Environmental Resources Management

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May 22, 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. 0223849

Subject: Second Half 2013 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 Second Half 2013 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 2013. 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 18, 2013 and December 13, 2013. A total of 110 ground water monitor wells were gauged and 109 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 2013 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

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 outlines a response to the plume movement induced by TXDOT's dewatering system. Cameron continues to address elevated concentrations of constituents of concern (COCs) at selected well locations where upward trends were previously identified. 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. The potential for more notifications appears to be high as the dewatering system continues to affect ground water flow patterns in the area.

Evaluation of Analytical Results from the Second Half 2013

The ground water analytical results collected during the Second Half of 2013 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 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.

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

Quarterly 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.

Northern (On-site) Area

At the former facility (on-site area), the southern boundary of the former facility is being controlled by the response action. The COC concentrations remain generally stable to decreasing at levels above their PCLs with the exceptions being MW-59, MW-67 and MW-111, which continue to report COCs as *Not Detected*.

On November 1, 2013, the TCEQ approved Cameron's request to plug and abandon the eight monitor wells to allow for redevelopment of the property. The wells, KMW-14, KMW-13, KMW-17, MW-54, MW-56, MW-58, MW-62 and MW-63 were located in the northeastern portion of the former facility. The re-installation of monitoring points in this portion of the site will be reevaluated following construction. The well plugging reports will be submitted in the 2013 Annual Ground Water Monitoring and Field Activities Summary Report.

From 1999 to 2009, the concentrations of site COCs have been reported as *Not Detected* in MW-03(S) which is located on the AWTY International School (AIS) property. However, with the change in ground water flow direction caused by the dewatering system, concentrations of 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE) and/or cis-1,2-dichloroethene(cis-

1,2-DCE) have been reported in MW-03(S) in each of the last eight sampling events at levels above the detection limit but below their respective PCLs.

Of the 26 monitor wells sampled in the Northern (on-site) Area in the Second Half 2013, 17 reported the site COCs as *Not Detected* or at levels below the PCLs.

Eastern (Off-site) Area

In the Second Half 2013 sampling event, both 1,1-DCE and vinyl chloride (VC) were reported at MW-74 above their respective PCLs. This monitor well is influenced by the dewatering system and will remain on the quarterly sampling schedule.

A permanganate treatment was conducted in March 2012 upgradient of MW-84 to address 1,1-DCE and VC in the area of this well. A review of the most-recent data indicates that VC has been reported as *Not Detected* for the last four sampling events. Although the latest data show 1,1-DCE above the PCL, a downward concentration trend in 1,1-DCE is apparent and this well will remain on the quarterly sampling schedule.

The reported concentrations of 1,1-DCE in MW-134 have decreased to levels below the PCL for the past five sampling events. The concentrations at MW-134 are influenced by the dewatering system. Cameron proposes to place MW-134 on the semi-annual monitoring schedule.

The concentrations of 1,1-DCE remained above the PCL in MW-174 and a downward trend has been observed in 2013. 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 generally remains within its historical footprint with many of the monitoring wells displaying stable to decreasing trends. Of the 11 trigger wells in this area, only one (MW-77) reported COC concentrations greater than their PCLs and eight monitor wells reported site COCs as *Not Detected.* MW-77 will be added to the quarterly schedule.

The concentrations of site COCs in MW-16R continued to show decreasing trends to below their respective PCLs for the third consecutive sampling event.

For the second consecutive sampling event, the concentrations of site COCs were reported below PCLs for MW-122 in the Second Half of 2013. MW-122 will remain on the quarterly sampling schedule.

Southern (Off-site) 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. A review of the capture zone of the Paraffine Partners treatment system suggests that the increasing trends may be associated with ground water pumping. If so, changes to the response action plan would be warranted.

Conclusions

Ground water concentrations were monitored at 109 monitor wells in the Second Half of 2013 to assess the effectiveness of the remedy.

The dewatering project at the I-610/I-10 Interchange is continuing to influence concentration trends in the on-site and off-site plumes causing unanticipated movement of affected ground water into previously unaffected areas. As a result of the induced plume movement caused by the dewatering system, ground water samples collected from MW-146, -147 and MW-169 (along the eastern and southern periphery of the plume) continued to report PCL exceedances of 1,1-DCE in the Second Half of 2013. The monitor wells to the east of MW-146, MW-147 and MW-169 reported COCs as *Not Detected*.

At the former facility (on-site area), downward COC concentration trends are observed in MW-52, MW-59 and MW-07R which lie upgradient from the treatment system near Silber Road. Along the southern boundary, MW-111 has reported COCs as *Not Detected* since 2011 and MW-67 has reported COCs as *Not Detected* since 2003.

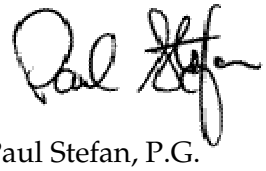
The dewatering system has affected the ground water flow direction along the eastern boundary of the former facility. As a result of the changed flow direction, MW-02(S), MW-03(S) and MW-130, located on the AWTY International School property, have transitioned from being cross gradient to the affected ground water on site to being potentially downgradient of the on-site affected ground water. MW-03(S) has reported at least one COC (1,1-DCA, 1,1-DCE and/or cis-1,2-DCE) at detectable levels, below their respective PCLs since 2010. Only one detection was reported in MW-03(S) (2005) in the between 1999 and 2009. This area will continue to be monitored for potential plume expansion during future sampling events.

The first quarter sampling event was conducted in February 2014, when select trigger wells were sampled as outlined in the RAP.

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

Sincerely,

Environmental Resources Management



Paul Stefan, P.G.

PAS/dd
Attachments

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

Tables

Attachment 1

May 22, 2014
Project No. 0223849

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
Second Half 2013 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Well [1]	COCs elevated above MQL	COCs elevated above PCL	Need for Additional Notification (Yes or No)	In-situ Treatment (Yes or No)	Sampling Frequency
MW-59			no (a)	no (b)	Quarterly
MW-74	1,1-dichloroethane		no (a)	no	Quarterly
MW-74	1,1-dichloroethene	1,1-dichloroethene	no (a)	no	Quarterly
MW-74	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	1,2-dichloroethane		no (a)	no	Quarterly
MW-122	cis-1,2-dichloroethene		no (a)	no	Quarterly
MW-122	tetrachloroethene		no (a)	no	Quarterly
MW-122	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-146	1,1-dichloroethene		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-169	1,1-dichloroethane		no (a)	no	Quarterly
MW-169	1,1-dichloroethene	1,1-dichloroethene	no (a)	no	Quarterly
MW-174	1,1-dichloroethane		no (a)	yes (c)	Quarterly
MW-174	1,1-dichloroethene	1,1-dichloroethene	no (a)	yes (c)	Quarterly
MW-174	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
[1] - Quarterly trigger well list as provided in TCEQ letter dated March 21, 2012.
(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 2013 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:	11/26/2013	11/26/2013	11/21/2013	12/5/2013	11/27/2013	11/21/2013	11/27/2013	12/5/2013	12/5/2013
1,1-Dichloroethane	0.00050	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.086	0.0058	0.014	ND(0.00050)	0.0056
1,1-Dichloroethene	0.00060	0.0070		ND(0.00060)	ND(0.00060)	ND(0.00060)	ND(0.00060)	**0.015**	**0.026**	**0.055**	ND(0.00060)	**0.019**
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)	0.0015 J	0.011	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)	**0.0089**	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)	**0.0051**	ND(0.00050)	0.0019 J	ND(0.00050)	ND(0.00050)

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:	12/5/2013	12/5/2013	11/26/2013	11/19/2013	11/19/2013	11/21/2013	12/5/2013	11/20/2013	11/20/2013
1,1-Dichloroethane	0.00050	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00053 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0034 J	ND(0.00050)
1,1-Dichloroethene	0.00060	0.0070		ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0035 J	ND(0.00060)	ND(0.00060)	ND(0.00060)	0.0058	ND(0.00060)
1,2-Dichloroethane	0.00050	0.0050		ND(0.00050)	0.00069 J	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.00054 J	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)	0.0014 J	ND(0.0010)
Tetrachloroethene	0.0010	0.0050		ND(0.0010)	ND(0.0010)	ND(0.0010)	**0.0064**	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0018 J	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)	0.0014 J	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:	11/19/2013	11/21/2013	11/27/2013	11/20/2013	11/20/2013	11/20/2013	11/19/2013	11/19/2013	11/19/2013
1,1-Dichloroethane	0.00050	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0024 J	0.0031 J	0.032	ND(0.00050)	0.0053	0.073
1,1-Dichloroethene	0.00060	0.0070		ND(0.0006)	ND(0.0006)	ND(0.0006)	0.0036 J	0.002 J	**0.049**	0.0018 J	**0.053**	**0.028**
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)	0.00071 J
cis-1,2-Dichloroethene	0.0010	0.070		ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0055	ND(0.0010)	ND(0.0010)	ND(0.0010)
Tetrachloroethene	0.0010	0.0050		**0.0065**	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)	ND(0.00050)	0.0013 J	ND(0.00050)	ND(0.00050)	0.00075 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
Second Half 2013 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical PCLs (a)	Location:	KMW-01	KMW-07	KMW-13	KMW-14	MW-01	MW-02(C)	MW-02(S)	MW-03(S)	MW-02R	MW-07R
		Depth: (b)	22.5	24			25		25	24.5	23	27
		Date:	12/5/2013	12/5/2013	PLUGGED	PLUGGED	11/26/2013	PLUGGED	12/13/2013	12/13/2013	11/19/2013	12/13/2013
1,1-Dichloroethane	4.9		NA	NA			0.0018 J		NA	NA	0.02	ND(0.00050)
1,1-Dichloroethene	0.0070		0.0013 J	ND(0.0006)			0.0061		ND(0.0006)	ND(0.0006)	**0.025**	ND(0.0006)
1,2-Dichloroethane	0.0050		NA	NA			ND(0.00050)		NA	NA	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.0010)	ND(0.0010)			ND(0.0010)		ND(0.0010)	0.0013 J	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)	ND(0.0010)
Trichloroethene	0.0050		ND(0.0010)	ND(0.0010)			ND(0.0010)		ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)
Vinyl Chloride	0.0020		0.00083 J	ND(0.00050)			ND(0.00050)		ND(0.00050)	ND(0.00050)	0.0019	ND(0.00050)

Constituent	Critical PCLs (a)	Location:	MW-15R	MW-16R	MW-35	MW-43R	MW-50R	MW-52	MW-54	MW-56	MW-58	MW-60
		Depth: (b)	33.5	26		24	23	25				34
		Date:	11/26/2013	11/26/2013	12/5/2013	11/26/2013	12/5/2013	11/20/2013	PLUGGED	PLUGGED	PLUGGED	11/26/2013
1,1-Dichloroethane	4.9		0.0039 J	0.0017 J	NA	ND(0.00060)	NA	NA				ND(0.00050)
1,1-Dichloroethene	0.0070		**0.022**	0.00084 J	ND(0.0006)	ND(0.0010)	**0.14**	**0.033**				ND(0.0006)
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	NA	0.0031	NA	NA				ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0013 J	**0.026**	ND(0.0010)				ND(0.0010)
Tetrachloroethene	0.0050		0.0038 J	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.012	ND(0.0010)				ND(0.0010)
Trichloroethene	0.0050		0.001 J	ND(0.0010)	ND(0.0010)	0.00056 J	**0.03**	ND(0.0010)				ND(0.0010)
Vinyl Chloride	0.0020		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.0010)	**0.11**	0.00072 J				ND(0.00050)

Constituent	Critical PCLs (a)	Location:	MW-61	MW-62	MW-63	MW-64	MW-65	MW-66	MW-67	MW-70	MW-73	MW-75R
		Depth: (b)	23			25	25	27	28	27	27	34.5
		Date:	11/26/2013	PLUGGED	PLUGGED	11/19/2013	11/19/2013	11/26/2013	11/20/2013	11/21/2013	12/5/2013	11/20/2013
1,1-Dichloroethane	4.9		ND(0.00050)			ND(0.00050)	0.023	0.1	NA	0.093	0.014	0.00053 J
1,1-Dichloroethene	0.0070		ND(0.0006)			ND(0.0006)	0.0023 J	**0.06**	ND(0.0006)	**0.19**	**0.092**	0.0036 J
1,2-Dichloroethane	0.0050		ND(0.00050)			ND(0.00050)	ND(0.00050)	ND(0.00050)	NA	0.0032 J	0.00071 J	ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.0010)			ND(0.0010)	0.0043 J	0.036	ND(0.0010)	0.036	0.0049 J	0.0018 J
Tetrachloroethene	0.0050		ND(0.0010)			ND(0.0010)	ND(0.0010)	**0.027**	ND(0.0010)	**0.035**	**0.0088**	ND(0.0010)
Trichloroethene	0.0050		ND(0.0010)			ND(0.0010)	ND(0.0010)	0.0036 J	ND(0.0010)	**0.031**	0.0041 J	**0.0072**
Vinyl Chloride	0.0020		ND(0.00050)			ND(0.00050)	**0.0021**	**0.03**	ND(0.00050)	**0.0061**	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, 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
Second Half 2013 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	MW-89	MW-90	MW-91
		Depth: (b)	31	27.5	33	31	31.5	33	BAILED	BAILED	BAILED	BAILED
		Date:	11/27/2013	11/20/2013	11/20/2013	11/27/2013	11/27/2013	11/20/2013	11/20/2013	11/20/2013	11/20/2013	11/19/2013
1,1-Dichloroethane	4.9		0.005	0.0012 J	0.035	0.031	0.012	0.0034 J	0.0031 J	0.0057	0.01	0.013
1,1-Dichloroethene	0.0070		0.014	0.0011 J	**0.066**	**0.088**	**0.031**	**0.049**	**0.015**	**0.023**	**0.045**	**0.058**
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	0.00084 J	ND(0.00050)	0.00086 J	ND(0.00050)	0.0007 J	0.00075 J	0.00072 J	0.001 J
cis-1,2-Dichloroethene	0.070		0.0015 J	0.0023 J	**0.16**	0.012	0.022	ND(0.0010)	0.012	0.0015 J	0.0031 J	0.0047 J
Tetrachloroethene	0.0050		ND(0.0010)	0.0025 J	**0.77**	**0.11**	**0.2**	ND(0.0010)	**0.26**	ND(0.0010)	**0.06**	**0.099**
Trichloroethene	0.0050		ND(0.0010)	ND(0.0010)	**0.19**	**0.019**	**0.031**	ND(0.0010)	**0.028**	**0.0067**	**0.018**	**0.014**
Vinyl Chloride	0.0020		ND(0.00050)	0.00056 J	**0.015**	**0.0025**	**0.0039**	ND(0.00050)	0.0014 J	ND(0.00050)	ND(0.00050)	ND(0.00050)

Constituent	Critical PCLs (a)	Location:	MW-92	MW-93	MW-94	MW-96R	MW-99	MW-100	MW-101	MW-102	MW-106	MW-107
		Depth: (b)	BAILED	BAILED	25	35	34	32.5	33	BAILED	BAILED	BAILED
		Date:	11/19/2013	11/19/2013	11/26/2013	11/19/2013	11/21/2013	11/21/2013	11/20/2013	11/19/2013	11/19/2013	11/19/2013
1,1-Dichloroethane	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0044 J	ND(0.00050)	0.0024 J	0.0046 J	ND(0.00050)	ND(0.00050)	0.0054
1,1-Dichloroethene	0.0070		0.0034 J	0.002 J	ND(0.0006)	**0.011**	ND(0.0006)	0.0019 J	**0.012**	ND(0.0006)	0.001 J	**0.047**
1,2-Dichloroethane	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)	0.00085 J
cis-1,2-Dichloroethene	0.070		0.0017 J	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0028 J	0.0015 J	ND(0.0010)	0.0018 J	ND(0.0010)
Tetrachloroethene	0.0050		**0.22**	**0.02**	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0012 J	**0.025**	**0.17**	**0.34**	**0.083**
Trichloroethene	0.0050		**0.01**	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0015 J	0.0043 J	0.0024 J	**0.0085**	0.0042 J
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-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:	11/20/2013	11/20/2013	11/20/2013	12/5/2013	11/26/2013	11/19/2013	11/18/2013	11/18/2013	11/21/2013	12/5/2013
1,1-Dichloroethane	4.9		NA	NA	NA	NA	0.059	0.031	0.029	ND(0.00050)	0.0036 J	0.0059
1,1-Dichloroethene	0.0070		**0.3**	**0.028**	**0.011**	ND(0.0006)	**0.08**	0.0017 J	**0.1**	**0.1**	**0.017**	**0.037**
1,2-Dichloroethane	0.0050		NA	NA	NA	NA	**0.0087**	ND(0.00050)	ND(0.00050)	0.004 J	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	0.070		0.0037 J	**0.14**	**0.032**	ND(0.0010)	0.048	ND(0.0010)	0.033	ND(0.0010)	0.0022 J	0.0017 J
Tetrachloroethene	0.0050		0.0031 J	**0.0079**	0.0021 J	ND(0.0010)	ND(0.0010)	ND(0.0010)	**0.063**	ND(0.0010)	0.0014 J	0.0037 J
Trichloroethene	0.0050		**0.013**	**0.012**	0.008	ND(0.0010)	0.0024 J	ND(0.0010)	**0.039**	0.0031 J	0.0041 J	0.0021 J
Vinyl Chloride	0.0020		**0.0084**	**0.015**	**0.0044**	ND(0.00050)	ND(0.00050)	0.00073 J	**0.0039**	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, 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
Second Half 2013 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 (d)	MW-129	MW-130	MW-132
		Depth: (b)	29	25	28	29	26	32		BAILED	27	27.5
		Date:	12/5/2013	11/27/2013	12/5/2013	12/5/2013	11/26/2013	11/18/2013		11/20/2013	12/13/2013	11/26/2013
1,1-Dichloroethane	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0051	ND(0.00050)	ND(0.00050)	NS	0.022	NA	ND(0.00050)
1,1-Dichloroethene	0.0070		ND(0.0006)	ND(0.0006)	0.0035 J	**0.02**	ND(0.0006)	0.0016 J	NS	**0.016**	ND(0.0006)	ND(0.0006)
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0011 J	ND(0.00050)	ND(0.00050)	NS	ND(0.00050)	NA	ND(0.00050)
cis-1,2-Dichloroethene	0.070		ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0081	ND(0.0010)	ND(0.0010)	NS	ND(0.0010)	ND(0.0010)	ND(0.0010)
Tetrachloroethene	0.0050		ND(0.0010)	0.0029 J	ND(0.0010)	**0.048**	ND(0.0010)	ND(0.0010)	NS	0.0017 J	ND(0.0010)	ND(0.0010)
Trichloroethene	0.0050		ND(0.0010)	ND(0.0010)	ND(0.0010)	**0.01**	ND(0.0010)	0.001 J	NS	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)	NS	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	MW-147	MW-149	MW-160
		Depth: (b)	27.5	27.5	26	30	33.5	26		31	27.5	29
		Date:	11/26/2013	11/20/2013	11/27/2013	12/13/2013	11/20/2013	11/20/2013	11/20/2013	11/27/2013	11/20/2013	11/19/2013
1,1-Dichloroethane	4.9		0.00086 J	ND(0.00050)	0.0032 J	0.06	0.0074	0.00054 J	0.02	0.0017 J	ND(0.00050)	ND(0.00050)
1,1-Dichloroethene	0.0070		0.0054	ND(0.0006)	0.0064	**0.19**	**0.014**	0.0016 J	ND(0.0006)	**0.035**	ND(0.0006)	ND(0.0006)
1,2-Dichloroethane	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	0.070		ND(0.0010)	ND(0.0010)	0.015	**0.2**	0.0096	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0010)
Tetrachloroethene	0.0050		ND(0.0010)	ND(0.0010)	**0.011**	**0.4**	**0.083**	ND(0.0010)	**0.019**	ND(0.0010)	0.0015 J	ND(0.0010)
Trichloroethene	0.0050		ND(0.0010)	ND(0.0010)	0.0031 J	**0.11**	**0.018**	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)	**0.0031**	**0.046**	0.0017 J	ND(0.00050)	ND(0.00050)	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:	11/19/2013	11/19/2013	11/19/2013	11/18/2013	11/19/2013	11/21/2013	11/21/2013	11/21/2013	11/18/2013
1,1-Dichloroethane	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.077	0.039	0.0016 J	ND(0.00050)	ND(0.00050)
1,1-Dichloroethene	0.0070		0.00098 J	ND(0.0006)	ND(0.0006)	0.002 J	**0.29**	**0.16**	0.0011 J	ND(0.0006)	ND(0.0006)
1,2-Dichloroethane	0.0050		ND(0.00050)	ND(0.00050)	ND(0.00050)	ND(0.00050)	0.0014 J	0.0015 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)	0.0022 J	0.018	ND(0.0010)	ND(0.0010)	ND(0.0010)
Tetrachloroethene	0.0050		ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0011 J	ND(0.0010)	0.015	ND(0.0010)	ND(0.0010)	ND(0.0010)
Trichloroethene	0.0050		0.0013 J	ND(0.0010)	ND(0.0010)	ND(0.0010)	0.0013 J	**0.026**	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)	**0.0059**	0.0013 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, 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
Second Half 2013 Monitoring Data Transmittal

Former Cameron Iron Works Facility
Houston, Texas

Constituent	Critical PCLs (a)	Location: / Depth: (b) / Date:	MW-175 BAILED 11/18/2013	MW-176 BAILED 11/18/2013	MW-177 BAILED 11/18/2013
1,1-Dichloroethane	4.9		ND(0.00050)	ND(0.00050)	ND(0.00050)
1,1-Dichloroethene	0.0070		0.002 J	ND(0.0006)	ND(0.0006)
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		**0.059**	0.0023 J	ND(0.0010)
Trichloroethene	0.0050		0.0021 J	0.001 J	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, 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
Second Half 2013 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:	12/13/2013	12/13/2013	12/13/2013
1,1-Dichloroethane	5.13	4.10		ND(0.00050)	0.0014 J	ND(0.00050)
1,1-Dichloroethene	0.06	0.05		ND(0.00060)	ND(0.00060)	0.030
1,2-Dichloroethane	0.554	0.443		ND(0.00050)	ND(0.00050)	ND(0.00050)
cis-1,2-Dichloroethene	9.36	7.49		0.0011 J	0.0013 J	0.0016 J
Tetrachloroethene	0.790	0.632		ND(0.0010)	ND(0.0010)	ND(0.0010)
Trichloroethene	1.110	0.888		0.0022 J	ND(0.0010)	0.0048 J
Vinyl Chloride	0.0336	0.0269		ND(0.00050)	ND(0.00050)	ND(0.00050)

Constituent	Critical PCLs (a)	80% Critical PCL (a)	Location:	SWD-17	SWD-18	SWD-20
			Date:	12/13/2013	12/13/2013	12/13/2013
1,1-Dichloroethane	5.13	4.10		0.0012 J	ND(0.00050)	ND(0.00050)
1,1-Dichloroethene	0.06	0.05		0.049	0.0064	ND(0.00060)
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		0.0010 J	0.0066	0.0030 J
Trichloroethene	1.110	0.888		0.0025 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

May 22, 2014
Project No. 0223849

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

LEGEND

- MONITOR WELL
- MONITOR/INJECTION WELL
- INJECTION WELL
- PLUGGED AND ABANDONED WELL
- SURFACE WATER SAMPLE LOCATION

N

NORTHERN

WESTERN

EASTERN

MW-59	27'
	11/26/2013
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	ND (0.00060)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-74	28'
	11/27/2013
1,1-Dichloroethane	0.086
1,1-Dichloroethene	**0.015**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	0.0015J
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	**0.0051**

MW-134	27'
	11/27/2013
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	ND (0.0060)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-145	26'
	11/20/2013
1,1-Dichloroethane	0.0031J
1,1-Dichloroethene	0.002J
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-146	29.5'
	11/20/2013
1,1-Dichloroethane	0.032
1,1-Dichloroethene	**0.049**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	0.0055
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	0.0013J

MW-122	29'
	11/20/2013
1,1-Dichloroethane	0.0034J
1,1-Dichloroethene	0.0058
1,2-Dichloroethane	0.00054J
cis-1,2-Dichloroethene	0.0014J
Tetrachloroethene	0.0018J
Trichloroethene	0.0014J
Vinyl Chloride	ND (0.00050)

MW-174	34'
	11/19/2013
1,1-Dichloroethane	0.073
1,1-Dichloroethene	**0.028**
1,2-Dichloroethane	0.00071J
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	0.00075J

MW-84	33'
	12/5/2013
1,1-Dichloroethane	0.0056
1,1-Dichloroethene	**0.019**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-169	36'
	11/19/2013
1,1-Dichloroethane	0.0053
1,1-Dichloroethene	**0.053**
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	ND (0.0010)
Trichloroethene	ND (0.0010)
Vinyl Chloride	ND (0.00050)

MW-125	BAILED
	11/19/2013
1,1-Dichloroethane	ND (0.00050)
1,1-Dichloroethene	ND (0.00060)
1,2-Dichloroethane	ND (0.00050)
cis-1,2-Dichloroethene	ND (0.0010)
Tetrachloroethene	**0.0065**
Trichloroethene	ND (0.010)
Vinyl Chloride	ND (0.00050)

0 550 1100

SCALE FEET

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

Environmental Resources Management

FIGURE 1
SITE FEATURE MAP
Second Half of 2013
Former Cameron Iron Works Facility
Houston, Texas

DESIGN: RJ	DRAWN: JMH	CHKD.: PAS
DATE: 4/3/2014	SCALE: AS SHOWN	REV.:

W.O.NO.: H:\DWG\D14\0223849B1-2nd HALF -2013.dwg , 4/3/2014 9:06:46 AM

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