Environmental
Resources
Management

15810 Park Ten Place
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Houston, Texas 77084-5140
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May 14, 2013

Mr. Mark Riggle
Project Manager
Voluntary Cleanup Section
Texas Commission on Environmental Quality
Mail Code 221
12118 North IH 35, Building D
Austin, Texas 78753

Project No. 0194630

Subject: First Quarter 2013 Monitoring Data Transmittal
Former Cameron Iron Works Facility, Houston, Texas
VCP No. 221; RN101474880; CN600374821

Dear Mr. Riggle:

On behalf of Cameron International Corporation (Cameron), Environmental Resources Management (ERM) is providing the First Quarter 2013 ground water monitoring results for the Former Cameron Iron Works Facility (the facility) for your review and consideration. This quarterly ground water sampling event was completed in February 2013 in accordance with the Texas Commission on Environmental Quality's (TCEQ) December 7, 2012 comments on the *Third Quarter 2012 Monitoring Data Transmittal* dated December 3, 2012.

All ground water analytical results collected during this sampling event were compared with the response action objectives outlined in the Response Action Plan (RAP), dated August 28, 2003. Table 1 lists the wells that require a response action and the proposed action for each well. The ground water analytical results are summarized in Table 2. Figure 1 posts the analytical data on the site map. A concentration versus time graph for each monitor well is also included in Attachment 2.

The laboratory reports and data usability summaries will be provided in the 2013 Annual Ground Water Monitoring Report and Field Activities Summary.

Evaluation of Plume Movement

Cameron continues to address elevated concentrations of constituents of concern (COCs) at selected well locations where upward trends were previously identified. The actions included expanding of treatment galleries and multiple injection events over the past two years. The evaluation of the data and information collected on the I-610/I-10 Interchange dewatering system has verified that this discharge is a significant factor in the on-site and off-site plume movement observed to date. This information was presented to the TCEQ in a February 2013 meeting in Austin. The discussions were focused on the changes in ground water flow conditions associated with the I-610/I-10 Interchange dewatering system and the challenges associated with implementing an effective, sustainable response action. ERM continues to evaluate the adequacy of the monitor well network to assess the full extent of affected ground water.

The following discussion provides details on the recent monitoring results for the ground water samples collected in February 2013.

Concentration Trends and Response Action Plan Activities

MW-59 reported site COCs as *Not Detected* for the fourth consecutive monitoring event in February 2013. MW-59 lies within the capture zone of the facility's ground water treatment system. Cameron proposes MW-59 be moved to the semi-annual monitoring schedule.

The reported concentrations of 1,1-dichloroethene (1,1-DCE) and vinyl chloride were above their PCLs at MW-74 for the fourth consecutive sampling event. The concentrations of both COCs appear to be steady over the last three trends. This monitor well is influenced by the dewatering system and will remain on the quarterly sampling schedule.

The increasing concentrations of COCs above their PCLs in MW-84 were reported beginning in 2009 and prompted an expansion of the treatment system in this area. Following treatments in July 2011 and again in March 2012, concentrations of 1,1-DCE in MW-84 have decreased by more than 95% over the past 28 months. 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), tetrachloroethene (PCE), trichloroethene (TCE) and vinyl chloride were reported as *Not Detected* in the February 2013 monitoring event. Cameron is monitoring this location for the presence of permanganate. This well will remain on the quarterly sampling schedule.

The concentration of TCE in MW-122 was reported at 0.0081 mg/L, slightly above its PCL of 0.005 mg/L. MW-122 will remain on the quarterly sampling schedule for one additional sampling event before recommending semi-annual sampling.

The concentrations of COCs in MW-125 have remained generally stable. Permanganate treatments have been conducted in both up and downgradient wells and this area is monitored for the presence of permanganate. MW-125 will remain on the quarterly sampling schedule.

The reported concentrations of 1,1-DCE in MW-134 have been steadily decreasing over the past seven sampling events - the last two events reported 1,1-DCE levels below its PCL. The concentrations at MW-134 are influenced by the dewatering system and will remain on the quarterly sampling schedule.

The reported concentrations of 1,1-DCE in MW-145 exceeded the PCL in March 2012 at which time it was added to the trigger well list. This area was part of the treatment gallery expansion and received permanganate treatment just prior to the March 2012 sampling event. In August 2012, the ground water exhibited the deep purple color associated with permanganate during low flow purging of MW-145 and was not sampled. MW-145 was sampled in November 2012 and February 2013 and reported estimated concentrations of 1,1-DCA at 0.0011 J and 0.0022 J, respectively. Both values are well below the PCL for 1,1-DCA (2.4 mg/L). 1,1-DCE, 1,2-DCA, cis-1,2-DCE, PCE, TCE and vinyl chloride were reported as *Not Detected*. Cameron is monitoring this area for the presence of permanganate. The concentrations at MW-145 are influenced by the dewatering system and will remain on the quarterly sampling schedule.

The concentrations of 1,1-DCE at MW-146 have remained steady above its PCL over the past three sampling events. This area is influenced by the dewatering system and MW-146 will remain on the quarterly sampling schedule.

The reported concentration of 1,1-DCE in MW-169 has displayed steadily increasing trends above its PCL. The concentrations at MW-169 are believed to be influenced by the dewatering project and will remain on the quarterly sampling schedule.

The concentration of 1,1-DCE was first reported above the PCL in August 2011 at MW-174. Permanganate treatments were conducted upgradient of MW-174 in July 2011 and March 2012. The concentrations of 1,1-DCE remain generally steady at roughly 0.1 mg/L. This area is influenced by the dewatering system and will continue to be monitored for the presence of permanganate. MW-174 will remain on the quarterly sampling schedule.

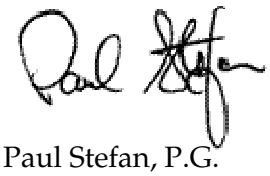
Conclusions

Ground water concentrations were monitored at select wells in the first quarter of 2013 to assess the effectiveness of the remedy at controlling affected ground water. Based on the available data, the dewatering system at the I-610/I-10 Interchange is influencing concentration trends in both on- and off-site areas. In February 2013, Cameron met with TCEQ to present the information gathered pertaining to the dewatering system and sought guidance from TCEQ on the challenges associated with implementing an effective, sustainable response action for the facility. Cameron has received little support from the various stakeholders engaged for collaborative evaluation of feasible remedial alternatives. A Revised Response Action Plan is planned, pending guidance from TCEQ on how to address the challenges presented by the dewatering system. The next ground water monitoring event is scheduled to be completed in May 2013.

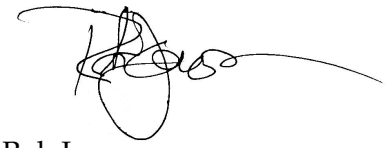
Please contact Mr. Ted Fasting of Cameron International Corporation at (713) 513-3325 or me at (281) 600-1023 with any questions or comments.

Sincerely,

Environmental Resources Management



Paul Stefan, P.G.
Partner



Rob Jaros
Project Manager

PAS/hmh
Attachments

cc: Marsha Hill, Texas Commission on Environmental Quality, Region XII
Ted Fasting, Cameron International Corporation
Bruce Himmelreich, Cameron International Corporation (without attachments)
President, Stablewood Property Owners Association
Robin Morse, Crain, Caton, and James, P.C.
Larry Nettles, Vinson & Elkins

Tables

Attachment 1

May 14, 2013
Project No. 0194630

Environmental Resources Management
15810 Park Ten Place, Suite 300
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TABLE 1

Summary of Response Action Plan Implementation
First Quarter 2013 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Well [1]	COCs elevated above MQL	COCs elevated above PCL	Need for Additional Notification (Yes or No)	In-situ Treatment (Yes or No)	Sampling Frequency
MW-59			no (a)	no (b)	Quarterly
MW-74	1,1-dichloroethane		no (a)	no	Quarterly
MW-74	1,1-dichloroethene	1,1-dichloroethene	no (a)	no	Quarterly
MW-74	vinyl chloride	vinyl chloride	no (a)	no	Quarterly
MW-84	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-84	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
MW-122	Trichloroethene	Trichloroethene	no (a)	no	Quarterly
MW-125	Tetrachloroethene	Tetrachloroethene	no (a)	yes (c)	Quarterly
MW-134	1,1-dichloroethene		no (a)	yes (c)	Quarterly
MW-145 [2]	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-146 [2]	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-146 [2]	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
MW-146 [2]	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
MW-169 [2]	1,1-dichloroethane		no (a)	no	Quarterly
MW-169 [2]	1,1-dichloroethene	1,1-dichloroethene	no (a)	no	Quarterly
MW-174	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-174	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
MW-174	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
MW-174	vinyl chloride		no (a)	yes (c)	Quarterly

NOTES:

COCs = Chemicals of Concern
MQL = Method Quantitation Limit
PCL = Protective Concentration Level
[1] - Quarterly trigger well list as provided in TCEQ letter dated December 7, 2012.
[2] - Trigger well added following evaluation of First Half of 2012 data.
(a) Properties in the vicinity of the affected ground water have been previously notified.
(b) MW-59 is within the capture zone of EW-1.
(c) Injection wells located in this area were injected with sodium permanganate in March 2012. This area is being gauged regularly for the presence of permanganate. Additional permanganate will be injected as needed to reduce concentration levels to the PCL.
(d) Not Sampled due to the presence of permanganate in ground water during low flow purging.
(e) MW-169 lies within the capture zone EW-1 of the Stablewood Remediation System.

TABLE 2

Summary of Ground Water Data for Trigger Wells
First Quarter 2013 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	MQL	Critical PCLs (a)	Location:	MW-59	MW-74	MW-84	MW-122	MW-125
			Depth: (b)	27'	29'	33'	29'	BAILED
			Date:	2/20/2013	2/20/2013	2/20/2013	2/20/2013	2/20/2013
1,1-Dichloroethane	0.0050	4.9		ND (0.00050)	**0.084**	**0.0068**	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.0050	0.0070		ND (0.00060)	**0.019**	**0.023**	**0.0040 J**	ND (0.00060)
1,2-Dichloroethane	0.0050	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.0050	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0050	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	**0.010**
Trichloroethene	0.0050	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	**0.0081**	ND (0.0010)
Vinyl Chloride	0.0020	0.0020		ND (0.00050)	**0.0045**	ND (0.00050)	ND (0.00050)	ND (0.00050)

Constituent	MQL	Critical PCLs (a)	Location:	MW-134	MW-145	MW-146	MW-169	MW-174
			Depth: (b)	26'	26'	30'	36'	34'
			Date:	2/20/2013	2/20/2013	2/20/2013	2/20/2013	2/20/2013
1,1-Dichloroethane	0.0050	4.9		ND (0.00050)	**0.0022 J**	**0.015**	**0.0014 J**	**0.042**
1,1-Dichloroethene	0.0050	0.0070		**0.0027 J**	ND (0.00060)	**0.022**	**0.055**	**0.12**
1,2-Dichloroethane	0.0050	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.0050	0.070		ND (0.0010)	ND (0.0010)	**0.0049 J**	ND (0.0010)	**0.0067**
Tetrachloroethene	0.0050	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0050	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.0020	0.0020		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	**0.0010 J**

NOTES:

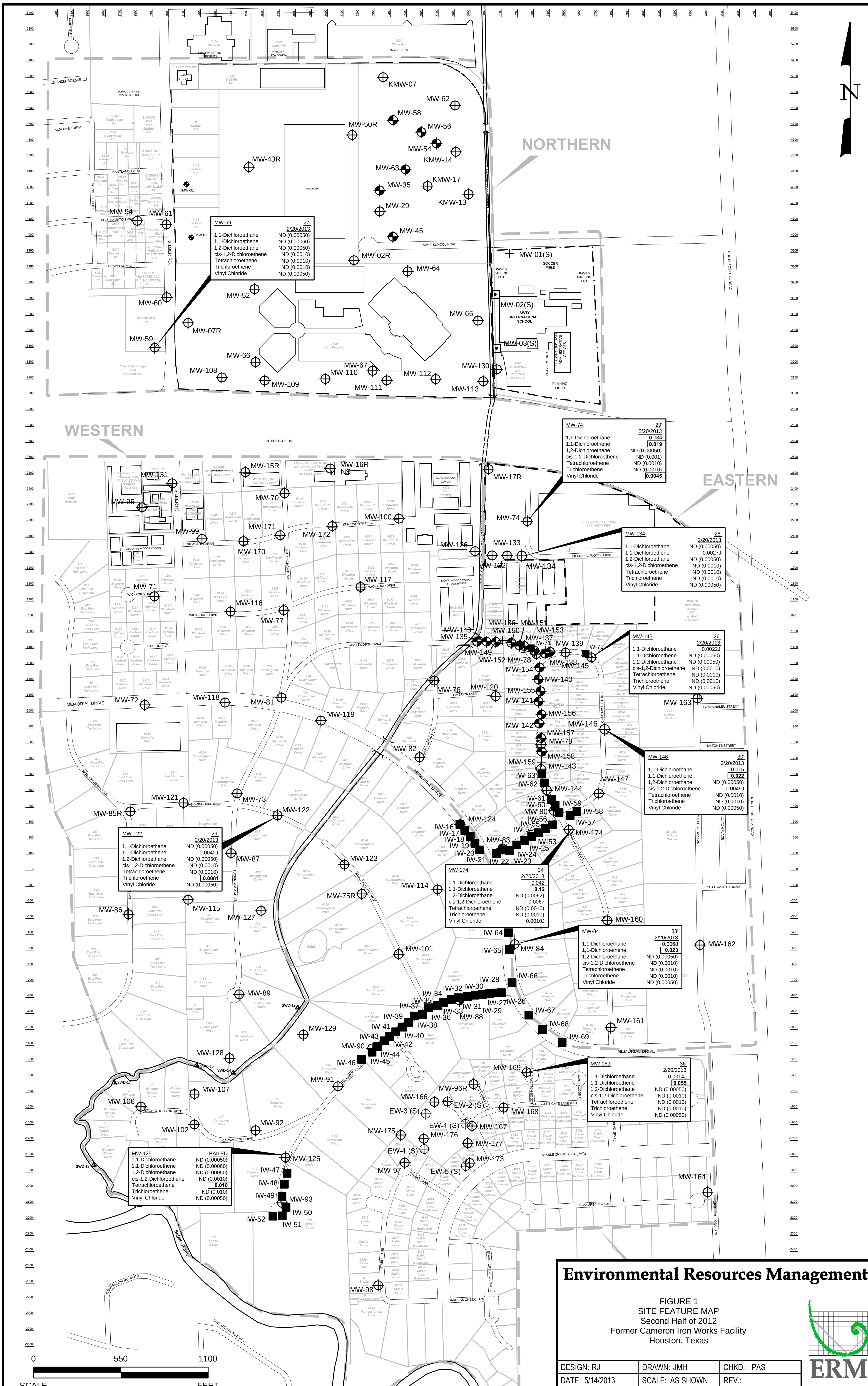
The reported concentrations are in mg/L.
0.023 = exceedance of TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water critical PCLs.
Bold values exceed the MQL.
ND (0.00050) = *Not Detected* at the Sample Detection Limit (SDL) given in parentheses.
MQL = Method Quantitation Limit.
(a) TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water PCLs, Table 3, table for TRRP Rule dated April 2008.
(b) The sample depths are reported in feet below top of casing elevations.
J = Estimated data, the reported sample concentration is approximated due to exceedance of QC requirements.
NS = Not Sampled due to the presence of permanganate during low flow purging.

Figures

Attachment 2

May 14, 2013
Project No. 0194630

Environmental Resources Management
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
(281) 600-1000



MW-59	27' 2/20/2013
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	ND (0.00060)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-74	29' 2/20/2013
1,1-Dichloroethane	0.084
1,1-Dichloroethene	**0.019**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.001)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	**0.0045**

MW-134	26' 2/20/2013
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	0.0027J
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-145	26' 2/20/2013
1,1-Dichloroethane	0.0022J
1,1-Dichloroethene	ND (0.00060)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-146	30' 2/20/2013
1,1-Dichloroethane	0.015
1,1-Dichloroethene	**0.022**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	0.0049J
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-122	29' 2/20/2013
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	0.0040J
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	**0.0081**
Vinyl Chloride	ND (0.00050)

MW-174	34' 2/20/2013
1,1-Dichloroethane	0.042
1,1-Dichloroethene	**0.12**
1,2-Dichloroethane	ND (0.0062)
cis-1,2-Dichloroethene	0.0067
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	0.0010J

MW-84	33' 2/20/2013
1,1-Dichloroethane	0.0068
1,1-Dichloroethene	**0.023**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-169	36' 2/20/2013
1,1-Dichloroethane	0.0014J
1,1-Dichloroethene	**0.055**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-125	BAILED
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	ND (0.00060)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	**0.010**
Trichloroethene	ND (0.010)
Vinyl Chloride	ND (0.00050)

Environmental Resources Management

FIGURE 1
SITE FEATURE MAP
Second Half of 2012
Former Cameron Iron Works Facility
Houston, Texas

ERM

DESIGN: RJ	DRAWN: JMH	CHKD.: PAS
DATE: 5/14/2013	SCALE: AS SHOWN	REV.:

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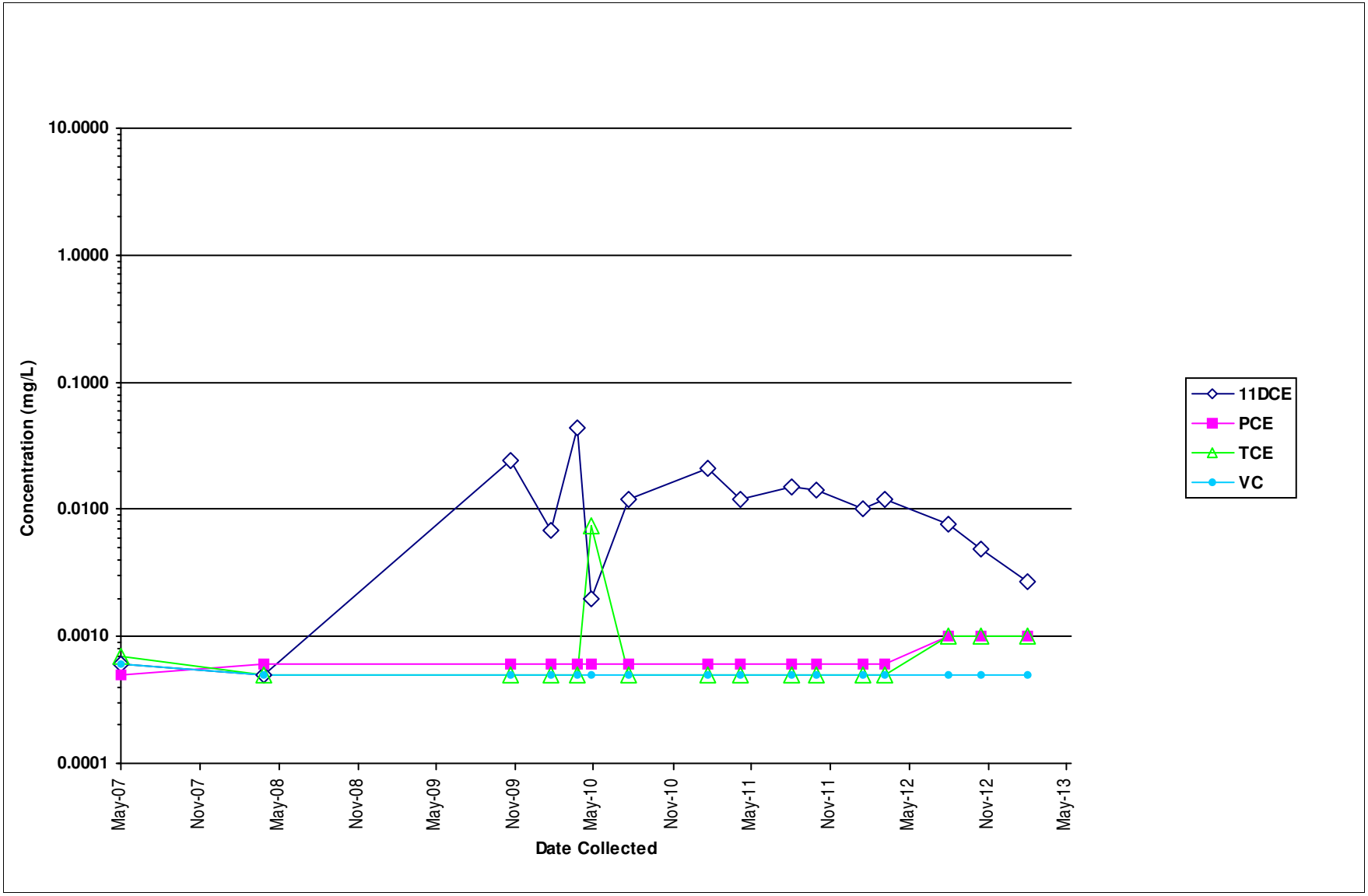
ERM-Southwest, Inc. TX PE Firm No. 2393

Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-134

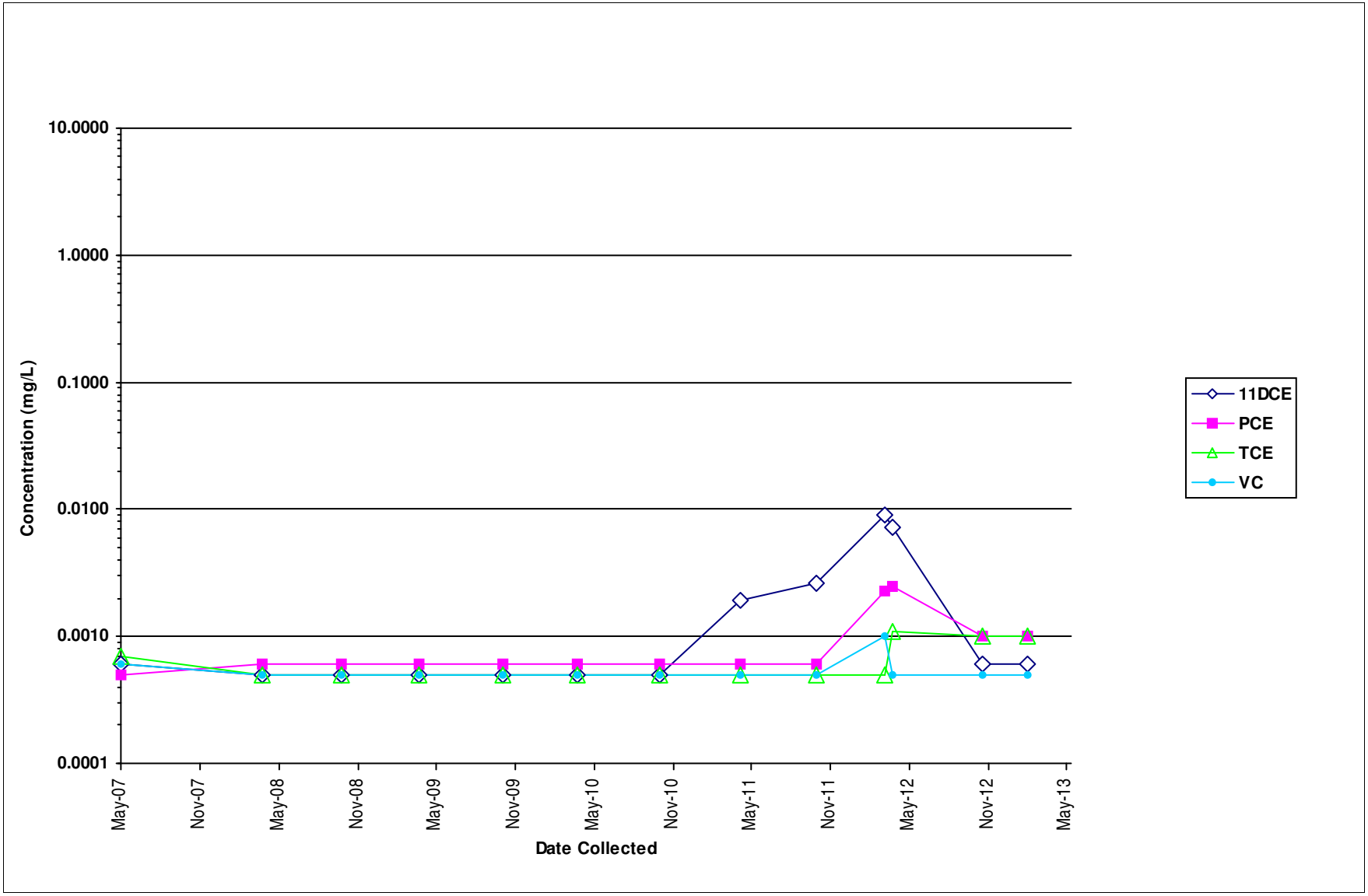


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-145

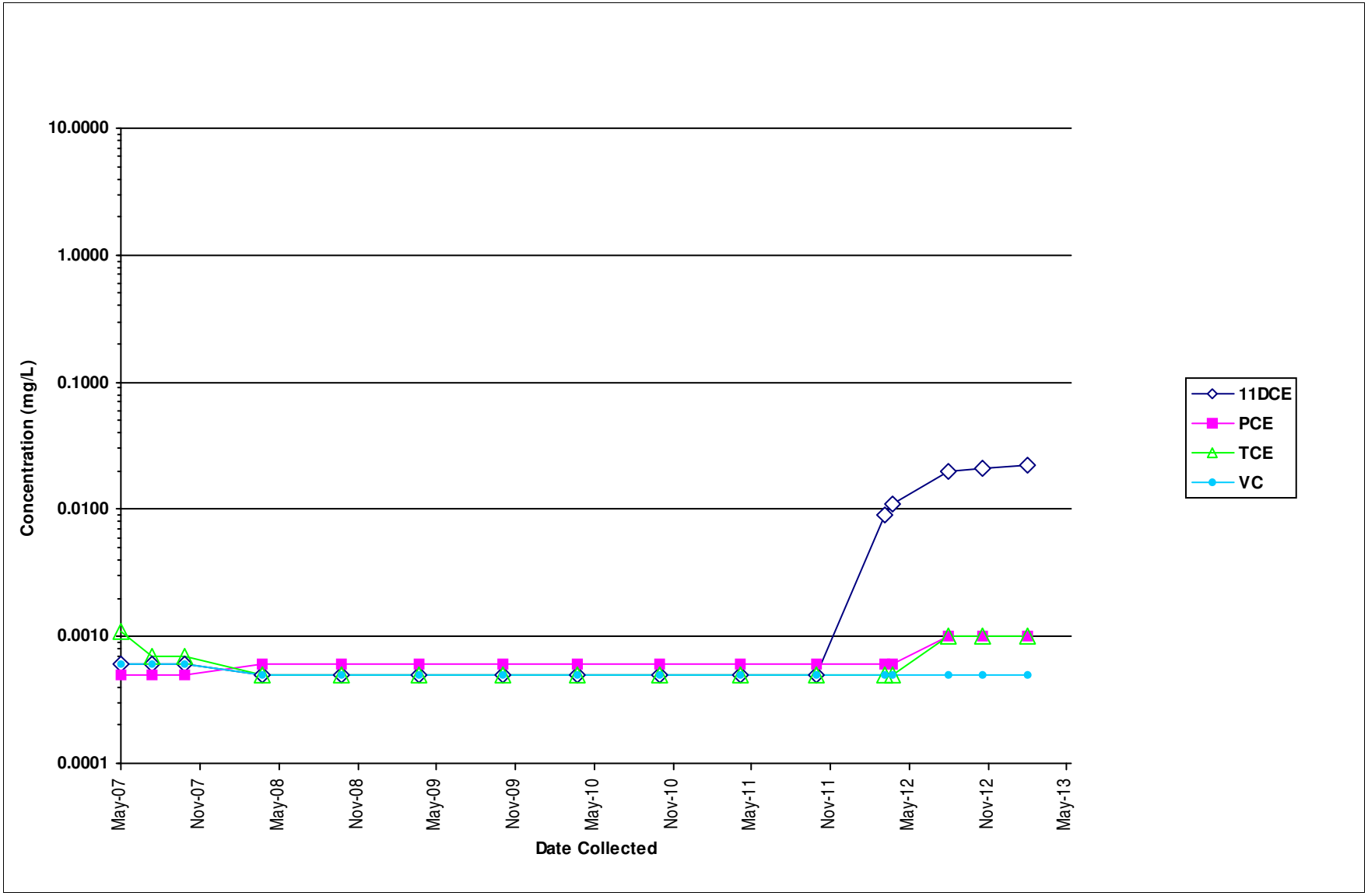


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-146

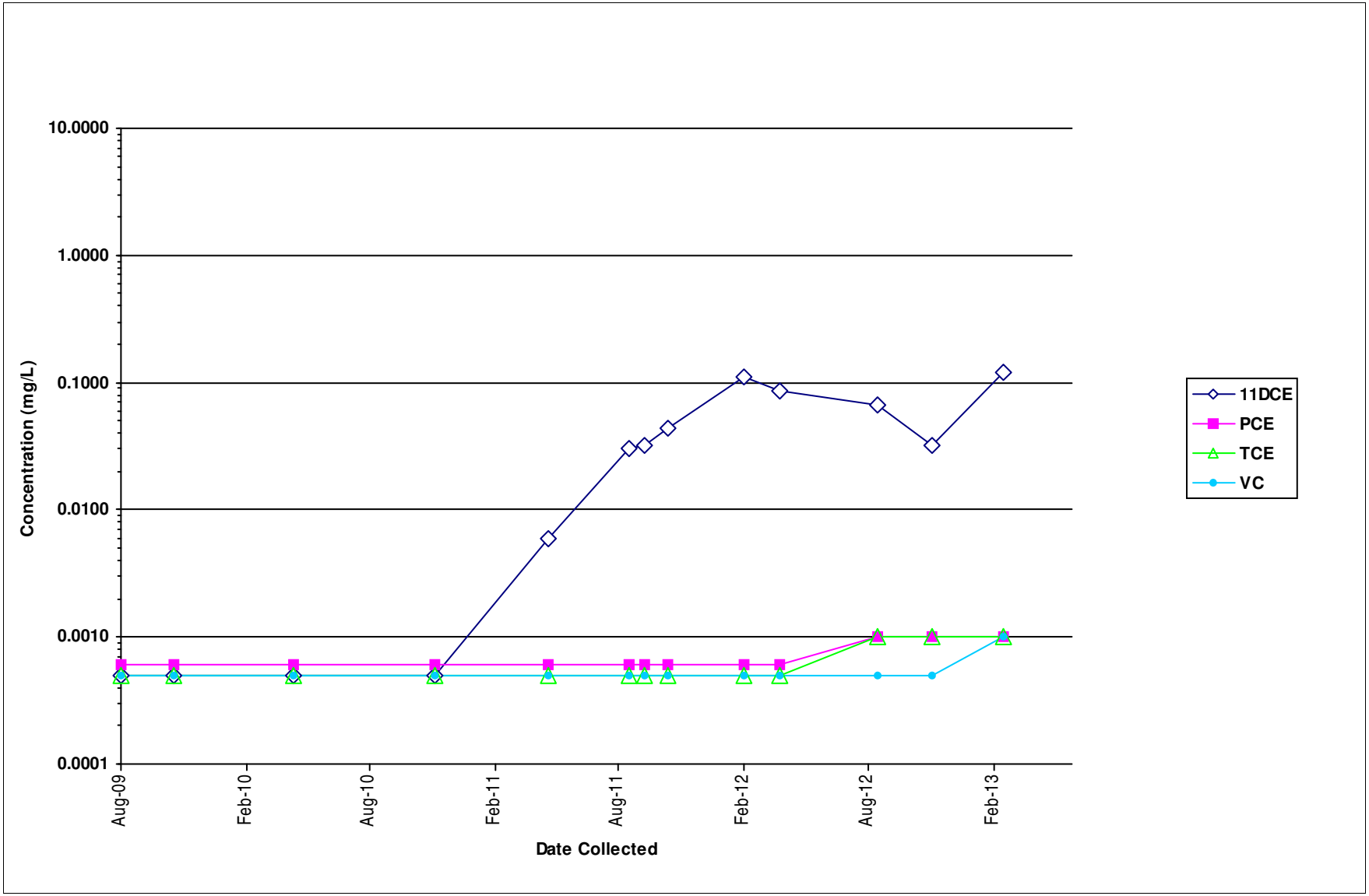


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-174

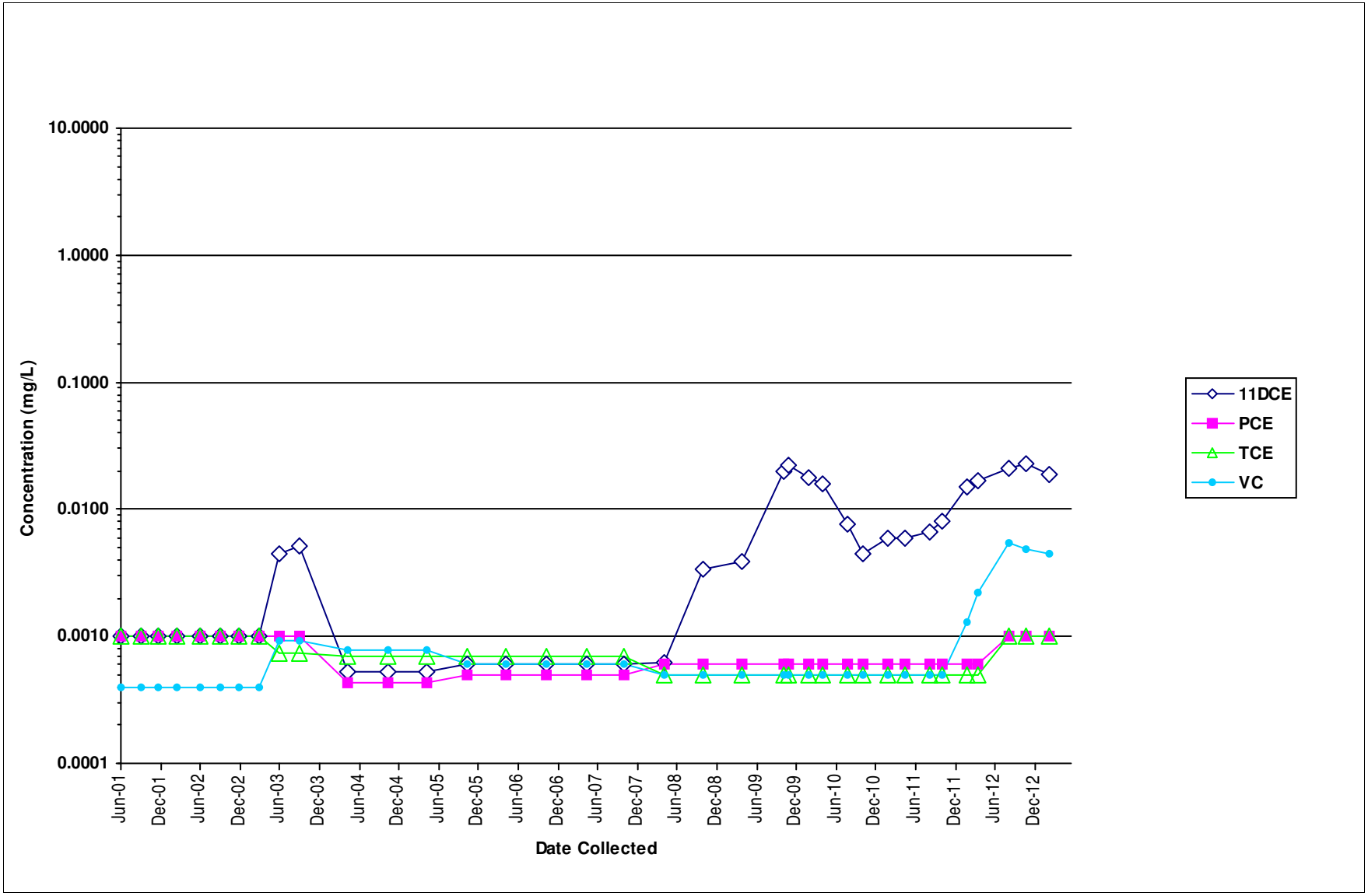


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-74

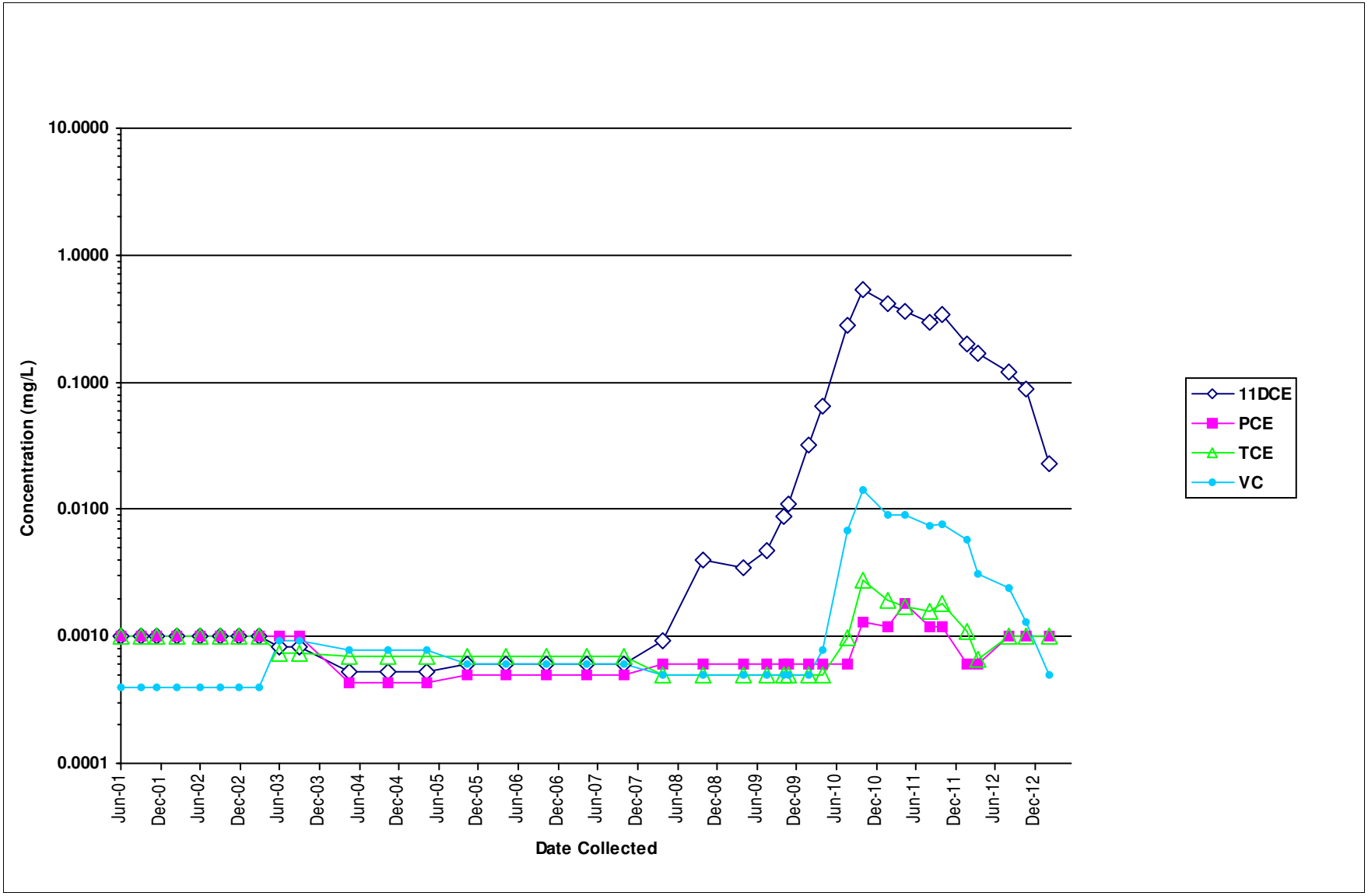


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-84

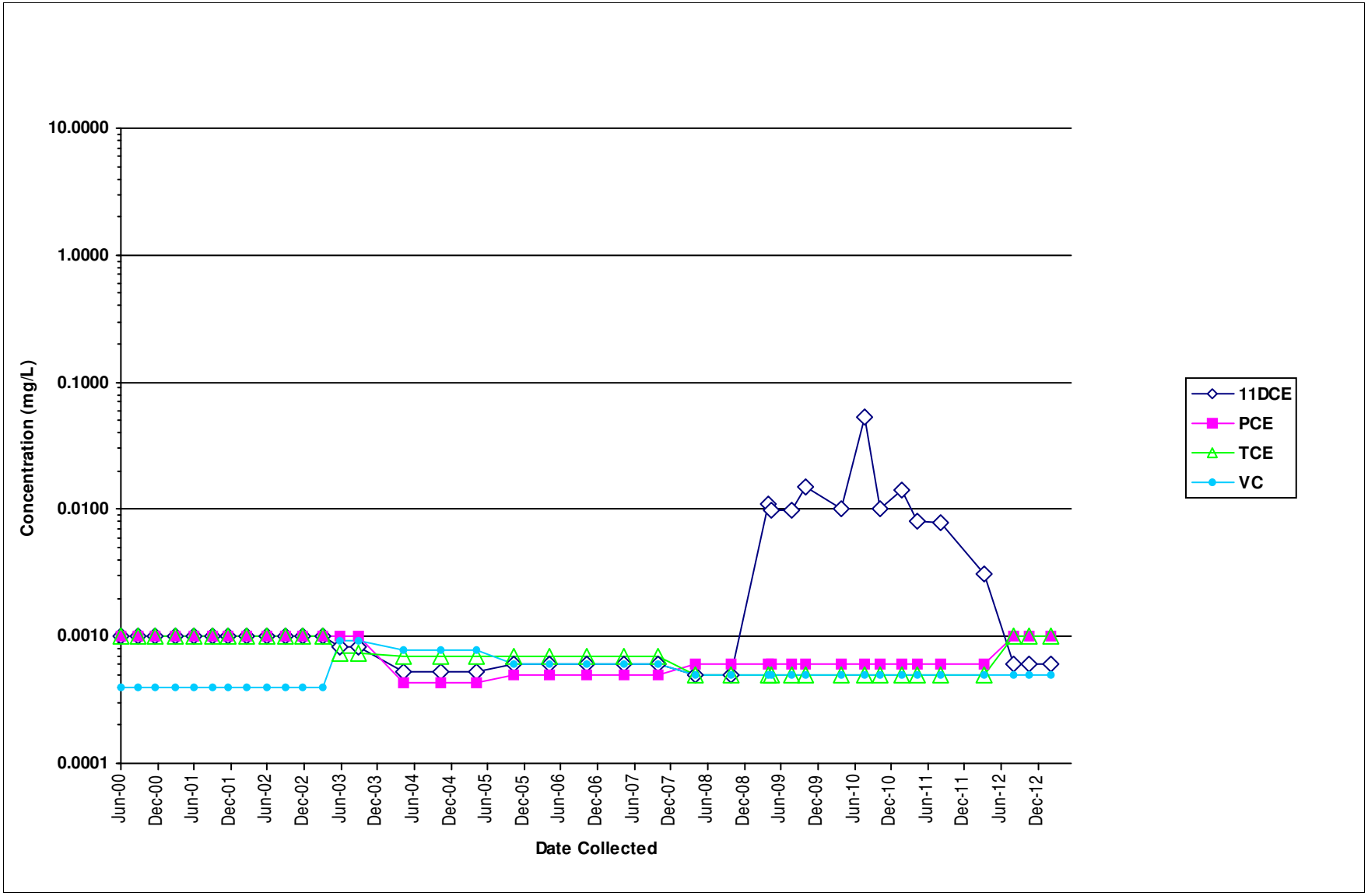


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Northern

Client Sample ID: MW-59

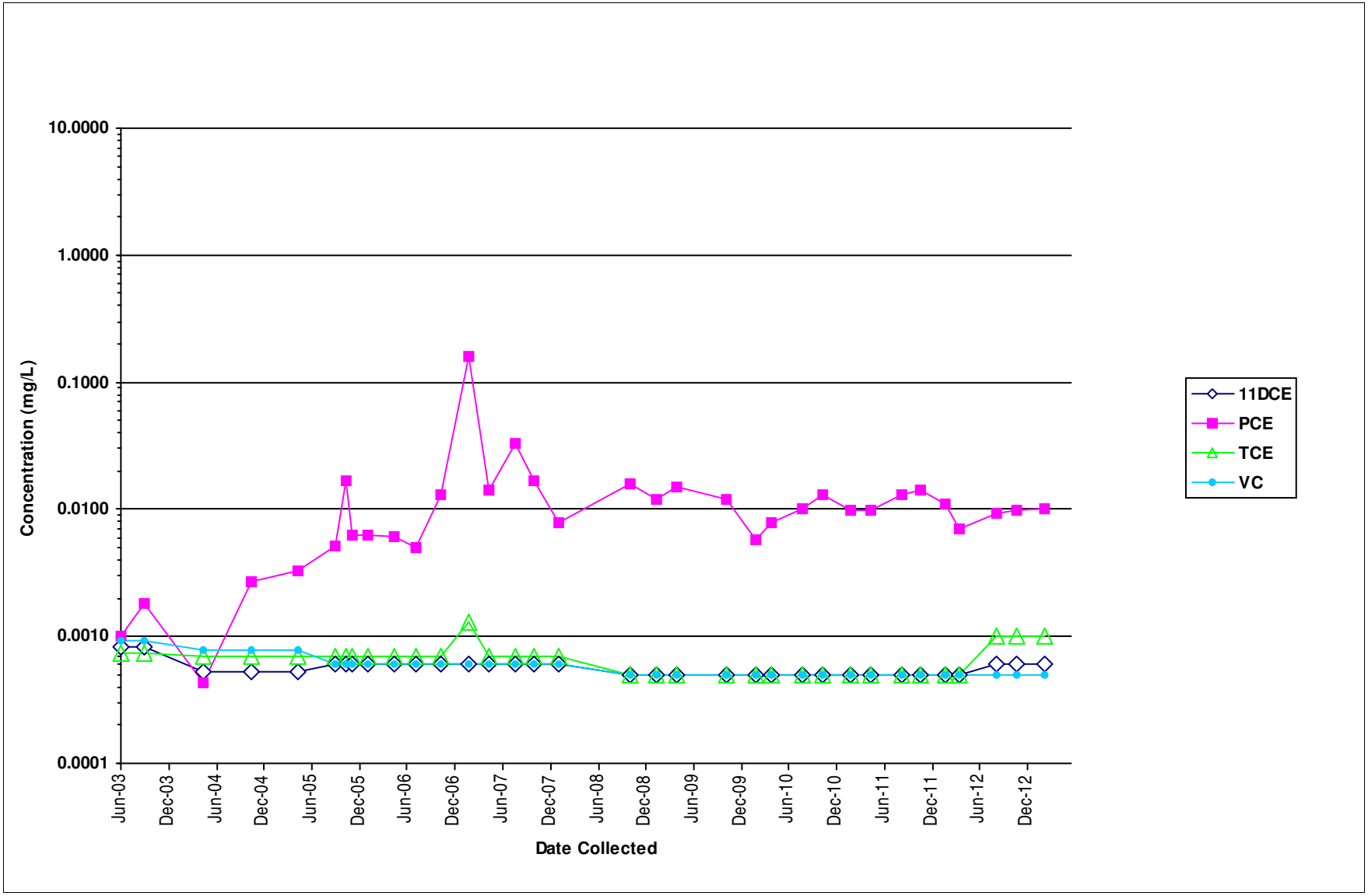


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Southern

Client Sample ID: MW-125

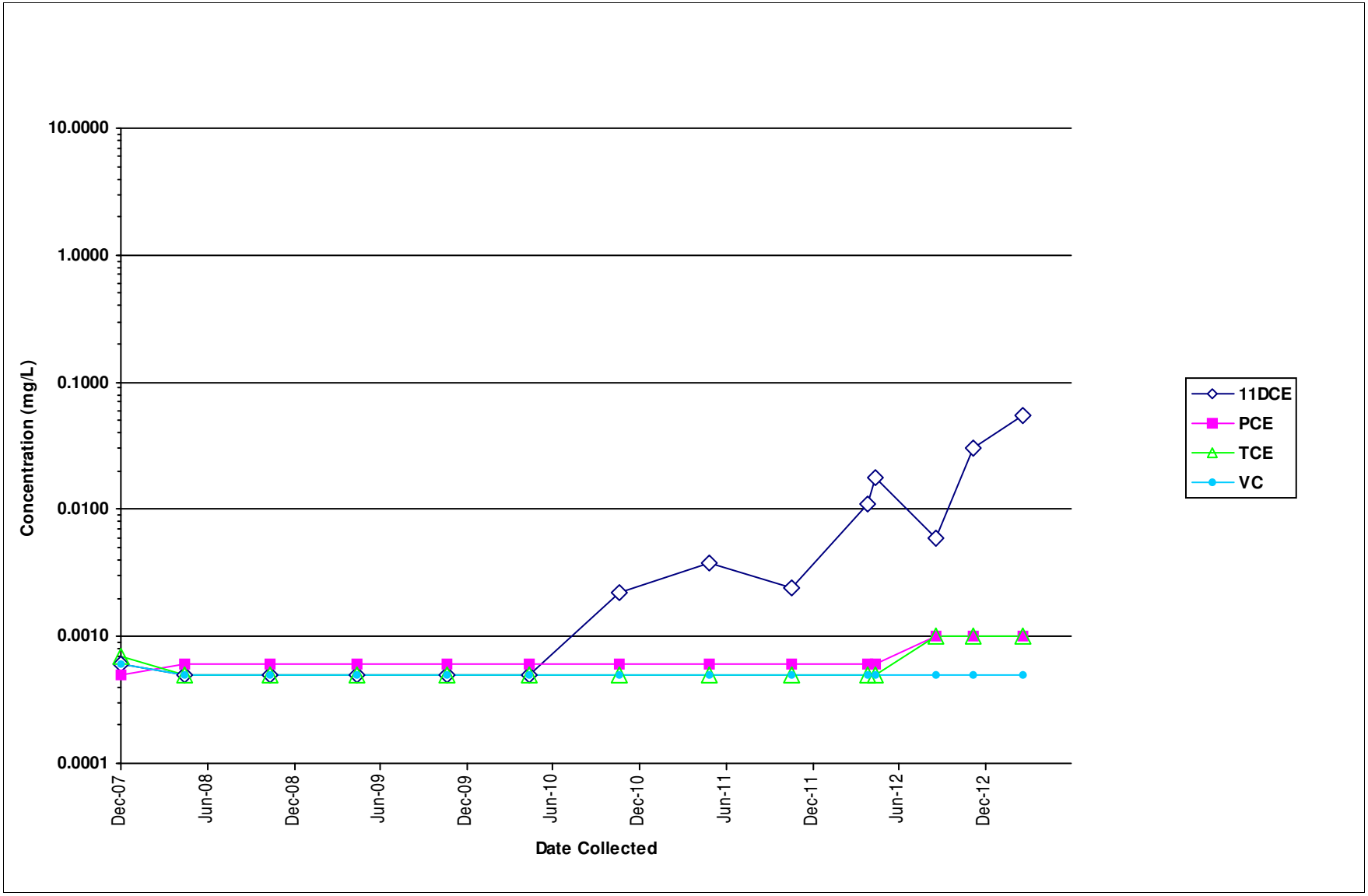


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Southern

Client Sample ID: MW-169



Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Western

Client Sample ID: MW-122