Burke – Proposed footnotes and text language; need to finalize and send for review and approval.
- Meeting was adjourned.


N
Route 4S
300 Area Process Trenches
North Process Pond
618-3
618-2
South Process Pond
618-1
325 Building
324 Building
Cypress St.
George Washington Way
300-Area Soil Cleanup Levels for Protection of Groundwater and Surface Water
June 1, 1976

Today's discussion topics

1. Background
2. Results of reevaluation of waste sites for 300-Area using the unit length basis for cleanup values
3. Suggested Path Forward – Document revisions

ROD Table 4. Soil Cleanup Levels for Protection of Groundwater and Surface Water

Table 4: Cleanup Levels for 300-FF-2 COCs – Soil, Structures and Debris							
Media: Soil, Structures and Debris Site Area: 300-FF-2 Controls to Ensure Restricted Use: Yes.							
Contaminant	Units	Residential Cleanup Areas Outside both the 300 Area Industrial Complex and 618-11			Industrial Cleanup Areas within the 300 Area Industrial Complex and 618-11		
		Shallow Zone <= 15 ft bgs Direct Exposure Human Health		Soil CUL for GW & River Prot. Surface to GW	Shallow Zone <= 15 ft bgs Direct Exposure Human Health		Soil CUL for GW & River Prot. Surface to GW
		CUL	Basis for CUL		CUL	Basis for CUL	
Americium-241	pCi/g	32	RA	--	210	RA	--
Cesium-137	pCi/g	4.4	RA	--	18	RA	--
Cobalt-60	pCi/g	1.4	RA	--	5.2	RA	--
Europium-152	pCi/g	3.3	RA	--	12	RA	--
Europium-154	pCi/g	3.0	RA	--	11	RA	--
Europium-155	pCi/g	129	RA	--	518	RA	--
Iodine-129	pCi/g	0.076	RA	12.8	1.940	RA	37.1
Plutonium-238	pCi/g	39	RA	--	155	RA	--
Plutonium-239/240	pCi/g	35	RA	--	245	RA	--
Plutonium-241	pCi/g	854	RA	--	12,900	RA	--
Technetium-99	pCi/g	1.5	RA	272	166,000	RA	420

Units should have reflected per meter of waste site parallel to GW flow

Sample Impacted Values

ROD Table 4. Soil Cleanup Levels for Protection of Groundwater and Surface Water (cont'd)

Total Petroleum Hydrocarbons – motor oil	mg/kg	2,000	MTCA-A	2,000	2,000	MTCA-C	2,000

bgs = below ground surface
CUL = cleanup level
GW = groundwater
CWA = Clean Water Act
Prot. = protection
RA = risk assessment
MTCA = Washington State's Model Toxics Control Act. MTCA-B is unrestricted. MTCA-C is industrial.
CULs basis for radionuclides is a cancer risk of $1x10^{-4}$ or 15 mrem/year dose whichever is more conservative. For uranium, 15 mrem/year is more conservative so that is the basis for the uranium isotopes total CUL. That total is divided among the individual uranium isotopes using the natural ratio of isotopes.
No uranium isotopes CUL is selected for groundwater and river protection because the DWS is used which is based on uranium metal.
CULs basis for chemicals is the more conservative of a hazard index of one or the cancer risk. The cancer risk is $1x10^{-6}$ for residential cleanup and $1x10^{-5}$ for industrial cleanup based on MTCA.
Basis for soil CUL for groundwater and river protection is the soil leach model in the RI.

Footnote should have been clearer and provided text on unit length basis

Background

- Two OUs impacted by this issue -- 300-Area and 100-F/IU
- Soil Cleanup Levels in the ROD for Protection of Groundwater and Surface Water in 100-F/IU are based on a 1-m waste site length that is parallel to groundwater flow.
  - Some contaminants have GWP values set by policy and are not impacted: Arsenic, TPH, Cr+6,
- This unit length basis was not footnoted in the table of Cleanup Values described in the PP, ROD or RDR/RA Work Plan.
- Footnotes and information did not propagate from the RI/FS into PP, ROD, and RD/RA WPs
- When properly applied each waste site would calculate a cleanup value specific to that site
- The missing footnotes was discovered on February 8, 2016, during the preparation of the 100-BC RI/FS.

Impacted Documents

- Soil Screening Values (SSLs) and PRG Calculation: ECF 300-NPL-11-0154 – change is needed for clarity
- Comparison of Waste Sites EPCs to GWP/SWP SSLs and PRGs: ECF 300-NPL-11-0155 needs to be corrected to take into account waste sites (decision units) dimensions
- RI/FS, ROD, PP, RD/RA Work Plan and RSVPs

Reevaluation of Waste Sites for 300-Area

- Sites Evaluated in the RI/FS:
  - Initial evaluation complete; no changes to any conclusions in the RI/FS. Documentation can be provided by issuing a revision to ECF 300-NPL-11-0154 and 55.
- Sites evaluated post ROD
  - Initial evaluation complete for RSVPs; no changes to any waste site conclusions. Documentation can be provided by issuing an addendum to the RSVP.

Initial evaluations indicate previous decisions stand and will undergo documentation and review

Suggested Path Forward – Document Revisions

- Document the re-evaluation of Pre- and Post-ROD waste sites for 300-Area.
- EPA Guidance (attached) has been reviewed and the correction to the Cleanup value table could fall into one of two categories:
  - **Non-Significant Post-ROD Change**—Recommended approach if the re-evaluation concludes that there is no significant impact on the scope, performance, or cost of the remedy. Modification to the functional specifications of the remedy are handled through a memo to Post-ROD site file, or
  - **Significant Post-ROD Change**—involves a change to a component of a remedy that does not fundamentally alter the overall cleanup approach. Significant change is handled through an ESD.
- It is recommended that this change be considered non-significant and prepare appropriate documentation for 300-Area
  - ROD, and RD/RAWP site file – add footnote to cleanup levels in the ROD; add footnote and text to the RD/RA WP to explain how the cleanup levels should be used.
  - RI/FS: issue change notice with revised ECFs, text and tables.
  - RSVPs: issue change notice with revised text and tables
- Documents currently underway would provide footnotes and detailed explanation of use and calculation of values. (100-DH PP, 100-N RI/FS, 100-BC RI/FS)

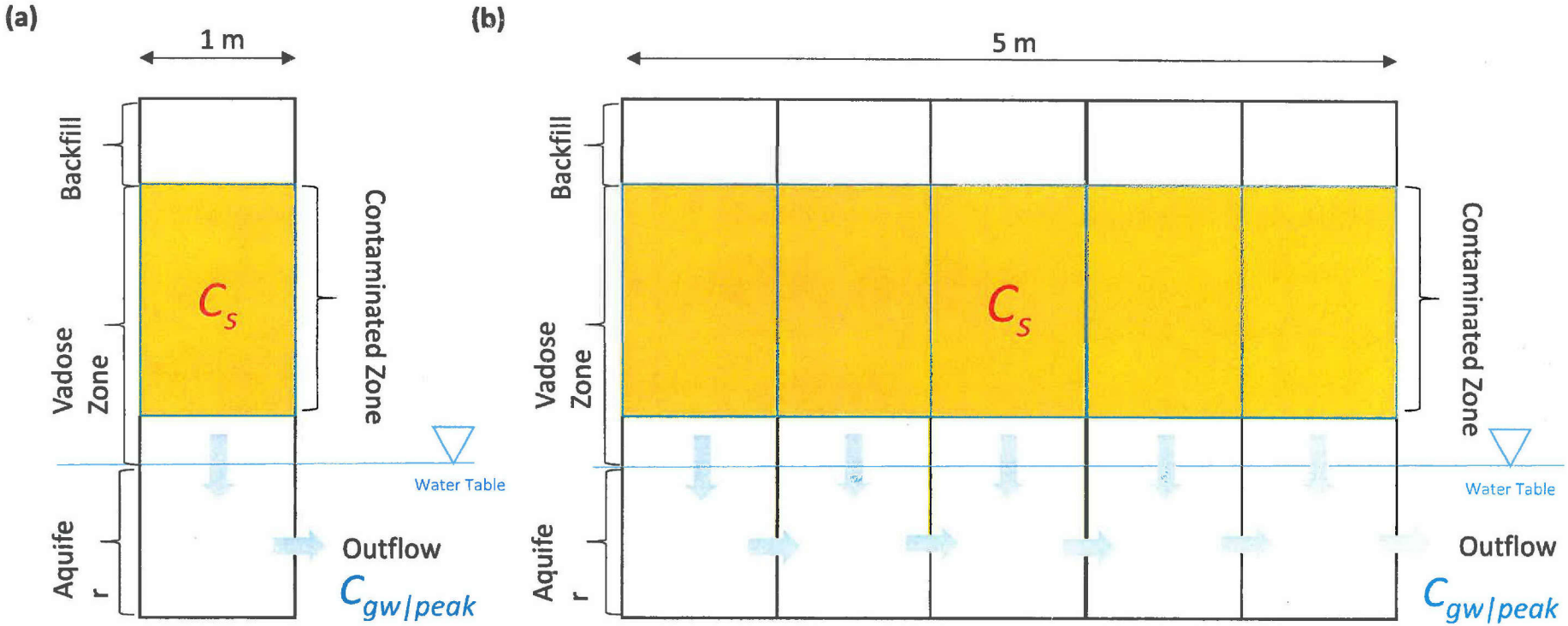
Suggested Footnote Language

Soil cleanup levels protective of groundwater and protective of surface water are provided on a unit-length basis. To apply these soil cleanup levels, divide the listed value by a representative length across the waste site decision unit in the general direction of groundwater flow to obtain the cleanup value for evaluation use. (Note that this scaling is not applicable to soil cleanup levels for uranium, arsenic, hexavalent chromium, or TPH-diesel.)

Units on tables will also be clarified and revised.

Additional clarifying language will be placed in the RI/FS and RD/RA Work Plan on the proper use of the calculation.

Example Application of the unit length basis for cleanup values



Assume:
C_s = 1 mg/kg
$C_{gw|peak}$ = 1 mg/L
WQS = 1 mg/L
Then SSL = 1 mg/kg

$$SSL_{unit-length} = C_s \frac{WQS}{C_{gw|peak}}$$

Then for the full 5-m site:
C_s = 1 mg/kg
$C_{gw|peak}$ = 5 mg/L
WQS = 1 mg/L
Then SSL = 0.2 mg/kg

7.0 DOCUMENTING POST-ROD CHANGES: MINOR CHANGES, EXPLANATIONS OF SIGNIFICANT DIFFERENCES, AND ROD AMENDMENTS[1]

7.1 EVALUATING POST-RECORD OF DECISION INFORMATION

After a ROD is signed, new information may be received or generated that could affect the implementation of the remedy selected in the ROD, or could prompt the reassessment of that remedy.[1] The information could be identified at any time during, immediately prior to, or after the implementation of the remedy. Where information is submitted by a PRP, the public, or the support agency after a ROD is signed, the lead agency must consider and respond to this information and place such comments and responses in the Administrative Record file when *all* of the following criteria are met (per NCP §300.825(c)):

- Comments contain significant information;
- The new information is not contained elsewhere in the Administrative Record file;
- The new information could not have been submitted during the public comment period; and
- The new information substantially supports the need to significantly alter the response action.

The lead agency also may evaluate whether a remedy change is warranted on its own merits, even where the requirements of NCP §300.825(c) are not triggered.[2]

7.2 TYPES OF POST-RECORD OF DECISION CHANGES

The lead agency's categorization of a post-ROD change to the Selected Remedy is a site-specific determination and must consider the following as set out in NCP §300.435(c)(2).

- *Scope.* Does the change alter the scope of the remedy (*e.g.*, type of treatment or containment technology, the physical area of the response, remediation goals to be achieved, type and volume of wastes to be addressed)?
- *Performance.* Would the change alter the performance (*e.g.*, treatment levels to be attained, long-term reliability of the remedy)?
- *Cost.* Are there significant changes in costs from estimates in the ROD, taking into account the recognized uncertainties associated with the hazardous waste engineering process selected? (Feasibility Study cost estimates are expected to provide an accuracy of +50 percent to -30 percent.)

Based on this evaluation, and depending on the extent or scope of modification being considered, the lead agency must make a determination as to the type of change involved (*i.e.*, nonsignificant or minor, significant, or fundamental change). Remedy changes should fall along a continuum from minor to fundamental. Similarly, an aggregate of nonsignificant or significant changes could result in a fundamental change.

Post-ROD changes fit into one of the three following categories:

- *Nonsignificant or Minor Changes* usually arise during design and construction, when modifications are made to the functional specifications of the remedy to address issues such as performance optimization, new technical informa-

[1] It is EPA's policy to encourage appropriate remedy changes in response to advances in remediation science and technology (*Superfund Reforms: Updating Remedy Decisions,* (EPA 540-F-96-026, September 1996).

[2] Responding to post-ROD comments submitted by PRPs, the public, or the support agency may only require a general overview of the comments and a simple EPA response if no change to the remedy is involved or the change is minor (see *Answers to Comments Submitted After the Superfund ROD Is Signed,* EPA memorandum, October 11, 1995, http://es.epa.gov/oeca/osre/951011. html). However, a formal public comment period may be conducted depending upon whether the change is significant or fundamental (for definitions of these types of changes see Section 7.2).

tion, support agency/community concerns and/or cost minimization (*e.g.*, value engineering process). Such changes may affect things such as the type or cost of materials, equipment, facilities, services, and supplies used to implement the remedy. The change will not have a significant impact on the scope, performance or cost of the remedy.

- *Significant Changes* generally involve a change to a component of a remedy that does not fundamentally alter the overall cleanup approach.

- *Fundamental Changes* involve an appreciable change or changes in the scope, performance, and/or cost or may be a number of significant changes that together have the effect of a fundamentalchange. An example of a fundamental change is one that results in a reconsideration of the overall waste management approach selected in the original ROD.

Highlight 7-1 provides examples of post-ROD changes. (See also NCP preamble, 55 *FR* 8772 for more information.) Please note that the examples presented in Highlight 7-1 are not meant to present strict thresholds for changes in cost, volume, or time.

7.3 DOCUMENTING POST-RECORD OF DECISION CHANGES

The type of documentation required for a post-ROD change depends on the nature of the change. Changes that significantly or fundamentally affect the remedy selected in the ROD will require more explanation and/or opportunity for public comment than those that do not. Each type of post-ROD change is associated with one of three documentation procedures: (1) a memo or note to the post-ROD file for an insignificant or minor change; (2) an explanation of significant differences (ESD) for a significant change, and (3) a ROD amendment for a fundamental change. Sample outlines for ESDs and ROD Amendments are provided in Highlight 7-2.

7.3.1 Documenting Non-Significant (or Minor) Post-ROD Changes: Memo to the Site File

Any non-significant or minor changes should be recorded in the post-ROD site file (*e.g.*, the RD/RA case file). If the lead agency chooses, non-significant changes can also be documented for the public in a Remedial Design Fact Sheet. Although not legally required, a written statement describing the change is generally recommended (See "*Answers to Comments Submitted After the Superfund ROD is Signed*," EPA memorandum, October 11, 1995, http://es.epa.gov/oeca/osre/951011.html).

7.3.2 Documenting Significant Post-ROD Changes: Explanation of Significant Differences

When documenting significant changes made to a remedy, the lead agency must comply with CERCLA §117(c) and NCP §§300.435(c)(2)(i) and 300.825(a)(2). An ESD must describe to the public the nature of the significant changes, summarize the information that led to making the changes, and affirm that the revised remedy complies with the NCP and the statutory requirements of CERCLA.

To describe the nature of the significant changes, it is suggested that a side-by-side comparison of the original and proposed remedy components be used to clearly display the significant differences.

The ESD should provide additional information on changes that have resulted in the remedy as a result of the change (*e.g.*, changes in the cleanup cost estimate or remediation time frame). Generally, a new nine-criteria analysis is not required; however, the ESD should include a statement that the ROD remains protective and continues to meet ARARs (NCP §§300.430(f)(1)(ii)(B)(1) and (2)).[3] It is also generally appropriate to prepare an ESD document when the lead agency decides to exercise a contingency remedy that was previously described in the ROD (see Section 8.3).

While the ESD is being prepared and made available to the public, the lead agency may proceed with the pre-design, design, construction, or operation activities associated with the remedy. The lead agency

[3] An ESD does not generally reopen consideration of ARARs for the remedy since an ESD does not fundamentally change the remedy. However, if an ESD results in the addition of any new components to the remedy, any ARARs that apply to the change that the ESD describes must be discussed and met or waived. For example, if any ARARs apply to an ESD change which adds stabilization of residuals to a thermal treatment remedy, they must be discussed in the ESD and met or waived.

Highlight 7-1: Examples of Post-Record of Decision Changes

(NOTE: Examples are not meant to present strict thresholds for changes in cost, volume, or time.)

Minor Changes

- **Small Increase in Volume:** Remedial design testing shows that the volume of soil requiring treatment is 75,000 cubic yards rather than the 60,000 estimated in the ROD, but the estimated cost of the overall remedy will only increase by a small percentage.

- **Disposal Location:** During remedial design, it is discovered that it is not feasible to construct the on-site landfill (which is part of the Selected Remedy) in the location specified in the ROD. However, another similar location at the site is suitable for a landfill, and this location is chosen.

- **Ground-Water Monitoring:** The Selected Remedy calls for long-term pump and treat of contaminated ground water with monitoring on a quarterly basis. After a period of time, a determination is made that no significant change in data quality or monitoring effectiveness will occur if monitoring contaminant levels in the ground water is less frequent. Ground-water monitoring is changed to semi-annual sampling.

Significant Changes

- **Large Increase in Volume/ Cost Increase:** Sampling during the remedial design phase indicates the need to significantly increase the volume of contaminated waste material to be incinerated in order to meet selected cleanup levels, thereby substantially increasing the estimated cost of the remedy.

- **Disposal Location:** The lead agency determines that it is not feasible to construct an on-site landfill for treated waste in accordance with the remedy selected in the ROD. The treated wastes must be sent to an off-site landfill. Although the overall management approach for the treated waste (landfill disposal) will remain the same, the costs and implementation time will increase significantly.

- **Contingency Remedy:** As part of an active ground-water pump and treat system, contaminant concentrations decrease to an asymptotic level which is close to attainment of the cleanup level. Investigation shows that adding additional wells to pump and treat ground water will not improve the performance of the remedy in attaining the cleanup level. The ROD included contingency language that the pump and treat remedy would continue operating until contaminant levels were reduced by at least 90%. At such time, monitored natural attenuation would be relied upon to attain the cleanup levels specified in the ROD (if performance monitoring data indicated that this would be an effective method of achieving the final cleanup levels). A decision is made to implement the contingency, thus changing the remedy from pump and treat to monitored natural attenuation. This represents a significant change in achieving the cleanup levels at the site.

- **New ARAR Promulgated (Impacts on Cleanup Levels and Other Parameters):** The lead agency determines that the attainment of a newly promulgated requirement is necessary, based on new scientific evidence, because the existing ARAR is no longer protective. Although this new requirement will significantly change the remedy (*i.e.*, cleanup level, timing, volume, or cost), it will not fundamentally alter the remedy specified in the ROD (*i.e.*, the selected technology will not change) and it will not impact the level of protection (*i.e.*, risk reduction) that the remedy will provide.

- **Land Use:** During remedial design, the local zoning board decides to change the current land use from residential to commercial. Although this new requirement will significantly change features of the remedy (*i.e.*, determination of principal or low level threats, reasonable risk scenarios, appropriate cleanup levels), it will not fundamentally alter the remedy specified in the ROD (*e.g.*, the selected technology will not change).

- **Secondary Technology:** The lead agency decides to use a biological treatment method instead of air stripping (which was specified in the ROD) for ex-situ treatment of extracted ground water. The basic pump and treat approach remains unaltered and the cleanup level specified in the ROD will be met by the alternate technology; the change is significant, but not fundamental. [See *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites* (EPA 540-R-96-023, October 1996).]

Highlight 7-1: Examples of Post-Record of Decision Changes (continued)

- **Institutional Controls:** During a five-year review, the lead agency reviews institutional control measures implemented at the site and determines that additional measures, that differ significantly from what was described in the ROD, are necessary to be protective (*e.g.*, need for an easement to replace a deed notice).

- **Change in ARARs:** At a five-year review, it is determined that a cleanup level is not consistent with an updated State cleanup standard, and thus is not protective and needs to be modified. This change will not cause a fundamental change in the volume of waste to be remediated.

Fundamental Changes

- **Change Primary Treatment Method:** The in-situ soil washing remedy selected in the ROD proves to be infeasible to implement after testing during remedial design. A decision is made to fundamentally change the remedy to excavate and thermally treat the waste.

- **Change Primary Treatment Method with Cost Increase:** Additional information obtained during remedial design testing demonstrates that the Selected Remedy for ground water, monitored natural attenuation, will not meet cleanup levels, as had been originally predicted in the RI/FS. The lead agency decides to fundamentally change the remedy from monitored natural attenuation to pump and treat. The estimated cost of the cleanup increases significantly.

- **Change Primary Treatment Method with Cost Decrease:** Pump and treat is the Selected Remedy for ground water. Prior to construction of a pump and treat system, interested parties collect and present ground-water information to the lead agency showing that contaminant concentrations are decreasing due to natural processes (*e.g.*, biodegradation, dilution, adsorption, dispersion). Modeling indicates that monitored natural attenuation will achieve cleanup levels in a time frame comparable to pump and treat at substantially less cost.

- **Change from Containment to Treatment with Cost Increase:** At a five-year review for a small industrial site, tests indicate that the containment remedy will not be protective and now a more active response approach (*e.g.*, treatment) is necessary. A new remedy must be selected that will meet protectiveness requirements, resulting in unanticipated costs for the site.

- **Technical Impracticability Waiver:** While implementing an active pump and treat remedy, the presence of DNAPL is discovered. A determination is made to invoke a Technical Impracticability Waiver of the ARAR because treatment of the DNAPL zone is impracticable from an engineering perspective. Rather than treat the source material (DNAPL) a decision is made to implement a containment approach (*e.g.*, slurry wall) for the DNAPL zone. Pump and treat will continue outside the containment zone. As a result, the scope, performance, and cost of the original remedy is fundamentally changed.

- **Community Preference:** The original remedy selected in the ROD was on-site incineration of contaminated soils with estimated costs of $50 million. The community opposes the building of an incinerator and requests that an alternate remedy be selected. New information received after the ROD was signed demonstrates that thermal desorption can meet the cleanup goals in a reasonable time frame for less cost with no loss in protection. This change is based on the community's preference for an alternative to the original Selected Remedy.

- **Volume Decrease Changes Primary Treatment Method:** The Selected Remedy called for treatment by lead recovery and recycling of lead contaminated materials. Additional investigation in design showed the volume of waste to be smaller than originally presumed. The decrease in volume made recycling uneconomical. The amended remedy calls for treatment and containment such that waste is stabilized and consolidated in a lined and capped on-site containment facility. The scope of the new remedy is more efficient, is cost-effective, and is supported by the State and the community.

should consult with the support agency, as appropriate, before issuing an ESD (NCP §300.435(c)(2)). Although not specifically required by CERCLA §121(f) and NCP §300.435(c)(2)(i), it is also recommended that the lead agency provide the support agency the opportunity to comment, and summarize the support agency's comments in the ESD. The lead agency also must publish a notice of availability and a brief description of the ESD in a major local newspaper of general circulation (as required by NCP §300.435(c)(2)(i)(B)). The ESD must be made available to the public by placing it in the Administrative Record file and information repository (NCP §§300.435(c)(2)(i)(A) and 300.825(a)(2)). A formal public comment periodis *not* required when issuing an ESD.

In some cases, an additional public comment period or public meeting may be held voluntarily on a planned ESD (NCP §300.825(b)). This may be useful where there is considerable public or PRP interest in the matter. The Office of Emergency and Remedial Response (OERR) recommends issuing the ESD in a fact sheet format as outlined in Highlight 7-2. The Regional Administrator (or their designee) must sign an ESD. In such cases it may be appropriate to delay implementation of the remedy relating to the ESD to allow a consideration of possible concerns.

7.3.3 Documenting Fundamental Post-ROD Changes: ROD Amendment

When a fundamental change is made to the basic features of the remedy selected in a ROD with respect to scope, performance, or cost, the lead agency is required to develop and document the change consistent with the ROD process (NCP §§300.435(c)(2)(ii)(A) through (H)). This entails the issuance of a revised Proposed Plan that highlights the proposed changes. An amended ROD that documents the change follows the Proposed Plan. The portion of the ROD being amended is evaluated using the nine criteria, focusing on those central to the rationale for the Selected Remedy.

In general, the introductory sections of the ROD do not need to be readdressed in the ROD Amendment but may be referenced from the previous ROD. The focus of the amendment should be to document the rationale for the amendment and provide assurances that the proposed remedy satisfies the statutory requirements. This is accomplished through an evaluation, utilizing the nine criteria, of the portion of the remedy being changed.

To describe the nature of the changes, it is suggested that a side-by-side comparison of the original and proposed remedy components be used to clearly display the differences.

The information included in a ROD Amendment is a function of the type of change made and the rationale for that change. If the amended ROD addresses the entire response action for the site or a series of operable units (*e.g.*, soil, surface water, ground water), only the portion of the remedy that is being changed (*e.g.*,ground water) requires an amendment. For the portion of the ROD being amended, a new nine-criteria analysis, including a new ARARs analysis, will be necessary (see NCP §300.430(f)(1)(ii)(B)(2)). Portions of the analysis in the original ROD can be cross-referenced, where appropriate. RD/RA activities being conducted on other portions of the site or at operable units not proposed for changes may continue during the amendment process.

When fundamental changes are proposed to the ROD, the lead agency must conduct the public participation and documentation procedures specified in NCP §§300.435(c)(2)(ii) and 300.825(a)(2). This would include issuing a revised Proposed Plan that highlights the proposed changes. The format should follow that of the Proposed Plan described in Chapter 3. The final decision to amend is not made until after consideration of public comment (NCP §300.435(c)(2)(ii)).

If a fundamental change is made after a consent decree has been entered at an enforcement-lead site, the decree may need to be modified to conform to the amended ROD, and perhaps involve the Department of Justice or the Court. RPMs should check with their Regional Counsel on how this may be accomplished.

ROD Amendments, like RODs, must be signed by the Regional Administrator (or their designee). A recommended outline and checklist can be found in Highlight 7-2.

7.4 HEADQUARTERS REVIEW AND FILING OF DECISION CHANGES

Draft ESDs and ROD Amendments (including revised Proposed Plans) should be submitted to EPA Headquarters for review and comment pursuant to *Focus Areas for Headquarters OERR Support for Regional Decision Making* (OSWER 9200.1-17, May 22, 1996). In the event that the remedy change meets the criteria for review by the National Remedy Review Board, the appropriate consultation procedures should be followed. For more information on the National Remedy Review Board, see http://www.epa. gov/superfund/programs/nrrb/index.htm. See also Appendix C, *Consolidated Guide to ConsultationProcedures for Superfund Response Decisions* (EPA 540-F-97-009, May 1997).

A copy of a signed final ESD or ROD Amendment should be submitted within 30 days of signature to the following Headquarters office:

ROD Clearinghouse
Superfund Document Center
U.S. EPA Mail Code 5202G
401 M Street, SW
Washington, DC 20460

Please refer to Appendix D for guidance on submitting decision documents to EPA Headquarters.

Highlight 7-2: Sample Outline and Checklist for ESDs and ROD Amendments

Component	Explanation of Significant Differences	ROD Amendment
Introduction to the Site and Statement of Purpose	• Site name and location. • Identification of lead and support agencies. • Citation of CERCLA §117(c) and NCP §300.435(c)(2)(i). • Include date of ROD signature. • Summary of circumstances that led to the need for an ESD. • Statement that ESD will become part of Administrative Record file (NCP 300.825(a)(2)). • Address of location where the file is available and hours of availability.	• Site name and location. • Identification of lead and support agencies • Citation of CERCLA §117 and NCP §300.435(c)(2)(ii). • Include date of original ROD signature. • Summary of circumstances that led to the need for a ROD Amendment. • Statement that ROD Amendment will become part of Administrative Record file (NCP 300.825(a)(2)). • Address of location where the file is available and hours of availability.
Site History, Contamination, and Selected Remedy	• Brief summary of contamination problems and site history. • Present the Selected Remedy, as originally described in the ROD.	• Brief summary of contamination problems and site history. • Present the Selected Remedy, as originally described in the ROD.
Basis for the Document	• Summarize information that prompted and supports significant differences from the Selected Remedy, including the results of the treatability studies or other information developed or provided during the remedial design process. • Reference any information in the Administrative Record file that supports the need for the change.	• Summarize the information that prompted and supports fundamentally changing the remedy selected in the ROD, including the results of treatability studies or other information developed or provided during the remedial design process that supports the amendment. • Reference any information in the Administrative Record file that supports the need for the amendment.

Description of Significant Differences or New Alternatives	• Describe the significant differences between the remedy as presented in the ROD and the action now proposed, highlighting scope, performance, and cost.
	• Describe any changes in Expected Outcomes that will result from the ESD (e.g., change in time to achieve cleanup objectives).
		• Describe original Selected Remedy and new proposed remedy in the same manner as in a standard ROD, highlighting the following:
		  ◦ Treatment components.
		  ◦ Containment or storage components.
		  ◦ Institutional Control components.
		  ◦ Key ARARs.
		• Explain how the change will affect the Remedial Action Objectives for the site.
		• Describe any changes in Expected Outcomes that will result from the ROD Amendment (e.g., change in land use, change in cleanup levels).

Evaluation of Alternatives	Not Applicable to ESDs.	• Use the nine criteria to compare the original and the new proposed remedies.
Support Agency Comments	• Include a summary of support agency comments on the ESD.	• Include a summary of support agency comments on the ROD Amendment.
Statutory Determinations	• State that the modified remedy satisfies CERCLA §121.	• State that the modified remedy satisfies CERCLA §121.
Public Participation Compliance	• Document that the public participation requirements set out in NCP §300.435(c)(2)(i) have been met.	• Document that the public participation requirements set out in NCP §300.435(c)(2)(ii) have been met.