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February 15, 2005

Via e-mail
Ms. Teri DuPriest
Quality Assurance Evaluator
HQ/AFCEE
3300 Sidney Brooks
Brooks City Base, TX 78235-5112

Subject: Final Data Quality Objective (DQO) Meeting #1 Minutes,
Construction of Outfall Reuse, Aboveground Storage Tank Relocation, & Interim Remedial Actions at SWMU B-3 and AOC-65, Camp Stanley Storage Activity
Texas Contract FA8903-04-D-8675, Task Order 0006
Parsons job number 744223.01000

Dear Ms. DuPriest:

Attached please find final minutes for the task order DQO meeting held on Thursday, January 20, 2005. Attached to the minutes is the meeting agenda. Please let me know if you have any questions or comments.

Sincerely,

Brian Vanderglas
Project Manager

Attachments

xc: Attendees
Jason Shirley, Brian Murphy, and Jeff Aston, CSSA
Chris Beal, Portage
Doug Downey, Gary Cobb, Scott Pearson, and Eric Tennyson, Parsons
Greg Lyssy, US EPA
Sonny Rayos, Bryan Smith, and Abigail Power, TCEQ
Stephanie Harr, Portage
John Lynch, Parsons
744223 Project File

DQO #1 MEETING MINUTES
CONSTRUCTION OF OUTFALL REUSE SYSTEM, ABOVEGROUND STORAGE TANK RELOCATION, AND INTERIM REMEDIAL ACTIONS AT CAMP STANLEY STORAGE ACTIVITY, TEXAS
FA8903-04-D-8675/DELIVERY ORDER 0006
PARSONS 744223.01000

Date: Thursday, 20 January 2005

Time: 8:30 P.M. - 3:00 P.M.

Place: Camp Stanley Storage Activity (CSSA)

Subject: DQOs for TO-06, Other Issues with CSSA Environmental Program

Attendees:

Attendee	Organization	Phone
Brian K. Murphy	CSSA ENV	(210) 698-5208
Jason Shirley	CSSA	(210) 295-7416
Jeff Aston	USACE	(210) 336-1270
Chris Beal	Portage	(210) 336-1171
Sonny Rayos	TCEQ	(512) 239-2371
Bryan Smith	TCEQ	(512) 239-6075
Abigail Power	TCEQ – Region 13	(210) 403-4064
Greg Lyssy	USEPA	(214) 665-8317
Scott Pearson	Parsons	(512) 719-6087
Doug Downey	Parsons	(512) 719-6059
Eric Tennyson	Parsons	(210) 396-0136
BrianVanderglas	Parsons	(512) 719-6059
Gary Cobb	Parsons	(512) 719-6011
Julie Burdey Kimberly Riley Eric North Ken Rice	Parsons Afternoon only	(512) 719-6000

Minutes prepared by Brian Vanderglas, Parsons.

The agenda is presented in Attachment 1.

Introductions of Attendees and TO 0006 Background & Objectives

The meeting was opened with brief introductions. The purpose of the meeting was described as an opportunity to present activities planned at Camp Stanley Storage Activity to enhance the removal of contaminants from vadose and saturated intervals of the formation underlying SWMU B-3 and AOC-65. Brian Vanderglas introduced his project team attending the meeting and identified their primary roles under this task order. This was followed by each attendee identifying themselves and their association with the project.

Task Order 06 Overview

Brian Vanderglas provided a brief project overview of the scoped tasks and work activities for eight tasks planned under this TO. This meeting was described as a data quality objective meeting because the primary objective of the meeting was to assist Parsons with the final preparation of the draft work plans by identifying or clarifying data quality objectives that are critical to the task order and other project requirements.

The primary focus of the meeting was on the remedial optimization task since that is the new concept that is planned for remediating chlorinated hydrocarbons in the groundwater and vadose limestone formation. Other important TO-06 topics introduced included the bioreactor monitoring network planned and permit requirements and the continuation of the soil vapor extraction system.

Other Task Order Discussion Topics

Parsons introduced topics from two task orders other than TO-06 to take advantage of having TCEQ, USEPA, and CSSA representatives in attendance. A well optimization study is being performed under AFCEE 4PAE TO-08__ to optimize the groundwater monitoring program. Under AFCEE ENRAC TO-19, CSSA wanted to discuss the closure requirements, schedule for remaining Risk Reduction Standard No. 1 closures that are being pursued, and waste handling practices with TCEQ.

Conceptual Design and Technical Basis for Treatability Study

General Description of Integrated Approach

CSSA is pursuing an integrated approach to control and reduce contaminant migration into the underlying aquifer and toward possible receptors, relying on both aggressive and quasi-passive type solutions. As an initial step, buried debris and contaminated material will be removed from SWMU B-3 to eliminate a large volume or potentially contaminated material from the trench to eliminate this material from contributing further to the groundwater contamination found at plume 1, centered around wells CS-D, CS-16, and CS-MW-CC.

Expansion of the existing SVE system is the second step, and is intended to continue the removal of volatile contaminant residuals in the complex vadose intervals of the fractured media. While SVE has not proven to be able to remove large quantities of contaminant mass, achievable removal rates of 100 pounds per year or more can be sustained for relatively low cost per contaminant mass actually removed. The benefit of continued SVE is less contaminant mass available for migration to groundwater.

The third and final step is to design and implement an innovative, low cost approach to sustain and possibly enhance the biological attenuation characteristics within the vadose portion of the formation and within the saturated plume. This enhancement will be attempted through a combination of fast acting and slow release carbon sources which will add the necessary substrate to sustain or enhance the natural biological degradation that is already occurring in the fractured bedrock and groundwater system. The substrate will be applied through an initial flush of the system with soluble substrate, such as lactate, to rapidly energize the system. After the lactate, an additional substrate will be applied by backfilling the landfill trenches with organic mulch blended with vegetable oil or other food-grade oils. Accumulation of precipitation within the bark-filled trench should facilitate ideal circumstances for passively delivering dissolved carbon into the underlying fractures and ultimately into the aquifer. The specific combination of treatments proposed for SWMU B-3 was chosen to maximize potential effectiveness at CSSA, and to take advantage of the unique situation where it may be possible to simultaneously remove contaminant mass through extraction and actually deliver amendments into the same groundwater recharge fractures that continue to transport the bulk of the contaminants to the aquifer.

Substrate Injection

A push-pull test will be performed by injecting organic substrates into groundwater through an injection well constructed near SWMU B-3. The precise location of the injection well was the topic of much discussion, but no final decision was made at the meeting. Parsons will recommend a location and provide a basis for the recommended location in the work plan documents, but there was general agreement that the location should remain flexible, and that the final location should be selected after installation of the four Westbay multi-level monitoring wells. The emphasis should be on selecting an injection location where contaminant levels are relatively higher than other locations within the plume.

Bryan Smith of TCEQ indicated that a Class IV authorization would need to be obtained for re-injection of hazardous fluids per 30 TAC 331.19 prior to initiating any injections. The authorization request could be based on previous studies using similar type processes on similar sites and contaminants. Results from pilot study injection would need to demonstrate that the treatment processes are reducing contaminant levels in the injected solution. Further discussion of the permitting requirements for the push-pull and bioreactor injection studies were moved to the discussion topic on Requirements, Issues and Related Topics (below).

There was some discussion on the value of using well CS-D for a preliminary injection test to determine if enhancing degradation within the aquifer would actually lead to complete, or accelerated degradation of TCE and PCE in the likely source area. The appeal with well CS-D is there is long history of data (established baseline) with known concentrations consistently greater than 100 micrograms per liter, so influence of injecting substrates could be readily measured. USEPA and CSSA voiced concern about fouling well CS-D which could prove detrimental to collecting future groundwater monitoring data from this critical well. Parsons will follow up with TCEQ and USEPA to evaluate the value of this information.

Monitoring System and Testing

Prior to injecting substrate materials for performance of the push-pull test, Parsons will install four multi-level monitoring wells around SWMU B-3. A baseline level of critical constituents will be conducted for monitoring the affect of substrate injection to the groundwater biological degradation reactions. There was much discussion regarding the appropriate locations for the four Westbay wells. Based on the apparent plume emanating from the SWMU B-3 area, it appears that the plume is migrating primarily West toward well CS-D and to the South of SWMU B-3. It was noted that the regional groundwater flow is to the southeast. The four proposed monitoring locations are tentatively slated to be about 150-250 feet from the SWMU B-3 perimeter in the Northwest, West, and Southern direction, with one up-gradient location to the Northeast. The wells will be installed in the anticipated order from most-contaminated (West of SWMU B-3) to least contaminated (East of SWMU B-3) with packer testing and borehole geophysics performed to identify the most suitable intervals based on hydraulics and contaminant levels. Extensive hydrologic testing will be conducted on the first Westbay well location, and that data will be evaluated to select the locations and design(s) of the remaining wells.

Requirements, Issues, and Related Topics

The primary requirement discussed regarding the TO-06 bioreactor and injection study was related to the TCEQ and USEPA's injection authorization rules. Bryan Smith indicated that the injection authorization for the Class IV permit is only for a period of 6 months, at which time it must be renewed. He also indicated that it can take up to 60 days to process an injection authorization for hazardous liquids. Bryan Smith emphasized that any engineering plans submitted with the injection authorization application require a professional engineer certification while any hydrogeology or contaminant report require a professional engineer or professional geoscientist certification. Also, that the renewal of the permit after the initial six months is contingent on proving contaminant degradation and that the amount of degradation needed to continue operation is a flexible, site-by-site determination.

There was much discussion regarding whether it would be appropriate or compliant to re-inject groundwater from well CS-16 directly back into the formation through a bioreactor constructed in the excavated SWMU B-3 trench or whether the groundwater would need to be treated through the GAC unit and redirected from Outfall 002 to the bioreactor cell following treatment. This question was not resolved during the meeting because Bryan Smith needed to know more about the site hydrogeology and the specific formation that is being used to re-circulate groundwater, and Greg Lyssy indicated that he needed additional clarification within USEPA regarding their interpretation of their *in situ* treatment standard. Mr. Lyssy indicated that he felt it was worthwhile to pursue a Class IV injection authorization permit to re-inject groundwater that has not been treated by the GAC unit at well CS-16.

Other requirements mentioned by Bryan Smith related to monthly monitoring of injected liquids at the point of injection after treatment. This presents potential difficulties since the treatment of the injected groundwater is the bioreactor itself. Parsons will follow-up with TCEQ to clarify this requirement.

Greg Lyssy inquired about the schedule, and Brian Vanderglas indicated that work plans will be submitted in February to Camp Stanley, and that drilling of wells is anticipated to begin

in late March or April 2005. Baseline sampling will cover at least a three month period prior to initiating the substrate injection for the push-pull test, so the injection start date is probably in mid to late summer 2005.

Groundwater Monitoring Program Summary/Well Optimization Study

Kimberly Riley notified all attendees that Parsons was nearing completion of its groundwater monitoring optimization program under TO-08, and that Camp Stanley would be making modification recommendations to US EPA on the groundwater monitoring data quality objectives currently guiding the monitoring program. Kimberly Riley presented the well optimization process that Parsons is currently performing to develop our recommendations based on qualitative and statistical analyses.

SWMU and AOC Closure(s) Issues, Concerns

The grandfathering date for closing sites under the TCEQ's Risk Reduction Rules was discussed. Upon review of TCEQ guidance, it was determined that all closure reports for qualified sites must be submitted by May 1, 2005.

Camp Stanley requested clarification regarding sites with minimal actions and data, or areas of concern (AOCs) that were set up for investigation because waste management practices were unknown. Camp Stanley wanted to know what the TCEQ's closure requirements are for AOCs where it was determined that no waste management activities actually took place. Sonny Rayos indicated that "closure" under risk reduction standard no. 1 (RRS1) is not applicable for these sites since they were not sampled and do not have the burden of data (proof) for RRS1. However, he indicated a no further action determinations could be made in such cases and should be sufficient.

Sonny Rayos inquired about the status of the Waste Management Plan (WMP). Parsons indicated that the WMP is currently under revision and includes a majority of the suggestions made by TCEQ. Mr. Rayos specifically wanted to address how Camp Stanley handles its hazardous and pre-RCRA waste. Ken Rice indicated the "area of contamination" concept/policy is used when handling RCRA-characteristic remediation waste and as such generation of waste occurs only when material is moved from the AOC/SWMUs.

Julie Burdey discussed the schedule for the remaining SWMU/AOC RRS1 closures, and that Camp Stanley anticipates submittal of ten additional reports pursuing closure under RRS1 by May 1, 2005. Discussions regarding questions and request for additional information on submitted closure reports were relegated to informal communications between Parsons and TCEQ, specifically, Sonny Rayos.

Action Items

Parsons will prepare the Class IV injection authorizations to re-inject hazardous fluids immediately following submittal of the draft work plans to Camp Stanley.

Parsons will coordinate with Bryan Smith and Greg Lyssy to obtain clarification of the re-injection requirements of groundwater from Well 16 into the bioreactor constructed in the SWMU B-3 excavation.

Parsons will follow up with US EPA, CSSA, and TCEQ to determine whether initiating a preliminary lactate injection pilot study at well CS-D should be implemented in advance of the push-pull test planned closer to SWMU B-3.

Miscellaneous/Hazardous Waste Inspections

The CSSA "annual" TCEQ hazardous waste inspection was discussed. Mr. Shirley inquired if CSSA would have another inspection this year. Ms. Power, from the TCEQ Region 13 office, informed everyone in attendance of the meeting that there will be another inspection. Mr. Murphy raised concerns about the frequency of the TCEQ Region 13 visits since CSSA is a conditionally exempt small quantity generator. Ms Power stated that the inspection is warranted because TCEQ feels that CSSA has outstanding issues, primarily the handling of AOC-65/Bldg 90 investigation derived waste as non-hazardous. Ms. Power commented that if CSSA feels the high frequency of TCEQ's inspections at CSSA was not warranted, then CSSA could appeal to the Commission.

The meeting was then adjourned.

DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, RRAD
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

Agenda for Data Quality Objective Meeting Number 01

Construction of Outfall Reuse System, Aboveground Storage Tank Relocation & Interim Remedial Actions at SWMU B-3 & AOC-65

AFCEE WERC, Task Order 06

Date: Thursday, January 20, 2005; 8:30 am to 4:30 pm

Place: Parsons office, 8000 Centre Park Drive, Suite 200, Austin, Texas 78754

Proposed Order of Discussion

Time	Topic
8:30 am –9:15 am	Introduction of project team & TO-06 background & objectives
9:15 am – 10:15 pm	Conceptual Design & Technical Basis for Treatability Study General Description of Integrated Approach *Removal Action/Bioreactor Cell construction/GW Injection/SVE* Substrate Injection *into Groundwater & Bioreactor Cell* Monitoring System and Testing *BREAK*
10:30am – 11:30 am	Requirements, Issues, and Related Topics
	LUNCH
1:00 pm – 2:00pm	Groundwater Monitoring Program Summary/Well Optimization Study
2:00pm – 3:15pm	SWMU and AOC Closure(s) Issues, Concerns *BREAK*
3:30 pm – 4:30pm	Other Issues Related to EPA Administrative Order/SWMU Closures

Data Quality Objective Meeting

For the Treatability Study Actions
at SWMU B-3 & AOC-65

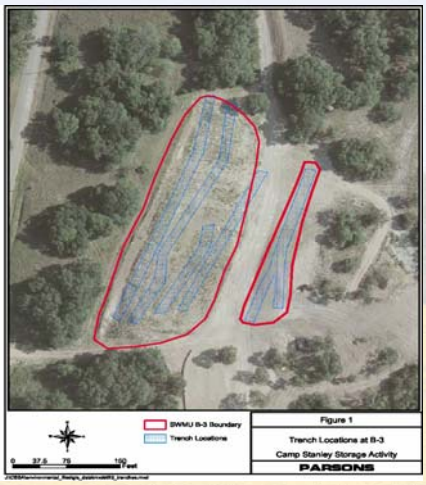
Camp Stanley Storage Activity
Boerne, TX

Introduction

- Objective of the treatability study is to test the efficacy of controlling or reducing chlorinated organic contaminate migration into the underlying aquifer near SWMU B-3 and AOC-65.
- The Integrated Approach includes the active aggressive remedial techniques (removal & SVE) with passive enhancements.

Background

- SWMU B-3 contains approximately 30,000 CY of organic and inorganic contaminated waste debris and soil media.
- Limited removal actions to date of have removed ~700 CY of PCE/TCE characteristic hazardous remediation waste and ~1,400 CY of non-hazardous remediation waste.



Integrated Approach

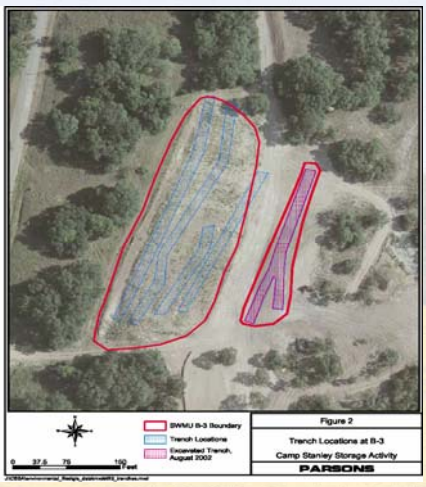
1. Initial Step - Removal of contaminant source within waste/soil media through excavation and disposal.
2. Continuation Step – Removal of contaminant source with the Glen Rose limestone formation through SVE.
3. Final Step – treatment of contaminants within the groundwater matrix through enhanced bioremedial techniques.

Why Integrated Approach?

1. Removal action is quickest and most effective method of contaminant mass removal from site.
2. Continued SVE provides cost effective remediation of VOC mass removal.
3. Use of passive and direct enhanced remedial techniques to accelerate VOC biodegradation in vadose and saturated zones.

Initial Step

- Limited removal action completed in August 2002.
- Additional removal actions are planned as part of the integrated approach.

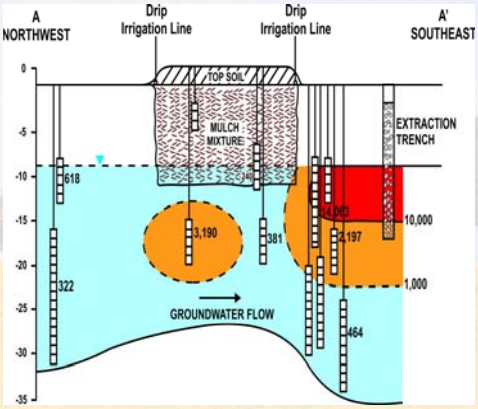


Continuation Step

- Continue mass removal of source contaminants through SVE at SWMU B-3 and AOC 65.
- Expand current SVE systems at SWMU B-3 and AOC-65 to enhance mass removal in shallow vadose formation.

Final Step

- Treat remaining contaminants in formation through enhanced bioremediation techniques.
- How?
  - Bioreactor with leach field to continually re-energize bioreactor trench.
  - Possible injection well for substrate injections directly into GW.
- Bioreactor constructed in SWMU B-3 during backfill/site restoration.



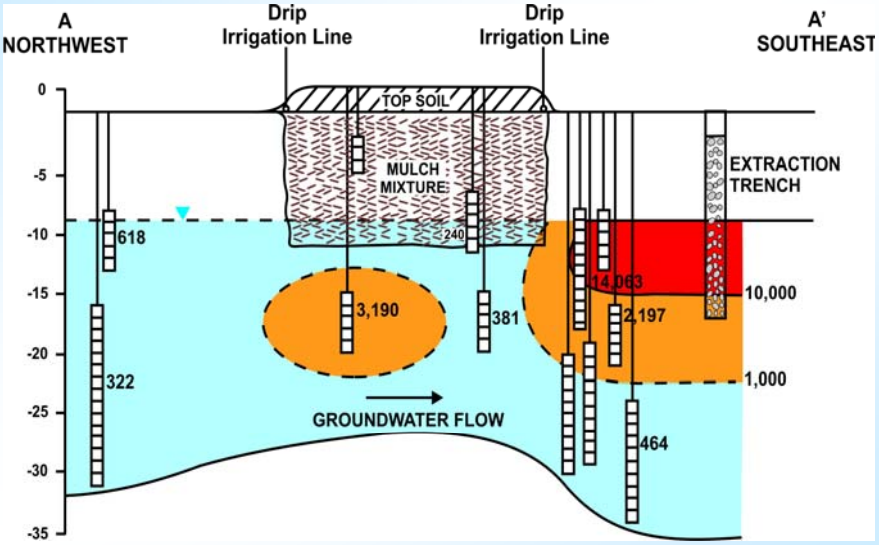
Current Research Initiative

In Situ Bioreactors for Fractured Media

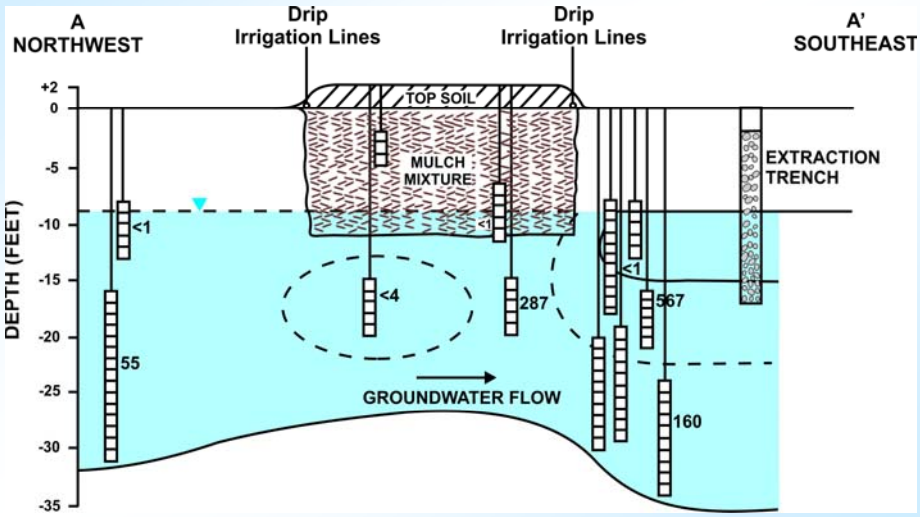
- ESTCP sponsored project to evaluate the benefits of establishing bioreactors in chlorinated solvent source areas.
- Altus AFB Landfill 3 Hot Spot – 27 mg/L TCE
- Fractured claystone and shale in upper 30 feet of aquifer
- 98 percent TCE reduction and 50 percent total chlorinated reduction in first 8 months. DCE and vinyl chloride reduction is also occurring
- Application to CSSA TCE and PCE sites

Solar-Powered Recirculation System at Altus AFB LF-3 Bioreactor

Altus AFB Bioreactor Cross-Section (TCE Baseline)



TCE Levels in Bioreactor (After 8 Months)



SWMU B-3 Push/Pull Test - Basis

- Why?
  - Verify that natural biological degradation of VOCs can be enhanced.
  - Quantify enhanced degradation rates that are achievable.
  - Obtain hydrogeologic information for possible full-scale implementation.

SWMU B-3 Push/Pull Test - Introduction

- Anaerobic dechlorination involves biologically mediated degradation of VOCs to less toxic compounds (e.g., TCE --► Ethene & Cl^-).
- VOCs serve as an electron acceptor during reductive dechlorination.
- Primary electron donor used in dechlorination of VOCs is molecular hydrogen (H_2).
- H_2 derived from fermentation of naturally occurring or anthropogenic organic substrates.
- Introduction of organic substrates provides a source of electron donor (H_2), allowing anaerobic dechlorinators to grow and enhance rates of VOC degradation.

SWMU B-3 Push/Pull Test - Basis

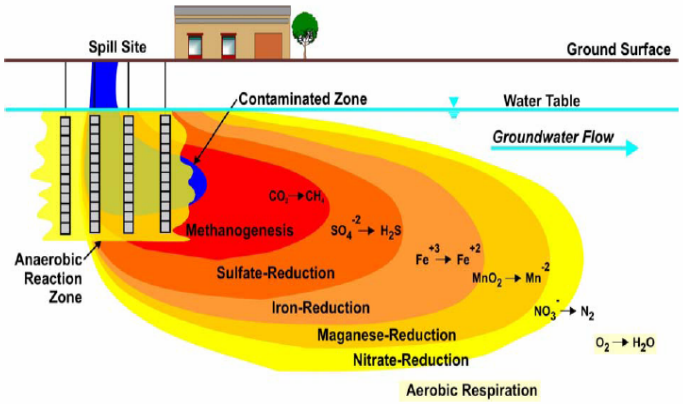
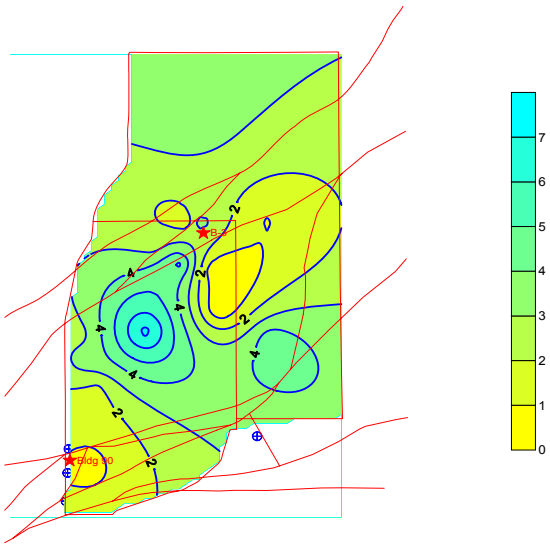


Figure 1.3 Reducing Zones Established Downgradient of Substrate Injection

Dissolved Oxygen Concentrations (mg/L) - September 2002



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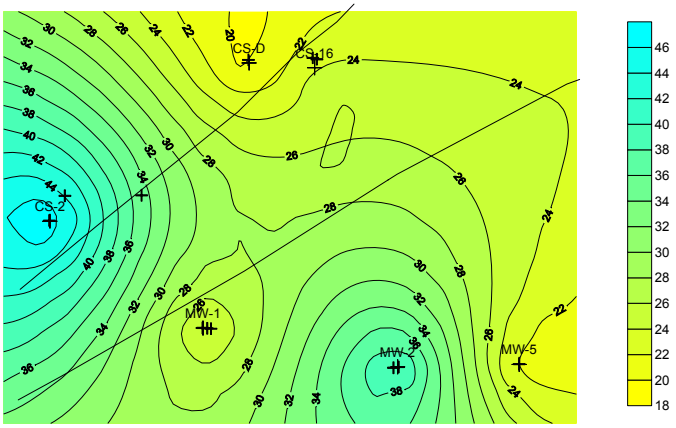
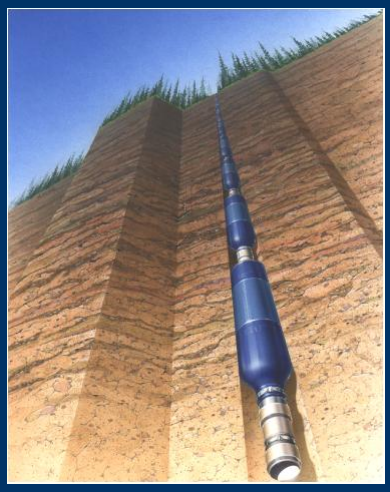


SWMU B-3 Push/Pull Test - Overview

- Inject (push) mixture of contaminated groundwater, organic substrate and tracer(s).
- Extract (pull) and analyze groundwater samples.
- Analyze VOC concentrations over time.
- Sample downgradient wells to assess lateral extent of reaction zones.
- Sample Westbay multi-level monitoring wells to assess vertical distribution of reaction zones.
- Tracer(s) provide hydraulic data for study and groundwater migration.

Westbay Monitoring Introduction

- Multi-Level Monitoring
- Modular Delivery Systems - - MP casing systems
- Modular Data Acquisition Systems - - MOSDAX probes
- Completion Methods and Installation
- Hydrogeologic Testing



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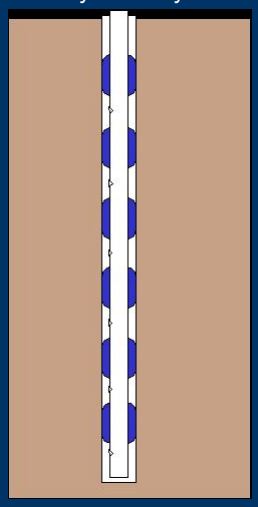
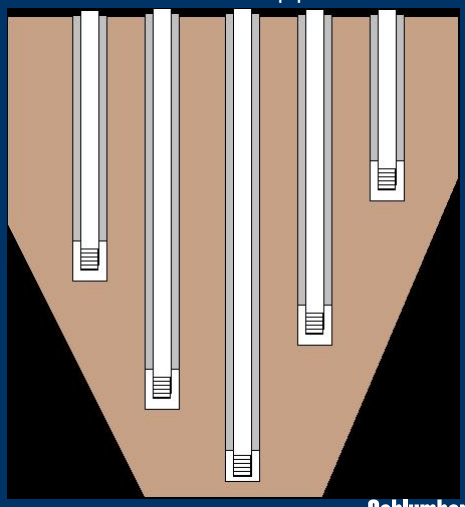
Multi-Level Monitoring

Westbay's MP System



Cluster of Standpipes



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SWMU B-3 Push/Pull Test - Design

- Multilevel Westbay wells
  - One upgradient and three downgradient
  - Four to five sampling ports in each well
  - At least one well with lowest port set in Cow Creek.
- Injection well
  - One injection well located near one Westbay well
  - Screened to shallow transmissive zone (based on Westbay borehole findings
- Substrate selection
  - Lactate, vegetable oil, or lactate/veg oil mixture
  - Substrate volume and loading rate based on injection zone hydraulics and VOC concentrations
- Tracer selection
  - Conservative tracer = bromide
  - Non-conservative tracer (if used) – TBD

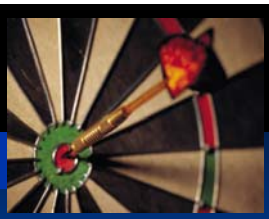
SWMU B-3 Push/Pull Test - Implementation

- Install Westbay multilevel monitoring points.
- Install injection well with injection interval based on Westbay wells.
- Extract desired amount of groundwater from injection well and mix with substrate and tracer(s)
- Inject groundwater/substrate/tracer mixture into formation
- Flush injectate from well casing, screen, and sandpack using fresh water
- Wait for substrate to enhance biological activity in injection zone.
- Collect groundwater samples from injection well and monitoring points over time.

SWMU B-3 Push/Pull Test – Data Analysis

- Data collected;
  - VOCs, TOC, volatile fatty acids, dissolved oxygen, redox potential, and MNA parameters as appropriate.
  - Conservative & non-conservative concentrations.
  - Groundwater elevation measurements.
- VOC Concentrations vs. time to establish first-order degradation rates.
- TOC/VFA vs. time to establish substrate usage rates.
- Groundwater and substrate velocity.
- Completeness of degradation reaction.

What's the Point?



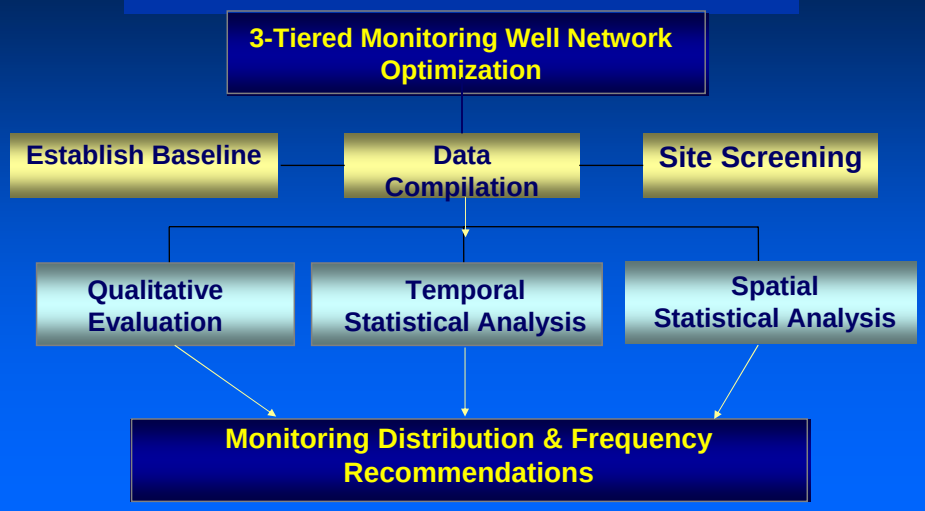
Parsons' 3-Tiered LTMO Approach combines a qualitative evaluation with temporal and spatial statistics to evaluate the distribution and frequency of groundwater sampling.

The 3-Tiered LTMO approach has been applied at multiple sites and identified significant monitoring program reductions and potential cost savings.

Steps Involved in an LTMO

1. Review/Develop Objectives for Monitoring Program
2. Examine Existing Data
3. Determine if Site is a LTMO Candidate
4. Perform Optimization
5. Assess & Implement Results

3-Tiered LTMO At A Glance



3-Tiered Analysis Methodology

- Qualitative Evaluation
- Temporal Evaluation
- Spatial Evaluation
- 3-Tiered Summary

Data

Information

Solutions

Decisions

3-Tiered Summary Results Example

Well ID	Qualitative Evaluation		Temporal Evaluation		Spatial Evaluation		Summary		
	Remove	Retain	Remove	Retain	Remove	Retain	Remove	Retain	Recommended Monitoring Frequency
LC-03		√		√				√	Biennially
LC-05	√			√	√		√		--
LC-06		√		√		√		√	Annually
LC-14a		√	√		√			√	Annually
LC-19a		√		√	√			√	Annually
LC-19b	√		√		√		√		--
LC-19c	√		√		√		√		--
LC-26	√		√		√		√		--
LC-41a		√	√					√	Annually
LC-44a	√		√				√		--
LC-49		√		√		√		√	Annually
LC-51	√			√			√		--

- Combines Qualitative, Temporal and Spatial Results
- Case-by Case example:
  - **LC-14a** sampling frequency reduced based on temporal & spatial results

3-Tiered LTMO Analysis Summary

- Qualitative Evaluation
  - Experienced geologist big-picture analysis
- Temporal Statistical Evaluation
  - Mann Kendall trend analysis
- Spatial Statistical Evaluation
  - Geostatisical Kriging relative predicted error analysis

3-Tiered LTMO Analysis

Combines three evaluations to optimize the distribution and frequency of groundwater sampling.

Applications

- 20+ Sites in Past 3 Years
- 10 to 300+ Well Monitoring Networks
- Identified 13% - 83% Reductions*
- On Average Identified Over 1/3 Reductions*
- Results Highly Dependant on Site Conditions
  - No recent optimization and more frequent current sampling → higher identified reductions
  - Sites with small number of wells can still lead to significant relative reductions

*Reduction in average sampling events per year

On-Going & Future Activities

- LTMO Roadmap
  - Sponsored by EPA & USACE
  - Currently being peer-reviewed
- EPA interested in CSSA as a case study
  - EPA requested to attend meetings at CSSA
- LTMO Seminar, March 30-31, 2005
  - Offered by U.S. EPA, Cal EPA, USACE, and USN
  - Targeted to regulatory community
  - CSSA to be presented as example site

Summary

- Long Term Monitoring: essential & costly
- Long Term Monitoring Optimization
  - Potential cost savings
  - Improved understanding of site
- CSSA LTMO study
  - Currently draft
  - Final submittal to regulators
  - Apply recommendations of LTMO study to 2005 sampling events


Thank you! Questions?
Identifying Opportunities for Cost Savings Applying Long Term Monitoring Optimization
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