



Closed Loop Bioremediation Pilot Demo, NWIRP Bethpage, AOC 22 Project Status Update

Agenda

- Project Team
- Project Objectives
- Project Status To-Date
- Conclusions and Next Steps



Project Team

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CLB System Operator

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President / CEO

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Sr. Project Engineer

Edmundo Uribe
Tierra Technologies
Sr. Project Engineer

Project Objectives

Primary Pilot Project Objective

- ❑ Mass removal of fuel oil #4 and #6 from soil between 10-60 ft bgs.

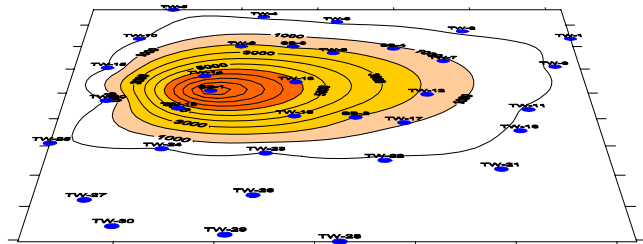
Supporting Project Objectives

- ✓ Contaminant Desorption
- ✓ Contaminant Mobilization
- ❑ Contaminant Degradation

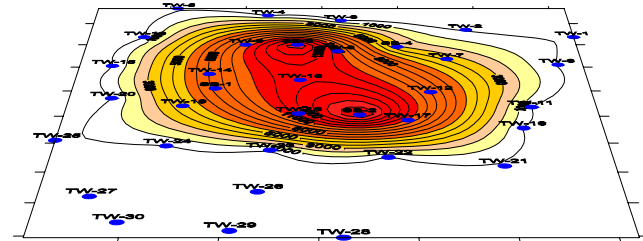
Project Status To-Date

- Contaminant desorption was completed successfully
 - Application of heat using $H_2O_2 + Fe$ to reduce viscosity
 - Application of surfactant to desorb contaminants
- Contaminant mobilization is on-going
 - Contaminant is mobile and moving downward via gravity
 - 20 – 40 ft bgs levels have confirmed TPH reduction from 27 -76%
- Biodegradation has begun
 - 22.4% TPH reduction in soil per May '05 sampling event
 - Low pH reported in June '05 has been buffered to pH > 6
 - Increase bio-activity has been confirmed

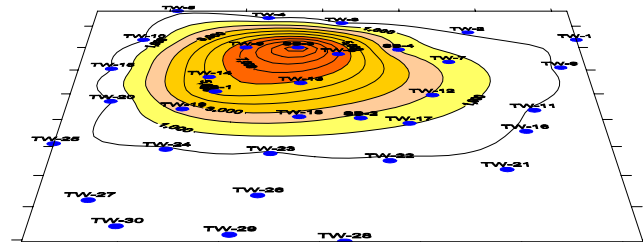
Soil Sampling TPH
December 13, 2004



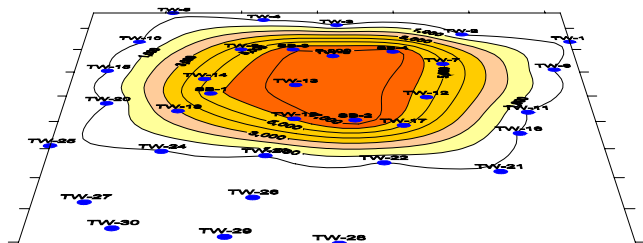
20'



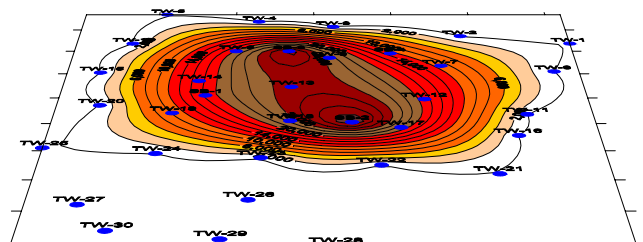
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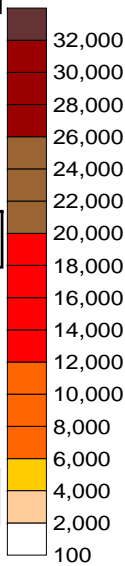
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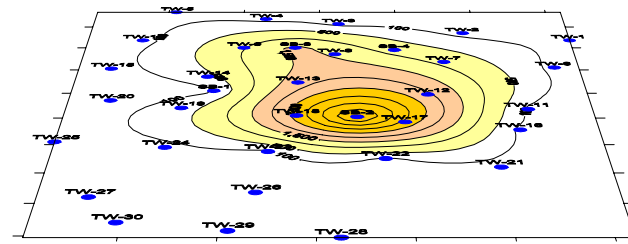
50'



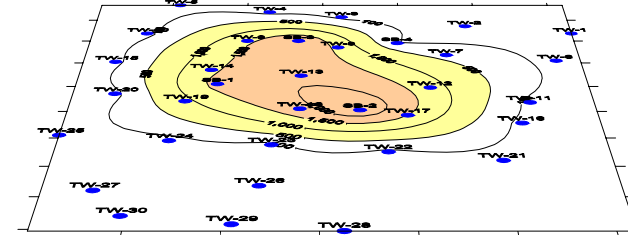
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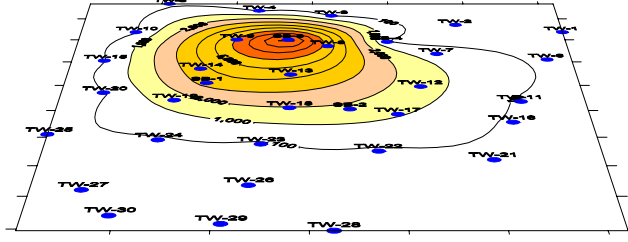
Soil Sampling TPH
August 8, 2005



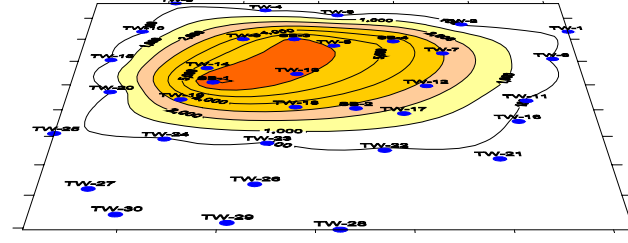
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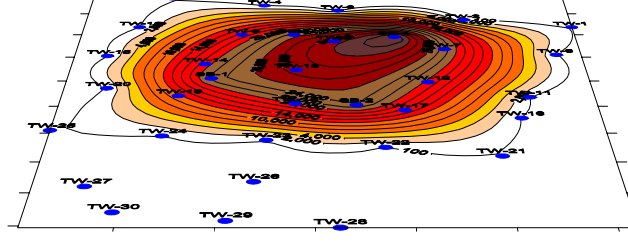
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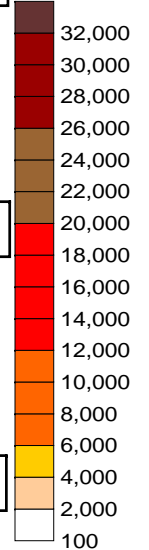
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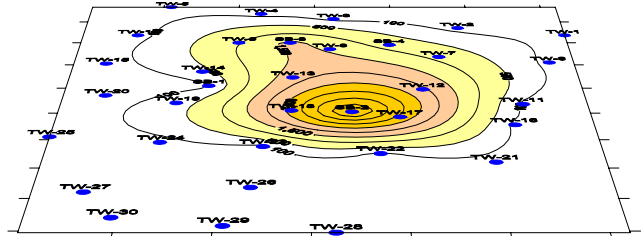
50'



60'



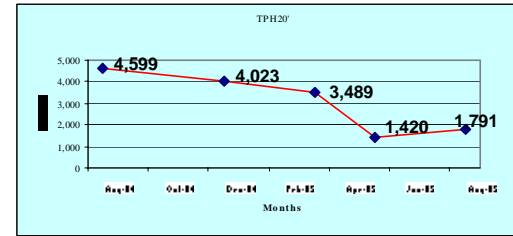
Soil Sampling TPH
August 8, 2005



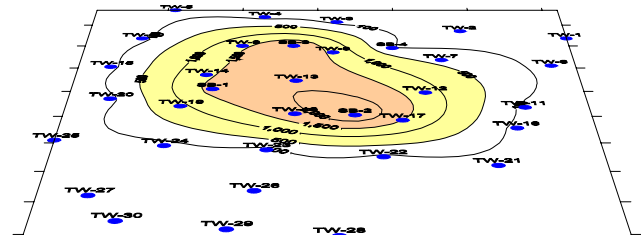
20'

-61%

Soil Sampling Average TPH
August 8, 2005

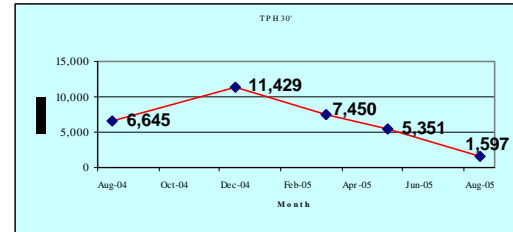


20'

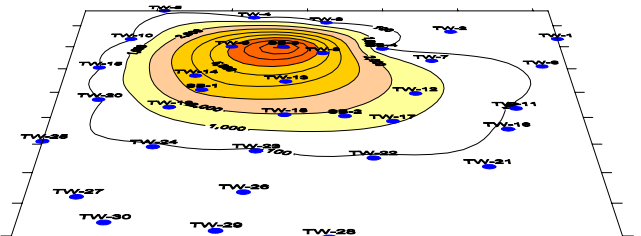


30'

-76%

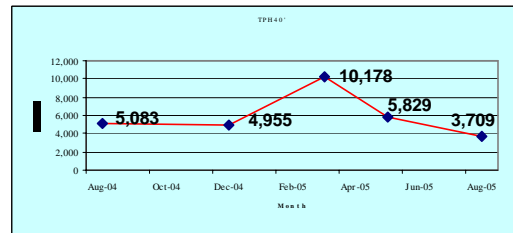


30'

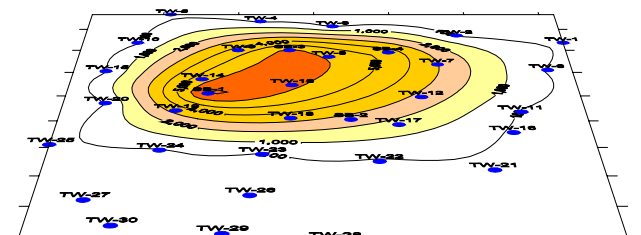


40'

-27%

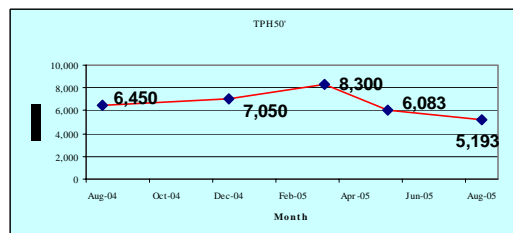


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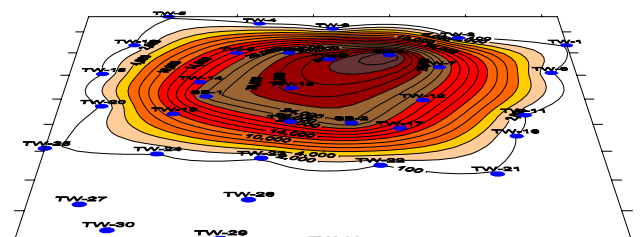


50'

-19%

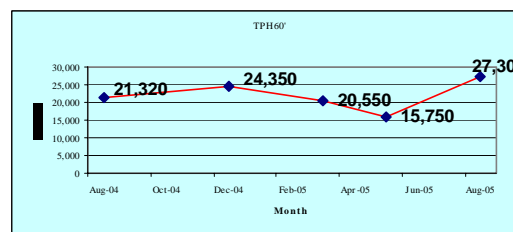


50'

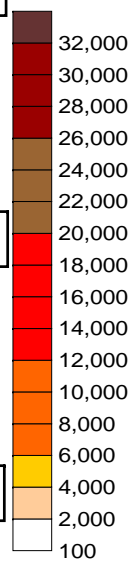


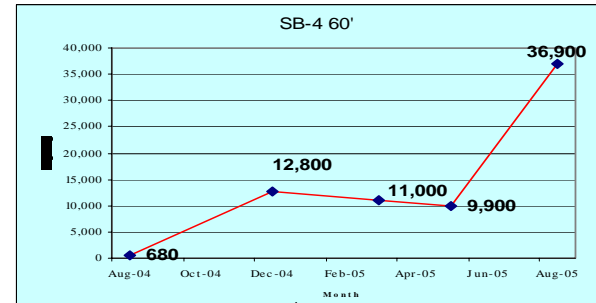
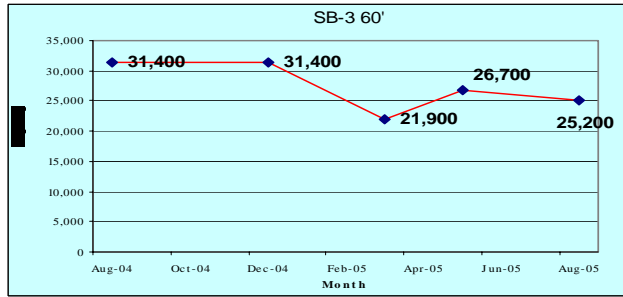
60'

28%

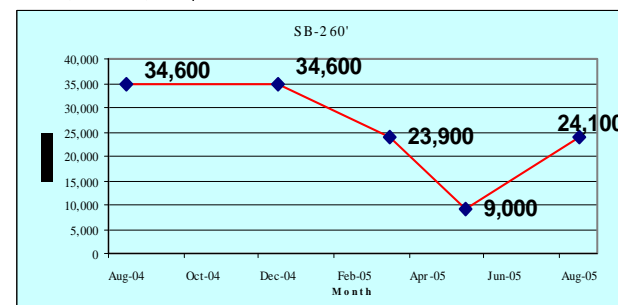
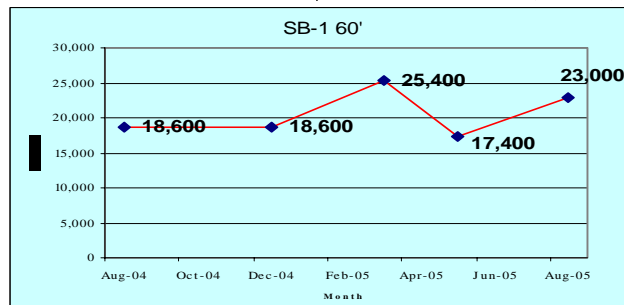
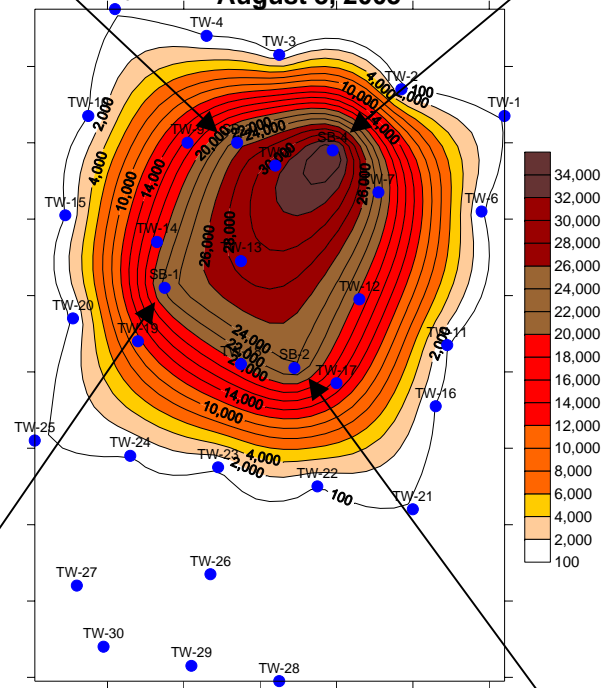


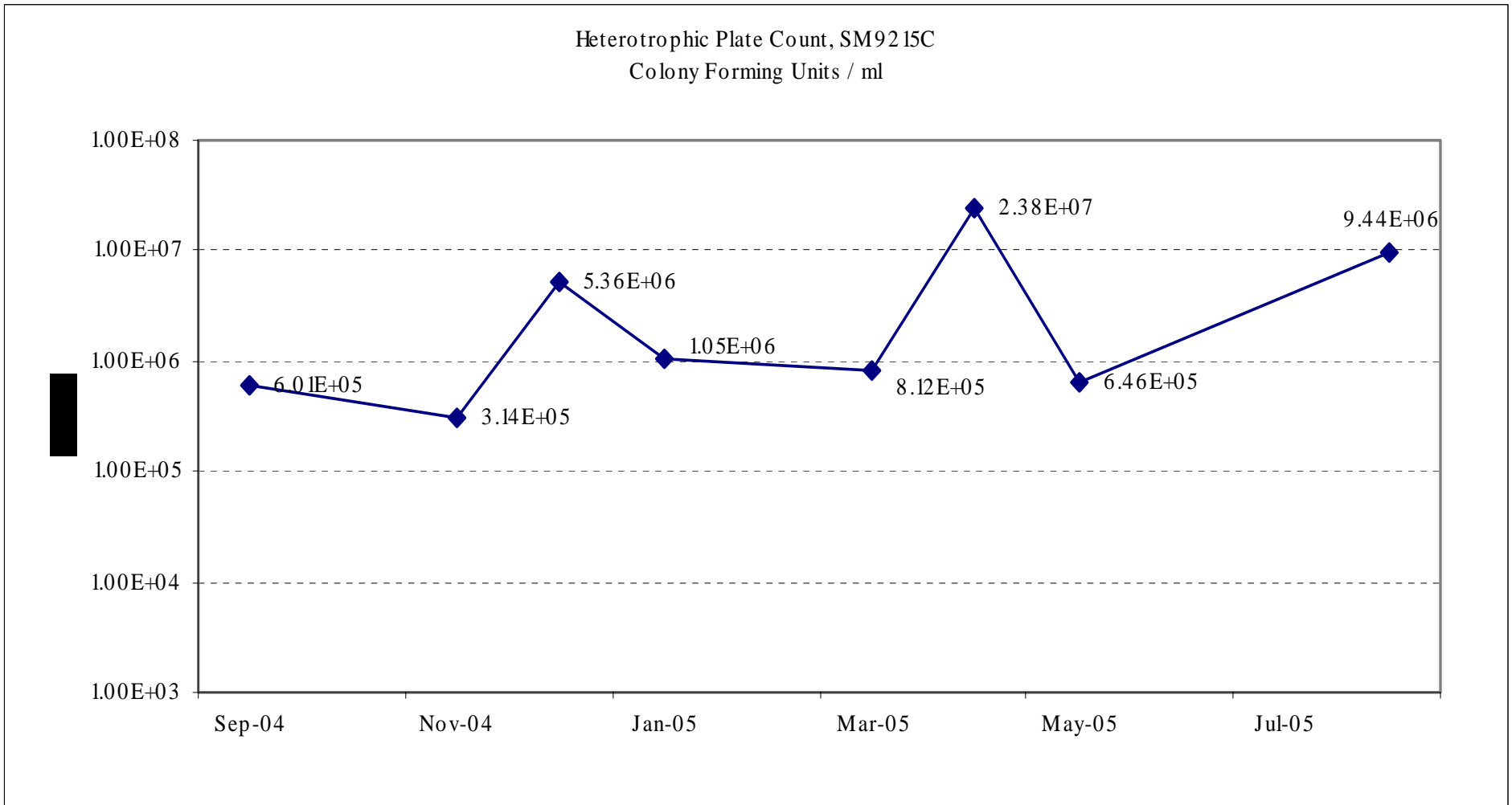
60'





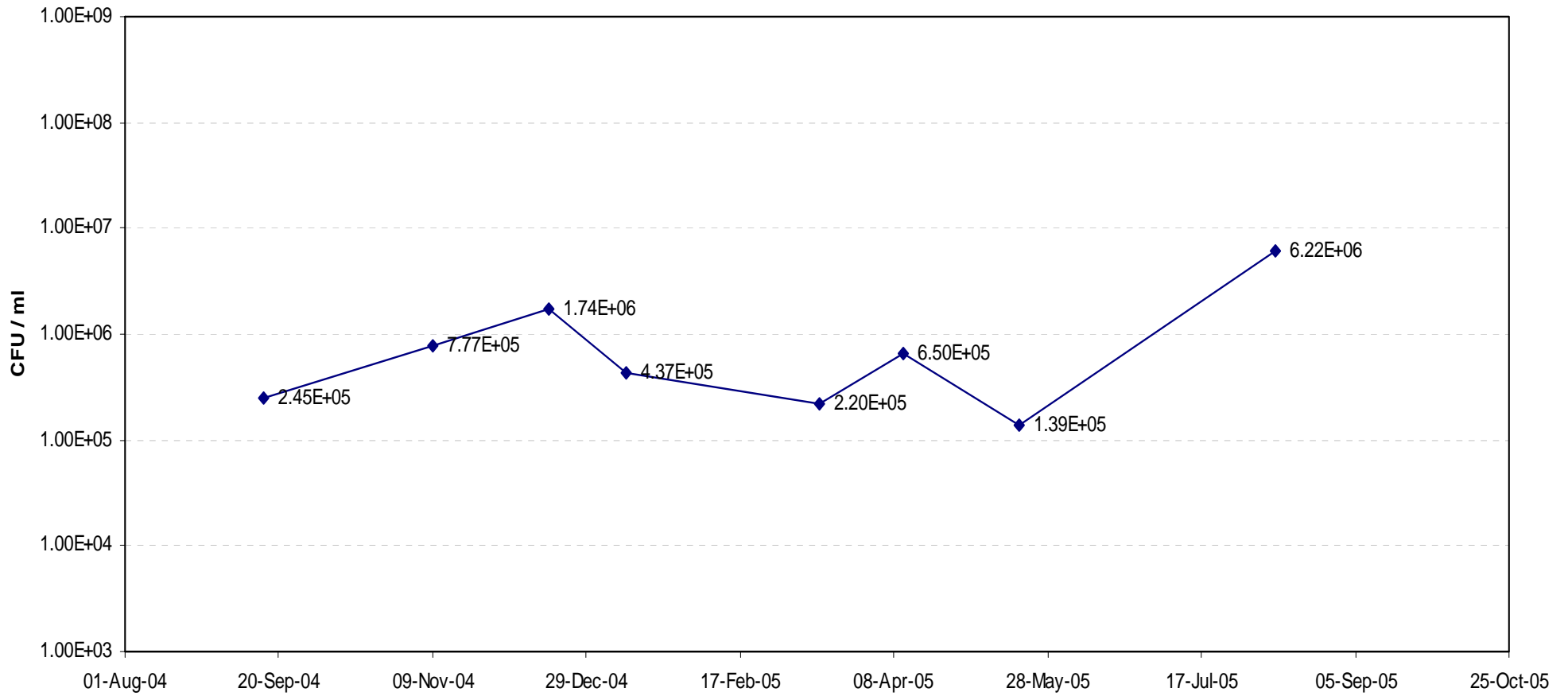
**Soil Sampling TPH60'
August 8, 2005**







Mean Petroleum Hydrocarbon Degradator Population Colony Forming Units / ml



Project Status To-Date

Project Milestones

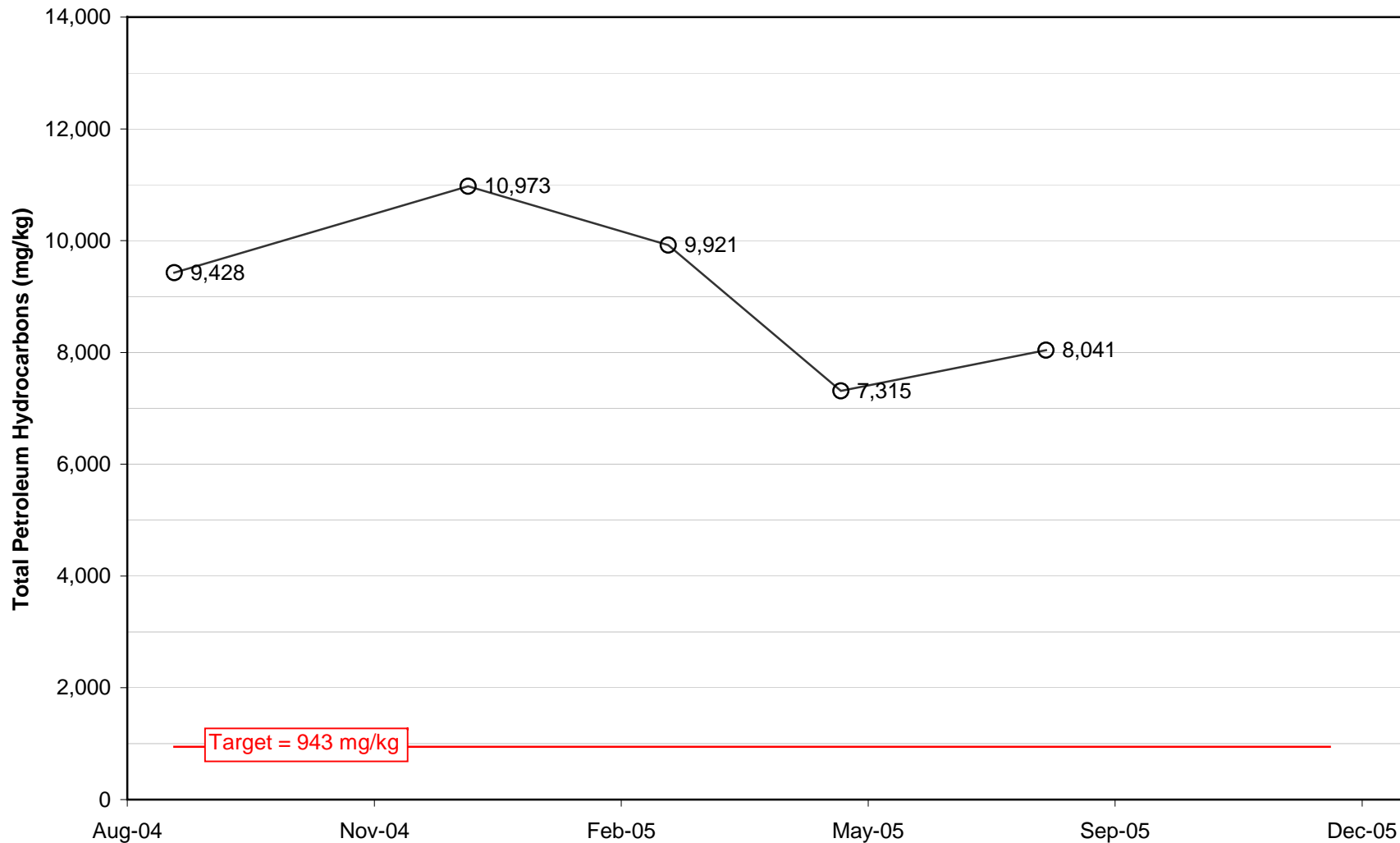
Design, Plans, Permits	2/04 – 7/04	100% Complete
Mobilization, System Installation	8/04 – 10/04	100% Complete
System Operation - Groundwater Sampling & Analysis - Soil Sampling & Analysis	10/04 – 9/05 Monthly Every 2 Months	75% Complete Last Sample 8/10 Last Sample 8/9
Final Report / Closeout	9/05 – 1/06	0%
Site Restoration	2/06 – 3/06	0%

Project Status To-Date

Mean Soil Analytical Results CLB Pilot Demonstration, NWIRP Bethpage AOC 22



Proprietary Information



Conclusions and Next Steps

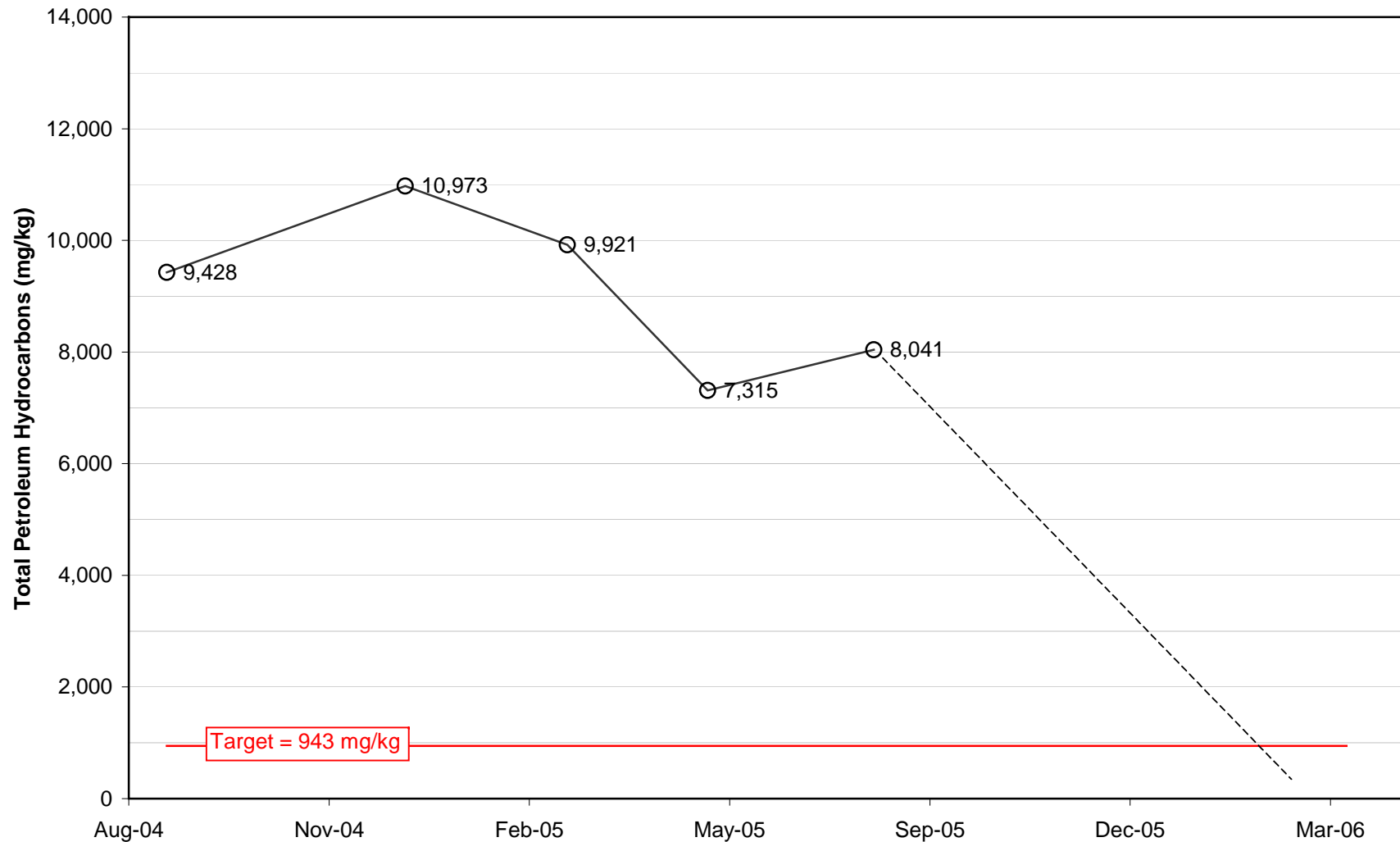
- Conclusions
 - Contaminant mobilization to 50-60 ft level has been confirmed
 - Biodegradation in groundwater is accelerating
 - 5 Months of additional time is required to reach 90% goal
 - Additional time impacts budget by \$ 509,649.00
- Next Steps
 - Need to increase free product recovery rate
 - Need to oxygen enhance the sparging process

Conclusions and Next Steps

Mean Soil Analytical Results CLB Pilot Demonstration, NWIRP Bethpage AOC 22



Proprietary Information



Questions and Discussion