ArvinMeritor/ETI PRB Meeting
March 12, 2010
Troy, Michigan

Brown and Caldwell Presentation Outline

A handout package will be prepared for use in the following discussions.

1. Summary of pre-investigation observations (discussion with visual on handout)
   The visual will focus on the observed increasing trend in cDCE and vinyl chloride concentrations in Panel 9. This is why we began the investigation.

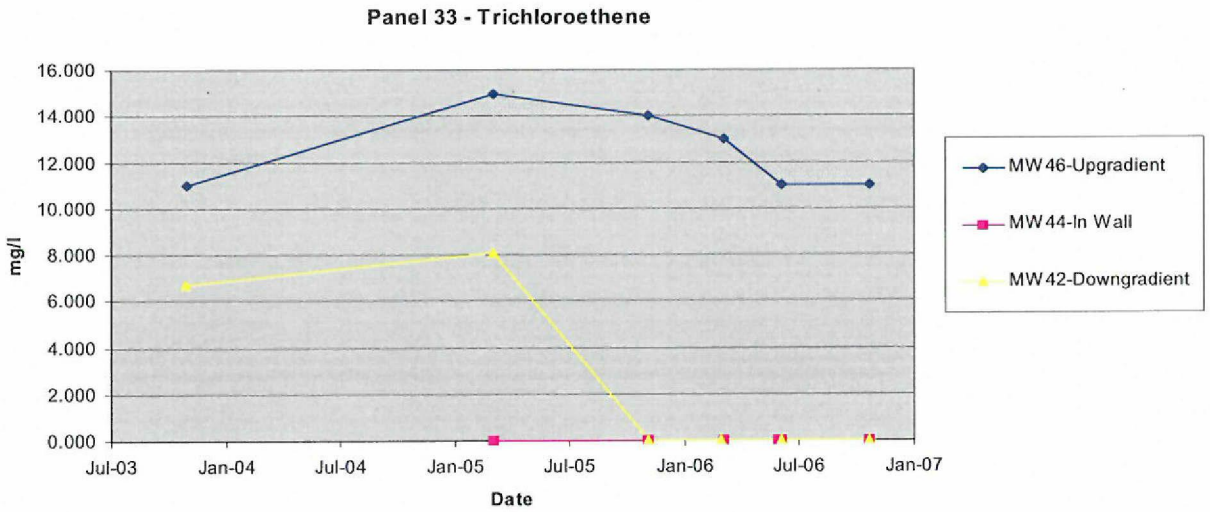
2. Hydraulic Data Trends (discussion with visuals on handout)
   The visual will illustrate the changes in the water levels measured in the PRB wells over time. It demonstrates that the PRB permeability is decreasing and that the problem is worsening.

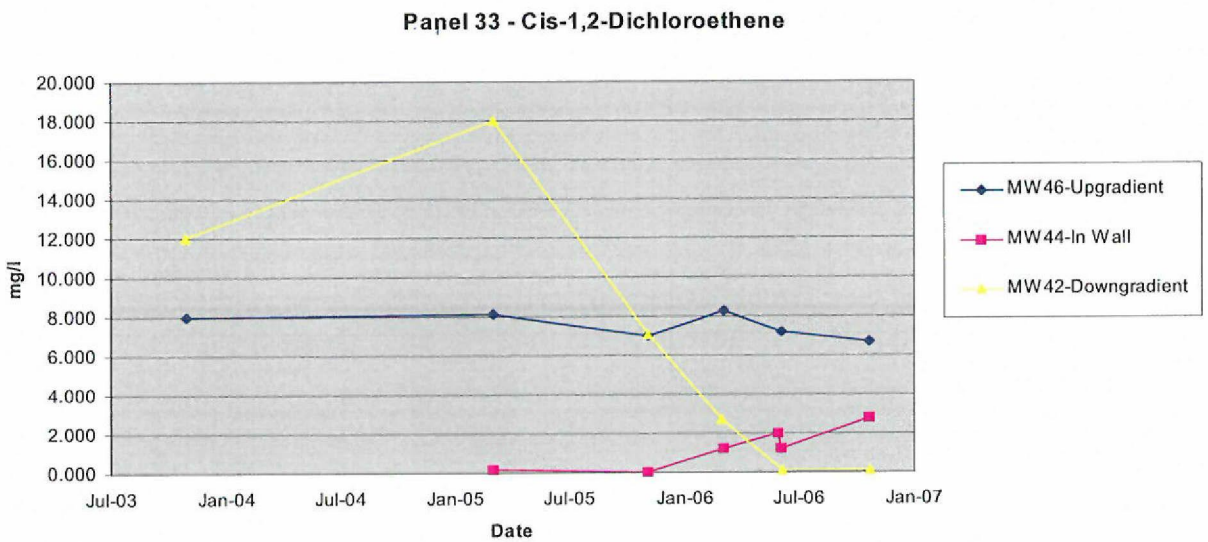
3. Results from Hydraulic gradient analysis (discussion with visuals on handout)
   The visual will include the figures showing the pattern of reduced variability based on the differences in water level measurements. The visual will show that the permeability reduction is occurring at or near the upgradient face of the PRB.

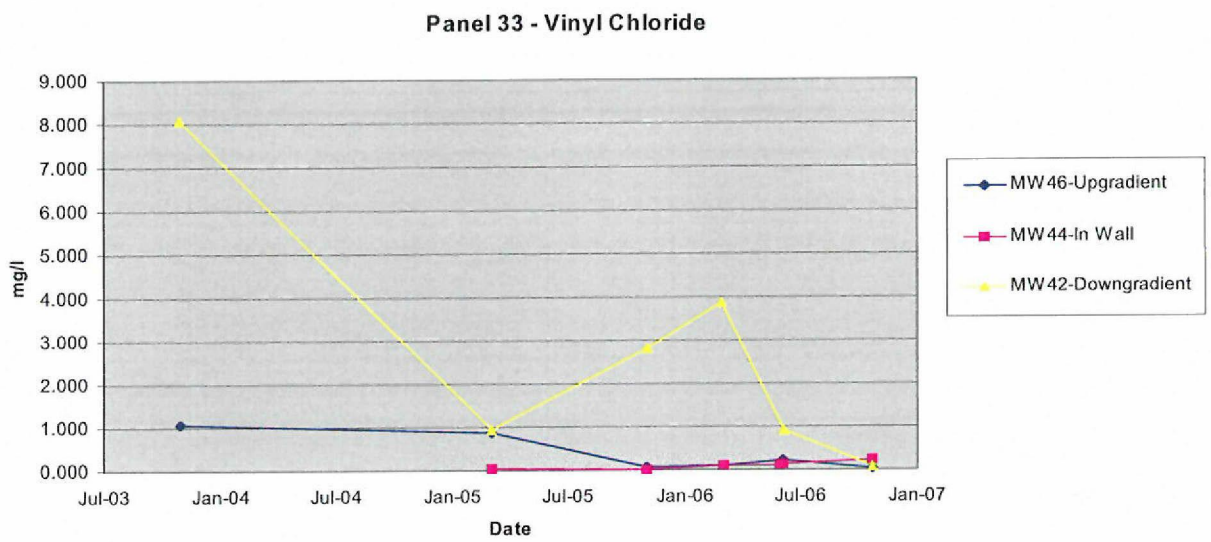
4. Results from coring (discussion with data summarized in tabular format on handout)
   The visuals will include a figure showing the textural analyses, a figure showing the microbial biomass concentrations, and a table with the microbial population dynamics. The visuals will show that the entrainment of fines is not a cause of the permeability reduction and that the PRB is enhancing microbial growth.

5. Our interpretations (discussion)
   This will be an open discussion.

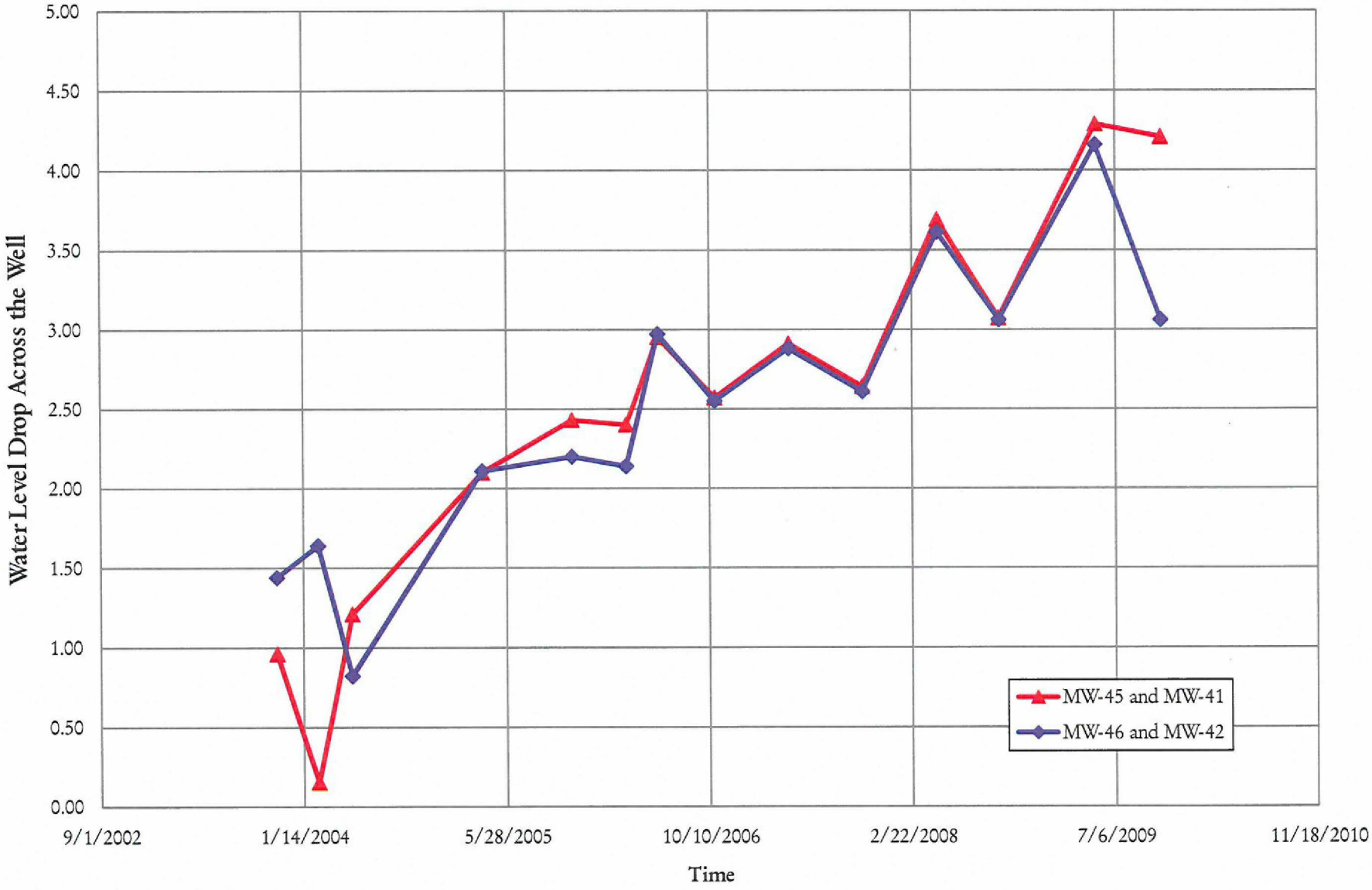
Plume diagrams


Panel 33 - Trichloroethene
16.000
14.000
12.000
10.000
8.000
6.000
4.000
2.000
0.000
mg/l
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Date
MW46-Upgradient
MW44-In Wall
MW42-Downgradient


Panel 33 - Cis-1,2-Dichloroethene
20.000
18.000
16.000
14.000
12.000
10.000
8.000
6.000
4.000
2.000
0.000
mg/l
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Date
MW46-Upgradient
MW44-In Wall
MW42-Downgradient


Panel 33 - Vinyl Chloride
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
mg/l
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Date
MW46-Upgradient
MW44-In Wall
MW42-Downgradient

Water Level Drop Across the PRB
Shallow Wells MW-45 and MW-41 and Deep Wells MW-46 and MW-42



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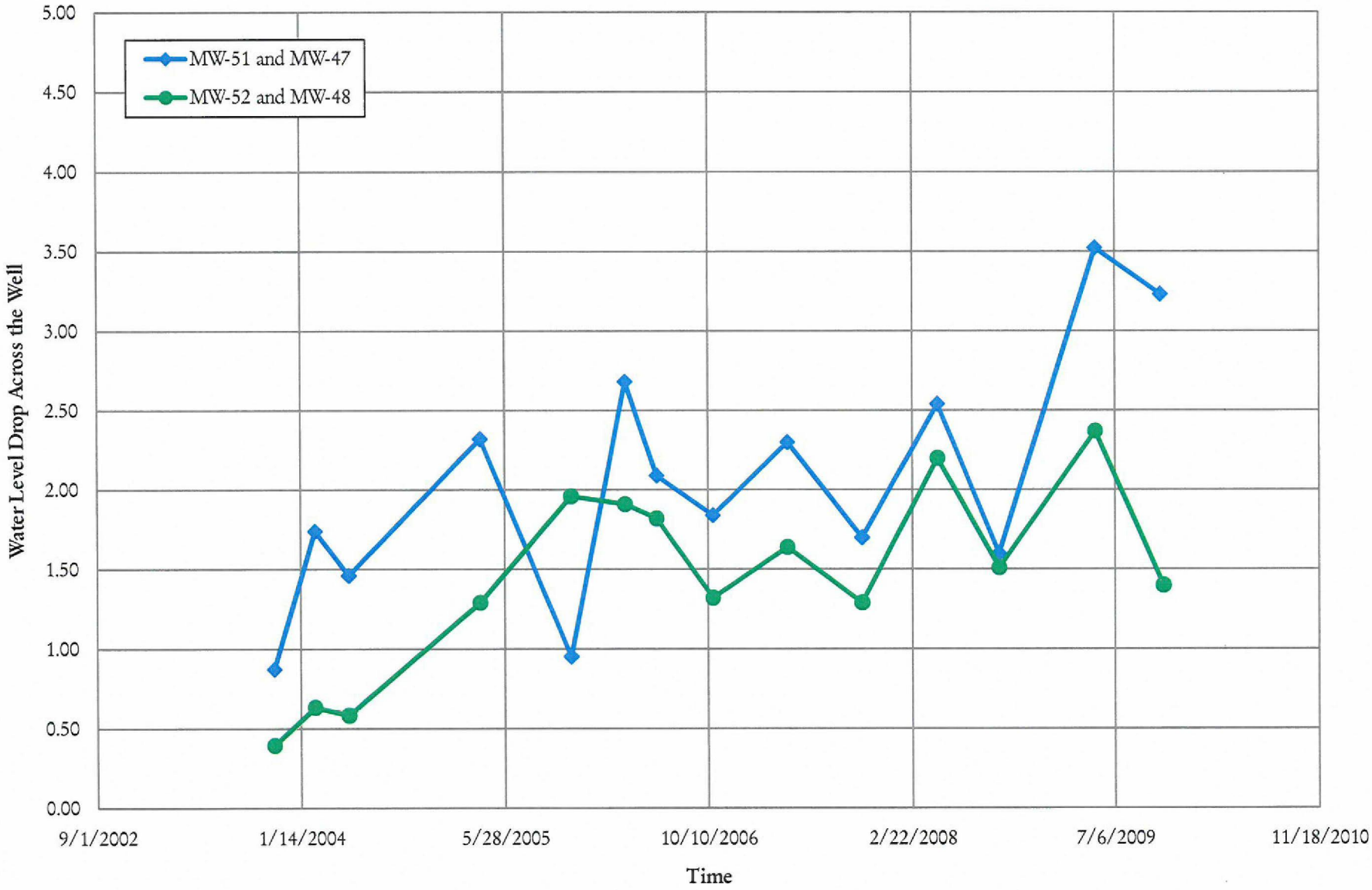
Water Level Drop Across the PRB
Shallow Wells MW-51 and MW-47 and Deep Wells MW-52 and MW-48



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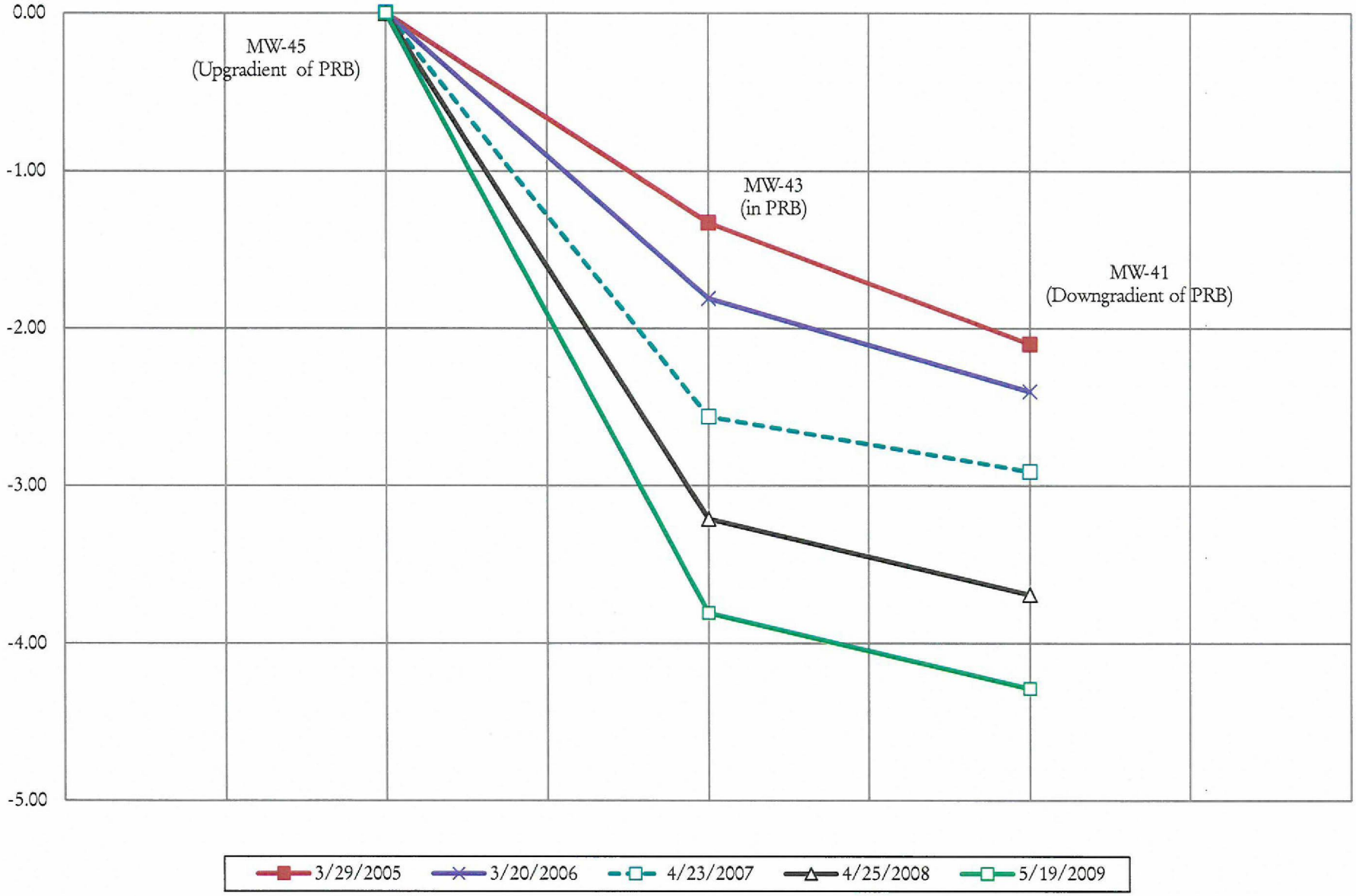
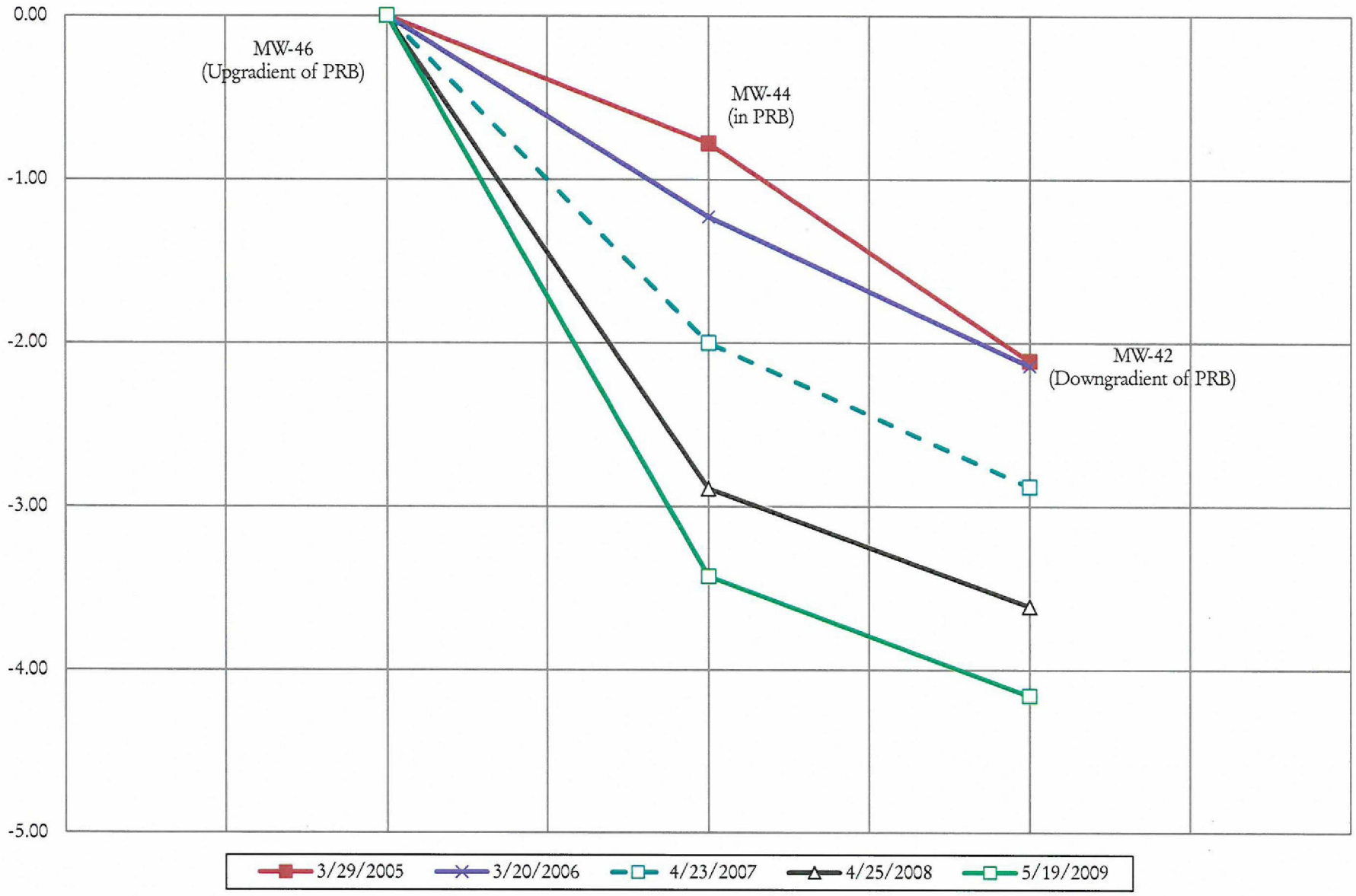
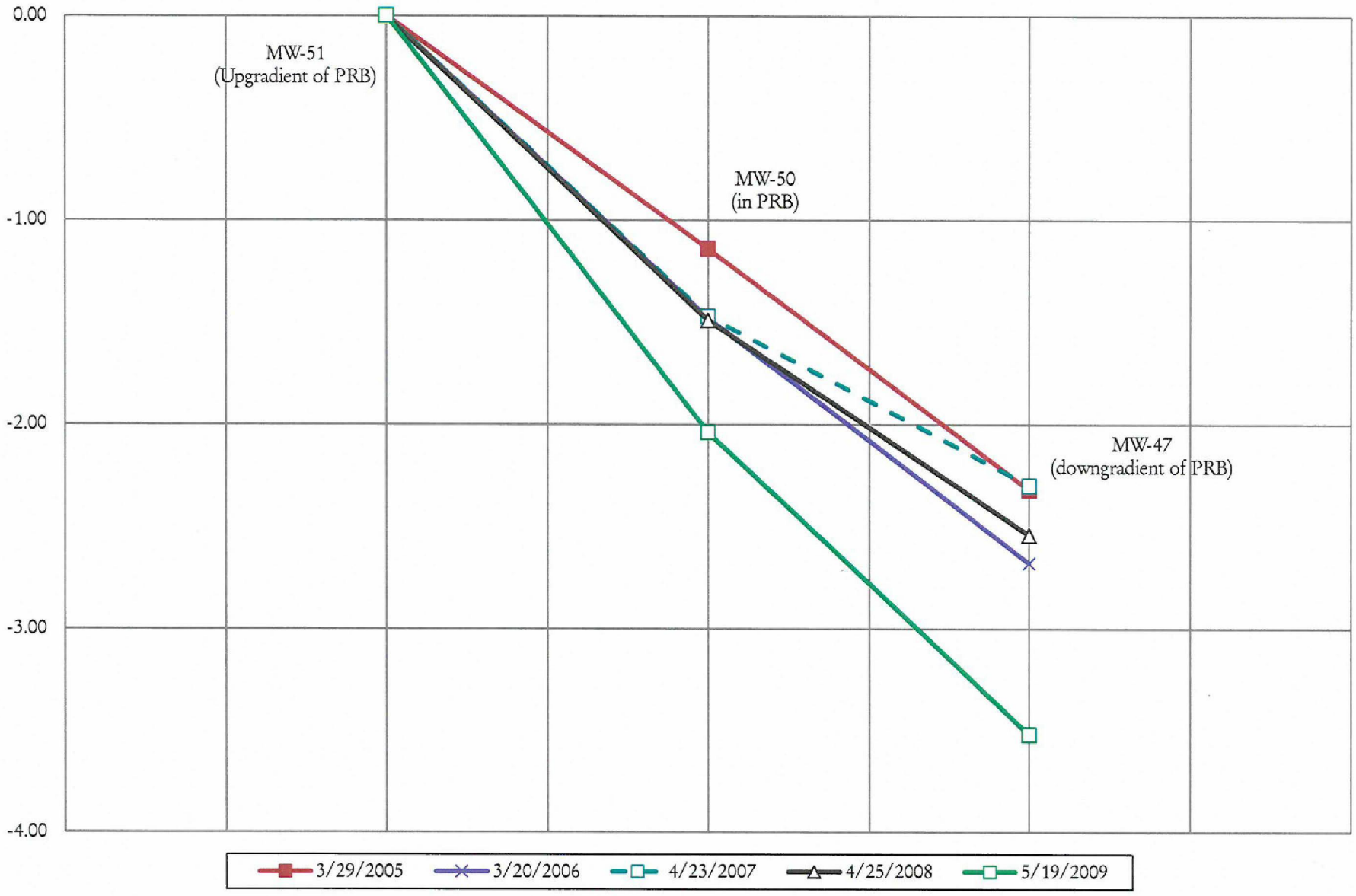
Gradient Changes at North Transect
Shallow Wells MW-45, MW-43, and MW-41 Over Time



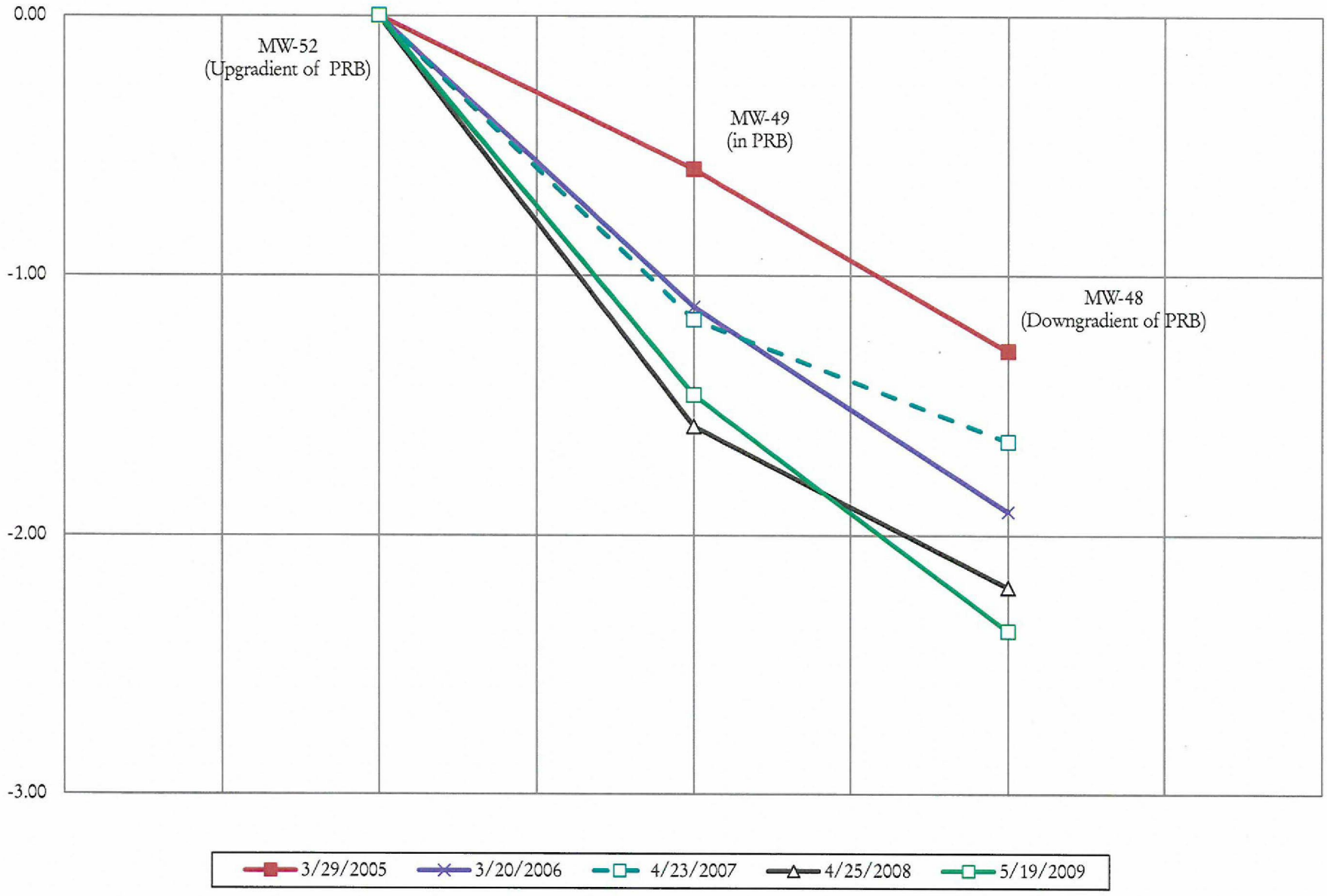
Gradient Changes at North Transect
Deep Wells MW-46, MW-44, and MW-42 Over Time



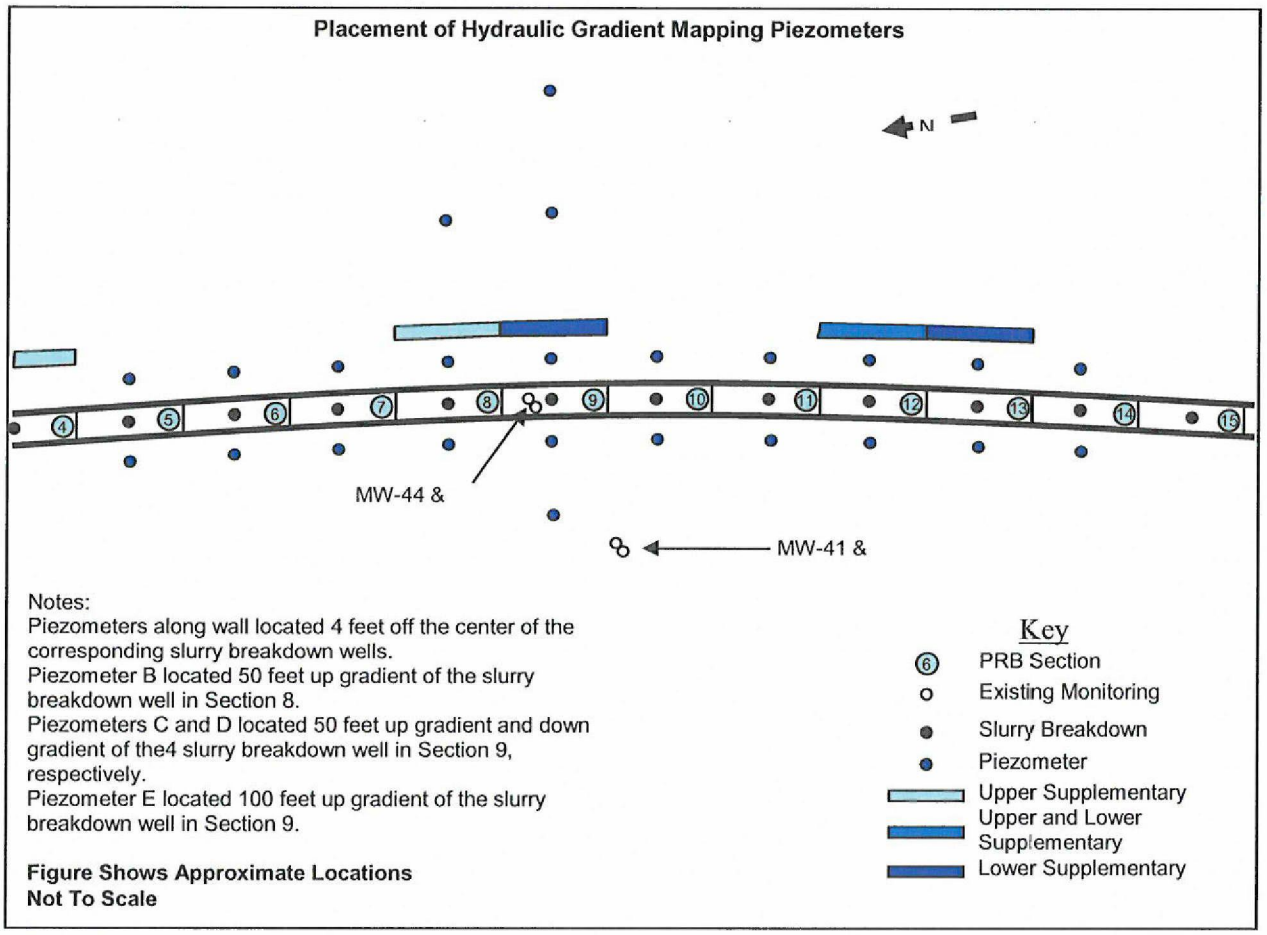
Gradient Changes at South Transect
Shallow Wells MW-51, MW-50, and MW-47 Over Time

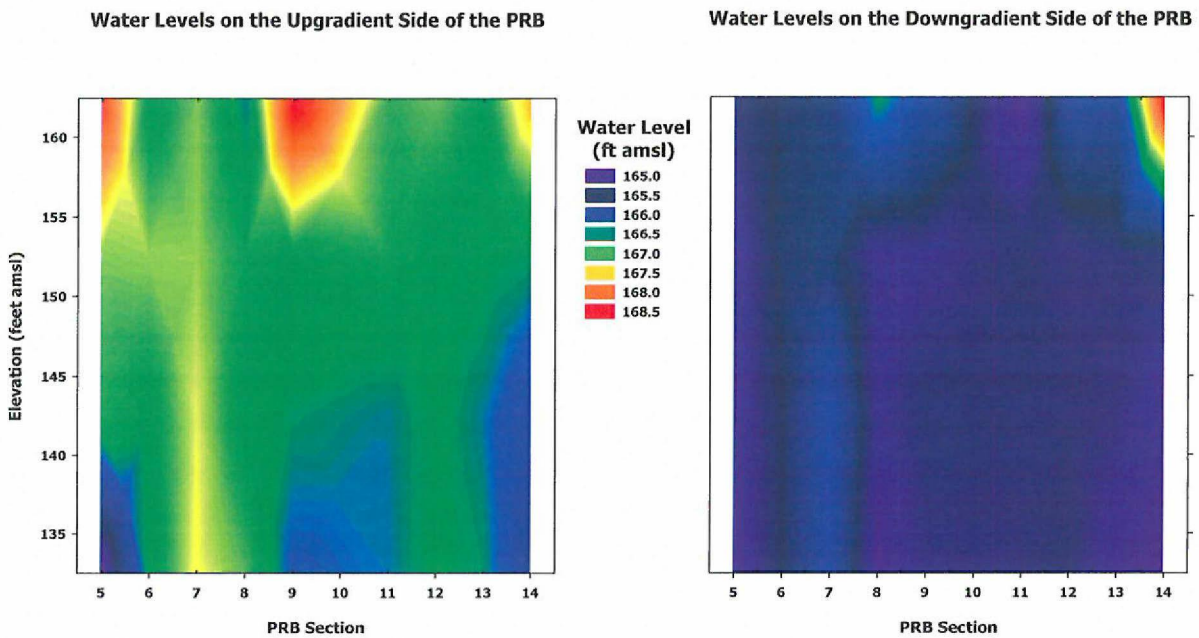


Gradient Changes at South Transect
Deep Wells MW-52, MW-49, and MW-48 Over Time

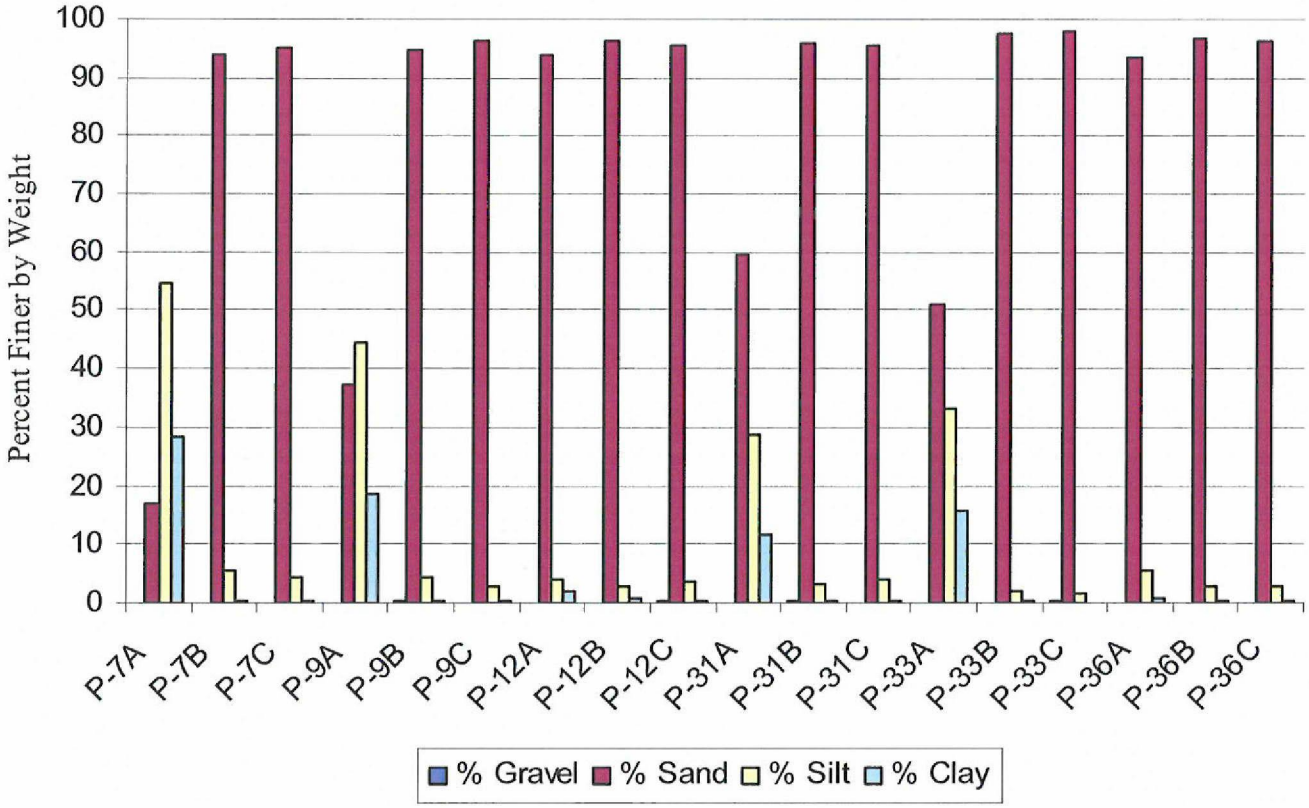


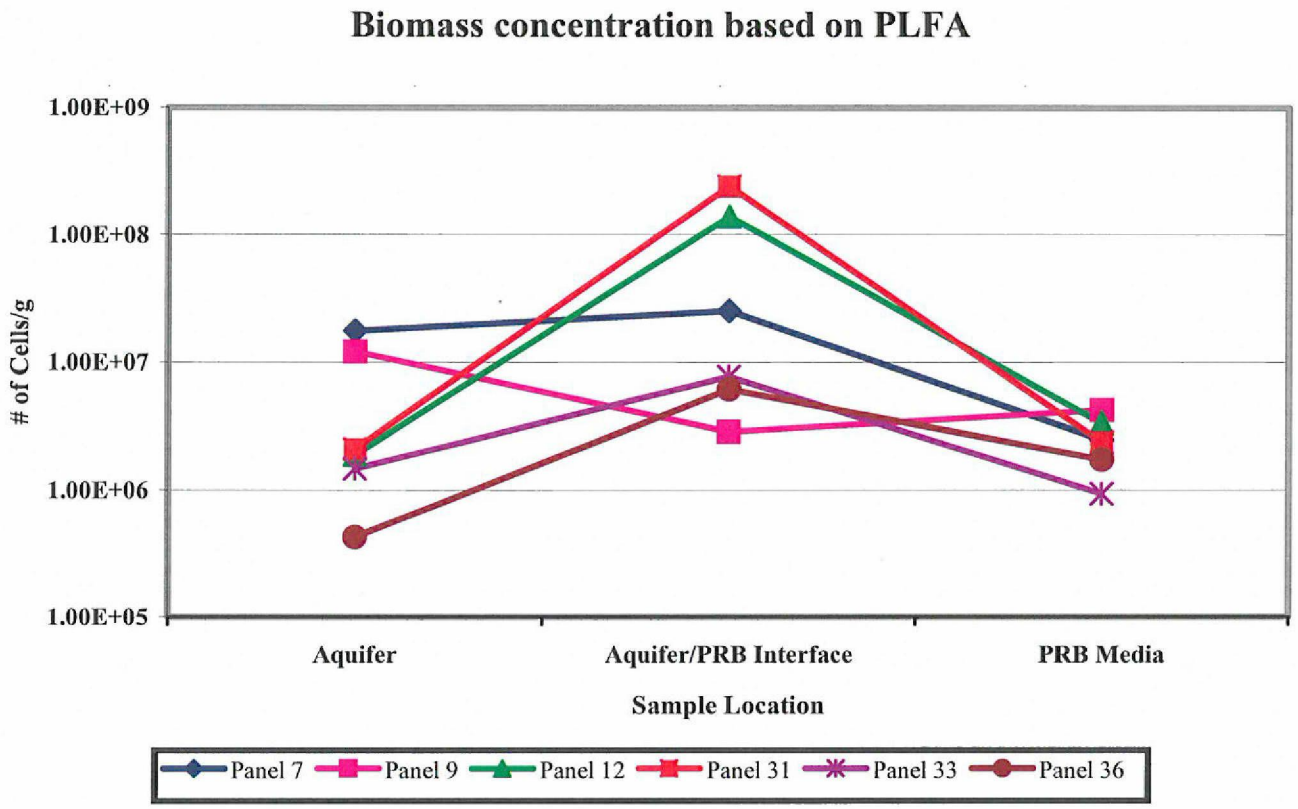
Layout of Piezometer Installations





Textural Analysis




Biomass concentration based on PLFA
1.00E+09
1.00E+08
1.00E+07
1.00E+06
1.00E+05
# of Cells/g
Aquifer
Aquifer/PRB Interface
PRB Media
Sample Location
Panel 7
Panel 9
Panel 12
Panel 31
Panel 33
Panel 36

Predominant Species Detected by DGGE

PRB Panel	Core Segment	Similar Genus	Donors	Acceptors
7	Aquifer	*Zymophilus spp.*		
	Interface	*Bacillus spp*	organics	O_2, NO_3^-
31	Aquifer	*Sulfourospirillum spp.*	simple organics, H_2	O_2, S_0, NO_3^-, PCE
		Acetobacterium		
		Desulfomicrobium spp.	organics, H_2	$SO_4^=$, S_2O_3
		Desulfovibrio spp.	organics	$SO_4^=$, S_0
	Interface	*Sulfourospirillum spp.*	simple organics, H_2	O_2, S_0, NO_3^-, PCE
		Acetobacterium		
		Desulfomicrobium spp.	organics, H_2	$SO_4^=$, S_2O_3
9	Aquifer	*Lactobacillus*		O_2, fructose
		unclassified Erysipelotrichaceae		
	Interface	*Dehalococcoides spp.*	H_2	PCE, TCE
		Spirochaetaceae		
33	Aquifer	*Rikenellaceae*		$SO_4^=$, S_0
		Dehalococcoides spp.	H_2	PCE, TCE
		unclassified Clostridiales		
	Interface	*Desulfobulbaceae*	simple organics	$SO_4^=$, S_0
		Desulfotomaculum spp.		
		Desulfovibrio spp.	organics	$SO_4^=$, S_0
		Desulfomonile spp.	H_2, formate, pyruvate lactate, benzoate	TCE, SO_3^-, $SO_4^=$, S_2O
12	Aquifer	*Desulfobulbaceae*		
		Desulfovibrio spp.	organics	$SO_4^=$, S_0
	Interface	*Rikenellaceae*		$SO_4^=$, S_0
		Marinococcus		
		Clostridium spp.	H_2, acetate	acetate, proline
		Clostridiaceae		
36	Aquifer	*Bacteroides spp.*	polysaccharides	fumarate, NO_3^-
		Rikenella spp.		succinate
		unclassified clostridiales		
		Clostridium spp.	H_2, acetate	acetate, proline
		Anaerofustis		
	Interface	*Bacteroides spp.*	polysaccharides	fumarate, NO_3^-
		Clostridium spp.	H_2, acetate	acetate, proline