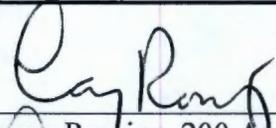
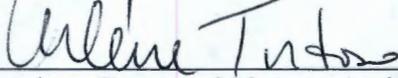
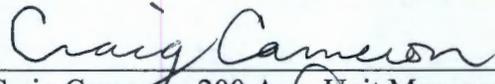


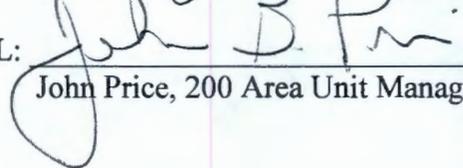
**Meeting Minutes Transmittal/Approval  
Unit Managers' Meeting  
200 Area Groundwater and Source Operable Units  
1200 Jadwin, Richland, Washington  
October 17, 2007**

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APPROVAL:  Date: 11-15-07  
Larry Romine, 200 Area Unit Manager, DOE/RL

APPROVAL:  Date: 11/15/07  
Arlene Tortoso, 200 Area Assistant Manager, DOE/RL

APPROVAL:  Date: 11/19/07  
Craig Cameron, 200 Area Unit Manager, EPA

APPROVAL:  Date: 11/27/2007  
John Price, 200 Area Unit Manager, Ecology

**RECEIVED**  
NOV 30 2007  
**EDMC**

Minutes of the 200 Area Unit Managers' Meeting of October 17, 2007 are attached. Minutes are comprised of the following:

Attachment 1	Agenda
Attachment 2	Attendance Record
Attachment 3	Agreements and Issues List
Attachment 4	Action Item List
Attachment 5	Operable Units and Facilities Status
Attachment 6	200-UP-1 Uranium
Attachment 7	200-UP-1 Technetium-99
Attachment 8	200-ZP-1 Pump-and-Treat Performance for FY2007
Attachment 9	299-W15-6 Carbon Tetrachloride
Attachment 10	Figure showing potential ZP-1 extraction wells
Attachment 11	ICP/MS Data for Extraction Well 299-W15-44
Attachment 12	Technetium-99 ICP/MS Data for Ion Exchange Column at 200-ZP-1 Extraction Well 299-W15-765
Attachment 13	Nitrate Field Data for Well 299-W15-44
Attachment 14	Nitrate Field Data for Well 299-W15-765
Attachment 15	Comparison of Maximum Carbon Tetrachloride Rebound concentrations Monitored at 200-PW-1 Soil Vapor Extraction Sites (FY2003 to FY2007)
Attachment 16	299-E27-155 and 299-E33-344 Well Location Map
Attachment 17	Increases in Uranium above the Water Table at Well 299-E33-18
Attachment 18	Stepped Pump Test
Attachment 19	Proposed N Well Location Map

Attachment 20

Wells with Significant Uranium Increases

Attachment 21

Proximal Wells without Significant Uranium  
Increases

Attachment 22

May 2007 Sodium contour Map in the B/BX/BY  
WMA and Surrounding Sites

Attachment 23

Approval of the Carbon Tetrachloride Expedited  
Response Action (200-PW-1 Operable Unit) Soil  
Vapor Monitoring Strategy for October 2007  
Through March 2008.

# **200 AREA UNIT MANAGERS' MEETING DRAFT AGENDA**

**1200 Jadwin/Rm 1-C-1**

**October 17, 2007**

**8:30 – 10:15 AM**

## **GROUNDWATER AND SOURCE OPERABLE UNITS**

- Status Review of OUs

## **200-UW-1, 200-CW-3 AND FACILITIES**

- Status Review
- Outstanding Action Items/Issues

200 Area Unit Managers Status Meeting  
October 17, 2007

Please print clearly and use black ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Michael Stevens	D&D		430-5756
Jenne Sauer	D&D		376-3762
Phil Rogers	S&GL		376-5807
Tom Watson	FH		376-5450
Deanna Klages	FGG		373-6312
John Price	Ecology	TPA Proj Mgr	372-7921
Earl Lloyd	FGG		373-6541
Rich Oldham	S&G&P	E & O	372-2426
Mark Byrnes	FH	TPA Project Manager	373-3796
Craig Cameron	EPA		376-8665
Janice Williams	FH		372 3553
Jonia Cummins	FH	PO-1 LEAD	372 2484
Jean Wanni	EEO		372-7930
Glen Triner	FH	UW-1/UP-1	430-1013
Susan Narbutowicz	FH	BP-5	376-4623
Virginia Rohay	FH	200-PW-1	373-3803
Jay S. Decker	FH	SC-1/LW-1	376-4416
Brian Chastanary	DOE	TPA PM	373-6137
Frank Roddy	DOE	RL 30	372-0945
Marlin Young	DOE	RCM	376-8274



**Issue Resolution Meeting  
Agreements and Issues List  
October 17, 2007  
200 Area Unit Managers' Meeting**

**Agreement:** The Parties agreed that the remaining waste sites in the 200 North Area will be added into the 200-CW-3 Operable Unit through a TPA Change Package for investigation and remediation under the 100 Area Remaining Sites ROD. The waste sites are:

- 2607-N, 2607-P and 2706-R septic tanks
- 200-N-3 landfill
- 200-UPR-N-1 and 200-UPR-N-2 spill sites

**Issue:** None Identified

**Delegations for October 17, 2007 UMM meeting:** None

EPA	Craig Cameron
Ecology	John Price
DOE/RL	Briant Charboneau
	Larry Romine

**200 Area Unit Managers' Meeting**

**OPEN ACTION ITEM TRACKING**

Action #	Action/Subject	Assigned To	Owed To	Assigned Date	Original Due Date	Adjusted Due Date	Status
80	Send report from Remedial Action Decision Making panel.	FH-Miller	ECY/EPA Price/Goswami/ Cameron	10/18/06	11/16/06	10/20/07	Document has been completed but is undergoing management review. Minor editorial changes are needed - will be completed by October UMM.
102	The issue of EPA approval of all SAPs (including those for which Ecology is the lead regulatory agency) is being elevated to the IAMIT Executive Committee. The results of the Executive Committee meeting on this issue should be reviewed by RL and reported to the Tri-Parties at the next UMM.	RL-Charboneau	All	8/16/07	9/20/07	10/18/07	
105	RL to send Ecology comments/resolution on the Supplemental Characterization Work Plan	RL-Foley	Ecology-Price	10/1/2007		11/30/2007	

**CERCLA 5-Year Review Action Items**

Action #	Action/Subject	Assigned To	Due Date	Status
13-1	Complete a data quality objective process and sampling plan to further characterize the technetium-99 groundwater plume near T Tank Farm.	Fluor Hanford		Complete
14-1	Assess treatment options to address technetium-99 near T Tank Farm.	Fluor Hanford		Complete
15-1	Complete data quality objective process and sampling plan to further characterize the high soil conductivity measurements detected at B/C cribs and trenches.	Fluor Hanford	12/1/2007	
16-1	Increase the pump size in 200-ZP-1 extraction wells 299-W15-45 and 299-W15-47.	Fluor Hanford		Complete
17-1	Evaluate expanding the soil-vapor extraction operations. Also, specifically review converting former groundwater extraction well 299-W15-32 to a soil-vapor extraction well.	Fluor Hanford		Complete
18-1	Prepare an explanation of significant difference for 200-UP-1 Interim ROD	Ecology	6/1/2008	

## **200 AREA UNIT MANAGERS' MEETING OPERABLE UNITS AND FACILITIES STATUS**

October 17, 2007

### **D&D OUs**

#### **200-CW-3 EPA**

- The remediation completion report for site 261-N- 7 has been approved by RL and EPA.
- Site 216-N-7 and 216-N-5 will be seeded in November.
- SAP and RAWP revisions have been initiated to include sites 216-N-1, 4, and 6 as well as the septic systems, solid waste site, and UPRs.

#### **200-BC Control Area**

#### **Rail Car Disposition Options Study**

- The railroad car disposition options study is being worked.

#### **Ecology Sites UPR 200-N-1 and UPR 200-N-2 (in Proximity to 200-CW-3)**

- Met with team members to initiate development of options to the TPA change request to move the two UPR sites into the 200-CW-3 Operable Unit.

#### **EE/CA for Buildings 212-N, P, R**

The development of the EE/CA has been initiated.

#### **200-UW-1 Ecology**

- ROD - Based on the 9/11/07 meeting with the Tri-Parties and a clarification meeting on 9/13/07, DOE directed FH to split the current draft ROD into a Final ROD on the 5 crib waste sites and a final ROD on the 28 MNA and RTD waste sites. The crib ROD is scheduled to be delivered to the parties in two weeks to support a January approval to allow for construction of the U-8 barrier. Ecology delivered their version of the ROD to EPA on 9/27/07.
- DOE continued working on remedial action goals (RAG) for 200-UW-1. FH transmitted the technical basis documents to RL on 10/1/07. The documents are expected to be transmitted to the EPA and Ecology next week describing how the approach being proposed satisfies the applicable or relevant and appropriate requirements of WAC 173-340-747(8), and other State and Federal regulations and guidance.
- Agreement has been reached between DOE-RL, SHPO, and the tribes on the MOA for the Area C Borrow Source. Minor revisions are being made to the document and it will be circulated for signature shortly.
- Phase II of the 241-U-361 Settling Tank sludge sampling is complete. Delays due to equipment failures caused the completion of sampling to slip to the end of September. The samples all appear to be very dense and dose rates were around 1 millirem per hour. All samples are being processed at the 222-S lab.

## **FACILITIES STATUS**

- The PUREX DQO Summary Report was issued on September 24.
- Completed incorporation of regulator comments on the U Plant RD/RAWP and transmitted draft Rev. B to RL on September 25. Document is being finalized for RL transmittal to regulators by October 10.
- The Multi-Canyon Project Management Plan was issued on September 20.

### **Facility Binning (No change)**

#### **200-UP-1, 200-CS-1, 200-CW-1 OU Group**

##### **200-UP-1**

##### **(M-15-17A, 11/30/10, Feasibility Study/Proposed Plan) Ecology**

- The July sample results identified a Uranium concentration of 445 ug/L, however the Tc-99 value is elevated (13,000 pCi/L).
- All other values remain below the interim RAOs of 480 µg/L and 9,000 pCi/L respectively (**Attachments 6 and 7**).
- No additional sampling data has been received.
- RI/FS Work Plan:
  - Drilling is scheduled to begin on the remaining six wells (UP-6, UP-7, UP-8, UP-9, UP-10, and UP-12).
- Tc-99 Increase @ S-Farm
  - The Tc-99 levels in well W22-44 increased from 3,400 pCi/L to 6,440 pCi/L in the last sampling (March of 2007). The derived groundwater standard is 900 pCi/L.
  - No additional sampling data has been received.
- Pump and Treat
  - On 4/19/07, the pumps in wells W19-36 and W19-43 were restarted. Currently, the project is pumping approximately 11.4 gpm. These two wells address the higher uranium groundwater concentrations found in the area.
  - As of 10/1/07 ~ 3,000,000 gallons had been pumped to LERF Basin #43.
  - Treatment of the water is scheduled to start this month.

##### **200-CS-1**

##### **Feasibility Study/Proposed Plan (Ecology)**

The Draft B of the feasibility study and proposed plan were submitted to Ecology on September 27, 2007, consistent with the update plan in the RL August 31, 2006 letter to Ecology.

Ecology has formally stated that it does not plan to implement a CERCLA ROD for CS-1. Instead, Ecology will prepare a draft RCRA Permit modification for closure of the three

treatment, storage, and/or disposal units (TSDs) and integrate RCRA corrective action for the non-TSD waste site (216-S-11) with the 216-S-10 Pond and Ditch TSD.

RL has legal requirements regarding radionuclide contaminants and all chemical contaminants, as well as NEPA that are not met by Ecology's proposed regulatory pathway. RL is agreeable to further discussions with Ecology about regulatory solutions that allow the Tri-Parties to meet their legal obligations.

#### **200-CW-1**

##### **(M-015-38B, 5/31/09, Feasibility Study/Proposed Plan) Ecology**

###### **• Model Group 5 SAP**

- Ecology's revised proposal has been evaluated to compare cost with MG-5 SAP as submitted, baseline, and additional cost (to Ecology proposal) to meet RL need for sufficient characterization for reducing defined waste site for removal or other action. The resultant proposed revisions were presented to Ecology on 10/10/07. Ecology confirmed that the proposed MG-5 SAP revisions would be acceptable.
- The MG-5 SAP will be revised accordingly and submitted to Ecology/EPA for approval by 12/10/07.
- Delays in gaining approval of the SAP have delayed starting field activities.

#### **200-ZP-1, 200-PW-1/3/6 OU Group**

#### **200-ZP-1**

##### **(M-15-48B, 9/30/07, Feasibility Study/Proposed Plan) EPA**

###### **• Remediation Treatment Status:**

- Between October 1, 2006 and September 30, 2007 the 200-ZP-1 pump-and-treat system average pumping rate was approximately 253 gpm (**Attachment 8**).
- Four of the ten 200-ZP-1 extraction wells are currently off line to support CHG's resistivity surveys being performed by the Tx-Ty Tank Farm.
- Trend data for carbon tetrachloride in well 299-W15-6 showed no significant changes from previous months (**Attachment 9**).
- The 2 T Tank Farm extraction wells (299-W11-45 and 299-W11-46) continue to pump water to ETF at around 40 gpm. The 2 flow meters have now been installed. The system was shut down last week for a period of time for an ETF transfer.
- The draft detailed evaluation of the most promising GAC alternatives is complete and is out for internal review.
- We have narrowed down the new wells to be tied into the ZP-1 treatment building to those shown on **Attachment 10**.
- Pump tests are scheduled for wells 299-W15-1, 299-W15-7, and 299-W15-11 next week. Preliminary design work has started for tying four of these wells into the ZP-1 treatment building.

- RI/FS Status:
  - FS and PP Report:
    - Draft A reports are out for EPA review.
- Tc-99 Investigation Status:
  - T Tank Farm Investigations:
    - Construction of the T-5 well (C5244, 299-W10-32, replaced by well C5855, 299-W10-33) was completed on 9/28.
  - Purolite Resin Treatability Testing (**Attachments 11, 12, 13, and 14**):
    - Well 299-W15-765 appears to be showing signs of breakthrough. Well 299-W15-44 still shows no sign of breakthrough.
    - The skids are currently being winterized to allow them to run for another month or so.
    - On October 15, 2007 FH received concurrence from EPA and RL to reduce the sampling frequency specified in DOE/RL-2006-64, Rev. 0 to once per week as opposed to twice per week.

#### **200-PW-1, 200-PW-3, & 200-PW-6**

##### **(M-15-45B, 9/30/07, Feasibility Study/Proposed Plan) EPA**

- The PW-1/3/6 FS and PP were transmitted to EPA September 28, 2007, meeting TPA milestone M-15-45B. Comments from EPA are due November 15, 2007.
- The PW-1/3/6 Remedial Investigation Report, Revision 0 was transmitted to EPA, for their approval, September 28, 2007.
- Soil Vapor Extraction System (SVE):
  - The SVE system was shutdown for the winter on 10/1/07.
  - Approval by RL and EPA of the monitoring planned for October 2007 through March 2008 will be attached to these meeting minutes (**Attachment 23**).
  - The passive system remains operational.
  - Monthly monitoring results for September 2007 are presented in **Attachment 15**.

#### **200-CW-2/4/5 & 200-SC-1 OU Group**

##### **200-CW-2, CW-4, CW-5, & SC-1**

##### **(M-15-40D, 7/31/08, Feasibility Study/Proposed Plan) EPA**

TPA change packages M-15-07-01 and M-15-07-03 were signed by EPA.

Change package M-15-07-01 removes 200-CW-2, 200-CW-4 and 200-SC-1 from the M-15-40D milestone and establishes milestone M-40E to submit a FS and PP for the 200-SC-1 OU.

Change package M-15-07-03 modified the milestone M-15-40D. A new submittal date for the FS and PP was established to allow additional analysis of exposure point concentrations at the Z-ditches.

**200-TW-1 & 200-PW-5 OU Group**

**200-TW-1 & 200-PW-5 (No change)**

**(M-15-42D, 12/31/11, Feasibility Study/Proposed Plan for TW-1 & PW-5) EPA**

**200-TW-2 OU Group**

**200-TW-2 (No change)**

**(M-15-42E, 12/31/11, Feasibility Study/Revised Recommended Remedy(ies) for TW-2) Ecology**

**200-PO-1, 200-PW-2/4, 200-MW-1 OU Group**

**200-PO-1**

**(M-13-10A, 9/30/07, RI/FS Work Plan) Ecology**

- Work Plan & Characterization SAP  
RL transmitted the 200-PO-1 RI/FS Work Plan (DOE/RL-2007-31, Draft A) document to Ecology on 8/31/07 in completion of M-013-10A milestone. Ecology has requested a 30 day extension to review and comment through 11/30/07.
- DQO  
The DQO Summary Report (SGW-34011 Rev. 0) was issued and provided to Ecology on 9/20/07.

**200-PW-2 & 200-PW-4**

**(M-15-43D, 12/31/10, Feasibility Study and Revised Recommended Remedy(ies)) Ecology**

- No new items to report.

**200-MW-1**

**(M-15-44B, 12/31/08, Feasibility Study/Proposed Plan) EPA**

- Drilling the high-risk borehole in the 216-A-2 Crib has been completed and the borehole is currently being decommissioned.
- Work on the mini-RI for the supplemental investigations was initiated and a kickoff meeting was held October 11, 2007.

**200-BP-5 & 200-LW-1/2 OU Group**

**200-BP-5**

**(M-13-06B, 3/31/07, RI/FS Work Plan, Completed) EPA**

**(M-15-21A, 10/31/10, Feasibility Study/Proposed Plan) EPA**

**Work Plan Presentation:**

- Power Point Presentations for the purpose of the A-E wells was provided to DOE, stakeholders and tribes 10-17-07. This presentation will be included to Rev 1 of the 200-BP-5 DQO. The revised DQO is expected to be revised by December 2007.

**Drilling:**

- Cable tool drilling commenced at well 299-E27-155/C5852, located southwest of the WMA C September 26<sup>th</sup>. This well is designed to investigate the down gradient nature and extent of contaminants being reported in wells near the WMA C (**see Figure 1, Attachment 16**).
- Pre-drilling activities for well 299-E33-344/C5859 are nearly complete. This well is scheduled to start drilling at the beginning of November (**see Figure 1**). The purpose of this well is to investigate a zone of increasing uranium located above the aquifer (**see Figure 2, Attachment 17**) and to complete hydraulic study of the unconfined aquifer through a stepped pump test (**see Figure 3, Attachment 18**).
- Pre-drilling activities for well 699-52-55A/C5861 located north of the 200 East Area are complete. This well is scheduled for drilling upon the completion of well 299-E27-155 (**see Figure 4, Attachment 19**). The purpose of this well is to complete a hydraulic study in the unconfined aquifer through a stepped pump test and refine the conceptual model.

**Groundwater Monitoring:**

- Uranium concentrations have been reported with significant increases in the following isolated wells over the past several months (**see Figure 5, Attachment 20**):
  - 299-E33-16
  - 299-E33-31
  - 299-E33-41
- Uranium concentrations in proximal wells to these significant reported increase have not shown the same significant increase (**see Figure 6, Attachment 21**):
  - 299-E33-9
  - 299-E33-15
  - 299-E33-18
- Other mobile contaminants such as Tc-99, nitrate, and sodium continue to increase across the B/BX/BY WMA with significant increases recently reported under various waste sites including BY Cribs, 216-B-8 Cribs and along the northern boarder of the B WMA (**see Figure 7, Attachment 22**).

**200-LW-1/200-LW-2**

**(M-15-46B, 12/31/11, Feasibility Study/Recommended Remedy) Ecology**

- No new items to report.

## **200-UR-1, 200-MG-1/2 & ECO OU Group**

### **200-UR-1**

- Radiological surveys for the eastern portion of the BC Control Area scheduled to begin October 2007.
- West Lake DQO summary report FH-RL review workshop tentatively scheduled for the week of October 15, 2007.
- An EE/CA for BCCA removal action is being developed.
- RI/FS Work Plan Rev. 0 is under revision.

### **200-MG-1/200-MG-2 Model Group 1 Sites**

**(M-15-49A, 12/31/08, MG-1 Feasibility Study/Recommended Remedy) Ecology**

**(M-15-49B, 12/31/08, MG-2 Feasibility Study/Proposed Plan) EPA**

- Strategy and communication approaches for preparation of 200-MG-1/2 Feasibility Studies are complete.
- A meeting is being planned to discuss waste site categorization approach, proposed FS outline, and project schedule with regulators.
- Development of Feasibility Studies for 200-MG-1/2 Waste Sites is in process.
- Reassignments of select sites into 200-MG-1/2 are being accomplished via TPA Change Requests.

### **Ecological Risk Assessment**

- Data validation and Data Quality Assessments (DQAs) for the ERA are complete.
- FH review of the internal draft of the Environmental Risk Assessment report is complete and comments have been incorporated.
- The Environmental Risk Assessment Report Decisional Draft is nearly complete. RL review of the document is planned for 10/29/07 through 11/20/07.
- ERA Draft A is planned for transmittal to regulators by 2/14/07.

## **200-BC-1, 200-IS-1, 200-SW-1/2 OU Group**

### **200-BC-1**

**(M-15-51, 4/30/10, Feasibility Study/Proposed Plan) EPA**

- Updated DQO and SAP addressing electrical resistivity correlation have been prepared that address EPA comments on the Draft A documents. Anticipate submittal to EPA in 2-3 weeks.
- EPA approved SAP for Phase I of the excavation-based treatability test on 6/28/07. Installation of DPT holes and logging associated with Phase I of the excavation-based treatability test continued. Remaining Phase I field work is to collect soil samples and install/log 6-12 additional "step-off" holes to establish extent of lateral contamination spread.

- TPA Change Notice (TPA-CN-181), approved 9/20/07, changed the treatability test Phase I sampling strategy to reduce the number of samples while assuring collection of samples over entire range of interest, plus continuing sampling if initial sampling does not provide sufficient correlation of logging data vs. sampling data. Modified sample collection tooling provides much-improved worker protection from hazards associated with "hot" samples.
- Soil sampling associated with Phase I of the TT began 10/03/07. As of 10/09, twelve samples have been collected from four holes.
- Draft A of the Treatability Test Plan, including SAP, was transmitted to EPA 6/18/07. Update reflecting the TPA Change Notice #181 was informally provided to EPA to facilitate their review.

**200-IS-1 (No change)**

**(M-13-27, 6/30/07, RI/FS Work Plan) Ecology**

- Ecology has requested an extension to October 25, 2007 for review of the WP and SAPs.

**200-SW-1/2**

**(M-13-28, 9/30/07, RI/FS Work Plan) Ecology**

- The 200-SW-1 and 200-SW-2 OU RI/FS Work Plan (Draft B) was approved by DOE-RL and delivered to Ecology on September 28, 2006 (on schedule, and meeting TPA Milestone M-013-28).

**Supplemental Characterization**

- **Supplemental Work Plan** – Resolution on path forward was reached between the Tri-Parties and the resolutions are being incorporated into a redline of the work plan. Ecology emailed a set of comments on the redline of the work plan that doesn't affect the scope of the work plan. Delays in gaining approval of the work plan are having associated delays in starting field activities.

**Annual Reporting Requirement for the Sitewide Institutional Controls Plan at the 200 Area UMM**

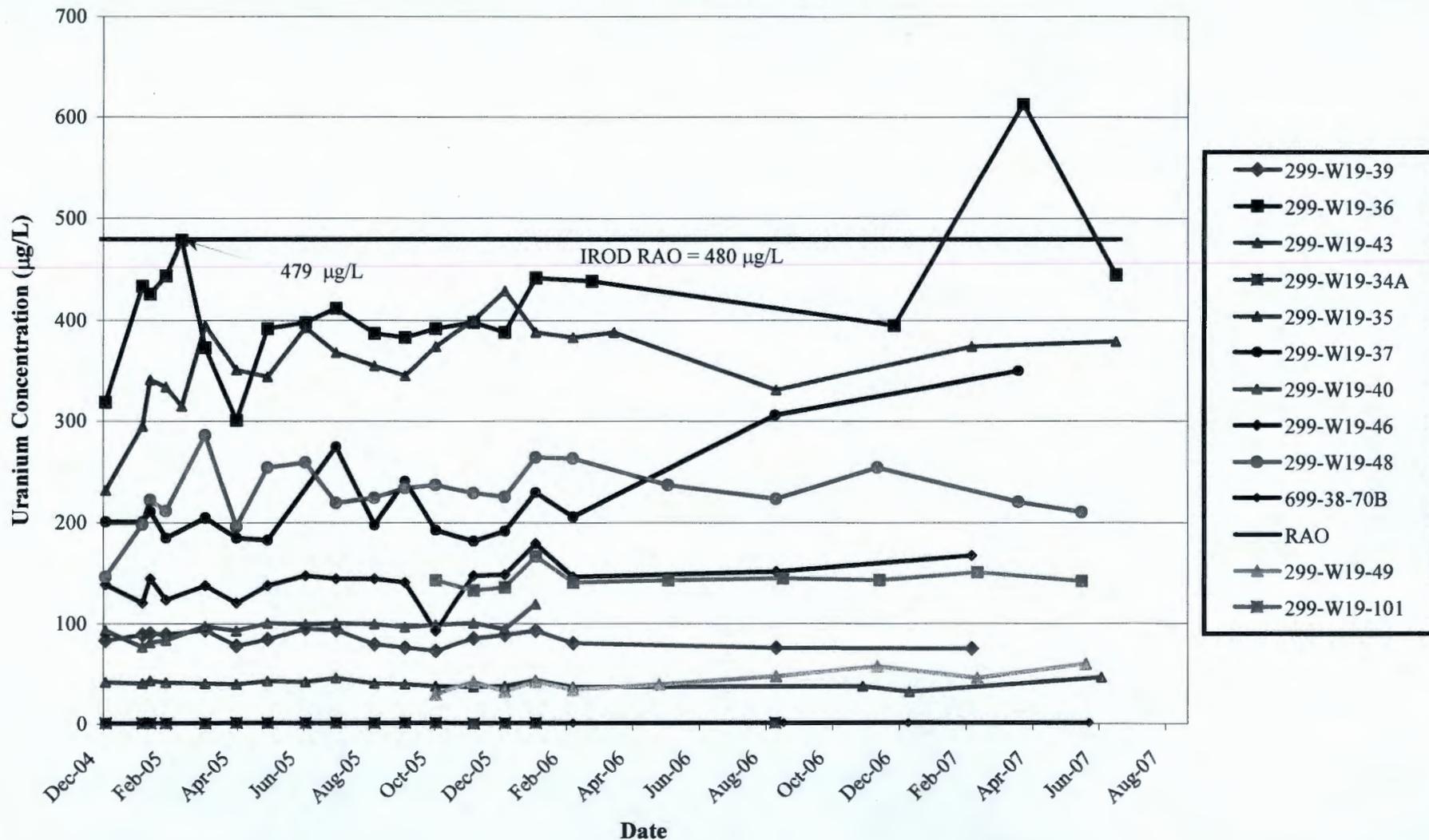
Source Document: Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions (DOE/RL-2001-41 REV 2).

The Plan describes how the institutional controls (ICs) are implemented and maintained, and serves as a reference for the selection of institutional controls in the future.

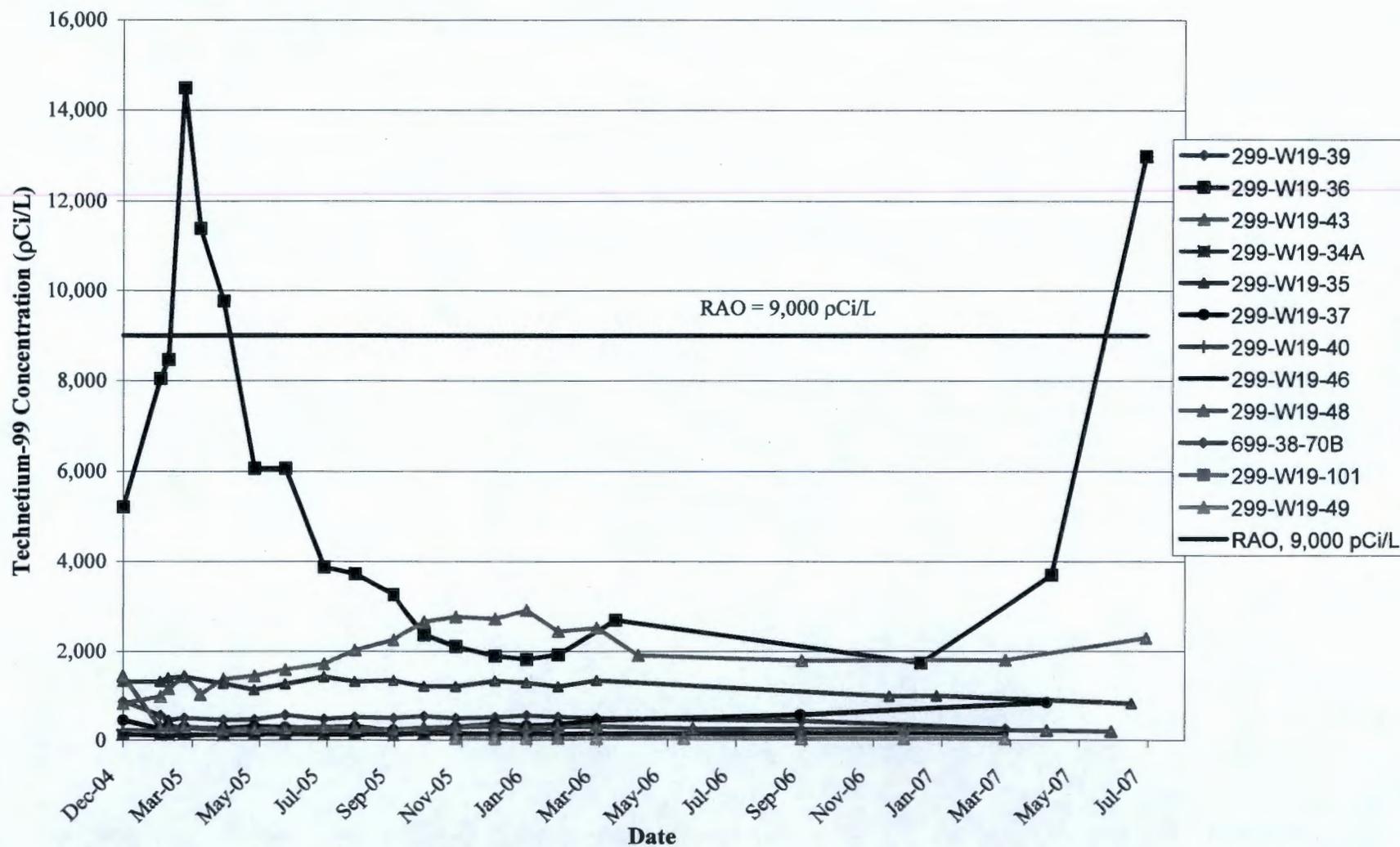
Institutional controls generally include non-engineered restrictions on activities and access to land, groundwater, surface water, waste sites, waste disposal areas, and other areas or media that contain hazardous substances to minimize the potential for human exposure to the substances. Common types of institutional controls include procedural restrictions for access, fencing, warning notices, permits, easements, deed notifications, leases and contracts, and land-use controls.

- The plan was updated in June 2007 to add 221-U requirements.
- The plan addresses ICs for 200 Area UMM facilities 221-U, 200-UP-1, and 200 ZP-1.
  - The institutional controls for 221-U are divided into during and after remediation. The remediation has not started yet so the requirements do not yet apply.
  - For 200-UP-1 DOE is responsible for establishing and maintaining land use and access restrictions until the final remedy is implemented. No violations of land use or access restrictions have occurred. (The final IC requirements are applicable when the remediation is complete.)
  - No institutional controls are identified for 200-ZP-1

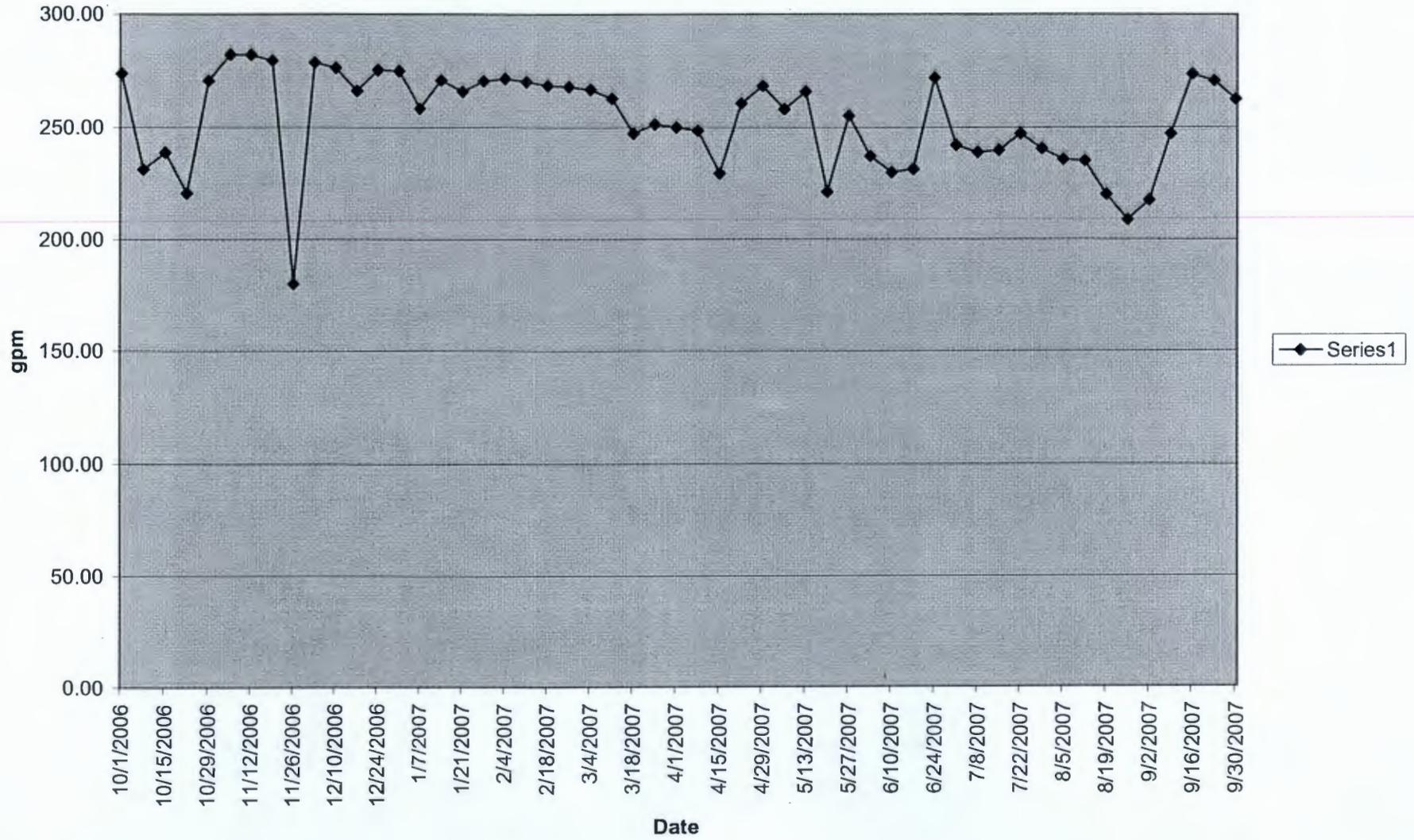
200-UP-1, Uranium ( $\mu\text{g/L}$ )



200-UP-1, Technetium-99 (pCi/L)



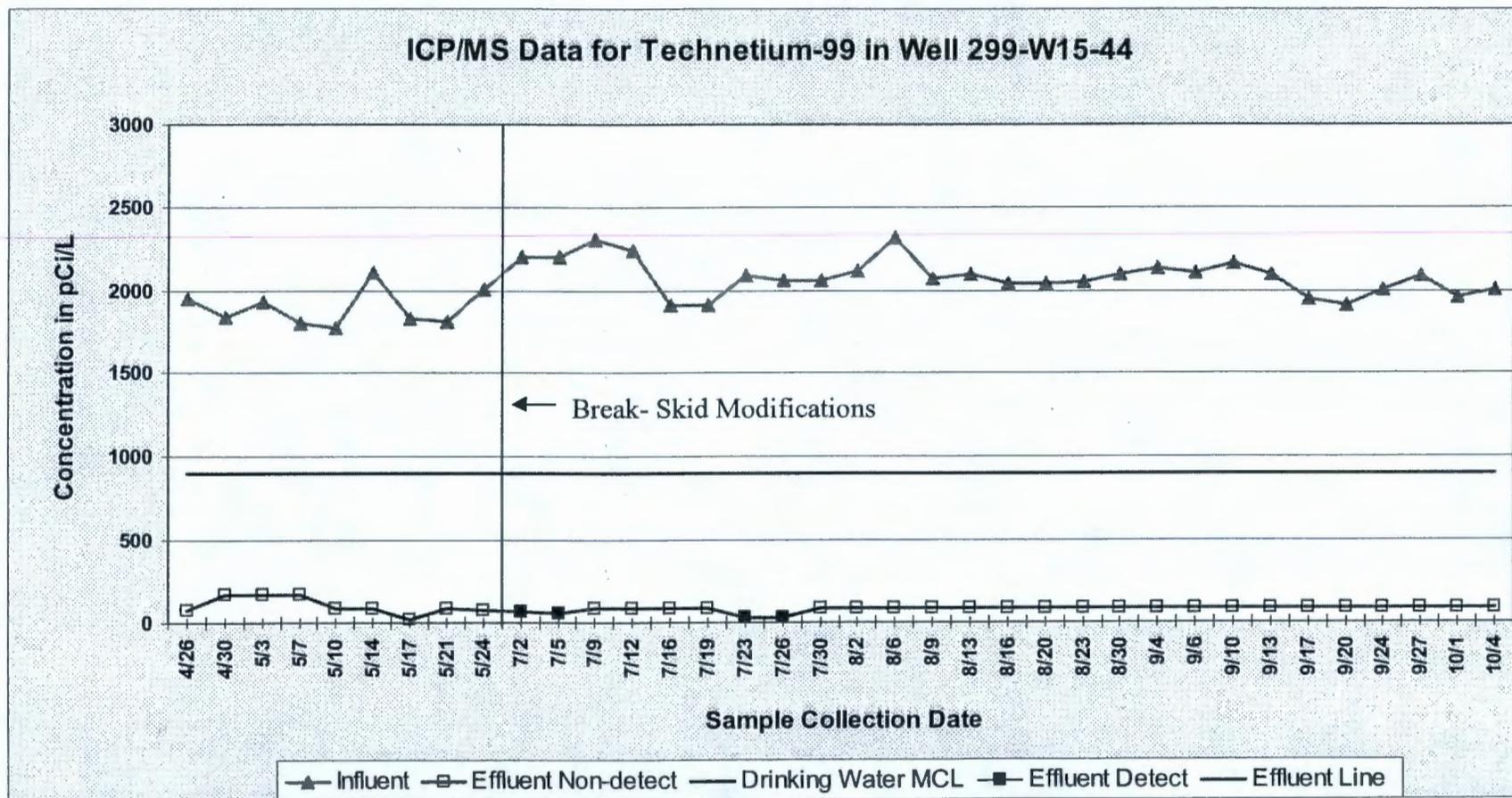
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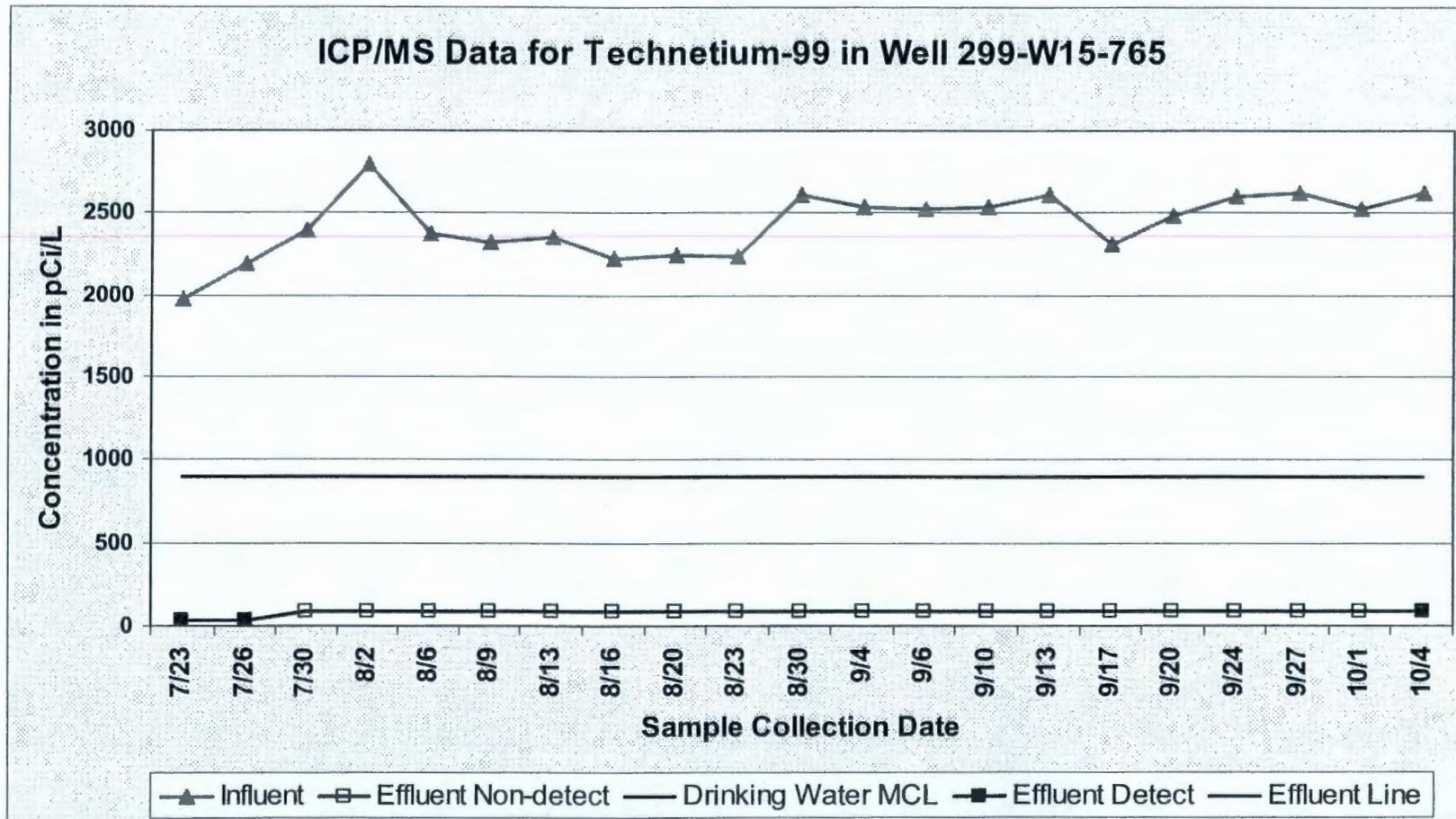




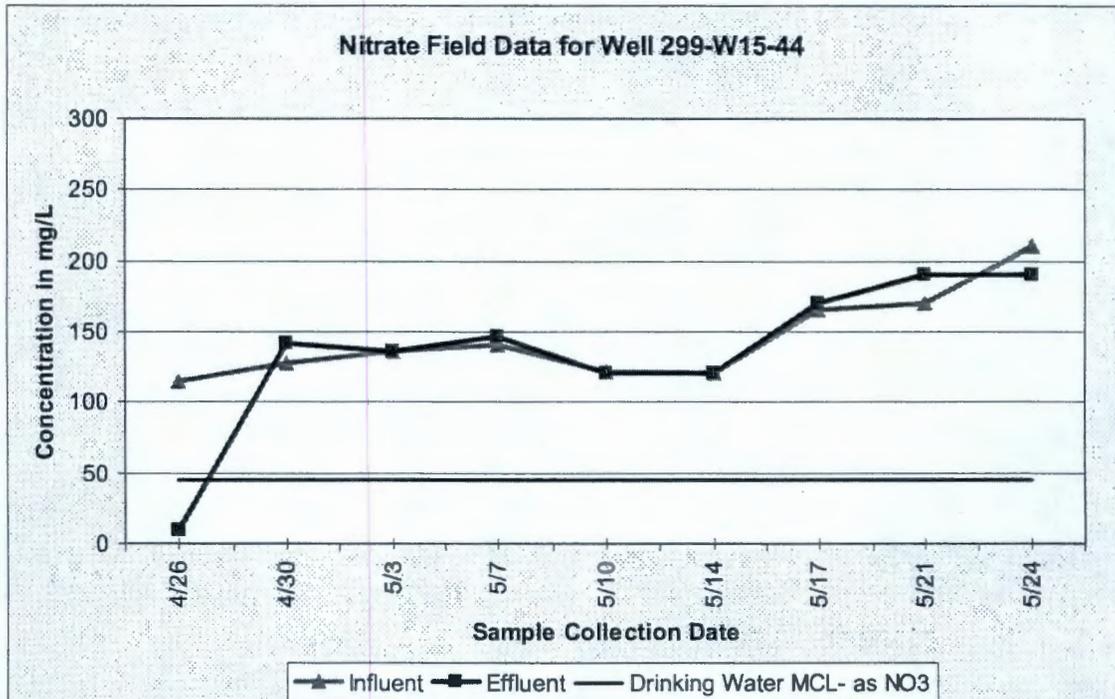
Techneium-99 ICP/MS Data for Ion Exchange Column at 200-ZP-1 Extraction Well 299-W15-44



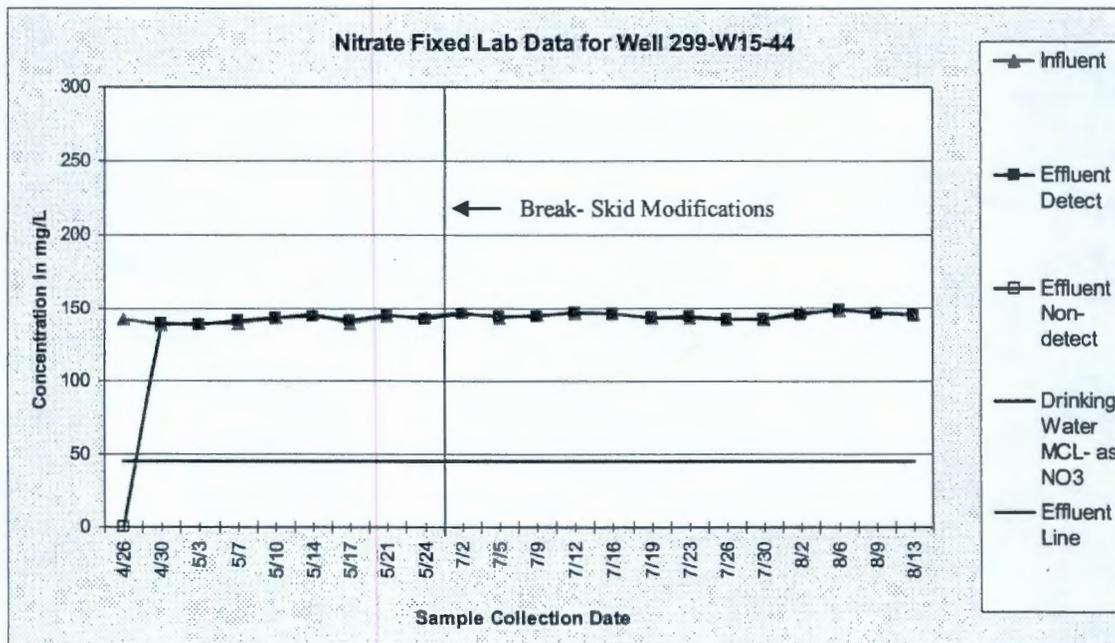
**Technetium-99 ICP/MS Data for Ion Exchange Column at 200-ZP-1 Extraction Well 299-W15-765**



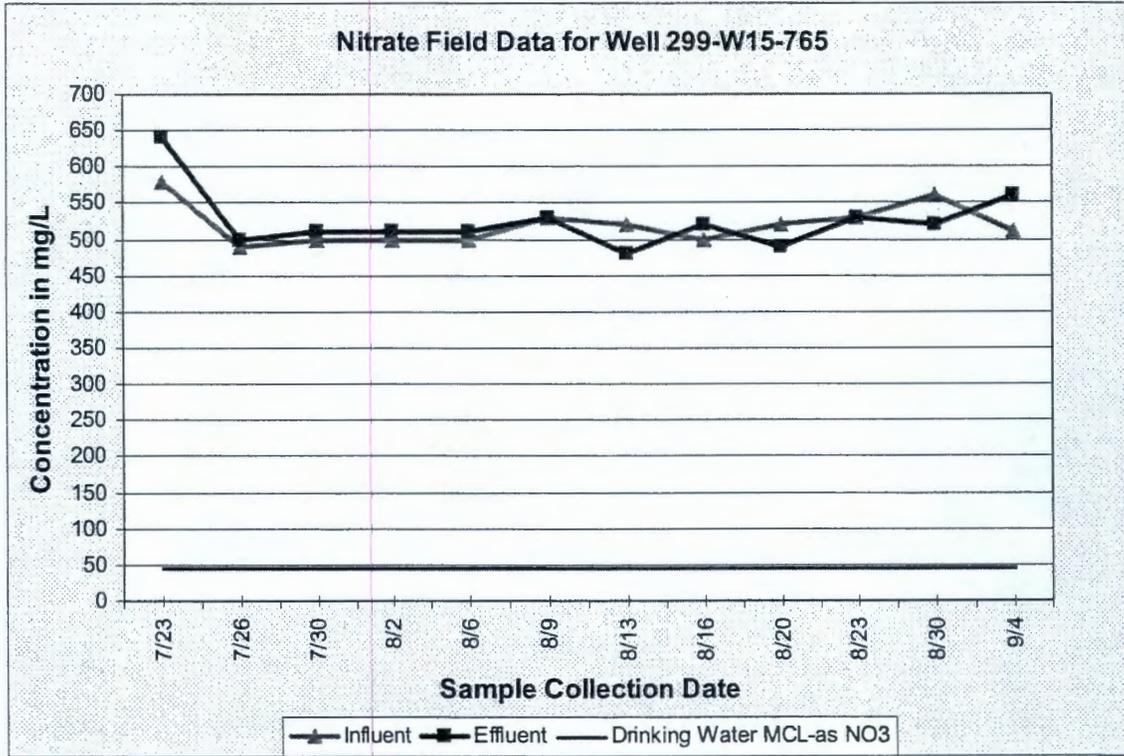
Nitrate Field Data for Extraction Well 299-W15-44



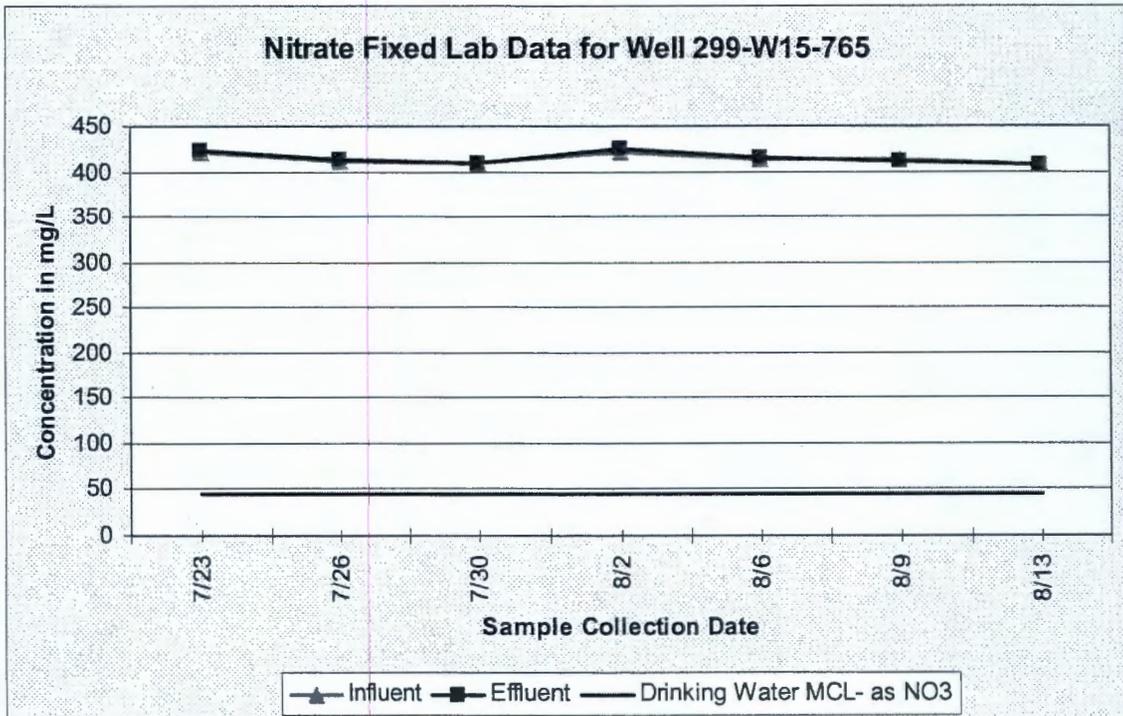
Nitrate Fixed Lab Data for Extraction Well 299-W15-44



Nitrate Field Data for Extraction Well 299-W15-765



Nitrate Fixed Lab Data for Extraction Well 299-W15-765



Comparison of Maximum Carbon Tetrachloride Rebound Concentrations  
Monitored at 200-PW-1 Soil Vapor Extraction Sites  
FY 2003 - FY 2007

200-PW-1	Location	Site	July 2002 (Z-9) or October 2003 (Z-1A) - March 2004		July 2002 (Z-9) or April 2004 (Z-1A) - September 2004		October 2004 - June 2005		July 2005 - June 2006		July 2006 - September 2007	
			Maximum Rebound of Carbon Tetrachloride (ppmv)	months*	Maximum Rebound of Carbon Tetrachloride (ppmv)	months*	Maximum Rebound of Carbon Tetrachloride (ppmv)	months*	Maximum Rebound of Carbon Tetrachloride (ppmv)	months*	Maximum Rebound of Carbon Tetrachloride (ppmv)	months*
	CPT-17/ 10 ft	Z-9	9.0	21	9.9	27	11.4	5	2.5	12	1.6	9
	CPT-18/ 15 ft	Z-9	2.4	21	2.5	27	3.1	5	0	12		
	CPT-4A/ 25 ft	Z-1A										
	CPT-27/ 15 ft	Z-9									0	9
	CPT-4E/ 25 ft	Z-1A			2.4	0	2.4	9	2.4	0	3.3	12
	CPT-16/ 25 ft	Z-9	2.6	21	3.6	27	4.4	5	1.6	12	1.0	9
	CPT-31/ 25 ft	Z-12										
	CPT-32/ 25 ft	Z-1A	5.9	6			8.6	9	6.4	6	8.0	12
	CPT-30/ 28 ft	Z-18	0	6			1.6	9	1.2	6	0	12
	CPT-13A/ 30 ft	Z-1A	1.8	6	1.9	0	8.3	9	4.1	0	5.8	12
	CPT-7A/ 32 ft	Z-1A	9.5	6	1.9	0	4.4	9	3.8	0	3.9	12
	CPT-27/ 33 ft	Z-9	2.7	21	2.7	27	8.4	5	1.8	12		
	CPT-1A/ 35 ft	Z-12	18.3	6	18.0	0	14.0	9	17.2	0	12.2	12
	CPT-18/ 35 ft	Z-9									0	9
	CPT-28/ 40 ft	Z-9					5.4	0			59.3	12
	CPT-33/ 40 ft	Z-18					3.9	9			1.8	12
	CPT-34/ 40 ft	Z-18			1.8	0	3.0	9	2.0	0	2.8	12
	CPT-21A/ 45 ft	Z-9					7.9	0				
	CPT-30/ 48 ft	Z-18									4.2	9
	W15-220ST/ 52 ft	Z-9										
	CPT-9A/ 60 ft	Z-9	35.9	21	35.9	27	32.4	5	29.2	12	22.0	14
	CPT-28/ 60 ft	Z-9					68.3	0				
	CPT-C3872 / 63 ft	Z-1A					15.5	9	9.9	6	17.2	12
	CPT-16/ 65 ft	Z-9			4.2	27	6.7	5	5.6	0		
	CPT-21A/ 65 ft	Z-9	150	21	150	27	170	0	167	12	193	14
	CPT-1A/ 68 ft	Z-12					13.7	9			6.4	12
	CPT-30/ 68 ft	Z-18										
	CPT-13A/ 70 ft	Z-1A										
	CPT-24/ 70 ft	Z-9			9.1	27			5.2	12		
	CPT-32/ 70 ft	Z-1A					5.5	9			6.4	12
	W15-219SST/ 70 ft	Z-9			5.7	22						
	CPT-4A/ 75 ft	Z-1A										
	CPT-18/ 75 ft	Z-9			8.3	27			4.3	12		
	CPT-31/ 76 ft	Z-12										
	CPT-33/ 80 ft	Z-18										
	W15-82/ 83 ft	Z-9	85.8	21	85.8	27	95.8	5	8.1	12	3.9	9
	CPT-21A/ 86 ft	Z-9	244	21	244	27	209	5	223	12	230	14
	CPT-34/ 86 ft	Z-18										
	W15-95U/ 86 ft	Z-9										
	W15-218SST/ 86 ft	Z-9										
	CPT-28/ 87 ft	Z-9	258	21	258	27	246	5	245	12	262	14
	CPT-4B/ 90 ft	Z-1A										
	CPT-1A/ 91 ft	Z-12										
	CPT-4A/ 91 ft	Z-1A										
	CPT-9A/ 91 ft	Z-9										
	W15-85/ 91 ft	Z-9										
	W18-252SST/ 100	Z-1A										
	W18-152/ 101 ft	Z-12	12.4	6			16.0	9	16.2	6	16.3	12
	W15-8U/ 103 ft	Z-9							10.4	12	14.1	9
	CPT-4E/ 103 ft	Z-1A										
	W18-167/ 106 ft	Z-1A	266	6			196	9	174	6	3.0	12
	CPT-4F/ 109 ft	Z-1A					11.9	9			5.2	12
	W18-165/ 109 ft	Z-1A	205	6			35.2	9	394	6	3.2	12
	W15-217/ 114 ft	Z-9	458	21	467	27	374	5	19.7	12	16.5	9
	CPT-24/ 118 ft	Z-9			15.3	27			23.9	12		
	W15-220SST/ 118	Z-9			26.0	27			25.2	12		
	W18-158L/ 120 ft	Z-1A										
	W15-219SST/ 130	Z-9			0	22						
	W18-249/ 130 ft	Z-18	41.0	6			64.9	9	24.1	6	19.7	12
	W18-248/ 131 ft	Z-1A	180	6			249	9	67.0	6	131	12
	W15-95L/ 144 ft	Z-9	40.3	21	40.3	27	26.7	5	25.7	12	18.0	9
	W15-219SST/ 155	Z-9			9.5	22						
	W15-220L/ 163 ft	Z-9			7.5	27			13.2	12		
	W18-247L/ 167 ft	Z-18					9.3	passive	7.8	passive	10.0	passive
	W18-246L/ 170 ft	Z-1A					22.0	passive	25.3	passive	14.7	passive
	W15-219L/ 175 ft	Z-9			23.0	27			12.2	12		
	W18-252L/ 175 ft	Z-1A					18.0	passive	16.9	passive	12.2	passive
	W15-9L/ 176 ft	Z-9	13.1	21	13.1	27	2.1	5	5.4	12	7.9	9
	W15-84L/ 180 ft	Z-9	25.9	21	25.9	27	23.0	5	14.0	12		
	W15-6L/ 182 ft	Z-9										
	W18-10L/ 183 ft	Z-18					12.2	passive	14.1	passive	13.8	passive
	W15-220SST/ 185	Z-9										
	W18-7/ 197 ft	Z-1A					24.6	passive	33.8	passive	39.3	passive
	W18-12/ 198 ft	Z-18					9.9	passive	9.4	passive	4.8	passive
	W18-11L/ 199 ft	Z-18					7.3	passive	9.0	passive	8.4	passive
	W18-6L/ 208 ft	Z-1A					23.2	passive	24.4	passive	15.8	passive
	W15-46/ 217 ft	Z-9							4.7	12	5.7	9

\* - based on location (Z-1A/18/12 or Z-9) of monitoring point; specific points may be beyond SVE zone of influence during particular operating configurations

- Z-18 and Z-12 wells off-line Oct 96 - Apr 98

- CPT-1A, CPT-9A, and possibly CPT-7A appeared to be beyond SVE zone of influence in Oct 96 based on differential pressure (BHI-01105, p. 6-1)

- CPT-9A, CPT-21A, CPT-28 beyond SVE zone of influence in May 96 based on CCl4 concentrations and airflow modeling based on measured vacuums (BHI-01105, p. 6-1)

Carbon Tetrachloride Rebound Concentrations  
Monitored at 200-PW-1 Soil Vapor Extraction Sites  
July 2006 - September 2007

200-PW-1		07/26/2006	08/30/2006	09/26/2006	10/25/2006	11/30/2006	12/19/2006	01/31/2007	02/27/2007	03/21/2007	04/18/2007	05/29/2007	06/27/2007	07/25/2007	08/30/2007	09/24/2007
Location (Well or Probe) /feet bgs	Site	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)	CCI4 (ppmv)
CPT-17/ 10 ft	Z-9				1.2	1.2	1.2	1.4	1.6	1.5					1.3	1.3
CPT-18/ 15 ft	Z-9														0	0
CPT-27/ 15 ft	Z-9				0	0	0	0	0	0						
CPT-4E/ 25 ft	Z-1A	0	0	0							3.2	3.3	1.8	1.5	2.0	1.4
CPT-16/ 25 ft	Z-9				0	1.0	0	0	1.0	0					0	0
CPT-32/ 25 ft	Z-1A	0	0	0	0	1.2	2.1	3.4	6.0	5.7	8.0	7.6	7.1	5.3		
CPT-30/ 28 ft	Z-1A	0	0	0							0	0	0	0		
CPT-13A/ 30 ft	Z-1A	2.4	2.5	2.4	3.3	2.9	5.8	1.6	5.0	2.2	1.8	3.7	2.4	2.1	3.2	4.6
CPT-7A/ 32 ft	Z-1A	2.0	1.9	1.2	1.9	2.5	2.6	3.2	3.4	3.8	3.9	2.7	2.7	2.5	2.2	1.9
CPT-27/ 33 ft	Z-9														1.0	0
CPT-1A/ 35 ft	Z-12	11.0	13.4	10.2	10.0	4.6	5.1	4.4	7.3	2.8	4.2	1.2	6.6	7.2	10.0	12.2
CPT-18/ 35 ft	Z-9				0	0	0	0	0	0						
CPT-28/ 40 ft	Z-9	5.5	4.3	4.8							8.6	59.3	4.9	5.5		
CPT-33/ 40 ft	Z-18	0	1.3	1.6							1.5	1.8	1.4	1.3		
CPT-34/ 40 ft	Z-18	0	1.3	1.3							1.2	1.4	1.1	1.1	2.8	2.3
CPT-21A/ 45 ft	Z-9															
CPT-30/ 48 ft	Z-9				0	4.2	3.1	2.9	1.5	1.1						
CPT-9A/ 50 ft	Z-9	32.8	40.7	43.3	30.6	42.6	42.0	43.7	39.5	27.4	39.7	39.1	43.6	37.5	45.6	44.7
CPT-9A/ 60 ft	Z-9	12.8	9.8	15.7	14.2	16.2	13.1	13.2	7.2	10.7	12.9	12.1	12.1	22.0	14.5	14.9
CPT-28/ 60 ft	Z-9															
CPT-C3872 / 63 ft	Z-1A	2.1	2.2	2.4	3.5	5.5	6.1	7.8	12.2	10.1	11.5	15.2	16.8	17.2		
CPT-9A/ 64 ft	Z-9	33.8	33.8	33.9	28.1	32.3	28.9	16.7	29.9	26.1	23.4	31.4	32.4	30.4	33.1	32.0
C4937/ 64.1 ft	Z-9														191	101
C4938/ 64.0 ft	Z-9														78.2	35.7
C5340/ 64.5 ft	Z-9														48.4	17.3
CPT-16/ 65 ft	Z-9														6.2	6.9
CPT-21A/ 65 ft	Z-9	153	132	137	123	120	123	127	138	101	119	105	193	112	160	130
CPT-1A/ 68 ft	Z-12	13.2	12.5	5.6							6.2	0	0	6.4		
CPT-24/ 70 ft	Z-9														2.5	2.4
CPT-32/ 70 ft	Z-1A	4.2	4.3	3.5							5.2	6.0	6.4	6.3		
W15-219SST/ 70 ft	Z-9															
CPT-18/ 75 ft	Z-9														0	0
W15-82/ 83 ft	Z-9				0	0	0	2.3	3.9	0					0	0
CPT-21A/ 86 ft	Z-9	179	171	194	159	169	164	189	170	119	161	125	207	183	230	190
CPT-28/ 87 ft	Z-9	180	185	216	181	202	196	0	209	119	182	147	262	162	243	232
W18-152/ 101 ft	Z-12	10.8	12.5	13.3	13.0	14.4	13.8	15.1	16.3	13.1	13.8	12.6	13.7	11.8		
W15-8U/ 103 ft	Z-9				2.4	6.1	1.2	4.6	14.1	1.7					0	0
W18-167/ 106 ft	Z-1A	0	0	0	0	0	0	3.0	1.1	0	0	0	3.0	0		
CPT-4F/ 109 ft	Z-1A	1.2	2.9	0							4.1	5.2	0	0		
W18-165/ 109 ft	Z-1A	-(q)	0	0	0	0	0	2.5	2.2	0	0	0	3.2	0		
W15-217/ 114 ft	Z-9				0	0	0	7.0	16.5	0					4.8	1.1
CPT-24/ 118 ft	Z-9														19.9	20.9
W15-220SST/ 118 ft	Z-9														21.0	15.3
W18-249/ 130 ft	Z-18	4.6	19.4	18.1	16.8	18.4	8.8	19.7	16.1	16.0	15.0	15.4	18.1	14.9		
W15-219SST/ 130 ft	Z-9															
W18-248/ 131 ft	Z-1A	-(m)	27.2	43.0	42.1	45.3	30.7	52.7	131	4.7	70.0	34.4	65.9	60.9		
W15-95L/ 144 ft	Z-9				10.0	16.2	15.3	16.9	18.0	0					12.3	12.0
W15-219SST/ 155 ft	Z-9															
W15-220L/ 163 ft	Z-9														8.5	0
W15-219L/ 175 ft	Z-9														15.7	0
W15-9L/ 176 ft	Z-9				4.7	2.3	2.2	3.5	7.9	4.7					6.7	6.6
W15-84L/ 180 ft	Z-9														11.0	4.4
W15-46/ 217 ft	Z-9				0	0	0	4.0	5.7	0					3.1	0
		(m) Unable to sample; well in use by Vista Engineering														
		(q) Unable to sample; well in use for geophysical logging														

Carbon Tetrachloride Concentrations  
 Monitored at 200-PW-1 Passive Soil Vapor Extraction Wells  
 July 2006 - September 2007

200-PW-1	7/26/2006	8/29/2006	9/26/2006	10/26/2006	11/28/2006	12/20/2006	1/30/2007	2/28/2007	3/21/2007	4/16/2007	5/30/2007	6/27/2007	7/25/2007	8/28/2007	9/25/2007
Location															
(Well or Probe)	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4
/feet bgs	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
W18-6L/ 208 ft	—(b)	—(b)	15.8	3.7	1.4	0	4.8	4.9	8.1	8.5	11.3	12.3	8.2	5.5	5.2
W18-7/ 197 ft	11.0	15.3	0	5.6	6.0	2.1	7.8	14.1	11.8	21.1	39.3	18.4	16.3	9.4	3.4
W18-10L/ 183 ft	10.0	12.7	11.7	0	0	2.0	12.6	7.0	13.8	1.0	5.7	10.4	5.1	7.6	2.3
W18-11L/ 199 ft	3.0	8.4	1.3	0	0	0	4.5	3.4	3.2	0	3.3	4.3	2.0	0	0
W18-12/ 198 ft	0	4.8	0	0	0	0	1.3	0	0	0	0	1.4	0	0	0
W18-246L/ 170 ft	—(b)	—(b)	3.7	1.7	0	0	2.2	5.3	4.1	9.6	14.7	4.6	8.5	9.0	5.1
W18-247L/ 167 ft	0	5.7	1.0	0	0	0	1.4	0	5.1	0	0	10.0	5.7	6.6	0
W18-252L/ 175 ft	—(b)	—(b)	—(b)	—(b)	—(b)	—(b)	—(b)	2.1	4.5	8.1	12.2	12.0	3.7	2.4	1.1
	(b) disconnected for use by Vista Engineering for cross-well seismic investigation														





Figure 3 Stepped Pump Test

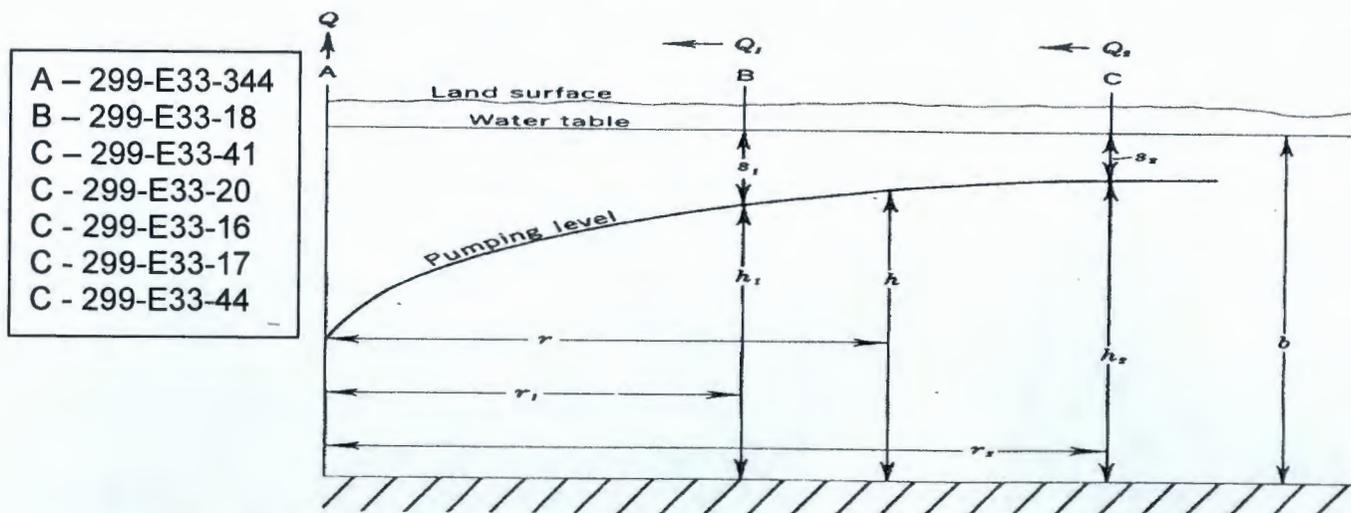
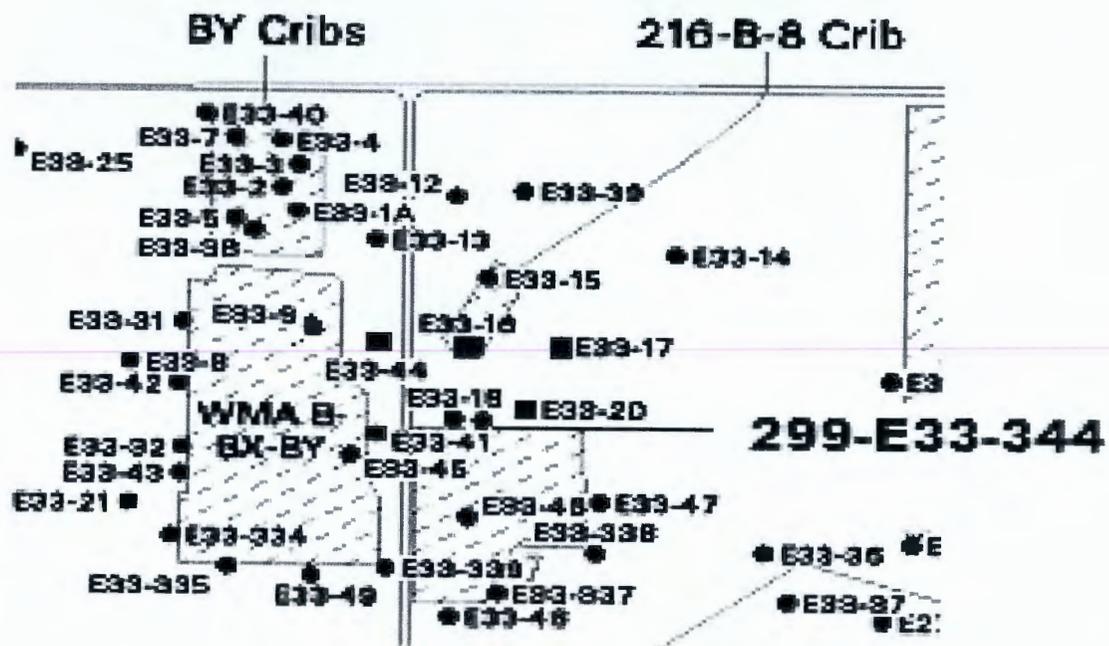
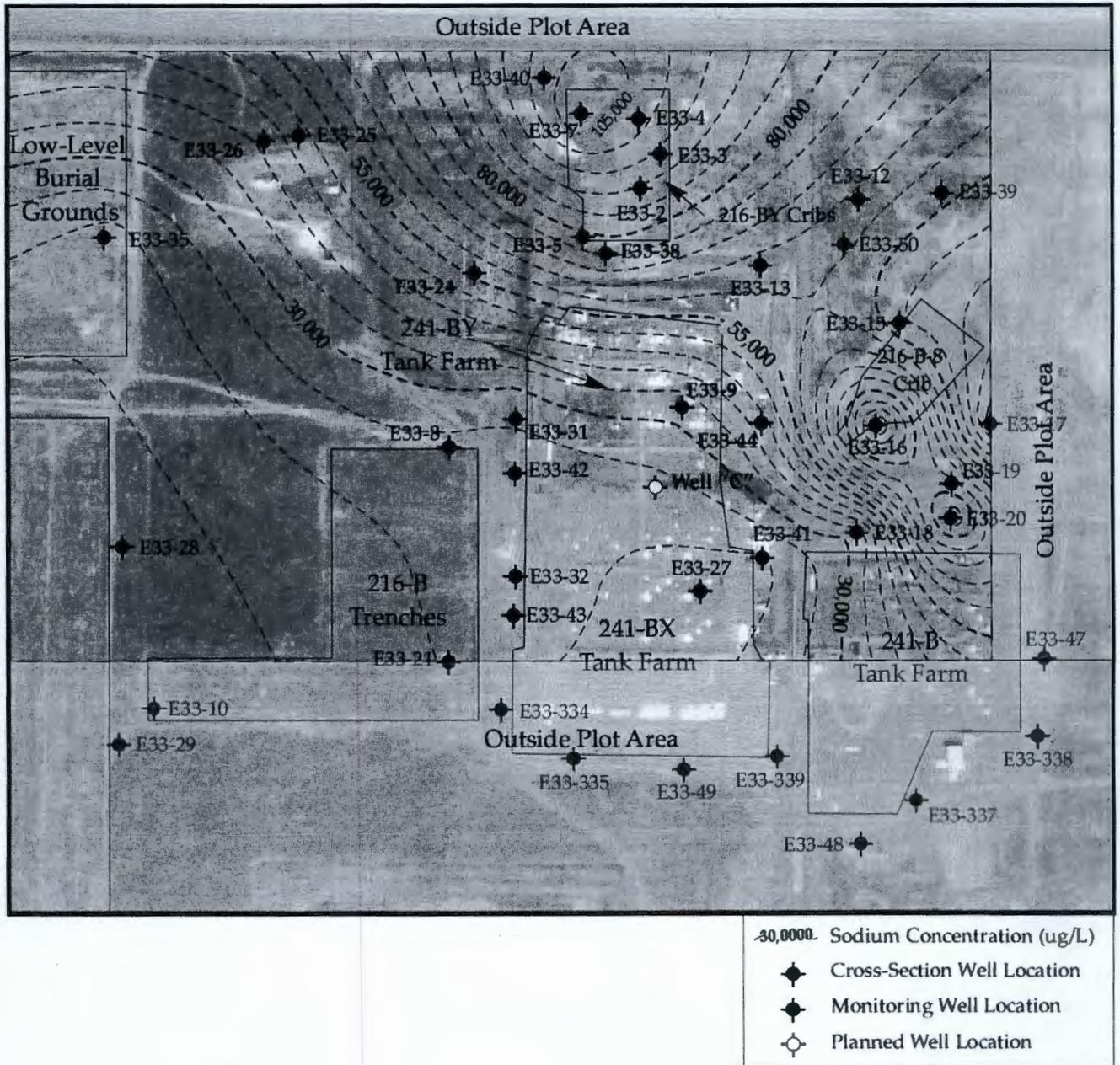








Figure 7: May 2007 Sodium Contour Map in the B/BX/BY WMA and Surrounding Sites.



Attachment 23, Figure 1

APPROVAL OF THE CARBON TETRACHLORIDE EXPEDITED RESPONSE ACTION  
(200-PW-1 OPERABLE UNIT) SOIL VAPOR MONITORING STRATEGY FOR  
OCTOBER 2007 THROUGH MARCH 2008

The Unit Managers for the Carbon Tetrachloride Expedited Response Action (200-PW-1 Operable Unit) approve the attached Soil Vapor Monitoring Strategy for October 2007 through March 2008.

*A.C. Tortoso 10/17/07*

A. C. Tortoso  
U.S. Department of Energy  
Richland Operations Office

*Craig Cameron for*

Date D. A. Faulk  
U.S. Environmental Protection Agency  
Region 10, Hanford Office

Date *10/17/07*

CARBON TETRACHLORIDE EXPEDITED RESPONSE ACTION  
SOIL VAPOR MONITORING STRATEGY FOR OCTOBER 2007 THROUGH MARCH 2008

Non-Operational Monitoring and Passive Soil Vapor Extraction Monitoring

This strategy describes planned non-operational monitoring and passive soil vapor extraction monitoring to be conducted during October 2007 through March 2008 for the 200 West Area Carbon Tetrachloride Expedited Response Action (200-PW-1 Operable Unit). Operation of the soil vapor extraction system will be temporarily suspended during this time, and monitoring will be conducted at both the 216-Z-9 (Z-9) site and the 216-Z-1A/Z-18/Z-12 (Z-1A) site. Passive soil vapor extraction will be maintained at Z-1A wells during this time. Operating plans for use of the soil vapor extraction system will be submitted to the Unit Managers for approval prior to implementation.

Soil vapor monitoring will be conducted at vadose zone locations near the groundwater, the Cold Creek unit, and the ground surface at the Z-1A and Z-9 sites while they are not being actively remediated using the soil vapor extraction system. Anomalies in the monitoring results will be reported at the 200 Area Unit Manager Meetings. If carbon tetrachloride vapor concentrations increase such that the carbon tetrachloride contamination may impact human health or the environment (including groundwater), the Unit Managers will decide on the appropriate response to mitigate the problem (e.g., relocating the soil vapor extraction system to address the problem).

**Scope:** Monitor carbon tetrachloride soil vapor concentrations at selected probes and wells during non-operation of the soil vapor extraction (SVE) system (Tables 1 and 2). All of the probes and wells will be "non-operational," i.e., they will not be connected to the SVE system. Approximately eight non-operational wells have a passive soil vapor extraction system installed at the wellhead.

Passive soil vapor extraction is a remediation technology that uses naturally induced pressure gradients between the subsurface and the surface to drive soil vapor to the surface. In general, falling atmospheric pressure causes subsurface vapor to move to the atmosphere through wells, while rising atmospheric pressure causes atmospheric air to move into the subsurface. The passive soil vapor extraction systems will be used to remove carbon tetrachloride from the vadose zone.

Passive extraction wells will vent through aboveground canisters containing granular activated carbon (GAC). The wells will be monitored monthly using the sampling method used for the non-operational wells. The vapor concentration will be monitored both upstream and downstream of the GAC. The measured vapor concentrations will be used to estimate the amount of carbon tetrachloride extracted through each well during the month.

For monitoring the non-operational probes and wells and the passive extraction wells, the components of this scope are:

### Attachment 23, Figure 3

- Collect soil vapor samples in Tedlar bags for field screening
- Analyze soil vapor samples for carbon tetrachloride using a field screening instrument (the Bruel and Kjaer 1302 multi-gas analyzer)
- Evaluate concentration trends and report anomalous results to 200-PW-1 Unit Managers
- Include results in annual reports

**Purpose and Objectives:** The purpose of non-operational monitoring is to measure carbon tetrachloride concentrations in the vadose zone during the shutdown of the SVE system.

The objectives of monitoring the non-operational wells and probes are (1) to be cognizant of carbon tetrachloride concentrations and trends near the vadose-atmosphere and vadose-groundwater interfaces to evaluate whether non-operation of the SVE system is negatively impacting atmosphere or groundwater; and (2) to be cognizant of carbon tetrachloride concentrations and trends near the lower permeability Cold Creek unit to provide an indication of concentrations that can be expected during restart of SVE operations and to support selection of on-line wells.

The objectives of monitoring the passive soil vapor extraction system wells, which are all open near the vadose-groundwater interface, are: (1) to be cognizant of the carbon tetrachloride concentrations and trends near the vadose-groundwater interface to evaluate whether non-operation of the SVE system is negatively impacting groundwater; and (2) to quantify the mass of carbon tetrachloride removed using this technology.

**Duration:** Non-operational monitoring and passive soil vapor extraction monitoring will be conducted from October 2007 through March 2008 during FY 2008.

**Monitoring Frequency:** Monitoring will be conducted monthly.

**Monitoring Locations:** Locations were selected to focus carbon tetrachloride monitoring near the vadose-atmosphere and vadose-groundwater interfaces and near the Cold Creek unit (Table 1). At the recommendation of the technical lead, and with approval from the task lead, these monitoring locations could be revised based on developing trends, accessibility, and/or recommendations of the sampler. The 200-PW-1 Unit Managers will be advised of any changes to the monitoring locations. Monitoring locations are shown on Figure 1.

**Data Management:** The field screening data obtained from non-operational wells and probes and passive extraction wells are entered into a controlled field logbook, which is maintained by Lockheed Martin Services Inc (LMSI) Records Information Management (RIM) department. The 200-PW-1 technical lead organizes and maintains spreadsheets of the field screening data on a desktop computer. The field screening data are entered into the Hanford Environmental Information System (HEIS) database.

#### Attachment 23, Figure 4

**Data Reporting:** All of the field screening data, and associated quality control data, are included in the annual performance evaluation report for soil vapor extraction operations. The 200-PW-1 Unit Managers will be advised of any anomalous results or new trends, based on comparison with results of previous carbon tetrachloride monitoring and evaluation by the 200-PW-1 technical lead.

**Quality Assurance/Quality Control:** Quality assurance/quality control requirements for sampling and analysis will be conducted at a level appropriate to field screening for volatile organic compounds, in accordance with the project quality assurance project plan. At a minimum, one field duplicate sample will be collected for every 20 vapor samples collected. A carbon tetrachloride standard and a blank sample will be analyzed at the beginning of the analysis of the vapor samples.

Table 1. Distribution of Selected Monitoring Locations.

Target Zone	Number of Monitoring Locations		
	Z-1A	Z-9	Total
Near-surface (3-20 m below ground surface)	6	9	15
Cold Creek unit (25-45 m below ground surface)	5	6	11
Groundwater (50-65 m below ground surface)	8 <sup>a</sup>	2	10
Total	19	17	36

<sup>a</sup> Approximately eight available monitoring locations near the vadose/groundwater interface in the Z-1A area are being monitored as part of the passive soil vapor extraction system network (Table 2).

Table 2. Wells and Probes Selected for Non-Operational Monitoring and Passive Soil Vapor Extraction Monitoring.

Target Zone	Z-9	Depth (m)	Comment	Z-1A	Depth (m)	Comment
near-surface	CPT-17 10 ft (blue)	3	southwest of Z-9	CPT-32 25 ft (green)	8	west of Z-1A
near-surface	CPT-27 15 ft (blue)	5	southeast of Z-9	CPT-13A 30 ft (blue)	10	southeast of Z-1A
near-surface	CPT-16 25 ft (blue)	8	east of Z-9	CPT-7A 32 ft (yellow)	10	farfield northeast of Z-1A
near-surface	CPT-18 35 ft (blue)	11	northwest of Z-9	CPT-1A 35 ft (black)	11	west of Z-12
near-surface	CPT-9A 60 ft (blue)	18	farfield north of Z-9	CPT-30 48 ft (blue)	15	north of Z-18 (middle of Z-1A/Z-18/Z-12 field)
near-surface	CPT-21A 65 ft (green)	20	south of Z-9	CPT-C3872	19	east side of Z-1A
near-surface	C4937	20	south of Z-9	---	---	---
near-surface	C4938	20	south of Z-9	---	---	---
near-surface	C5340	20	south of Z-9	---	---	---
Cold Creek	W15-82	25	east side of Z-9	W18-165	33	within Z-1A
Cold Creek	CPT-21A 86 ft (red)	26	south of Z-9	W18-152	34	northwest corner of Z-12
Cold Creek	CPT-28 87 ft (red)	27	farfield south of Z-9	W18-167	37	within Z-1A
Cold Creek	W15-8U	31	south of Z-9	W18-249	41	northeast corner of Z-18
Cold Creek	W15-217	35	southwest corner of Z-9	W18-248	41	east side of Z-1A
Cold Creek	W15-95L	44	north side of Z-9	---	---	---
ground water	W15-9L	57	north of Z-9, 11 m from W15-32 extraction well	W18-247L*	51	southeast of Z-18
ground water	W15-46	66	south of Z-9	W18-246L*	52	west of Z-1A
ground water	---	---	---	W18-252L*	53	west of Z-1A (middle of Z-1A/Z-18/Z-12 field)
ground water	---	---	---	W18-10L*	55	east side of Z-18
ground water	---	---	---	W18-7*	57	east side of Z-1A
ground water	---	---	---	W18-6L*	60	west side of Z-1A
ground water	---	---	---	W18-11L*	60	Z-18
ground water	---	---	---	W18-12*	60	Z-18

\* Passive soil vapor extraction wells

Note: Colors refer to the color coding on the soil vapor probe tubing.



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