Environmental Resources Management

CityCentre Four
840 West Sam Houston Parkway North, Suite 600
Houston, Texas 77024-3920
(281) 600-1000
(281) 520-4625 (fax)

November 21, 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: Third Quarter 2014 Monitoring Data Transmittal
Former Cameron Iron Works Facility, Houston, Texas
VCP No. 221; RN101474880; CN600374821

Dear Mr. Bryant:

On behalf of Cameron International Corporation (Cameron), Environmental Resources Management (ERM) is providing the Third Quarter 2014 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 on August 21, 2014 in accordance with the Texas Commission on Environmental Quality's (TCEQ) letter dated October 14, 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 which 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 2014 Annual Ground Water Monitoring Report and Field Activities Summary.

Evaluation of Plume Movement

The Texas Department of Transportation's (TxDOT) I-610/I-10 Interchange dewatering system continues to induce easterly plume movement to both on-site and off-site plumes. Based on the ground water monitoring data collected since the installation of the dewatering system, Cameron proposes to monitor the Protective Concentration Level (PCL) exceedence zones.

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. The comments will be addressed in the next RAP addendum.

The following discussion provides details on the recent ground water monitoring results and the remedy component/components addressing the ground water in the vicinity.

Concentration Trends and Response Action Plan Activities

Ground water samples from the 10 trigger wells listed in the TCEQ's October 14, 2013 letter were collected on August 21, 2014. The results of the Third Quarter 2014 sampling event have been grouped into one of three categories:

- Monitor wells in which the concentrations of COCs are reported as *Not Detected* or below PCLs;
- Monitor wells in which the concentrations of COCs are decreasing or stable but above PCLs; and
- Monitor wells in which the concentrations of COCs are exhibiting increasing concentration trends above their PCLs.

Concentrations of COCs reported as Not Detected or below PCLs

Two of the 10 trigger wells sampled during the August 2014 sampling event contained COC concentrations reported as *Not Detected* or below the PCLs. These wells represent off-site areas where the attenuation of COCs is occurring due to natural processes as described in the RAP. The trigger wells are listed below:

- MW-134 - The concentrations of COCs in ground water at MW-134 have remained at levels below the PCLs since November 2012 and have been reported as *Not Detected* since November 2013. MW-134 is influenced by the TxDOT dewatering system and Cameron proposes to move MW-134 to the semi-annual sampling schedule.
- MW-122 - The concentration of trichloroethene (TCE) has fluctuated above and below the PCL since 2011 and was below the PCL in August 2014. Concentrations of 1,1-dichloroethene (1,1-DCE) and cis-1,2-dichloroethene (cis-1,2-DCE) were reported below the PCL.

Concentrations of COCs decreasing or stable but above PCLs

The seven remaining trigger wells sampled during the August 2014 event were decreasing or stable at concentrations above the PCLs. The group represents areas in which the implementation of the response actions continue to address or monitor affected ground water as listed in Table 1.

- MW-74, MW-146 and MW-147 - The concentrations of 1,1-DCE and vinyl chloride (VC) are generally stable and have remained above the PCLs at MW-74 since March 2012. The concentration trends of 1,1-DCE at MW-146 and MW-147 have remained generally stable to decreasing at levels above the PCL.
- MW-84 - The concentration of 1,1-DCE was reported at 0.016 mg/L and has been stable over the past 15 months. Since October 2010, the concentration of 1,1-DCE has decreased over 96% following oxidant treatments in July 2011 and March 2012.

- MW-125 - The concentrations of PCE (0.006 mg/L in August 2014) have remained generally stable at levels slightly above the PCL since 2009.
- MW-145 - The concentration of 1,1-DCE was reported slightly above the PCL. This well lies near a portion of the oxidant treatment gallery.
- MW-174 - The concentration of 1,1-DCE was reported at 0.050 mg/L. The concentrations of COCs have decreased over 90% from the reported maximums following oxidant treatments in July 2011 and March 2012.
- MW-169 - Generally stable concentration trends of 1,1-DCE above its PCL have been apparent since February 2013. MW-169 lies within the capture zone of the Paraffine Partners Ltd. treatment system which continues to address affected ground water in the area.

Concentrations of COCs exhibiting increasing concentration trends above the PCLs

There were no results reported in the August 2014 quarterly sampling event that exhibited increasing COC concentration trends above the PCLs. Such trends were previously present in MW-146, MW-147 and MW-169; however, the concentrations of COCs above the PCLs at these locations have stabilized over recent sampling events.

Conclusions

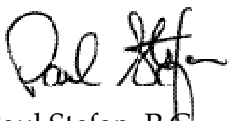
Ground water concentrations were monitored at select wells in the third quarter of 2014 in accordance with the TCEQ's October 14, 2013 letter to document the potential for plume movement and assess the effectiveness of the remedy. The dewatering system at the I-610/I-10 Interchange continues to influence the affected ground water plumes both on and off site. The magnitude and trends of COC concentrations and the overall extent of affected ground water generally remain consistent with prior submittals.

The next sampling event is scheduled for November 2014.

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.G.
Principal Partner

PAS/hmh
Attachments

cc: see attached list

cc: Jason Ybarra, Texas Commission on Environmental Quality, Region XII, Houston
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

November 21, 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
Third Quarter 2014 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-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	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	1,1-dichloroethane		no (a)	no	Quarterly
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
MW-125	Tetrachloroethene	Tetrachloroethene	no (a)	yes (c)	Quarterly
MW-134			no (a)	no	Quarterly
MW-145	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-145	1,1-dichloroethene		no (a)	yes (c)	Quarterly
MW-145	cis-1,2-dichloroethene		no (a)	yes (c)	Quarterly
MW-145	vinyl chloride		no (a)	yes (c)	Quarterly
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
MW-147	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-147	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
MW-169	1,1-dichloroethane		no (b)	no	Quarterly
MW-169	1,1-dichloroethene	1,1-dichloroethene	no (b)	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

NOTES:

COCs = Chemicals of Concern
MQL = Method Quantitation Limit
PCL = Protective Concentration Level
[1] - 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-169 lies within the capture zone EW-1 of the Paraffine Partners Ltd. Remediation System.
(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) Not Sampled due to the presence of permanganate in ground water during low flow purging.

TABLE 2

Summary of Ground Water Data for Trigger Wells
Third Quarter 2014 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	SDL	Critical PCLs (a)	Location: / Depth: (b) / Date:	MW-74 28' 8/21/2014	MW-84 33' 8/21/2014	MW-122 29' 8/21/2014	MW-125 BAILED 8/21/2014	MW-134 27' 8/21/2014
1,1-Dichloroethane	0.00040	4.9		**0.052**	**0.0040** J	ND (0.00040)	ND (0.00040)	ND (0.00040)
1,1-Dichloroethene	0.00050	0.0070		**0.011**	**0.016**	**0.0025 J**	ND (0.00050)	ND (0.00050)
1,2-Dichloroethane	0.00050	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.00060	0.070		**0.0048 J**	ND (0.00060)	**0.0011 J**	ND (0.00060)	ND (0.00060)
Tetrachloroethene	0.00060	0.0050		ND (0.00060)	ND (0.00060)	ND (0.00060)	**0.0060**	ND (0.00060)
Trichloroethene	0.00050	0.0050		**0.0013 J**	ND (0.00050)	**0.0041 J**	ND (0.00050)	ND (0.00050)
Vinyl Chloride	0.00040	0.0020		**0.0049**	ND (0.00040)	ND (0.00040)	ND (0.00040)	ND (0.00040)

Constituent	SDL	Critical PCLs (a)	Location: / Depth: (b) / Date:	MW-145 26' 8/21/2014	MW-146 29.5' 8/21/2014	MW-147 31' 8/21/2014	MW-169 36' 8/21/2014	MW-174 34' 8/21/2014
1,1-Dichloroethane	0.00040	4.9		**0.0130**	**0.022**	**0.0035 J**	**0.019**	**0.072**
1,1-Dichloroethene	0.00050	0.0070		**0.0090**	**0.039**	**0.023**	**0.071**	**0.050**
1,2-Dichloroethane	0.00050	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	**0.00094 J**
cis-1,2-Dichloroethene	0.00060	0.070		**0.0011 J**	**0.0023 J**	ND (0.00060)	ND (0.00060)	**0.0039 J**
Tetrachloroethene	0.00060	0.0050		ND (0.00060)	ND (0.00060)	ND (0.00060)	ND (0.00060)	**0.0019 J**
Trichloroethene	0.00050	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	**0.0015 J**
Vinyl Chloride	0.00040	0.0020		**0.0013 J**	**0.0017 J**	ND (0.00040)	**0.00086 J**	**0.0024**

NOTES:

The reported concentrations are in mg/L.

(a) TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential $^{GW}GW_{Ing}$ PCLs, Table 3, table for TRRP Rule revised September 10, 2014.

(b) The sample depths are reported in feet below top of casing elevations.

SDL = Sample Detection Limit.

0.023 = exceedance of TCEQ TRRP Tier 1 Residential $^{GW}GW_{Ing}$ PCLs.

Bold values exceed the SDL.

ND (0.00050) = *Not Detected* at the Sample Detection Limit (SDL) given in parentheses.

J = Estimated data, the constituent's reported concentration is approximated.

NS = Not Sampled.

Figures

Attachment 2

November 21, 2014
Project No. 0260324

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

NORTHERN

WESTERN

EASTERN

SOUTHERN

N

KMW-07
MW-50R
MW-43R
KMW-01
MW-35
MW-29
MW-01
MW-02R
MW-64
MW-52
MW-65
MW-02(S)
MW-03(S)
MW-07R
MW-66
MW-67
MW-130
MW-108
MW-110
MW-112
MW-109
MW-111
MW-113
MW-94
MW-61
MW-60
MW-59
MW-15R
MW-16R
MW-131
MW-95
MW-70
MW-100
MW-99
MW-171
MW-172
MW-170
MW-126
MW-17R
MW-74
MW-133
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IW-45
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MW-91
MW-96R
MW-107
MW-166
EW-2 (S)
MW-106
EW-3 (S)
MW-168
MW-92
MW-102
MW-175
EW-1 (S)
MW-167
MW-176
MW-177
EW-4 (S)
MW-173
MW-125
MW-97
EW-5 (S)
MW-164
MW-47
MW-48
IW-49
MW-93
IW-50
IW-52
IW-51
MW-98

MW-74 — 28' — 8/21/2014

1,1-Dichloroethane	**0.052**
1,1-Dichloroethene	**0.011**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	**0.0048J**
Tetrachloroethene	ND (0.00060)
Trichloroethene	**0.0013J**
Vinyl Chloride	**0.0049**

MW-134 — 27' — 8/21/2014

1,1-Dichloroethane	ND (0.00040)
1,1-Dichloroethene	ND (0.00050)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.00060)
Tetrachloroethene	ND (0.00060)
Trichloroethene	ND (0.00050)
Vinyl Chloride	ND (0.00040)

MW-145 — 26' — 8/21/2014

1,1-Dichloroethane	**0.013**
1,1-Dichloroethene	**0.0090**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	**0.0011J**
Tetrachloroethene	ND (0.00060)
Trichloroethene	ND (0.00050)
Vinyl Chloride	**0.0013J**

MW-146 — 29.5' — 8/21/2014

1,1-Dichloroethane	**0.022**
1,1-Dichloroethene	**0.039**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	**0.0023J**
Tetrachloroethene	ND (0.00060)
Trichloroethene	ND (0.00050)
Vinyl Chloride	**0.0017J**

MW-147 — 31' — 8/21/2014

1,1-Dichloroethane	**0.0035J**
1,1-Dichloroethene	**0.023**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.00060)
Tetrachloroethene	ND (0.00060)
Trichloroethene	ND (0.00050)
Vinyl Chloride	ND (0.00040)

MW-122 — 29' — 8/21/2014

1,1-Dichloroethane	ND (0.00040)
1,1-Dichloroethene	**0.0025J**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	**0.0011J**
Tetrachloroethene	ND (0.00060)
Trichloroethene	**0.0041J**
Vinyl Chloride	ND (0.00040)

MW-174 — 34' — 8/21/2014

1,1-Dichloroethane	**0.072**
1,1-Dichloroethene	**0.050**
1,2-Dichloroethane	**0.00094J**
cis-1,2-Dichloroethene	**0.0039J**
Tetrachloroethene	**0.0019J**
Trichloroethene	**0.0015J**
Vinyl Chloride	**0.0024**

MW-84 — 33' — 8/21/2014

1,1-Dichloroethane	**0.0040J**
1,1-Dichloroethene	**0.016**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.00060)
Tetrachloroethene	ND (0.00060)
Trichloroethene	ND (0.00050)
Vinyl Chloride	ND (0.00040)

MW-169 — 36' — 8/21/2014

1,1-Dichloroethane	**0.019**
1,1-Dichloroethene	**0.071**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.00060)
Tetrachloroethene	ND (0.00060)
Trichloroethene	ND (0.00050)
Vinyl Chloride	**0.00086J**

MW-125 — BAILED — 8/21/2014

1,1-Dichloroethane	ND (0.00040)
1,1-Dichloroethene	ND (0.00050)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.00060)
Tetrachloroethene	**0.0060**
Trichloroethene	ND (0.00050)
Vinyl Chloride	ND (0.00040)

0 550 1100
SCALE FEET

Environmental Resources Management

FIGURE 1
SITE FEATURE MAP
Third Quarter 2014
Former Cameron Iron Works Facility
Houston, Texas

DESIGN: RJ	DRAWN: CAK	CHKD.: PAS
DATE: 11/6/2014	SCALE: AS SHOWN	REV.:
W.O.NO.: H:\DWG\K14\0260324_SF_3rdQtr2014.dwg , 11/6/2014 9:18:44 AM		

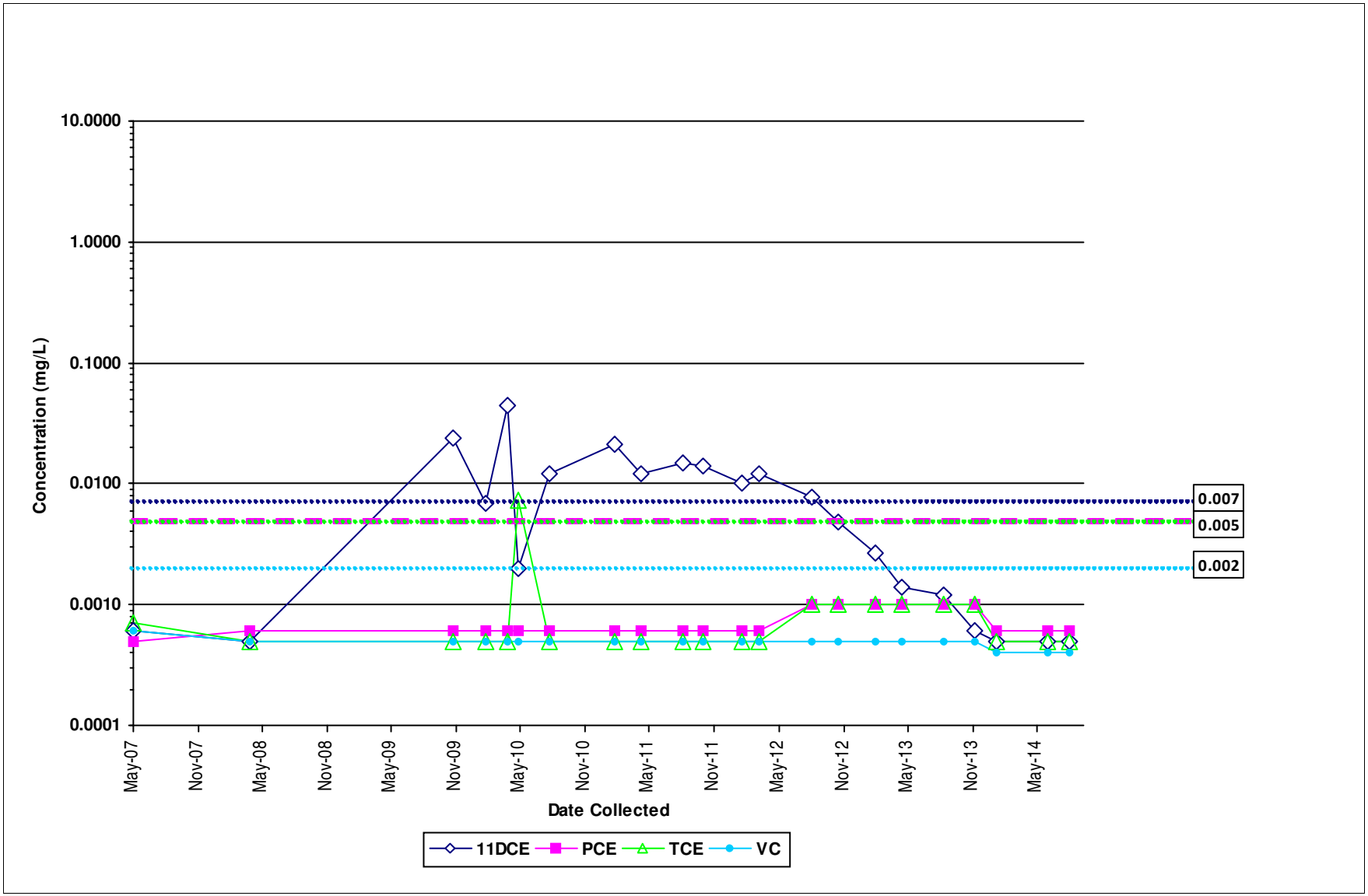
ERM-Southwest, Inc. TX PE Firm No. 2393

Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-134

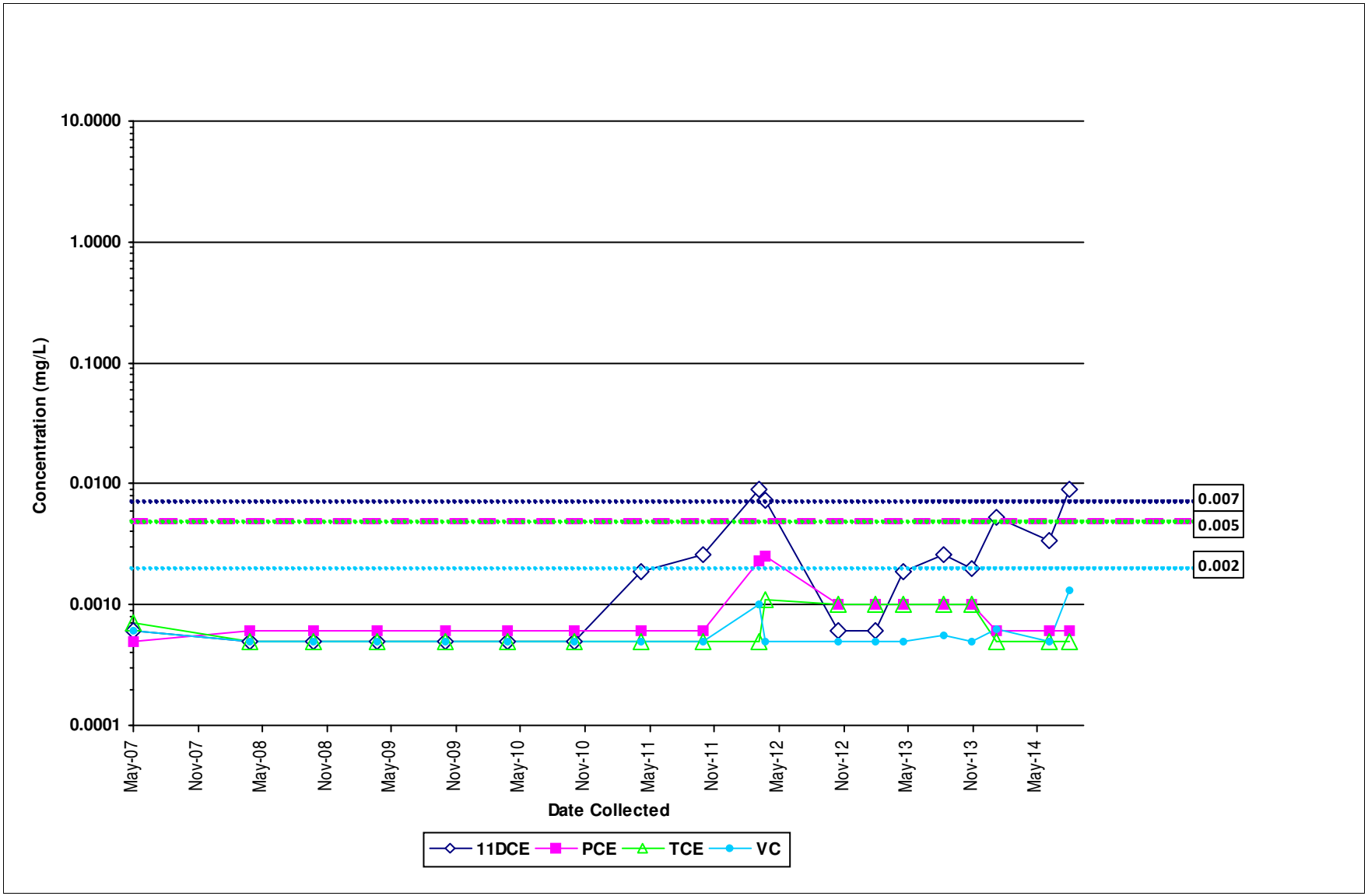


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-145

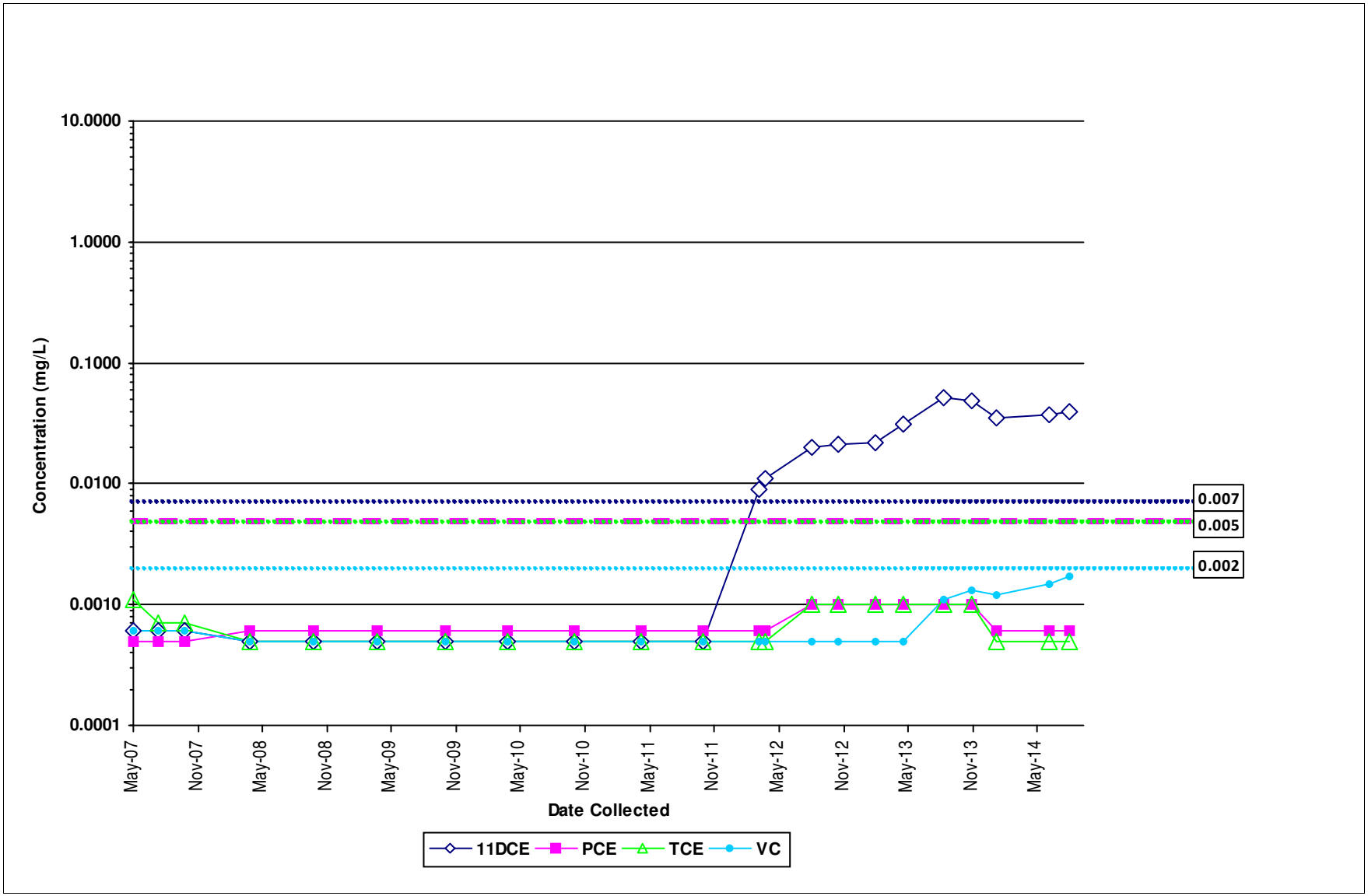


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-146

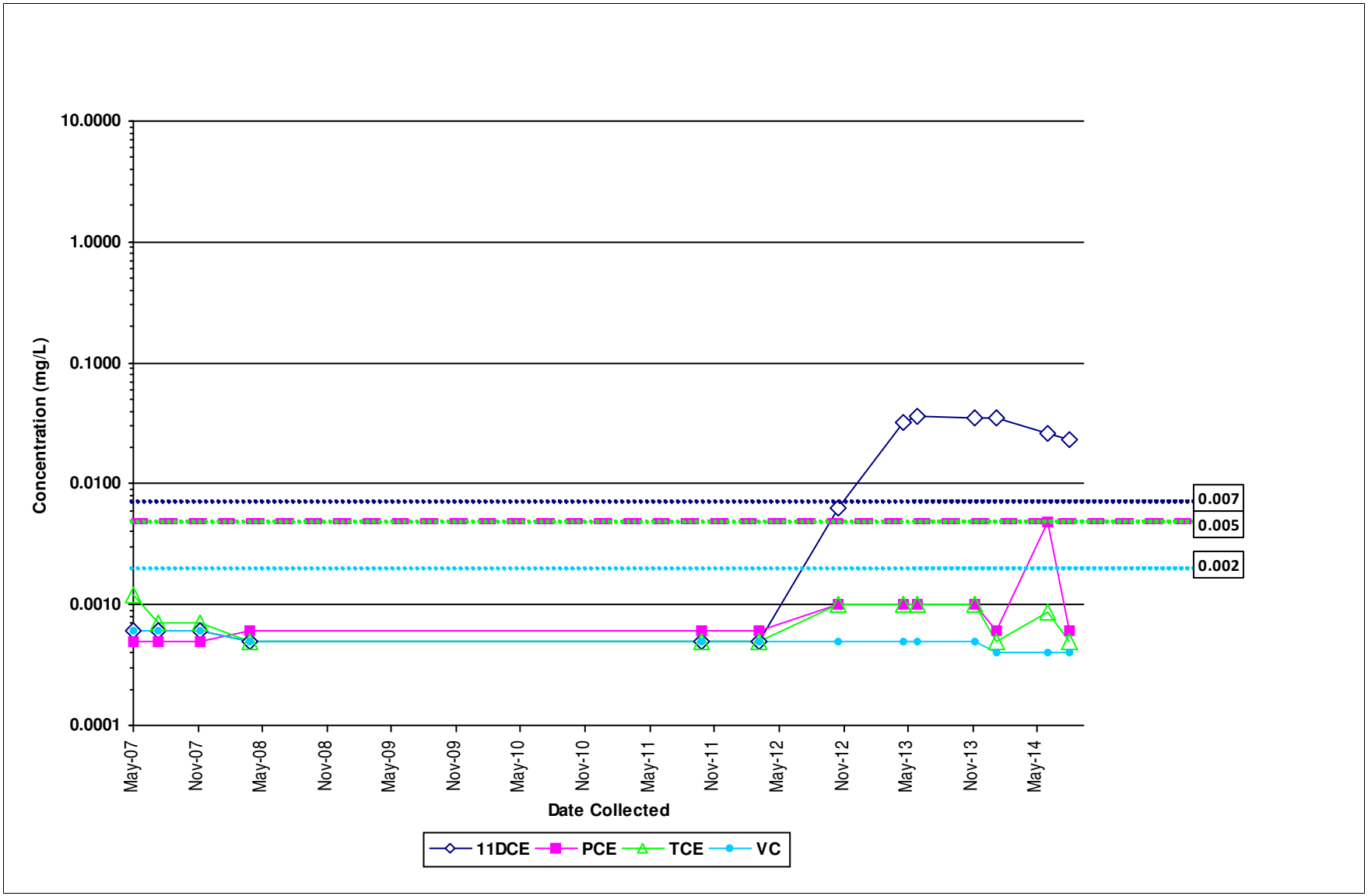


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-147

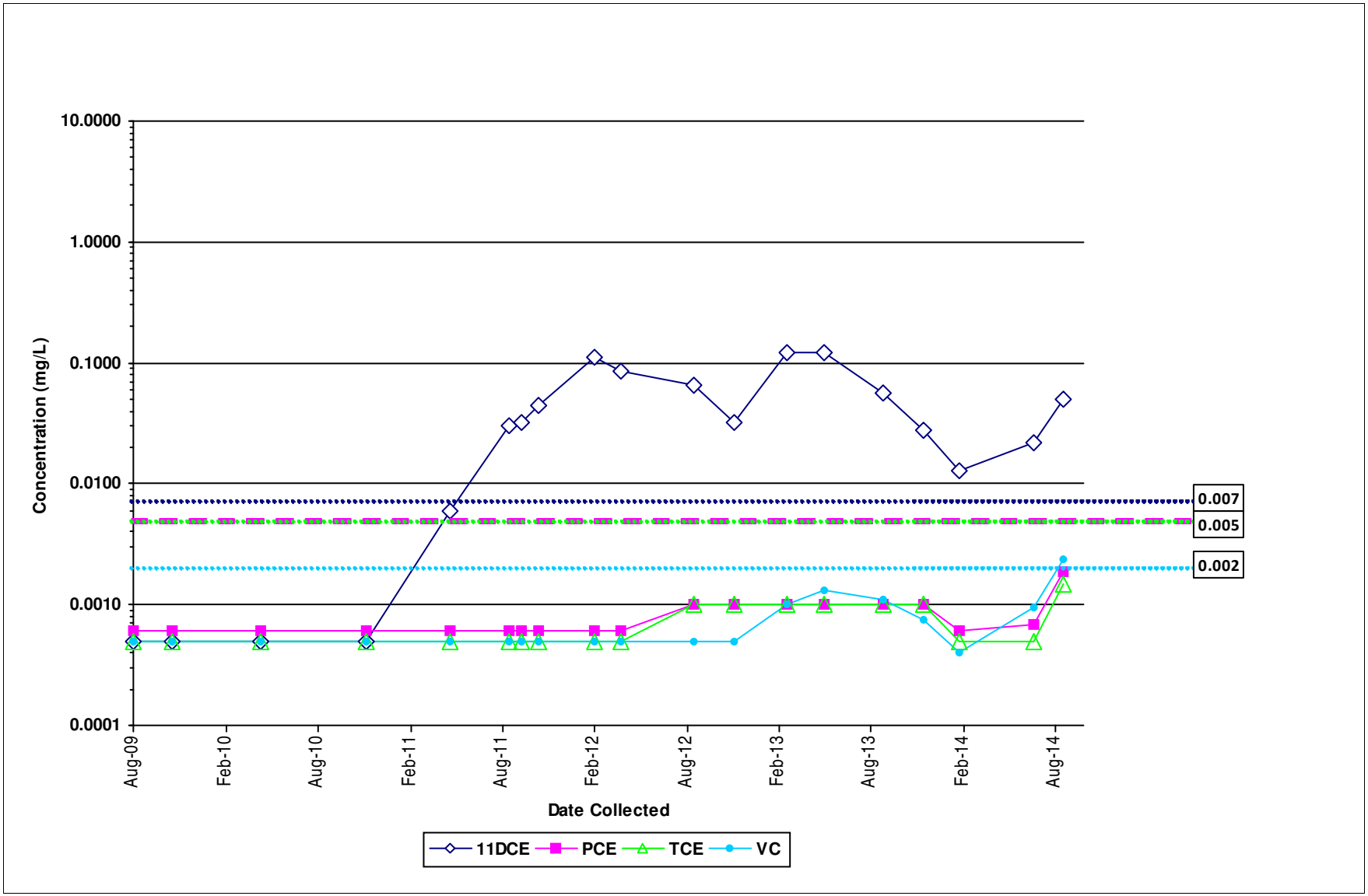


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-174

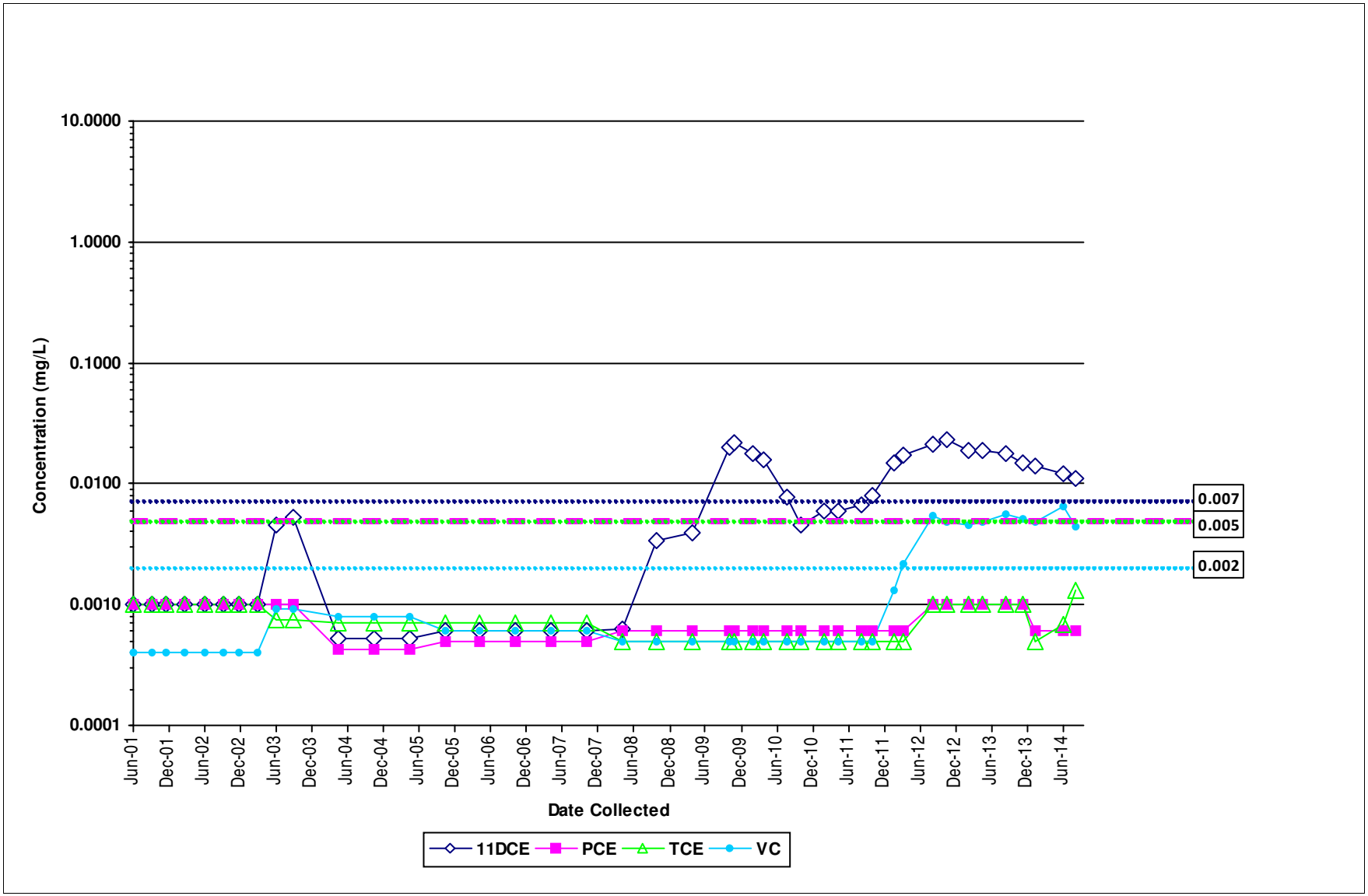


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-74

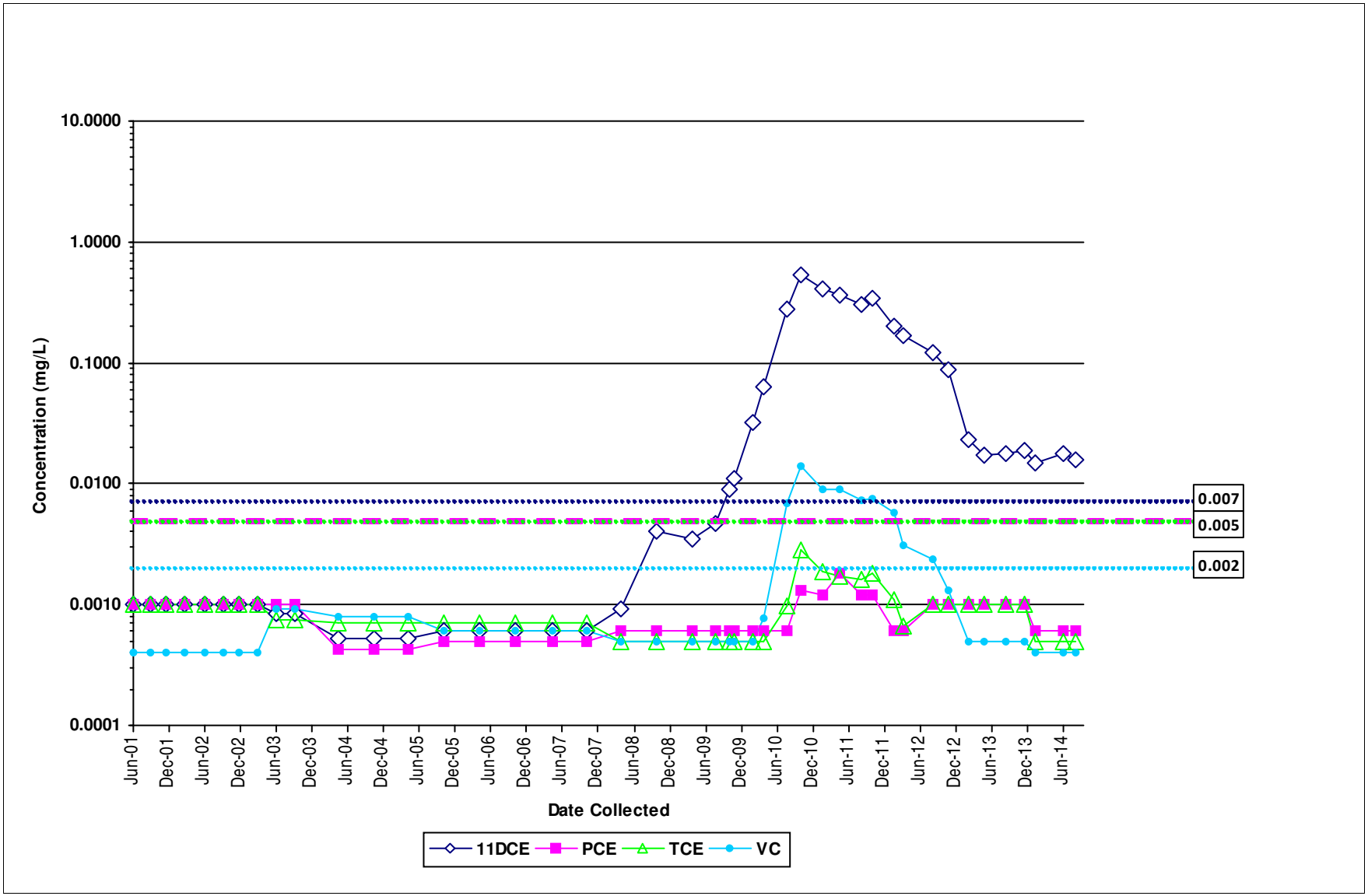


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: EASTERN

Client Sample ID: MW-84

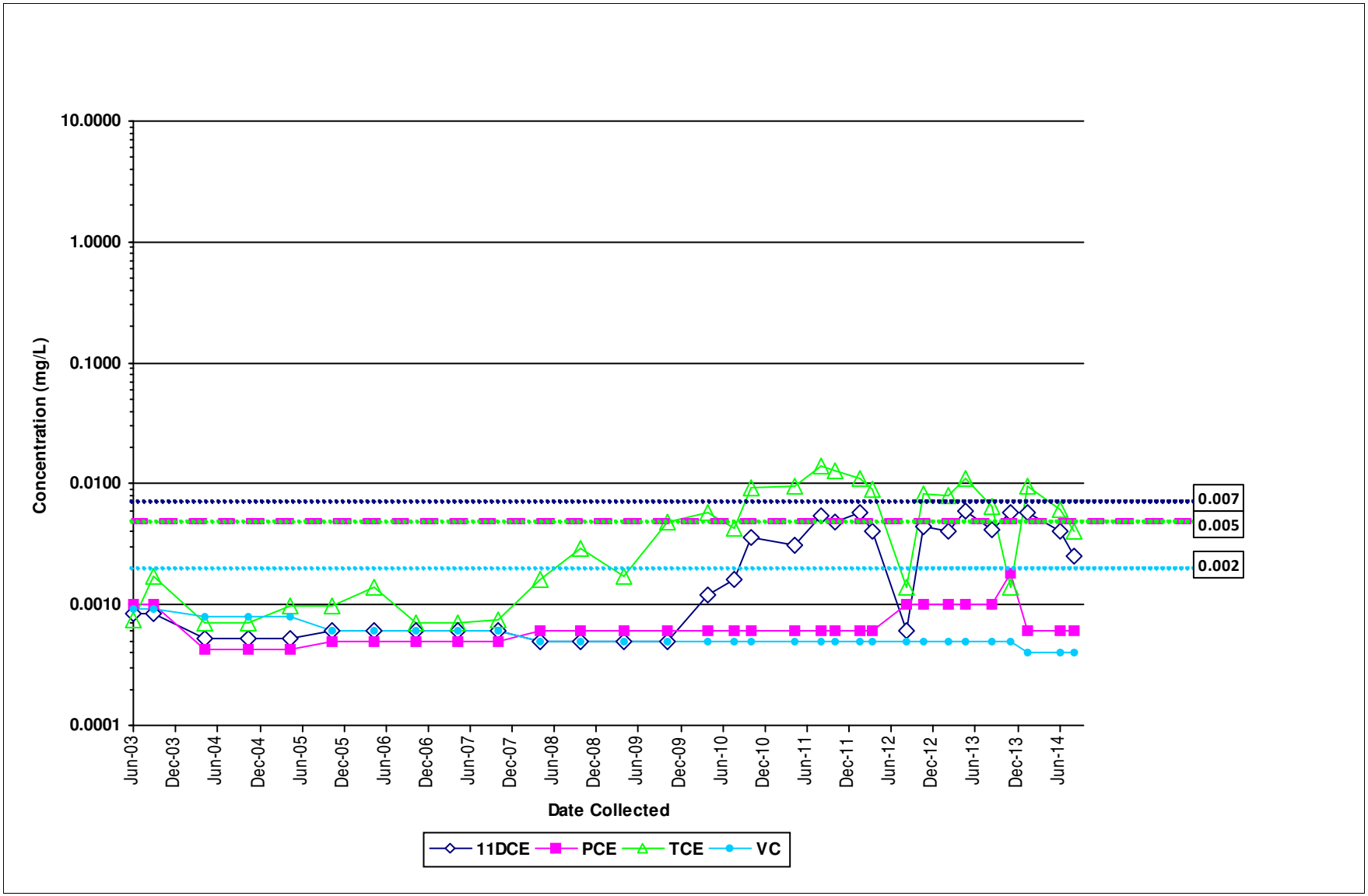


Ground Water Progress Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: WESTERN

Client Sample ID: MW-122

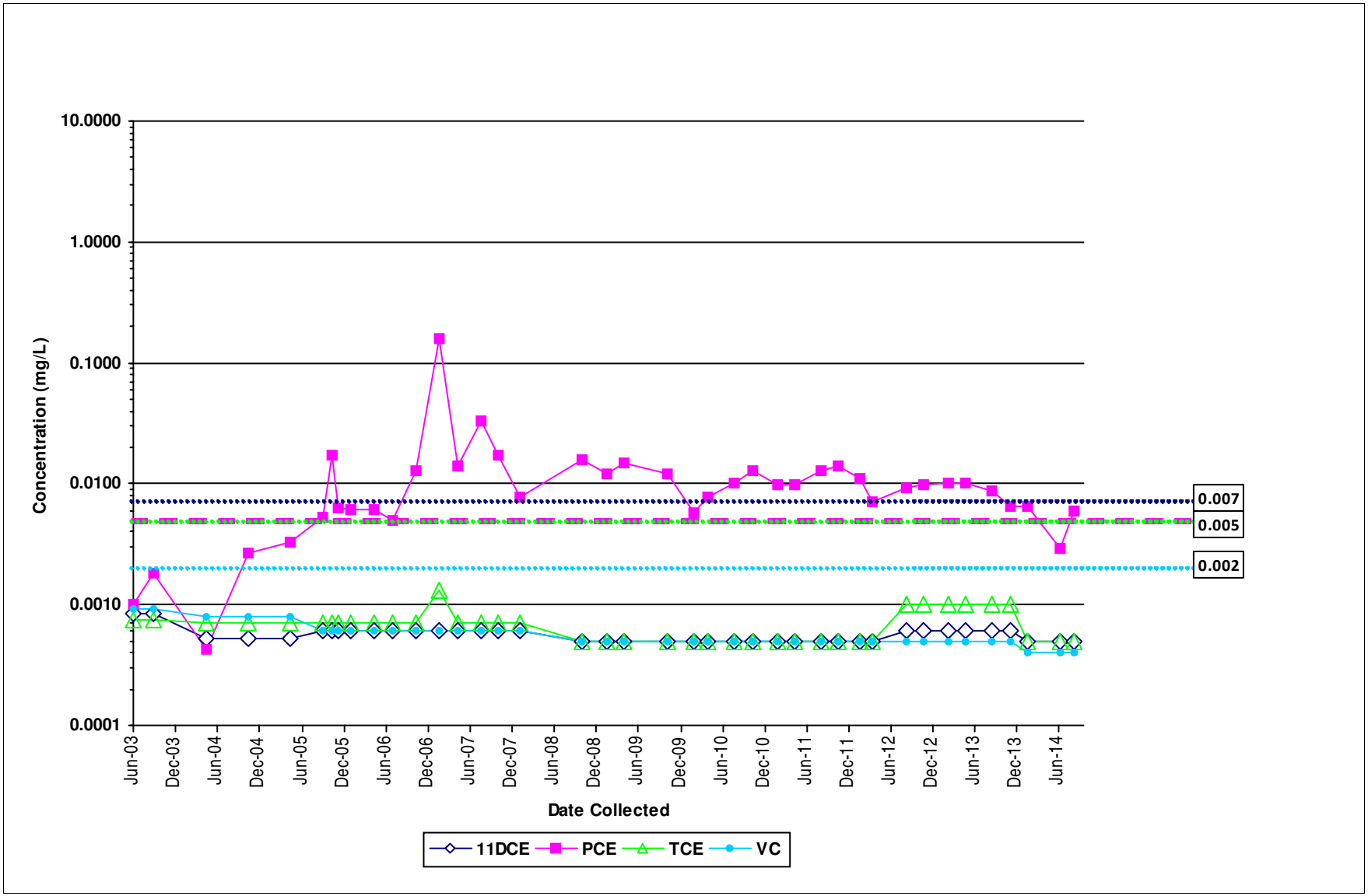


Ground Water Progress Graph

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