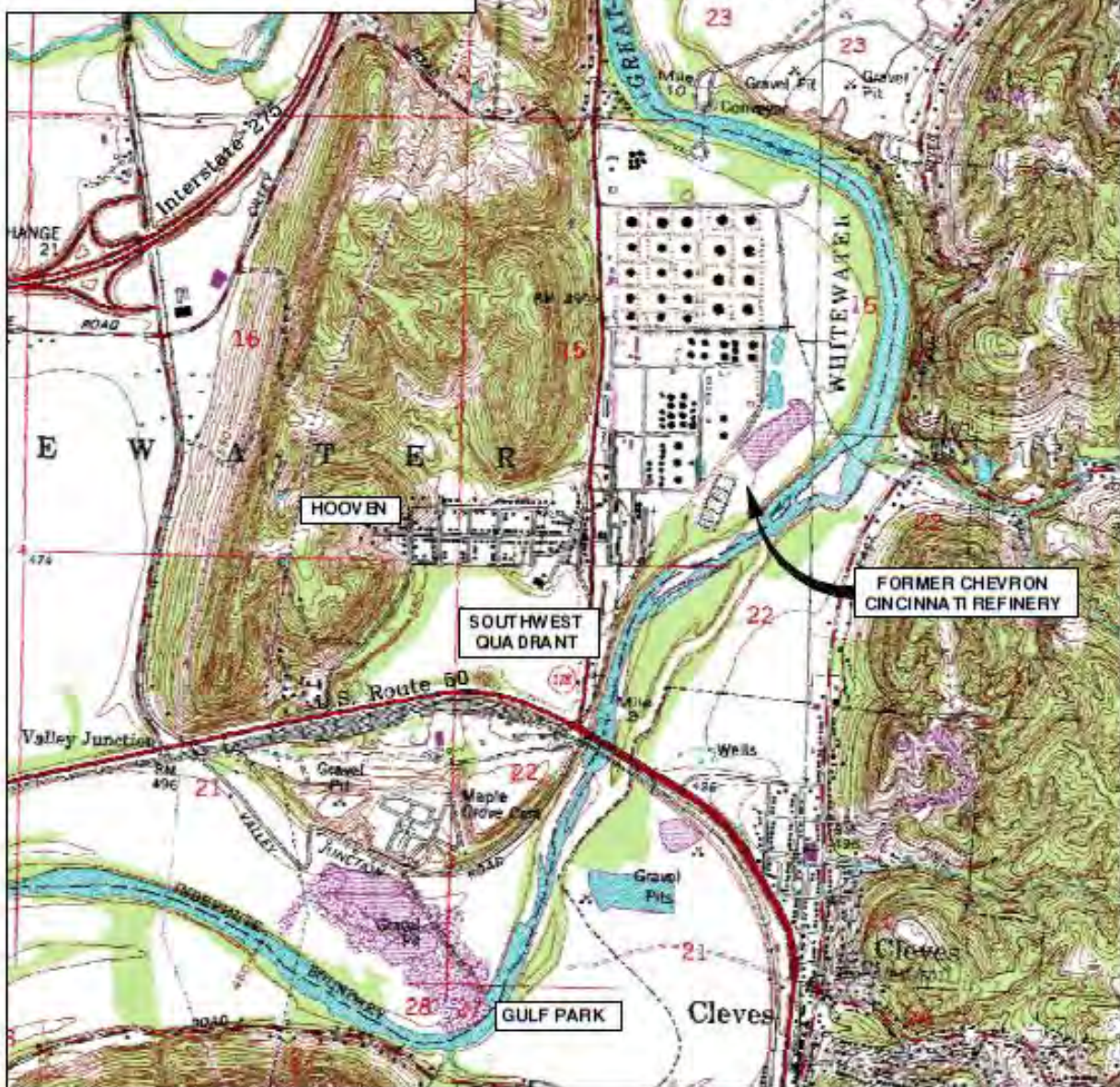


US EPA ARCHIVE DOCUMENT



Base map: U.S.G.S 7.5' Quadrangles, Hoover and Addyston, Ohio, 1996

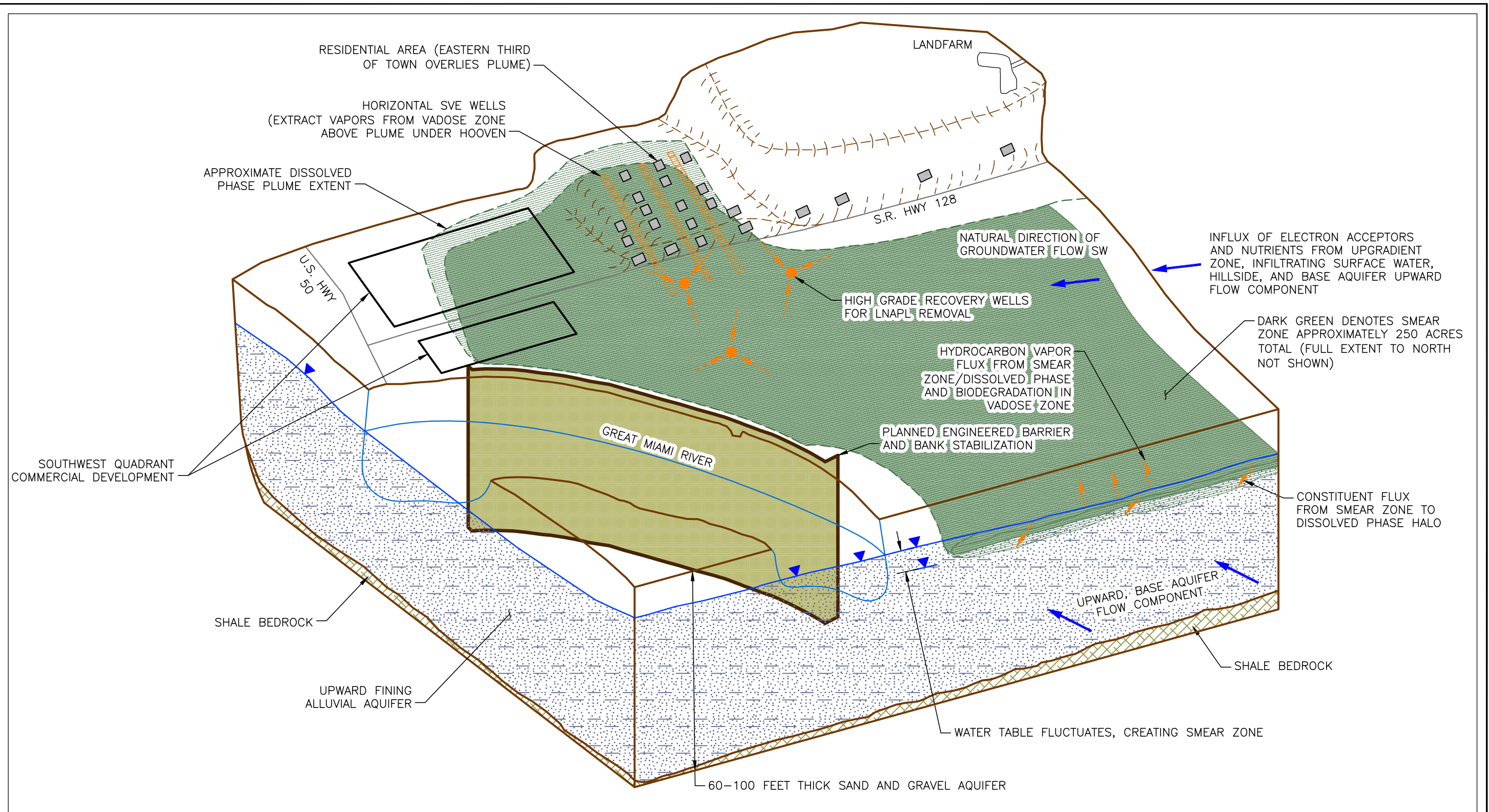


FIGURE 1-1

SITE LOCATION MAP

SECOND 2008 SEMI-ANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY
HOOVER, OHIO

Drawn By: DVS Checked By: PM Scale: 1" = 2,000' Date: 7/1/09 File: 500USGS SITE 2009.05



Source: Provided by Chevron Cincinnati.

EXPLANATION

-  HIGH-GRADE PUMPING TARGETED AREAS WITH HIGHEST RESIDUAL LNAPL SATURATION.
-  WATER LEVEL
-  DISSOLVED PHASE PLUME EXTENT
-  SMEAR ZONE EXTENT



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FIGURE 1-2

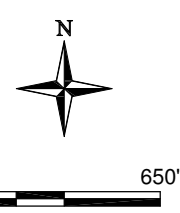
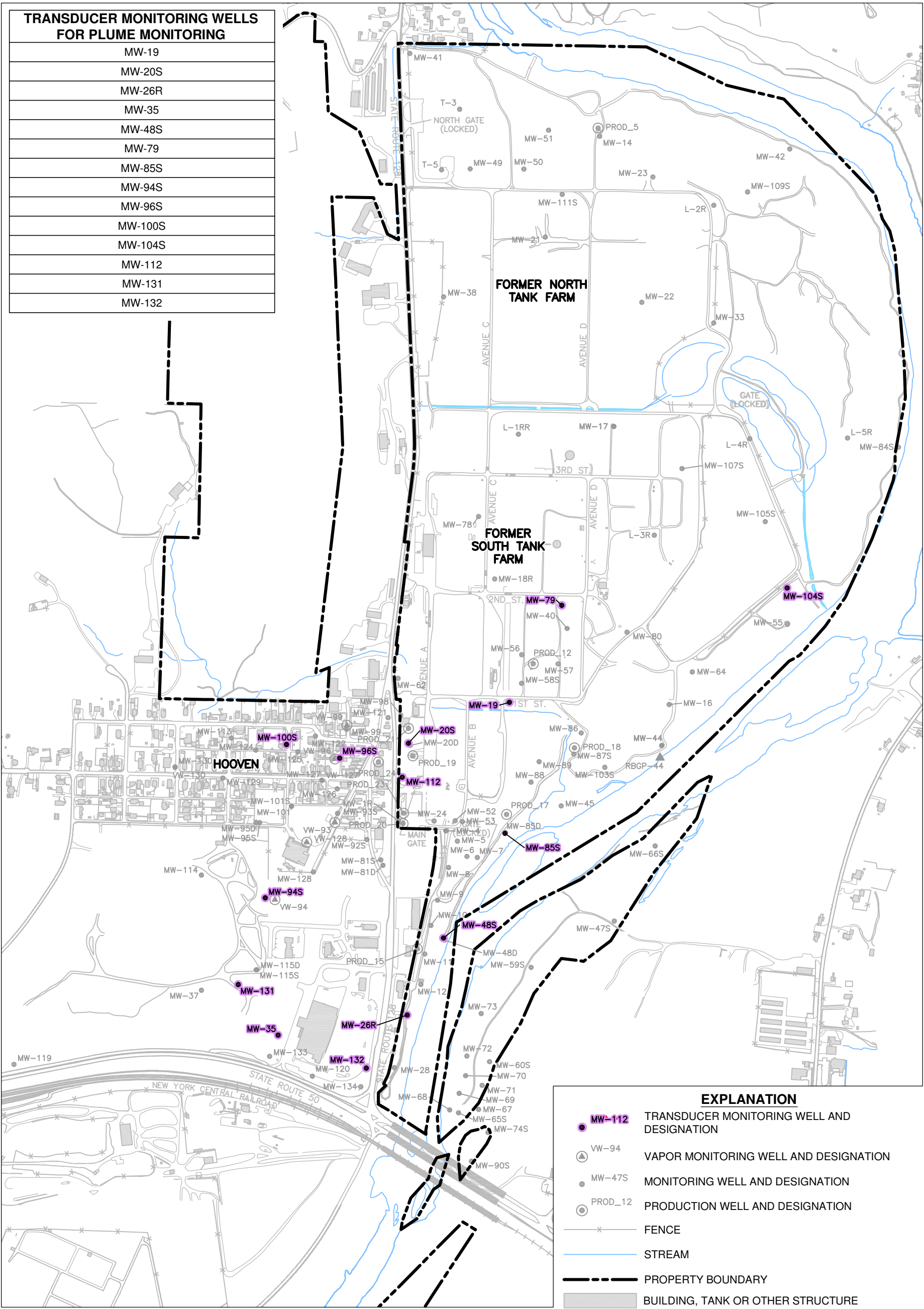
GROUNDWATER CONCEPTUAL SITE MODEL

SECOND 2008 SEMIANNUAL MONITORING EVENT

CHEVRON CINCINNATI FACILITY

HOOVEN, OHIO

Drawn By: REP	Checked By: KR	Scale: NONE	Date: 7/10/09	File: 500GWCONCModel-200905
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FIGURE 2-1

TRANSDUCER MONITORING WELLS

SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY
HOOVEN, OHIO

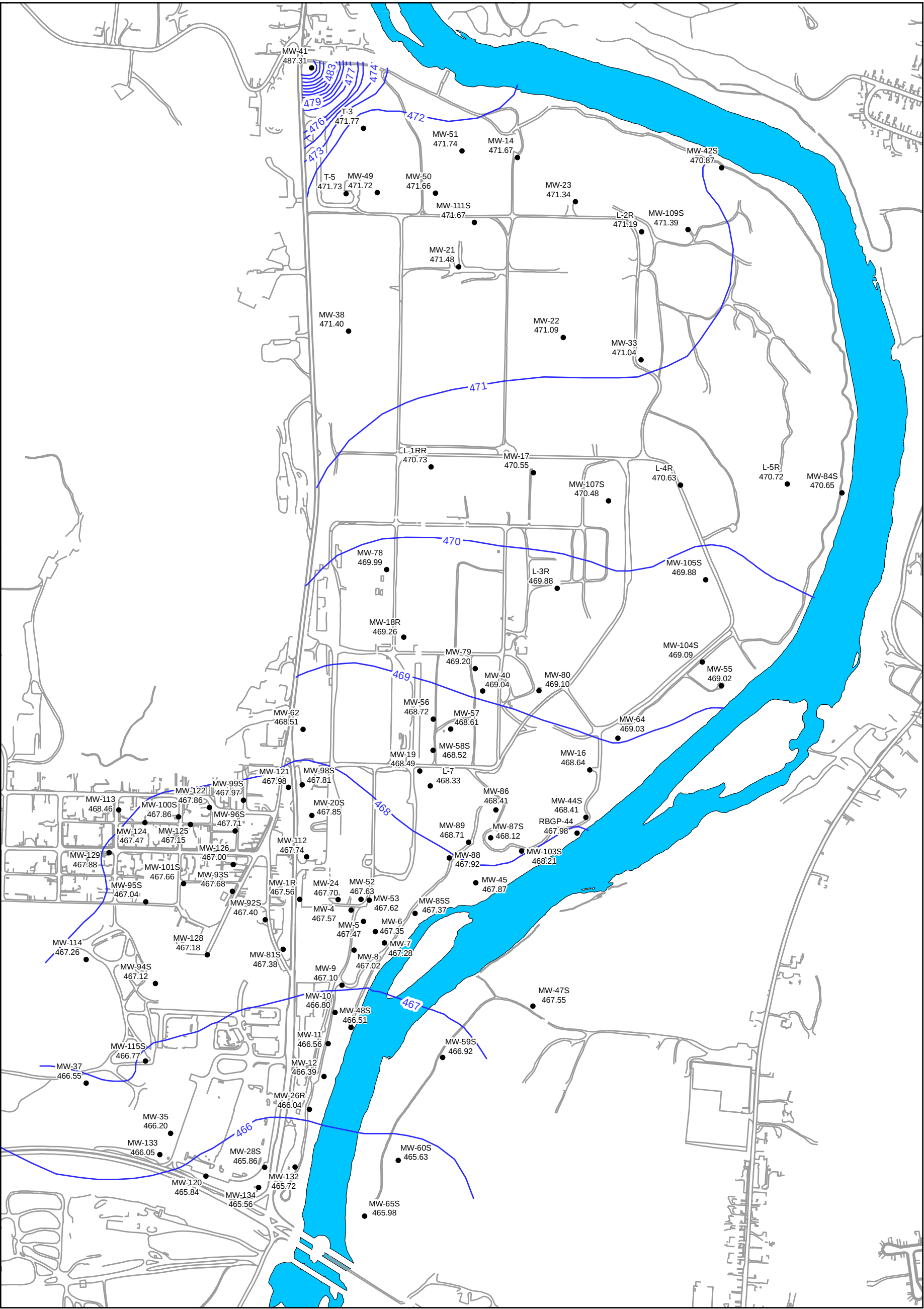
Drawn By: REP

Checked By: PS

Scale: 1" = 650'

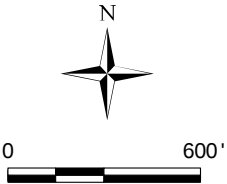
Date: 10/31/08

File: 500TRANMONWELLS200904



EXPLANATION

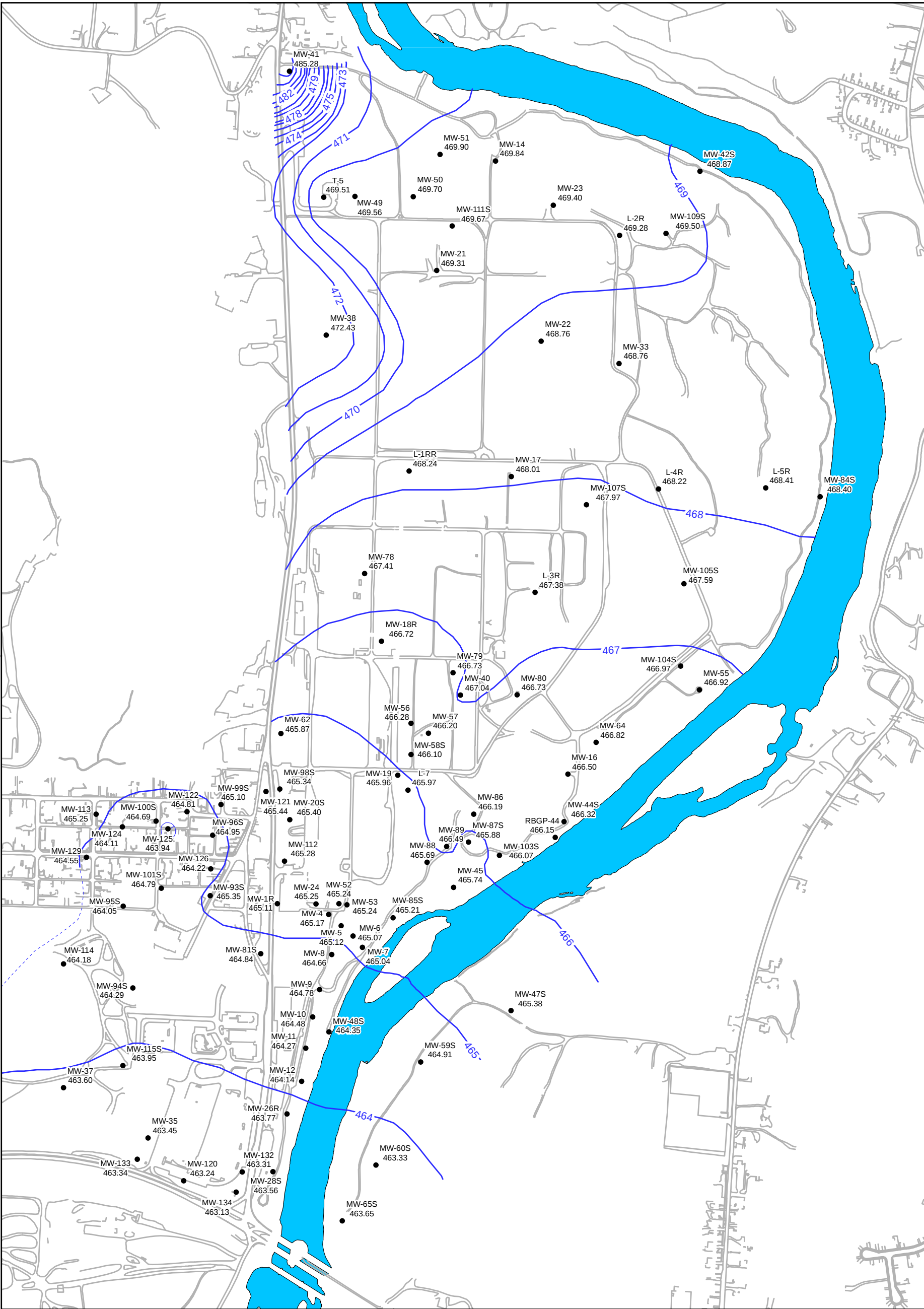
EQUIPOTENTIAL CONTOUR LINE
Elevation In Feet Above Mean Sea Level
Contour Interval is 1.0 feet
(Line dashed where approximate)





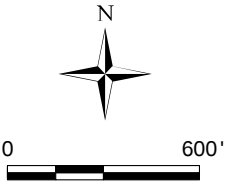
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FIGURE 2-2			
POTENTIOMETRIC SURFACE MAP JULY, 2008			
SECOND 2008 SEMIANNUAL MONITORING EVENT CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO			
Drawn By: PS	Checked By: PM	Scale: 1" = 600'	Date: 07/07/09
File: July_08_Potsurface.mxd			



EXPLANATION

— EQUIPOTENTIAL CONTOUR LINE
Elevation In Feet Above Mean Sea Level
Contour Interval is 1.0 feet
(Line dashed where approximate)

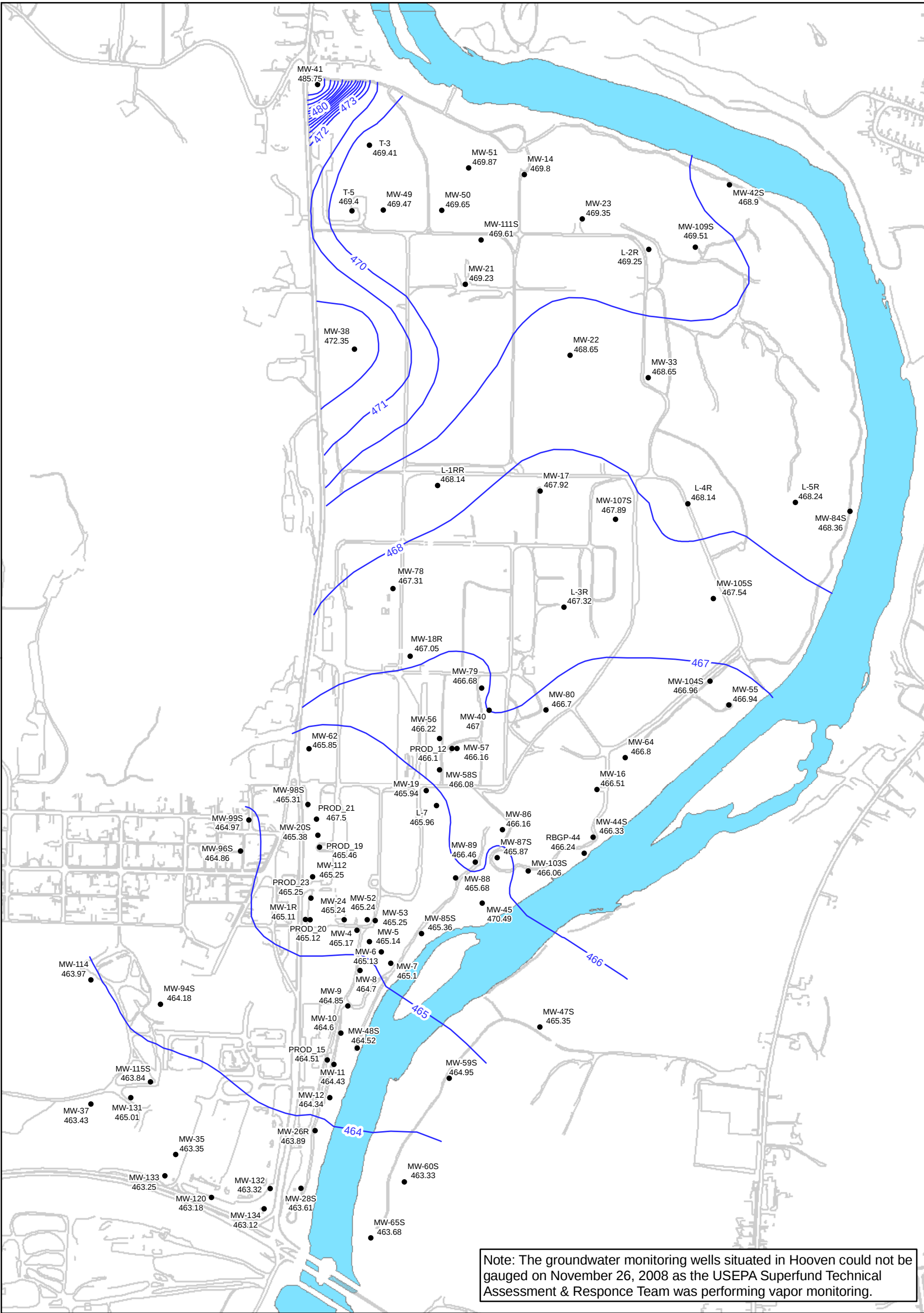


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FIGURE 2-3

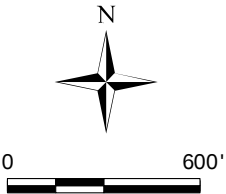
**POTENTIOMETRIC SURFACE MAP,
SEPTEMBER, 2008**

**SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY,
HOOVEN, OHIO**



EXPLANATION

EQUIPOTENTIAL CONTOUR LINE
Elevation In Feet Above Mean Sea Level
Contour Interval is 1.0 feet
(Line dashed where approximate)



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FIGURE 2-4			
POTENTIOMETRIC SURFACE MAP NOVEMBER, 2008			
SECOND 2008 SEMIANNUAL MONITORING EVENT CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO			
Drawn By: PS	Checked By: PM	Scale: 1" = 600'	Date: 7/07/09 File: Nov_08_Potsurface.mxd

RT-20
RT-2M
RT-2I
MW-138
MW-35
MW-37
MW-47S
PROD_12

MONITORING WELL AND DESIGNATION
(INSTALLED MARCH 2009)

POINT OF COMPLIANCE MONITORING WELL AND DESIGNATION

PRODUCTION WELL AND DESIGNATION

☐ BUILDING, TANK OR OTHER STRUCTURE



A horizontal scale bar with a black and white checkered pattern. The number '0' is at the left end and '300' is at the right end.

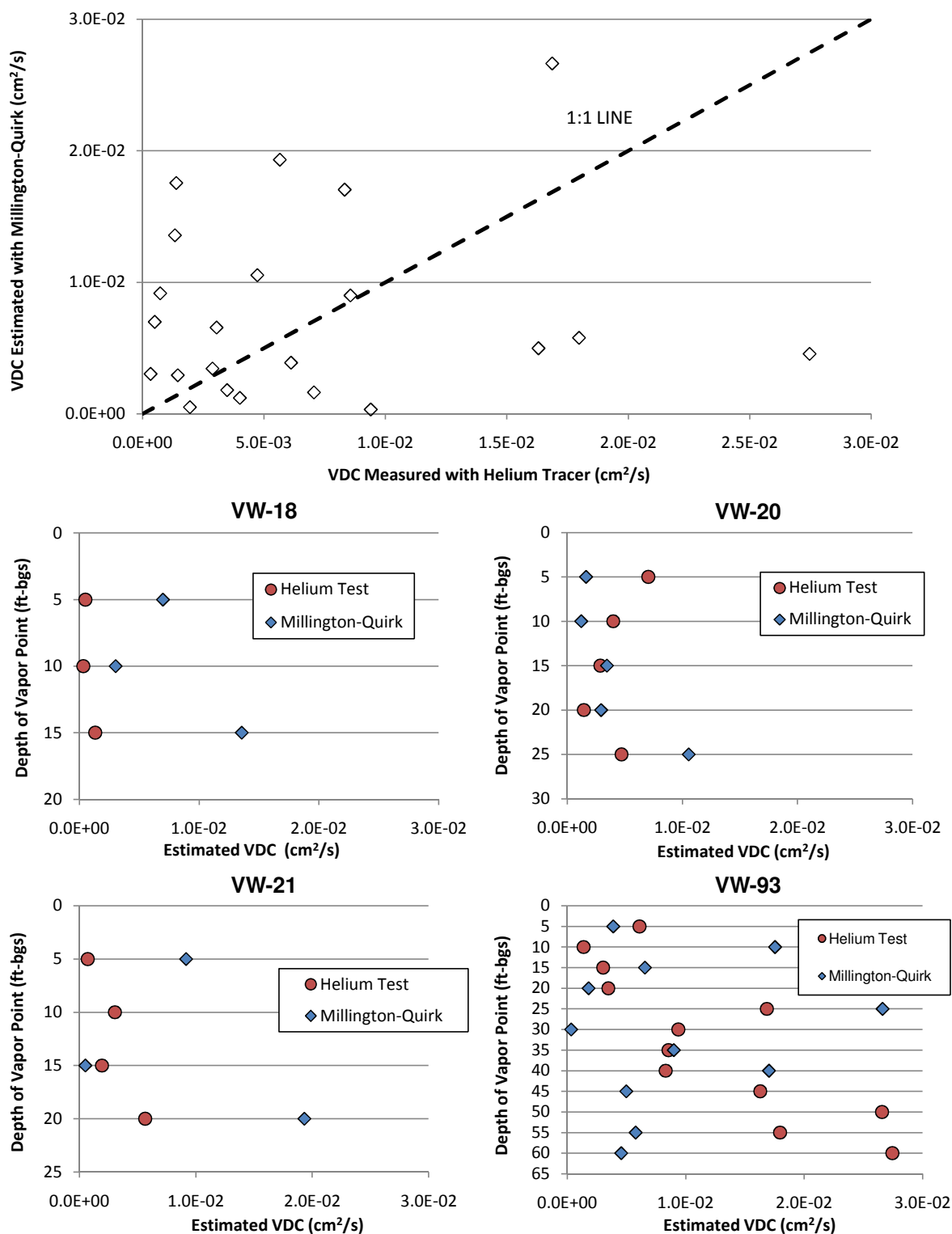


SENTINEL, POINT OF COMPLIANCE, AND ROST MONITORING NETWORK

**SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY
HOOVEN, OHIO**

File: 500ROST-TRANSECTS200905

FIGURE 2-6. COMPARISON OF EFFECTIVE VAPOR DIFFUSION COEFFICIENTS
SECOND 2008 SEMI-ANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO



NOTES:

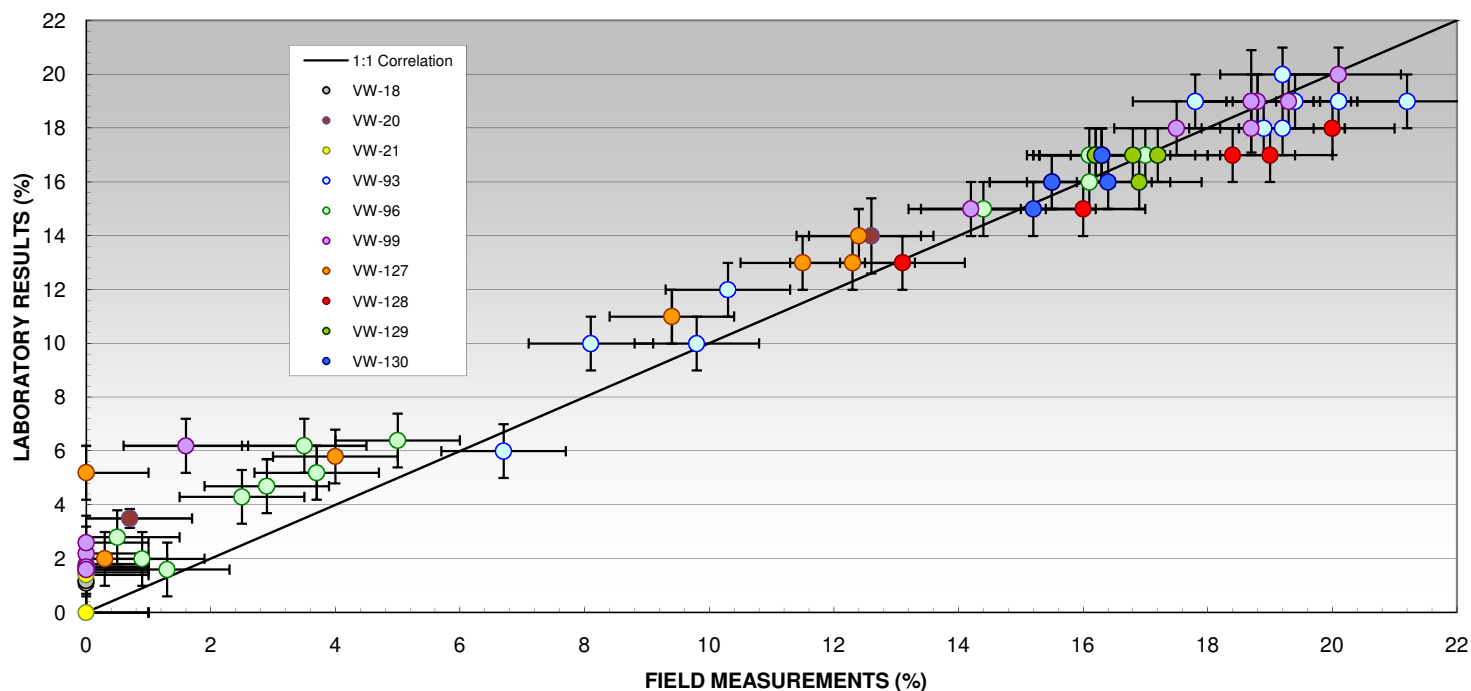
Two vapor points have Millington-Quirk estimates outside of the scale for individual nested vapor wells:

VW-21 (10 feet) = $5.9\text{E-}02$

VW-93 (50 feet) = $4.7\text{E-}02$

FIGURE 2-7. NESTED WELL OXYGEN AND CARBON DIOXIDE CORRELATION PLOTS, SEPTEMBER 2008
SECOND 2008 SEMI-ANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO

OXYGEN CORRELATION PLOT



CARBON DIOXIDE CORRELATION PLOT

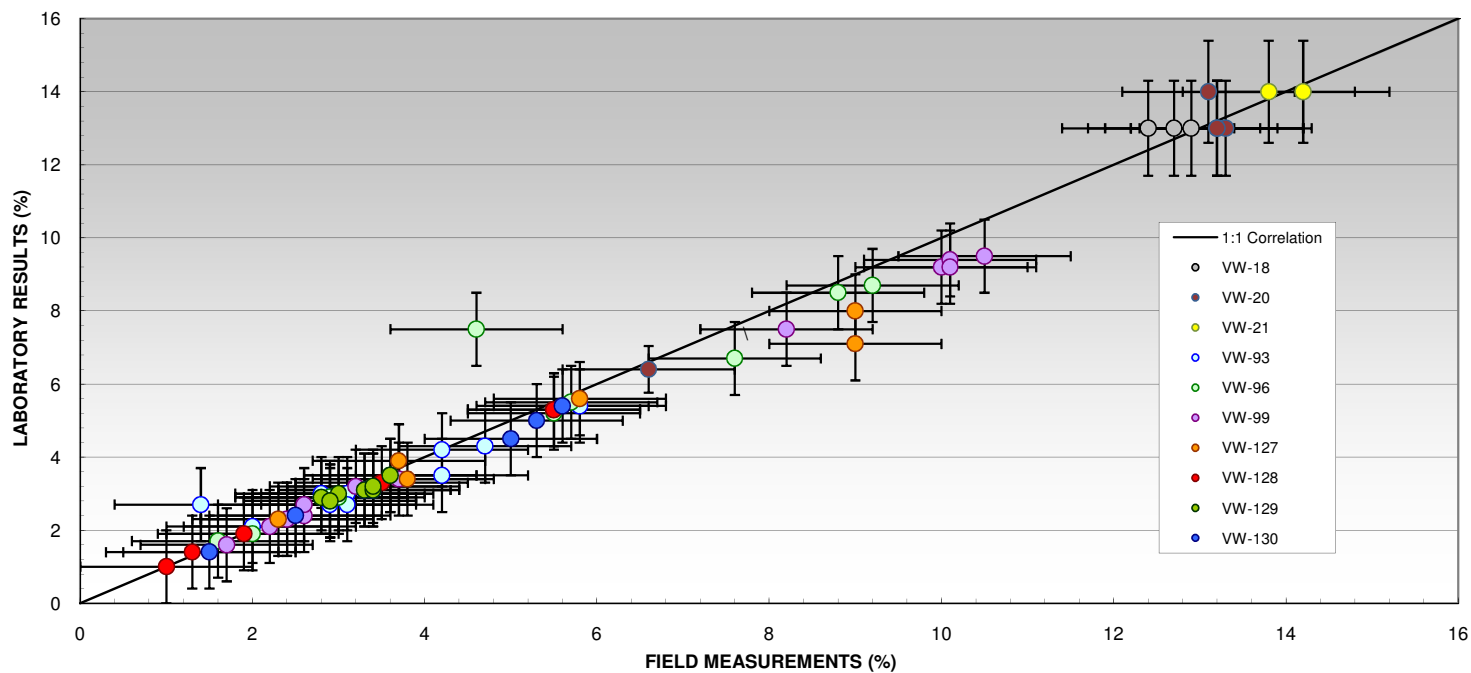
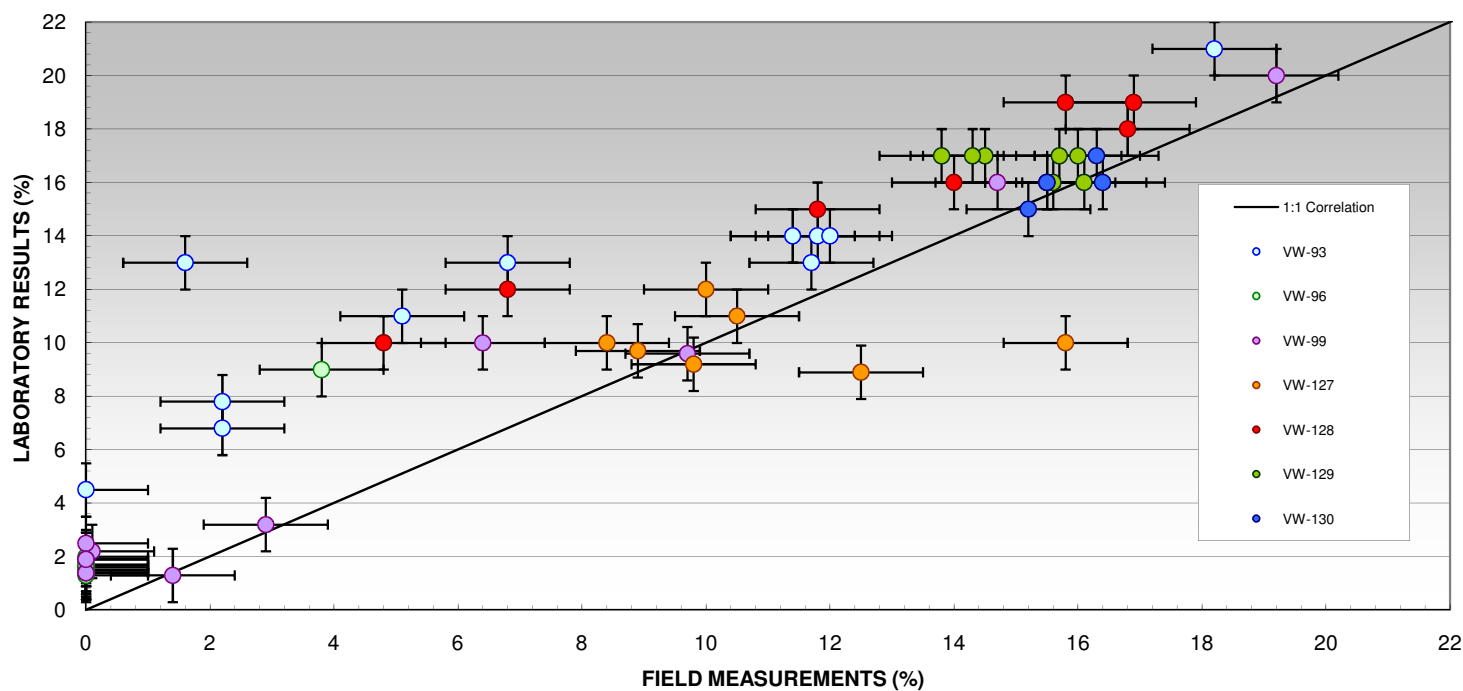


FIGURE 2-8. NESTED WELL OXYGEN AND CARBON DIOXIDE CORRELATION PLOTS, DECEMBER 2008
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO

OXYGEN CORRELATION PLOT



CARBON DIOXIDE CORRELATION PLOT

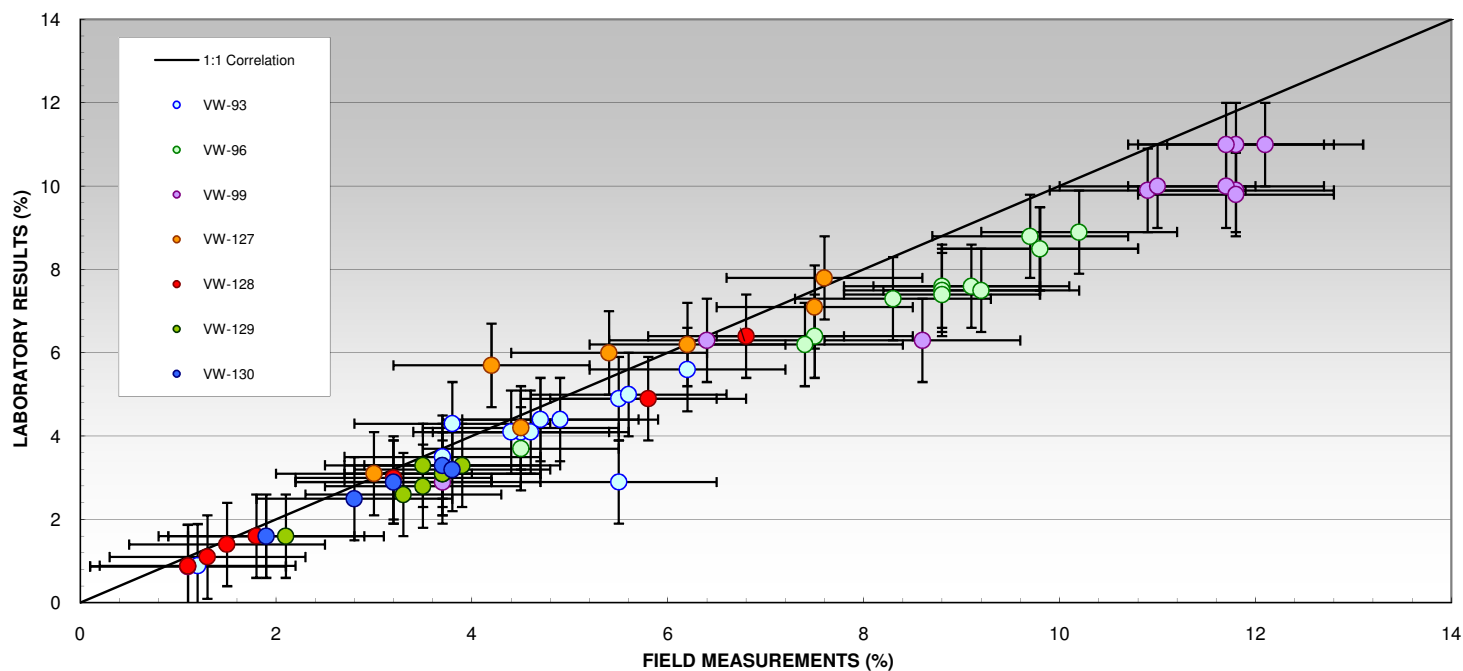
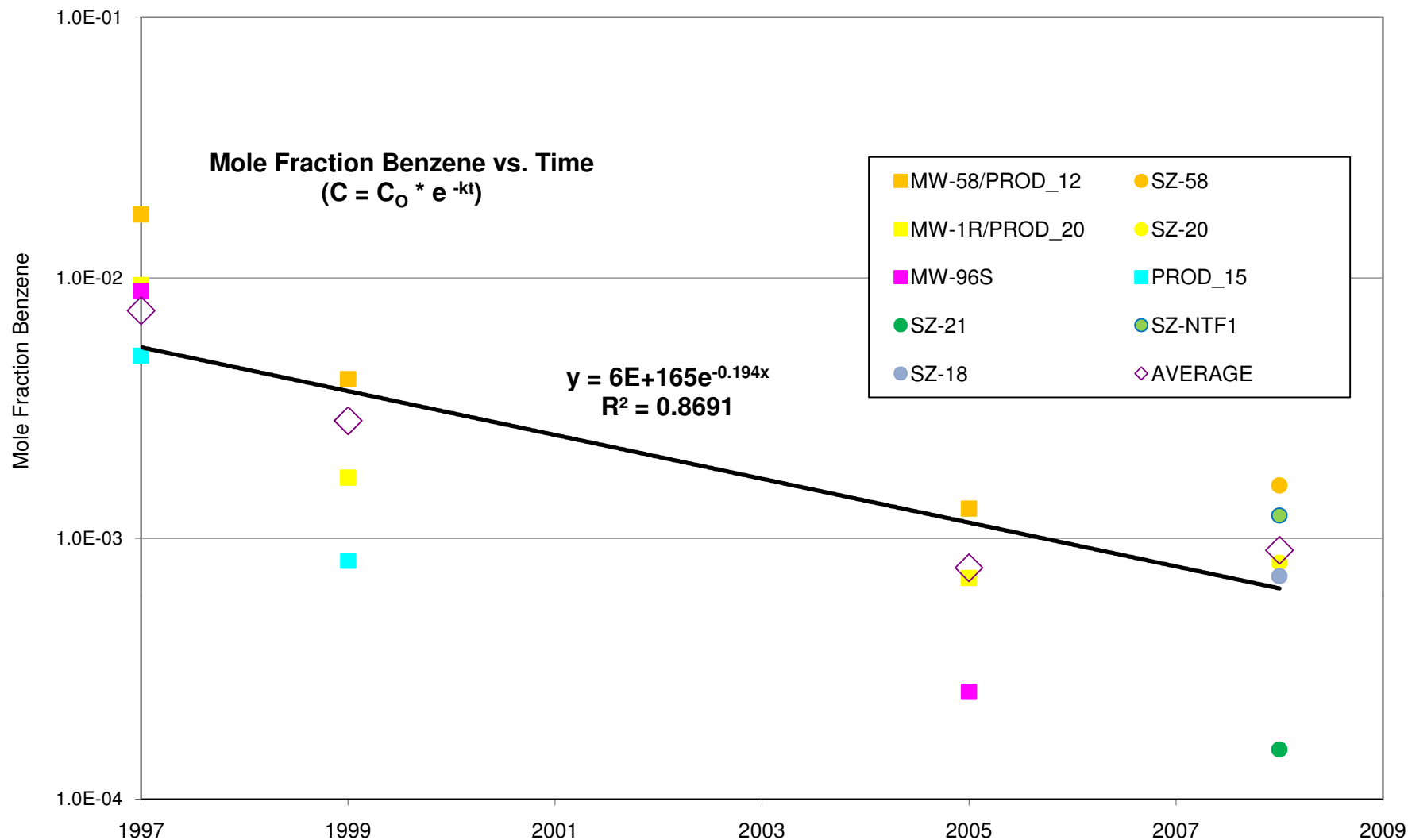


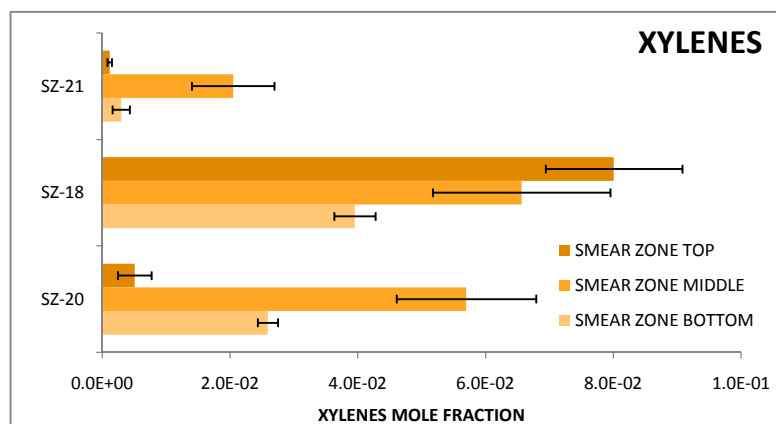
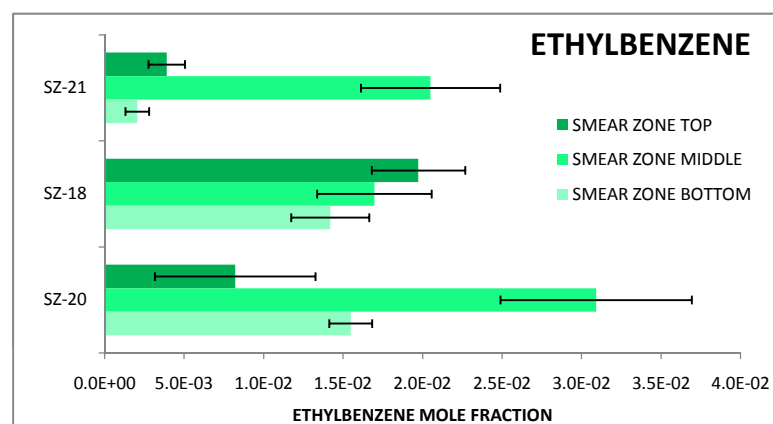
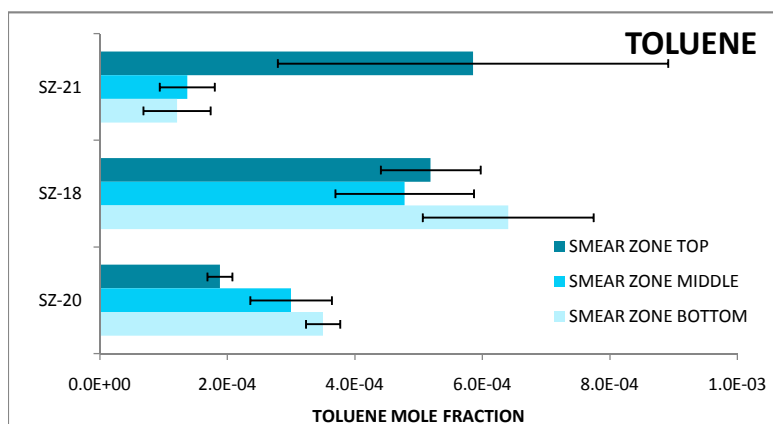
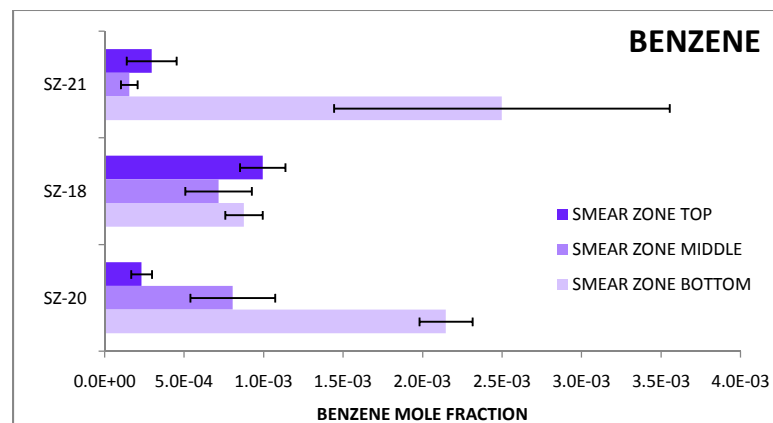
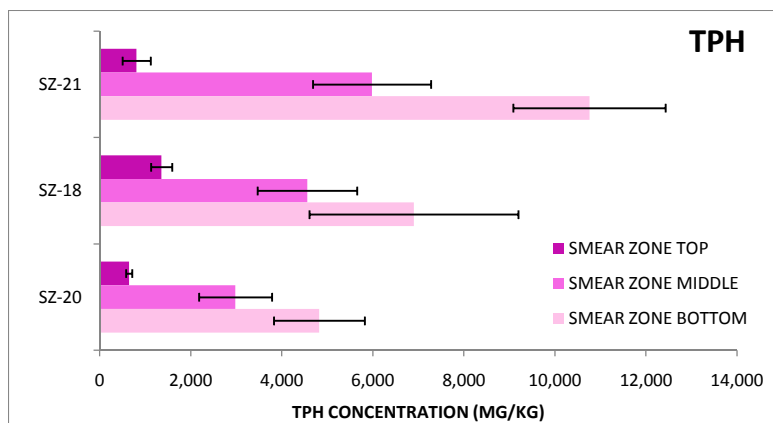
FIGURE 3-1. BENZENE MOLE FRACTION VERSUS TIME IN LNAPL AND SOIL CORE SAMPLES
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO

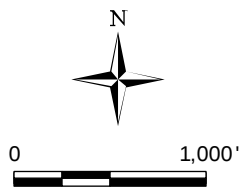
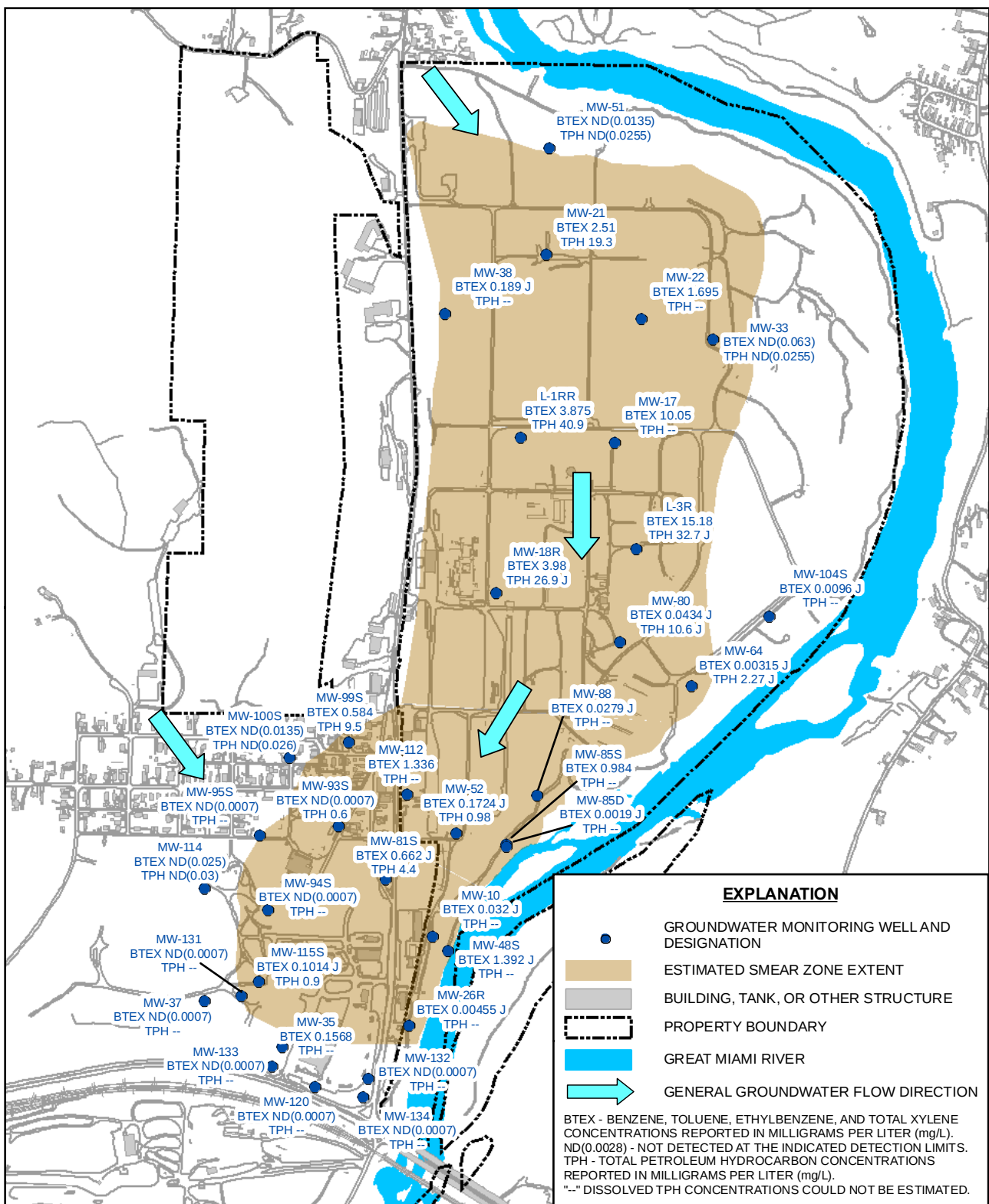


EXPLANATION

1. SZ DESIGNATION INDICATES SMEAR ZONE SOIL CORE, WHERE MOLE FRACTION BENZENE REPRESENTS AVERAGE OF FOUR SAMPLES COLLECTED FROM MIDDLE OF THE SMEAR ZONE AT THE WATER TABLE.
2. MOLE FRACTION BENZENE FOR ALL OTHER LOCATIONS CALCULATED USING LNAPL ANALYTICAL RESULTS

FIGURE 3-2. SOIL CORE MOLE FRACTION ESTIMATES FOR GROUPED MEDIA SAMPLING LOCATIONS
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO



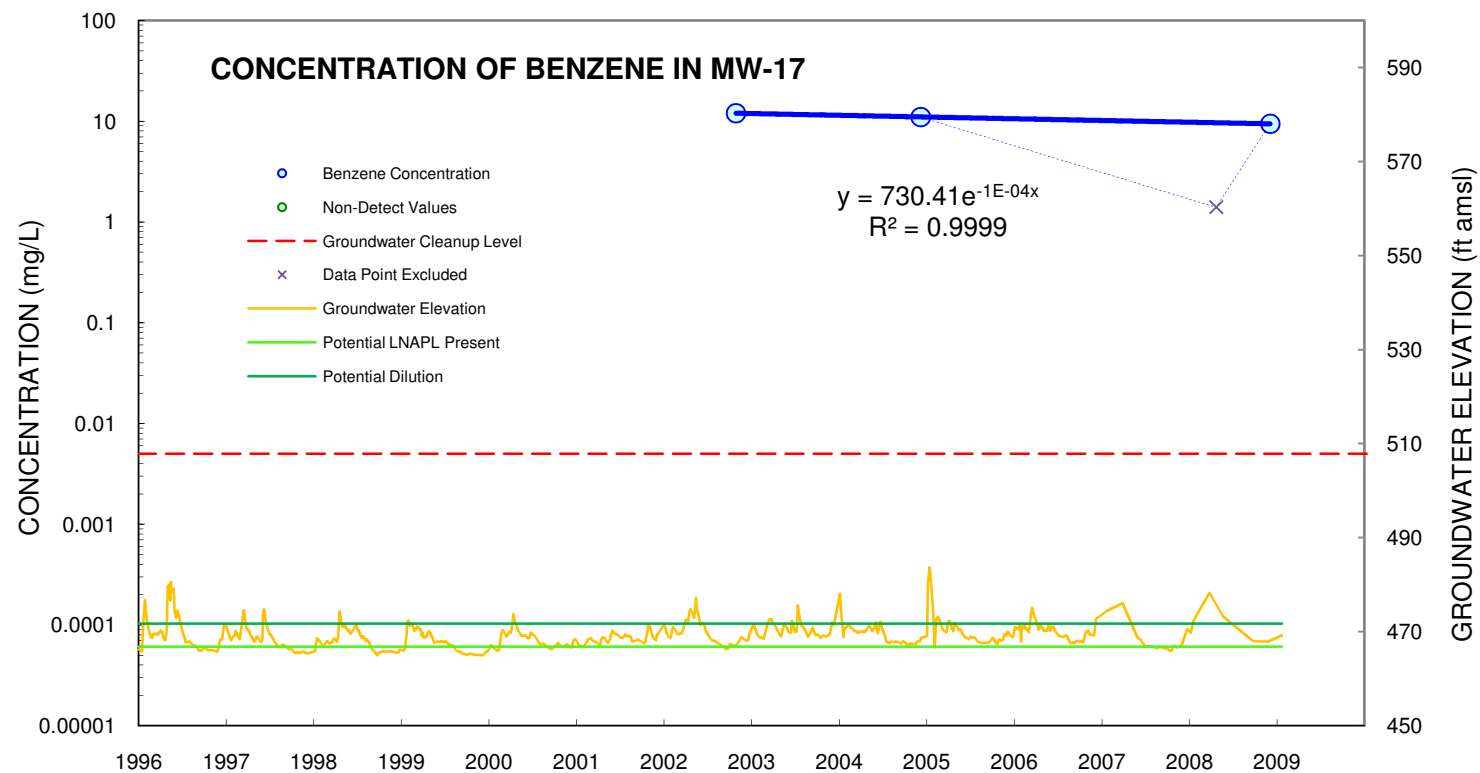


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FIGURE 3-3
DISSOLVED PHASE CONSTITUENT
CONCENTRATIONS - SECOND SEMIANNUAL 2008
MONITORING EVENT
CHEVRON CINCINNATI FACILITY,
HOOVEN, OHIO

Drawn By: BLM | Checked By: BR | Scale: 1" = 1000' | Date: 04/03/09 | File: 200810_QI_TPH Trends.mxd

**FIGURE 3-4. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-17
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION

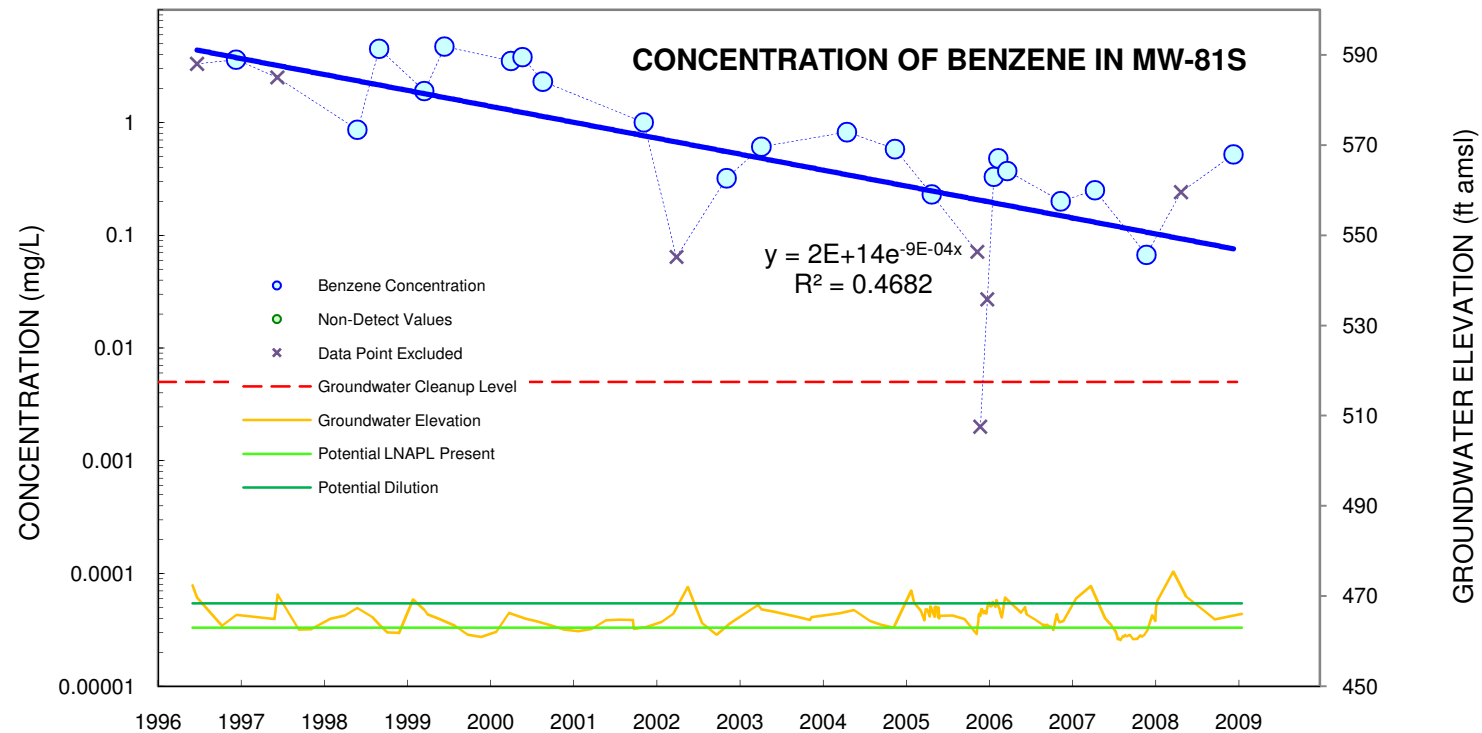
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

ONE DATA POINT EXCLUDED (4/23/08)

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

**FIGURE 3-5. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-81S
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION

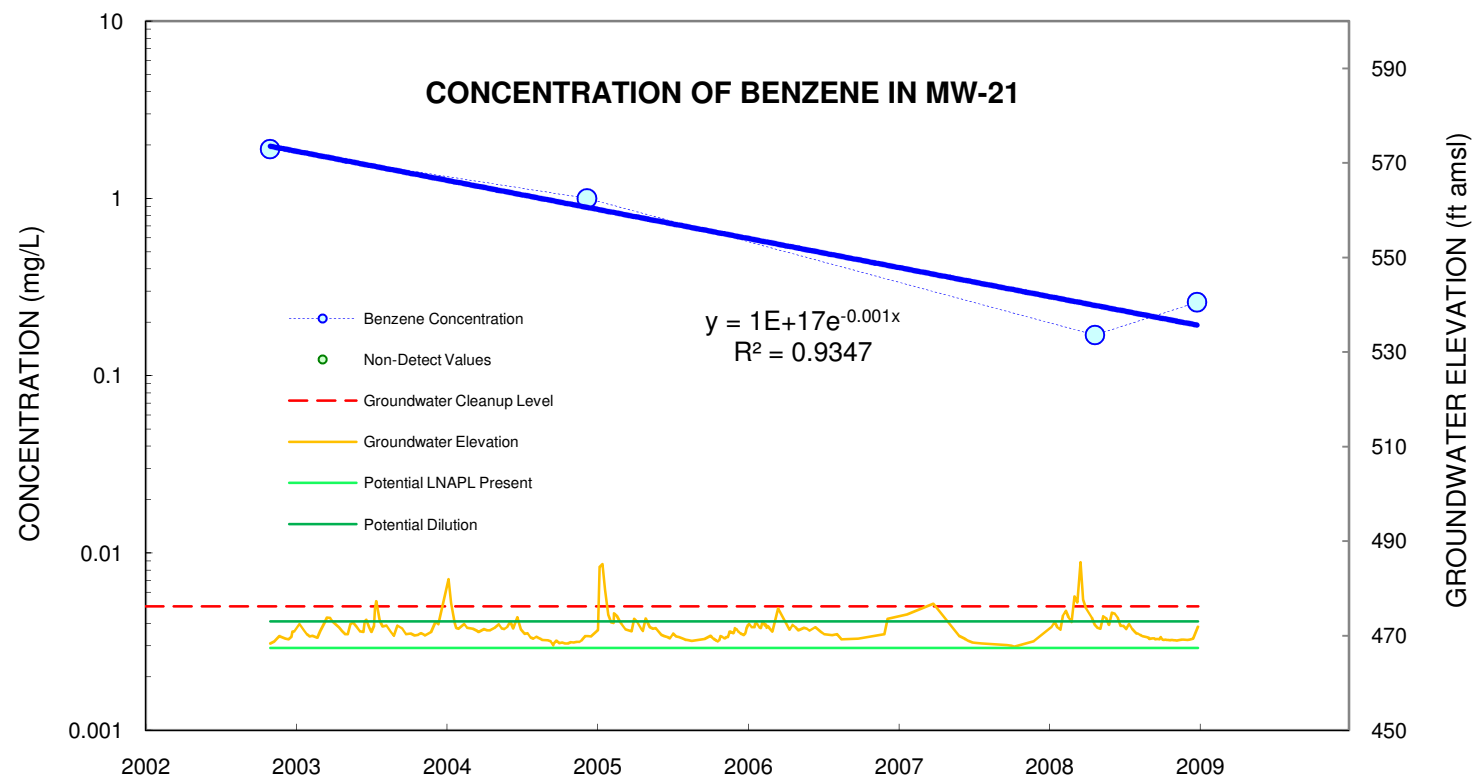
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

EIGHT DATA POINTS EXCLUDED (6/20/1996, 6/9/1997, 4/1/2002, 11/15/2005, 11/28/2005, 12/29/2005, 4/30/2008)

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

**FIGURE 3-6. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-21
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION

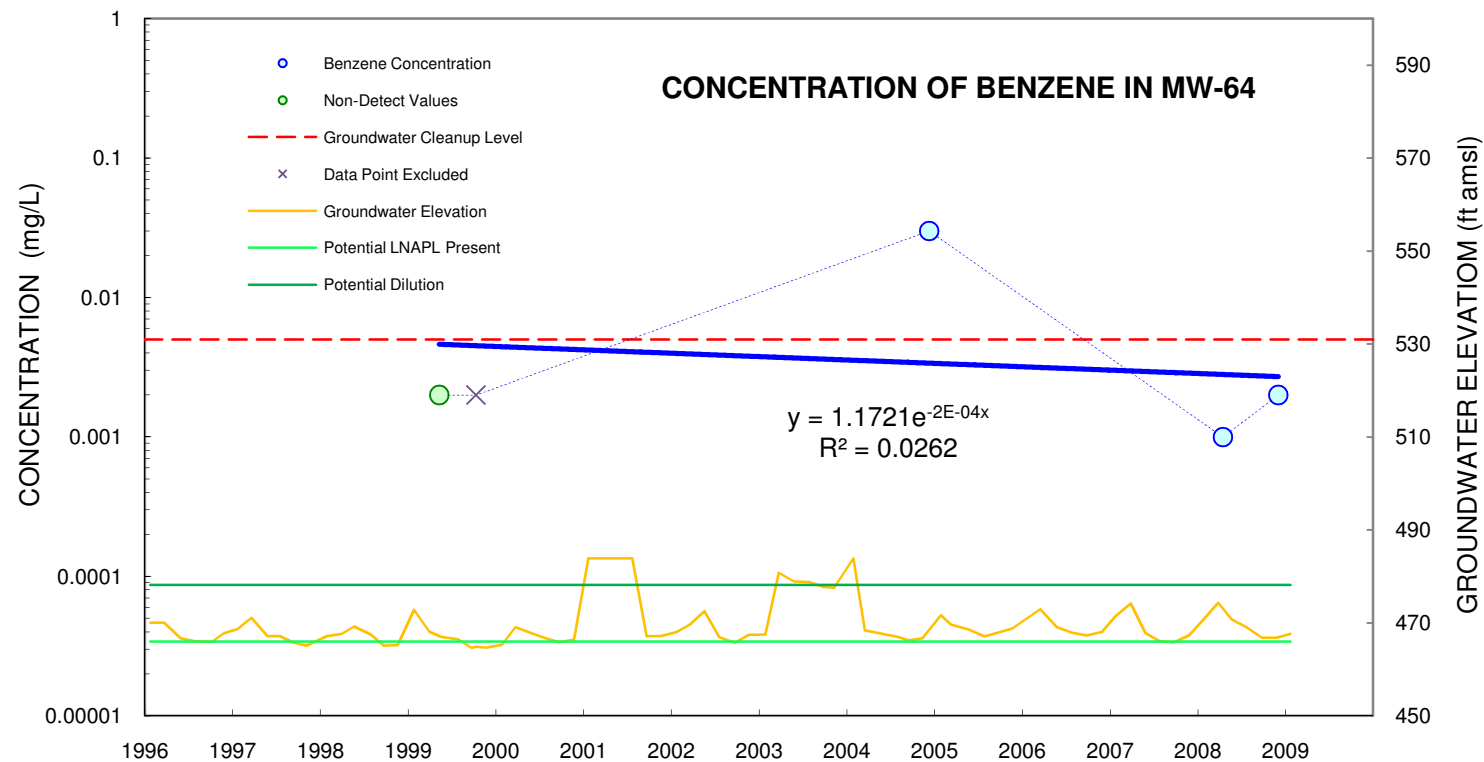
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

NO DATA POINTS EXCLUDED FOR MW-21

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

**FIGURE 3-7. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-64
SECOND 2008 SEMI-ANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION

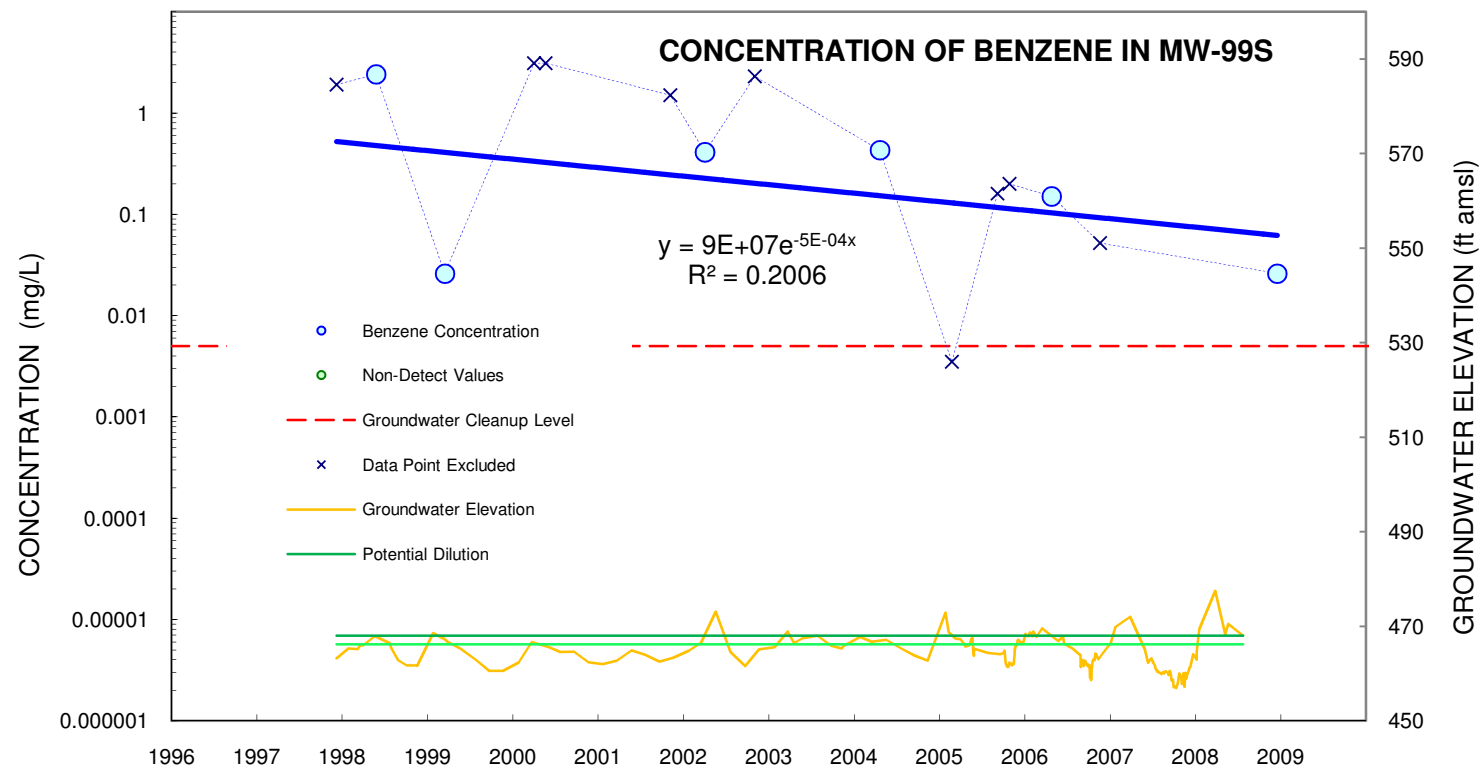
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

ONE DATA POINT EXCLUDED (10/12/99)

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

**FIGURE 3-8. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-99S
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION:

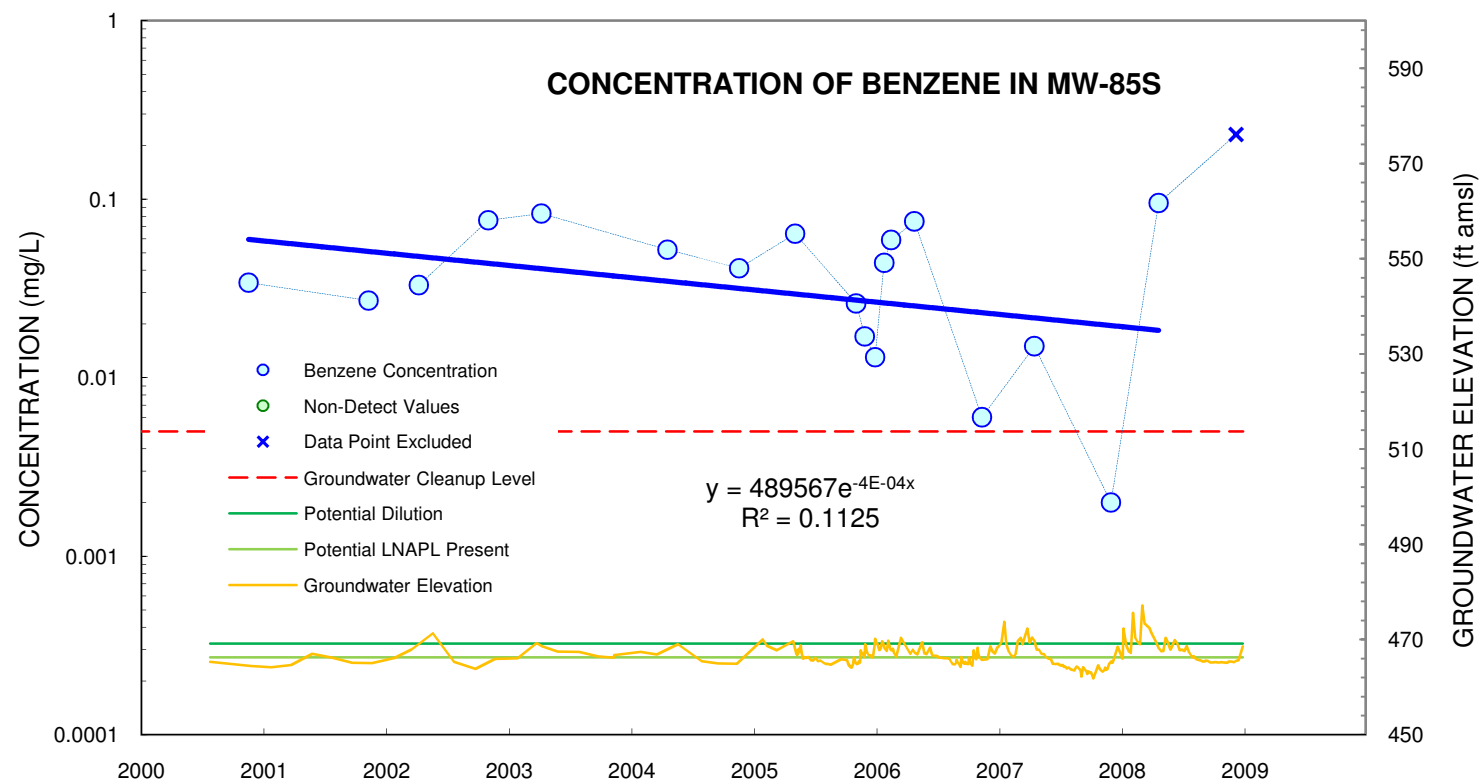
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

NINE DATA POINTS EXCLUDED (12/10/1997, 4/3/2000, 5/23/2000, 11/7/2001, 11/4/2002, 2/24/2005, 9/7/2005, 10/28/2005, and 11/20/2006).

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

**FIGURE 3-9. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-85S
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION

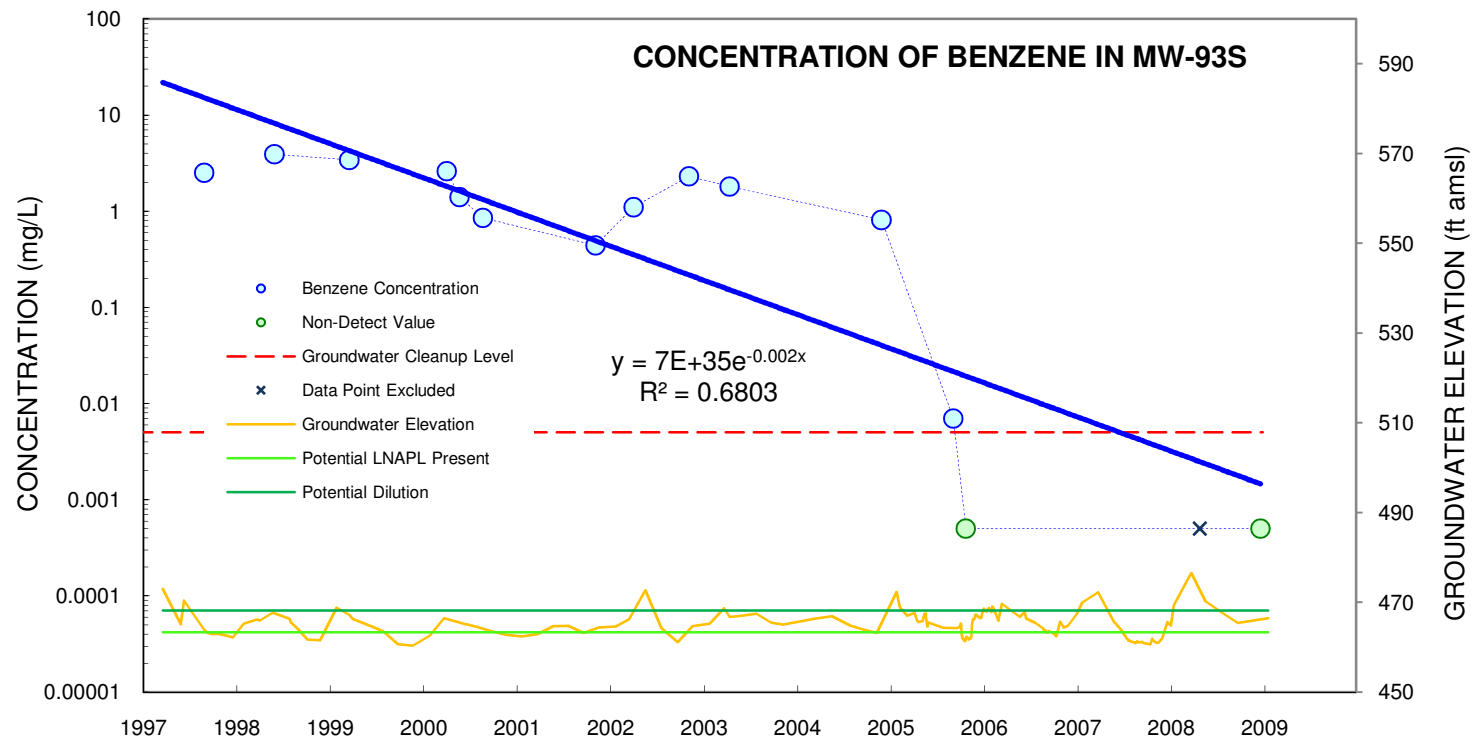
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

ONE DATA POINT EXCLUDED (12/11/08)

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

**FIGURE 3-10. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-93S
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO**



EXPLANATION

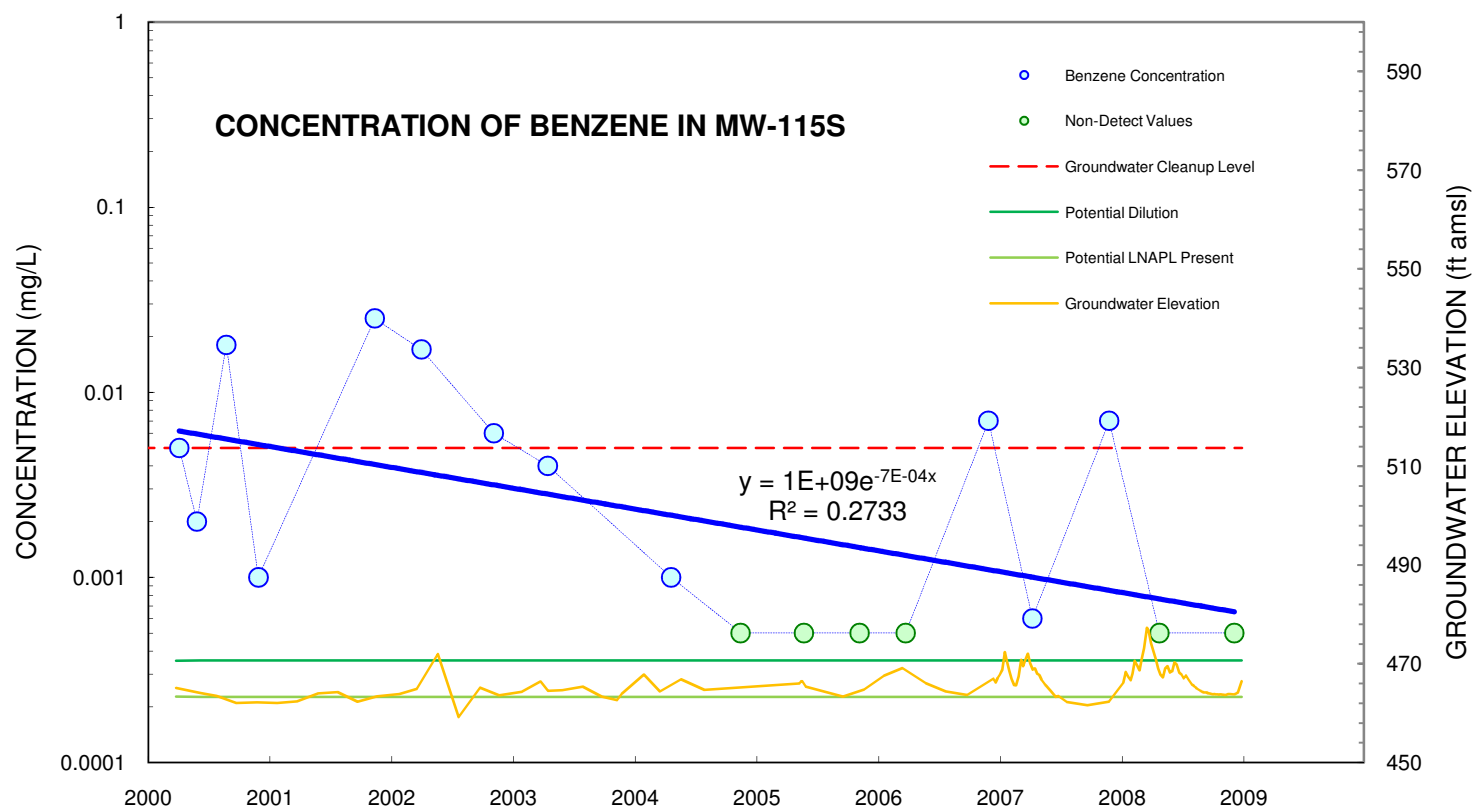
WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

ONE DATA POINT EXCLUDED (4/30/2008)

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER

FIGURE 3-11. GROUNDWATER CONSTITUENT CONCENTRATIONS VERSUS TIME, MONITORING WELL MW-115S
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO



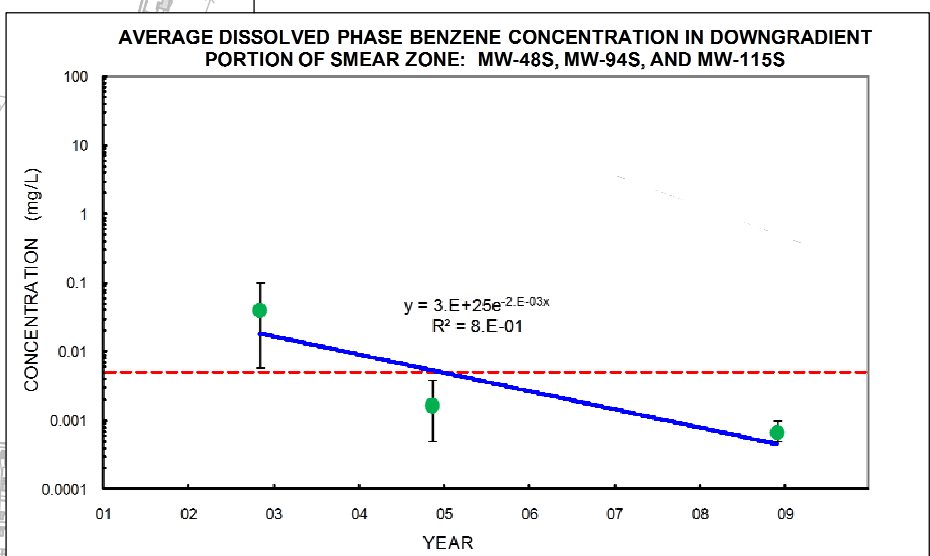
EXPLANATION

WATER LEVELS PRESENTED FOR POSSIBLE EXCLUSION OF DATA POINTS BASED ON POTENTIAL DILUTION OR PRESENCE OF LNAPL.

NO DATA POINTS EXCLUDED FOR MW-115S

FT AMSL - FEET ABOVE MEAN SEA LEVEL

mg/L - MILLIGRAMS PER LITER



MW-22 UPGRAIDENT MONITORING WELL AND DESIGNATION
 MW-17 INTERIOR MONITORING WELL AND DESIGNATION
 MW-48S DOWNGRAIDENT MONITORING WELL AND DESIGNATION
 PROPERTY BOUNDARY
 FENCE
 STREAM
 GROUNDWATER CLEANUP LEVEL
 GENERAL GROUNDWATER FLOW DIRECTION
 BUILDING, TANK OR OTHER STRUCTURE
 SMEAR ZONE

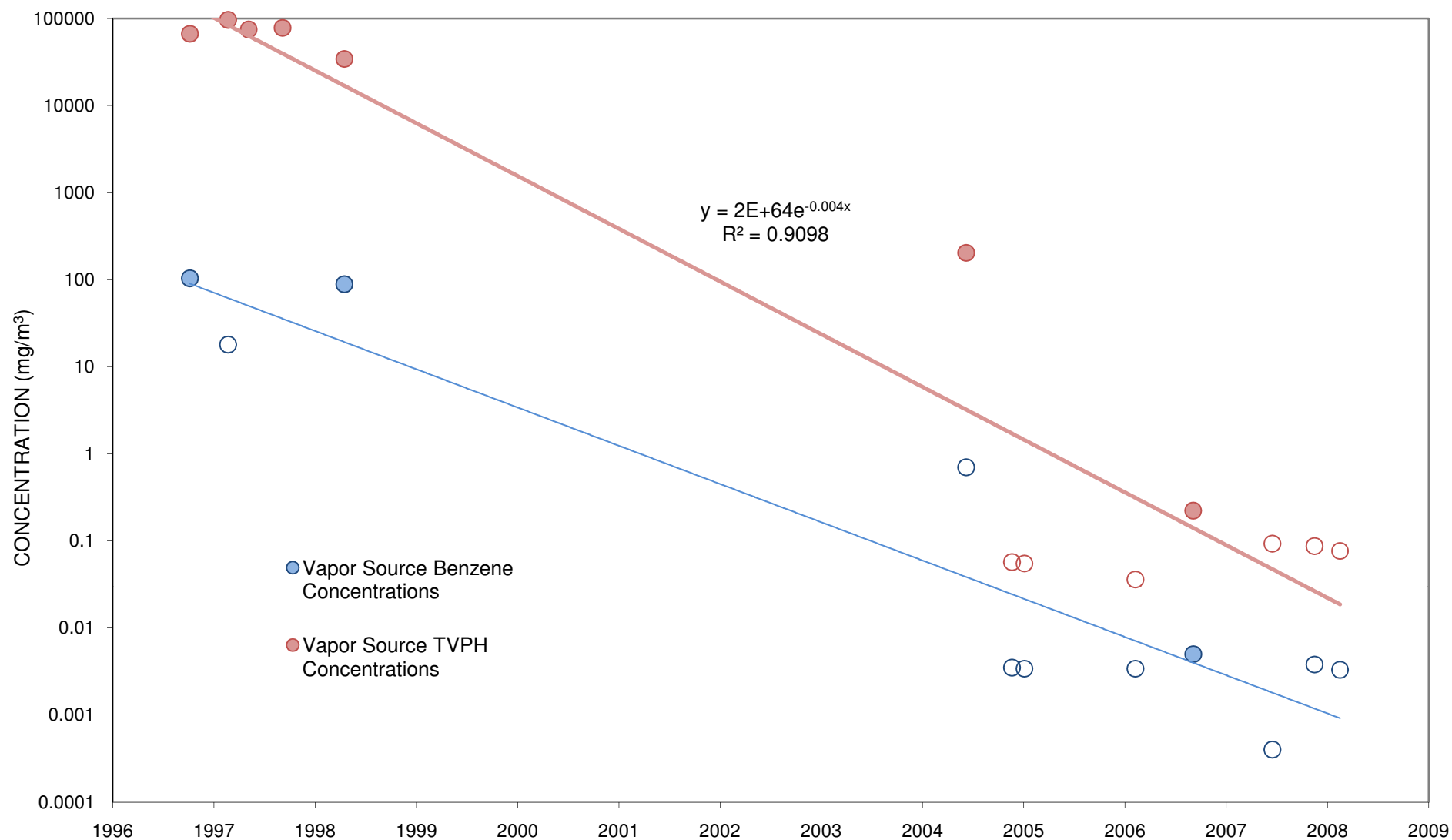
1. ERROR BARS REPRESENT MINIMUM AND MAXIMUM CONCENTRATIONS MEASURED DURING SAMPLING EVENT
2. NON-DETECT CONCENTRATIONS SET TO REPORTING LIMIT FOR AVERAGING
3. SAMPLING EVENTS DISPLAYED: FALL 2002, FALL 2004, AND FALL 2008



**SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY
HOOVEN, OHIO**

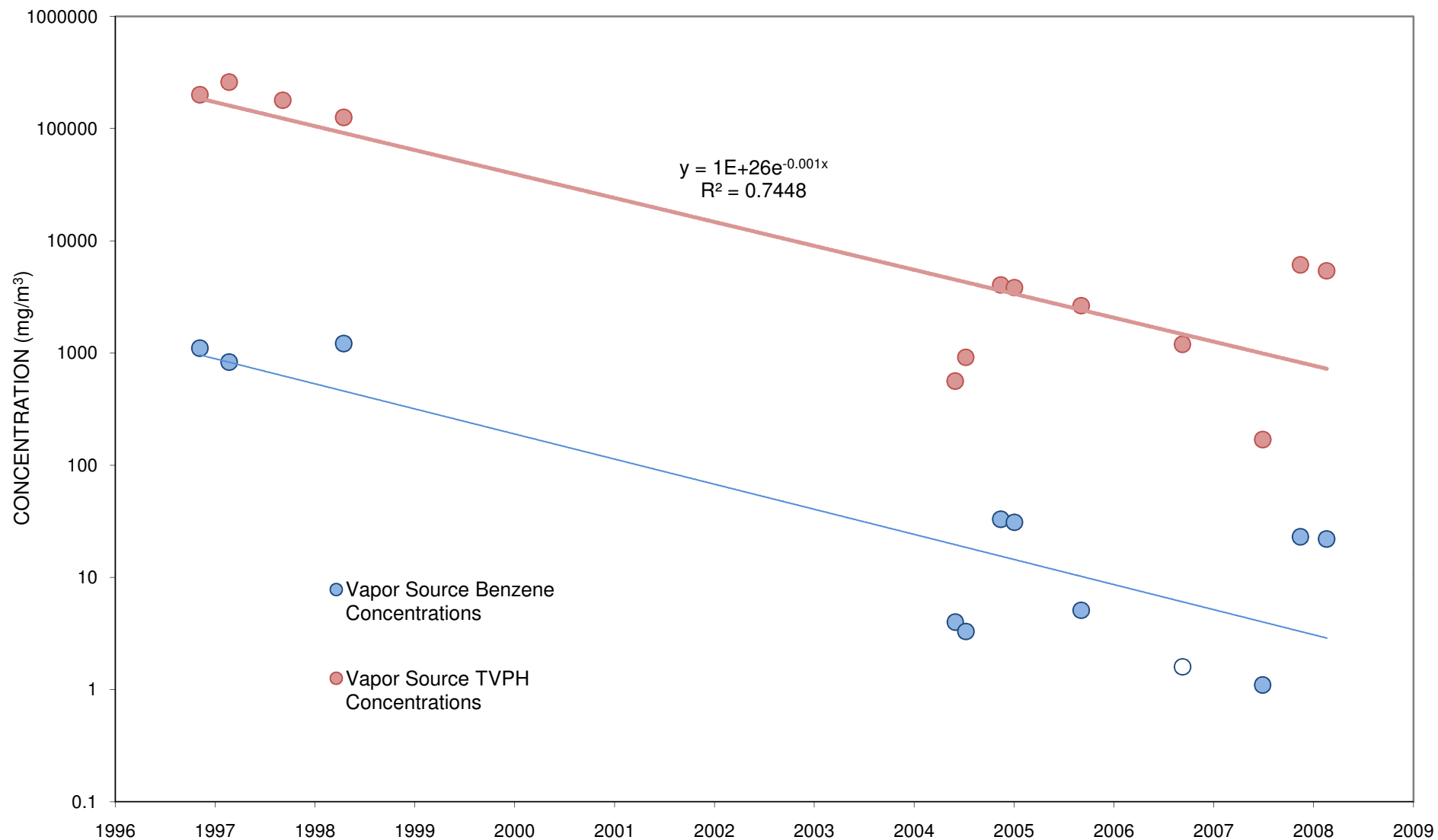
Drawn By: REP	Checked By: BM	Scale: AS SHOWN	Date: 7/14/09	File: 500SPATIO200907
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FIGURE 3-13. VAPOR SOURCE CONCENTRATIONS, NESTED VAPOR MONITORING WELL VW-93
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO

**EXPLANATION**

OPEN SYMBOL DESIGNATES A NON-DETECT VALUE

FIGURE 3-14. VAPOR SOURCE CONCENTRATIONS, NESTED VAPOR MONITORING WELL VW-96
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO



EXPLANATION

OPEN SYMBOL DESIGNATES A NON-DETECT VALUE

FIGURE 3-15. VAPOR SOURCE CONCENTRATIONS, NESTED VAPOR MONITORING WELL VW-99
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO

**EXPLANATION**

OPEN SYMBOL DESIGNATES A NON-DETECT VALUE

FIGURE 3-16. 2008 REDOX PROCESSES IN GROUNDWATER
SECOND 2008 SEMIANNUAL MONITORING EVENT
CHEVRON CINCINNATI FACILITY, HOOVEN, OHIO

