

Environmental
Resources
Management

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April 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: Second Half 2012 Monitoring Data Transmittal
Former Cameron Iron Works Facility, Houston, Texas
VCP No. 221

Dear Mr. Riggle:

On behalf of Cameron International Corporation (Cameron), Environmental Resources Management (ERM) is providing the Second Half 2012 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 Second Half of 2012. 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 November 5, 2012 and November 9, 2012. A total of 121 ground water monitor wells were gauged and 114 were sampled during this event. A total of six surface water locations were sampled in accordance with the Response Action Plan (RAP) and RAP Addenda. Based on a review of these results, the concentration trends of constituents of concern (COCs) were generally consistent with First Half of 2012 data 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

Cameron continues to address elevated concentrations of constituents of concern (COCs) at selected well locations where upward trends were previously identified in association with a Texas Department of Transportation (TxDOT) dewatering system at the intersection of I-10 and 610 Loop. This dewatering system was first described in the *First Half 2011 Monitoring Data Transmittal* and on August 17, 2012, ERM received permission from TxDOT to measure the flow from the dewatering system. The discharge was measured following a five day period without rainfall to isolate the dewatering system's influent to only ground water with no contribution from surface runoff or storm water. At that time, the dewatering system was extracting more than 120 gallons per minute (gpm) of ground water and this system is believed to be a significant factor in the on-site and off-site plume movement observed to date. ERM continues to evaluate the adequacy of the monitor well network to capture the full extent of affected ground water.

The appropriate notifications have been made in accordance with TCEQ requirements to property owners who may potentially have affected ground water beneath their property. A potential for more notifications is present because the dewatering system continues to affect ground water flow patterns in the area.

Evaluation of Analytical Results from the Second Half 2012

The ground water analytical results collected during the Second Half of 2012 were compared with the response action obligations outlined in the RAP. The boundary wells are referred to as "trigger wells" because of their position on the plume boundary and purpose to detect the potential for 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.

The laboratory reports and data usability summaries will be provided in the 2012 Annual Ground Water Monitoring Report and Field Activities Summary.

Select (Trigger) Wells and 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. Also in Attachment 2, COC concentration trend graphs for select monitor wells.

Northern (On-site) Area

At the former facility (on-site area), several areas near the southern boundary of the former facility have responded well to the response action. The concentrations of COCs in MW-16R continued to show decreasing trends to below their respective PCLs for the first time since 2003. At the southern boundary of the former facility near the recovery wells of the treatment system, COC concentrations remain generally stable to slightly decreasing at levels above their PCLs with the exceptions being MW-67 and MW-111, which continue to report COCs as *Not Detected*. MW-59 has reported the site COCs below PCLs over the last three monitoring events. This monitor well is within the capture zone of the facility's ground water treatment system and will remain on the quarterly sampling schedule.

Upward trends in COC concentrations have been observed in KMW-14 over the past four sampling events. The ground water flow direction near KMW-14 appears to have been influenced by the dewatering system. Ground water flow direction has changed from south to southeast in this area. Concentrations of 1,1-dichloroethane (1,1-DCA) have been reported in MW-03(S) located on the Awty International School property over the past six sampling events at concentrations above the detection limits, but below the PCLs.

Eastern Area

In the Second Half 2012 sampling event, both 1,1-DCE and vinyl chloride (VC) were reported above their respective PCLs and upward trends are apparent. 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 since 2009 and prompted an expansion of the treatment system in this area. A permanganate treatment was conducted upgradient of MW-84 just prior to this event and the most-recent data show a continuation of downward concentration trends in both 1,1-DCE and VC. This well will remain on the quarterly sampling schedule.

The reported concentrations of 1,1-DCE in MW-134 have remained generally stable over the past four sampling events and the most-recent data show the concentration of 1,1-DCE below its PCL. The concentrations at MW-134 are influenced by the dewatering system. MW-134 will remain on the quarterly sampling schedule.

The concentrations of 1,1-DCE remained above the PCL in MW-174 and a downward trend is apparent over the last three sampling events. A permanganate treatment was conducted up gradient of MW-174 on March 23, 2012. This area will continue to be monitored for the presence of permanganate and MW-174 will remain on the quarterly sampling schedule.

Western Area

The western area generally remains within its historical footprint with many of the monitoring wells displaying stable to decreasing trends. Of the 16 trigger wells in this area, only three

(MW-70, MW-170 and MW-122) reported COC concentrations greater than their PCLs with 10 monitor wells reporting site COCs as *Not Detected*.

The concentration of trichloroethene (TCE) was above the PCL in MW-122 in the Second Half of 2012 and appears to display a stable to slightly decreasing trend. MW-122 will remain on the quarterly sampling schedule.

Southern Area

The concentrations of PCE in MW-125 have remained generally stable. Permanganate treatment in both upgradient and downgradient wells was conducted in July 2011. This area will continue to be monitored for the presence of permanganate and MW-125 will remain on the quarterly sampling schedule.

The increasing concentrations of 1,1-DCE at MW-169 are being evaluated for a possible response action in this area.

MW-144, MW-88 and MW-93 were not sampled in the Second Half of 2012 due to the presence of permanganate at these wells, visually apparent as a purple color. Oxidation Reduction Potential (ORP) readings of greater than 550 mV were measured in MW-88, consistent with the presence of permanganate.

In other areas of the plume, remedial effects are making significant progress. The ground water treatment system in the Stablewood Subdivision has reduced concentrations and the extent of affected ground water significantly. Four of the five recovery wells (EW-2, EW-3, EW-4, and EW-5) were turned off during the Second Half of 2012. Permanganate has been observed in EW-2 since April 2012 and the plume is being monitored as the ground water levels return to pre-pumping conditions.

Conclusions

Ground water concentrations were monitored at 114 monitor wells in the Second Half of 2012 to assess the effectiveness of the remedy at controlling affected ground water.

The dewatering project at the I-610/I-10 Interchange is continuing to influence concentration trends in the off-site plumes causing unanticipated movement of affected ground water into previously unaffected areas. Ground water samples collected from MW-146 and MW-169 reported continued PCL exceedences of 1,1-DCE in the Second Half of 2012. A total of 26 notification letters were sent to property owners located in the eastern and southern portions of Pinewood Estates and northern Stablewood areas in August 2012.

At the former facility (on-site area), several areas near the western and southern boundaries of the former facility have responded well to the response action. Downward COC concentration trends are observed in MW-52, MW-59 and MW-07R which lie upgradient from the treatment system near Silber Road (west). Along the southern boundary, MW-111 has

reported COCs as *Not Detected* over the past four sampling events and MW-67 has reported COCs as *Not Detected* since 2003.

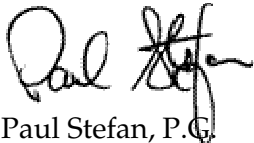
The northeastern portion of the former facility also appears to be influenced by the dewatering system. The concentrations of COCs in KMW-14 continue to show increasing concentration trends in site COCs with 1,1-DCE, cis-1,2-DCE, TCE and VC reporting concentrations above their PCLs in the Second Half of 2012.

The next scheduled ground water monitoring event occurred in February 2013, when select trigger wells were sampled as outlined in the Response Action Plan.

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

A handwritten signature in black ink, appearing to read "Paul Stefan". The signature is fluid and cursive, with the first name "Paul" being larger and more prominent than the last name "Stefan".

Paul Stefan, P.C.
Principal Partner

PAS/hmh
Attachments

cc: Marsha Hill, Texas Commission on Environmental Quality, Region X II
Ted Fasting, Cameron International Corporation
Bruce Himmelreich, Cameron International Corporation, (without attachment)

Tables
Attachment 1

April 2, 2013
Project No. 0194630

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

TABLE 1

Summary of Response Action Plan Implementation
Second Half 2012 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	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-84	Vinyl chloride		no (a)	yes (c)	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	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-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

NOTES:

COCs = Chemicals of Concern

MQL = Method Quantitation Limit

⁽¹⁾ - Quarterly trigger well list as provided in TCEQ letter dated March 21, 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) 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
Second Half 2012 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	29	28	30	32.5	27	33
			Date:	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/7/2012
1,1-Dichloroethane	0.00050	4.9		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.094	ND (0.00050)	0.0061	ND (0.00050)	0.014
1,1-Dichloroethene	0.00060	0.0070		ND (0.00060)	ND (0.00060)	ND (0.00060)	ND (0.00060)	0.023	ND (0.00060)	0.063	ND (0.00060)	0.088
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)
cis-1,2-Dichloroethene	0.0010	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0029 J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0010	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0010	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.00050	0.0020		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0049	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0013 J

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	34	27	29	29
			Date:	11/7/2012	11/6/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/8/2012	11/7/2012
1,1-Dichloroethane	0.00050	4.9		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)
1,1-Dichloroethene	0.00060	0.0070		ND (0.00060)	ND (0.00060)	ND (0.00060)	0.006	ND (0.00060)	ND (0.00060)	ND (0.00060)	0.0044 J	ND (0.00060)
1,2-Dichloroethane	0.00050	0.0050		ND (0.00050)	0.001 J	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0022 J	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.0010	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0016 J	ND (0.0010)
Tetrachloroethene	0.0010	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0010	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0082	ND (0.0010)
Vinyl Chloride	0.00050	0.0020		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)

Constituent	SDL	Critical PCLs (a)	Location:	MW-125	MW-131	MW-134	MW-139	MW-145	MW-146	MW-168	MW-169	MW-174
			Depth: (b)	BAILED	25	27	25	26	29.5	35	36	34
			Date:	11/7/2012	11/8/2012	11/6/2012	11/6/2012	11/7/2012	11/7/2012	11/8/2012	11/8/2012	11/7/2012
1,1-Dichloroethane	0.00050	4.9		ND (0.00050)	ND (0.00050)	ND (0.00050)	0.024	0.0011 J	0.019	ND (0.00050)	ND (0.00050)	0.028
1,1-Dichloroethene	0.00060	0.0070		ND (0.00060)	ND (0.00060)	0.0048 J	0.026	ND (0.00060)	0.021	ND (0.00060)	0.030	0.032
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)
cis-1,2-Dichloroethene	0.0010	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0058	ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0010	0.0050		0.0097	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0010	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.00050	0.0020		ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0010 J	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)

NOTES:

The reported concentrations are in mg/L.

0.0088 = exceedance of TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Class 2 Ground Water critical PCLs.

ND (0.00050) = Not Detected at the sample detection limit given in parentheses.

SDL = Sample Detection 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 ground surface.

(c) Not sampled due to permanganate in well.

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

L = Biased Low.

U = Not detected, the SDL is estimated

NS = Not sampled.

TABLE 3

Summary of Monitor Well Ground Water Data
Second Half 2012 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical PCLs (a)	Location:										
		Depth: (b)	KMW-01	KMW-07	KMW-13	KMW-14	MW-01	MW-02(C)	MW-02(S)	MW-03(S)	MW-02R	MW-07R
		Date:	22.5	24	26	20	25	23	25	24.5	23	27
		11/9/2012	11/9/2012	11/8/2012	11/9/2012	11/6/2012	11/6/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	
1,1-Dichloroethane	4.9	NA	NA	NA	NA	NA	NA	ND (0.00050)	0.0091	NA	NA	
1,1-Dichloroethene	0.0070	0.0042 J	ND (0.00060)	ND (0.00060)	0.12	ND (0.00060)	ND (0.00060)	ND (0.00060)	ND (0.00060)	0.009	ND (0.00060)	
1,2-Dichloroethane	0.0050	NA	NA	NA	NA	NA	NA	ND (0.00050)	ND (0.00050)	NA	NA	
cis-1,2-Dichloroethene	0.070	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.15	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	
Tetrachloroethene	0.0050	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.004 J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	
Trichloroethene	0.0050	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.027	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	
Vinyl Chloride	0.0020	ND (0.00050)	0.0014 J	ND (0.00050)	0.032	ND (0.00050)	0.0035	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	

Constituent	Critical PCLs (a)	Location:										
		Depth: (b)	MW-15R	MW-16R	MW-35	MW-43R	MW-50R	MW-52	MW-54	MW-56	MW-58	MW-60
		Date:	33.5	26		24	23	25	25	30	25	34
		11/8/2012	11/8/2012		11/6/2012	11/6/2012	11/7/2012	11/9/2012	11/9/2012	11/9/2012	11/6/2012	
1,1-Dichloroethane	4.9	0.0051	0.0071	NS	NA	NA	NA	NA	NA	NA	ND (0.00050)	
1,1-Dichloroethene	0.0070	0.028	0.0060	NS	0.019	0.069	0.026	0.58	ND (0.00060)	ND (0.00060)	ND (0.00060)	
1,2-Dichloroethane	0.0050	0.001 J	ND (0.00050)	NS	NA	NA	NA	NA	NA	NA	ND (0.00050)	
cis-1,2-Dichloroethene	0.070	ND (0.0010)	0.0027 J	NS	ND (0.0010)	0.0078	ND (0.0010)	17	ND (0.0010)	ND (0.0010)	ND (0.0010)	
Tetrachloroethene	0.0050	0.008	ND (0.0010)	NS	ND (0.0010)	0.0068	ND (0.0010)	0.21	ND (0.0010)	ND (0.0010)	ND (0.0010)	
Trichloroethene	0.0050	0.0016 J	ND (0.0010)	NS	ND (0.0010)	0.015	ND (0.0010)	1.9	ND (0.0010)	ND (0.0010)	ND (0.0010)	
Vinyl Chloride	0.0020	ND (0.00050)	ND (0.00050)	NS	ND (0.00050)	0.027	ND (0.00050)	0.16	ND (0.00050)	ND (0.00050)	ND (0.00050)	

Constituent	Critical PCLs (a)	Location:										
		Depth: (b)	MW-61	MW-62	MW-63	MW-64	MW-65	MW-66	MW-67	MW-70	MW-73	MW-75R
		Date:	23	32	27	25	25	27	28	27	27	34.5
		11/6/2012	11/9/2012	11/9/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/9/2012	11/7/2012	11/8/2012	
1,1-Dichloroethane	4.9	ND (0.00050)	NA	NA	NA	NA	NA	NA	0.075	0.0062	0.0056	
1,1-Dichloroethene	0.0070	ND (0.00060)	ND (0.00060)	0.0084	ND (0.00060)	0.0017 J	0.077	ND (0.00060)	0.19	0.051	0.0094	
1,2-Dichloroethane	0.0050	ND (0.00050)	NA	NA	NA	NA	NA	NA	0.0017 J	0.00052 J	ND (0.00050)	
cis-1,2-Dichloroethene	0.070	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.024	ND (0.0010)	0.044	ND (0.0010)	ND (0.0010)	
Tetrachloroethene	0.0050	ND (0.0010)	ND (0.0010)	0.0024 J	ND (0.0010)	ND (0.0010)	0.026	ND (0.0010)	0.029	0.0018 J	ND (0.0010)	
Trichloroethene	0.0050	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0024 J	ND (0.0010)	0.038	0.0016 J	0.0012 J	
Vinyl Chloride	0.0020	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0014 J	0.022	ND (0.00050)	0.006	ND (0.00050)	ND (0.00050)	

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, table for TRRP Rule dated March 25, 2009.

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

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible due to debris 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
Second Half 2012 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical PCLs (a)	Location:										
		MW-76	MW-78	MW-79	MW-82	MW-83	MW-87	MW-88 (c)	MW-89	MW-90	MW-91	
		Depth: (b)	31	27.5	33	31	31.5	33	BAILED	BAILED	BAILED	
		Date:	11/6/2012	11/6/2012	11/7/2012	11/6/2012	11/7/2012	11/6/2012	11/6/2012	11/7/2012	11/7/2012	
1,1-Dichloroethane	4.9		0.0038 J	0.0016 J	0.035	0.028	0.022	0.0019 J	NS	0.004 J	0.0089	0.0063
1,1-Dichloroethene	0.0070		0.016	0.0025 J	0.078	0.11	0.043	0.026	NS	0.016	0.055	0.041
1,2-Dichloroethane	0.0050		ND (0.00050)	ND (0.00050)	0.00051 J	ND (0.00050)	0.00062 J	ND (0.00050)	NS	0.00072 J	0.0015 J	0.0013 J
cis-1,2-Dichloroethene	0.070		ND (0.0010)	0.0062	0.036	0.015	0.023	ND (0.0010)	NS	ND (0.0010)	0.004 J	0.0025 J
Tetrachloroethene	0.0050		ND (0.0010)	0.013	0.24	0.13	0.29	ND (0.0010)	NS	ND (0.0010)	0.11	0.11
Trichloroethene	0.0050		ND (0.0010)	0.0045 J	0.067	0.022	0.047	ND (0.0010)	NS	0.0076	0.013	0.011
Vinyl Chloride	0.0020		ND (0.00050)	ND (0.00050)	0.0063	0.0023	0.004	ND (0.00050)	NS	ND (0.00050)	ND (0.00050)	ND (0.00050)

Constituent	Critical PCLs (a)	Location:										
		MW-92	MW-93 (c)	MW-94	MW-96R	MW-99	MW-100	MW-101	MW-102	MW-106	MW-107	
		Depth: (b)	BAILED		25	35	34	32.5	33	BAILED	BAILED	BAILED
		Date:	11/7/2012		11/6/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012
1,1-Dichloroethane	4.9		ND (0.00050)	NS	ND (0.00050)	0.0061	ND (0.00050)	0.0033 J	0.0063	ND (0.00050)	ND (0.00050)	0.0035 J
1,1-Dichloroethene	0.0070		ND (0.00060)	NS	ND (0.00060)	0.017	ND (0.00060)	0.0046 J	0.024	ND (0.00060)	ND (0.00060)	0.038
1,2-Dichloroethane	0.0050		ND (0.00050)	NS	ND (0.00050)	ND (0.00050)	0.0022 J	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.070		ND (0.0010)	NS	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0032 J	ND (0.0010)	0.0018 J	ND (0.0010)
Tetrachloroethene	0.0050		0.16	NS	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0078	0.031	0.079	0.25	0.20
Trichloroethene	0.0050		0.0042 J	NS	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.008	ND (0.0010)	0.0088	0.0065
Vinyl Chloride	0.0020		ND (0.00050)	NS	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)

Constituent	Critical PCLs (a)	Location:										
		MW-108	MW-109	MW-110	MW-111	MW-112	MW-113	MW-114	MW-115	MW-116	MW-118	
		Depth: (b)	27	26	27	26	26	27	34	35	27	29
		Date:	11/7/2012	11/7/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/6/2012	11/6/2012	11/6/2012	11/8/2012
1,1-Dichloroethane	4.9		NA	NA	NA	NA	NA	NA	0.018	ND (0.00050)	0.0023 J	0.012
1,1-Dichloroethene	0.0070		0.40	0.037	0.024	ND (0.00060)	0.034	0.0023 J	0.10	0.14	0.016	0.074
1,2-Dichloroethane	0.0050		NA	NA	NA	NA	NA	NA	0.0022 J	0.0053	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.070		0.0049 J	0.17	0.026	ND (0.0010)	0.098	ND (0.0010)	0.016	ND (0.0010)	ND (0.0010)	0.0055
Tetrachloroethene	0.0050		0.0054	0.007	0.0033 J	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.054	ND (0.0010)	0.0018 J	0.0093
Trichloroethene	0.0050		0.0078	0.016	0.0065	ND (0.0010)	0.0014 J	ND (0.0010)	0.023	0.0037 J	0.0054	0.009
Vinyl Chloride	0.0020		0.015	0.018	0.0049	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)

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, table for TRRP Rule dated March 25, 2009.

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

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible due to debris 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
Second Half 2012 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical PCLs (a)	Location:	MW-119	MW-120	MW-121	MW-124	MW-126	MW-127	MW-128	MW-129	MW-130	MW-132
		Depth: (b)	29	25	28	29	26	32	BAILED	BAILED	27	27.5
		Date:	11/8/2012	11/6/2012	11/6/2012	11/8/2012	11/8/2012	11/5/2012	11/6/2012	11/6/2012	11/8/2012	11/6/2012
1,1-Dichloroethane	4.9		ND (0.00050)	0.00084 J	ND (0.00050)	0.01	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0071	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.0070		ND (0.00060)	0.0017 J	0.0041 J	0.049	ND (0.00060)	ND (0.00060)	ND (0.00060)	0.015	ND (0.00060)	ND (0.00060)
1,2-Dichloroethane	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0048 J	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)	0.028	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0050		ND (0.0010)	0.011	ND (0.0010)	0.097	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0041 J	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0050		ND (0.0010)	0.0015 J	ND (0.0010)	0.025	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.0020		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)

Constituent	Critical PCLs (a)	Location:	MW-133	MW-135	MW-140	MW-141	MW-142	MW-143	MW-144 (c)	MW-147	MW-149	MW-160
		Depth: (b)	27.5	27.5	26	30	33.5	26		31	27.5	29
		Date:	11/6/2012	11/6/2012	11/6/2012	11/7/2012	11/7/2012	11/7/2012		11/7/2012	11/6/2012	11/7/2012
1,1-Dichloroethane	4.9		ND (0.00050)	ND (0.00050)	0.0019 J	0.015	0.0051	0.0009 J	NS	ND (0.00050)	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.0070		0.0062	ND (0.00060)	0.0021 J	0.031	0.014	0.0028 J	NS	0.0063	ND (0.00060)	ND (0.00060)
1,2-Dichloroethane	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	NS	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.070		ND (0.0010)	ND (0.0010)	0.0073	0.03	0.0037 J	ND (0.0010)	NS	ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0050		ND (0.0010)	ND (0.0010)	0.027	0.17	0.034	ND (0.0010)	NS	ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0050		ND (0.0010)	ND (0.0010)	0.0098	0.039	0.007	ND (0.0010)	NS	ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.0020		ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0044	0.0011 J	ND (0.00050)	NS	ND (0.00050)	ND (0.00050)	ND (0.00050)

Constituent	Critical PCLs (a)	Location:	MW-161	MW-162	MW-163	MW-166	MW-167	MW-170	MW-171	MW-172	MW-173	
		Depth: (b)	30	33.5	28	BAILED	BAILED	25	24	25	BAILED	
		Date:	11/6/2012	12/6/2012	11/7/2012	11/7/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012	
1,1-Dichloroethane	4.9		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.029	0.0014 J	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.0070		ND (0.00060)	ND (0.00060)	ND (0.00060)	ND (0.00060)	0.0013 J	0.0089	0.15	0.0019 J	ND (0.00060)	ND (0.00060)
1,2-Dichloroethane	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0012 J	ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.014	ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.01	ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	0.0050		0.0040 J	0.0026 J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.022	ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.0020		ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.0012 J	ND (0.00050)	ND (0.00050)	ND (0.00050)

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, table for TRRP Rule dated March 25, 2009.

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

(c) Not sampled due to permanganate in well.

(d) Monitor well was inaccessible due to debris 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
Second Half 2012 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical PCLs (a)	Location:	MW-175	MW-176	MW-177
		Depth: (b)	BAILED	BAILED	BAILED
		Date:	11/8/2012	11/8/2012	11/8/2012
1,1-Dichloroethane	4.9		ND (0.00050)	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.0070		ND (0.00060)	ND (0.00060)	ND (0.00060)
1,2-Dichloroethane	0.0050		ND (0.00050)	ND (0.00050)	ND (0.00050)
cis-1,2-Dichloroethene	0.070		ND (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.0050		0.025	0.004 J	ND (0.0010)
Trichloroethene	0.0050		ND (0.0010)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.0020		ND (0.00050)	ND (0.00050)	ND (0.00050)

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, table for TRRP Rule dated March 25, 2009.

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

(c) Not sampled due to permanganate in well.

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TABLE 4

Summary of Surface Water Data
Second Half 2012 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical	80% Critical	Location:	SWD-12	SWD-14	SWD-15
	PCLs (a)	PCL (a)		Date:	11/28/2012	11/28/2012
1,1-Dichloroethane	5.13	4.10		ND (0.00050)	0.0017 J	0.0011 J
1,1-Dichloroethene	0.06	0.05		0.0020 J	0.0035 J	0.010
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 (0.0010)	ND (0.0010)	ND (0.0010)
Tetrachloroethene	0.790	0.632		ND (0.0010)	ND (0.0010)	ND (0.0010)
Trichloroethene	1.110	0.888		0.0022 J	0.0019 J	0.0032 J
Vinyl Chloride	0.0336	0.0269		ND (0.00050)	ND (0.00050)	ND (0.00050)

Constituent	Critical	80% Critical	Location:	SWD-17	SWD-18	SWD-20
	PCLs (a)	PCL (a)		Date:	11/28/2012	11/28/2012
1,1-Dichloroethane	5.13	4.10		ND (0.00050)	ND (0.00050)	ND (0.00050)
1,1-Dichloroethene	0.06	0.05		0.014	0.0035 J	0.0017 J
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 (0.0010)	ND (0.0010)
Tetrachloroethene	0.790	0.632		0.0019 J	0.0062	0.0038 J
Trichloroethene	1.110	0.888		ND (0.0010 J)	ND (0.0010)	ND (0.0010)
Vinyl Chloride	0.0336	0.0269		ND (0.00050)	ND (0.00050)	ND (0.00050)

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

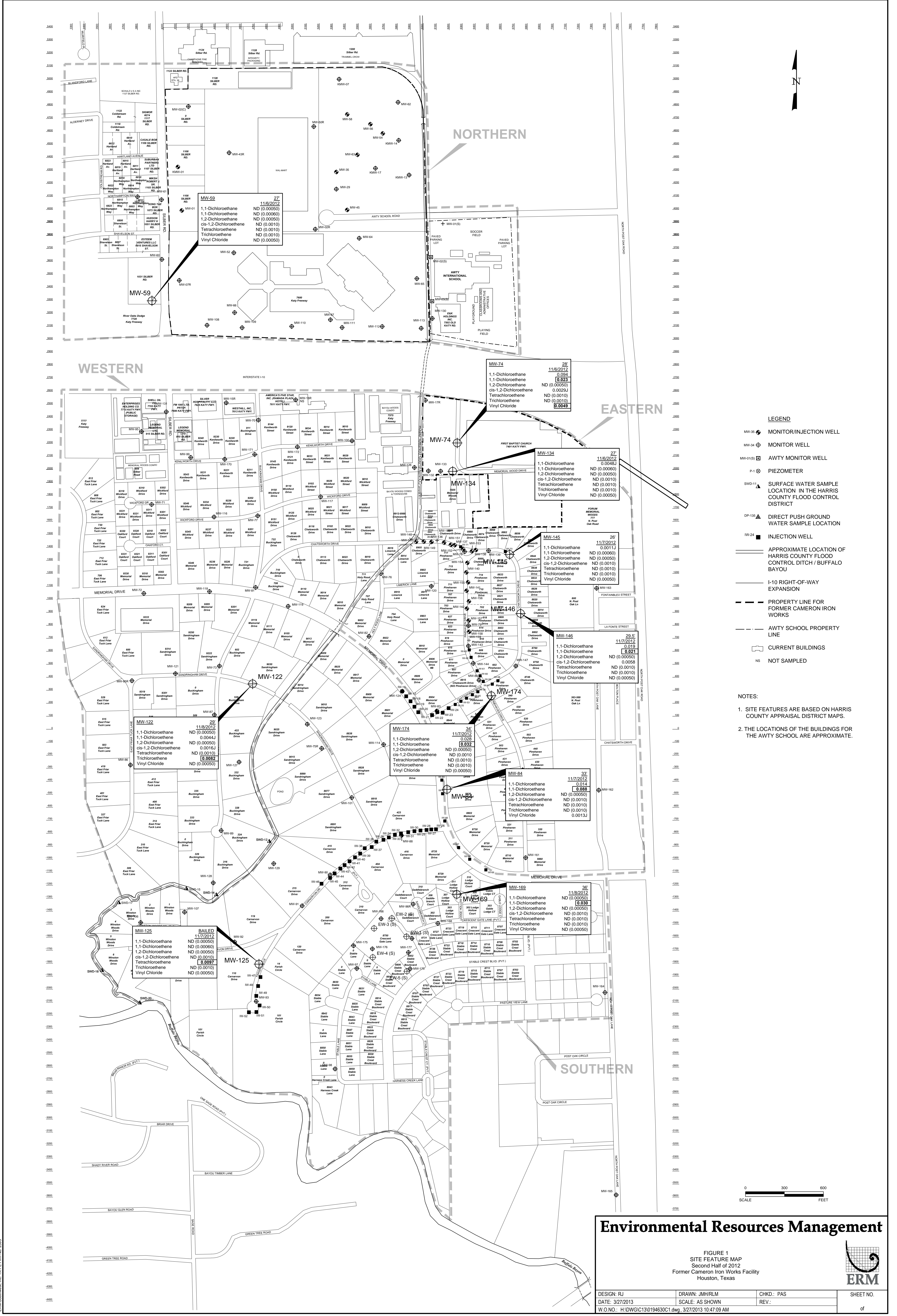
(a) Taken from the critical PCLs calculated in the *Human Health Ecological Risk Assessment for Surface Water and Sediment*, dated June 2003.

SWD = Surface Water Harris County Flood Control Ditch.

Figure
Attachment 2

April 2, 2013
Project No. 0194630

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



LEGEND

- MW-35 ◉ MONITOR/INJECTION WELL
- MW-34 ⊕ MONITOR WELL
- MW-015 ⊕ AWTY MONITOR WELL
- P-1 ⊕ PIEZOMETER
- SWD-11 ▲ SURFACE WATER SAMPLE LOCATION IN THE HARRIS COUNTY FLOOD CONTROL DISTRICT
- DP-135 ▲ DIRECT PUSH GROUND WATER SAMPLE LOCATION
- IW-24 ■ INJECTION WELL
- APPROXIMATE LOCATION OF HARRIS COUNTY FLOOD CONTROL DITCH/BUFFALO BAYOU
- I-10 RIGHT-OF-WAY EXPANSION
- - - PROPERTY LINE FOR FORMER CAMERON IRON WORKS
- - - AWTY SCHOOL PROPERTY LINE
- ▭ CURRENT BUILDINGS
- NS NOT SAMPLED

NOTES:

1. SITE FEATURES ARE BASED ON HARRIS COUNTY APPRAISAL DISTRICT MAPS.
2. THE LOCATIONS OF THE BUILDINGS FOR THE AWTY SCHOOL ARE APPROXIMATE.

Environmental Resources Management

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



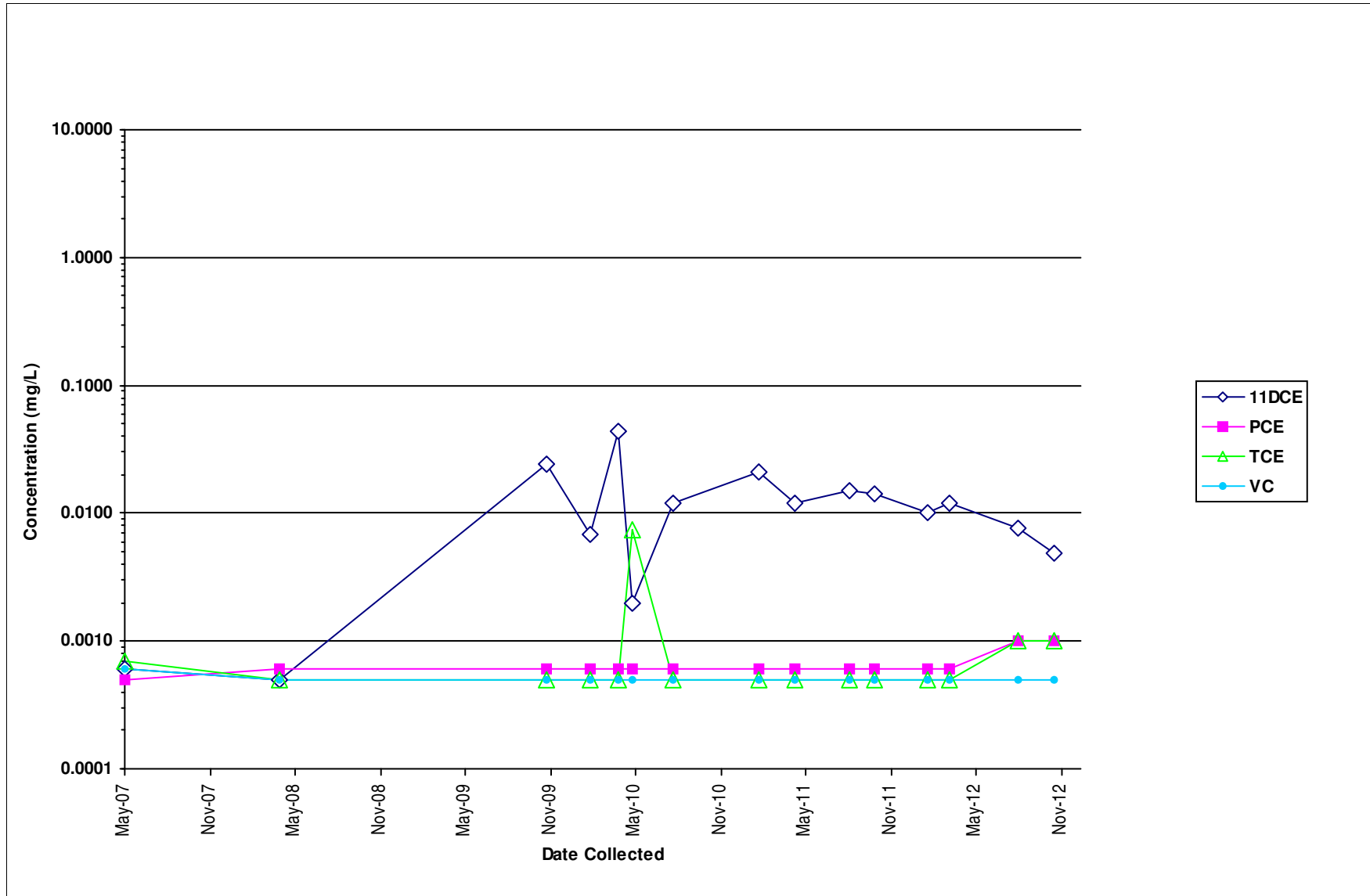
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Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-134

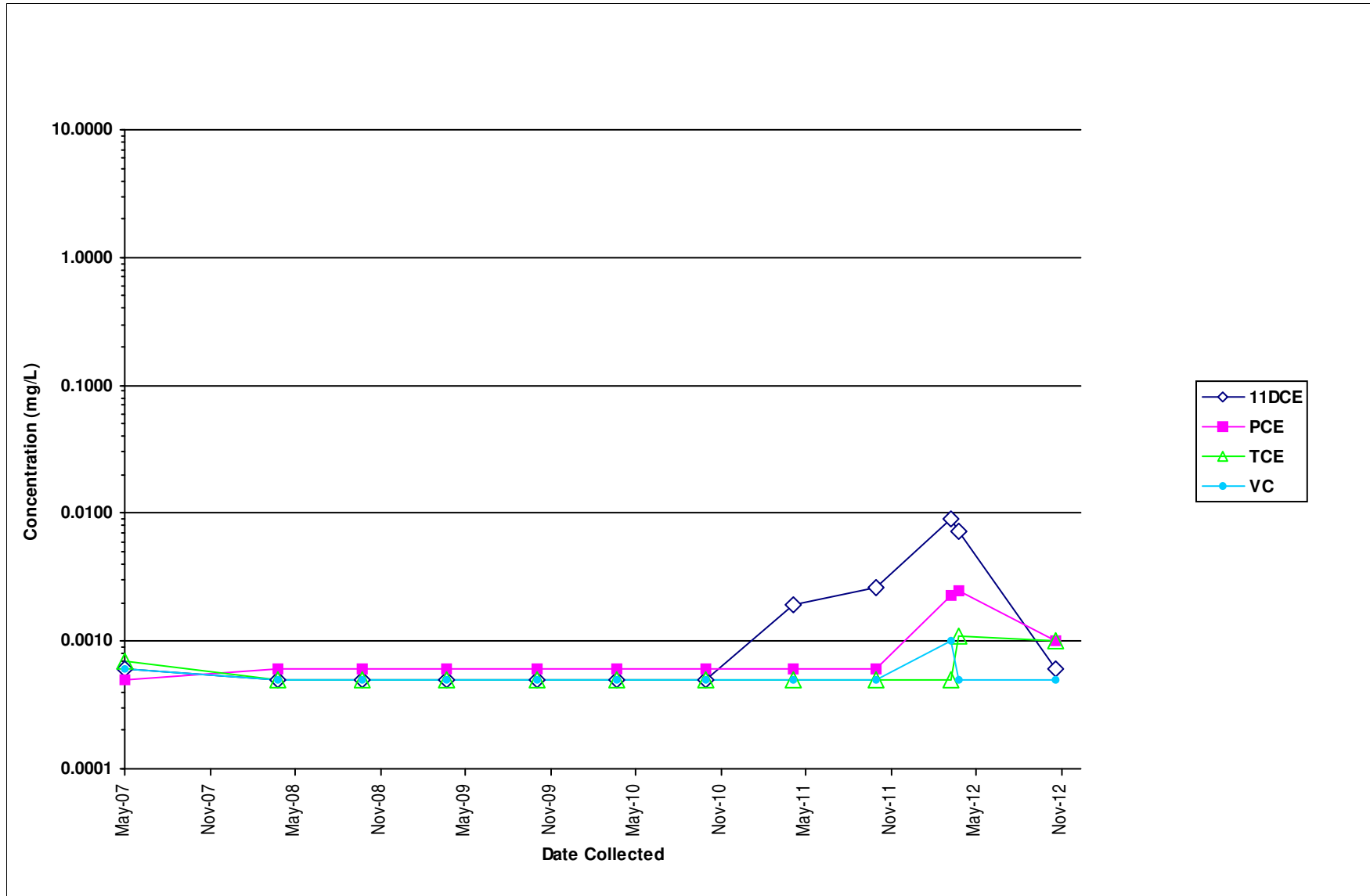


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-145

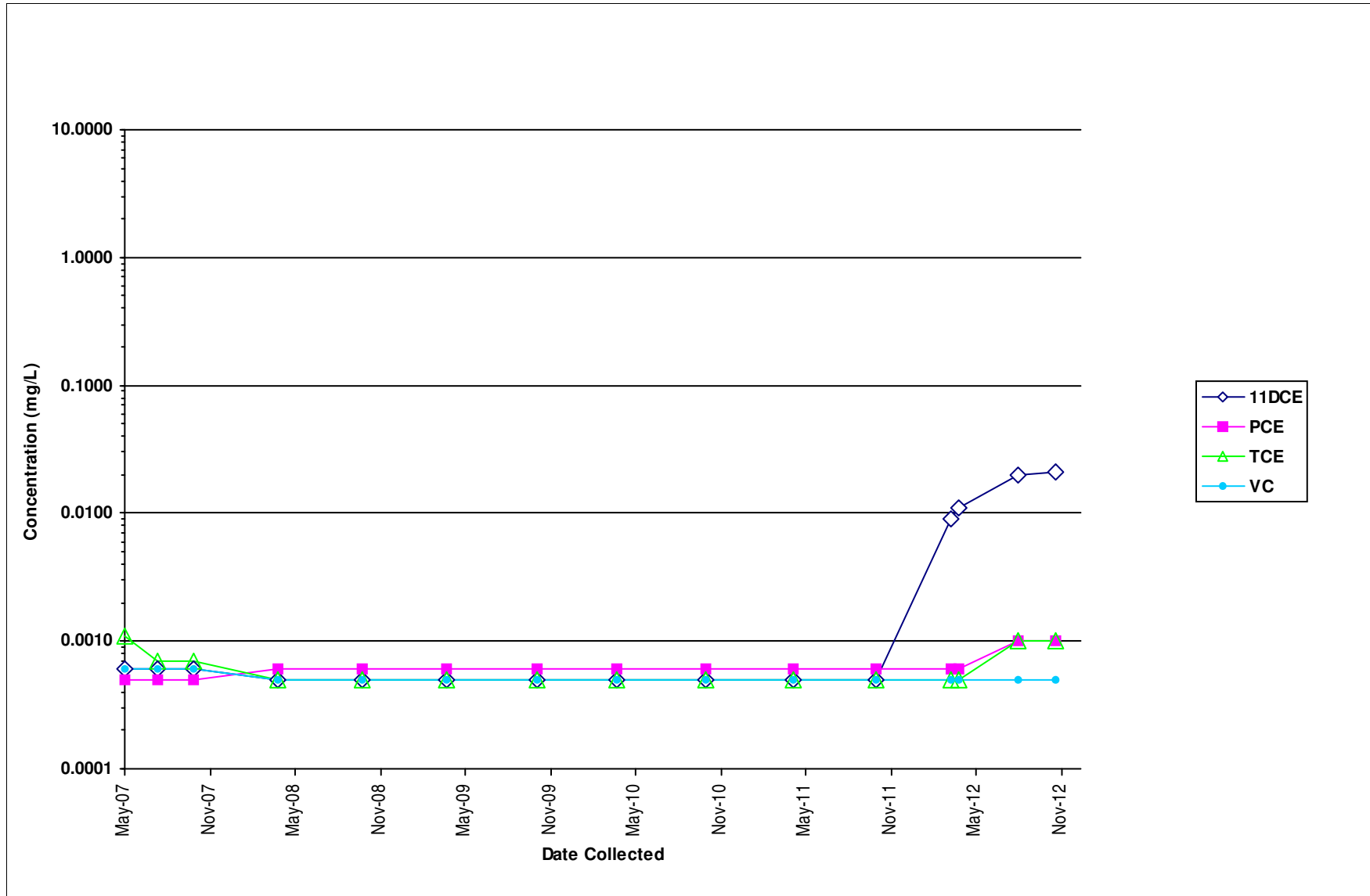


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-146

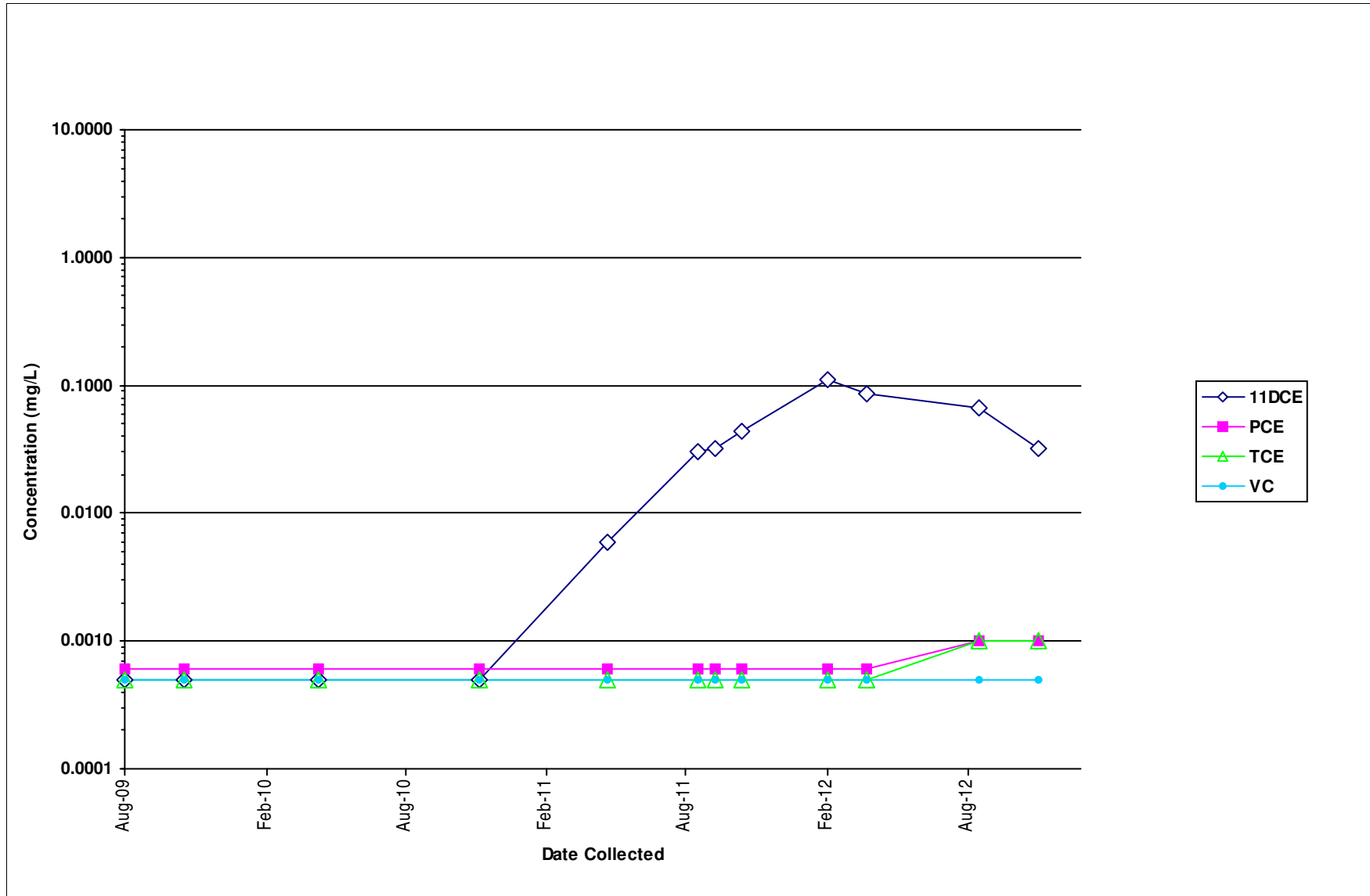


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-174

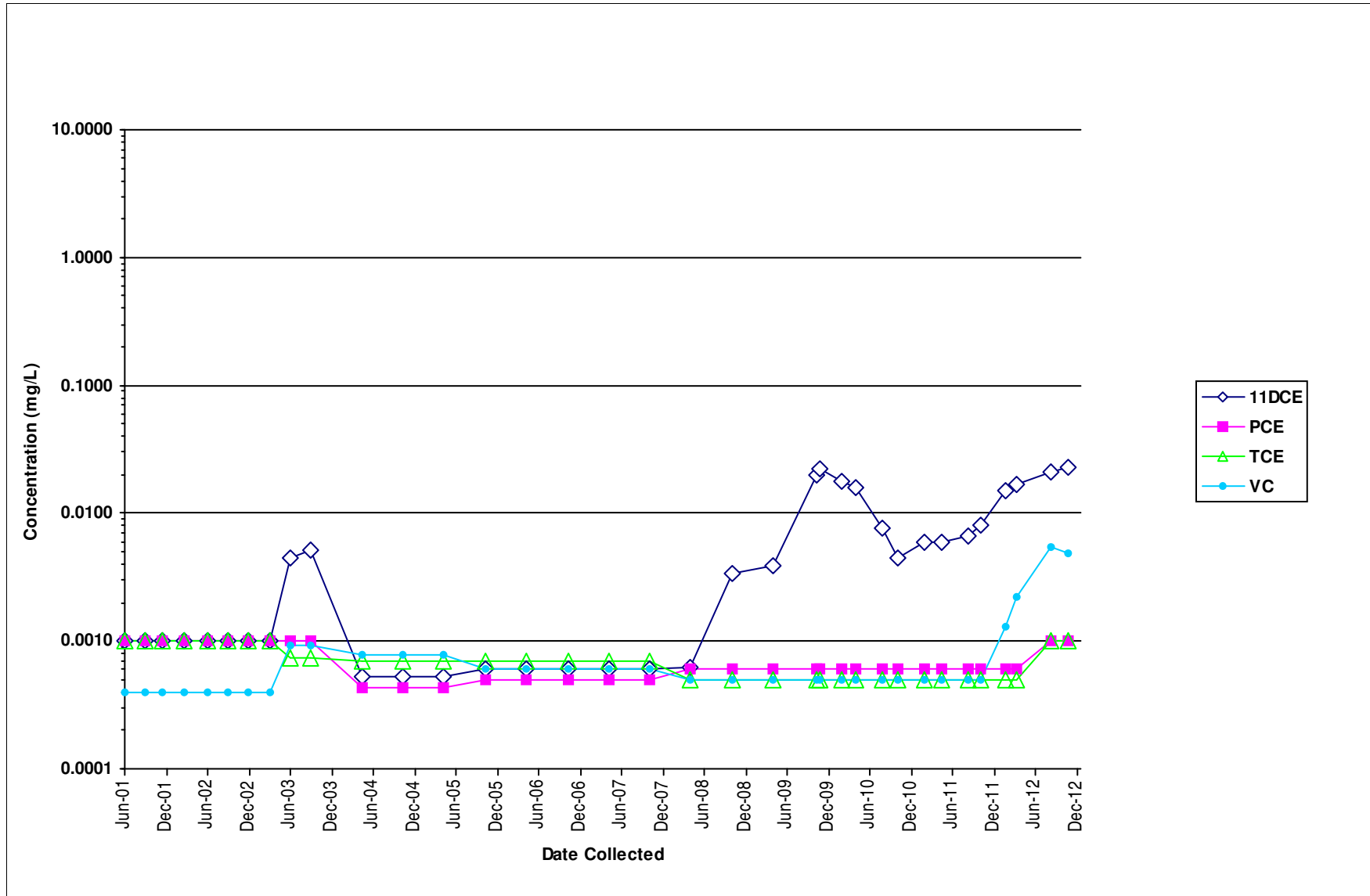


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-74

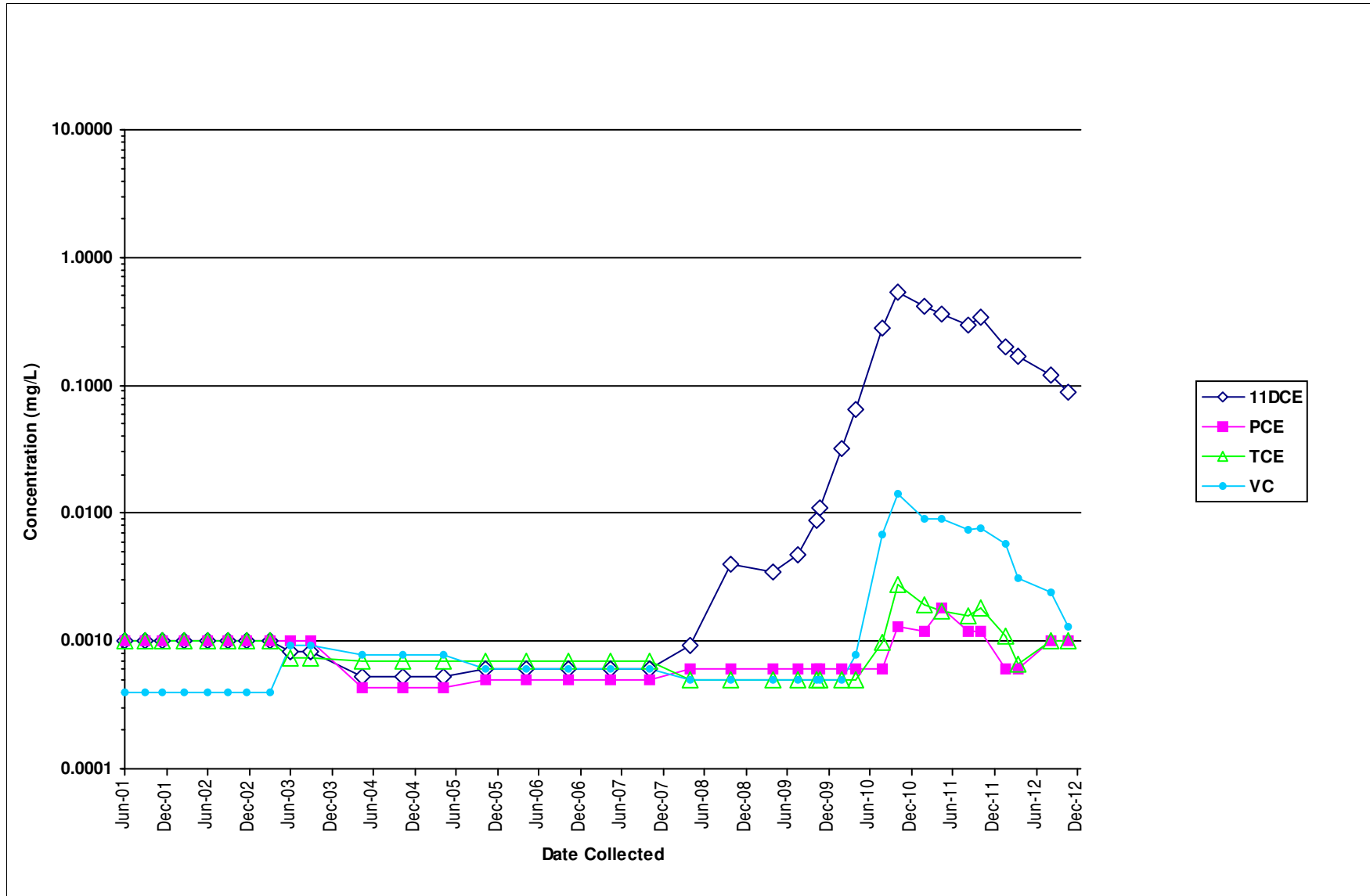


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Eastern

Client Sample ID: MW-84

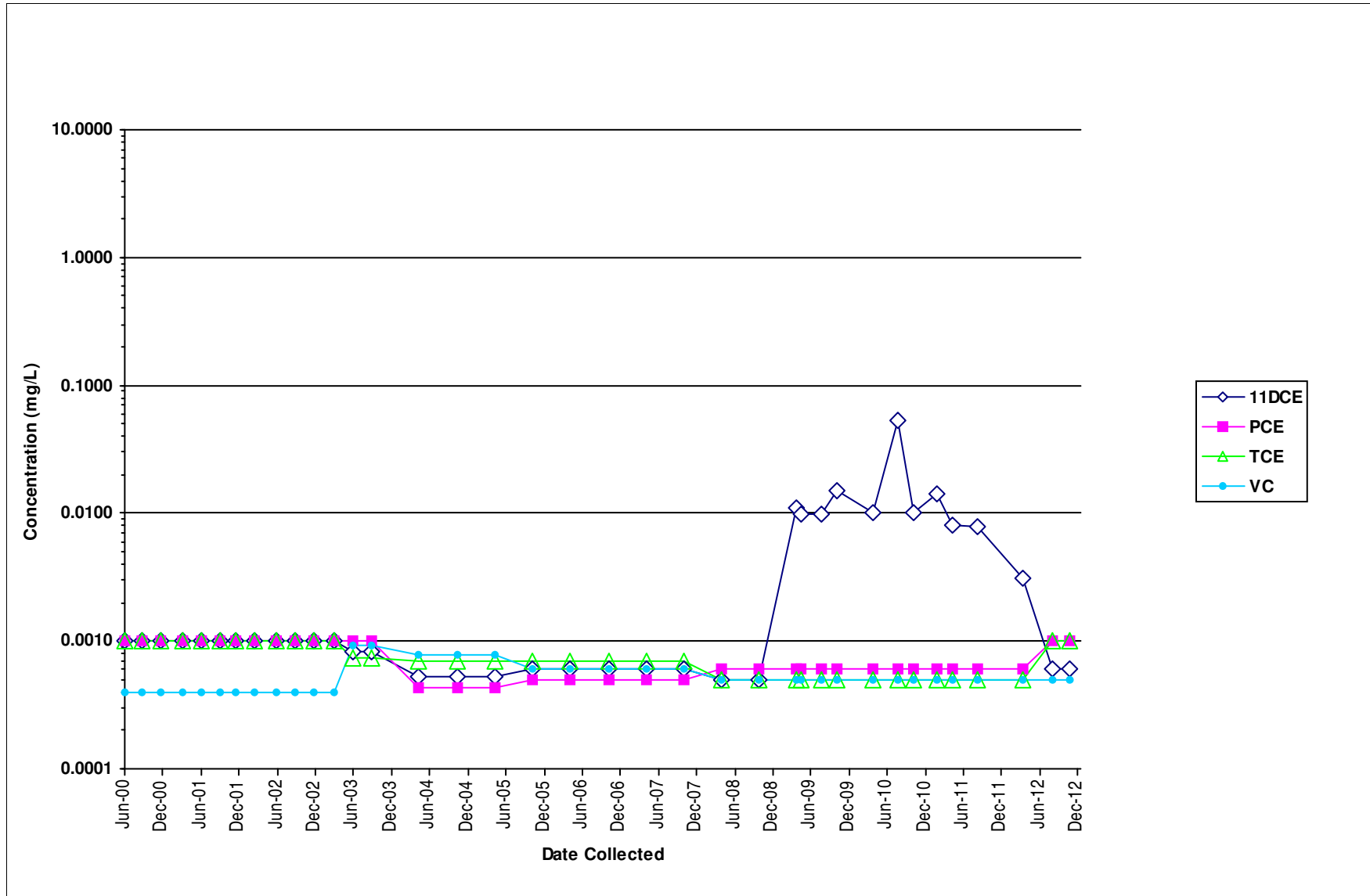


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Northern

Client Sample ID: MW-59

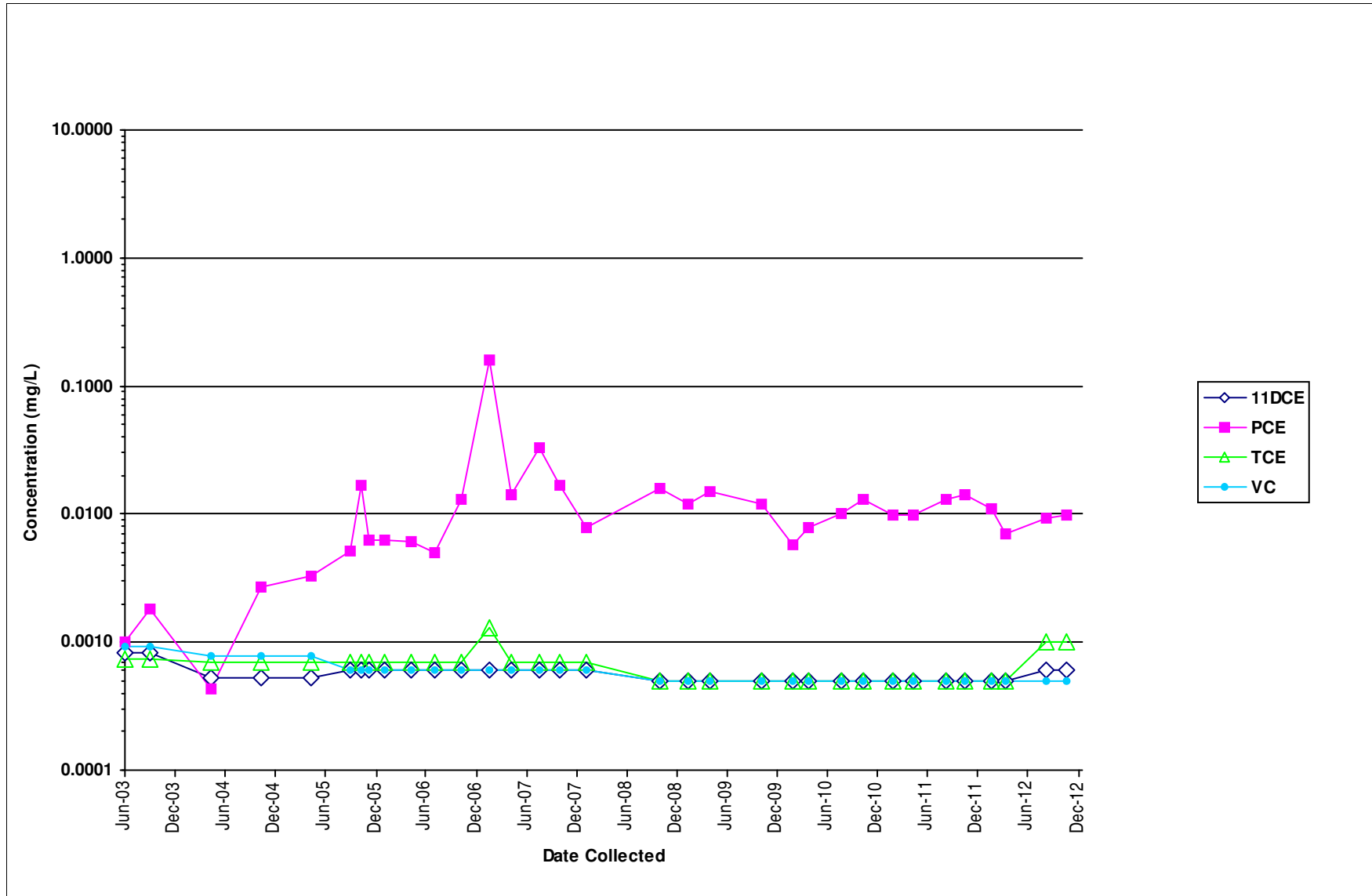


Ground Water Concentration Trend Graph

Former Cameron Iron Works Facility
Houston, Texas

Plume Area: Southern

Client Sample ID: MW-125

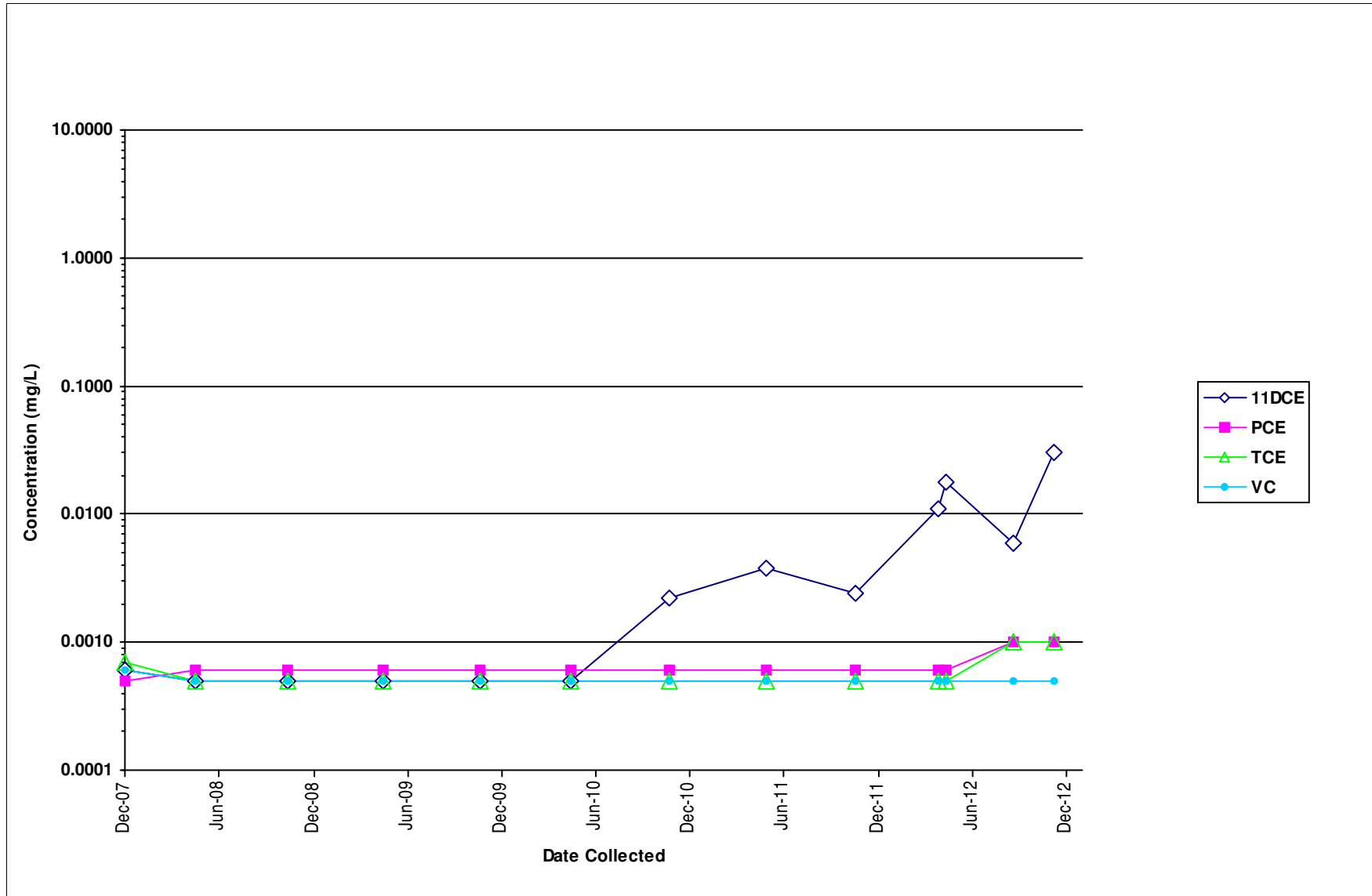


Ground Water Concentration Trend Graph

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

