

**Environmental  
Resources  
Management**

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November 10, 2014

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

Project No. 0260324

Subject: First Half 2014 Monitoring Data Transmittal  
Former Cameron Iron Works Facility, Houston, Texas  
VCP No. 221



Dear Mr. Bryant:

On behalf of Cameron International Corporation (Cameron), Environmental Resources Management (ERM) is providing the First Half 2014 Data Transmittal for the Former Cameron Iron Works Facility (the Facility) in Houston, Texas to the Texas Commission on Environmental Quality (TCEQ) for review and consideration. This report presents a summary of the ground water monitoring results during the first half of 2014. A summary table (Table 1, Attachment 1) has been created to convey this information, as well as the current response action for each area.

The semiannual ground water and surface water sampling event was conducted between June 17 and June 26, 2014. A total of 110 ground water monitor wells were gauged and 108 were sampled during this event. A total of six surface water locations were sampled in accordance with the Response Action Plan (RAP) dated August 28, 2003 and RAP Addenda. Based on a review of these results, the concentration trends of constituents of concern (COCs) were generally consistent with Second Half of 2013 results across the majority of the on-site and off-site areas with some exceptions. The exceptions are discussed in detail below.

***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. In accordance with the TCEQ's June 25, 2013 letter, Cameron submitted a RAP addendum dated March 12, 2014 that outlined a response to the plume movement induced by TXDOT's dewatering system. Cameron received comments on the RAP addendum in the TCEQ's letter dated July 22, 2014.

Plume movement on the western edge of the off-site property was observed in the first half of 2014. A review of the results from ground water samples collected from MW-71 indicated that 1,1-DCE was reported at concentrations greater than the 0.0070 mg/L PCL in both June (0.0082 mg/L) and the August confirmation sample (0.0077 mg/L). A field duplicate was also collected during the August event and reported 1,1-DCE at 0.0074 mg/L. The magnitude of the exceedance in each instance was approximately 1 ppb, suggesting that the mass of 1,1-DCE in the area is not significant and concentrations could decrease to levels below the PCL in the future. A review of the ground water elevation data collected in this area since 2010 shows a northwest to southeast ground water flow direction and the COC concentrations from the upgradient wells MW-95 and MW-131 have been reported as *Not Detected* since 2001. No response actions are proposed in this area pending review of results from the next two routine sampling events.

These results triggered the notification requirements at four residences along Wickford Drive. To date, the appropriate notifications have been made in accordance with TCEQ requirements to property owners who may potentially have affected ground water beneath their property. This process will continue as needed.

#### ***Evaluation of Analytical Results from the First Half 2014***

The ground water analytical results collected during the first half of 2014 were compared with the response action obligations outlined in the RAP and subsequent correspondence. The boundary wells are referred to as "trigger wells" because of their position on the plume boundary and their intended purpose to detect plume movement. Table 1 indicates which trigger wells require a response action and the proposed response action for each. The ground water analytical results for the trigger wells are presented in Table 2, and the analytical results for the non-trigger wells are presented in Table 3.

The reported surface water concentrations, summarized on Table 4, are below both the critical PCLs and 80% of the critical PCLs as established in the *Human Health and Ecological Risk Assessment for Surface Water and Sediment*, dated June 19, 2003.

Concentration versus time graphs for select site COCs for the wells listed in Table 1 are provided in Attachment 2.

The laboratory reports and data usability summaries will be provided in the 2014 Annual Ground Water Monitoring Report and Field Activities Summary.

#### ***Plume Concentration Trends by Area***

In Attachment 2, Figure 1 illustrates the locations of the areas described below and the select monitor wells associated with each area for reference purposes. The following sections of the report present the results of the first half of 2014 monitoring event and the concentration trends observed to date.

#### *Northern (On-Site) Area*

There are currently no ground water wells that are monitored quarterly in the Northern Area (the former facility / on-site area). The southern boundary of the on-site area is being controlled by the ground water recovery and treatment component of the RAP. The COC concentrations remain generally stable to decreasing at levels above the PCLs.

Due to the change in ground water flow direction caused by the dewatering system, the concentrations of site COCs are being monitored along the eastern site border with the AWTY International School (AIS) property. The concentrations of VC reported at MW-65 have fluctuated above and below the PCL since 2012. Down gradient of MW-65, the extent of affected ground water is defined by MW-03(S) where the COCs have been reported below their respective PCLs in each of the last nine sampling events dating back to 2010.

Twelve of the 25 monitor wells sampled in the on-site plume reported the site COCs as *Not Detected* or at levels below the PCLs. Near the ground water recovery wells, seven of the 13 monitor wells reported PCL exceedences along the southern boundary of the on-site area, within the capture zone of the recovery wells.

#### *Eastern (Off-Site) Area*

The Eastern (off-site) Area is bound by the Harris County Flood Control Drainage Ditch (HCFD) to the west, I-10 to the north, Post Oak Lane to the east and Memorial Drive to the south. The ground water flow direction and movement of the plumes in this area is affected by TxDOT's dewatering system. Since 2009, Cameron has worked to manage the impact of approximately 400 feet of eastward plume movement. Seven of the 10 quarterly trigger wells are currently located in the Eastern Area. The concentrations of COCs are generally stable at levels above the PCLs along the eastern edge of the plume and decreasing trends are observed along the western edge of this plume area.

In the First Half 2014 sampling event, both 1,1-DCE and vinyl chloride (VC) were reported at MW-74 above their respective PCLs. Trace amounts of cis-1,2-dichloroethene have been reported over the past three years and, most-recently, trichloroethene was reported above the detection limit. MW-74 is influenced by the dewatering system and will remain on the quarterly sampling schedule.

The concentrations of 1,1-DCE and VC in the area of MW-84 have decreased as a result of the permanganate treatment conducted in March 2012. A review of the most-recent data indicates that the concentration of 1,1-DCE has decreased approximately 97% from the maximum reported concentration of 0.53 mg/L in 2010. VC has been reported as *Not Detected* for the last six sampling events. The concentration of 1,1-DCE remains stable at levels above the PCL and this well will remain on the quarterly sampling schedule.

The reported concentrations of site COCs in MW-134 ground water have been reported as *Not Detected* over the past three sampling events. Cameron proposes to place MW-134 on the semi-annual monitoring schedule.

The concentrations of 1,1-DCE remain above the PCL at MW-174 and trace amounts of the other COCs are also present in the ground water. This area will continue to be monitored for the presence of permanganate and MW-174 will remain on the quarterly sampling schedule.

*Western (Off-Site) Area*

The western area lies south of I-10 and to the west of the HCFCDD and the ground water plume generally remains within its historical footprint. A majority of the ground water sampling results continue to display stable to decreasing trends for the COCs. Six of the seven monitor wells that make up the western edge of the off-site plume (MW-131, MW-95, MW-99, MW-72, MW-85R and MW-86) reported COCs as *Not Detected* or at estimated concentrations below the PCL.

At MW-71, the reported 1,1-DCE concentrations were greater than the PCL during the first half of 2014 – prompting the notification of four residential properties. Confirmation samples were collected on August 21, 2014 to verify reported results at MW-71. MW-71 is scheduled to be sampled again in November 2014 and will be added to the quarterly schedule beginning in 2015.

During November 2013 sampling event, MW-77 reported concentrations of 1,1-DCE and TCE at levels above the PCL (0.026 mg/L and 0.0089 mg/L, respectively). The reported COC concentrations at MW-77 are anomalous –when compared with the results reported at MW-77 since 2001. MW-77 is scheduled to be sampled in November 2014.

The concentrations of COCs were reported as *Not Detected* at MW-16R for the first time since its installation in 2003.

The reported concentrations of TCE at MW-122 remain slightly above the PCL and MW-122 will remain on the quarterly sampling schedule.

*Southern (Off-Site) Area*

The southern area lies to the east of the HCFCDD and south of Memorial Drive and includes the areas near Carnarvon Drive and the Stablewood Subdivision. The affected ground water in this area generally remains consistent with previous extents.

The concentration of PCE in MW-125 decreased to below the PCL for the first time since 2005. The decreasing PCE trend will continue to be monitored and MW-125 will remain on the quarterly sampling schedule.

A review of the capture zone of the Paraffine Partners treatment system suggests that the increasing concentrations of 1,1-DCE at MW-169 are being recovered and treated by the system.

### ***Conclusions***

An evaluation of the data and information collected on the Texas Department of Transportation's (TxDOT) I-610/I-10 Interchange dewatering system continues to confirm that this system is the cause of the on-site and off-site plume movement observed to date. The discussions and information presented in Cameron's April 16, 2013 submittal entitled *Former Cameron Iron Works - TxDOT Dewatering System Evaluation and Response* 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 submitted an addendum to the 2003 RAP on March 12, 2014 to address the plume movement induced by TxDOT's dewatering system. Cameron received comments on the RAP addendum from the TCEQ in their July 22, 2014 letter.

As a result of the induced plume movement caused by the dewatering system, the eastern and southern periphery of the plume continue to report PCL exceedances and these areas remain the focus of most of the investigation and remedial activities.

The dewatering system has affected the ground water flow direction along the eastern boundary of the former facility. As a result of the changed flow direction, the AWTY International School property has transitioned from being cross-gradient from the on-site portion of affected ground water to being potentially downgradient of the on-site affected ground water. This area will continue to be monitored for potential plume expansion during future sampling events.

The next sampling event is scheduled for November 2014.

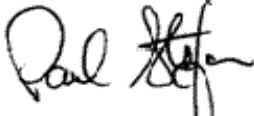
November 10, 2014  
Mr. Rodney Bryant  
Page 6

**Environmental  
Resources  
Management**

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

A handwritten signature in black ink that reads "Paul Stefan". The signature is written in a cursive style with a large initial "P" and a stylized "S".

Paul Stefan, P.C.

PAS/hmh  
Attachments

cc: Jason Ybarra, Texas Commission on Environmental Quality, Region XII  
Ted Fasting, Cameron International Corporation  
Bruce Himmelreich, Cameron International Corporation, (without attachment)

**Tables**  
*Attachment 1*

*November 10, 2014*  
*Project No. 0260324*

**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  
First Half 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area	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
Eastern	MW-74	1,1-dichloroethane		no (a)	no	Quarterly
	MW-74	1,1-dichloroethene	1,1-dichloroethene	no (a)	no	Quarterly
	MW-74	cis-1,2-dichloroethene		no (a)	no	Quarterly
	MW-74	trichloroethene		no (a)	no	Quarterly
	MW-74	vinyl chloride	vinyl chloride	no (a)	no	Quarterly
Eastern	MW-84	1,1-dichloroethane		no (a)	yes (c)	Quarterly
	MW-84	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
Western	MW-122	1,1-dichloroethene		no (a)	no	Quarterly
	MW-122	cis-1,2-dichloroethene		no (a)	no	Quarterly
	MW-122	trichloroethene	trichloroethene	no (a)	no	Quarterly
Western	MW-125	tetrachloroethene		no (a)	yes (c)	Quarterly
Eastern	MW-134			no (a)	no	Quarterly
Eastern	MW-145	1,1-dichloroethane		no (a)	yes (c)	Quarterly
	MW-145	1,1-dichloroethene		no (a)	yes (c)	Quarterly
	MW-145	vinyl chloride		no (a)	yes (c)	Quarterly
Eastern	MW-146	1,1-dichloroethane		no (a)	yes (c)	Quarterly
	MW-146	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
	MW-146	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
	MW-146	vinyl chloride		no (a)	yes (c)	Quarterly
Eastern	MW-147	1,1-dichloroethane		no (a)	yes (c)	Quarterly
	MW-147	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
	MW-147	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
	MW-147	tetrachloroethene		no (a)	yes (c)	Quarterly
	MW-147	trichloroethene		no (a)	yes (c)	Quarterly
Southern	MW-169	1,1-dichloroethane		no (a)	no	Quarterly
	MW-169	1,1-dichloroethene	1,1-dichloroethene	no (a)	no	Quarterly
	MW-169	vinyl chloride		no (a)	no	Quarterly
Eastern	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	1,2-dichloroethane		no (a)	yes (c)	Quarterly
	MW-174	vinyl chloride		no (a)	yes (c)	Quarterly

## NOTES:

COCs = Chemicals of Concern

MQL = Method Quantitation Limit

<sup>(1)</sup> - Quarterly trigger well list as provided in TCEQ letter dated October 14, 2013.

(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 periodically for the presence of permanganate. Additional permanganate will be injected as needed to reduce concentration levels to the PCL.

(d) Properties in the vicinity of the affected ground water have been notified.

(e) MW-169 lies within the capture zone EW-1 of the Stablewood Remediation System.



TABLE 2

Summary of Monitor Well Ground Water Data for Trigger Wells  
First Half 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility  
Houston, Texas

Constituent	SDL	Critical PCLs (a)	Location:	MW-17R	MW-59	MW-71		MW-72	MW-74	MW-77	MW-80	MW-81	MW-84
			Depth: (b)	26.5	27	27	27	29	28	30	32.5	27	33
			Date:	6/20/2014	6/26/2014	6/24/2014	8/21/2014	6/23/2014	6/20/2014	6/17/2014	6/23/2014	6/19/2014	6/20/2014
1,1-Dichloroethane	0.00050	4.9		ND(0.00040)	ND(0.00040)	0.00074 J	0.00067 J	ND(0.00040)	0.079	ND(0.00040)	0.023	ND(0.00040)	0.0048 J
1,1-Dichloroethene	0.00060	0.0070		ND(0.00050)	ND(0.00050)	0.0082	0.0077	ND(0.00050)	0.012	ND(0.00050)	0.062	ND(0.00050)	0.018
1,2-Dichloroethane	0.00050	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.0010	0.070		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.003 J	ND(0.00060)	0.0033 J	ND(0.00060)	ND(0.00060)
Tetrachloroethene	0.0010	0.0050		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0037 J	ND(0.00060)	ND(0.00060)
Trichloroethene	0.0010	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00051 J	ND(0.00050)	0.00068 J	ND(0.00050)	0.0017 J	ND(0.00050)	ND(0.00050)
Vinyl Chloride	0.00050	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0065	ND(0.00040)	0.0048	ND(0.00040)	ND(0.00040)

Constituent	SDL	Critical PCLs (a)	Location:	MW-85R	MW-86	MW-95	MW-97		MW-98	MW-99	MW-117	MW-122	MW-123
			Depth: (b)	30	33.5	25	BAILED	BAILED	BAILED	34	27	29	29
			Date:	6/20/2014	6/23/2014	6/17/2014	6/18/2014	8/21/2014	6/18/2014	6/19/2014	6/23/2014	6/20/2014	6/23/2014
1,1-Dichloroethane	0.00050	4.9		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.00085 J	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)
1,1-Dichloroethene	0.00060	0.0070		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0011 J	0.0012 J	0.00062 J	ND(0.00050)	ND(0.00050)	0.004 J	ND(0.00050)
1,2-Dichloroethane	0.00050	0.0050		ND(0.00050)	0.001 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.0010	0.070		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0011 J	ND(0.00060)
Tetrachloroethene	0.0010	0.0050		ND(0.00060)	ND(0.00060)	ND(0.00060)	0.023	0.019	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)
Trichloroethene	0.0010	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00058 J	0.00051 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0062	ND(0.00050)
Vinyl Chloride	0.00050	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)

Constituent	SDL	Critical PCLs (a)	Location:	MW-125	MW-131	MW-134	MW-139	MW-145	MW-146	MW-147	MW-168	MW-169	MW-174
			Depth: (b)	BAILED	25	27	25	26	29.5	31	35	36	34
			Date:	6/19/2014	6/20/2014	6/20/2014	6/25/2014	6/25/2014	6/25/2014	6/24/2014	6/18/2014	6/18/2014	6/24/2014
1,1-Dichloroethane	0.00050	4.9		ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0017 J	0.0043 J	0.023	0.0033 J	ND(0.00040)	0.016	0.070
1,1-Dichloroethene	0.00060	0.0070		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0034 J	0.0034 J	0.037	0.026	0.00077 J	0.085	0.022
1,2-Dichloroethane	0.00050	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00083 J
cis-1,2-Dichloroethene	0.0010	0.070		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0022 J	0.0007 J	ND(0.00060)	ND(0.00060)	0.0011 J
Tetrachloroethene	0.0010	0.0050		0.0029 J	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0048 J	ND(0.00060)	ND(0.00060)	0.00068 J
Trichloroethene	0.0010	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00086 J	ND(0.00050)	ND(0.00050)	0.0005 J
Vinyl Chloride	0.00050	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0005 J	0.0015 J	ND(0.00040)	ND(0.00040)	0.0013 J	0.00094 J

NOTES:

The reported concentrations are in mg/L.

0.028 = exceedance of TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Groundwater critical PCLs.

NA = Not Analyzed.

NS = Not Sampled.

ND (0.00050) = Not Detected at the Sample Quantitation Limit (SQL) given in parentheses.

(a) TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water PCLs, Table 3, June 2012.

(b) The sample depths are reported in feet below ground surface.

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible and was not sampled.

J = Estimated data, the reported sample concentration is approximated due to exceedance of QC requirements.

TABLE 3

Summary of Monitor Well Ground Water Data  
First Half 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility  
Houston, Texas

Constituent	Critical PCLs (a)	Location:	KMW-01	KMW-07 (d)	MW-01	MW-02(S)	MW-02R	MW-03(S)	MW-07R	MW-15R	MW-16R	MW-35
		Depth: (b)	22.5		25	25	23	24.5	27	33.5	26	
		Date:	6/26/2014		6/26/2014	6/26/2014	6/26/2014	6/26/2014	6/26/2014	6/19/2014	6/20/2014	6/26/2014
1,1-Dichloroethane	4.9		NA	NS	NA	ND(0.00040)		0.0042 J		0.0076	ND(0.00040)	NA
1,1-Dichloroethene	0.0070		0.0067	NS	0.0075	ND(0.00050)	0.00091 J	0.00057 J	ND(0.00050)	0.036	ND(0.00050)	0.007
1,2-Dichloroethane	0.0050		NA	NS	NA	ND(0.00050)		ND(0.00050)		0.00074 J	ND(0.00050)	NA
cis-1,2-Dichloroethene	0.070		ND(0.00060)	NS	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.00064 J
Tetrachloroethene	0.0050		ND(0.00060)	NS	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0039 J	ND(0.00060)	ND(0.00060)
Trichloroethene	0.0050		ND(0.00050)	NS	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0011 J	ND(0.00050)	ND(0.00050)
Vinyl Chloride	0.0020		ND(0.00040)	NS	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0039

Constituent	Critical PCLs (a)	Location:	MW-43R	MW-50R	MW-52	MW-60	MW-61	MW-64	MW-65	MW-66	MW-67	
		Depth: (b)	24	23	25	34	23	25	25	27	28	Resample
		Date:	6/25/2014	6/26/2014	6/26/2014	6/26/2014	6/26/2014	6/25/2014	6/25/2014	6/25/2014	6/26/2014	8/21/2014
1,1-Dichloroethane	4.9					ND(0.00040)	ND(0.00040)					
1,1-Dichloroethene	0.0070		0.018	0.19	0.039	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0029 J	0.08	ND(0.00050)	ND(0.00050)
1,2-Dichloroethane	0.0050					ND(0.00050)	ND(0.00050)					
cis-1,2-Dichloroethene	0.070		ND(0.00060)	0.036	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.004 J	0.070	0.0045 J	ND(0.00060)
Tetrachloroethene	0.0050		ND(0.00060)	0.011	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.034	0.02	0.0029 J
Trichloroethene	0.0050		ND(0.00050)	0.046	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0048 J	0.003 J	ND(0.00050)
Vinyl Chloride	0.0020		0.001 J	0.12	0.00054 J	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0021	0.044	0.0015 J	ND(0.00040)

Constituent	Critical PCLs (a)	Location:	MW-70	MW-73	MW-75R	MW-76	MW-78	MW-79	MW-82	MW-83	MW-87	MW-88
		Depth: (b)	27	27	34.5	31	27.5	33	31	31.5	33	BAILED
		Date:	6/17/2014	6/20/2014	6/19/2014	6/19/2014	6/25/2014	6/23/2014	6/19/2014	6/23/2014	6/20/2014	6/19/2014
1,1-Dichloroethane	4.9		0.081	0.015	0.0029 J	0.0045 J	0.00053 J	0.038	0.021	0.015	0.0047 J	0.0036 J
1,1-Dichloroethene	0.0070		0.15	0.096	0.0059	0.01	0.00057 J	0.096	0.062	0.06	0.094	0.021
1,2-Dichloroethane	0.0050		0.0027 J	0.00066 J	0.00058 J	ND(0.00050)	ND(0.00050)	0.0013 J	ND(0.00050)	0.0021 J	0.00079 J	0.0011 J
cis-1,2-Dichloroethene	0.070		0.026	0.0031 J	0.0025 J	ND(0.00060)	ND(0.00060)	0.2	0.0071	0.052	ND(0.00060)	0.016
Tetrachloroethene	0.0050		0.032	0.0057	0.0029 J	ND(0.00060)	ND(0.00060)	0.47	0.076	0.21	ND(0.00060)	0.25
Trichloroethene	0.0050		0.024	0.0028 J	0.0027 J	ND(0.00050)	ND(0.00050)	0.14	0.011	0.043	0.00058 J	0.033
Vinyl Chloride	0.0020		0.0039	ND(0.00040)	0.00053 J	ND(0.00040)	0.00044 J	0.031	0.0015 J	0.0099	ND(0.00040)	0.0018 J

## NOTES:

The reported concentrations are in mg/L.

0.028 = exceedance of TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Groundwater critical PCLs.

NA = Not Analyzed.

NS = Not Sampled.

ND (0.00050) = Not Detected at the Sample Quantitation Limit (SQL) given in parentheses.

(a) TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water PCLs, Table 3, June 2012.

(b) The sample depths are reported in feet below ground surface.

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible and was not sampled.

J = Estimated data, the reported sample concentration is approximated due to exceedance of QC requirements.

L = Biased Low.

U = Not detected, the SQL is estimated

TABLE 3 (Cont'd)

Summary of Monitor Well Ground Water Data  
First Half 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility  
Houston, Texas

Constituent	Critical PCLs (a)	Location:	MW-89	MW-90	MW-91	MW-92	MW-93	MW-94	MW-96R	MW-99	MW-100	MW-101
		Depth: (b)	BAILED	BAILED	BAILED	BAILED	BAILED	25	35	34	32.5	33
		Date:	6/20/2014	6/19/2014	6/19/2014	6/17/2014	6/17/2014	6/26/2014	6/18/2014	6/19/2014	6/17/2014	6/19/2014
1,1-Dichloroethane	4.9		0.0071	0.022	0.029	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0035 J	ND(0.000500)	0.0017 J	0.0036 J
1,1-Dichloroethene	0.0070		0.036	0.09	0.13	0.0029 J	0.0035 J	ND(0.00050)	0.0084	ND(0.00060)	0.0038 J	0.0087
1,2-Dichloroethane	0.0050		0.0008 J	0.00089 J	0.00097 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.000500)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.070		0.00099 J	0.0051	0.012	0.0013 J	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00100)	0.0039 J	0.00075 J
Tetrachloroethene	0.0050		ND(0.00060)	0.07	0.11	0.2	0.015	ND(0.00060)	ND(0.00060)	ND(0.00100)	0.00062 J	0.016
Trichloroethene	0.0050		0.0057	0.017	0.032	0.01	0.0033 J	ND(0.00050)	ND(0.00050)	ND(0.00100)	0.0018 J	0.0024 J
Vinyl Chloride	0.0020		ND(0.00040)	0.0011 J	0.0019 J	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.000500)	0.00043 J	ND(0.00040)

Constituent	Critical PCLs (a)	Location:	MW-102	MW-106	MW-107	MW-108	MW-109	MW-110	MW-111	MW-112	MW-113	MW-114
		Depth: (b)	BAILED	BAILED	BAILED	27	26	27	26	26	27	34
		Date:	6/17/2014	6/19/2014	6/19/2014	6/25/2014	6/25/2014	6/25/2014	6/26/2014	6/25/2014	6/25/2014	6/17/2014
1,1-Dichloroethane	4.9		ND(0.00040)	ND(0.00040)	0.013							0.031
1,1-Dichloroethene	0.0070		0.00088 J	0.0023 J	0.087	0.23	0.026	0.0065	0.0089	0.087	0.0013 J	0.11
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	0.00072 J							0.001 J
cis-1,2-Dichloroethene	0.070		0.00066 J	0.13	0.0013 J	0.011	0.061	0.026	ND(0.00060)	0.045	ND(0.00060)	0.035
Tetrachloroethene	0.0050		0.18	0.0033 J	0.072	0.0011 J	0.013	0.0013 J	0.0071	0.00064 J	ND(0.00060)	0.067
Trichloroethene	0.0050		0.0033 J	0.028	0.006	0.04	0.0067	0.0073	0.00091 J	0.002 J	ND(0.00050)	0.051
Vinyl Chloride	0.0020		ND(0.00040)	ND(0.00040)	0.00056 J	0.0031	0.013	0.0044	0.00072 J	ND(0.00040)	ND(0.00040)	0.0057

Constituent	Critical PCLs (a)	Location:	MW-115	MW-116	MW-118	MW-119	MW-120	MW-121	MW-124	MW-126	MW-127 (d)	MW-128
		Depth: (b)	35	27	29	29	25	28	29	26		
		Date:	6/17/2014	6/17/2014	6/23/2014	6/23/2014	6/19/2014	6/20/2014	6/23/2014	6/19/2014		
1,1-Dichloroethane	4.9		ND(0.00040)	0.0043 J	0.0050	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.024	ND(0.00040)	NS	0.0029 J
1,1-Dichloroethene	0.0070		0.075	0.018	0.031	ND(0.00050)	ND(0.00050)	0.015	0.08	ND(0.00050)	NS	0.022
1,2-Dichloroethane	0.0050		0.0029 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0028 J	ND(0.00050)	NS	ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.00060)	0.0017 J	0.0013 J	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.023	ND(0.00060)	NS	0.0049 J
Tetrachloroethene	0.0050		ND(0.00060)	0.0015 J	0.0038 J	ND(0.00060)	0.0011 J	ND(0.00060)	0.05	ND(0.00060)	NS	0.00076 J
Trichloroethene	0.0050		0.0025 J	0.0028 J	0.0015 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.016	ND(0.00050)	NS	0.028
Vinyl Chloride	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.0024	ND(0.00040)	NS	ND(0.00040)

NOTES:

The reported concentrations are in mg/L.

0.028 = exceedance of TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Groundwater critical PCLs.

NA = Not Analyzed.

NS = Not Sampled.

ND (0.00050) = Not Detected at the Sample Quantitation Limit (SQL) given in parentheses.

(a) TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water PCLs, Table 3, June 2012.

(b) The sample depths are reported in feet below ground surface.

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible and was not sampled.

J = Estimated data, the reported sample concentration is approximated due to exceedance of QC requirements.

L = Biased Low.

U = Not detected, the SQL is estimated

TABLE 3 (Cont'd)

Summary of Monitor Well Ground Water Data  
First Half 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility  
Houston, Texas

Constituent	Critical PCLs (a)	Location:	MW-129	MW-130	MW-132	MW-133	MW-135	MW-140	MW-141	MW-142	MW-143	MW-144
		Depth: (b)	BAILED	27	27.5	27.5	27.5	26	30	33.5	26	
		Date:	6/19/2014	6/26/2014	6/20/2014	6/20/2014	6/25/2014	6/24/2014	6/25/2014	6/24/2014	6/23/2014	6/23/2014
1,1-Dichloroethane	4.9		0.025		0.00093 J	0.00086 J	ND(0.00040)	0.011	0.030	0.0080	0.00069 J	0.038
1,1-Dichloroethene	0.0070		0.017	ND(0.00050)	ND(0.00050)	0.0045 J	ND(0.00050)	0.013	0.071	0.013	0.0012 J	0.049
1,2-Dichloroethane	0.0050		ND(0.00050)		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00084 J	0.0021 J	ND(0.00050)	ND(0.00050)	0.00068 J
cis-1,2-Dichloroethene	0.070		ND(0.00060)	ND(0.00060)	0.00075 J	ND(0.00060)	ND(0.00060)	0.029	0.11	0.015	ND(0.00060)	0.022
Tetrachloroethene	0.0050		0.0013 J	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.021	0.22	0.071	0.0022 J	0.12
Trichloroethene	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0046 J	0.053	0.017	0.00053 J	0.029
Vinyl Chloride	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.007	0.019	0.0031	ND(0.00040)	0.0042

Constituent	Critical PCLs (a)	Location:	MW-149	MW-160	MW-161	MW-162	MW-163	MW-166	MW-167	MW-170	MW-171	MW-172
		Depth: (b)	27.5	29	30	33.5	28	BAILED	BAILED	25	24	25
		Date:	6/26/2014	6/26/2014	6/26/2014	6/24/2014	6/23/2014	6/18/2014	6/18/2014	6/17/2014	6/19/2014	6/19/2014
1,1-Dichloroethane	4.9		ND(0.00040)	0.00087 J	0.0007 J	ND(0.00040)	ND(0.00040)	0.00056 J	0.099	0.025	0.00088 J	ND(0.00040)
1,1-Dichloroethene	0.0070		ND(0.00050)	ND(0.00050)	0.0022 J	ND(0.00050)	ND(0.00050)	0.0022 J	0.31	0.096	ND(0.00050)	ND(0.00050)
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0017 J	0.0009 J	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0029 J	0.010	ND(0.00060)	ND(0.00060)
Tetrachloroethene	0.0050		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0073	0.0011 J	0.0083	ND(0.00060)	ND(0.00060)
Trichloroethene	0.0050		ND(0.00050)	ND(0.00050)	0.0013 J	ND(0.00050)	ND(0.00050)	0.0018 J	0.0016 J	0.015	ND(0.00050)	ND(0.00050)
Vinyl Chloride	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	0.00051 J	0.0066	0.001 J	ND(0.00040)	ND(0.00040)

Constituent	Critical PCLs (a)	Location:	MW-173	MW-175	MW-176	MW-177
		Depth: (b)	BAILED	BAILED	BAILED	BAILED
		Date:	6/18/2014	6/18/2014	6/18/2014	6/18/2014
1,1-Dichloroethane	4.9		ND(0.00040)	0.0013 J	ND(0.00040)	ND(0.00040)
1,1-Dichloroethene	0.0070		ND(0.00050)	0.0055 J	0.0021 J	0.0047 J
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.00060)	0.0013 J	0.00092 J	ND(0.00060)
Tetrachloroethene	0.0050		ND(0.00060)	0.094	0.035	ND(0.00060)
Trichloroethene	0.0050		ND(0.00050)	0.0044 J	0.0034 J	ND(0.00050)
Vinyl Chloride	0.0020		ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)

NOTES:

The reported concentrations are in mg/L.

0.028 = exceedance of TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Groundwater critical PCLs.

NA = Not Analyzed.

NS = Not Sampled.

ND (0.00050) = Not Detected at the Sample Quantitation Limit (SQL) given in parentheses.

(a) TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water PCLs, Table 3, June 2012.

(b) The sample depths are reported in feet below ground surface.

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible and was not sampled.

J = Estimated data, the reported sample concentration is approximated due to exceedance of QC requirements.

L = Biased Low.

U = Not detected, the SQL is estimated

TABLE 4

Summary of Surface Water Data  
First Half 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility  
Houston, Texas

Constituent	Critical PCLs (a)	80% Critical PCL (a)	Location:	SWD-12	SWD-14	SWD-15
			Date:	7/1/2014	7/1/2014	7/1/2014
1,1-Dichloroethane	5.13	4.10		ND(0.00040)	ND(0.00040)	0.00074 J
1,1-Dichloroethene	0.06	0.05		ND(0.00050)	0.003 J	0.016
1,2-Dichloroethane	0.554	0.443		ND(0.00050)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	9.36	7.49		ND(0.00060)	0.001 J	ND(0.00060)
Tetrachloroethene	0.790	0.632		ND(0.00060)	ND(0.00060)	ND(0.00060)
Trichloroethene	1.110	0.888		0.00098 J	0.0031 J	0.0017 J
Vinyl Chloride	0.0336	0.0269		ND(0.00040)	ND(0.00040)	0.0005 J

Constituent	Critical PCLs (a)	80% Critical PCL (a)	Location:	SWD-17	SWD-18	SWD-20
			Date:	7/1/2014	7/1/2014	7/1/2014
1,1-Dichloroethane	5.13	4.10		ND(0.00040)	ND(0.00040)	ND(0.00040)
1,1-Dichloroethene	0.06	0.05		0.011	0.0035 J	ND(0.00050)
1,2-Dichloroethane	0.554	0.443		ND(0.00050)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	9.36	7.49		ND(0.00060)	ND(0.00060)	ND(0.00060)
Tetrachloroethene	0.790	0.632		ND(0.00060)	0.0082	ND(0.00060)
Trichloroethene	1.110	0.888		0.00058 J	ND(0.00050)	ND(0.00050)
Vinyl Chloride	0.0336	0.0269		0.00045 J	ND(0.00040)	ND(0.00040)

## NOTES:

The reported concentrations are in mg/L.

ND (0.00050) = Not Detected at the Reporting Limit given in parentheses.

J = Estimated data, the reported sample concentration is approximated due to exceedance of QC requirements.

U = Not detected, the SQL is estimated

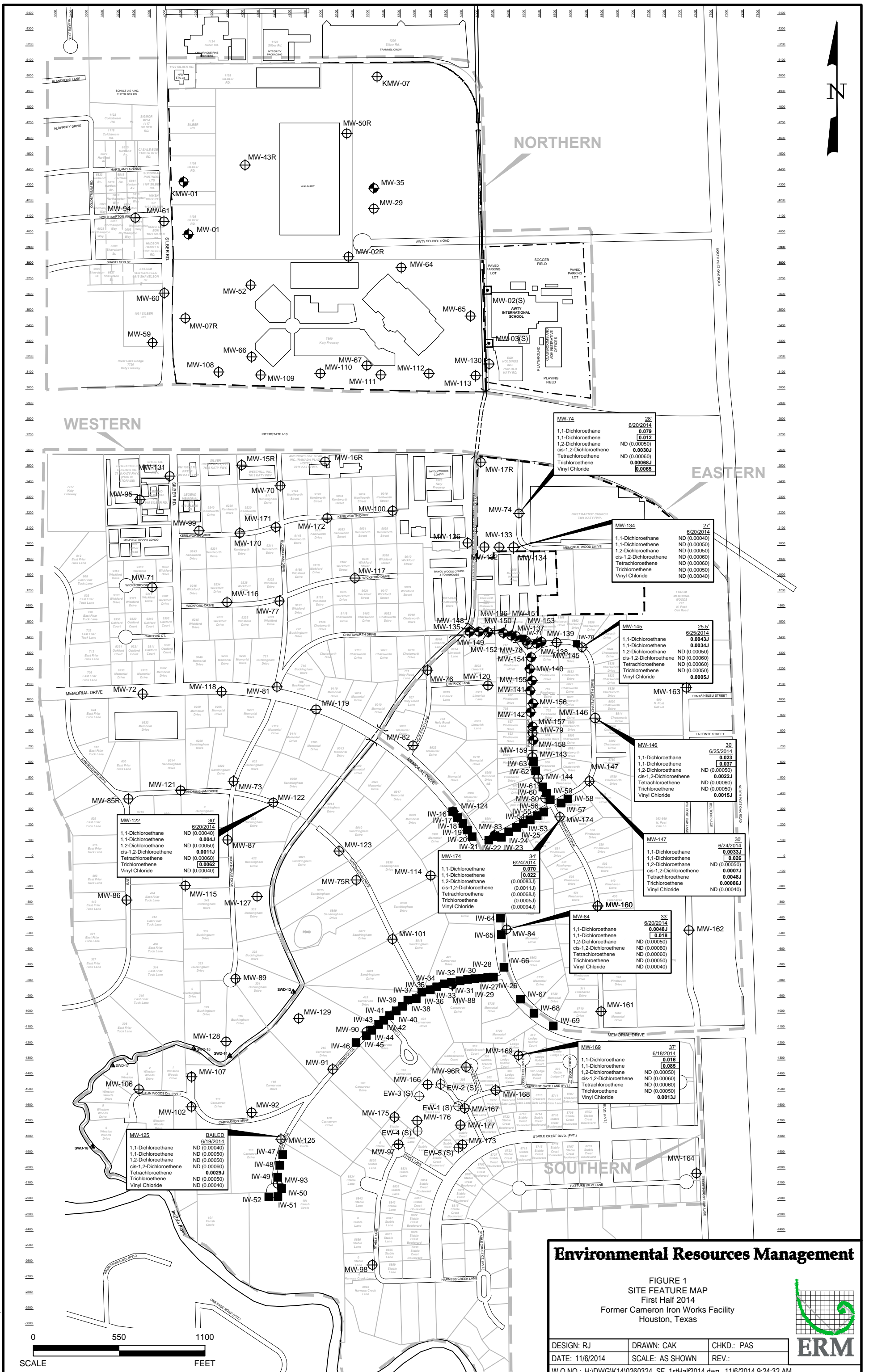
(a) Taken from the critical PCLs calculated in the *Human Health Ecological Risk Assessment for Surface Water and Sediment*, dated June 2003.

SWD = Surface Water Harris County Flood Control Ditch.

**Figures and Graphs**  
*Attachment 2*

*November 10, 2014*  
*Project No. 0260324*

**Environmental Resources Management**  
CityCentre Four  
840 West Sam Houston Parkway North, Suite 600  
Houston, Texas 77024-3920  
(281) 600-1000



WESTERN

NORTHERN

EASTERN

MW-74  
28'  
6/20/2014  
1,1-Dichloroethane 0.039  
1,1-Dichloroethane 0.012  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane 0.0030J  
Tetrachloroethane ND (0.00060)  
Trichloroethane 0.00068J  
Vinyl Chloride 0.0065

MW-134  
27'  
6/20/2014  
1,1-Dichloroethane ND (0.00040)  
1,1-Dichloroethane ND (0.00050)  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane ND (0.00060)  
Tetrachloroethane ND (0.00060)  
Trichloroethane ND (0.00050)  
Vinyl Chloride ND (0.00040)

MW-145  
25.5'  
6/25/2014  
1,1-Dichloroethane 0.0043J  
1,1-Dichloroethane 0.0034J  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane ND (0.00060)  
Tetrachloroethane ND (0.00060)  
Trichloroethane ND (0.00050)  
Vinyl Chloride 0.0005J

MW-146  
30'  
6/25/2014  
1,1-Dichloroethane 0.023  
1,1-Dichloroethane 0.037  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane 0.0022J  
Tetrachloroethane ND (0.00060)  
Trichloroethane ND (0.00050)  
Vinyl Chloride 0.0015J

MW-122  
30'  
6/20/2014  
1,1-Dichloroethane ND (0.00040)  
1,1-Dichloroethane 0.004J  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane 0.0011J  
Tetrachloroethane ND (0.00060)  
Trichloroethane 0.0062  
Vinyl Chloride ND (0.00040)

MW-174  
34'  
6/24/2014  
1,1-Dichloroethane 0.070  
1,1-Dichloroethane 0.022  
1,2-Dichloroethane (0.0003J)  
cis-1,2-Dichloroethane (0.0011J)  
Tetrachloroethane (0.00068J)  
Trichloroethane (0.0005J)  
Vinyl Chloride (0.00094J)

MW-84  
33'  
6/20/2014  
1,1-Dichloroethane 0.0048J  
1,1-Dichloroethane 0.018  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane ND (0.00060)  
Tetrachloroethane ND (0.00060)  
Trichloroethane ND (0.00050)  
Vinyl Chloride ND (0.00040)

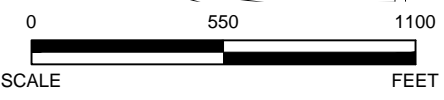
MW-169  
37'  
6/18/2014  
1,1-Dichloroethane 0.016  
1,1-Dichloroethane 0.085  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane ND (0.00060)  
Tetrachloroethane ND (0.00060)  
Trichloroethane ND (0.00050)  
Vinyl Chloride 0.0013J

MW-125  
BAILED  
6/19/2014  
1,1-Dichloroethane ND (0.00040)  
1,1-Dichloroethane ND (0.00050)  
1,2-Dichloroethane ND (0.00050)  
cis-1,2-Dichloroethane ND (0.00060)  
Tetrachloroethane 0.0029J  
Trichloroethane ND (0.00050)  
Vinyl Chloride ND (0.00040)

**Environmental Resources Management**

FIGURE 1  
SITE FEATURE MAP  
First Half 2014  
Former Cameron Iron Works Facility  
Houston, Texas

DESIGN: RJ	DRAWN: CAK	CHKD.: PAS
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W.O.NO.: H:\DWGK1410260324_SF_1stHalf2014.dwg, 11/6/2014 9:24:32 AM		

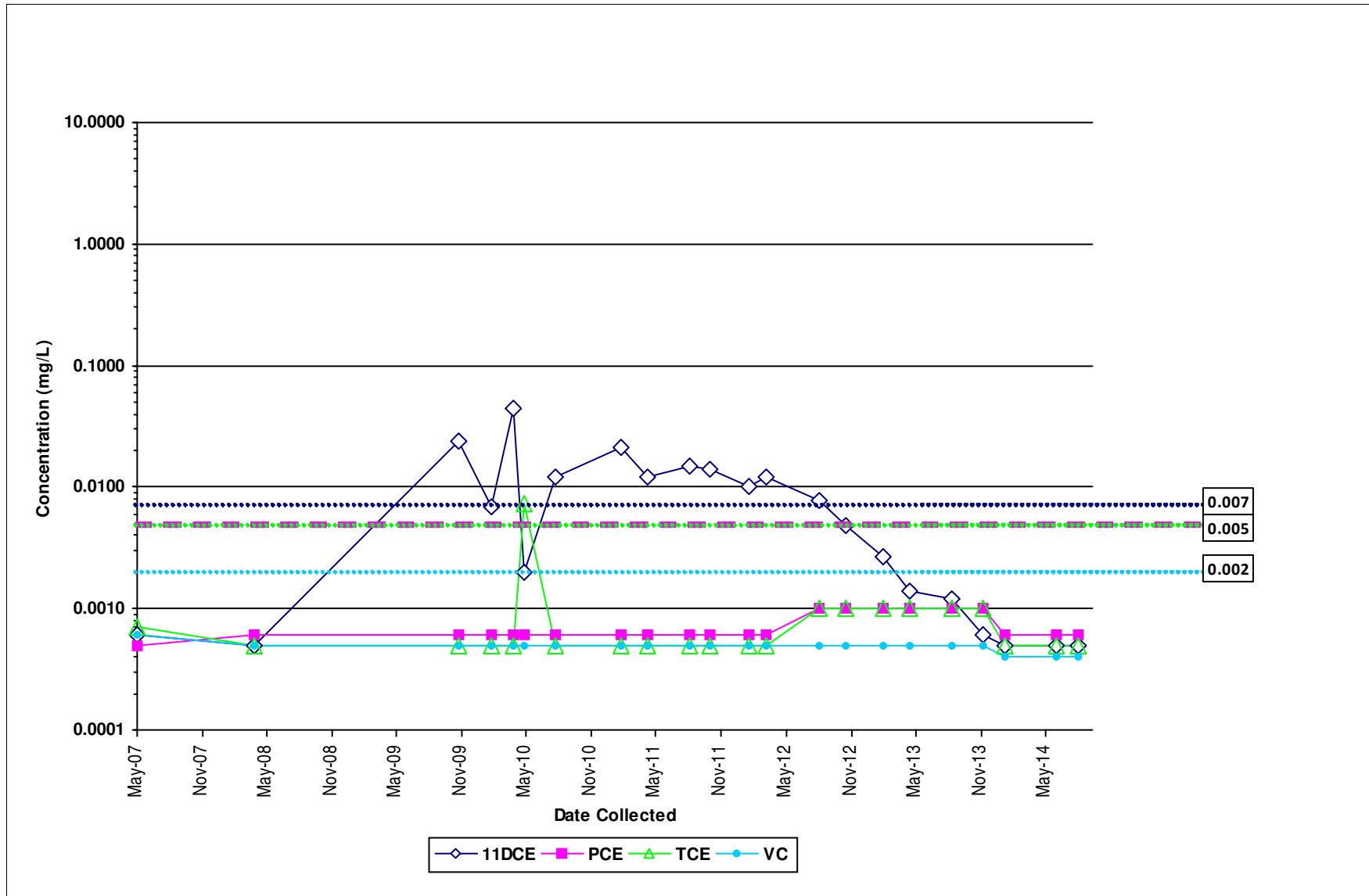


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-134



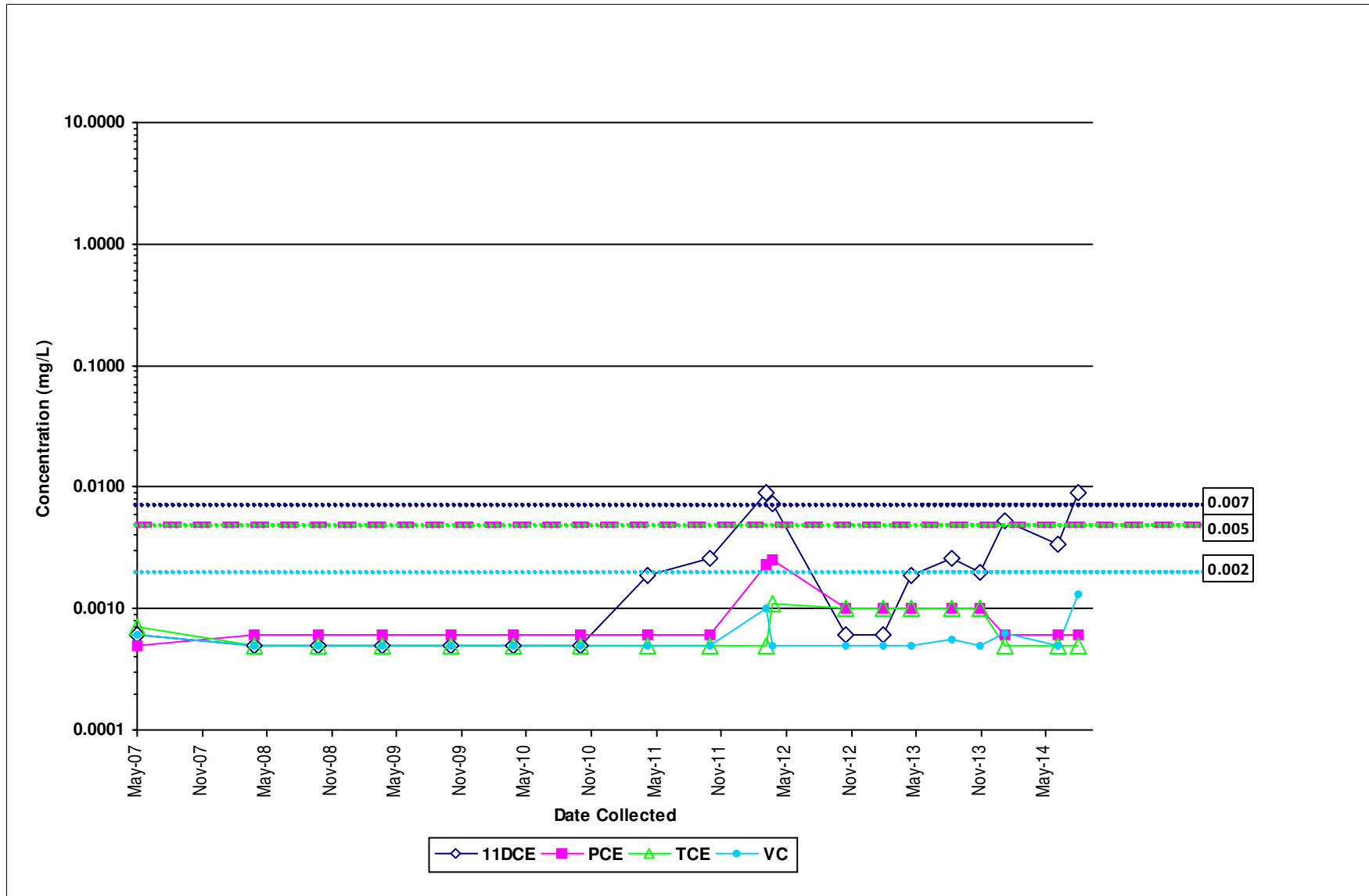


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-145

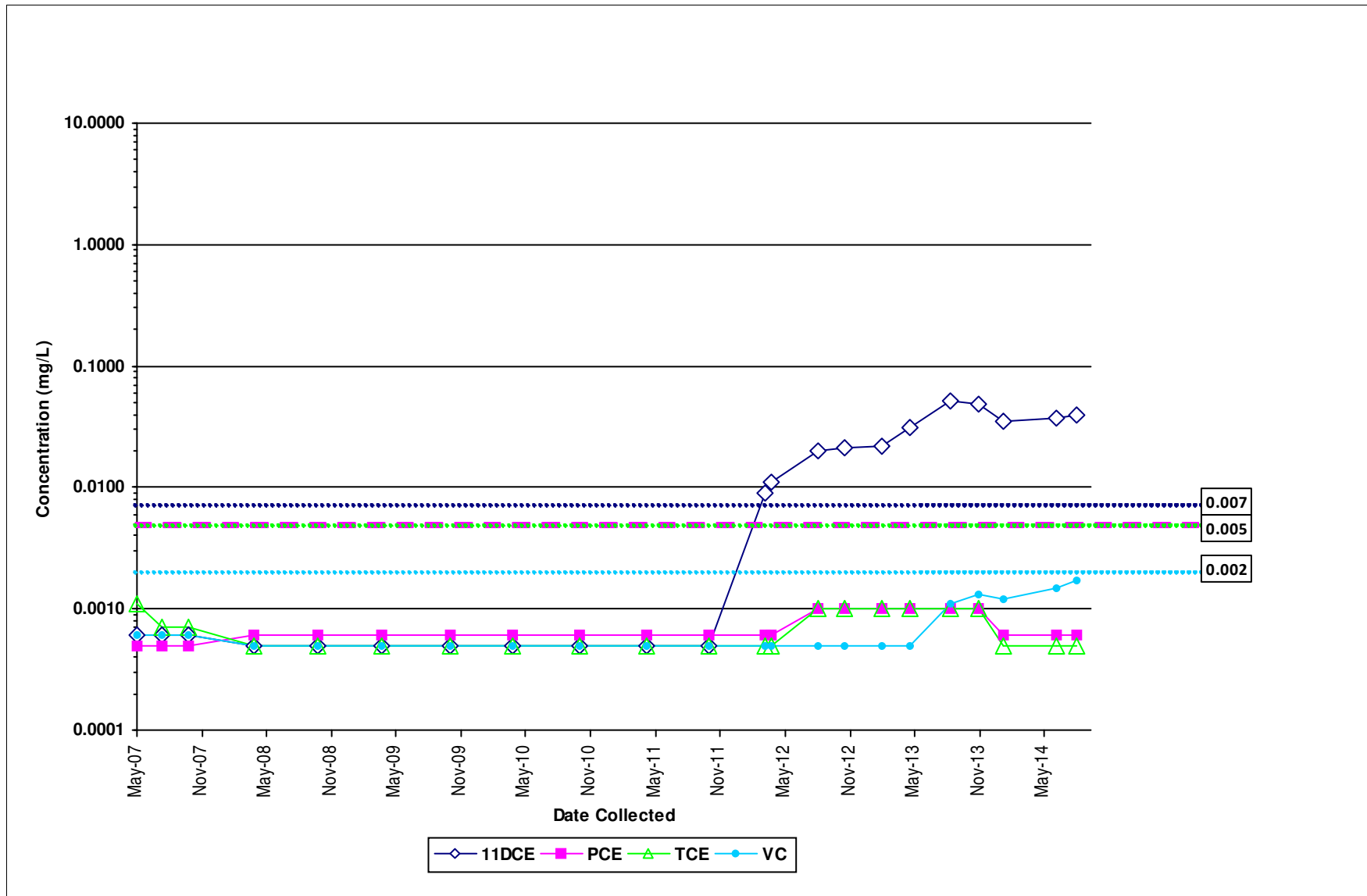


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-146

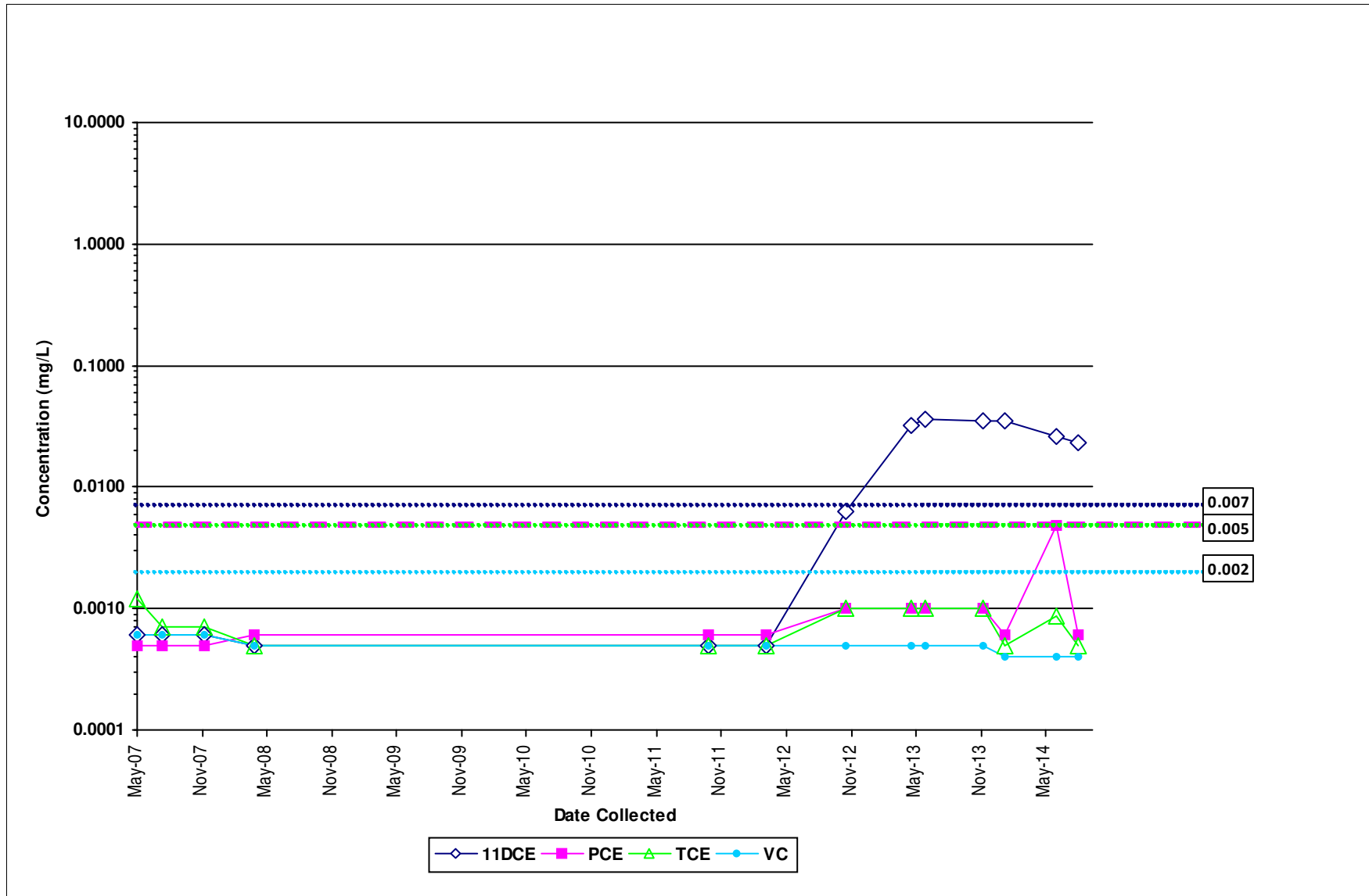


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-147

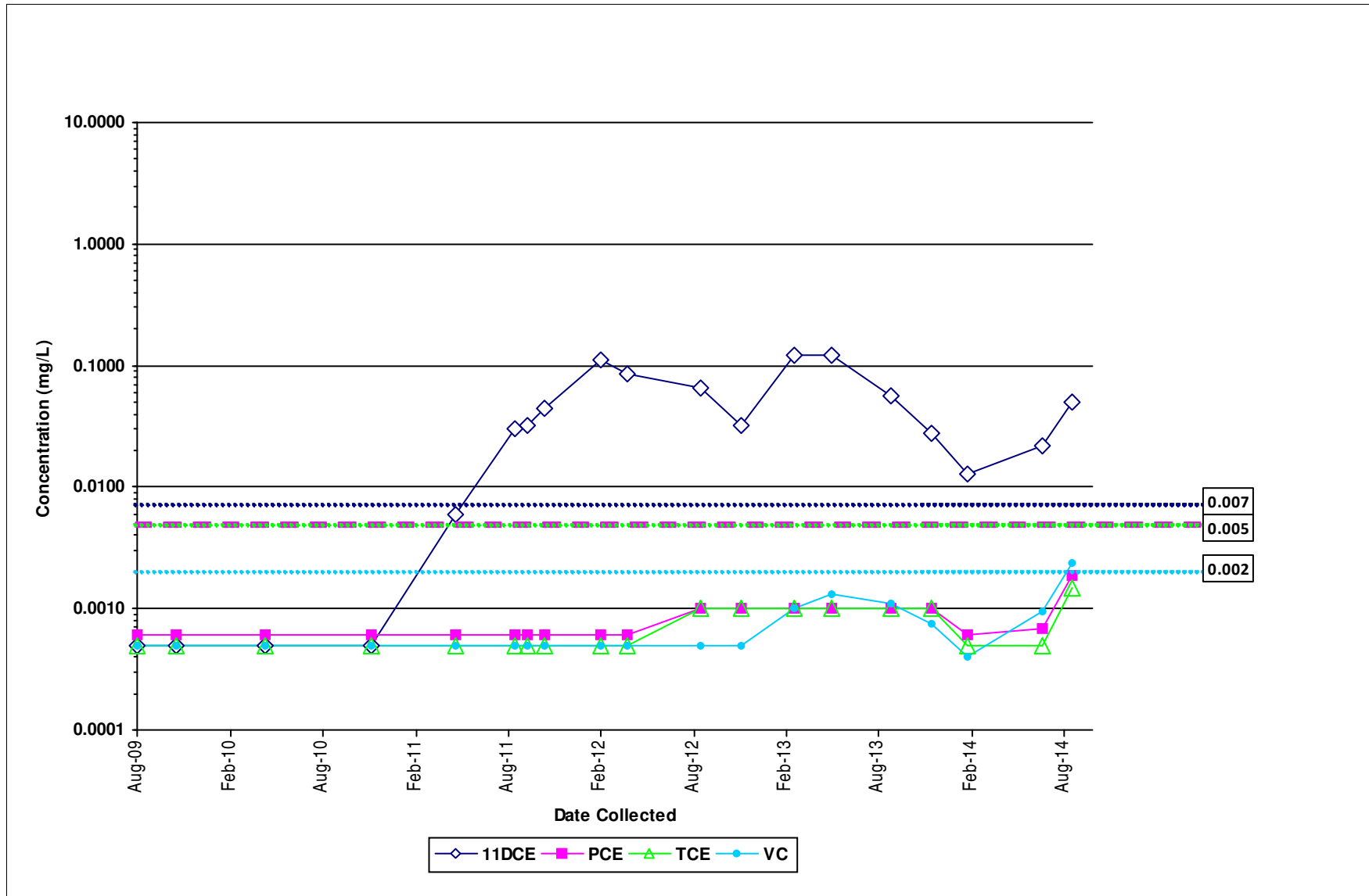


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-174

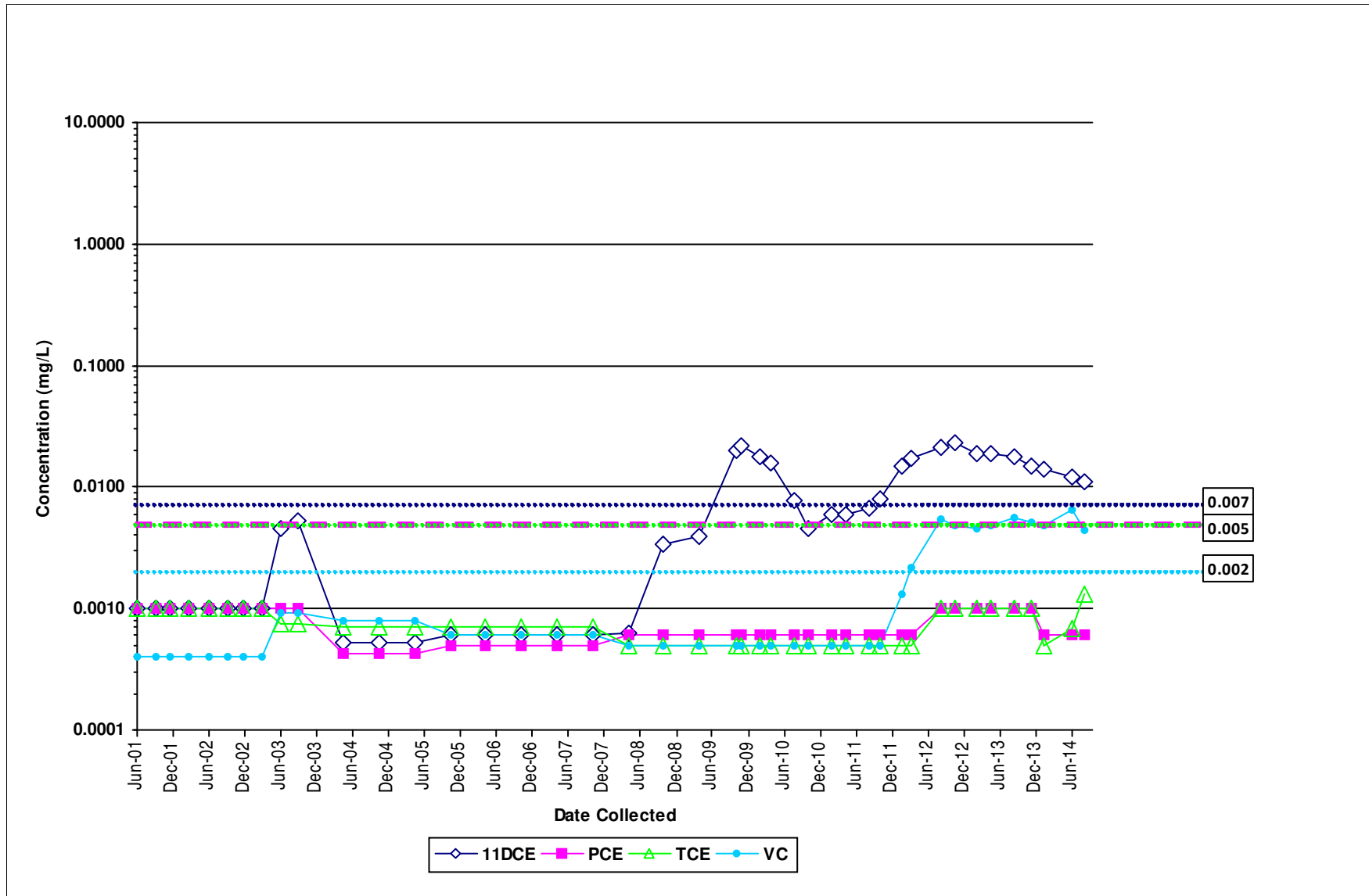


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-74

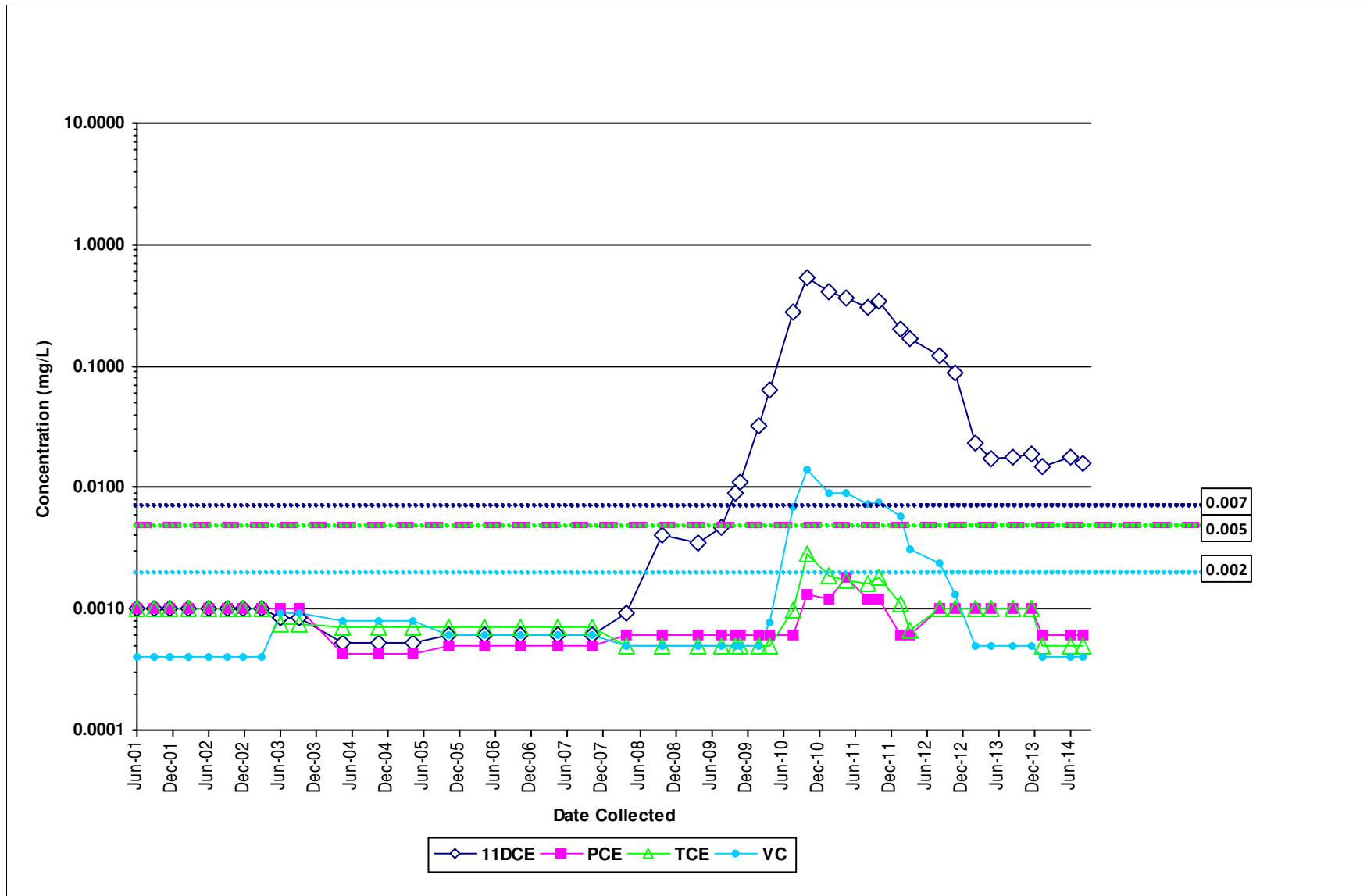


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-84

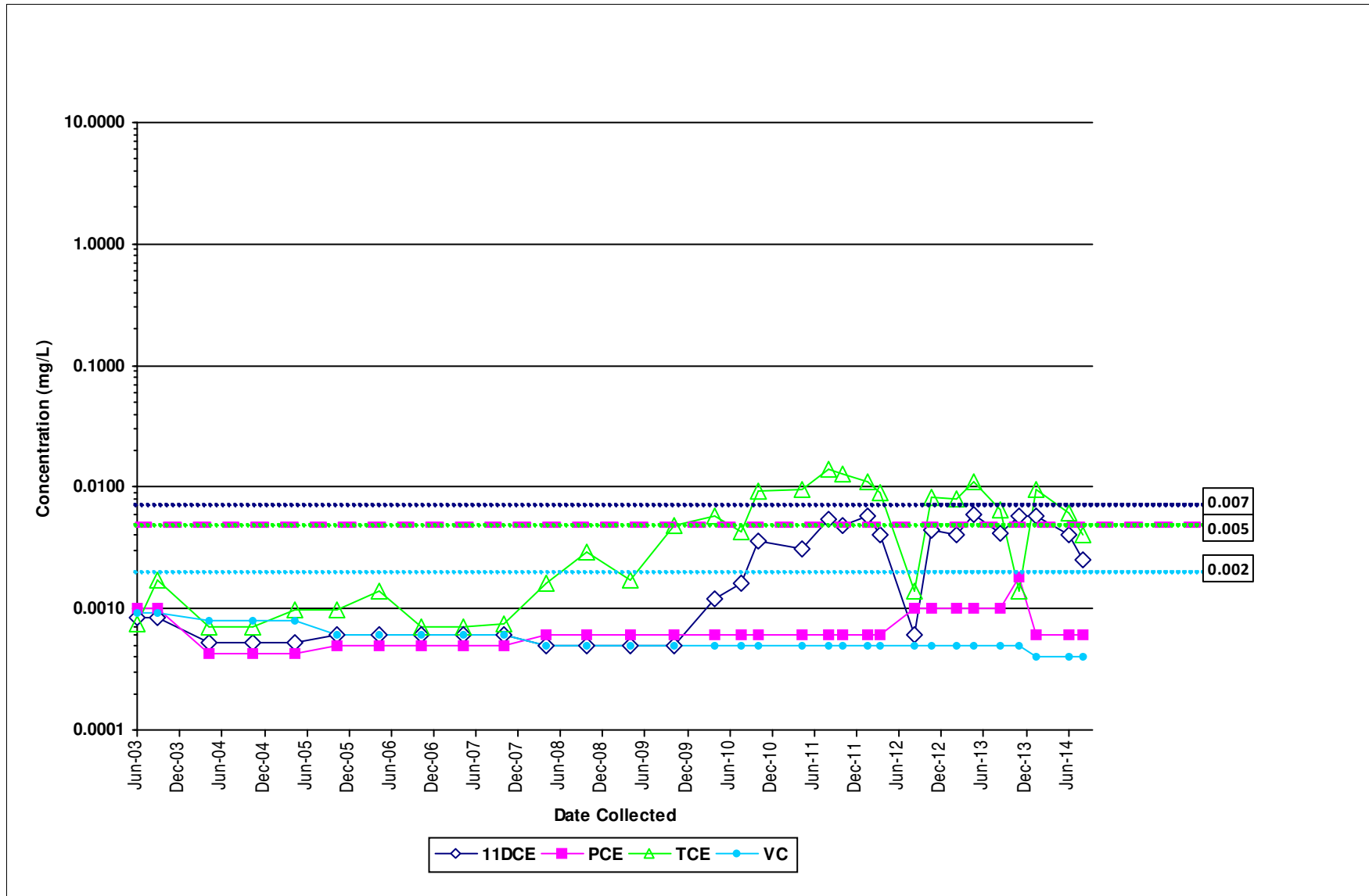


# Ground Water Progress Graph

Former Cameron Iron Works Facility  
Houston, Texas

Plume Area: WESTERN

Client Sample ID: MW-122

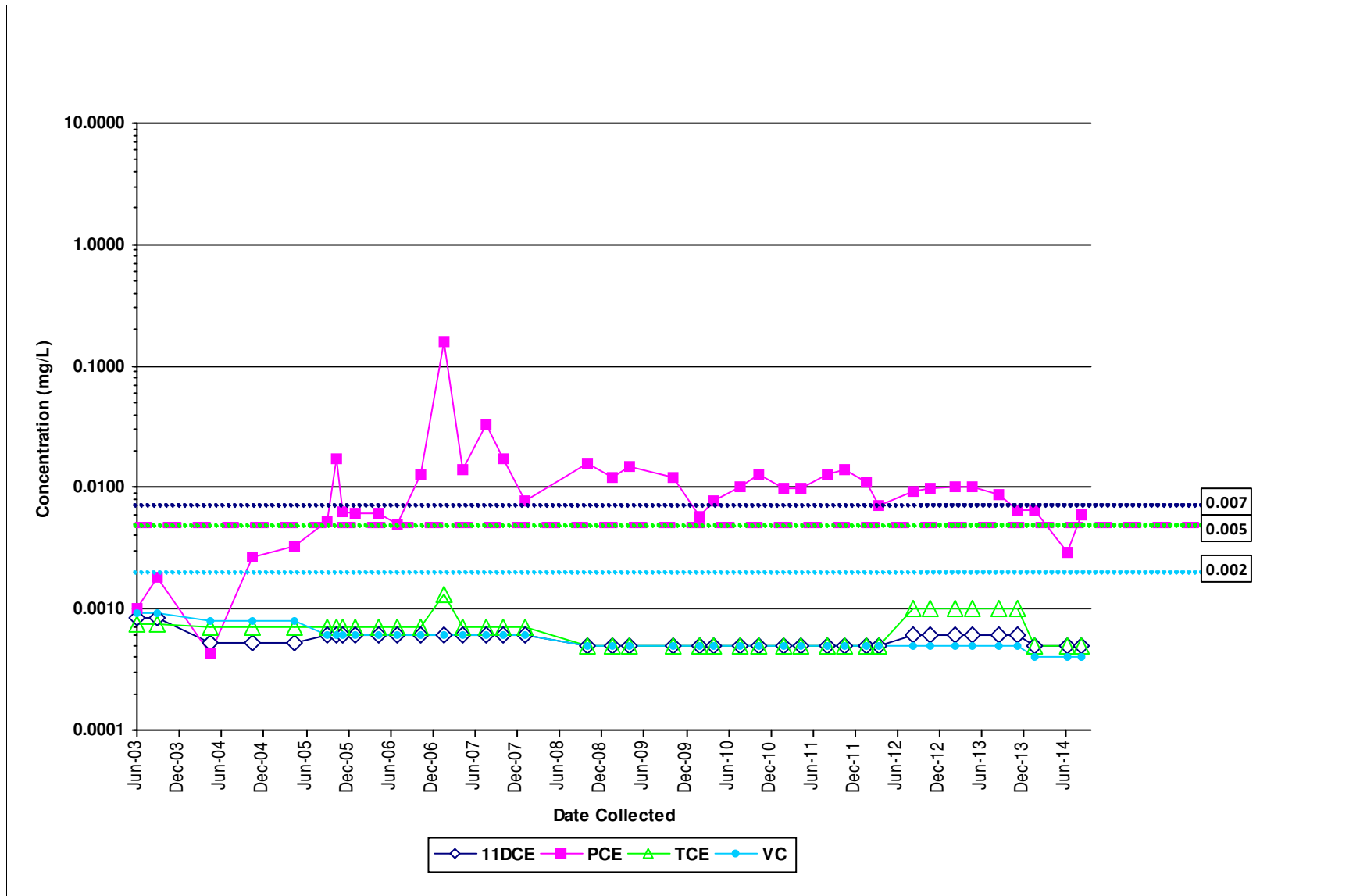


# Ground Water Progress Graph

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: SOUTHERN

Client Sample ID: MW-169

