

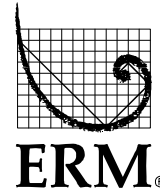
**Environmental  
Resources  
Management**

CityCentre Four  
840 West Sam Houston  
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October 2, 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: Third 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 Third 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 August 2013 in accordance with the Texas Commission on Environmental Quality's (TCEQ) July 9, 2013 comments on the *2012 Annual Ground Water Monitoring Report and Field Activities Summary* dated June 24, 2013.

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***

The evaluation of the data and information collected on the Texas Department of Transportation's (TxDOT) 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 and in Cameron's April 16, 2013 submittal entitled *Former Cameron Iron Works – TxDOT Dewatering System Evaluation and Response*. The discussions and information presented focused on the changes in ground water flow conditions induced by the I-610/I-10 Inter-change dewatering system. In accordance with the TCEQ's June 25, 2013 letter, Cameron will prepare a RAP to address the plume movement induced by TxDOT's dewatering system.

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

### ***Concentration Trends and Response Action Plan Activities***

MW-59 reported site COCs as *Not Detected* for the fifth consecutive monitoring event in August 2013. MW-59 lies within the capture zone of the ground water treatment system and the improved water quality trends illustrate the ground water extraction system's effectiveness along the western portion of the former facility. With TCEQ concurrence, Cameron will move MW-59 to the semi-annual monitoring schedule beginning in February 2014.

The reported concentrations of 1,1-dichloroethene (1,1-DCE) and vinyl chloride (VC) remain stable at levels above their PCLs at MW-74 for the sixth consecutive sampling event. 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 96% since October 2010. 1,2 dichloroethene, cis-1,2-dichloroethene (cis-1,2-DCE), tetrachloroethene (PCE), trichloroethene (TCE) and VC have been reported as *Not Detected* in 2013. 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 0.0064 mg/L, slightly above its PCL. Concentrations of 1,1-DCE and cis-1,2-DCE were reported above the SQL but below the PCL in August 2013. MW-122 will remain on the quarterly sampling schedule.

The concentrations of COCs in MW-125 have remained generally stable since August 2010. 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 since February 2011 and have remained at levels below its PCL since November 2012. 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 first exceeded the PCL in March 2012 at which time it was added to the trigger well list and initiated the expansion of the treatment gallery in this area. Following an oxidant injection event, the ground water exhibited the deep purple color associated with permanganate during low-flow purging of MW-145 and was not sampled in August 2012. The concentrations of COCs in MW-145 have remained below their respective PCLs since then and Cameron continues to monitor 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 continue an upward trend at levels above its PCL over the past six 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 stable above its PCL. 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*

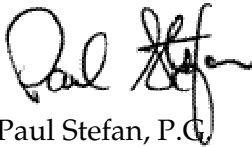
Ground water concentrations were monitored at select wells in the third quarter of 2013 to assess the effectiveness of the remedy at controlling affected ground water and document the potential for plume movement. Based on the available data, the dewatering system at the I-610/I-10 Interchange is influencing concentration trends in both on- and off-site areas. This information was presented to the TCEQ in a February 2013 meeting in Austin and in Cameron's April 16, 2013 submittal entitled *Former Cameron Iron Works – TxDOT Dewatering System Evaluation and Response*. In accordance with the TCEQ's June 25, 2013 letter, Cameron will prepare a RAP to address the plume movement induced by TxDOT's dewatering system.

The next ground water monitoring event is scheduled to be completed in November 2013.

Please contact Mr. Ted Fasting of Cameron International Corporation at (713) 513-3325 or me at (281) 600-1000 with any questions or comments.

Sincerely,

Environmental Resources Management



Paul Stefan, P.C.  
Principal Partner

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*

*October 2, 2013*  
*Project No. 0194630*

**Environmental Resources Management**  
CityCentre Four  
840 West Sam Houston Parkway North, Suite 600  
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TABLE 1

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

Former Cameron Iron Works Facility  
Houston, Texas

Well <sup>(1)</sup>	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-dichloroethane	1,1-dichloroethane	no (a)	no	Quarterly
MW-74	cis-1,2-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-dichloroethane	1,1-dichloroethane	no (a)	yes (c)	Quarterly
MW-122	1,1-dichloroethane		no (a)	no	Quarterly
MW-122	cis-1,2-dichloroethene		no (a)	no	Quarterly
MW-122	Trichloroethene	Trichloroethene	no (a)	no	Quarterly
MW-125	Tetrachloroethene	Tetrachloroethene	no (a)	yes (c)	Quarterly
MW-134	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-145 <sup>(2)</sup>	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-145 <sup>(2)</sup>	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-145 <sup>(2)</sup>	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
MW-145 <sup>(2)</sup>	vinyl chloride		no (a)	yes (c)	Quarterly
MW-146 <sup>(2)</sup>	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-146 <sup>(2)</sup>	1,1-dichloroethane	1,1-dichloroethane	no (a)	yes (c)	Quarterly
MW-146 <sup>(2)</sup>	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
MW-146 <sup>(2)</sup>	vinyl chloride		no (a)	yes (c)	Quarterly
MW-169 <sup>(2)</sup>	1,1-dichloroethane		no (a)	no	Quarterly
MW-169 <sup>(2)</sup>	1,1-dichloroethane	1,1-dichloroethane	no (a)	no	Quarterly
MW-174	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-174	1,1-dichloroethane	1,1-dichloroethane	no (a)	yes (c)	Quarterly
MW-174	1,2-dichloroethane		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

<sup>(1)</sup> - Quarterly trigger well list as provided in TCEQ letter dated December 7, 2012.

<sup>(2)</sup> - 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  
Third 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:	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013
1,1-Dichloroethane	0.0050	4.9		ND (0.00050)	<b>0.088</b>	<b>0.0070</b>	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.0050	0.0070		ND (0.00060)	<b>0.018</b>	<b>0.018</b>	<b>0.0042 J</b>	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)	<b>0.0019 J</b>	ND (0.0010)	<b>0.0020 J</b>	ND (0.0010)
Tetrachloroethene	0.0050	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	<b>0.0087</b>
Trichloroethene	0.0050	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	<b>0.0064</b>	ND (0.0010)
Vinyl Chloride	0.0020	0.0020		ND (0.00050)	<b>0.0056</b>	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:	8/30/2013	8/30/2013	8/30/2013	8/30/2013	8/30/2013
1,1-Dichloroethane	0.0050	4.9		ND (0.00050)	<b>0.0038 J</b>	<b>0.031</b>	<b>0.0024 J</b>	<b>0.070</b>
1,1-Dichloroethene	0.0050	0.0070		<b>0.0012 J</b>	<b>0.0026 J</b>	<b>0.051</b>	<b>0.044</b>	<b>0.056</b>
1,2-Dichloroethane	0.0050	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	<b>0.00081 J</b>
cis-1,2-Dichloroethene	0.0050	0.070		ND (0.0010)	<b>0.0012 J</b>	<b>0.0071</b>	ND (0.0010)	<b>0.0024 J</b>
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)	<b>0.00056 J</b>	<b>0.0011 J</b>	ND (0.00050)	<b>0.0011 J</b>

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.

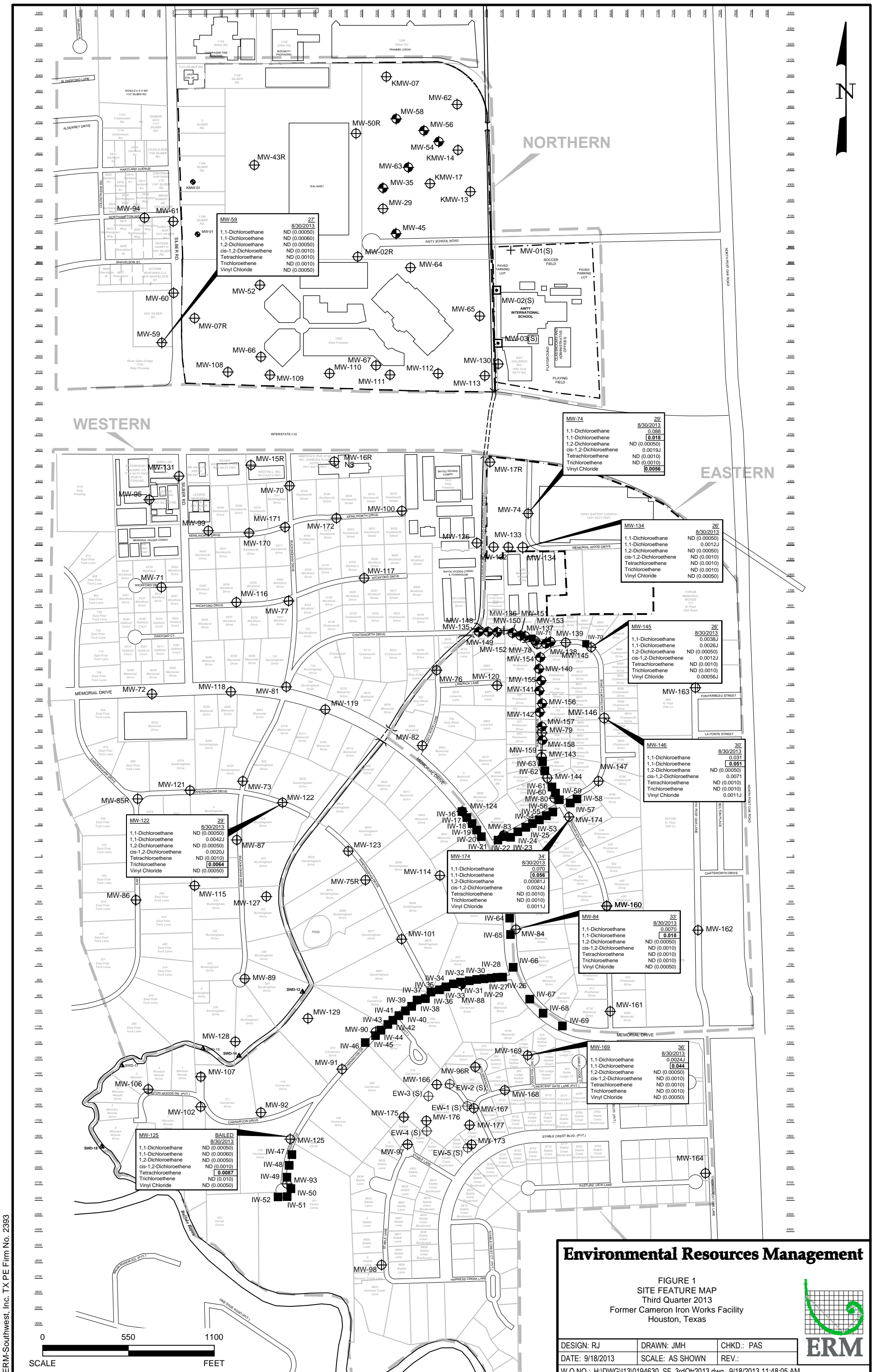
NS = Not Sampled due to the presence of permanganate during low flow purging.

**Figures**  
*Attachment 2*

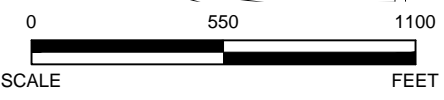
*October 2, 2013*  
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ERM-Southwest, Inc. TX PE Firm No. 2393

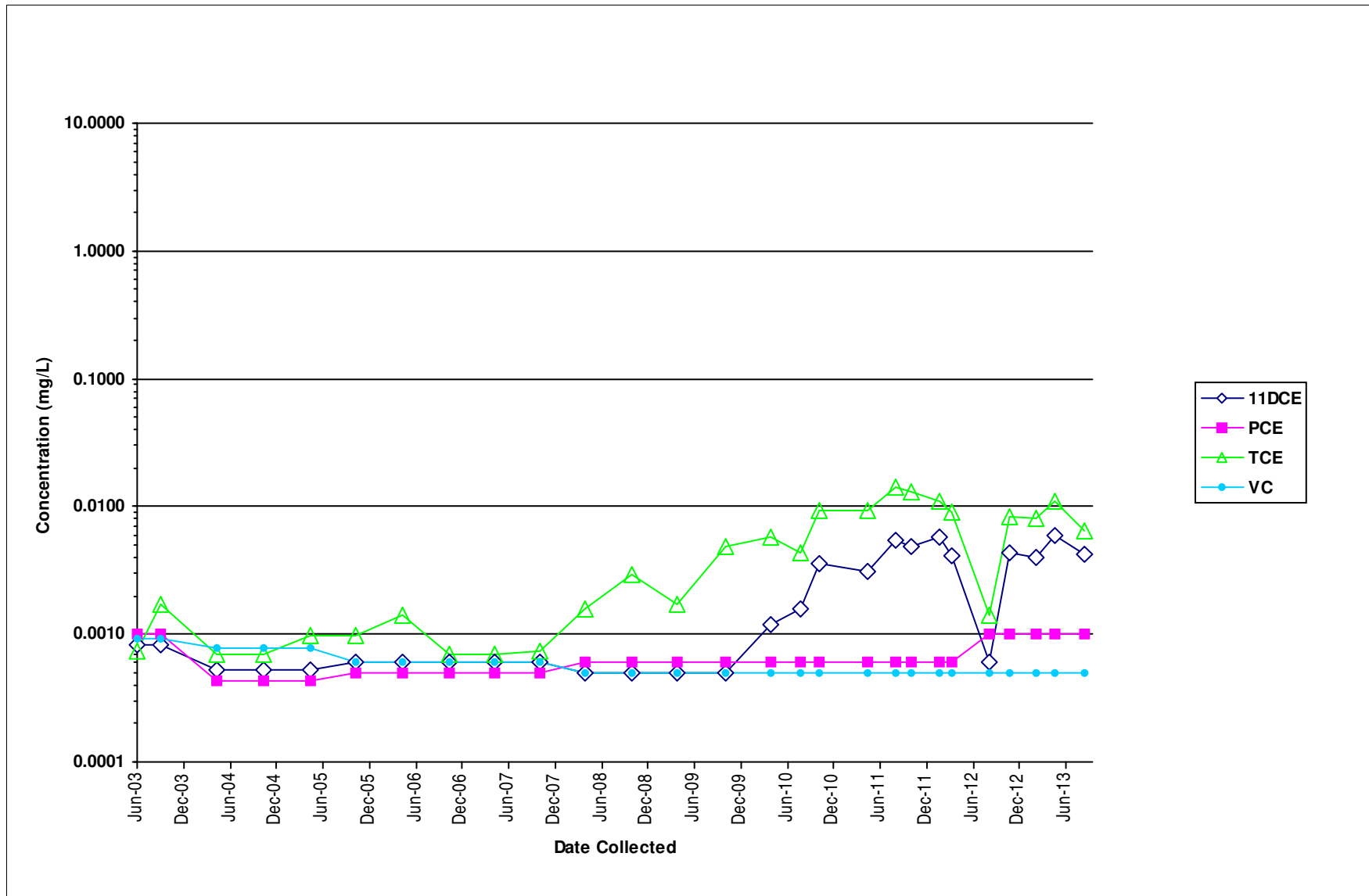


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Western

Client Sample ID: MW-122

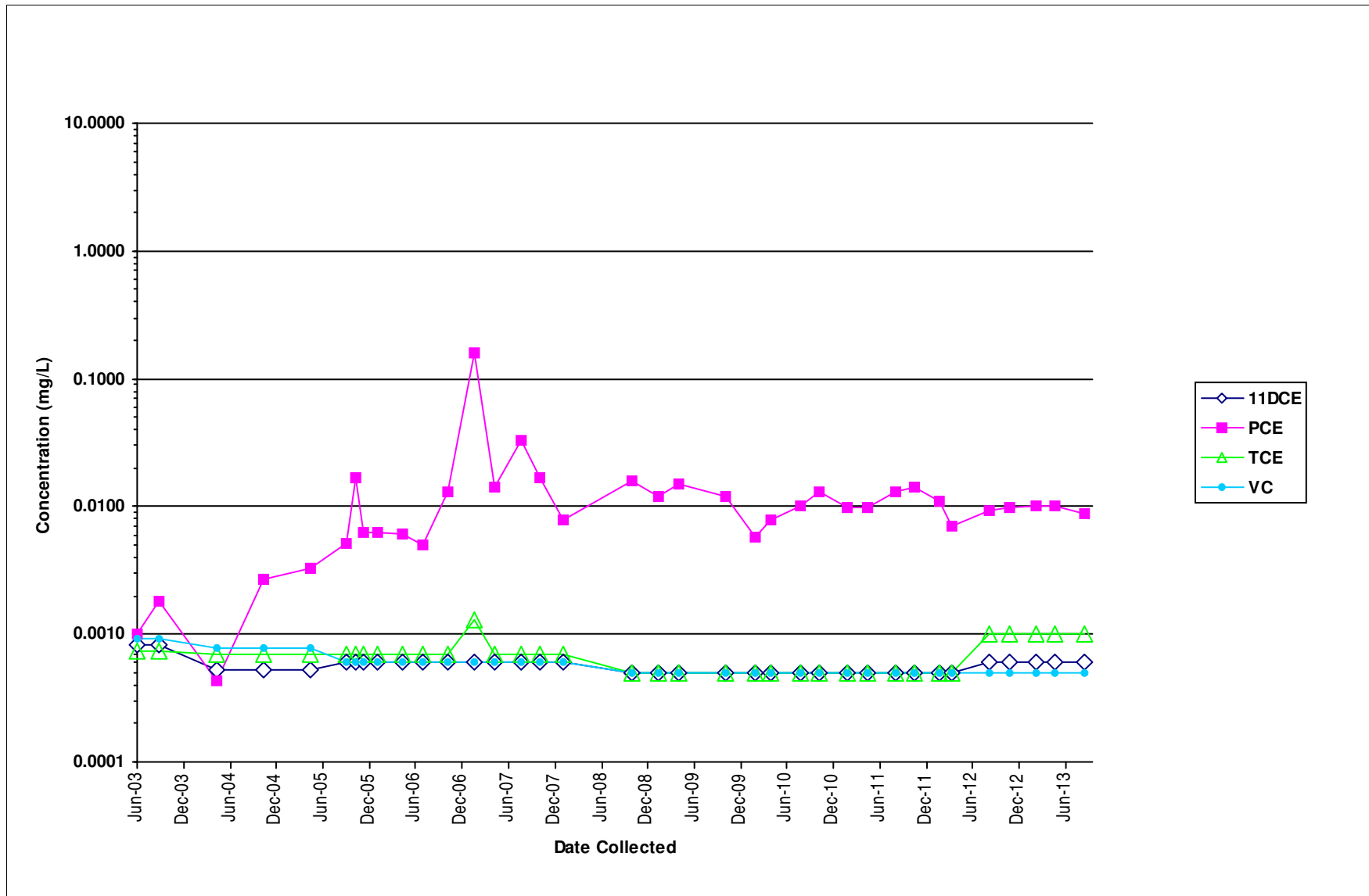


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Southern

Client Sample ID: MW-125

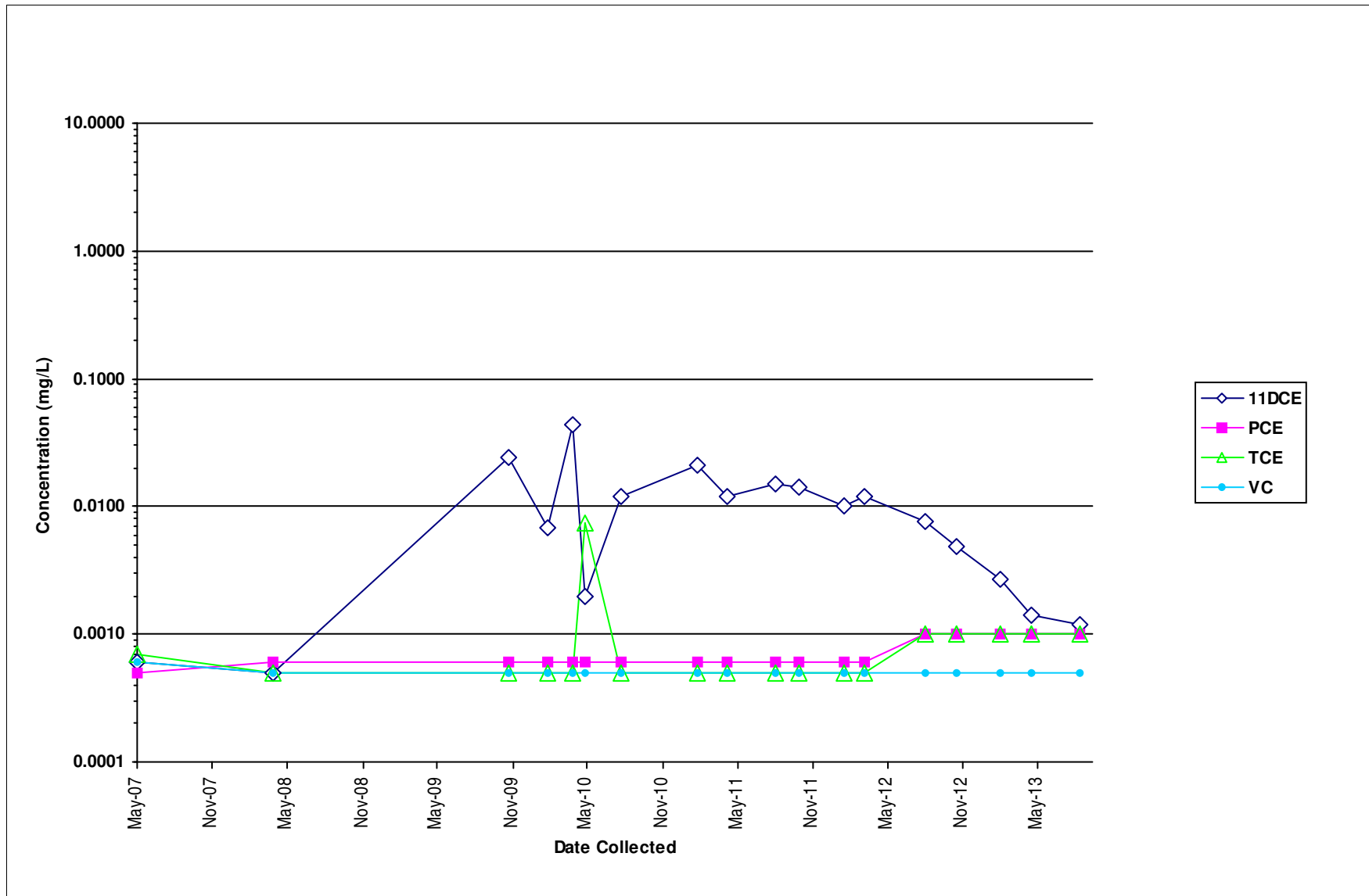


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-134

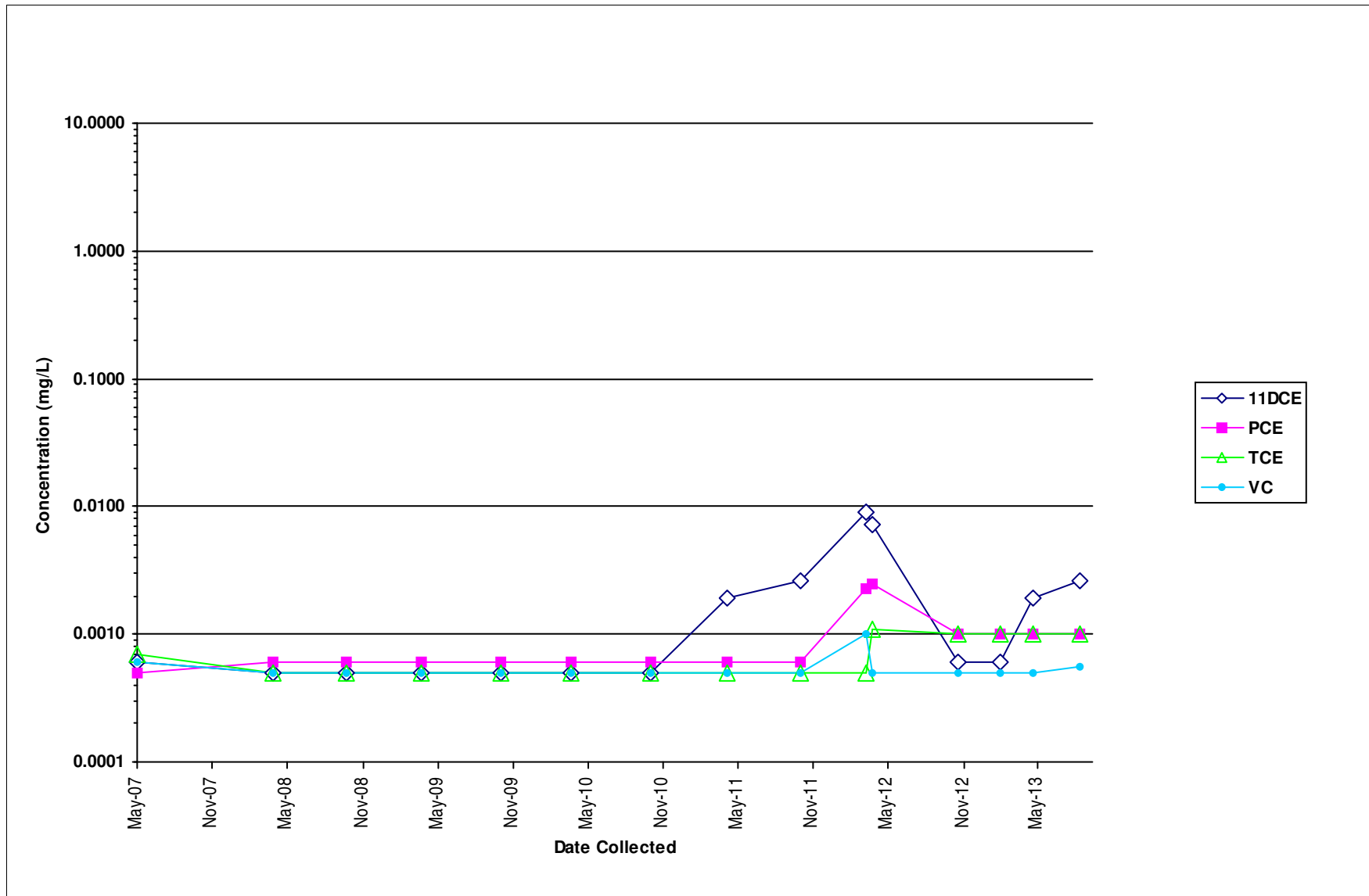


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-145

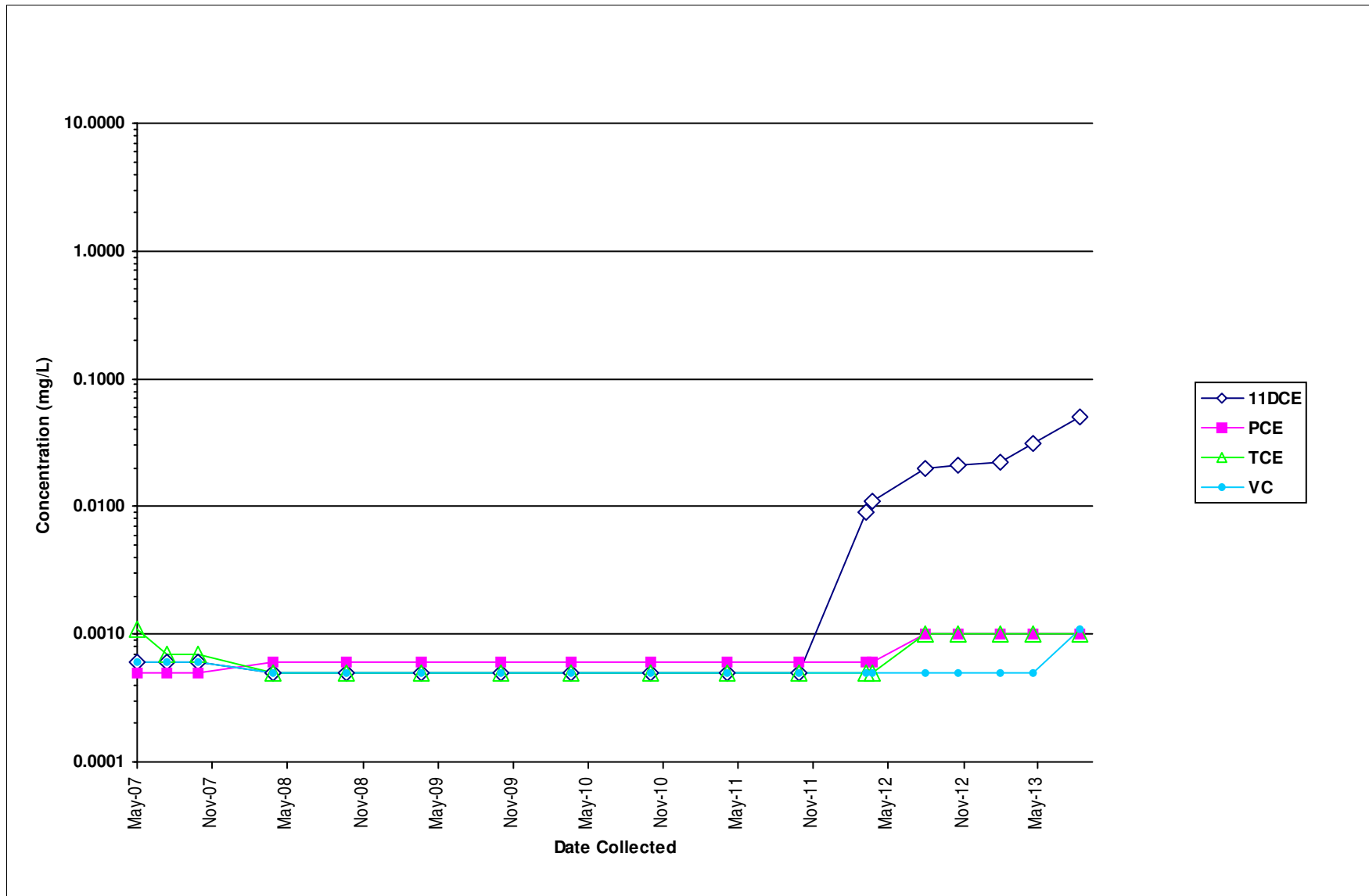


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-146

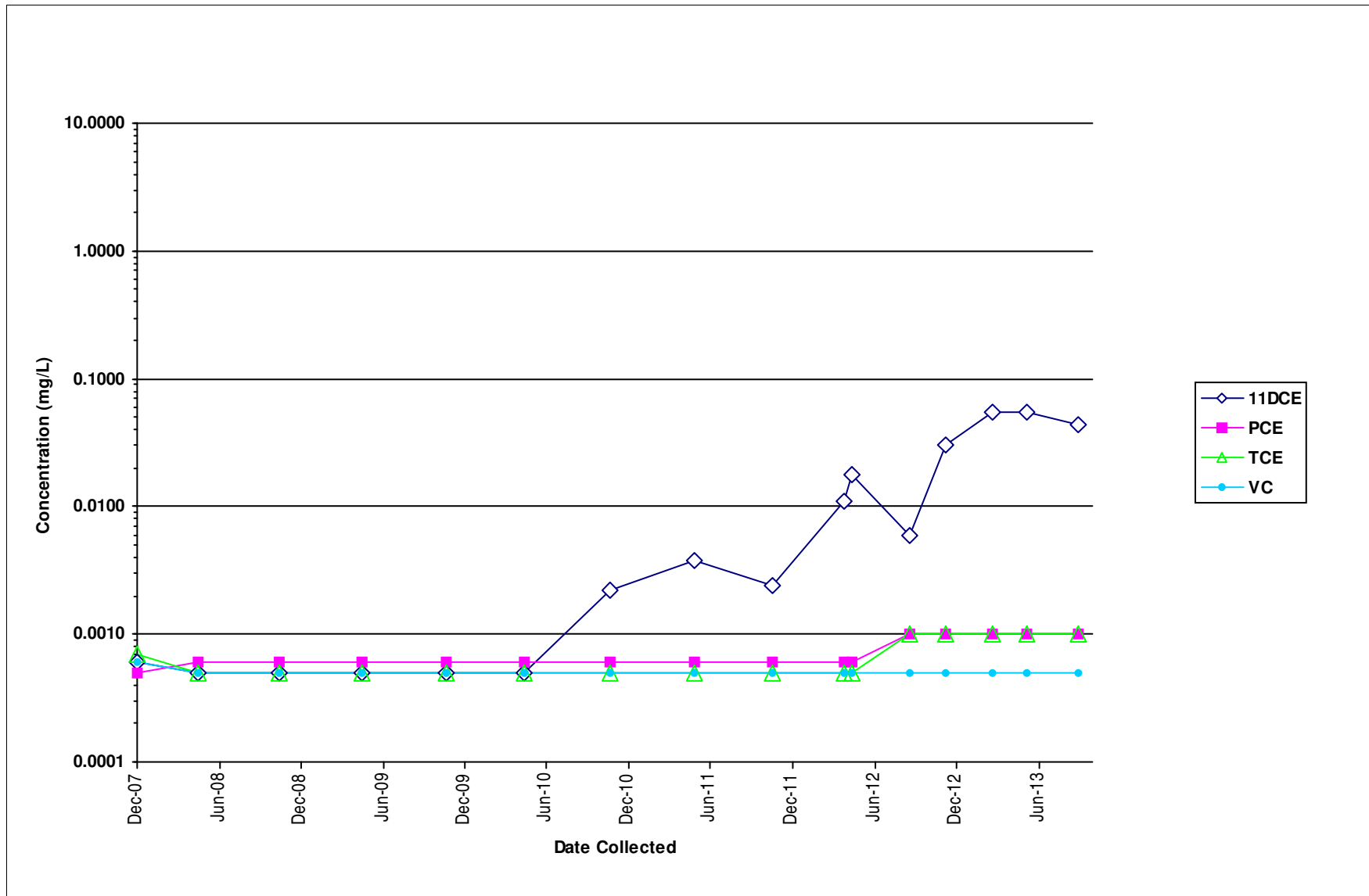


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Southern

Client Sample ID: MW-169



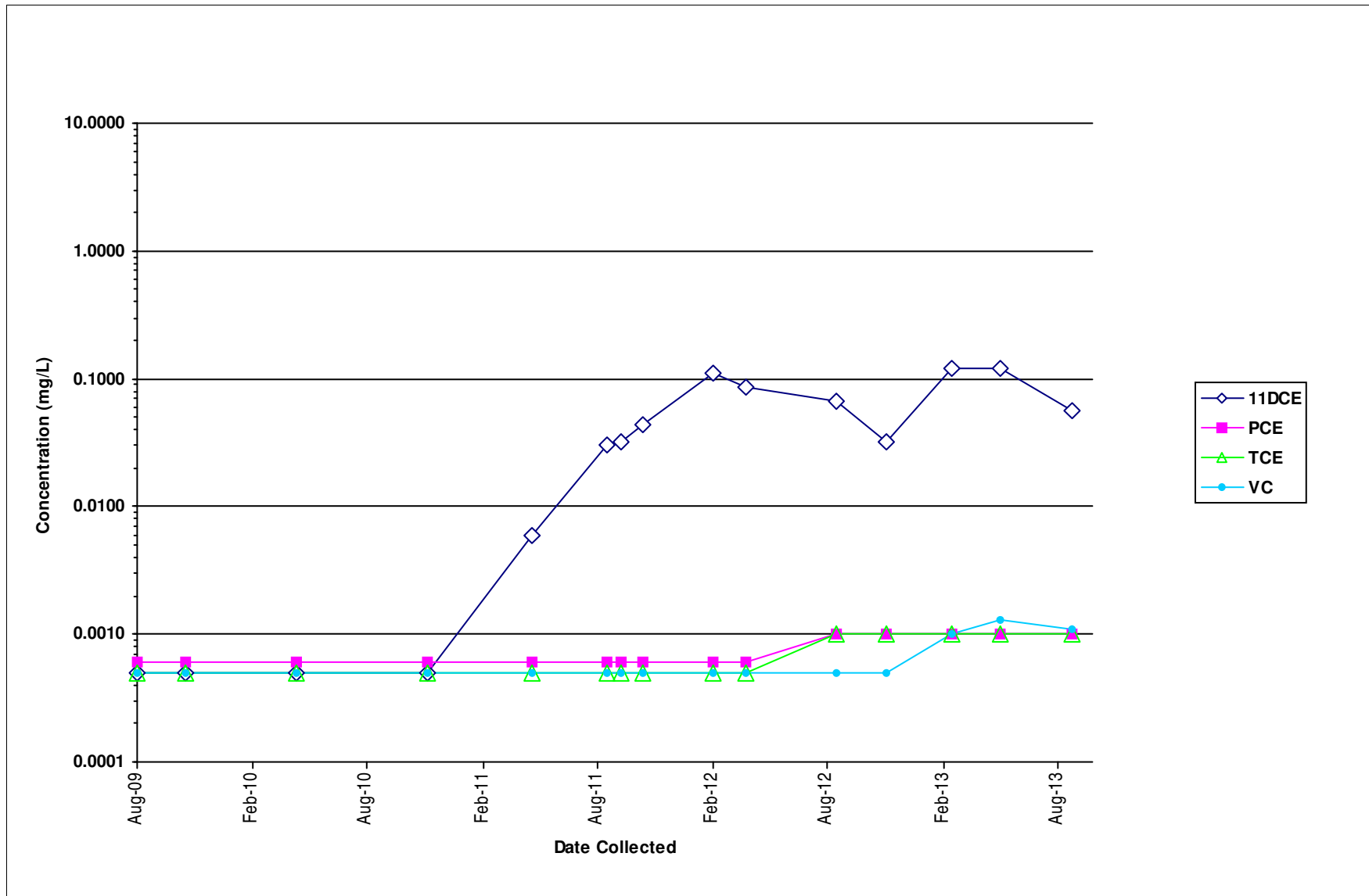
# Ground Water Progress Graph

Former Cameron Iron Works Facility

Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-174



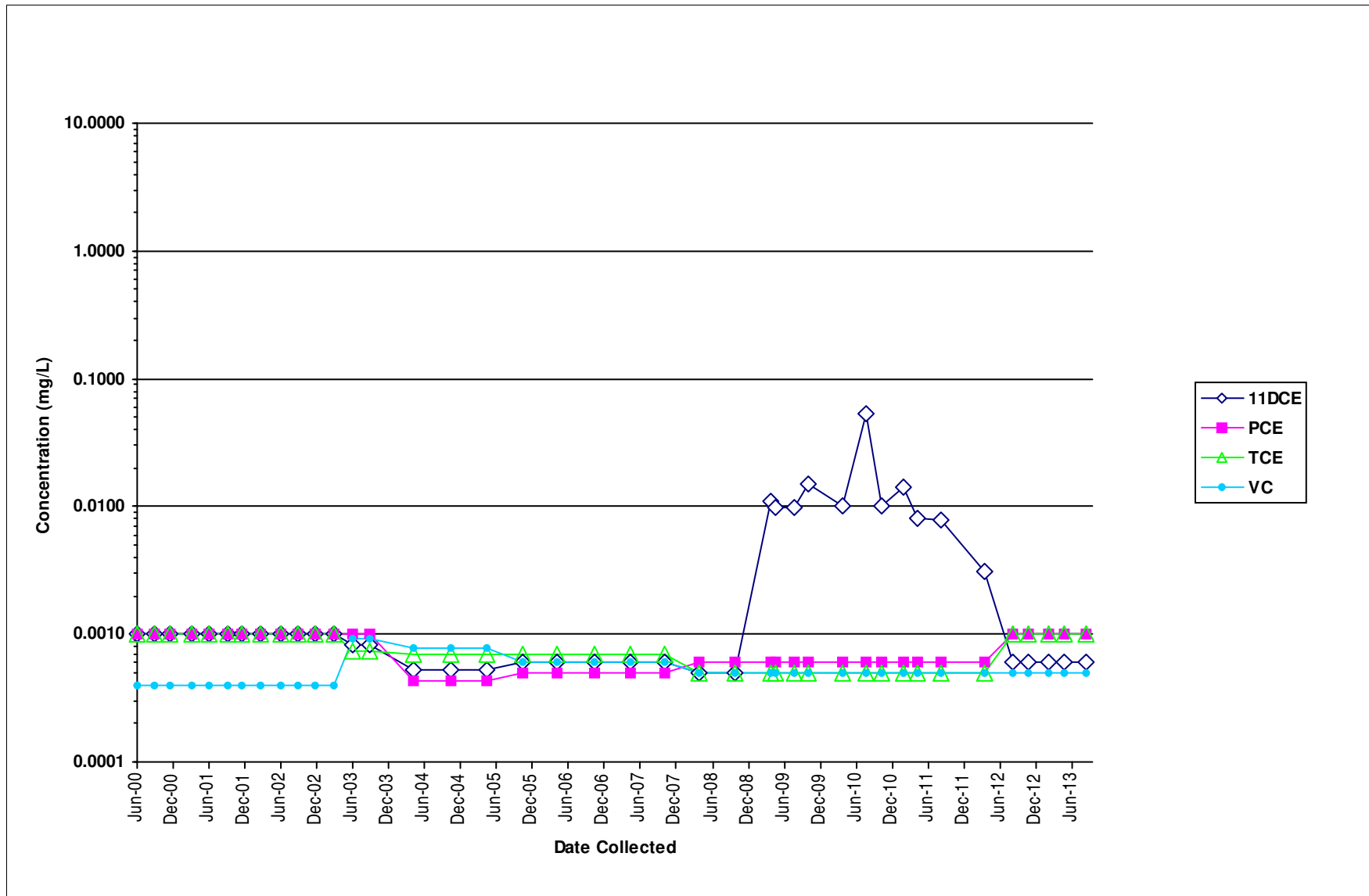


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Northern

Client Sample ID: MW-59

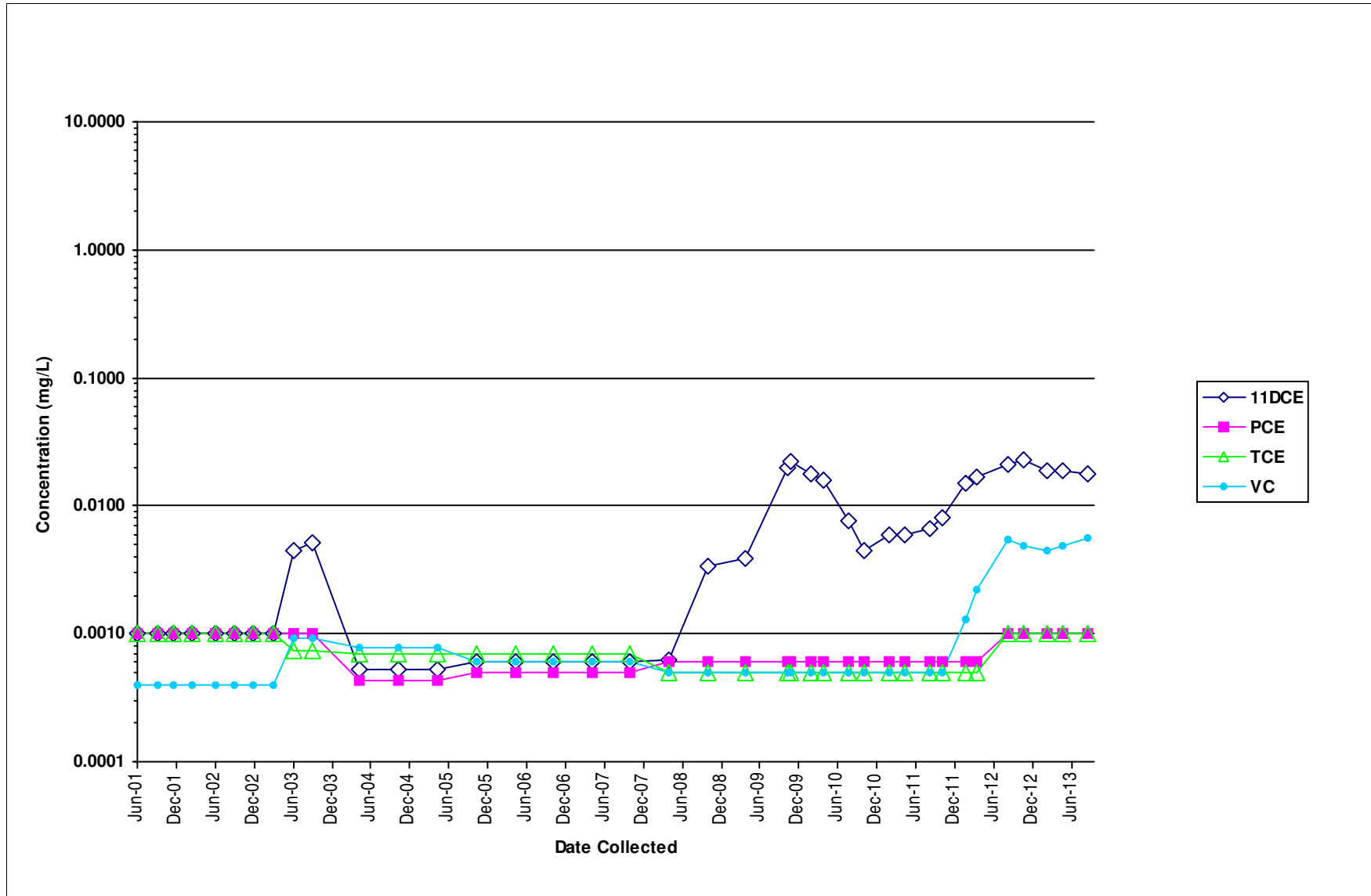


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-74



# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-84

