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AR-01099

**DISTRIBUTION  
PROJECT MANAGERS MEETING,  
200 AREA GROUNDWATER and SOURCE OPERABLE UNITS  
November 15, 2018**

**FINAL MEETING MINUTES**

Electronic Distribution to:

Meeting Attendees  
Administrative Record  
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EDMC**

**200 AREA PROJECT MANAGERS MEETING  
Attachments List  
November 15, 2018**

**Minutes of the 200 Area Project Managers Meeting of November 15, 2018 are attached.  
Minutes are comprised of the following:**

<b>Attachment 1</b>	<b>Agenda</b>
<b>Attachment 2</b>	<b>Attendees Sign-In Sheets</b>
<b>Attachment 3</b>	<b>Signature Approval Page</b>
<b>Attachment 4</b>	<b>Presentation- <i>Central Plateau 2018 Annual Institutional Controls Assessment</i></b>
<b>Attachment 5</b>	<b>Milestones and O.U. Status, September - October Data</b>
<b>Attachment 6</b>	<b>Documents Entered into the AR and Approved TPA Change Notices, September - October Data</b>
<b>Attachment 7</b>	<b>Action Item List</b>
<b>Attachment 8</b>	<b>Email, R. L. Long, <i>Performance Report Query</i>, to close Action Item 189</b>

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# Unfiltered Hexavalent Chromium



Presented by: Soil and Groundwater Remediation Project - CH2M Plateau Remediation Company  
Presented to: Department of Energy-Richland Office, Washington State Department of Ecology  
and United States Environmental Protection Agency

Date: March 2019



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# Why are we collecting unfiltered Cr(VI)?

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- Washington State Department of Ecology (Ecology) and United States Environmental Protection Agency (EPA) transmitted a letter (Hedges and Ceto, 2007, “Field Filtering of Ground Water Samples Prior to Laboratory Analysis”)
  - “The use of field-filtered ground water samples may cause an underestimation of the amount of contamination that is naturally mobile in the groundwater.”
  - Ecology and the EPA, therefore, notify Department of Energy-Richland (RL) that future ground water samples should not be field-filtered unless the turbidity exceeds 5 nephelometric turbidity units.
  - Field-filtering under any circumstances must be specifically requested, with basis provided, and approved by Ecology or EPA in work plans.
- WAC 173-340-720, Groundwater cleanup standards, Section 9 Compliance monitoring:
  - When groundwater cleanup levels have been established at a site, sampling of the groundwater shall be conducted to determine if compliance with the groundwater cleanup levels has been achieved. Compliance with groundwater cleanup levels shall be determined by analysis of groundwater samples representative of the groundwater.
    - Analyses shall be conducted on unfiltered groundwater samples, unless it can be demonstrated that a filtered sample provides a more representative measure of groundwater quality.
- Risk assessment to determine basis for action requires unfiltered sample results (Risk Assessment Guidance for Superfund, Part A)



# Data Use – Unfiltered Cr(VI)

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- Remedy Performance Monitoring, Plume Mapping, etc.
  - Treated as duplicate for dissolved Cr(VI) analyses.
  - Typically, concentration averaged with filtered Cr(VI) and filtered total Cr analyses.
  - Turbidity corrections are known to create low bias in some cases.
  - Unfiltered hexavalent chromium results are more erratic, causing increased effort to evaluate data quality.
- CERCLA Compliance Monitoring
  - Compare current groundwater concentration to cleanup standards.
  - WAC identifies unfiltered results, unless filtered samples are more representative of groundwater quality.
- Risk Assessment
  - Risk Assessment Guidance for current groundwater concentration to establish baseline risk.
  - “While filtration of ground-water samples provides useful information for understanding chemical transport within an aquifer (see Section 4.5.3 for more details), the use of filtered samples for estimating exposure is very controversial because these data may underestimate chemical concentrations in water from an unfiltered tap. Therefore, data from unfiltered samples should be used to estimate exposure concentrations. Consult with the RPM before using data from filtered samples.”
    - Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual (Part A), Section 6.5.2 Estimate Exposure Concentrations in Ground Water



# Dissolved Hexavalent Chromium Analytical Methods Require Filtering

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- Hexavalent Chromium analytical methods evaluate dissolved Cr(VI), no option for a total Cr(VI) analysis.
  - Definition of “dissolved metals”:
    - The concentration of metals determined in an aqueous sample after the sample is filtered through a 0.45  $\mu\text{m}$  filter.
- (Reference: Chapter Three of the SW-846 Compendium: Inorganic Analytes)



# Analytical Methods Measure Dissolved Hexavalent Chromium Only

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- **EPA Method 7196a (Colorimetric method using diphenylcarbazide)**

- Method Scope, Step 1.1 - “Method 7196 is used to determine the concentration of dissolved hexavalent chromium [Cr(VI)]” in groundwater.
- Summary of Method, Step 2.1 – “Dissolved hexavalent chromium, in the absence of interfering amounts of substances such as molybdenum, vanadium, and mercury, may be determined colorimetrically by reaction with diphenylcarbazide in acid solution.”

- **Standard Method 3500-Cr B (Colorimetric method using diphenylcarbazide)**

- Procedure Section: Step 4.B. – “Treatment of sample: Filter sample through a 0.45 µm filter”
- Equivalent method to EPA Method 7196a

- **Standard Method 3500-Cr C (Ion Chromatographic Method)**

- *Under General Discussion section:* Step 1.a. “Principle: This method is applicable to determination of the dissolved hexavalent chromium in drinking water, groundwater, and industrial wastewater effluents.”
- Step 1.d. “Sample preservation and holding time: Filter sample through a 0.45 um filter.”



# Analytical Methods Measure Dissolved Hexavalent Chromium Only

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- **EPA Method 1636 (Ion Chromatographic Method)**

- *Under General Discussion section:* Step 1.1. “This method is for the determination of dissolved hexavalent chromium (as CrO<sub>2</sub>-4) in ambient waters at EPA water quality criteria (WQC) levels using ion chromatography (IC).”
- Step 1.8. “For dissolved Cr(VI) determinations, samples must be filtered through a 0.45 µm capsule filter at the field site.”

- **EPA Method 7199 (Ion Chromatographic Method)**

- *Under Summary of Method:* 2.1. “An aqueous sample is filtered through a 0.45-µm filter”
- *Under Sample Collection, Preservation and Handling:* 6.2 “For determination of dissolved Cr(VI), the sample should be filtered through a 0.45-µm filter

- **EPA Method 218.6 (Ion Chromatographic Method)**

- *Under Summary of Method:* 2.1. “An aqueous sample is filtered through a 0.45-µm filter”
- *Under Sample Collection, Preservation and Storage:* 8.2 “For determination of dissolved Cr(VI), the sample should be filtered through a 0.45-µm filter



- Sample turbidity impacts data quality. Addressed as a post-filtration action if turbidity is still an issue:
  - EPA Method 7196a states that an aliquot of the sample containing all reagents except diphenylcarbazide should be prepared and used to correct the sample for turbidity (i.e. turbidity blank) (7.0).
  - Standard Method 3500-Cr B notes that if the solution is turbid take an absorbance reading before adding carbazide reagent and correct the absorbance reading of the final colored solution.
- Turbidity is not addressed in other methods.
- Laboratories address turbidity issues by various methods (see following slides)



# Laboratory Operating Procedures Excerpts for Dissolved Hexavalent Chromium Analysis

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- **Test America Richland**

- Under Interferences: Turbid samples should be filtered prior to analysis to prevent interference from turbidity. Suspended particles should be removed by filtration.  
NOTE: The procedure is silent on the actual turbidity correction

- **Test America St. Louis**

- They run a turbidity blank for every sample.
- *Under Sample Analysis:* 11.1.2.6 Record the turbidity blank for each sample, method blank, and LCS. If the absorbance reading of the turbidity blank is above the calibration curve, the sample must be either (re)filtered or diluted until it is within the calibration curve.

- **Test America Denver**

- Under Interferences: Turbidity and color in the samples may cause erroneously high absorbance readings but low levels can be corrected for by the use of a color blank.
- Under Sample Analysis: High levels of turbidity or color in a sample may require dilution of the sample prior to addition of the color reagent before analysis.



# Laboratory Operating Procedures Excerpts for Dissolved Hexavalent Chromium Analysis

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## • ALS

- Under Interferences: 4.2. If not accounted for, turbidity and/or color in waters or aqueous extracts will cause a high bias in the analysis because suspended particles will block light in the light path of the spectrophotometer and thereby contribute an absorbance signal that is not due to Cr+6.
- Turbid or colored samples should be filtered or centrifuged to remove or reduce cloudiness as much as possible. If turbidity and/or color is not filtered out, it can be accounted for by taking initial absorbance readings and subtracting it out from the final absorbance reading after the addition of diphenylcarbazide.
- Under Sample Prep: Turbid samples should be filtered using a syringe and a 0.45  $\mu\text{m}$  or 0.7  $\mu\text{m}$  filter disk to remove or reduce suspended particles as much as possible before aliquotting. If turbidity and/or color are not filtered out, it can be accounted for by taking initial absorbance readings after the addition of the 10% H<sub>2</sub>SO<sub>4</sub> and subtracting it out from the final absorbance reading after the addition of diphenyl.

## • GEL

- Under sample prep: Samples must be filtered via 0.45  $\mu\text{m}$  filter prior to buffer addition



# Unfiltered Cr(VI) Analysis

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- Unfiltered Cr(VI) analysis is not a standard laboratory method
  - Previously performed as a special Hanford request
  - EPA method is specifically for dissolved Cr(VI) analysis (represented by filtered)
  - Standard Methods does not recognize unfiltered analysis
- Colorimetric method only analyzes dissolved Cr(VI)
  - There is no step in the method to dissolve any suspended/colloidal Cr(VI)
- Measurements are less precise due to turbidity corrections
- A currently contracted lab is willing to perform unfiltered analysis with turbidity correction  
HOWEVER,
  - Uses manual colorimetric method rather than automated method. Disadvantages:
    - Results in much lower precision than automated method
    - Detection limit for manual method is 2x greater
    - Slower process jeopardizes 24 hour hold time
  - Requires shipments of filtered and unfiltered samples to separate labs
  - Additional cost



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# Filtered Cr(VI) analysis are more representative than Unfiltered Cr(VI) in groundwater

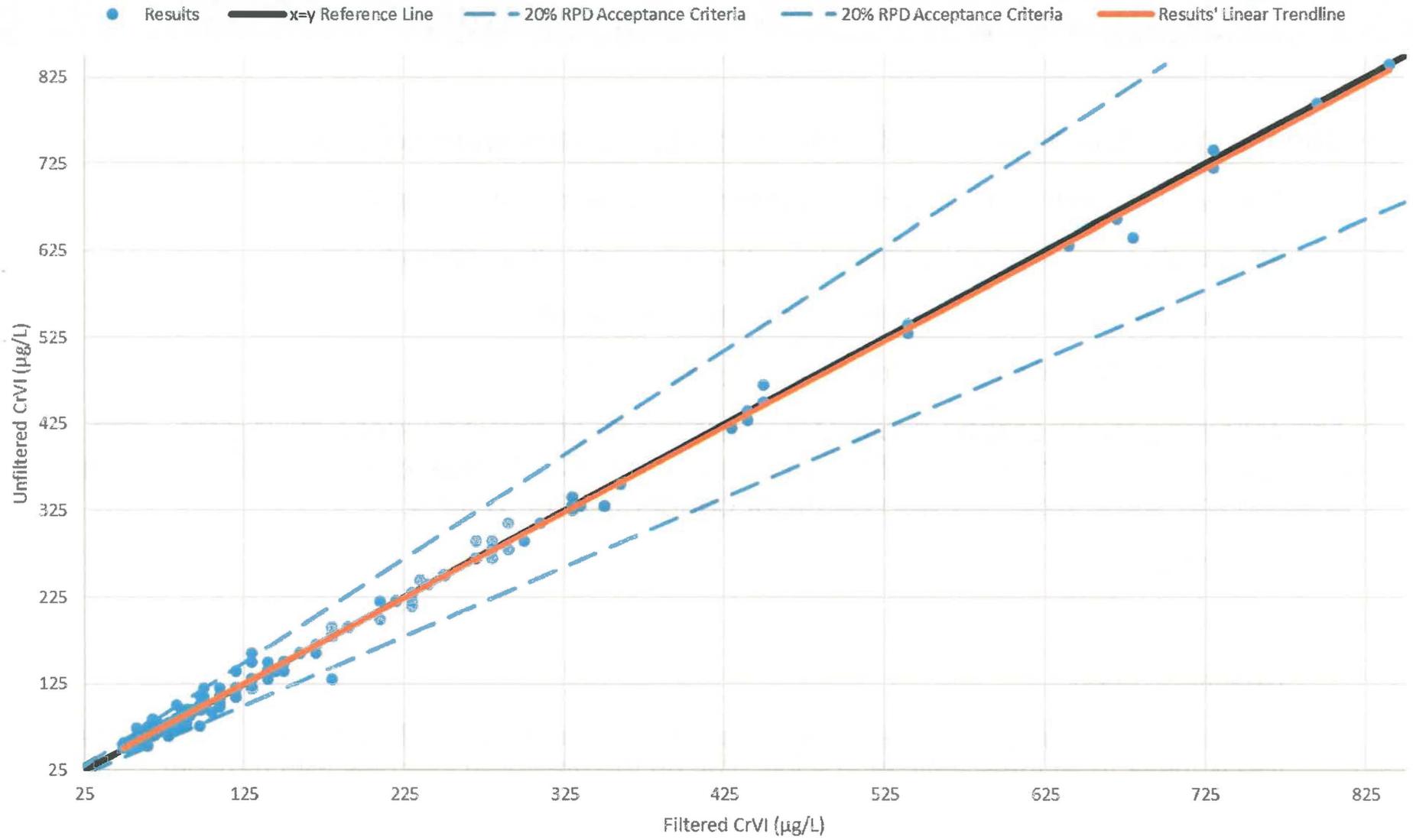
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- During CY2018 at 100-KR, 320 unfiltered/filtered pairs were collected:
  - 136 pairs showed zero difference between filtered and unfiltered pair.
  - 49 sample pairs showed unfiltered results was greater than filtered
  - 135 sample pairs showed unfiltered results less than filtered(Note that unfiltered samples include turbidity correction)
- The following three graphs present 3 years worth of groundwater Cr(VI) data. The data points are filtered and unfiltered pairs where Cr(VI) was detected. The graphs contain the same data set with different concentration ranges.
  - Results  $\geq 50\mu\text{g/L}$
  - Results  $\leq 50\mu\text{g/L}$
  - Results  $\leq 10\mu\text{g/L}$
  - The orange line is the data trend line. The black line is the  $x=y$  reference line. The orange line is lower in all three indicating a low bias on the unfiltered samples with turbidity correction.



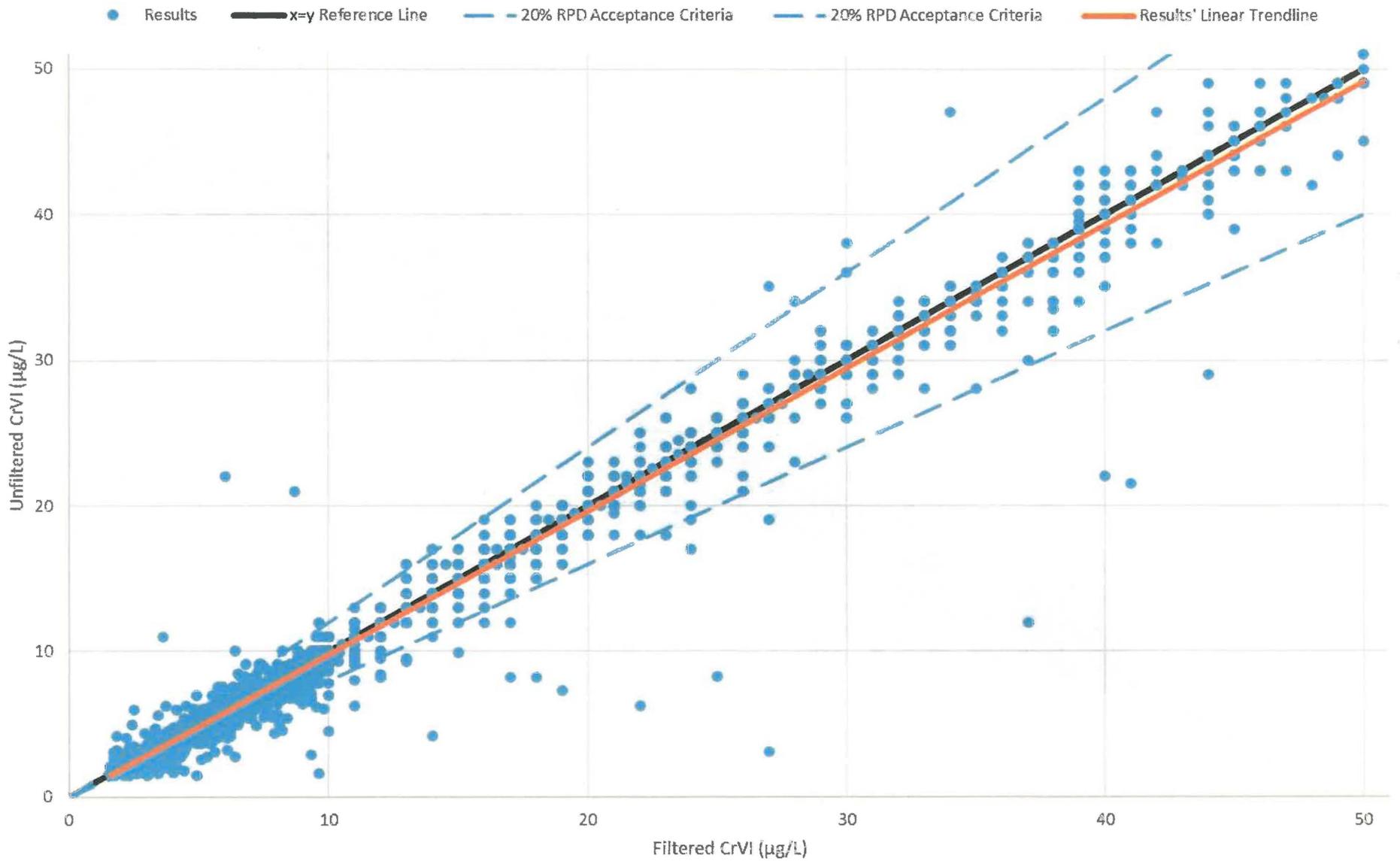
TARL Filtered and Unfiltered Hexavalent Chromium Results from Jan 2016 to Feb 2019 Excluding  
 Non-Detects Pairs (Results  $\geq 50 \mu\text{g/L}$ )

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 ATTACHMENT 10



TARL Filtered and Unfiltered Hexavalent Chromium Results from Jan 2016 to Feb 2019 Excluding  
 Non-Detects Pairs (Results  $\leq 50 \mu\text{g/L}$ )

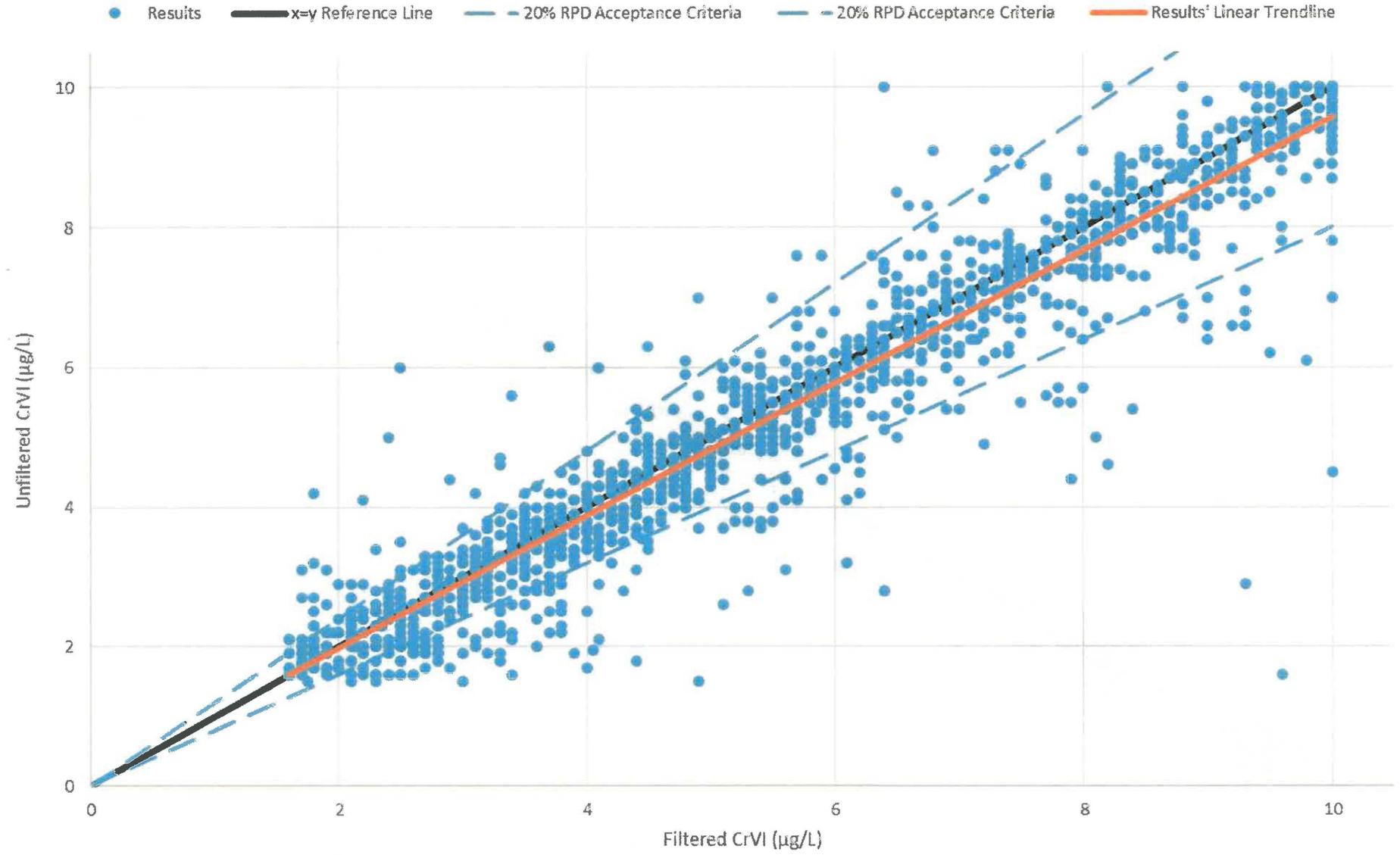
CHPRC-1901099  
 ATTACHMENT 10



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TARL Filtered and Unfiltered Hexavalent Chromium Results from Jan 2016 to Feb 2019 Excluding  
 Non-Detects Pairs (Results  $\leq 10 \mu\text{g/L}$ )

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 Plateau Remediation Company  
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- Follow EPA methods or equivalent for dissolved Cr(VI), which includes filtering.
  - There is no EPA method for undissolved Cr(VI).
- Provide presentation/discussion to EPA and Ecology.
- Seek EPA and Ecology agreement to use filtered analysis only for Cr(VI).
- Adjust groundwater SAPs to filtered Cr(VI) only.



100/300 Area UMM  
Action Items List  
March 21, 2019

Open (O)/ Closed (X)	Action No.	Co.	Actionee	Project	Action Description	Status
O	179	RL	John Neath/Mark French		Milestone M-016-181 and M-016-178. Laura Buelow to meet with DOE to establish milestone completion criteria	in progress
O	183		Ellwood Glossbrenner/ Bill Faught		Coordinate and share a soil flushing presentation in the next quarter	May-19
O	184		Bill Faught		Biovent vapor sample data to Ecology by December 1, 2018	Closed

**200 AREA PROJECT MANAGERS MEETING  
AGENDA  
November 15, 2018**

**Presentation:** *Central Plateau 2018 Annual Institutional Controls Assessment*

**Milestones and O. U. Status- September - October, 2018 Data**

- Deep Vadose Zone
- 200-IS-1 and 200-EA-1
- 200-SW-2
- 200-SW-1
- 200-OA-1, 200-CW-1, 200-CW-3
- 200-BC-1 and 200-WA-1
- 200-BP-5 and 200-PO-1
- M-015 Milestone Series
- 200-PW-1/3/6 and 200-CW-5
- 200-UP-1
- 200-ZP-1
- 200 Area Groundwater/200 West P&T Facility
- M-016 Milestone Series
- M-024 Milestone Series
- 200 Area RCRA TSD Closures
- Canyon Facilities
- Waste Site Removal

**Approach to Document PMM Agenda/Content**

**Action Items**

**Documents for the Administrative Record and Approved TPA Change Notices**

**Closing Comments (all)**

- Sign concurrence to meeting minutes if applicable
- Future PMM meetings will be held in 2420 Stevens Room 308 from 3:00-4:00pm as follows:

**2018**

- November 15

**2019**

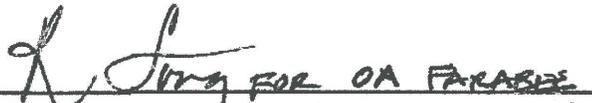
- January 17
- March 21
- May 16
- July 18
- September 19
- November 21

200 Area Project Managers' Status Meeting  
November 15, 2018

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Craig Cameron	EPA		376-8665
Sara Austin	CHPRC	TPA co-ordinator	376-4339
Scott Davis	NSA-TPA	" "	376-8757
Shirley Ginn	DOE		FAU 240-0161
BRIGITE WEESE	ECOLOGY	B-Plant/PIPEX Project Lead	372-7936
Deborah Singleton	CHPRC	CPRM	373-7689
Annie McLain	WDOH		943-6505
Jim Hanson	DOE	200 Area GW	373-9068
Kathy Higgins	DOE	TPA	376-3658
Ben Vannah	DOE	200-EA1	376-9623
Dib Goswami	Ecology	Pri Mgr	372-7902
Nina Menard	Ecology	—	372-7941
Michael Cline	DOE	PM	376-6070
Kelly Elsethagen	Ecology	PM	372-7923
RDougherty	DOE	SOMR	373-9626
KIM WELSH	ECOLOGY	DOC. LEAD	372-7882
Mark Deane	CHPRE	—	438-5516
Laura O'Mara	CHPRC	Secretary	373-9763

**200 Area Project Managers Meeting  
Meeting Minutes Approval  
November 15, 2018**

APPROVAL:  DATE: 3/21/2019  
Michael Cline, 200 Area Project Manager, DOE/RL

APPROVAL:  FOR OA FARABEE DATE: 3/21/2019  
Al Farabee, 200 Area Project Manager, DOE/RL

APPROVAL:  DATE: 3/21/2019  
Craig Cameron, 200 Area Project Manager, EPA

APPROVAL:  DATE: 3/21/2019  
*For* Nina Menard, 200 Area Project Manager, Ecology

**HFFACO Action Plan Section 4.1 requires signature of agreements and commitments made during the Project Manager Meeting. Approval of these minutes documents agreements and commitments identified in the attached "Milestones and O.U. Status" and the "Action Item List". Approval does not apply to the minutes themselves or to any other attachments.**

# CENTRAL PLATEAU 2018 ANNUAL INSTITUTIONAL CONTROLS ASSESSMENT



200 Area Project Managers Meeting

November 15, 2018



U.S. DEPARTMENT OF  
**ENERGY**

## Central Plateau Institutional Controls Assessment

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Institutional Controls are:

- Specified in CERCLA Decision documents and RCRA Closure/Corrective Action documents
- Annual assessment requirements are contained in *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions and RCRA Corrective Actions*, DOE/RL-2001-41

## Central Plateau Records of Decision

- 200-ZP-1 Groundwater Operable Unit ROD
- 200-UP-1 Groundwater Operable Unit Interim ROD
- 221-U Facility (Canyon Disposition Initiative) ROD
- 200-CW-5 and 200-PW-1/3/6 Source Operable Unit ROD
- Environmental Restoration Disposal Facility ROD
- 100/200 Areas Remaining Sites (200 North Area) ROD

## Institutional Controls Associated with Records of Decision

- Entry Restrictions – Example: Active badging and barricades
- Warning Notices – Example: Signage as specified in decision documents
- Groundwater-Use Management – Example: No unauthorized wells
- Land-Use Management – Example: Excavation permits, site evaluations

## Institutional Controls Assessment Results

- Institutional controls were in place throughout FY 2018 for the Central Plateau operable units.
- There were no failures of institutional controls during the fiscal year (See following tables).
- These controls are planned to be continued through FY 2019 on the Central Plateau.

## Institutional Controls Associated with Records of Decision

Beloit and 23<sup>rd</sup> Street



Camden and 23rd Street



# Institutional Controls Associated with Records of Decision



East of 200 West P&T



Southwest of 221-U Plant



**Table 1. Institutional Controls Requirements Listed in Record of Decision for Final Remedial Action for Hanford 200 Area, 200-UP-1 Operable Unit (Required through time of completion of the remedy.)**

Institutional Controls Category	Institutional Controls Requirement	2018 Status
Entry Restrictions	The DOE shall control access to 200-UP-1 OU Groundwater to prevent unacceptable exposure of humans to contaminants, except as otherwise authorized in lead regulatory agency approved documents.	No findings, access controls still in place.
Land-Use Management	Visitors entering any site areas of the 200-UP-1 OU will be required to be badged and escorted at all times.	No findings, work plans are being/have been submitted for approval.
Land-Use Management	No intrusive work shall be allowed in the 200-UP-1 OU unless the lead regulatory agency has approved the plan for such work and that plan is followed.	No findings, no unauthorized wells have been drilled.
Groundwater-Use Management	The DOE shall prohibit well drilling in the 200-UP-1 OU, except for monitoring, characterization, or remediation wells authorized in EPA approved documents.	No findings, no unauthorized well drilling.
Groundwater-Use Management	Groundwater use at the 221-U Facility site is prohibited, except for limited research purposes and monitoring and treatment authorized in EPA approved documents.	No findings, no unauthorized groundwater use has occurred.
Warning Notices	The DOE shall post and maintain warning signs along pipelines conveying untreated groundwater that caution site visitors and workers of potential hazards from the 200-UP-1 OU.	No findings.
Miscellaneous Provision	In the event of any unauthorized access (e.g. trespassing), DOE shall report such incidents to the Benton County Sheriff's Office for investigation and evaluation of possible prosecution.	No findings, no unauthorized access or trespass.
Land-Use Management	Activities that would disrupt or lessen the performance of the any component of the remedy are to be prohibited, except as otherwise authorized in lead regulatory agency approved documents.	No findings, no activities have been implemented that would disrupt/lessen performance of the interim remedy
Miscellaneous Provision	The DOE shall prohibit activities that would damage the remedy components (e.g. extraction wells, piping, treatment plant, and monitoring wells), except as otherwise authorized in lead regulatory agency approved documents.	No findings.

**Table 1. Institutional Controls Requirements Listed in Record of Decision for Final Remedial Action for Hanford 200 Area, 200-UP-1 Operable Unit (Required through time of completion of the remedy.)**

Institutional Controls Category	Institutional Controls Requirement	2018 Status
Land-Use Management	The DOE will prevent the development and use of property above the 200-UP-1 OU for residential housing, elementary and secondary schools, childcare facilities, and playgrounds.	No findings.
Miscellaneous Provision	The DOE shall report on the effectiveness of ICs for the 200-UP-1 OU interim remedy in an annual report, or on an alternative reporting frequency specified by the lead regulatory agency. Such reporting may be for the 200-UP-1 OU alone or may be part of the Hanford Site wide report.	No findings, included in annual report.
Land-Use Provision	Measures that are necessary to ensure continuation of ICs shall be taken before any lease or transfer of any land above the 200-UP-1 OU. DOE will provide notice to Ecology and EPA at least 6 months before any transfer or sale of 200-UP-1 OU or any land above the 200-UP-1 OU so that the lead regulatory agency can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for DOE to notify Ecology and EPA at least 6 months before any transfer or sale, DOE will notify Ecology and EPA as soon as possible, but no later than 60 days before the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions, DOE further agrees to provide Ecology and EPA with similar notice, within the same time frames, as to federal-to-federal transfer of property. DOE shall provide a copy of the executed deed or transfer assembly to Ecology and EPA.	No findings, no transfer/sale of land has taken place.
Miscellaneous Provision	DOE shall notify EPA and Ecology immediately upon discovery of any activity inconsistent with the OU-specific institutional control objectives for the Site.	No findings, no inconsistent activity discovered.

**Table 2. Institutional Controls Requirements (Required through the Time of Completion of Remedy Construction) Listed in Record of Decision for 221-U Facility (Canyon Disposition Initiative).**

Institutional Controls Category	Institutional Controls Requirement	2018 Status
Entry Restrictions	DOE shall control access to prevent unacceptable exposure of humans to contaminants at the 221-U Facility site addressed in the scope of this ROD until remedy construction is complete. Visitors entering any site areas are required to be badged and escorted at all times. See Figure 7 of the 221-U Facility ROD (US EPA 2005) for a site map showing the extent of the 221-U Facility site and the boundaries of the land-use controls. A more detailed map will be developed and included in the RD/RA work plan to be approved by EPA and Ecology.	No findings, access controls still in place.
Land-Use Management	No intrusive work shall be allowed at the 221-U Facility site unless the EPA and Ecology have approved the plan for such work and that plan is followed.	No findings, work plans are being/have been submitted for approval.
Land-Use Management	DOE shall prohibit well drilling at the 221-U Facility site except for monitoring, characterization, or remediation wells authorized in EPA-and Ecology-approved documents.	No findings, no unauthorized wells have been drilled.
Groundwater-Use Management	Groundwater use at the 221-U Facility site is prohibited, except for limited research purposes and monitoring and treatment authorized in EPA-and Ecology-approved documents. This prohibition applies until drinking water standards are achieved and EPA and Ecology authorize removal of restrictions. Decision documents for the 200-UW-1 Source Operable Unit and 200-UP-1 Groundwater Operable Unit as well as the Sitewide institutional controls plan will contain the institutional controls and implementing details prohibiting well drilling and groundwater use in the U Plant Area and portions of the 200 West Area as defined in those decision documents.	No findings, no unauthorized groundwater use has occurred.
Warning Notices	DOE shall post and maintain warning signs along access roads to caution site visitors and workers of potential hazards from the 221-U Facility site.	No findings, warning signs are in place.
Miscellaneous Provision	In the event of any unauthorized access to the site, such as trespass, DOE shall report such incidents to the Benton County Sheriff's Office for investigation and evaluation of possible prosecution.	No findings, no unauthorized access to the site has occurred.