

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

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APPROVAL: *Mario Vost for* Date: 6-27-07  
Larry Romine, 200 Area Unit Manager, DOE/RL

APPROVAL: *Arlene Tortoso* Date: 6-27-07  
Arlene Tortoso, 200 Area Assistant Manager, DOE/RL

APPROVAL: *Craig Cameron* Date: 6/21/07  
Craig Cameron, 200 Area Unit Manager, EPA

APPROVAL: *Nelma Jackson (for John Price)* Date: 6/21/07  
John Price, 200 Area Unit Manager, Ecology

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UNIT MANAGERS' MEETING,  
200 AREA GROUNDWATER SOURCE OPERABLE UNITS  
May 17, 2007**

DOE/RL

(No hard copy distribution)

EPA

Craig Cameron

B1-46

Ecology

John Price

H0-57

FH

Janice Williams (original)

E6-35

Administrative Record (2)

H6-08

Correspondence Control

A3-01

Minutes of the 200 Area Unit Managers' Meeting of May 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 Status	Operable Units and Facilities
Attachment 6	200-UP-1 Rebound Study, Technetium-99
Attachment 7	200-UP-1 Rebound Study, Uranium
Attachment 8	Tc-99 concentrations in extraction wells 299-W15-44 and 299-W15-765
Attachment 9	Tc-99 concentrations in monitoring well 299-W15-763
Attachment 10	Trend data for carbon tetrachloride in well 299-W15-6
Attachment 11	200-ZP-1 Purolite Resin Treatability Test Results
Attachment 12	Preliminary Nitrate Field Data from Well 299-W15-44 & 299-W15-765
Attachment 13	216-Z-9 Deployment-Robotic Crawler and Cameras for Qualitative Structural Evaluation
Attachment 14	Approval of the Carbon Tetrachloride Expedited Response Action Soil Vapor Extraction System Operating Plan for FY 2007
Attachment 15	Comparison of Maximum Carbon Tetrachloride Rebound Concentrations Monitored at 200-PW-1 Soil Vapor Extraction Sites, FY 2003 – FY 2007
Attachment 16	Locations of G and O Wells Associated with 200-BP-5 Operable Unit.

Attachment 17

Surface Geophysical Exploration Investigation Area

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

1200 Jadwin/Rm 1-C-1

May 17, 2007

8:30 – 10:15 AM

## **GROUNDWATER AND SOURCE OPERABLE UNITS**

- Status Review of OUs
- Outstanding Action Items/Issues

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

- Status Review
- Outstanding Action Items/Issues

200 Area Unit Managers Status Meeting  
May 17, 2007

Please print clearly and use black ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Mark Byrnes	FH	ZP-1 Project Manager	373-3996
John M. Onsg	DOE-RL	OUONSG	376-0057
Shawey Simon	ODOE		(541) 943-0853
Glen Triner	FH	UP-1/UV-1	430-1013
Rich Oldha-	FH	ECO	372-2426
Greg Thomas	FA	BP-5	373-3907
Phil Rogers	FH	MW-1	376-5807
Ted Repasky	CTUIR		541-966-2412
Sandra Lilligren	NPT		208-843-7375
Dennis Fuller	EPA		
Mark Benedek	FH	BC Ciba	6-0002
Ann Shattuck	FH	PW-1	6-8756
Fran K Roddy	DOE	LW-1, MW-1 SW #2, URI, MGI, wells	372-0945
Tom Watson	Fluor	200E S:GW	376-5450
Ken Brube	FH	CS-1 CW-1	376-2663
Pam Ankrum	FGG	UR-1, MG-1 BP-1, ECO	373-7222
Arlene Tortoso	DOE	200 Area Unit	373-9631
Jeannette Hyatt	FH-ELS	Env Prot	376-7923
RW H Debra	DOE-RL	BP-5 SW #2	373-9626
GREER BERLIN	FA	SW-1 SW-2 Pm.	374-2389



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

**Agreements:** Delegation of authority for UMM meetings

- Briant Charboneau has delegated his authority to Arlene Tortoso to review and sign the meeting minutes. Arlene Tortoso will also be the standing delegate should he not be available.
- EPA has delegated authority to any EPA representative in attendance.

**200 Area Unit Managers' Meeting  
OPEN ACTION ITEMS & TRACKING**

Attachment 4  
FH-0701281

Action #	Action/Subject	Assigned To	Owed To	Assigned Date	Original Due Date	Adjusted Due Date	Date Complete	Status
78	Present IS-1 DQO briefing to HAB. RL to request time slot on HAB River & Plateau Committee for this briefing.	DOE-K. Leary	All	8/23/06	9/21/06	TBD		Original due date could not be met. Due date TBD per K. Leary.
80	Send report from Remedial Action Decision Making panel (Tom Fogwell)	FH-M. Byrnes	ECY/EPA Price/Goswami/Cameron	10/18/06	11/16/06	6/30/07		Panel requested more time to complete their report.
81	Prepare a short overview of the BP-5 Work Plan for Ecology Tank Farms personnel (Include Rod Lobos-EPA).	FH-G. Thomas	J. Lyons/D. Goswami/ J. Caggiano	3/15/07	4/18/07	4/30/07	4/25/07	Completed - John Price to provide names to Greg Thomas.
83	Resolve the wording required to use single-walled piping for the T-Area wells	FH-M. Byrnes	J. Stults	3/15/07	3/27/07	4/30/07	5/10/07	Closed
84	Provide an overview of the correlation of soil characterization data to HRR for BC Cribs.	FH-M. Benecke	J. Stults	3/15/07	3/27/07	4/30/07	4/30/07	Closed
85	Provide a critical path schedule and confirm well locations for UP-1.	FH-Triner	Charboneau/ Jackson	4/18/07	4/24/07		4/24/07	Closed
86	Status on the regeneration option for Purolite resin	FH-Byrnes	Charboneau	4/18/07	4/18/07		4/18/07	Completed-Mark Byrnes provided/meeting was held.
87	Set up a meeting to discuss how we can address the tribal scenario.	FH-Byrnes	Charboneau	4/18/07	5/17/07		5/7/07	Completed-meeting was held.
88	RL needs to close-out the time critical-removal action on UW-1.	FH-Triner	RL-Romine (Leary)	5/17/07	6/21/07			

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

May 17, 2007

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

#### 200-UP-1

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

- Rebound Study:
  - Tc-99 and uranium concentrations are still below the interim RAOs of 9,000 pCi/L and 480 µg/L respectively (**Attachments 6 and 7**).
  - Uranium concentrations in well 299-W19-43 continue to fluctuate at about 380 µg/L.
  - Ecology update on the Explanation of Significant Difference (ESD) for the UP-1 interim ROD.
- RI/FS Work Plan:
  - Six of 12 new 200-UP-1 wells (UP1, UP2, UP3, UP4, UP5, and UP11) required by the RI/FS Work Plan have been installed. Planning for the remaining six wells is now scheduled for June FY2007.
- Pump & Treat
  - On 4/19/07, the pumps in wells W-19-36 and W-19-43 were restarted. Currently, the project is pumping approximately 12 gpm. These two wells address the higher uranium groundwater concentrations found in the area (~395 micrograms/liter).

#### 200-CS-1 (no change)

- Activities to support Draft B of the feasibility study and proposed plan continue.

#### 200-CW-1

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

- Supplementary remedial investigation field work is scheduled to begin in mid-July.
- A SAP for the supplementary remedial investigation field work is currently at Ecology for review and/or approval.

A Waste Control Plan is scheduled to be submitted the first week of June.

### ZP-1, 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 May 6, 2007 the 200-ZP-1 pump-and-treat system average pumping rate was approximately 260 gpm.
  - Currently all ten 200-ZP-1 extraction wells are on line pumping at approximately 270 gpm.
  - **Attachments 8 and 9** show the most recent Tc-99 concentrations in extraction wells 299-W15-765 and 299-W15-44, and nearby monitoring well 299-W15-763. The average Tc-99 concentration of the mixed extraction water entering the ZP-1 treatment building is approximately 40% of the MCL of 900 pCi/L.
  - Trend data for carbon tetrachloride in well 299-W15-6 is presented in **Attachment 10**.
  - Design work for hooking up wells 299-W11-45 and 299-W11-46 to the ETF transfer lines is on schedule. The 60% design review occurred last week. The final test plan supporting the well hookup to the ETF line has been issued.
  - EPA visited the 200-ZP-1 OU on May 15, 2007 to observe the alarm system and documentation of daily walk-downs of the above-ground well lines.
- RI/FS Status:
    - FS Report:
      - Document is on schedule.
      - The internal draft report is issued for review on May 14, 2007.
      - The Decisional Draft will be issued for DOE-RL review on or before July 2, 2007.
- Tc-99 Investigation Status:
    - T Tank Farm Investigations:
      - Drilling has started on the T-4 well (C5243, 299-W11-48). The well is currently at a depth of approximately 305.5 ft bgs as of 5/10/07. The depth to groundwater is approximately 242 ft bgs. Groundwater samples have been collected from 10, 20, 30, 40, 50, and 60 ft below the water table.
      - Drilling has started in the T-5 well (C5244, 299-W10-32). The well is 59 ft deep as of 5/10/07.
      - The DQO summary report (WMP-28389, External Review Draft) was submitted for external review from 2/16/07-3/28/07. Comments are being incorporated.
    - Purolite Resin Treatability Testing:
      - The Purolite resin treatability test is ongoing (see **Attachments 11 and 12**). We are anticipating Tc-99 breakthrough in the 299-W15-44 resin filter in late June, and breakthrough in the 299-W15-765 in August or September.
      - A slight change was made to the piping configuration in Figure B-1 of the treatability test plan (DOE/RL-2006-64, Rev. 0) where one additional particulate filter was put in line.

**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 is progressing. Risk assessment, alternatives development, and cost estimating are complete.
- FH internal review will begin May 21, 2007.
- Decisional Draft is scheduled for delivery to RL on July 2, 2007.
- EPA's comments on the PW-1/3/6 Remedial Investigation Report, Draft A, are being incorporated.

Andrea Hopkins, PFP, provided an update on activities at the 216-Z-9 trench, specifically the near term deployment of a robotic crawler. The crawler will take a variety of pictures within the trench. Of particular interest is the integrity of the trench cover (See **Attachment 13**).

- Soil Vapor Extraction System (SVE):
  - The SVE system was turned back on April 2, 2007 at Z-9 Area. The average flow rate through May 13, 2007 was 260 cfm.
  - System was shut down for a few hours the week of April 23 for flow meter replacement.
  - The three monitoring wells in the vicinity of Z-9 that are being converted to SVE wells are scheduled to be completed and put on line in the next couple of weeks.
  - The Carbon Tetrachloride Expedited Response Action Soil Vapor Extraction System Operating Plan for FY 2007, which was approved at the March 2007 UMM, was revised to add well 299-W15-32 and provided to DOE-RL and EPA for approval. If the revised plan is approved at the May UMM, it will be attached to these minutes. (**Attachment 14**).
  - The passive system remains operational.
  - Monthly monitoring results for April 2007 are presented in **Attachment 15**.

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

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

**(M-15-40D, 4/30/08, Feasibility Study/Proposed Plan) EPA**

- RL has requested a TPA change package be prepared for the 200-SC-1 OU RI/FS.

**TW-1 & 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**

- 216-B-57 – 200-BP-1 Prototype Barrier Long Term Performance Monitoring  
200-BP-1 Prototype Hanford Barrier Monitoring and Inspection Report anticipated to be submitted to RL on 9/28/07.

**TW-2 OU Group**

**200-TW-2 (no activity)**

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

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

**200-PO-1**

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

- DQO (no change)  
The DQO process continued for a 200-PO-1 OU investigation effort.
- SAP (no change)  
Work continued on a draft 200-PO-1 Characterization SAP to support the RI/FS Work Plan development. This SAP along with the existing Monitoring SAP (DOE/RL-2003-04 Rev.1) will be included in the Draft A Work Plan due to Ecology September 30, 2007.
- WORK PLAN (no change)  
Work continued on drafting the 200-PO-1 Draft A Work Plan.

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

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

- At the March UMM Ecology stated that a letter is forthcoming on the TSD closure plans and the FS.

**200-MW-1**

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

- A SAP for field work at 216-A-2 Crib and 216-A-21 Crib was transmitted to EPA on 4/5/07 with comments due to RL from EPA on May 21, 2007. FH, EPA, and FH met May 1, 2007 to resolve comment response language and at that time, EPA provided additional comments.

**BP-5 & 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:** The work plan was delivered to EPA on March 29 completing the M-13-06B milestone.

**Preparing planning documents for two groundwater monitoring wells this summer.**

- The wells are identified as the G and O wells (see Figure 1, Attachment 16) in the Work Plan (DOE/RL-2007-18 Draft A).
- The G Well location is planned to the north of the 299-E33-12 well and the O well location is planned to the southeast of the C Tank Farm.
- Purpose of the G well is to evaluate the extent of contamination in the upper confined aquifer north of the 299-E33-12 well.
- The purpose of the O well is to determine the extent of contamination to the southeast of the 299-E27-4, 299-E27-13 and 299-E27-23 wells, provide depth discrete analysis throughout the aquifer and determine the thickness of the aquifer.

**Beginning B Complex Conceptual Model Report.** The report will provide data sets that support the various conceptual models developed in this area over the years. In addition, data sets that conflict with each conceptual model will be discussed. Analyses and interpretation of the data sets will also be provided.

**High Resolution Resistivity Survey, Modeling and Report:**

- The field work is complete for the 36 HRR transects crossing the B/BX/BY WMA and surrounding waste sites (see Figure 2, Attachment 17).
- Modeling and report writing continue for delivery of the draft report by September 30, 2007.

**Groundwater Results:** Nothing to new to report.

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

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

- Project Management responsibilities are being transitioned from Pam Ankrum to Greg Thomas.
- Re-baseline planning for additional characterization has been completed.
- A Strategy for closure of the RI Report per TPA Change Number M-15-06-02 is being developed.

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

**200-UR-1**

- Rev. 0 - Reissue of the BC Controlled Area Sampling and Analysis Plan was approved by Department of Ecology on April 26, 2007. Analytical sampling (auger drilling) field work was completed March 28, 2007 as conditional approval to proceed was given by e-mail on December 13, 2006.
- West Lake DQO is in process. Recent interviews identified that there is tribal interest in the West Lake area.

**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**

- Planning has been completed and the baseline submitted as part of TPA Change Number M-15-06-02.
- Further work is pending change package authorization to implement from RL.

**Ecological Risk Assessment**

- The Phase III West Lake spring sampling activities have been completed.
- A meeting was held with the Hanford Natural Resource Trustee Council and other participants in the Ecological Risk Assessment for 5/15/07 to status the activities in the Phase III field characterization and provide status update. In August a workshop will be held to review the data collected.

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

**200-BC-1**

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

- EPA comments on the Addendum to the Work Plan addressing the excavation-based BC Cribs and Trenches Area waste sites treatability test were incorporated and the document was resubmitted.
- Draft A DQO summary report and SAP being reviewed by EPA. Plan to incorporate recommendations of the Expert Panel.
- Draft A SAP for Phase 1 of the excavation-based treatability test is expected to be transmitted to RL ~4/23. EPA review is in progress.
- Draft A of the Treatability Test Plan, including SAP, will be transmitted to RL by 5/31/2007.

**200-IS-1**

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

- Mini DQO meeting held on May 4, 2007 to determine the appropriate type and methods for obtaining congener data.
- The 200-IS-1 WP is on schedule, delivery to Ecology by June 30, 2007.

**200-SW-1/2**

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

Alignment meetings have been held with DOE-RL, Ecology and FH to discuss scope, schedule and content of the RI/FS Work Plan (Draft B) deliverable. A draft agreement involving a phased characterization-strategy has been developed based on DOE-RL and Ecology review and input; DOE-RL has recently signed the agreement and forwarded it to Ecology for signature.

## D&D OUs

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

- Excavation of site -5 started April 30, 2007.
- Initiated close out reports for sites -2 and -3 as no further remediation (excavation) is required.
- Site -7 results indicate that excavation is required. Excavation currently scheduled for early FY08, however, evaluating opportunities to accelerate schedule.

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

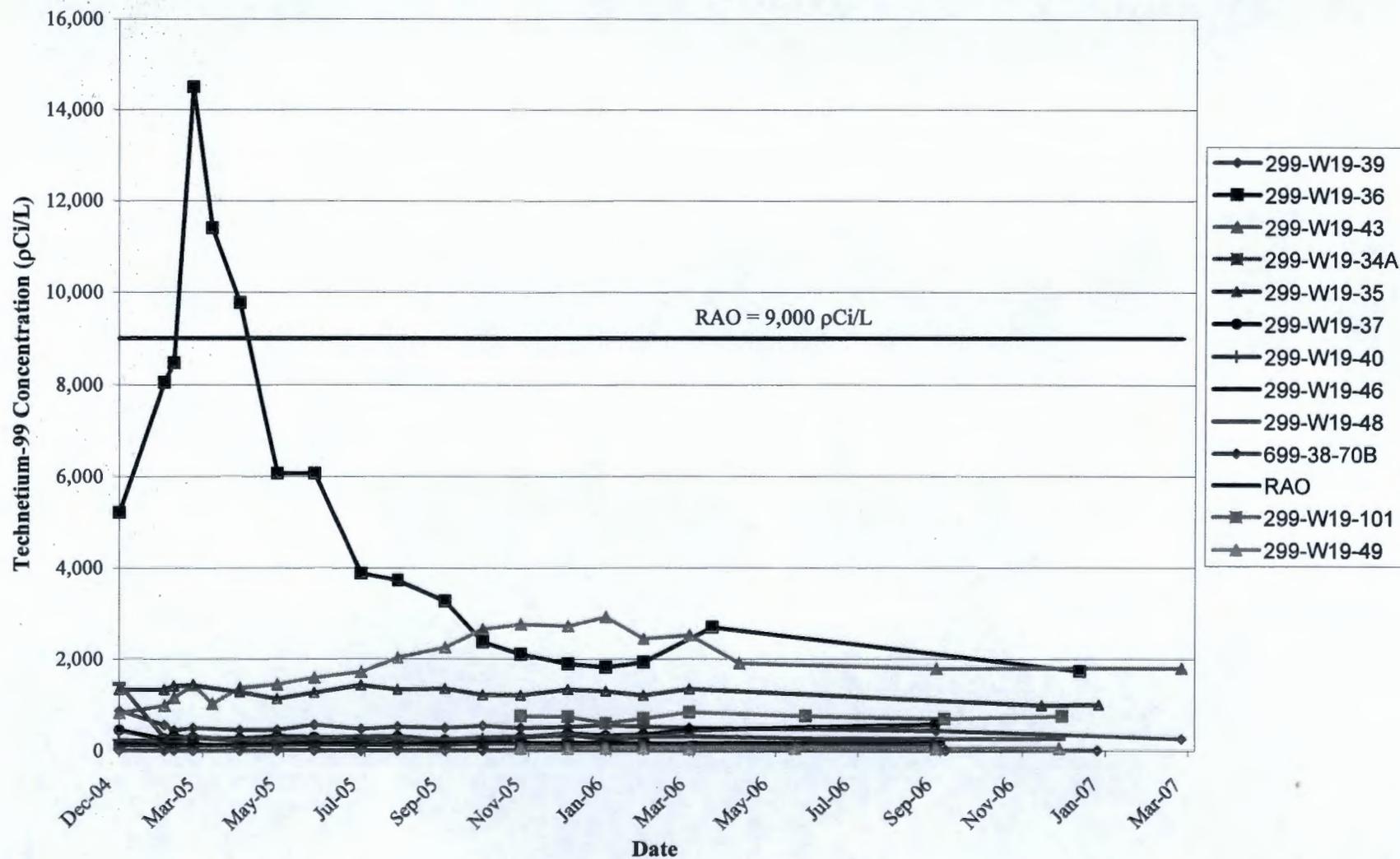
- 200-W-42 VCP / UPR-200-W-163 – Under a Time Critical Removal Action (TCRA) excavation on the Phase I portion of the 200-W-42 pipeline was completed; it was backfilled on 9/30/06. Phase II backfill has been excavated and contamination was still present at the 15 foot depth below ground surface. Additional characterization may be required for remedial action decision-making. Excavation area monitoring (contamination and air) continues. Ecology recognizes that the removal action objectives have been achieved, and that the removal action is consistent with the anticipated remedial action to the maximum extent practicable. DOE is the lead agency and must make the latter determination.
- Revised draft ROD completed the week of May 14th to incorporate TPA agency comments. An EPA regional review is still necessary.
- Responsiveness summaries to public comments on TPA Change Request for reclassifying Crib 216-U-12 to a RCRA Past Practice (RPP) unit were sent for final review week of 1/15/07. Approval will be requested at the June IAMIT meeting.
- TPA Change Request to change 216-U-15 from a CPP to a RPP has been reviewed and updated. Package will be transmitted with U-12 package for final review. No public review is anticipated for this portion of the change request. Approval will be requested at the June IAMIT meeting.
- DOE continued working on remedial action goals (RAGs) for 200-UW-1. A workshop to discuss the RAGs was conducted the week of May 14<sup>th</sup> with participants from DOE, Ecology, EPA, and the USGS. Currently, FH is preparing a technical basis letter to be transmitted to the regulators in early June describing how the approach being proposed satisfies the applicable or relevant and appropriate requirements of WAC 173-340-747(8).
- A cultural review of the Area C borrow source has been challenged by Yakama Tribes and Washington State Department of Archaeology & Historic Preservation (DAHP). Path- forward is under RL review.
- Phase II of the 241-U-361 Settling Tank (sampling tank sludge) has begun. Approval of the SAP and Waste Control Plan was received from Ecology on 4/2/07.

## FACILITIES STATUS

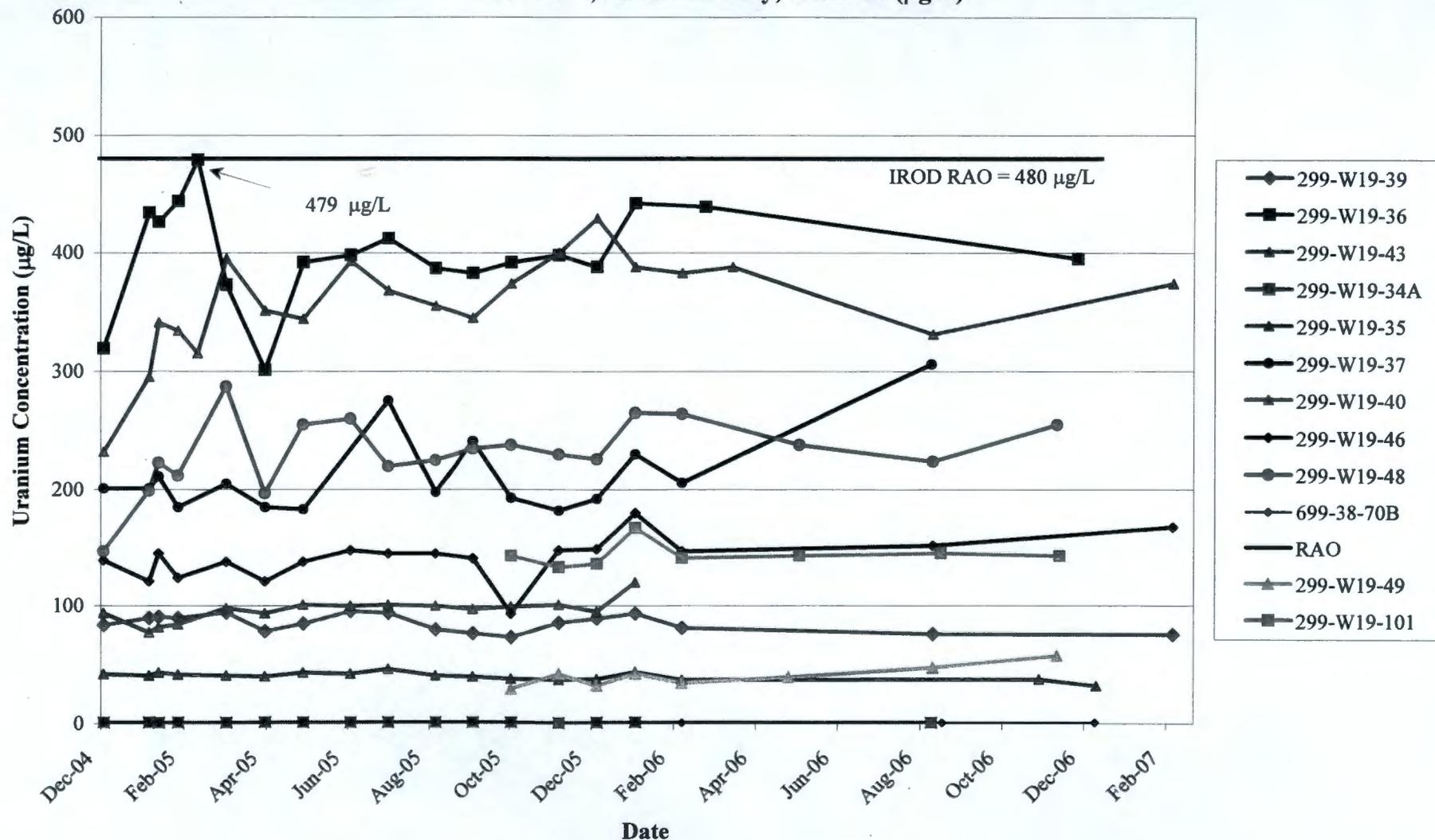
- **221-U Facility/Canyon Disposition Initiative (CDI)**

- Continuing development of remedial design engineering alternatives studies:
  - Grout study (June 2007)
  - Cell 30 vessel contents removal study (Issued May 2007)
  - Railroad tunnel reactivation study (Issued May 2007).
- Draft A *Remedial Design/Remedial Action Work Plan for the 221-U Facility* and an accompanying draft TPA change form were transmitted for EPA and Ecology review on 12/21/06, and comments were received in March 2007. RL requested and was granted a 60-day extension on the comment resolution period to allow adequate time to address the extensive comments at the project manager level.
- Continuing development of canyon waste acceptance study (June 2007).
- Initiated drafting of PUREX canyon DQO summary report addressing DQO steps 1 and 2
  
- **Facility Binning**  
RL is evaluating EPA's 4/23/07 letter, which grants an extension to the response to comments on the Remedial Design/Remedial Action Work Plan for the 221-U Facility, and recent guidance from DOE Headquarters regarding Environmental Agreements, Milestones, and Decision Documents to identify potential options for addressing facility binning path forward.

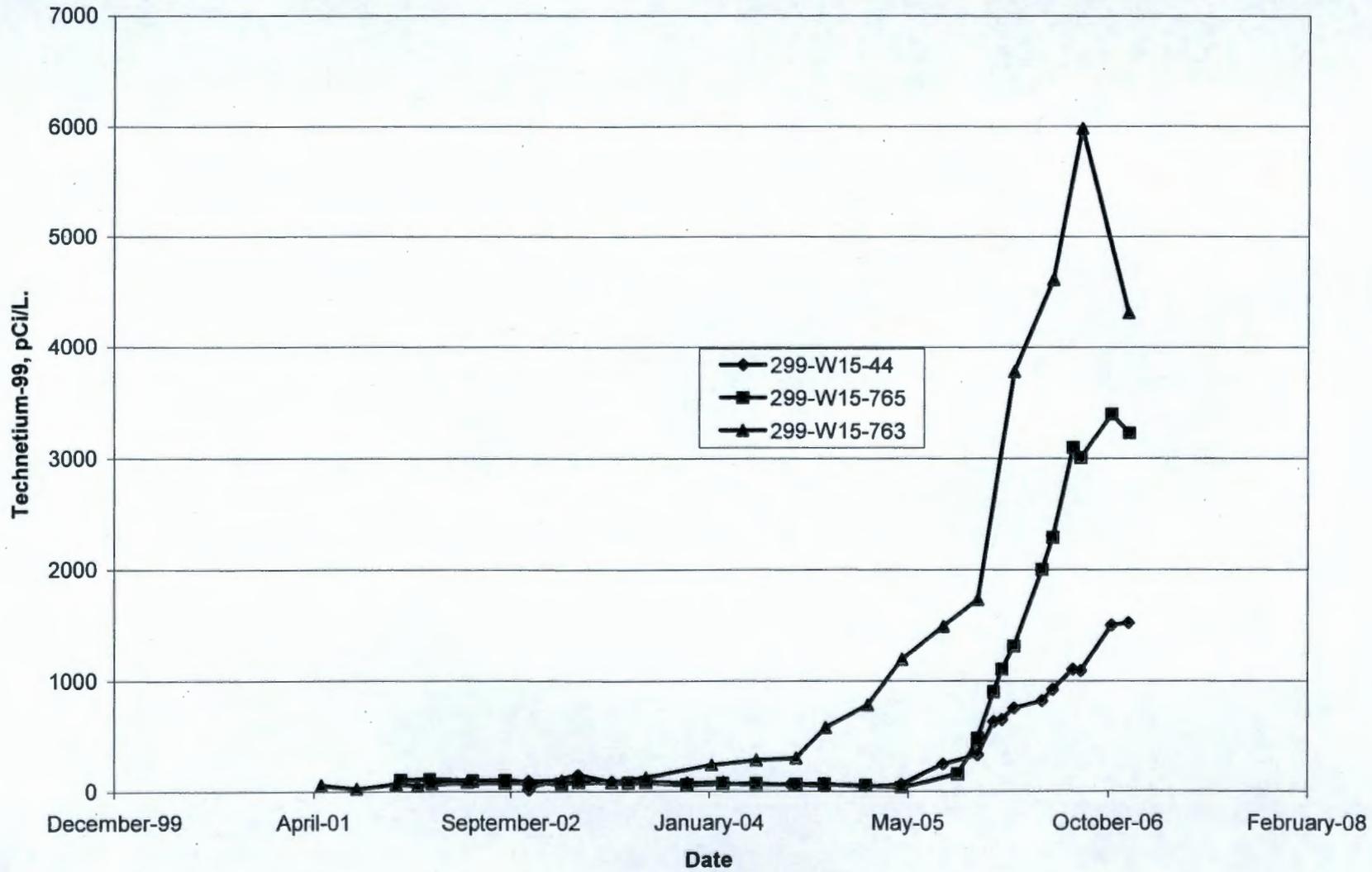
200-UP-1, Rebound Study, Technetium-99 (pCi/L)



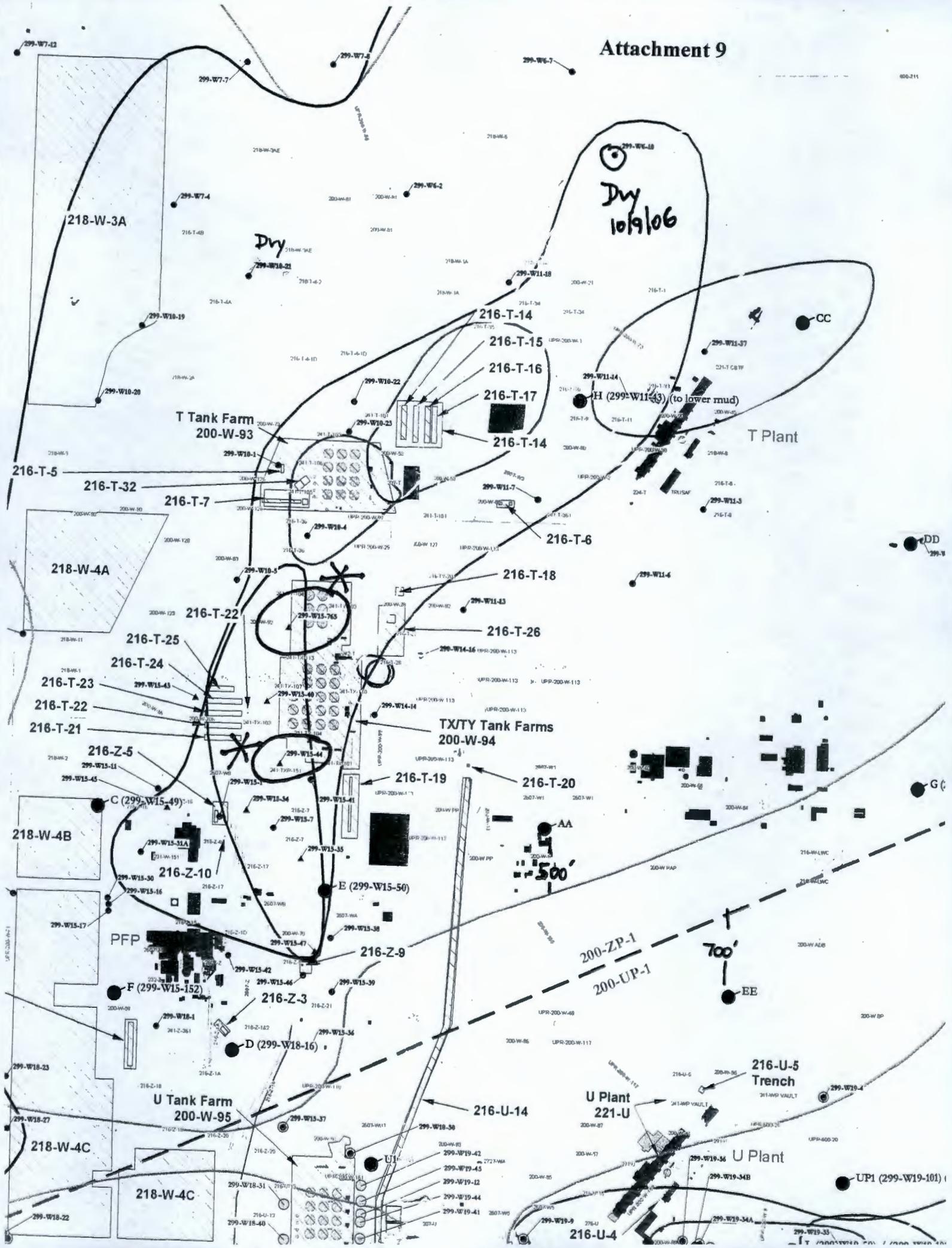
200-UP-1, Rebound Study, Uranium ( $\mu\text{g/L}$ )



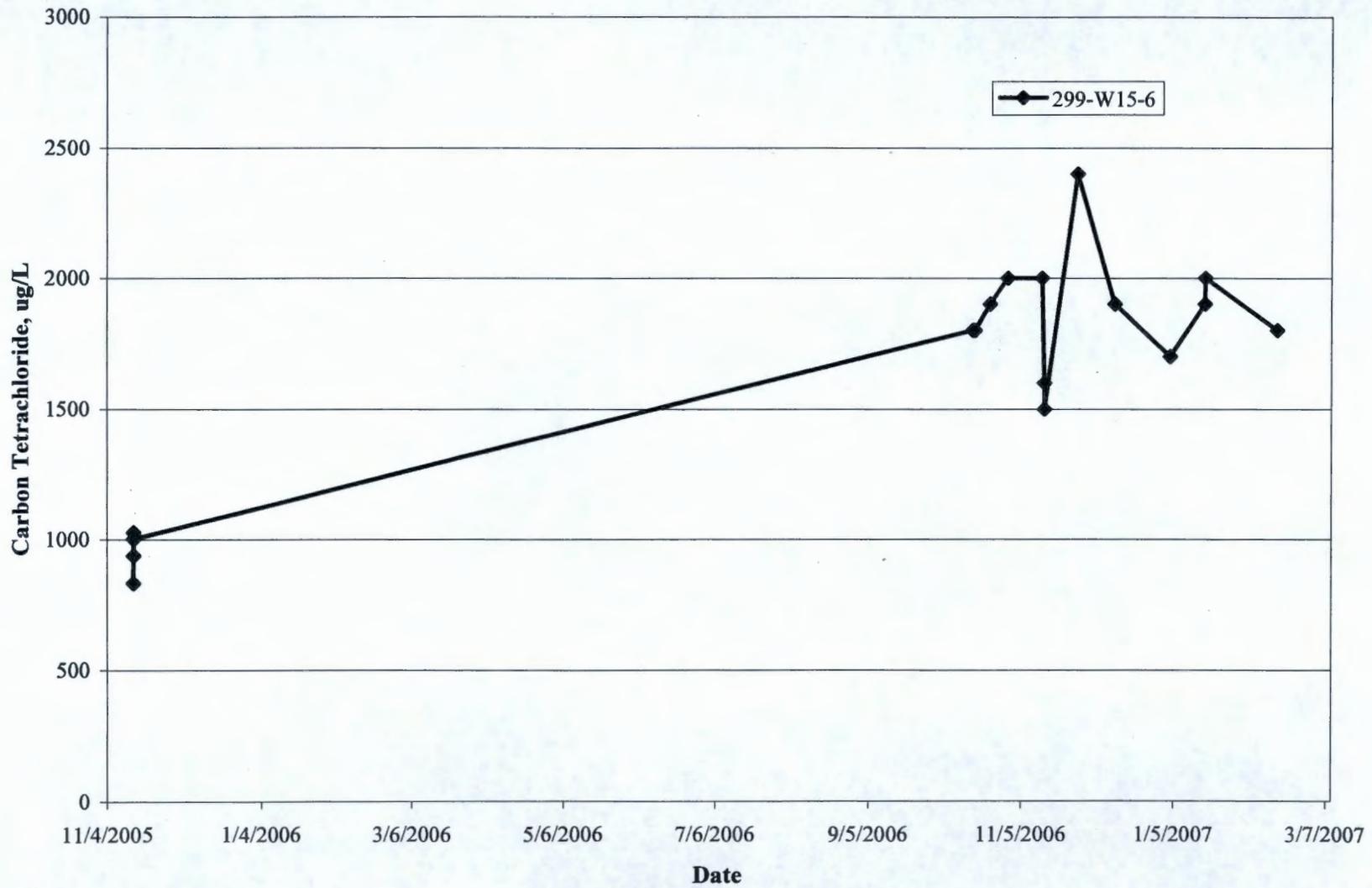
### Technetium-99 at Extraction Wells 299-W15-44 and 299-W15-765



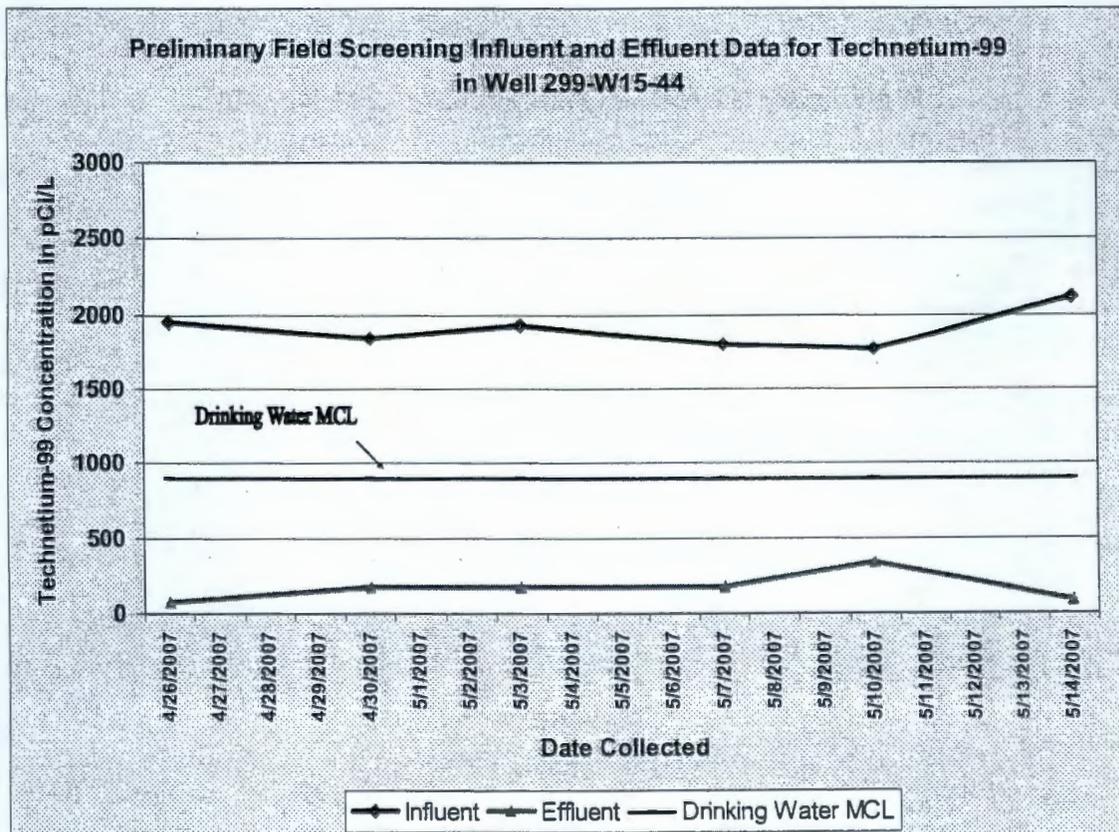
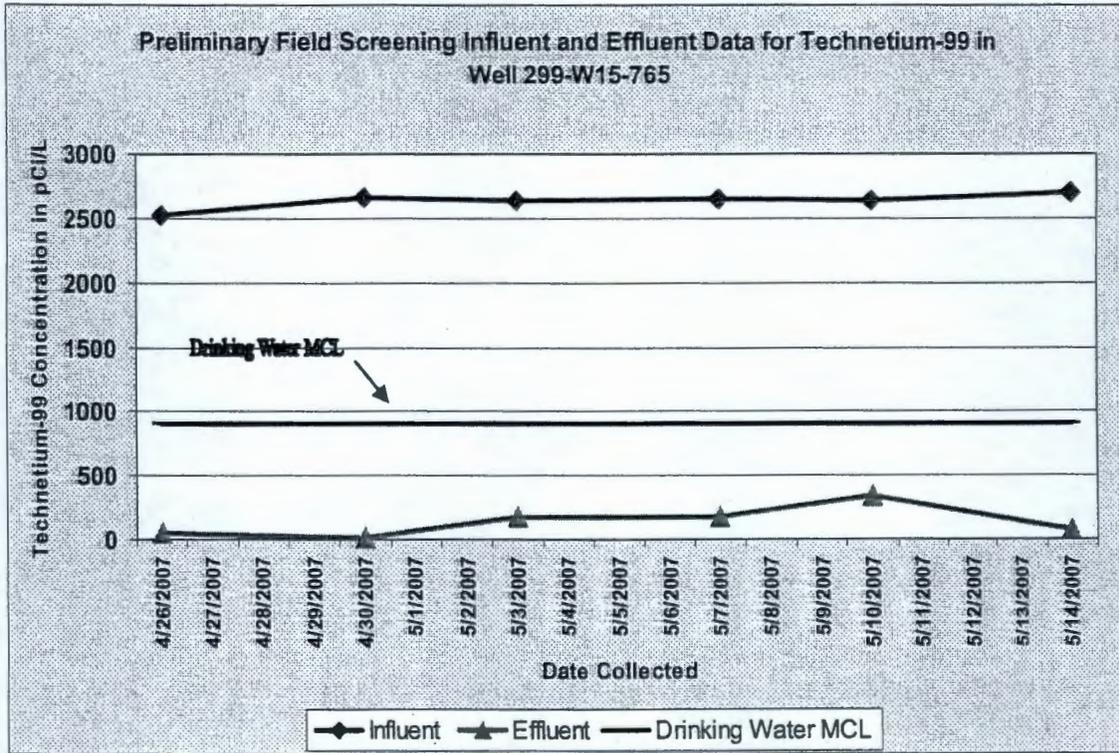
# Attachment 9



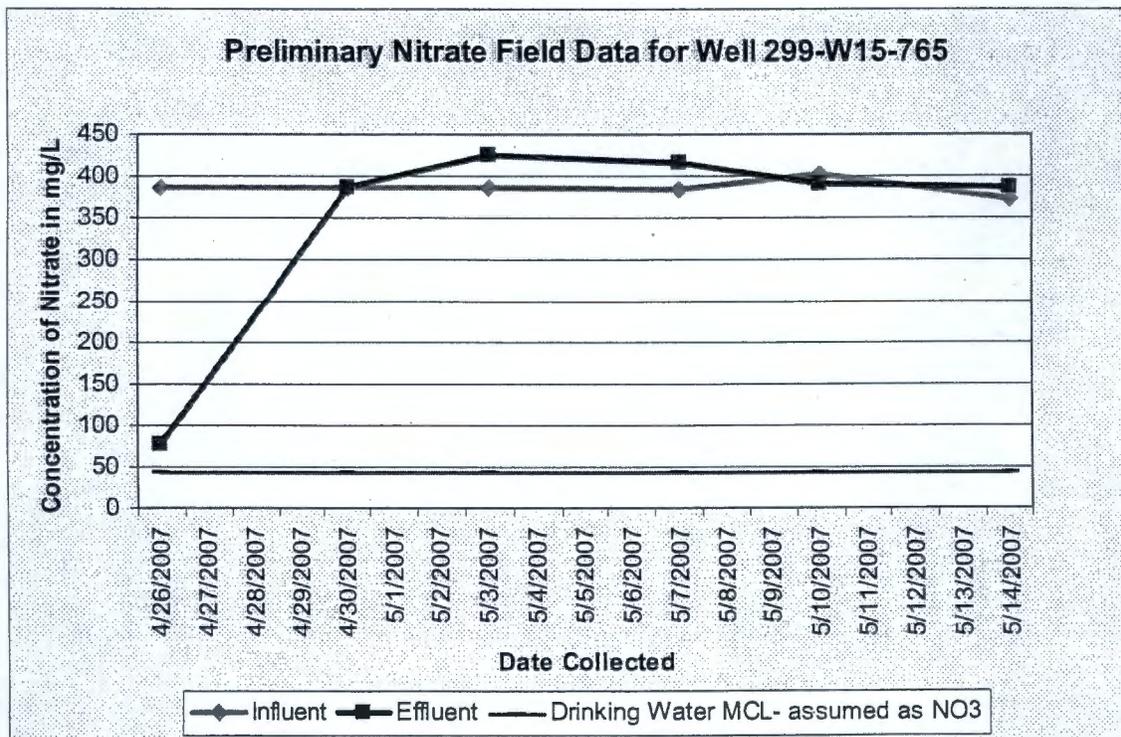
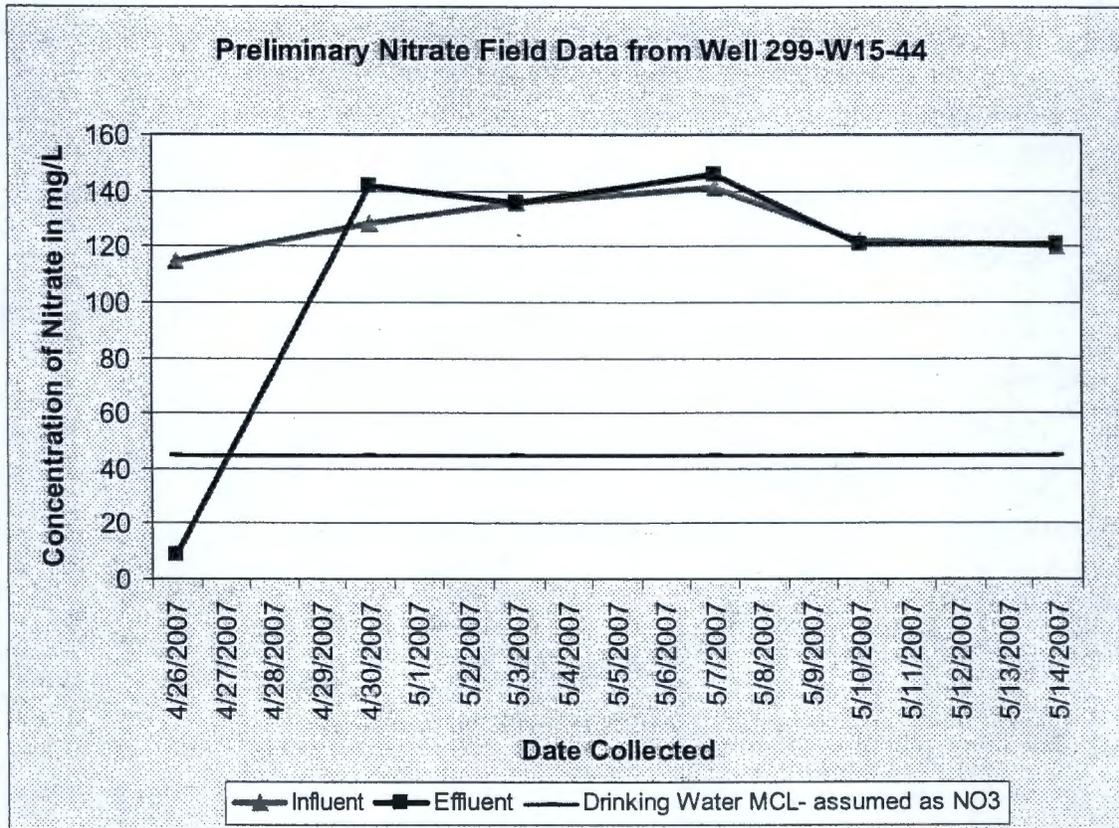
299-W15-6



## 200-ZP-1 Purolite Resin Treatability Test Results



# Attachment 12



## 216-Z-9 Deployment

Robotic Crawler and Cameras for  
Qualitative Structural Evaluation

### Purpose

Collect High Quality Photo Images of:

- Condition/Presence of Tiles
- Concrete Slab
- Support Columns
- Side Slopes and Slab Footings
- \* • Mining Equipment (Condition & Residues)

## Objectives

- Install Robotic Crawler with Camera
- Install Fixed Camera to Monitor Crawler Location
- Collect High-Resolution Images to Document Structural Conditions below the Slab

## Approach

- Conduct Mock up at HAMMER
  - Week of 5/14/07
  - Confirm Fit and Function of Components
  - Provide Personnel Training
  - Trouble Shoot Equipment

26" riser

## Documentation

- Characterization Work Plan Binder including:
  - FSP
  - SSHASP
  - QAPjP
  - Excavation Permit (if required)
  - Work Instruction/Package
  - Nuclear Safety Documentation
  - AMP
  - WMP

## Approach (cont.)

- Obtain approvals through DOE, Ecology and EPA
- Deploy end of May, first week of June timeframe.

WP → EPA, Ecology, RL<sup>2</sup>  
SAP for photos only  
Air Monitoring Plan in Work Plan

### Approach (cont.)

- Install Containment
- Remove Riser Cover
- Monitor Airspace for Rad & VOCs
- Attach Riser Extension

### Approach (cont.)

- Lower Crawler into Trench
- Attach Fixed Camera to Unistrut Rod
- Attach additional Rods and Fix to Riser Extension
- Attach Crawler and Camera Controls to Amphenol Connector on New Riser Lid
- Attach Lid to Riser

## Approach (cont.)

- Connect Crawler and Camera Controls to Amphenol Connector and Test Equipment
- Remove Containment
- Proceed with Collection of Images
- Leave Crawler and Camera in Place

## Air Emissions

- Potential to Emit (PTE) includes Radionuclides and Toxic Air Pollutants (TAP)
- Issues Related to Deployment, through the Open Riser, and Operations, through Riser Vents

## Radionuclide PTE

- Calculated PTE for Robot Deployment, Assuming 2,200 in<sup>3</sup> Displacement =  $18.38 \times 10^{-8}$  mrem to on-site MEI at LIGO (using Am-241 as sole contributor and assuming 3 deployments to allow for maintenance)
- Calculated PTE for Robot Operations =  $13.473 \text{ E}^{-04}$  mrem/year (using isotopic mix for RECUPLEX waste)

## Toxic Air Pollutant PTE

- TAP PTE, Assuming Displacement of 2,200 in<sup>3</sup> of Air in Trench during Deployment
- CCl<sub>4</sub> Small Quantity Emission Rate (SQER)(WAC 173-460-080) = 10 lbs/year
  - CCl<sub>4</sub> Calculated Emissions =  $11.99 \times 10^{-6}$  grams
  - Butane SQER = 5 lbs/hour
  - Butane Calculated Emissions =  $28 \times 10^{-7}$  grams

Attachment 14, Figure 1

APPROVAL OF THE CARBON TETRACHLORIDE EXPEDITED RESPONSE ACTION  
SOIL VAPOR EXTRACTION SYSTEM OPERATING PLAN FOR FY 2007

The Unit Managers for the Carbon Tetrachloride Expedited Response Action (200-PW-1 Operable Unit) approve the attached FY 2007 Soil Vapor Extraction System Operating Plan.

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U.S. Environmental Protection Agency  
Region 10, Hanford Office

## Attachment 14, Figure 2

### FY 2007 SOIL VAPOR EXTRACTION SYSTEM OPERATING PLAN FOR THE CARBON TETRACHLORIDE EXPEDITED RESPONSE ACTION (200-PW-1 OPERABLE UNIT)

Soil vapor extraction will be used at the 200-PW-1 Operable Unit (OU) during FY 2007 to remove carbon tetrachloride from the vadose zone. The primary objectives for this remediation are protection of the groundwater and mass removal. Only the 14.2 m<sup>3</sup>/min soil vapor extraction (SVE) system will be operated. Two sites will be remediated using SVE: the 216-Z-9 (Z-9) site and the 216-Z-1A/Z-18/Z-12 (Z-1A) site. Specific on-line wells have been selected prior to start-up at each site based on vapor monitoring, previous concentration trends, and location. These site-specific plans are included in this operating plan for approval by the Unit Managers prior to implementation. Based on characterization data collected at on-line wells during operation, the mix of on-line wells may be reconfigured during operations to optimize removal. These adjustments to the mix of on-line wells will not be submitted to the Unit Managers for approval prior to implementation but will be reported at Unit Manager Meetings. Ongoing passive soil vapor extraction will be maintained at Z-1A wells.

Soil vapor monitoring will be conducted at vadose zone locations near the groundwater, the Cold Creek unit (formerly called the Plio-Pleistocene layer), and the ground surface at the Z-1A and Z-9 sites while they are not being actively remediated using SVE. The soil vapor monitoring plan for both sites from April 2007 through September 2007 is included with this operating plan for approval prior to implementation. Monitoring results will be reported at the 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 vapor extraction system to address the problem).

The anticipated schedule for SVE operations and soil vapor monitoring is:

April 2007 through June 2007:	Operate the SVE system at the Z-9 site Monitor soil vapor concentrations at the Z-1A site
July 2007 through September 2007:	Operate the SVE system at the Z-1A site Monitor soil vapor concentrations at the Z-9 site

This soil vapor extraction system operating plan was revised in March 2007 to add well 299-W15-32 to the list of wells available for soil vapor extraction system operations at the 216-Z-9 site, April through June 2007 (Table 1). This well previously had been used as a groundwater extraction well for the 200-ZP-1 pump-and-treat system but was replaced as a result of declining water levels.

### Attachment 14, Figure 3

#### SOIL VAPOR EXTRACTION SYSTEM OPERATING PLAN AT THE 216-Z-9 SITE April 2007 – June 2007

Twenty-eight wells at the 216-Z-9 site (Z-9 site) are identified for potential vapor extraction (Table 1). Selected wells will be prepared for potential hook-up to the soil vapor extraction system during April through June 2007.

The last non-operational soil vapor monitoring at Z-9 prior to SVE restart will take place in mid to late March 2007. At that time, any sampling tubes will be removed from potential on-line wells. The current wellhead assemblies (configured for non-operational soil vapor monitoring) will not be disturbed until the monitoring has been completed and the tubing removed.

For initial start-up operations at Z-9, extraction will be implemented at four planned intervals: 299-W15-217, 299-W15-82, 299-W15-9U, and 299-W15-9L (Table 1) (Figure 1). Start-up operations at Z-9 in FY 1998, FY 1999, FY 2001, FY 2002, FY 2004, and FY2006 were also initiated using these four extraction intervals. (A slightly different set of initial wells was used in FY 2005). Selecting the same set of initial wells will allow the rebound in FY 2007 to be compared to the rebound in previous years. (The SVE system was not operated at the Z-9 site during FY2003 to avoid interfering with the characterization sampling to be conducted during drilling of well 299-W15-46.)

These four intervals will be characterized on the first day they are placed into operation. During continued operations, all on-line wells will be characterized each week and all off-line wells, if requested, will be characterized during the 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, and final weeks, according to the attached sampling and analysis plan (Table 2). The mix of on-line wells will be periodically changed during operations, based on changing concentrations, extraction interval locations, and operating experience. In general, the initial extraction wells will be nearer the carbon tetrachloride source (Z-9 Trench) and wells added later will expand operations away from this source.

The Z-9 slant well (299-W15-48), which was completed and placed on-line in FY 2006, will be prioritized for use in FY 2007. Three narrow-diameter wells [C4937 (P66D), C4938 (P69C), and C5340 (P68C)], which were installed south of Z-9 in FY2007, also will be prioritized for use in FY2007.

The 200-PW-1 OU technical lead organizes and maintains spreadsheets of the characterization data on a desktop computer. The characterization data are included in the annual performance evaluation report.

## Attachment 14, Figure 4

### SOIL VAPOR EXTRACTION SYSTEM OPERATING PLAN AT THE 216-Z-1A, 216-Z-18, AND 216-Z-12 SITE July 2007 – September 2007

Twenty-six wells at the 216-Z-1A, 216-Z-18, and 216-Z-12 site (Z-1A site) are identified for potential soil vapor extraction (Table 3). Selected wells will be prepared for potential hook-up to the soil vapor extraction system during July through September 2007.

The last non-operational soil vapor monitoring at Z-1A prior to SVE restart will take place in mid to late June 2007. At that time, any sampling tubes will be removed from potential on-line wells. The current wellhead assemblies (configured for non-operational soil vapor monitoring) will not be disturbed until the monitoring has been completed and the tubing removed.

Passive soil vapor extraction is being conducted at the following Z-1A wells with lower intervals open between the Cold Creek unit and groundwater: 299-W18-6L, 299-W18-7, 299-W18-10L, 299-W18-11L, 299-W18-12, 299-W18-246L, 299-W18-247L, and 299-W18-252L (Table 4).

For initial start-up operations at Z-1A, extraction will be implemented at five planned intervals in the Z-1A tile field: 299-W18-165, 299-W18-166, 299-W18-167, 299-W18-168, and 299-W18-174 (Table 3) (Figure 1). Start-up operations in FY 2001, FY 2002, FY 2003, FY 2004, and FY 2005 were also initiated using these five extraction intervals (a sixth interval selected in FY 2001 produced virtually no flow). In FY 2006, start-up operations were initiated using three of these wells. Selecting the same set of initial wells will allow the rebound in FY 2007 to be compared to the rebound in previous years.

These five intervals will be characterized on the first day of operations. During continued operations, all on-line wells will be characterized each week and all off-line wells, if requested, will be characterized during the 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, and final weeks, according to the attached sampling and analysis plan (Table 2). As before, the mix of on-line wells will be periodically changed during operations, based on changing concentrations, extraction interval locations, and operating experience. In general, the initial extraction wells will be nearer the primary carbon tetrachloride source (Z-1A Tile Field) and wells added later will expand operations away from this source.

The 200-PW-1 OU technical lead organizes and maintains spreadsheets of the characterization data on a desktop computer. The characterization data are included in the annual performance evaluation report.

## Attachment 14, Figure 5

### VADOSE ZONE MONITORING PLAN FOR SOIL VAPOR EXTRACTION SITES April 2007 – September 2007

#### Non-Operational Monitoring and Passive Soil Vapor Extraction Monitoring

This plan describes planned non-operational monitoring and passive soil vapor extraction monitoring to be conducted during April through September 2007 for the 200 West Area Carbon Tetrachloride Expedited Response Action (200-PW-1 Operable Unit). Non-operational monitoring will be conducted at the 216-Z-1A/Z-18/Z-12 (Z-1A) site during April through June 2007 while the soil vapor extraction (SVE) system is operating at the 216-Z-9 (Z-9) site. Non-operational monitoring will be conducted at the Z-9 site during July through September 2007 while the SVE system is operating at the Z-1A site. Passive soil vapor extraction monitoring will be conducted at the Z-1A site from April 2007 through September 2007.

**Scope:** Monitor carbon tetrachloride soil vapor concentrations at selected probes and wells during non-operation of the soil vapor extraction (SVE) system (Tables 5 and 6). At any particular time, all of the probes and some of the wells will be “non-operational,” i.e., they will not be connected to the SVE system. Eight of the 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 carbon tetrachloride 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:

- Collect soil vapor samples in accordance with GRP-EE-01-5.1
- Analyze soil vapor samples for carbon tetrachloride using the B&K field screening instrument in accordance with GRP-EE-05-4.0 at field screening level QC-1 (HNF-20635, Appendix B)
- Evaluate concentration trends for the Fluor Hanford Soil and Groundwater Remediation Project
- Report results to 200-PW-1 Operable 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.

## Attachment 14, Figure 6

The objectives of monitoring the non-operational wells and probes are (1) to measure 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 the 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 measure carbon tetrachloride concentrations and trends near the vadose-groundwater interface; 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 April 2007 through September 2007 during FY 2007.

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 5). These monitoring locations may be revised by the 200-PW-1 OU task lead based on developing trends, accessibility, and/or recommendations of the sampler. The 200-PW-1 Operable Unit Managers will be advised of any changes to the monitoring locations. Monitoring locations are shown on Figures 2 and 3.

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 OU technical lead organizes and maintains spreadsheets of the field screening data on a desktop computer. The field screening data are included in the annual performance evaluation report.

**Attachment 14, Figure 7**

References:

GRP-EE-05-4.0, *Analysis of Volatile Organic Compounds in Vapor Samples Using the Bruel and Kjaer 1301 and Innova 1312 Multi-Gas Analyzers*, Fluor Hanford, Inc., Richland, Washington.

GRP-EE-01-5.1, *Soil-Gas Sampling*, Fluor Hanford, Inc., Richland, Washington.

HNF-20635, *Groundwater Remediation Project Quality Assurance Project Plan (GRP-QA-001)*, Appendix B, "Additional QA Requirements Specific to Onsite Measurement," Fluor Hanford, Inc., Richland, Washington.

**Attachment 14, Figure 8**

Table 1. Wells Available for Soil Vapor Extraction System Operations at the 216-Z-9 Site, April through June 2007

Potential On-Line Wells	Reason	Initial Wells
299-W15-6U	Mass removal	
299-W15-6L	Groundwater Protection	
299-W15-8U	Mass removal	
299-W15-8L	Groundwater Protection	
299-W15-9U	Mass removal	X
299-W15-9L	Groundwater Protection	X
299-W15-32	Groundwater Protection	
299-W15-48	Mass Removal	
299-W15-82	Mass removal	X
299-W15-84U	Mass removal	
299-W15-84L	Mass removal	
299-W15-85	Mass removal	
299-W15-86	Mass removal	
299-W15-95U	Mass removal	
299-W15-95L	Mass removal	
299-W15-216U	Mass removal	
299-W15-216L	Groundwater Protection	
299-W15-217	Mass removal	X
299-W15-218U	Mass removal	
299-W15-218L	Groundwater Protection	
299-W15-219U	Mass removal	
299-W15-219L	Groundwater Protection	
299-W15-220U	Mass removal	
299-W15-220L	Groundwater Protection	
299-W15-223	Mass removal	
C4937 (P66D)	Mass removal	
C4938 (P69C)	Mass removal	
C5340 (P68C)	Mass removal	

**Attachment 14, Figure 9**

Table 2. Sampling and Analysis Plan for Soil Vapor Extraction System Operations, April through September 2007

When to Monitor	on-line wells	off-line wells	vacuum wellhead	flow	CCl4	CHCl3	CH2Cl2	MEK
					carbon tetrachloride	chloroform	methylene chloride	MEK
first day of operations	X		X	X	X	X	X	X
beginning of 2nd week	X	X	X	X	X	X	X	X
beginning of 3rd week	X		X	X	X	X	X	X
beginning of 4th week	X	X	X	X	X	X	X	X
beginning of 5th week	X		X	X	X	X	X	X
beginning of 6th week	X	X	X	X	X	X	X	X
beginning of 7th week	X		X	X	X	X	X	X
beginning of 8th week	X	X	X	X	X	X	X	X
beginning of 9th week	X		X	X	X	X	X	X
beginning of 10th week	X	X	X	X	X	X	X	X
beginning of 11th week	X		X	X	X	X	X	X
beginning of 12th week	X		X	X	X	X	X	X
last day of operations	X	X	X	X	X	X	X	X
Fax copy of monitoring records to 200-PW-1 OU Technical Lead (Virginia Rohay at 373-3974) by close of day following monitoring.								

**Attachment 14, Figure 10**

**Table 3. Wells Available for Soil Vapor Extraction System Operations at the 216-Z-1A/Z-18/Z-12 Site, July through September 2007**

Potential On-Line Wells	Reason	Initial Wells
299-W18-6U	Mass removal	
299-W18-89	Mass removal	
299-W18-93	Mass removal	
299-W18-94	Mass removal	
299-W18-96	Mass removal	
299-W18-97	Mass removal	
299-W18-98	Mass removal	
299-W18-99	Mass removal	
299-W18-152	Mass removal	
299-W18-153	Mass removal	
299-W18-157	Mass removal	
299-W18-158L	Mass removal	
299-W18-159	Mass removal	
299-W18-163L	Mass removal	
299-W18-165	Mass removal	X
299-W18-166	Mass removal	X
299-W18-167	Mass removal	X
299-W18-168	Mass removal	X
299-W18-169	Mass removal	
299-W18-171L	Mass removal	
299-W18-174	Mass removal	X
299-W18-246U	Mass removal	
299-W18-247U	Mass removal	
299-W18-248	Mass removal	
299-W18-249	Mass removal	
299-W18-252U	Mass removal	

**Table 4. Passive Soil Vapor Extraction Wells at the 216-Z-1A/Z-18/Z-12 Site, FY 2007**

Passive Soil Vapor Extraction Wells	Reason
299-W18-6L	Groundwater Protection
299-W18-7	Groundwater Protection
299-W18-10L	Groundwater Protection
299-W18-11L	Groundwater Protection
299-W18-12	Groundwater Protection
299-W18-246L	Groundwater Protection
299-W18-247L	Groundwater Protection
299-W18-252L	Groundwater Protection

Table 5a. Distribution of Selected Monitoring Locations During Soil Vapor Extraction System Operations at the 216-Z-9 Site, April through June 2007

Target Zone	Number of Monitoring Locations		
	Z-1A	Z-9	Total
Near-surface (3-25 m below ground surface)	11	3	14
Cold Creek (25-45 m below ground surface)	6	2	8
Groundwater (50-65 m below ground surface)	8 <sup>a</sup>	0	8
Total	25	5	30

<sup>a</sup> 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 5b. Distribution of Selected Monitoring Locations During Soil Vapor Extraction System Operations at the 216-Z-1A/Z-18/Z-12 Site, July through September 2007

Target Zone	Number of Monitoring Locations		
	Z-1A	Z-9	Total
Near-surface (3-25 m below ground surface)	5	9	14
Cold Creek (25-45 m below ground surface)	0	8	8
Groundwater (50-65 m below ground surface)	8 <sup>a</sup>	5	13
Total	13	22	35

<sup>a</sup> 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.

Attachment 14, Figure 12

Table 6a. Non-Operational Wells and Probes Selected for Monitoring During Soil Vapor Extraction System Operations at the 216-Z-9 Site, April through June 2007

Target Zone	Z-9	Depth (m)	Comment	Z-1A	Depth (m)	Comment
near-surface	CPT-28 40 ft (blue)	12	farfield south of Z-9	CPT-32 25 ft (green)	8	west of Z-1A
near-surface	CPT-9A 60 ft (blue)	18	farfield north of Z-9	CPT-4E 25 ft (white)	8	north central in Z-1A/Z-18/Z-12 field
near-surface	CPT-21A 65 ft (green)	20	south of Z-9	CPT-30 28 ft (green)	9	north of Z-18 (middle of Z-1A/Z-18/Z-12 field)
near-surface				CPT-13A 30 ft (blue)	10	southeast of Z-1A
near-surface				CPT-7A 32 ft (yellow)	10	farfield northeast of Z-1A
near-surface				CPT-1A 35 ft (black)	11	west of Z-12
near-surface				CPT-33 40 ft (green)	12	between Z-18 and Z-12
near-surface				CPT-34 40 ft (green)	12	west of Z-18
near-surface				CPT-C3872 62.5 ft	19	east side of Z-1A
near-surface				CPT-1A 68 ft (yellow)	21	west of Z-12
near-surface				CPT-32 70 ft (red)	21	west of Z-1A
Cold Creek	CPT-21A 86 ft (red)	26	south of Z-9	299-W18-152	31	northwest corner of Z-12
Cold Creek	CPT-28 87 ft (red)	27	farfield south of Z-9	299-W18-167	32	within Z-1A
Cold Creek				CPT-4F 109 ft (red)	33	north central in Z-1A/Z-18/Z-12 field
Cold Creek				299-W18-165	33	within Z-1A
Cold Creek				299-W18-249	40	northeast corner of Z-18
Cold Creek				299-W18-248	40	east side of Z-1A
ground-water				299-W18-247L*	51	southeast of Z-18
ground-water				299-W18-246L*	52	west of Z-1A
ground-water				299-W18-252L*	53	middle of Z-1A/Z-18/Z-12 field
ground-water				299-W18-10L*	55	east side of Z-18
ground-water				299-W18-7*	60	east side of Z-1A
ground-water				299-W18-11L*	60	within Z-18
ground-water				299-W18-12*	60	within Z-18
ground-water				299-W18-6L*	63	west side of Z-1A

\* Passive soil vapor extraction wells

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

## Attachment 14, Figure 13

Table 6b. Non-Operational Wells and Probes Selected for Monitoring During Soil Vapor Extraction System Operations at the 216-Z-1A/Z-18/Z-12 Site, July through September 2007

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-4E 25 ft (white)	8	north central in Z-1A/Z-18/Z-12 field
near-surface	CPT-18 15 ft (white)	5	northwest 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-27 33 ft (red)	10	southeast 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-34 40 ft (green)	12	west of Z-18
near-surface	CPT-16 65 ft (red)	20	east of Z-9			
near-surface	CPT-21A 65 ft (green)	20	south of Z-9			
near-surface	CPT-24 70 ft (green)	21	northwest of Z-9			
near-surface	CPT-18 75 ft (red)	23	northwest of Z-9			
Cold Creek	299-W15-82	25	east side of Z-9			
Cold Creek	CPT-21A 86 ft (red)	26	south of Z-9			
Cold Creek	CPT-28 87 ft (red)	27	farfield south of Z-9			
Cold Creek	299-W15-8U	31	southside of Z-9			
Cold Creek	299-W15-217	35	southwest corner of Z-9			
Cold Creek	CPT-24 118 ft (red)	36	northwest of Z-9			
Cold Creek	299-W15-220 SST/118 ft (red)	36	east of Z-9			
Cold Creek	299-W15-95L	44	north side of Z-9			
ground-water	299-W15-220L 163 ft	50	east of Z-9	299-W18-247L*	51	southeast of Z-18
ground-water	299-W15-219L 175 ft	53	northwest of Z-9	299-W18-246L*	52	west of Z-1A
ground-water	299-W15-84L 180 ft	55	west of Z-9	299-W18-252L*	53	middle of Z-1A/Z-18/Z-12 field
ground-water	299-W15-9L	57	11 m from 299-W15-32 extraction well	299-W18-10L*	55	east side of Z-18
ground-water	299-W15-46	66	southside of Z-9	299-W18-7*	60	east side of Z-1A
ground-water				299-W18-11L*	60	Within Z-18
ground-water				299-W18-12*	60	Within Z-18
ground-water				299-W18-6L*	63	west side of Z-1A

\* Passive soil vapor extraction wells

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

Figure 1. Location of Extraction and Monitoring Wells at the 216-Z-1A/Z-18/Z-12 and 216-Z-9 Sites

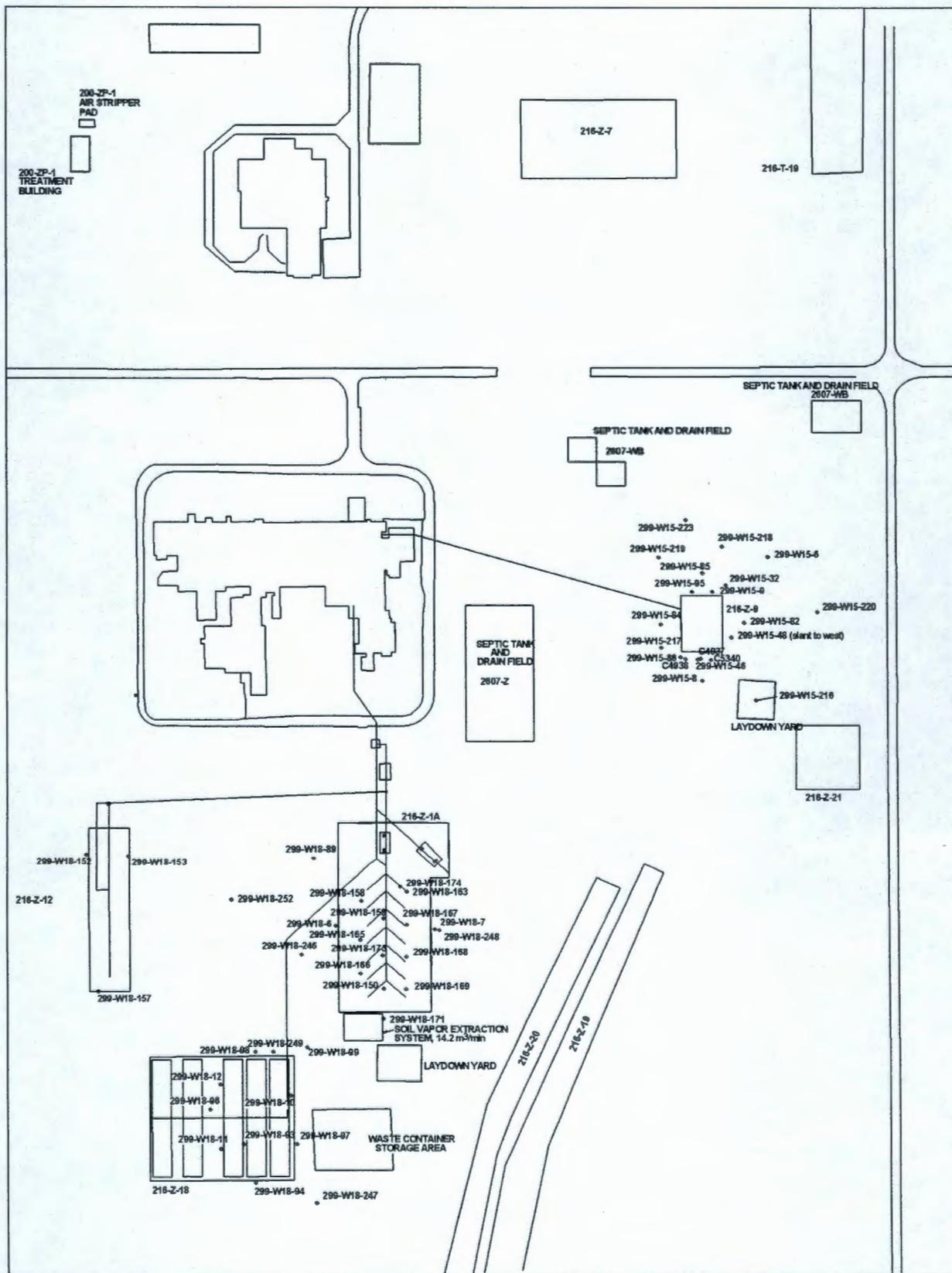
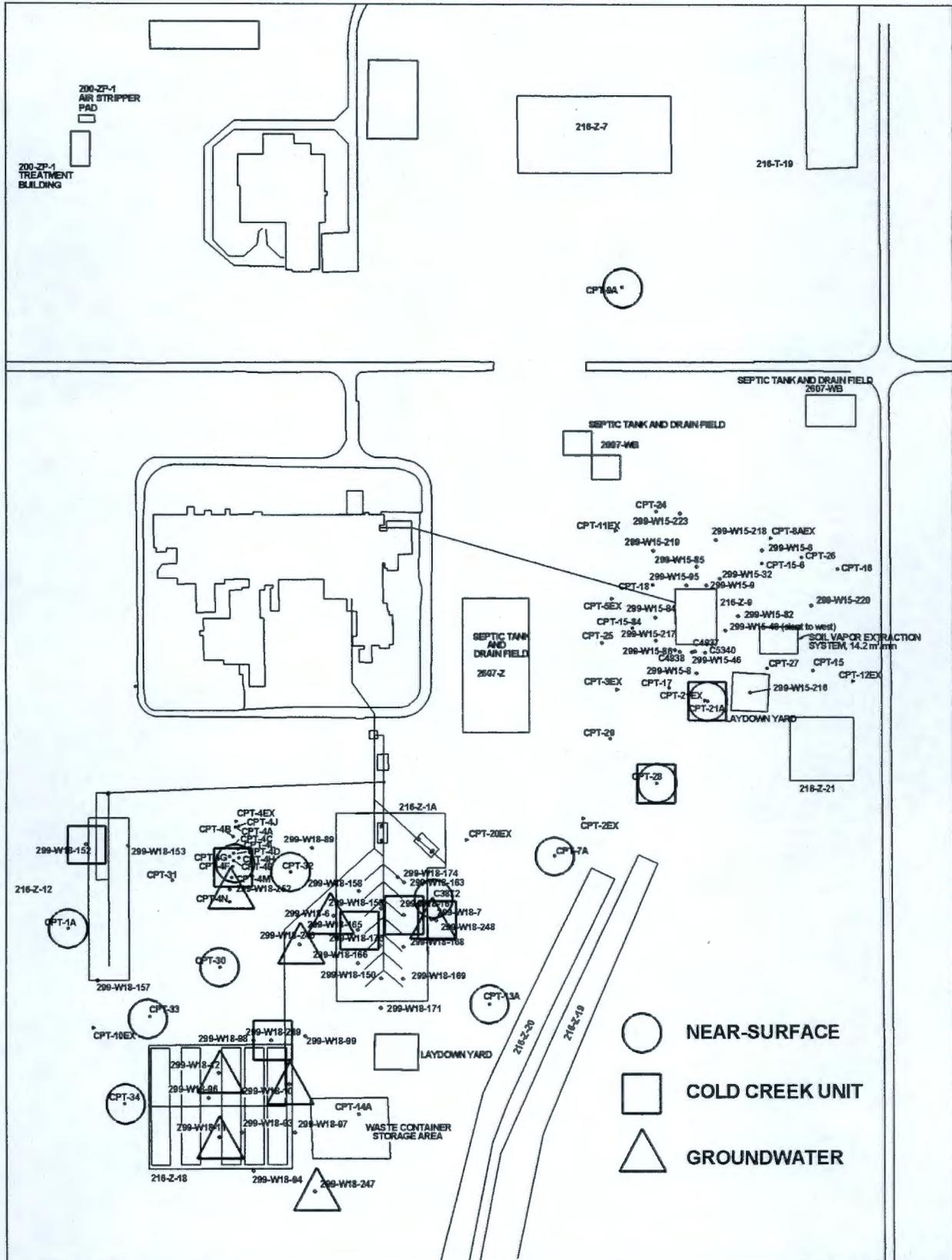


Figure 2. Location of Wells and Probes Selected for Non-Operational Monitoring and Passive Soil Vapor Extraction Monitoring, April through June 2007





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

200-PW-1		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 - April 2007	
Location (Well or Probe) /feet bgs	Site	Maximum Rebound of Carbon Tetrachloride (ppmv)	months* of rebound	Maximum Rebound of Carbon Tetrachloride (ppmv)	months* of rebound	Maximum Rebound of Carbon Tetrachloride (ppmv)	months* of rebound	Maximum Rebound of Carbon Tetrachloride (ppmv)	months* of rebound	Maximum Rebound of Carbon Tetrachloride (ppmv)	months* of rebound
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	3.2	7
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	7
CPT-30/ 28 ft	Z-18	0	6			1.6	9	1.2	6	0	7
CPT-13A/ 30 ft	Z-1A	1.8	6	1.9	0	8.3	9	4.1	0	5.8	7
CPT-7A/ 32 ft	Z-1A	9.5	6	1.9	0	4.4	9	3.8	0	3.9	7
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	10.0	7
CPT-18/ 35 ft	Z-9									0	9
CPT-28/ 40 ft	Z-9					5.4	0			8.6	7
CPT-33/ 40 ft	Z-18					3.9	9			1.5	7
CPT-34/ 40 ft	Z-18			1.8	0	3.0	9	2.0	0	1.2	7
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	16.2	9
CPT-28/ 60 ft	Z-9					68.3	0				
CPT-C3872 / 63 ft	Z-1A					15.5	9	9.9	6	12.2	7
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	153	9
CPT-1A/ 68 ft	Z-12					13.7	9			6.2	7
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			5.2	7
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	194	9
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	216	9
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	7
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	7
CPT-4F/ 109 ft	Z-1A					11.9	9			4.1	7
W18-165/ 109 ft	Z-1A	205	6			35.2	9	394	6	2.5	7
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	7
W18-248/ 131 ft	Z-1A	180	6			249	9	67.0	6	131	7
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	5.7	passive
W18-246L/ 170 ft	Z-1A					22.0	passive	25.3	passive	9.6	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	8.1	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	21.1	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 (BH-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 (BH-01105, p. 6-1)

Carbon Tetrachloride Rebound Concentrations  
 Monitored at 200-PW-1 Soil Vapor Extraction Sites  
 July 2006 - April 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
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)
CPT-17/ 10 ft	Z-9				1.2	1.2	1.2	1.4	1.6	1.5	
CPT-18/ 15 ft	Z-9										
CPT-27/ 15 ft	Z-9				0	0	0	0	0	0	
CPT-4E/ 25 ft	Z-1A	0	0	0							3.2
CPT-16/ 25 ft	Z-9				0	1.0	0	0	1.0	0	
CPT-32/ 25 ft	Z-1A	0	0	0	0	1.2	2.1	3.4	6.0	5.7	8.0
CPT-30/ 28 ft	Z-1A	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
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
CPT-27/ 33 ft	Z-9										
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
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
CPT-33/ 40 ft	Z-18	0	1.3	1.6							1.5
CPT-34/ 40 ft	Z-18	0	1.3	1.3							1.2
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
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
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
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
CPT-16/ 65 ft	Z-9										
CPT-21A/ 65 ft	Z-9	153	132	137	123	120	123	127	138	101	119
CPT-1A/ 68 ft	Z-12	13.2	12.5	5.6							6.2
CPT-24/ 70 ft	Z-9										
CPT-32/ 70 ft	Z-1A	4.2	4.3	3.5							5.2
W15-219SST/ 70 ft	Z-9										
CPT-18/ 75 ft	Z-9										
W15-82/ 83 ft	Z-9				0	0	0	2.3	3.9	0	
CPT-21A/ 86 ft	Z-9	179	171	194	159	169	164	189	170	119	161
CPT-28/ 87 ft	Z-9	180	185	216	181	202	196	0	209	119	182
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
W15-8U/ 103 ft	Z-9				2.4	6.1	1.2	4.6	14.1	1.7	
W18-167/ 106 ft	Z-1A	0	0	0	0	0	0	3.0	1.1	0	0
CPT-4F/ 109 ft	Z-1A	1.2	2.9	0							4.1
W18-165/ 109 ft	Z-1A	-(q)	0	0	0	0	0	2.5	2.2	0	0
W15-217/ 114 ft	Z-9				0	0	0	7.0	16.5	0	
CPT-24/ 118 ft	Z-9										
W15-220SST/ 118 ft	Z-9										
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
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
W15-95L/ 144 ft	Z-9				10.0	16.2	15.3	16.9	18.0	0	
W15-219SST/ 155 ft	Z-9										
W15-220L/ 163 ft	Z-9										
W15-219L/ 175 ft	Z-9										
W15-9L/ 176 ft	Z-9				4.7	2.3	2.2	3.5	7.9	4.7	
W15-84L/ 180 ft	Z-9										
W15-46/ 217 ft	Z-9				0	0	0	4.0	5.7	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 - April 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
Location (Well or Probe) /feet bgs	CCI4 (ppmv)									
W18-6L/ 208 ft	---(b)	---(b)	15.8	3.7	1.4	0	4.8	4.9	8.1	8.5
W18-7/ 197 ft	11.0	15.3	0	5.6	6.0	2.1	7.8	14.1	11.8	21.1
W18-10L/ 183 ft	10.0	12.7	11.7	0	0	2.0	12.6	7.0	13.8	1.0
W18-11L/ 199 ft	3.0	8.4	1.3	0	0	0	4.5	3.4	3.2	0
W18-12/ 198 ft	0	4.8	0	0	0	0	1.3	0	0	0
W18-246L/ 170 ft	---(b)	---(b)	3.7	1.7	0	0	2.2	5.3	4.1	9.6
W18-247L/ 167 ft	0	5.7	1.0	0	0	0	1.4	0	5.1	0
W18-252L/ 175 ft	---(b)	2.1	4.5	8.1						
(b) disconnected for use by Vista Engineering for cross-well seismic investigation										

Figure 1 G and O Well Location Map.

