

PUMA ENERGY CARIBE, L.L.C

January 21, 2016

Delivered via Hand delivered

David N. Cuevas-Miranda, Ph.D. Geologist/Marine Scientist Senior RCRA Corrective Action Project Manager US EPA-Region 2 Caribbean Environmental Protection Division 48 CARR 165 STE 7000 City View Plaza II Guaynabo, PR 00968-8073

Subject:

Responses and RCRA RFI implementation final Report for the former CAPECO site facility in Bayamon Puerto Rico.

Dear Mr. Cuevas:

After the approval by United States Environmental Protection Agency (EPA) of the, Final RCRA RFI Work Plan in March 19, 2013, and in response to the comments received from USEPA on November 12, 2015, please find attached PUMA Energy Caribe, LLC's (PUMA) RFI Implementation Final report as requested by the United States Environmental Protection Agency (EPA) in the Docket Num. II RCRA-95-3008(h)-0303 document, Section IX of the 1995 AOC.

During the meeting on January 12, 2016 it was agreed that once these responses were received USEPA the RFI will be accepted, once Puma submits the supplementary report from the data gaps is submitted to USEPA, the RFI will be considered complete.

In addition to the responses we are including for you approval the proposed Scope of Work discussed with you during our meeting on January 12, 2016, to complete the data gap requested by USEPA to complete the RFI. In addition, as discussed in the August 13, 2015 conference call with USEPA, PUMA, and ARCADIS, sample results will be compared to the most recent USEPA Regional Screening Levels (RSLs) in a separate submittal following completion of the RFI Report. As agreed by USEPA, PUMA, and ARCADIS, those same RSLs will then be used in subsequent reports moving forward; no further changes to human health screening levels will be conducted for this project.

Puma will begin the implementation of the Bi annual sampling event of the 72 monitoring wells that be on June, 2016 and December 2016. Groundwater samples will be analyze for VOCs +MTBE via USEPA SW846 Method 8260, Polycyclic Aromatic Hydrocarbons (PAHs) via USEPA SW846 Method 8270, Total Petroleum Hydrocarbons (TPH) via USEPA Method 8015 or similar, and total and dissolved mercury, lead, chromium, vanadium and arsenic via USEPA SW846 Method 6010/7470.

Once the result of the Bi-annual event have been compared to the most recent USEPA RSLs, PUMA will evaluate if the next annual events will include all monitoring wells or lees will be sampled.

Please feel free to contact me at 787.966.7331 or 787.600.5943 should you have any question or require additional information regarding this document.

Sincerely,

PUMA Energy Caribe, LLC

Brenda Toraño Díaz, PE

EHS Manager Enclosures

TECHNICAL REVIEW OF THE REVISED RCRA FACILITY INVESTIGATION REPORT, PUMA ENERGY CARIBE LLC SEPTEMBER 2015 FORMER CARIBBEAN PETROLEUM REFINING TERMINAL BAYAMON, PUERTO RICO

(EPA ID. No. PRD000632182)

EPA Comment

Response to Comment

II. General Comments

On the letter issued on June 22, 2015 about the Draft RFI Report, EPA made general comments about Puma's holistic approach and correlations between previous investigations and current RFI and any deviations from the 2013 RFI Work Plan. The Revised RFI Report addresses the previous comments satisfactorily, providing a list of the SWMUs and AOCs that have been removed (pages 9-17 and Figures 6-7) and sampled in previous investigations and also providing a description of those areas that have been excavated and backfilled with clean soil as part of the construction activities (Figure 18). According to this information, previous investigations before the 2009 fire and explosion already addressed nature and extent of contaminants from most of the former SWMUs and AOCs. Subsequently most of these SWMUs/AOCs were removed as part of the demolition and construction activities carried out by Puma for the new terminal. Furthermore, two areas that historically reported LNAPL thickness of over six inches (i.e. beneath the former Old East Separator and former Tank 481) were excavated to water table depth (Figure 18) and contaminated soil and water were subsequently removed and disposed accordingly. This is evident now as LNAPL thickness is less than an inch in these areas.

Nonetheless, there are areas in which soil samples were not taken and were targeted in the 2013 RFI Work Plan. These areas were potentially impacted by releases from the 2009 accident and, according to the Revised RFI Report, no construction activity or excavation were conducted. Thus, these are soil data gaps that need to be addressed in order to consider the RFI complete. Specifically

- Former location of Old Oil Lagoons (SWMU 11) and area North of Avenue D
- Former location of SWMUs 33, 34 and 35

Puma will prepare a work plan to propose soil sampling to address the soil data gaps at the former location of Old Oil Lagoons (SWMU 11) and former location of SWMUS 33, 34 and 35. Due to the presence of wetlands in the area north of Avenue D, samples will be collected in that area using hand auger techniques.

The area of the WWTP Puma will install and sample 2 additional wells.

Proposed Scope Of work is included in these responses

TECHNICAL REVIEW OF THE REVISED RCRA FACILITY INVESTIGATION REPORT, PUMA ENERGY CARIBE LLC SEPTEMBER 2015 FORMER CARIBBEAN PETROLEUM REFINING TERMINAL BAYAMON, PUERTO RICO (EPA ID. No. PRD000632182) EPA Comment Response to Comment

WWTP area

The WWTP area is going to be addressed after Puma concludes its demolition by the third quarter of 2016. Puma will install new monitoring wells to asses any residual LNAPL. If the WWTP area is not going to be excavated, EPA recommends that Puma shall consider taking soil samples in conjunction with well installation activities.

EPA concurs with Puma's recommendation of implementing periodic sampling events consisting of semi-annual groundwater sampling for the first year and annual groundwater sampling for three years. If the data is consisting with the current conditions, EPA will update the Environmental Indicators (Els) determinations to the positive status granted prior to the 2009 accident. Notwithstanding, Puma needs to address the soil data gaps mentioned earlier in order to have sufficient information to grant a positive status to the "Current Human Exposure under Control" determination. Furthermore, considering the RFI is in its late stages, EPA recommends that Puma begin planning for the final remedial alternatives for the Site.

TECHNICAL REVIEW OF THE REVISED RCRA FACILITY INVESTIGATION REPORT, PUMA ENERGY CARIBE LLC SEPTEMBER 2015 FORMER CARIBBEAN PETROLEUM REFINING TERMINAL BAYAMON, PUERTO RICO

(EPA ID. No. PRD000632182)

(EFA ID. NO. PRD00063218	2)
EPA Comment	Response to Comment
III. Specific Comments	
1. <u>Section 4.5.2 Previous Studies and Activities</u> - There should be a brief discussion included here that describes that the screening values used in this report were previously approved in the RFI Work Plan but are not up-to-date. It should be clearly stated that all media will be screened against the most current human health and ecological screening criteria in a separate submittal following completion of this RFI report.	A brief discussion will be included in Section 4.5.2 that describes the screening values used in the report and indicates that a separate document that screens the data against the most current human health and ecological screening levels will be submitted following approval of the RFI Report.
	Section 4.5.2 was be edited and replaced in the RFI report included.
IV. Responses to EPA Comments Issued on June 22, 2015	
1. <u>ARCADIS Puerto Rico Response to USEPA General Comment 4</u> - The RFI Report used the human health screening levels included in the USEPA-approved 2013 RFI Work Plan. As discussed in the August 13, 2015 conference call with USEPA, PUMA, and ARCADIS, sample results will be compared to the most recent USEPA Regional Screening Levels (RSLs) in a separate submittal following completion of the RFI Report. As agreed by USEPA, PUMA, and ARCADIS, those same RSLs will then be used in subsequent reports moving forward; no further changes to human health screening levels will be conducted for this project.	The most current RSLs will be used in future reports submitted following approval of the RFI Report.
<u>USEPA Response</u> - USEPA did agree that the most current RSL values would be used in subsequent reports moving forward. The new link for the Regional Screening Levels is <u>http://www2.epa.gov/risk/regional-screening-table</u> .	
However, we do not agree that "no further changes to human health screening values will be conducted for this project." Since it is likely that this project will be active for a few more years, the most current RSLs at the time of each new report	

TECHNICAL REVIEW OF THE REVISED RCRA FACILITY INVESTIGATION REPORT, PUMA ENERGY CARIBE LLC SEPTEMBER 2015 FORMER CARIBBEAN PETROLEUM REFINING TERMINAL BAYAMON, PUERTO RICO

(EPA ID. No. PRD000632182)

(EFA ID. 100. FKD000052182)				
EPA Comment	Response to Comment			
should be used for screening purposes. There is a "What's New" section on the RSL webpage that provides all of the toxicity values and RSLs that have been updated since the last version.				
2- <u>ARCADIS Response to USEPA Specific Comment 27</u> – The text has edited as recommended. The text has also been supported with the USEPA's current position on petroleum hydrocarbon biodegradation and the resulting limited distance within which there is a need to evaluate receptors in overlying buildings. <u>USEPA Response</u> - Section 5.2 on page 59 of the Revised RFI contains a	The reference to the 2015 USEPA document(s) will be provided in the revised RFI Report.			
reference to USEPA 2015 but this document is not listed in the Reference Section. Please provide the name of this document so that the statements in this section concerning the evaluation of occupied buildings can be verified.				
<u>3- ARCADIS Response to USEPA Specific Comment 30</u> - Groundwater sample results will be compared to the most recent USEPA Vapor Intrusion Screening Levels in a separate submittal following completion of the RFI Report, if warranted, based on the current USEPA petroleum vapor intrusion technical guidance.	The two recommended documents will be used to identify the need for VI evaluation at the site, including potential groundwater screening against USEPA VISLs, in future reports following approval of the RFI Report.			
<u>USEPA Response</u> - Currently, there are two separate guidance documents available to evaluate potential vapor intrusion into indoor air. They are both available at the following link http://www2.epa.gov/vaporintrusion. For RCRA facilities, the June 2015 OSWER Technical Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources To Indoor Air should be used. For Underground Storage Tank sites, the June 2015 Technical Guidance for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Sites should be used.				



Imagine the result

PUMA Energy Caribe, LLC

RCRA Facility Investigation Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

September 2015



Adu

Efraín Calderón Jr. Project Manager

Jol C alonso

John Alonso, CHMM, REP Client Director

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Prepared for: PUMA Energy Caribe, LLC

Prepared by: BBL Caribe Engineering P.S.C. 48 City View Plaza I Suite 401 Road 165, Km 1.2 Guaynabo Tel 787 777 4000 Fax 787 777 8086

Our Ref.: B0045714.0001

Date: September 11, 2015

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

1.	Introdu	uction			1
2.	Site De	escripti	on		2
	2.1	Gener	al		2
	2.2	Site O	perations	and Activities	3
		2.2.1	Historic	al Site Operations	3
		2.2.2	Current	Activities and Development Plans	3
			2.2.2.1	Status of Refinery	4
			2.2.2.2	Construction Activities	4
			2.2.2.3	Aboveground Storage Tanks	4
3.	Enviro	nmenta	al Setting	3	5
	3.1	Тород	Iraphy		5
	3.2	Soils a	and Geolo	ду	5
	3.3	Surfac	e Waters		6
	3.4	Hydro	geology		6
	3.5	Undev	eloped W	etland Area	7
	3.6	Surrou	unding Pro	operties	7
4.	Site Ch	naracte	rization		8
	4.1	Source	es and Ide	entification of Contaminants of Concern	8
		4.1.1	Genera	Activities as Sources of Contaminants of Concern	8
		4.1.2	Historic	al Sources of COCs	8
			4.1.2.1	SWMUs and AOCs Requiring Investigation under the 1995 Order	8
			4.1.2.2	Former RCRA Unit	18
	4.2	Potent	tial Off-Site	e Sources of Contamination	18
	4.3	Histori	ical Invest	igations and Remedial Activities	19
		4.3.1	Previou	s Groundwater Monitoring	19
			4.3.1.1	1988	19
			4.3.1.2	1989	19

		4.3.1.3	2003	20
		4.3.1.4	Through September 2009	20
		4.3.1.5	Before the October 2009 Incident	20
4.4	Post F	ire Activiti	es (After 2009)	21
	4.4.1	Well Su	rvey	21
	4.4.2	Surface	Water Inspection	21
	4.4.3	2011 W	etland Area Evaluation	22
	4.4.4	UST Re	emoval and Additional Sampling	22
	4.4.5	Area M	Soil Sampling	23
	4.4.6	Well Clo	osure Activities	24
4.5	Nature	e and Exte	nt of Contamination	25
	4.5.1	Historic	al Conditions	25
	4.5.2	Previou	s Studies and Activities	26
		4.5.2.1	Surface and Subsurface Soil Sampling in SWMUs and AOCs	26
		4.5.2.2	Las Lajas Creek Sediment	27
		4.5.2.3	Surface Water	28
		4.5.2.4	Groundwater	29
	4.5.3	Octobe	r 2009 Incident	35
	4.5.4	Soil and	Product Recovery in Response to 2009 Incident	36
4.6	Activit	ies Condu	cted as Part of the 2013 RFI Work Plan	37
	4.6.1	Remova	al of Underflow Dam and Gabions	37
	4.6.2	2014 Sa	ampling Activities	37
		4.6.2.1	Soil Sampling Procedures	38
		4.6.2.2	Soil Sampling	39
		4.6.2.3	Surface Water Sampling Procedures	41
		4.6.2.4	Groundwater Sampling Procedures	43
	4.6.3	Ground	water Monitoring Well Installation	43

		4.6.4	Presen	ce of Free Product (Light Non-Aqueous Phase Liquid)	44
		4.6.5	Ground	water Quality Monitoring	44
			4.6.5.1	Groundwater Sampling	44
			4.6.5.2	Natural Attenuation Baseline	45
		4.6.6	Soil Sa	mples Analytical Results	45
			4.6.6.1	Southern and Eastern Perimeter Areas	46
			4.6.6.2	Avenue D	47
			4.6.6.3	Undeveloped Wetland Area	48
			4.6.6.4	Las Lajas Creek	48
		4.6.7	Ground	water Samples Analytical Results	49
			4.6.7.1	Facility-Wide Groundwater Sampling	49
			4.6.7.2	Groundwater Data in Old Oil Lagoons Area (SWMU 11)	52
			4.6.7.3	Groundwater Data in SWMU 32 and SWMU 33 Area	52
			4.6.7.4	Natural Attenuation Parameters	52
			4.6.7.5	Surface Water from the Undeveloped Wetland Area	54
			4.6.7.6	Surface Water from Lajas Creek	54
5.	Conce	ptual S	ite Mode	21	54
	5.1	Source	es and Re	eceiving Media	54
		5.1.1	On-Site	Sources	55
		5.1.2	Octobe	r 2009 Incident	55
		5.1.3	Backgro	bund	56
		5.1.4	Off-Site	Sources	57
	5.2	Fate a	ind Transp	port Mechanisms	58
	5.3	Potent	tial Recep	tors	61
		5.3.1	Potentia	al Human Receptors	61
			5.3.1.1	On-Site	61
			5.3.1.2	Off-Site	62

		5.3.2	Potentia	al Ecological Receptors	62
	5.4	Potent	tial Expos	ure Points and Exposure Routes	63
		5.4.1	On-Site		63
		5.4.2	Off-Site	Off-Site	
		5.4.3	Potentia	al Ecological Exposure Points and Exposure Routes	65
	5.5	Expos	Exposure Pathway Evaluation Summary		
6.	Discus	sion			67
	6.1	Summ	ary of Re	sults and Conclusions	67
		6.1.1	Soils		67
		6.1.2	Ground	water	67
		6.1.3	Undeve	loped Wetland Area	69
			6.1.3.1	Surface Water	69
			6.1.3.2	Soils	69
		6.1.4	Las Laj	as Creek	69
			6.1.4.1	Surface Water	69
			6.1.4.2	Soils	69
		6.1.5	Fate an	d Transport Analysis	69
	6.2	Recon	nmendatio	ons	70
7.	Refere	nces			71
Та	bles				
	Table	e 1	Decom	missioned Groundwater Monitoring Wells	74
	Table	le 2 Existing Groundwater Monitoring Wells		75	
	Table	Table 3		Historical Groundwater Data Available for V	
	Table			nd Hour Information for All Samples	120
	Table		•	rison of Product Thickness 2009 to 2014	125
	Table			le Construction Information of Existing and New Wells	127
	Table	e 7	Historic	al Groundwater Data Available for Metals	130

Table of Contents

Table 8	Sample Results from Soil Borings in Southern and Eastern Perimeters	148
Table 9	Quality Assurance/Quality Control Samples	152
Table 10	Sample Results from Soil Borings in Avenue D	180
Table 11	Surface Water and Soil Sample Results from Las Lajas Creek	186
Table 12	Groundwater Sample Results	201
Table 13	Sampled Groundwater Monitoring Wells	218
Table 14	Groundwater Sample Results for Geochemical Parameters	218

Figures

Figure 1	Topographic and Site Location Map	222
Figure 2	Terminal Aerial View Sept., 2012/Jan., 2015	223
Figure 3	Former Site Layout Map 2011	224
Figure 4	Current Terminal Site Layout Map 2014	225
Figure 5	Geologic Map	226
Figure 6	SWMU and AOC Areas Locations Map 2012	227
Figure 7	SWMU and AOC Areas Locations Map 2014	228
Figure 8	Existing and Former Monitoring Wells Location (Aerial View) 2012	229
Figure 9	Existing and Former Monitoring Wells Location Map 2012	230
Figure 10	Decommissioned Monitoring Wells Location Map 2011-2014	231
Figure 11	Terminal Aerial View Monitoring Wells Location 2014	232
Figure 12	Monitoring Wells Location Map 2014	233
Figure 13	Soil Borings & Samples Location Map 2014	234
Figure 14	Lajas Creek and Wetland Samples Location Map and Analytical Results for ORO and Arsenic 2014	235
Figure 15	Hydrogeological Units Zone A and Zone B Map	236
Figure 16	Former, Current and New Monitoring Wells, LNAPL Levels 2009 - 2011 - 2014	237
Figure 17	Soil Analytical Results for Arsenic 2014	238

Table of Contents

Figure 18	Free-Phase Hydrocarbon Plume Areas and Soil Removal	239
Figure 19	Groundwater Samples Location Map 2014	240
Figure 20	Groundwater Samples Location Map and Analytical Results for Benzene, Ethylbenzene and Isopropyl Benzene 2014	241
Figure 21	Groundwater Samples Location Map and Analytical Results for MTBE 2014	242
Figure 22	Groundwater Samples Location Map and Analytical Results for Trichloroethene and 1, 1, 2 Trichloroethane 2014	243
Figure 23	Groundwater Samples Location Map and Analytical Results for Naphthalene 2014	244
Figure 24	Groundwater Samples Location Map and Analytical Results for Total and Dissolved Arsenic 2014	245
Figure 25	Groundwater Samples Location Map and Analytical Results for Total Chromium 2014	246
Figure 26	Groundwater Samples Location Map and Analytical Results for Total Lead 2014	247
Figure 27	Groundwater Samples Location Map and Analytical Results for Total and Dissolved Vanadium 2014	248
Figure 28	Groundwater Samples Location Map and Analytical Results for Total and Dissolved Mercury 2014	249
Figure 29	Zone A Groundwater Contour Map	250
Figure 30	Zone B Groundwater Contour Map	251
Figure 31	New Soil Borings and Monitoring Wells Cross Sections 2014	252

Appendices

A 1995 RCRA Order

- B Current Condition Report (2012)
- C USEPA's Migration of Contaminated Groundwater under Control Documentation of Environmental Indicator Determination (2008)
- D Anderson, Mulholland & Associates' Site-wide Groundwater Monitoring Program, Draft Final Report (2004)
- E West Side Incident Report
- F PREQB's UST and Additional Sampling Report (2014)

- G Area M Report
- H Documentation Related to Fort Buchanan Property
- I Gabion Underflow Dam Letter Report
- J Standard Operating Procedures
- K Soil Boring/Well Construction Logs
- L Photolog
- M Laboratory Analytical Reports and Chain-of-Custody
- N January 2015 RSL

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

1. Introduction

This Resource Conservation and Recovery Act Facility Investigation (RFI) report was conducted in accordance with the Final RFI Work Plan (Work Plan) dated February 2013 that was approved by the United States Environmental Protection Agency (USEPA) on March 19, 2013. The purpose of the Work Plan was to comply with the requirements set forth in the Resource Conservation and Recovery Act (RCRA) Corrective Action agreement between the United States Environmental Protection Agency (USEPA) and PUMA Energy Caribe, LLC (PUMA). BBL Caribe Engineering P.S.C. (BBL Caribe, also known as ARCADIS Puerto Rico) prepared this report on behalf of PUMA for the property located on Road PR-28, km 2, Luchetti Industrial Park, Bayamón, located in the Commonwealth of Puerto Rico (the Facility or Site).

When the Facility was acquired by PUMA in May 2011, PUMA assumed the responsibility of executing Corrective Action activities required under RCRA (Agreement). The required activities were stipulated in the Agreement with the New Purchaser dated 2011 (Docket Num. RCRA-02-2011-7305) between PUMA and the USEPA, which served as a modification to the 1995 Administrative Order on Consent (Order), Docket Num. II RCRA-95-3008(h)-0303 that was in place prior to the May 2011 purchase by PUMA. **Appendix A** includes copy of the 1995 RCRA Order.

The original 1995 order required that 35 solid waste management units (SWMUs) and areas of concern (AOCs) identified within the premises of the Facility were investigated for potential releases of hazardous constituents to the environment. The 2011 Agreement modified and superseded the 1995 Order and stipulated PUMA's obligations based on the pre-purchase negotiations between PUMA and the USEPA.

To define the work which PUMA was required to complete under the 2011 Agreement, PUMA's initial activity was the completion of an evaluation of the current conditions of the Facility and the preparation of a Current Conditions Report or CCR. **Appendix B** includes a copy of the revised CCR that was submitted to the USEPA on May 2012. This report was approved by the USEPA in 2012. Following the preparation of the CCR, PUMA prepared a RFI Work Plan and included additional assessment activities based on USEPA's approval of the RFI Work Plan.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

The RFI Work Plan and subsequent assessment activities considered the following:

- (i) The continued use of the Facility as an industrial bulk oil terminal
- (ii) The goal of expediting the investigation and corrective actions at the Facility and minimizing costs to the extent there are alternative options which are protective of human health and the environment
- (iii) Use of cleanup standards for industrial properties (subject to any change in property usage), risk-based assessments, engineering controls and/or institutional controls, as appropriate, and PUMA's preference to employ a holistic approach to the investigation and remediation of the Facility rather than a SWMUs an areas of concern as long as the investigation(s) and corrective action(s) are protective of human health and the environment
- (iv) Application and use of current USEPA's corrective action approaches and/or standards (versus those in place in 1995), notwithstanding provisions contained in Attachments II and III of the 1995 Order

This RFI report provides a summary of the assessment activities performed until December 31, 2014 in accordance with the approved Work Plan.

2. Site Description

2.1 General

The Facility is located at Road PR-28, km 2, Luchetti Industrial Park in Bayamón, Puerto Rico, approximately 3 miles south of the Atlantic Ocean coast. The land use on adjacent properties is primarily commercial or industrial. Commercial and industrial properties border the Facility to the south and west; an U.S. Army facility, Fort Buchanan, is to the east; and Highway PR-22 to the north.

The entire Facility encompasses approximately 179 acres, of which 115 acres are developed as a petroleum products storage facility, including operational buildings, administrative offices, parking areas; and a wastewater treatment plant to the north. The Facility has an aboveground pipeline for the transfer of fuel from loading docks on San Juan Bay and to customers at the LMMIA airport. A liquid propane gas storage and distribution area is under development at the Facility. The remainder of the



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

property is undeveloped and includes a wetland area and Las Lajas Creek. **Figure 1** shows the general location of the Facility and surrounding areas.

2.2 Site Operations and Activities

2.2.1 Historical Site Operations

The Facility began operations as a petroleum refinery in 1955 under the name of Caribbean Refining Corporation. Gulf Oil Corporation purchased the Facility in 1962, and renamed it as Caribbean Gulf Refining Corporation. Chevron Corporation acquired ownership of the Facility when it purchased Gulf Oil Corporation in 1984. The Facility was sold to First Oil Corporation in 1987, and operated as an independent refinery under the name Caribbean Petroleum Refining, Limited Partnership (CPR). The Facility operated as a petroleum refinery between 1955 and 2000. After that, the Facility continued to operate as a terminal for storage of a variety of petroleum products.

A series of explosions and fires at the terminal damaged or destroyed many of the storage tanks at the Facility on October 23, 2009. An unknown quantity of petroleum was released during the incident. It is likely that the fire consumed much of the released material, but at least some was conveyed in runoff to Las Lajas Creek and an associated wetlands area to the north of the active portions of the Facility. The RFI was put on hold, so that post-fire conditions may be assessed in order to better surmise the more representative AOCs.

The previous owners of the Facility, Caribbean Petroleum Refining (CPR), Caribbean Petroleum Corporation (CPC), and Gulf Petroleum Refining (Puerto Rico) Corporation (collectively, the "Debtors") filed a voluntary petition for relief pursuant to Chapter 11 of the United States Bankruptcy Code on August 12, 2010. The Debtors pursued a sale of substantially all of their assets as part of the bankruptcy proceedings, which included the Facility

2.2.2 Current Activities and Development Plans

The Facility is currently being converted from its former use as a refinery and storage facility to strictly storage and distribution. It is still under various stages of construction and redevelopment, although portions have been brought on-line as active storage systems. **Figure 2**, **Figure 3** and **Figure 4** show the progressive changes in Facility structures and features in 2012/2015, 2011, and 2014, respectively.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

2.2.2.1 Status of Refinery

The refinery, which ceased operations in 2000, was demolished by PUMA in 2012 to 2013 in accordance with the requirements of the "Agreement and Order of Consent for Demolition" (CERCLA-02-2011-2003) between the USEPA and PUMA in May 2011. Demolition activities began in February 2012. Final report was delivered in October 2013 to the USEPA. Order was closed by the USEPA in September 2014.

2.2.2.2 Construction Activities

PUMA's original plan was to redevelop the Facility in three phases, with the goal of creating a state-of-the art bulk fuel storage terminal. The phases of the on-going construction activities are the following:

- Phase I Encompasses the reconstruction and demolition, which includes environmental assessment and demolition of the existing refinery, control, and warehouse buildings of the Facility
- Phase II Encompasses the construction of the tank farm to increase storage capacity to 1.39 million barrels
- Phase III Evaluates the potential future expansion to 5 million-barrel storage capacity

2.2.2.3 Aboveground Storage Tanks

The following activities have been completed at the Facility by 2014:

- PUMA completed the tank cleaning, and disposed the scrap metal storage that the USEPA began implementing after the 2009 fires. All affected tanks at the Facility were dismantled.
- On-site pipelines were drained, cleaned and removed. Additionally, the fuel transfer pipeline and its components (saddles, supports and valves) from the loading dock underwent refurbishment and restoration.
- As part of the reconstruction plan of the terminal Facility, during the fire of 2009 many tanks were destroyed or heavily damaged. PUMA evaluated damaged tanks and decided based on their results of the evaluation to demolish some and



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

refurbish others. Tanks that were refurbished were: TK-101, TK-102, TK-103, TK-104, TK-106, TK-502, TK-601, and TK-602. The tanks that were demolished newly built were: TK-105, TK-201, TK-202, TK-203, TK-501, TK-503, TK-504, TK-603, and TK-604. All 17 tanks are in compliance and are fully operational.

3. Environmental Setting

3.1 Topography

The Facility is situated at approximate elevations between 10 and 35 feet above mean sea level (amsl), with a general surface gradient sloping to the north. Within the Facility, topography is higher in the southeast and southwest corners, away from the primary storage areas. The undeveloped area to the north of the Facility is relatively flat and is considered a wetland area. Las Lajas Creek, a named water body that originates south of the Facility, flows through this area. Flow in Las Lajas Creek is influenced significantly by rainfall in the area. In addition to Las Lajas Creek, this area is bordered by Diego Creek to the west and Santa Catalina Creek, which border the property towards the east. This information is based on the most recent revised United States Geological Survey (USGS) topographic map, Bayamón Quadrangle, 1969 (Photorevised 1982). The regional topography includes mogotes from the limestone formations present in the area. **Figure 1** includes the topographic map of the Site and surrounding areas.

3.2 Soils and Geology

Soils at the Facility are predominantly low-permeability clays. The majority of the undeveloped wetland area contains soils classified by the United States Department of Agriculture (USDA) as Almirante clay with 2% to 5% slopes (USDA 2008). A portion to the east of the wetland contains soils classified by the USDA as Martín Peña muck (USDA 2008). Soil profiles have exhibited hydric soil indicators in the undeveloped wetland area (Hydrogeomorphic Assessment Report prepared by ARCADIS, 2011).

The Facility is located on alluvium deposits (Qa), consisting of sand, clay, and sandy clay based on the USGS Geologic Map of the Bayamón Quadrangle. **Figure 5** includes the geologic map of the site and surrounding areas. The overburden thickness varies from about 10 feet at the southern perimeter of the Facility to about 90 feet at the northern perimeter (USEPA's 2008 Migration of Contaminated Groundwater under Control, Documentation of Environmental Indicator Determination, **Appendix C**). A layer of carbonate sediments is located beneath the clay soils overlying limestone

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

bedrock. Undulations of the carbonate sediment layer result in natural "domes" covered by clay soils.

3.3 Surface Waters

Las Lajas Creek flows through the undeveloped wetland area at the north of the property. Las Lajas Creek is a low-flow, shallow perennial stream that originates in the hills south of the Facility and eventually discharges into the San Juan Bay. The creek, which receives storm water runoff from the commercial and residential areas of the area, is channeled underground as it enters the Facility and returns to an open channel north of the Facility's wastewater treatment plant (WWTP) area. The Facility has a National Pollutant Discharge Elimination System's (NPDES) storm water discharge permit (Facility ID Num. PR0000370). This NPDES point is located north of the facility adjacent to the WWTP polishing lagoon, and is identified in **Figure 3**.

As noted above, there are two creeks that border the undeveloped portion of the Facility to the west and east. The Diego Creek is located approximately 100 meters to the west, although a portion flows through the northwest area of the undeveloped property. It drains to a channelized surface water feature to the north that eventually discharges to the San Juan Bay. The Santa Catalina Creek is located to the east, approximately 140 meters from the Facility, and discharges to the channel to the north. These features are shown on **Figure 1.** This information is based on the most recent revised USGS topographic map, Bayamón Quadrangle, 1969 (Photorevised 1982) and ARCADIS' Hydrogeomorphic Assessment Report prepared in 2011.

3.4 Hydrogeology

Two general hydrogeologic units have been described at the Facility (Geraghty and Miller, Inc. 1989). The uppermost clay unit contains a low permeability semi-perched layer and a permeable carbonate water-bearing zone (referred to as Zone A in CPR documents). The general horizontal groundwater flow direction in Zone A is to the north, although localized mounds and depressions reportedly occur in the central portion of the Facility. The underlying carbonate sediment layer also contains a water-bearing zone (referred to as Zone B in CPR documents). Groundwater flow in Zone B is generally in the north to northwest direction 2004 Site-wide Groundwater Monitoring Report (Anderson, Mulholland & Associates, Inc., see **Appendix D**).

Groundwater in Zone B is semi-confined. The potentiometric surface of groundwater for wells completed in the carbonate sediment layer is generally higher than water level



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

elevations measured in Zone A (i.e., the water table wells). The groundwater gradient is generally towards the north. Water migration into and through the surface soils is slow as a result of the Facility's geology. Figure 4 and Figure 5 of **Appendix B** depict groundwater elevations and general flow directions in Zone A and Zone B based in the 2004 Site-wide Groundwater Monitoring Report (Anderson, Mulholland & Associates, Inc., see **Appendix D**).

3.5 Undeveloped Wetland Area

The undeveloped area in the northern portion of the Facility comprises approximately 64 acres of the Facility. As discussed in Section 3.1 and Section 3.3, this area includes a wetland area and named surface water bodies. Figures provide an estimated delineation of the area.

3.6 Surrounding Properties

Properties immediately surrounding the Facility consist of industrial/commercial properties, a military base, and undeveloped land. The adjacent properties include the following:

- North: Road PR-22, across which several commercial warehouses are located
- East: Road PR-28, across which is Fort Buchanan, a U.S. military base
- South: Road PR-28, across which is Fort Buchanan and the Julio Enrique Monagas Park
- West: Luchetti Industrial Park

Based on ARCADIS Puerto Rico's observations, the closest residence is at least 0.1 mile south of the Facility and located at the Fort Buchanan military base complex.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4. Site Characterization

4.1 Sources and Identification of Contaminants of Concern

4.1.1 General Activities as Sources of Contaminants of Concern

Contaminants of concern (COCs) are defined by those parameters that are associated by operational activities. In the past, the refinery processed imported virgin crude oil to produce petroleum distillates, fuel gases, diesel oil, asphalt, kerosene, fuel oil, gas oil, residual oils, and unleaded gasoline. The Facility previously produced leaded gasoline, but discontinued production as of January 1, 1988 (Kearney 1989). Hazardous wastes historically managed at the Facility include primary oil/water/solids separation sludge (F037), secondary oil/water/solids separation sludge (F038), slop oil emulsion solids (K049), heat exchanger bundle solids (K050), API separator sludge (K051), ignitable waste (D001), and toxicity characteristic (benzene) wastewater (D018) (USEPA's 2004 Current Human Exposures under Control).

The Facility continued to operate as a terminal for storage of a variety of petroleum products (e.g., gasoline, diesel, jet fuel, and fuel oil) following discontinuation of refinery operations in 2000. As noted earlier, the Facility was placed under 1995 Corrective Action Order to address residual contamination arising from waste management practices.

4.1.2 Historical Sources of COCs

4.1.2.1 SWMUs and AOCs Requiring Investigation under the 1995 Order

The 1995 3008(h) Order established 22 SWMUs and 12 AOCs as requiring investigation. The 2011 Agreement provides for a holistic approach to the Corrective Action. **Figure 6** depicts the locations of these SWMUs and AOCs in 2012. **Figure 7** shows current status of SWMUs and AOCs.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

These areas are listed below, and include the corresponding actions taken:

SWMU Description	Status		
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities	
SWMU 1: Container Storage Area	-	Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014	
SWMU 2: Slop Oil Tank 1000	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan.		
SWMU 3: Slop Oil Tank 1001	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan.		
SWMU 4: Solids Knockout Pit	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan.		

RFI Report

SWMU Description	St	atus
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
SWMU 5: Surge Tank ET-1	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan.	
SWMU 6: API Separator	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan.	
SWMU 7: Corrugated Plate Interceptor	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan	
SWMU 8: Equalization Basin	Previously closed by CPR in 1999, and will continue to be monitored in accordance with the closure requirements in the AGREEMENT WITH NEW PURCHASER - PUMA ENERGY CARIBE, LLC. Docket No.: RCRA-02-2011-7305	

RFI Report

SWMU Description	Sta	atus
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
SWMU 9: Inlet basin to Biological Reactor #1	Cleaned and demolished in 2014. Under the Work-Plan Decommission and Demolition of the Industrial Wastewater Treatment Plant, approved by USEPA on June 17, 2014. Completion report under preparation. Additional sampling according the RCRA Work Plan	
SWMU 10: Digester	Cleaned and demolished in 2014 under the Work- Plan Decommission and Demolition of the Industrial Wastewater treatment Plant, approved by USEPA on June 17, 2014, Final report pending	
SWMU 11: Old Oil Lagoons area	Soil sampling pending will depend on construction phases and in accordance with the Final Resource Conservation and Recovery Act Facility Investigation Work Plan, approved on March 19, 2013	
SWMU 12: Old East Separator		Previously removed by CPR prior to the Explosion of October 2009.
SWMU 13: Slop Oil Tank 452	Cleaned and demolished in 2014 under the Work- Plan Decommission and Demolition of the Industrial Wastewater treatment Plant, approved by USEPA on June 17, 2014, Final report pending	
SWMU 19: Natural Aeration Basins	Will be Clean and demolish in 2015 under the Work-Plan Decommission and Demolition of the Industrial Wastewater treatment Plant, approved by USEPA on June 17, 2014, Final report pending	

RFI Report

SWMU Description	n Status	
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
SWMU 21: IAF Unit	Cleaned and demolished in 2014 under the Work- Plan Decommission and Demolition of the Industrial Wastewater treatment Plant, approved by USEPA on June 17, 2014, Final report pending	
SWMU 22: Process Sewer		Flushed and manholes sealed in 2014 in accordance with the Final Resource Conservation and Recovery Act Facility Investigation Work Plan, approved on March 19, 2013. A Letter Report submitted to USEPA on February 17, 2014
SWMU 23: Crude Oil 101		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 24: Sulphur Pit		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 26: Sulphur Recycling Plant		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014

RFI Report

SWMU Description	Status	
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
SWMU 27: Tank 481		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 29: Storage Area – Particulate		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 31: Flare		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 32: Old Landfill area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order. This work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 33: Non- Hazardous Disposal	Addressed under the RCRA Order (holistic approach) and be will monitor during sampling events will be presented of the strategy for site redevelopment and restoration under the RCRA Order	

RFI Report

SWMU Description	Status	
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
SWMU 34: Sulphur Lagoon	Addressed under the RCRA Order (holistic approach) and be will monitor during sampling events will be presented of the strategy for site redevelopment and restoration under the RCRA Order	
SWMU 35: Catalytic Waste Pond	Addressed under the RCRA Order (holistic approach) and be will monitor during sampling events will be presented of the strategy for site redevelopment and restoration under the RCRA Order	
SWMU 37: Sulphur Drum Storage Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
SWMU 38: Centrifuge	Cleaned and demolished in 2014 under the Work- Plan Decommission and Demolition of the Industrial Wastewater treatment Plant, approved by USEPA on June 17, 2014, Final report pending	
SWMU 39: Gravity Thickener Yard	Cleaned and demolished in 2014 as part of the CWA, RCRA orders and under the Phase I of the Decommissioning and Demolition of the Industrial Wastewater and Treatment plant Approved October 13, 2013, report will be submitted after full decommissioning has been completed in 2016	

RFI Report

SWMU Description	Status	
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
SWMU 40: Scrap Metal		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 1: Crude Unit Charge Pump Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 2: Fuel Oil Transfer Pump (Cummins) Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 3: Fuel Oil Transfer Pump Area near Tank 603		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 4: Asphalt Heater Unit		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014

RFI Report

SWMU Description	Status	
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
AOC 5: Fuel Oil Loading Rack Pump Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 6: Debutanizer Re-Boiler Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 7: FCC Unit Compressor Lube System Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 8: Heat Exchanger Bundles at Heavy Cycle Steam Generator		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 9: Crude Unit Num. 1 Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014

RFI Report

SWMU Description	Status	
	Additional Action Required - additional delineation proposed	No Further Action - addressed during construction/removal activities
AOC 10: Crude Unit Num. 1 near Heat Exchanger Bundle Area		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 11: Fuel Oil Pipeline Spill Areas		Removed and demolished during demolition of refinery in 2012 under the CERCLA Order, this work was summarized in The Final Completion Report, dated October 18, 2013 and approved by USEPA on September 15, 2014
AOC 12: Old Loading Rack		Removed by CPR, PUMA demolished slab, and construction activities were conducted in the RCRA area (holistic approach)

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.1.2.2 Former RCRA Unit

There is also a closed RCRA unit, the equalization basin, at the Facility. The equalization basin, referred to as SWMU 8, is located on the western side of the Facility (see **Figure 7**). As part of its wastewater treatment facility, CPR operated the equalization basin to receive effluent from oil/water separation units, and discharge it to a biological treatment system. The equalization basin was an unlined surface impoundment regulated under Subtitle C of the RCRA because it managed D018 and F038 wastes. The equalization basin ceased operation and receipt of hazardous waste on June 6, 1993, and an aboveground equalization tank replaced it. Sludge was removed from the bottom and sides of the basin in April 1994.

RCRA closure of the equalization basin was completed in August 1999. Activities for the closure consisted of dewatering the basin; stabilizing the residual sludge; backfilling the basin; and installing impermeable clay and flexible membrane liner cap, a drainage layer, and a vegetative cover. The USEPA approved the final closure on December 3, 1999.

4.2 Potential Off-Site Sources of Contamination

There is information that a residual contamination from Fort Buchanan property could have impacted the Facility based on the following (ARCADIS Puerto Rico 2011a):

- The USEPA noted that "trichloroethylene and vinyl chloride have been detected in monitoring wells along the eastern boundary of CPR" during its evaluation of Els completed in October 2008. "This plume is considered part of a larger plume located primarily on the property of Fort Buchanan, located east of CPR. Fort Buchanan is currently in the process of identifying the source and evaluating the need for remedial actions for this plume" (USEPA 2008).
- The USEPA responded on February 4, 2011 to an on-going release of oil and possibly cooking grease and industrial waste that was discharged into a storm sewer and, ultimately, a wetland that borders the Facility to the north. This incident and the response activities conducted are documented in the USEPA June 30, 2011 pollution report for the Fort Buchanan property. The Pollution Report is included in Appendix F of Appendix B.
- To the west of the facility, a storm channel runs from south to north from State Road 28, and collects runoff water form adjacent properties, such as Zacarías and



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Associates, Inc. and SSW Realty and PorGasco, Inc./Tropigas. This channel is superficial until it reaches the Tropigas property, where it flows into an underground pipe that runs northwest and surfaces adjacent to the PUMA's aeration basin and flows into Las Lajas Creek. At times, oily material has been observed flowing onto the Facility. PUMA has reported these findings to the USEPA. See west side incident report in **Appendix E**.

4.3 Historical Investigations and Remedial Activities

The CPR's terminal and refinery have been subject of numerous environmental investigations and response actions since at least 1980. Starting in 1980, LNAPL was removed from a cased pit located near the LPG tanks in the former old loading rack area. It was estimated that 1, 000, 000 gallons of product and/or groundwater were removed using this approach. A five-well recovery system with automatic pumps was installed in 1984 to 1985. This system removed about 68, 000 gallons of product and/or groundwater by May 1987 (ARCADIS Puerto Rico 2011a).

4.3.1 Previous Groundwater Monitoring

4.3.1.1 1988

Geraghty and Miller, Inc. initiated a groundwater assessment that ultimately delineated the extent of LNAPL in the areas of the Facility where it was initially identified by previous consultants.

4.3.1.2 1989

- June: Geraghty and Miller performed an assessment of dissolved hydrocarbon constituents in groundwater at the perimeter of the refinery.
- October: Another groundwater recovery system was installed.
- December: LNAPL recovery operations began. Regular maintenance and monitoring were conducted. These included measurements in 14 wells that were part of the recovery system and 79 additional on-site wells. In addition, LNAPL was periodically bailed from 29 wells that were not connected to the recovery system (Radian 1990).

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.3.1.3 2003

Anderson, Mulholland & Associates, Inc. collected groundwater samples in two phases in 2003 as documented in the 2004 Site-wide Groundwater Monitoring Report (Anderson, Mulholland & Associates, Inc. 2004). During Phase 1 (May and July 2003), groundwater was collected from wells in the vicinity of LNAPL plumes and in the northeast portion of the Facility, and from wells in the vicinity of the WWTP and process sewer, to assess the impact on groundwater, if any, from Facility operations in these areas.

During Phase 2 (October 2003), groundwater samples were collected from 51 monitoring wells across the Facility. Based on the findings, additional work was proposed to confirm/delineate impacts to groundwater; however, the 2009 incident occurred before most of the work could be implemented.

4.3.1.4 Through September 2009

One hundred thirty one groundwater wells were routinely monitored for the presence of subsurface free product at the Facility. The activities included the following:

- Sixteen monitoring wells were sampled once or bi-annually to evaluate migration of dissolved constituents to groundwater
- Sixty wells were used to recover product
- Remaining wells were used to monitor product "sheen" and groundwater elevations on a monthly basis
- Twenty-two of the product recovery wells were automated (pneumatically operated recovery wells to continuously remove free product); about 38 were either bailed or emptied with a vacuum truck periodically to remove free product; an estimated 80, 000 gallons of product were removed from the subsurface at the rate of a few hundred gallons per month between 1991 and 2009 (ARCADIS Puerto Rico 2011a)

4.3.1.5 Before the October 2009 Incident

Groundwater monitoring was ongoing at the Facility, conducted annually in the wells associated with the equalization basin (see Section 2.6 of **Appendix B**), and semi-

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

annually at the 16 wells associated with the underground recovery system. The 16 wells selected were intended to provide information for evaluating potential downgradient migration of dissolved constituents from the LNAPL plume at the Facility. Five of the sampled wells monitored the upper clayey sediment water-bearing zone (Zone A), and 11 monitored the unlithified carbonate sediment zone (Zone B). Selected wells were also sampled since 2003 to address identified data gaps, and provide delineation information.

The last semi-annual groundwater sampling event associated with the underground recovery monitoring system was conducted in September 2009. The last RCRA annual groundwater sampling event associated with the equalization basin was conducted in March 2009. Section 3 of **Appendix B** includes a discussion of the findings of historical groundwater assessments.

4.4 Post Fire Activities (After 2009)

4.4.1 Well Survey

PUMA contracted ARCADIS Puerto Rico to conduct a well survey in September 2011 to assess the condition of these wells. Table 5 of **Appendix B** presents the condition of the wells based on the survey. It also presents LNAPL thicknesses that were able to be measured at that time. At the time of the fire, tanks contained petroleum products.

As part of the 2013 RFI Work Plan submitted to the USEPA on March 5, 2013, additional remedial investigations and activities were proposed to be conducted at the Facility. These activities included management of petroleum impacted soils and passive LNAPL recovery.

4.4.2 Surface Water Inspection

As a result of the 2009 explosion and fire, visual impacts were observed in the Las Lajas Creek and the wetland following the 2009 incident. Regular visual inspections of these areas were conducted as part of the removal action conducted by the USEPA and subsequently by PUMA. These inspections did not identify the presence of residual hydrocarbons in Las Lajas Creek.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.4.3 2011 Wetland Area Evaluation

ARCADIS Puerto Rico conducted a Hydrogeomorphic Functional Assessment of the wetland in September 2011 (ARCADIS Puerto Rico, 2011c). At that time, the assessment concluded that:

- Surface and subsurface water retention has been reduced, which is likely due to the lack of organic material in the surface soil layer, as a result of the October 2009 fires. It is expected that the organic layer will be replenished over time.
- Nutrient cycling performance is good due to the presence of shrub stratum, and is expected to further improve with the replenishment of the organic layer.
- The performance of organic carbon export is currently low due to the absence of organic material and the presence of the water control structures (underflow damn), which limits the hydrologic connection with the downstream portion of Las Lajas Creek. The water control structures in the wetland significantly limit the migration of dissolved and particulate organic carbon. Removal of the water control structures would likely improve the functional performance of the wetland.
- The plant and habitat communities are in good condition, and are expected to further improve as the organic layer is replenished.
- Residual oil or related indicators (odors, sheens, and staining) were not found in the vegetation, soil, or surface waters.

Appendix D of **Appendix B** includes copy of the Hydrogeomorphic Functional Assessment Report. As of 2015, the vegetative cover at the terminal areas has increased and site facilities have been under construction and restoration.

4.4.4 UST Removal and Additional Sampling

The PREQB, on its letter dated March 27, 2013, authorized PUMA a UST closure, and requested sampling activities in the area of a former 7, 000-gallon capacity diesel UST and a former 4, 000-gallon capacity gasoline UST. The tank removal authorization was for a 6, 000-gallon capacity out of use fiberglass UST that was used to store gasoline located on Avenue B at the south of the Site and north of a former warehouse building (**Figure 6** and **Figure 7**).

Additional sampling activities were conducted in the area of a former 7, 000-gallon capacity diesel UST where reportedly another 4, 000-gallon gasoline UST was located at the southwestern-most corner of the Site in the area where a former service station existed at the Site. The 7, 000-gallon capacity diesel UST was removed by the previous owner in April 1993; and the 4, 000-gallon gasoline UST was reported as not found during such removal actions. The former out of use 6, 000 gallon gasoline UST south of the former warehouse area was removed on January 28, 2014.

On December 20, 2013, sampling in the area of the former 7, 000-gallon UST was conducted. The findings of the additional sampling activities at the former diesel 7, 000-gallon capacity and gasoline 4, 000-gallon capacity USTs area indicated limited residual TPH-DRO concentrations to the east of the former tank area. A sample, T2-1-4-E-7-8, had a TPH-DRO concentration of 125 mg/kg, which is slightly above the PREQB's screening level of 100 mg/kg for this parameter. This sample was collected from a depth of 7 to 8 feet bgs. All the other samples had non-detected concentrations or were below the PREQB's soil screening levels. Groundwater was not detected at the maximum depth drilled of 12 feet bgs.

On January 29, 2014, sampling in the excavation of the 6, 000-gallon UST was conducted. A total of 10 soil samples were collected from the tank pit including the fuel line and dispenser areas. All samples had non-detect concentrations for BTEX, MTBE, TPH-ORO and TPH-GRO. TPH-DRO concentrations ranged between non-detect and 37.4 mg/kg. Lead concentrations ranged between 3.32 mg/kg and 13.5 mg/kg. All the analytical results of the parameters of concern were well below the PREQB's screening levels. No groundwater samples were collected since groundwater was not detected at the excavated areas. A report summarizing these activities was submitted to the PREQB on June 10, 2014, and is included in **Appendix F**; however, response has not been received.

4.4.5 Area M Soil Sampling

Based in the 1995 RCRA 3008H Order, ARCADIS Puerto Rico conducted sampling of soils as part of the response activities related to the October 2009 fire an explosion and new construction. These activities were conducted in accordance with Section 13 entitled Modifications of the CWA Work Plan that was approved by the USEPA on January 19, 2012. The soil removal activities were conducted in compliance with the CWA, CERCLA and RCRA Agreement and Order on Consent between PUMA and USEPA. Between October and November 2013, ARCADIS Puerto Rico conducted the sampling of the soils in the designated Area M.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

This area consisted of a pile of soils of about 30 feet height located between Avenue D and Avenue F originated from construction activities, which were removed from previous dikes of the terminal facilities. These soils occupied an approximate area of 168, 000 cubic yards. The purpose of sampling activities was to determine the viability of reusing the soils to rebuild and/or extend existing dikes and minimize off-site disposal. The USEPA, via electronic mail dated December 19, 2012, approved the option to reuse existing soils at the Site.

The sampling methodology consisted of the removal of the surface ground cover. The area was then divided into a grid. Subsequently, one composite sample was collected from each grid. A total of 168 soil samples were collected from the area. The soil samples were analyzed by Pace Analytical Laboratories for volatile organic compounds (VOCs) by USEPA Method 8260, metals by USEPA Method 6010, Mercury by USEPA Method 7471, dioxins by USEPA Method 8280, semi volatiles by USEPA Method 8270, pesticides by USEPA Method 8081/8141, herbicides by USEPA Method 8151 and PCBs by USEPA Method 8082. On January 31, 2014, the analytical results of Area M sampling activities were submitted to the USEPA.

The analytical results of the Area M sampling were compared to site background concentrations obtained from a study conducted by Anderson, Mulholland and Associates, Inc. (included in Appendix B of the Phase II Process Sewer Report dated April 2003). The background samples were collected between the years of 1998 and 2000. During the referenced study, 14 background samples were collected and analyzed from eight locations located at the perimeter of the terminal.

The analytical results of the Area M soil samples indicated concentrations primarily of metals such as aluminum, barium, calcium, chromium, iron, lead, magnesium, manganese and zinc. The Area M soil was recommended for reuse at the terminal facilities. Copy of the report is included in **Appendix G**.

4.4.6 Well Closure Activities

As specified in the 2013 RFI Work Plan approved by the USEPA, a survey of the condition of existing wells was completed after the 2009 fire incident at the Site. Based on field activities, ARCADIS' personnel determined that a number of existing wells needed to be closed in order to maintain the monitoring wells network in protected areas away from the Facility's future traffic and new operational processes. After the 2009 explosion, several wells lost integrity; others were accidentally destroyed during construction activities, and were no longer functional (**Figure 8** and **Figure 9**). As a



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

result, were decommissioned. Additionally, some wells located in green areas were broken as a consequence of tree roots, which impeded necessary activities for monitoring groundwater, consequently those were sealed too.

Between 2013 and 2014, 121 of 195 existing wells were decommissioned. These wells were mostly located in Avenue C, Avenue D, Avenue E, Equalization Basin area, 2nd Street, 4th Street, and in the newly constructed manifold area. **Table 1** shows the identification number of each of these wells, and **Figure 10** depicts their location in the Facility's layout. As a result of the well closure activities, additional well installations were necessary to fulfill the groundwater monitoring requirements. **Figure 11** and **Figure 12** show the remaining wells after closure activities and the newly installed monitoring wells from 2014. **Table 2** also provides the list of existing wells.

4.5 Nature and Extent of Contamination

4.5.1 Historical Conditions

Free product existed as a light non-aqueous phase liquid (LNAPL) in different portions of the terminal property floating on groundwater both in the clay soil layer and from the carbonate sediment layer (larger volumes) based on the various subsurface investigations conducted by Anderson, Mulholland & Associates, Inc., and as concluded in the USEPA's 2008 Environmental Indicators (EI) Report (USEPA 2008). Generally, LNAPL is essentially pushed upward by the water in the carbonate sediment layer, and trapped against the overlying clay soils due to undulations of the carbonate sediment layer. Under these conditions, floating free product in the carbonate sediments is not expected to migrate.

Additionally, selected dissolved-phase volatile organic compounds (VOCs), baseneutral analytes (BNAs), and metals have been detected in historical Zone A and Zone B groundwater samples. Some of these concentrations may be attributable to previous operations at the Facility and/or dissolution of the LNAPL plumes, while others may be attributable to potential offsite sources. As documented in the 2004 Sitewide Groundwater Monitoring Report (Anderson, Mulholland & Associates, Inc. 2004), no evidence of offsite groundwater impact due to Facility operations was historically found.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.5.2 Previous Studies and Activities

The following sub-sections discuss historical data collection efforts at the site and the results of those data compared to screening levels relevant at the time of data collection. At the request of USEPA, the current data set based on the activities proposed in the Final RFI Work Plan dated February 2013 and approved by the USEPA on March 19, 2013 will be compared to the latest USEPA Regional Screening Levels (http://www.epa.gov/risk/risk-based-screening-table-generic-tables) for the evaluation of potential exposures to human health and to media-specific ecological screening values (ESVs) from the Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico (CH2MHill 2010) and Master Ecological Risk Assessment Protocol for Vieques Environmental Restoration of potential exposures to ecological receptors. These data comparisons will be provided in a separate submittal following approval of the RFI Report.

4.5.2.1 Surface and Subsurface Soil Sampling in SWMUs and AOCs

- Anderson, Mulholland & Associates, Inc. (1998) collected surface and subsurface soil samples at 25 and 30 SWMUs/AOCs/areas in multiple phases from 1998 to 2002, as part of the past RFI activities. The laboratory analyzed the samples for VOCs, BNAs, and/or metals.
- b. Surface soil samples (less than two feet below ground surface [bgs]) were collected at 25 SWMUs/AOCs/areas during multiple investigations, as part of the RFI activities. The laboratory analyzed the samples for VOCs, BNAs, and/or metals. Arsenic concentrations in exceedance of the Regional Screening Levels (RSLs) for Industrial Soil and Protection of Groundwater were detected at 25 SWMUs/AOCs, with levels ranging up to 93.2 mg/kg. Arsenic also exceeded its background level at 15 SWMUs/AOCs. Table 7 of Appendix B shows the maximum detected arsenic concentrations that exceed the surface soil screening level at the SWMUs/AOCs/areas during the investigations (USEPA 2004). Other constituents with concentrations above the RBSLs are shown in Table 7 of Appendix B.
- c. Subsurface soil (greater than 2 feet bgs) samples were collected at 31 SWMUs/ AOCs/areas during multiple investigations, as part of the RFI activities. The laboratory analyzed the samples for VOCs, BNAs, and/or metals. Exceedances of

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

the RSLs for Industrial Soil or Protection of Groundwater were detected at 30 SWMUs/AOCs.

Parameters exceeding their respective RSLs included arsenic, vanadium, benzo(a)anthracene, and benzo(a)pyrene. Arsenic exceeded its Industrial Soil and Protection of Groundwater RSLs at 30 SWMUs/AOCs/areas, with concentrations ranging up to 138 mg/kg. Arsenic also exceeded its background level at 18 SWMUs/AOCs/areas. Vanadium exceeded its Protection of Groundwater RSL and background level only at SWMU 34. Benzo(a)anthracene exceeded its Industrial Soil and Protection of Groundwater RSLs only at SWMU 11. Benzo(a)pyrene exceeded its Industrial Soil and Protection of Groundwater RSLs only at SWMU 3 and SWMU11. Table 8 of **Appendix B** presents the maximum detected concentrations that exceeded subsurface soil screening levels at the SWMUs/ AOCs/areas during the investigations (USEPA 2004).

In response to the soil data gathered in SWMU 11 (Old Oil Lagoons), an Interim Corrective Measure (ICM) was implemented in December 2006. The ICM involved excavation of impacted soil from within the old oil lagoons and off-site disposal as non-hazardous waste. Soil was excavated until constituent concentrations were below USEPA Industrial Soil Ingestion Regional Screening Levels (RSLs) (Anderson, Mulholland & Associates 2009b). Confirmatory sampling revealed that concentrations in soil were still above the Protection of Groundwater RSLs (USEPA 2008).

4.5.2.2 Las Lajas Creek Sediment

Anderson, Mulholland and Associates, Inc. (2002) collected sediment samples at nine locations in the creek, upstream and within the Facility boundary, as part of the Las Lajas Creek Human Health Assessment in June 2002; additionally, collected bank soil samples at three locations north of the Facility's WWTP. The laboratory analyzed the samples for VOCs, BNAs, polychlorinated biphenyls (PCBs), and metals (Anderson, Mulholland & Associates 2003b).

Constituent concentrations in the sediment and bank soil samples were historically compared to human health RBSLs for ingestion and migration to groundwater. For the ingestion pathway, detected concentrations were compared to USEPA Region III risk-based concentrations for an industrial exposure. For the migration to groundwater pathway, detected concentrations were compared to USEPA Soil Screening Levels (SSLs) as presented in USEPA's Soil Screening Guidance. SSLs based on a dilution-



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

attenuation factor (DAF) of 20 were used, due to the limited areal extent of sediment in the Creek and the bank of the Creek. Metal concentrations were also compared to background levels determined during the RFI investigation for the CPR facility. The creek sediment and bank soil sample results and RBSLs/SSLs that were used for comparison are presented on Table 6 of **Appendix B**. Sample locations are depicted on Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and Figure 7 of the Las Lajas Creek Assessment-Supplemental Bank and Sediment Sampling Report (Anderson, Mulholland & Associates 2003b).

Results from the sediment samples indicated that constituents were not detected except for arsenic and chromium. Arsenic was the only constituent above the soil ingestion RBSL. Arsenic was considered delineated, as it did not exceed background levels at the two most downstream locations.

Results from bank soil samples also indicated that constituents were not detected, except for arsenic and chromium. Chromium exceeded its background concentrations, but arsenic did not. The potential impact of chromium on groundwater was proposed to be addressed as part of the CPR's Site-Wide Groundwater Monitoring Program.

4.5.2.3 Surface Water

There was limited evaluation of surface water quality prior to the October 2009 explosion and fire. In 2009, CPR developed a work plan for surface water sampling at Las Lajas Creek, to assess potential impacts to surface water from groundwater. The work plan was pending final USEPA approval when the October 2009 incident took place; however, it should be noted that prior to the fire and explosion, LNAPL plumes were not reported in the vicinity of surface water and impacts to surface water from the LNAPL plumes have not been previously indicated (USEPA 2008).

As a result of the 2009 explosion and fire, visual impacts were observed in Las Lajas Creek and the wetland following the 2009 incident; however, later assessments of the area in 2011 did not indicate residual impacts. The latest visual assessment of this area, as part of the removal action conducted by the USEPA and subsequently by PUMA, has not identified the presence of residual hydrocarbons. ARCADIS Puerto Rico evaluated Las Lajas Creek in September 2011 as part of the Hydrogeomorphic Functional Assessment of the wetlands at the Facility (ARCADIS Puerto Rico 2011c). The 2011 assessment report is provided as Appendix D of **Appendix B**. The assessment did not find residual oil in the wetland or creeks. Indications of residual oil

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

(e.g., petroleum-like odors, sheens, surface staining, or discoloration) were not observed on standing vegetation, soil profiles, or surface waters.

4.5.2.4 Groundwater

Historically, various monitoring wells have been sampled for selected constituents (depending on what area of the Facility they are located). A summary of the historical conditions and potential contaminants of concern are discussed below based on the 2004 Groundwater Monitoring Report (Anderson, Mulholland & Associates, Inc. 2004), the semiannual groundwater sampling event conducted in September 2009, and as provided in the 2008 EI documentation prepared by the USEPA. Concentrations were historically compared to USEPA Industrial Risk-based Screening Levels (RBSLs) and MCLs; however, it should be noted that for the purposes of the 2012 CCR and this RFI Report, concentrations were re-evaluated and compared to the most recent (November 2011) USEPA's Region III Tapwater RSLs, with exceptions noted below. Maximum Contaminant Levels (MCLs) were used for comparison where RSLs are not established. The following is a summary of historical groundwater information collected at the Facility prior to the 2009 fire and explosion:

- a. 2004 to 2009
 - (i) Petroleum hydrocarbons were present in the upper clayey sediment (Zone A) and carbonate sediment (Zone B) water-bearing zones in the form of LNAPL. Figure 6 of **Appendix B** presents the known locations (pre-fire) of the LNAPL plumes. There were reportedly five plumes, generally within the tank farm and WWTP areas. Previous investigations conclude that the LNAPL plumes were stable with negligible migration through September 2009.
 - (ii) Analytical results from groundwater sampling included in the 2004 Groundwater Monitoring Report (Anderson, Mulholland & Associates, Inc., 2004) indicated concentrations of various constituents above their respective screening criteria. The site-wide groundwater investigation determined that groundwater in the shallow (Zone A) and deep (Zone B) zones were impacted by various historical onsite activities. However, it was also concluded that migration of contaminated groundwater appeared to be stabilized, no evidence of impact was present offsite, and there was no indication that the impact to groundwater resulted in unacceptable risk to human health (Anderson, Mulholland & Associates, Inc., 2004). Due to the extensive amount of data included in the 2004 report, data were not re-evaluated respective to the



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

current RSLs for the 2012 CCR. The tables and figures from the 2004 report are included as Appendix G of **Appendix B** for reference. Concentrations were compared to RBSLs and MCLs at the time. The aerial extent of impacted groundwater exceeding screening levels (2004 RBSLs and MCLs) is presented on Figure 6-1, Figure 6-2 and Figure 6-3 of 2012 Current Conditions Report (**Appendix B**). The following conclusions were made in the referenced 2004 Anderson, Mulholland & Associates, Inc. report:

- Process sewer area (SWMU 22): An area of impacted groundwater was identified in Zone A, underlying the southern portion of the Facility's former process sewer system. The following VOCs and BNAs were detected above 2004 screening levels: benzene, 1, 2-Dichloroethane (1, 2-DCA), 2-methylnaphthalene and naphthalene. Total arsenic and lead were also detected above screening levels, but dissolved concentrations were not above screening levels. With the exception of 1, 2-DCA, the constituents detected were consistent with those expected to be found in a petroleum refinery process sewer.
- Old loading rack (AOC 12): Groundwater in Zone A in this area was impacted with benzene, naphthalene, and total and dissolved arsenic. The loading rack was removed in 1976, and was not considered a continuous source of impact.
- Wastewater treatment plant area: Several VOCs and BNAs were detected above screening levels in Zone A in this area: benzene, 2-methylnaphthalene, naphthalene, chrysene, fluorene and bis(2-ethylhexyl)phthalate (BEHP; likely a laboratory contaminant per the 2004 report). Several total metals were above screening levels (arsenic, barium, beryllium, chromium, lead and vanadium), but dissolved concentrations were below screening levels. This impact was suspected to be related to reported releases from the underground piping in the area. The piping was repaired or replaced.
- Old oil lagoons (SWMU 11): Zone A in this area contained exceedances of benzene, naphthalene, benzo(a)pyrene, and total and dissolved arsenic. The source was presumed to be historical releases from the oil lagoons. The lagoons were closed in 1980. At closure, materials were removed and placed in an approved offsite landfill. Closure was approved by the Puerto Rico Environmental Quality Board.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

- Sulfur lagoon (SWMU 34): No VOCs or BNAs were detected above screening levels in this area. Total metals concentrations of arsenic, chromium and vanadium were above screening levels in Zone A, but dissolved concentrations were not above screening levels.
- Northeast Facility area: TCE and its degradation products (vinyl chloride [VC] and cis-1, 2-dichloroethene [cis-, 1, 2-DCE]) were detected in Zone B at least once at concentrations above screening levels in this area. The presence of TCE was attributable to offsite sources (Anderson, Mulholland & Associates, Inc., 2004). The USEPA is conducting an ongoing investigation related to the Fort Buchanan property that is the potential source of this plume. A presentation on the Fort Buchanan's northwest boundary investigation is included in **Appendix H**.
- Zone B: An arsenic plume with levels above the MCL of 10 µg/L was found to occur in Zone B in the northern tank farm Area M. The highest arsenic level within the plume was present at MW-85B2 (69 µg/L). Arsenic was not detected above screening levels in Zone A overlying the plume, and was confined to the onsite Facility wells. The source of the arsenic was not determined.
- Groundwater: MTBE was detected in 27 of 42 groundwater samples analyzed for VOCs. MTBE was only detected above the acceptable drinking water guidelines at the time (20 to 40 µg/L; established by USEPA in the 1997 Drinking Water Advisory) in one well (B-2 at an estimated concentration of 517 µg/L). Several concentrations were present in exceedance of the former RSL (12 µg/L), including well MW-15A, which is located adjacent to Outfall 002.
- Wells: There were also isolated/anomalous detections in some wells that needed to be confirmed because concentrations were only above MCLs during one sample round (e.g. VC in MW-83B1, cis-1, 2-DCE in MW-75B, benzene and naphthalene in MW-13A, arsenic in MW-41A). A summary of proposed supplemental activities to delineate/confirm the findings of the 2003 investigations are presented in Table 6-1 of Appendix G of Appendix B. Delineation work was then indicated to be implemented as applicable, and the wells/constituents of concern were going to be reevaluated during future investigations and compared to current RSLs/MCLs.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

- (iii) The dissolved lead concentration in a groundwater sample collected from monitoring well MW-37A during the March 2008 sampling event exceeded the USEPA drinking water MCL. This is the only dissolved lead exceedance detected at this well since it was added to the monitoring program in 1992. Prior to this detection, an MCL exceedance of dissolved lead in groundwater was not detected since September 1997 (in well MW-76B). Total lead detections in 2003 were not believed to represent real groundwater conditions.
- (iv) Historically, dissolved mercury has been detected at concentrations above USEPA Tapwater RSLs along the northern boundary of the Facility.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

b. 2008

- (i) During the March/April 2008 sampling event, well MW-30B (located in the west-central part of the Facility) contained 1, 2-dichloropropane at a concentration above the Tapwater RSL, consistent with historical results. Additional wells were subsequently sampled for 1, 2-dichloropropane in order to delineate the plume. None of the downgradient wells showed concentrations of this constituent, and its potential presence at well MW-30B appears to be localized. There are no buildings in the area of MW-30B, and the potential for vapor intrusion is therefore not a concern. If evaluation of data or proposed future land use reveals that there is a potential vapor intrusion issue, PUMA will conduct a vapor intrusion assessment.
- c. 2005 to 2009
 - (i) Benzene and ethylbenzene have historically been detected at concentrations above Tapwater RSLs in several wells; however, since 2005, the only concentration above the RSL in the semiannual sampling network was 0.5J µg/L of benzene in September 2009 (MW-14B). Additionally, among the wells in the semiannual sampling network, toluene and total xylenes were only detected above RSLs in MW-37A, but were not detected above RSLs since 1995 and 1998, respectively. MW-14B and MW-37A are located downgradient from the LNAPL plumes. BTEX concentrations were likely from dissolution of the plumes with subsequent downgradient transport.
 - (ii) Concentrations of chlorinated VOCs, including TCE, tetrachloroethene (PCE), cis-1, 2-DCE, trans-1, 2-DCE and VC have been historically detected in monitoring wells located along the Facility's eastern boundary. The detected concentrations of TCE, PCE and VC exceeded their respective Tapwater RSLs. Among the wells sampled, detected concentrations of trans-1, 2-DCE did not exceed its respective Tapwater RSL. Detections of cis-1, 2-DCE did not exceeded its respective Tapwater RSL since March 2004. This plume was probably part of a larger plume originating from the Fort Buchanan property, located east of the Facility. Fort Buchanan was in the process of identifying the source, and evaluating the need for remedial actions for this plume as concluded in the 2008 EI. PUMA does not have monitoring wells along the southern boundary of the Facility to assess the upgradient (background) concentrations potentially associated with the Fort Buchanan plume (USEPA, 2008). Fort Buchanan was not impacted by the 2009 incident, and therefore

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

the conclusions set forth in the 2008 El related to this plume should remain valid.

d. 2006 to 2007

- (i) Anderson, Mulholland and Associates, Inc. conducted four rounds of groundwater sampling between July 2006 and December 2007 as part of the RFI's SGMP. The objective was to delineate the extent of mercury and chlorinated hydrocarbon concentrations based on previous contaminant levels in select wells. Anderson, Mulholland and Associates, Inc. sampled 14 wells for mercury and four wells for the chlorinated hydrocarbons of concern. The technical memorandum that presented the results (Anderson, Mulholland & Associates, 2008) also presented historical data of these constituents for reference. Table 1 of **Appendix B** presents the historical mercury concentrations in monitoring wells from March 1996 through December 2007, and **Table 3** presents the historical concentrations of VOC constituents of concern in the four wells of concern from March 1996 through December 2007.
- (ii) The semiannual groundwater sampling associated with the underground recovery system focused on VOCs/BNAs and select dissolved metals. Constituents of concern have historically been chlorinated hydrocarbons (TCE, PCE, VC, and cis/trans-1, 2-DCE), mercury, arsenic, and lead, although some of these have not been detected above their respective Tapwater RSLs for several years, or are only detected in isolated areas. BTEX have also been historically detected at isolated locations, but recent concentrations have not exceeded their respective RSLs.
- (iii) A semiannual groundwater sampling event associated with the underground recovery system was conducted in September 2009. Table 3 of Appendix B presents the analytical results for this event. The report summarizing the 2009 results (Anderson, Mulholland & Associates, 2009c) also provides historical BTEX and dissolved lead concentrations in the well network. Table 4 of Appendix B presents these results.

e. 2009

(i) The September 2009 sampling event indicated that benzene, 1, 2-dichloropropane, TCE, PCE and VC exceeded their respective USEPA Tapwater RSLs in



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

isolated locations. The single benzene and 1, 2-dichloropropane exceedances were qualified as estimated concentrations by the laboratory. Benzene had not previously been detected in this location (MW-14B) since September 2005. TCE, PCE and VC are not petroleum-related VOCs, and their presence (in MW-75B) is not attributed to Facility activities (Anderson, Mulholland & Associates 2009c). This dissolved-phase chlorinated VOC plume is considered part of a larger plume potentially originating from the Fort Buchanan property, located east and upgradient of the Facility (USEPA 2008). Concentrations of cis-1, 2-DCE and trans-1, 2-DCE were also detected in MW-75B; however, these concentrations were an order-of-magnitude lower than their respective Tapwater RSLs. Dissolved metals were not detected above method detection limits in any well (Table 3 of **Appendix B**).

f. October 2009 Incident

(i) The October 2009 explosion and fire, as well as the associated response activities, damaged or destroyed many of the monitoring and recovery wells at the Facility.

4.5.3 October 2009 Incident

Several explosions and ensuing fires occurred at the Facility on October 23, 2009. The fires destroyed 17 tanks on the Facility, and damaged surrounding tanks and other infrastructure, including the fuel transfer pipeline. Third party emergency response contractors provided emergency cleanup and assistance at the terminal immediately following the incident. In February 2010, the USEPA issued a Unilateral Administrative Order pursuant to the Oil Pollution Act (OPA) and the Clean Water Act (CWA), directing CPR to commence cleanup and removal actions at the terminal. CPR was unable to perform such activities primarily due to financial constraints. In March 2010, the USEPA assumed responsibility for the cleanup activities covered by the Unilateral Administrative Order.

The USEPA subsequently implemented response actions under OPA undertaking tank dismantling and removal of contaminated soil. USEPA's contractors led efforts to dismantle already-damaged tanks, and staged the steel in designated areas on the Site for recycling. The contractors evaluated soils in the secondary containment areas and beneath the dismantled tanks as they dismantled the tanks to determine if soil should be removed. Contaminated soils were excavated and disposed off-site at a non-hazardous waste landfill in Puerto Rico (ARCADIS Puerto Rico 2011b). Soils were



excavated until the ground surface appeared clean by visual inspection. **Figure 3** shows aerial photos showing the Site areas and reconstruction activities in progress.

In 2009 at the time of the Site explosion and fire, the CPR tank farm consisted of 42 aboveground fuel storage tanks. Tanks that were impacted by releases associated with the 2009 incident are depicted on Figure H-1 of Appendix F in **Appendix B**. Areas specifically impacted or suspect to be impacted by the 2009 incident included the following:

- Northern Tank Farm
- Vicinity of WWTP
- Storm water channels within the active portion of the Facility
- Portions of the undeveloped property

Table 9 and Table 10 of the 2012 CCR provide a summary of areas where cleanup activities have been conducted at the Facility by the USEPA, CPR, and PUMA; and which contaminated media have been disposed offsite, respectively. USEPA disposal information was obtained from the USEPA Pollution Reports. Figure H-2 of Appendix F of CCR (**Appendix B**) depicts the areas that have been addressed.

As noted earlier, PUMA purchased the Facility in May 2011, and has taken over the environmental responsibilities related to the Order, as well as the cleanup and assessments related to the October 2009 incident. As established in the May 2011 Agreement, PUMA is not responsible for the investigation and/or remediation of any historical contamination potentially released from the Facility via air emissions, which have been deposited in areas which are not contiguous or adjacent to the Facility (e.g., contamination deposits in non-contiguous/non-adjacent locations relating to the explosion or air emissions from petroleum refining operations, etc.).

PUMA's intended use for the Facility is terminal-storage only. The refining process has been taken off and the area was demolished.

4.5.4 Soil and Product Recovery in Response to 2009 Incident

Immediately following the 2009 explosion and fires, the USEPA began recovering free product and contaminated soil from various areas at the Facility that were impacted by

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

the incident. Response actions are documented in the USEPA's pollution reports for the CPR Facility.

4.6 Activities Conducted as Part of the 2013 RFI Work Plan

4.6.1 Removal of Underflow Dam and Gabions

In accordance with the 2013 Approved RFI Work Plan, the removal of the underflow dam and gabions that were installed by the USEPA during the 2009 fire was conducted between March 14 and 15, 2014. The removal activities were conducted in accordance with "Underflow Removal Procedure" approved by the USEPA on February 5, 2014.

The gabions and underflow dam were located in the area of the Las Lajas Creek and the wetland area towards the northeast of the terminal. Activities were conducted during low water level conditions. Prior to the removal of the underflow dam and the gabions, absorbent material and turbidity control measures were placed in the work area. The removal of the gabions and the underflow dam was conducted in two phases. The first phase consisted of soil removal, which was conducted in a direction from east to west. The removed soil was stored inside plastic-lined metal boxes, stored at the terminal facilities, and sampled for adequate disposal.

The second phase consisted of the gabions removal. For this activity, a backhoe was used to remove the gabions to be inspected. No product or sheen was found within the creek or the gabions; therefore, these were used to line the bottom of the creek to avoid any future erosion of the creek. A letter report summarizing these activities was submitted to the USEPA on August 7, 2014, and is included in **Appendix I**.

4.6.2 2014 Sampling Activities

This section describes the protocols and procedures for sampling activities and the findings of the sampling activities that were proposed in the 2013 RFI Work Plan and completed in 2014. The summary of the soil sampling is provided by specific location within the Facility. The groundwater results are summarized facility-wide. The sampling activities for the undeveloped wetland area and Las Lajas Creek, which included surface water and soil/sediment, are presented by area.

The soil, surface water and groundwater sampling activities were conducted in accordance with the approved 2013 Final RFI Work Plan Sampling and Analysis Plan and standard operating procedures (SOPs) to assess site conditions. All collected

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

samples were grab samples. The general samples collection procedures included the following:

- · Documenting soil sample name, depth, date, sampler name(s), and parameters
- Samples for VOCs analysis were collected first, and then the other parameters were collected and sent to the analytical laboratory
- Samples were appropriately handled, packed and shipped to the analytical laboratory in accordance with the procedures outlined in the Work Plan

4.6.2.1 Soil Sampling Procedures

Soil sampling activities included the collection of sediment and soil samples. Soil samples were collected from boreholes installed at the Site and from stockpiles at the terminal facilities. Sediment samples were collected from the undeveloped wetland area to the north of the terminal and from Las Lajas Creek. The soil sampling activities included the following:

- Description of the soils following the Unified Soil Classification System and a geologic description of the portion of the soil recovered from each sampling interval
- Visual examination and documentation of soil samples characteristics, such as: odor, color, and presence of free product or sheen, if any
- Screening of all soil samples for the presence of volatile organic compounds using a calibrated PID
- Obtaining a representative sample using drilling equipment; boreholes were drilled using a hand auger or direct push type drilling equipment until advancing the holes to the desired depth; samples were collected directly from the drilling equipment
- Soil samples collected for laboratory analysis were obtained above the groundwater table

To collect the samples, ARCADIS Puerto Rico's personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. Refer to **Appendix J** for the standard operating procedures followed during sampling activities.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.6.2.2 Soil Sampling

According to the approved 2013 RFI Work Plan, two samples were to be collected from each borehole: one of the highest PID reading and one above the groundwater level; however, if the highest PID reading sample coincided with the one above groundwater level, only one sample was collected. **Figure 13** presents the location of the soil boreholes.

a. Southern and Eastern Perimeter Areas - The southern and eastern perimeter areas of the Facility were evaluated to determine the extent of potential soil contamination that was located in this area and that may extend beyond the Facility boundary. This evaluation was also intended to identify contamination that may be originating offsite but also considering the natural occurrences of certain constituents (e.g. metals) as previously described by Anderson Mulholland and Associates Inc. (Background Metal Concentration Determination, 2000) for the Facility

Between January and February 2014, nine soil borings were drilled in the southern and eastern boundaries of the Facility. The lithology encountered during drilling activities consisted of clay, sandy clay, silty clay, clayey sand and carbonate sediments. **Appendix K** provides the lithology descriptions of each borehole. **Appendix L** includes a photolog presenting these activities.

A total of 18 soil samples were collected in the perimeters and analyzed for volatile organic compounds (USEPA Method 8260), semi volatile organic compounds (USEPA Method 8270), total petroleum hydrocarbons in the oil range organics, diesel range organics (USEPA Method 8015) and gasoline range organics (USEPA Method 8260), mercury (USEPA Method 7470), and metals (including arsenic, chromium, lead and vanadium) (USEPA Method 6010). Each sample was generally named following the nomenclature: SB-P- # - # - #, meaning SB - soil boring, P – perimeter, # - # - # - boring number – sample depth range (top depth in feet and bottom depth in feet).

b. Avenue D - The location of Avenue D is at the central portion of the Facility, which is being used for product storage. This was the area identified as having the highest levels of contamination prior to the October 2009 fire and explosion. The analytical results of certain naturally occurring constituents were compared to the Background Metal Concentration Determination (2000) by Anderson Mulholland



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

and Associates Inc. Between September and October 2014, five soil borings were drilled in Avenue D. **Appendix L** includes a photolog presenting these activities.

The lithology encountered during drilling activities consisted of clay, sandy clay, silty clay, clayey sand, silty sand, sandy silt, clayey silt, sandy gravel, and gravelly clay (**Appendix K**). A total of six soil samples were collected and analyzed for volatile organic compounds (USEPA Method 8260), semi volatile organic compounds (USEPA Method 8270), total petroleum hydrocarbons in the oil range organics, diesel range organics (USEPA Method 8015), gasoline range organics (USEPA Method 8260), mercury (USEPA Method 7470), and metals (including arsenic, chromium, lead and vanadium) (USEPA Method 6010). Each sample was named following the nomenclature SB-AD- # - # - #, meaning SB - soil boring, AD - Avenue D, # - # - # boring number – sample depth range (top depth in feet and bottom depth in feet).

c. Undeveloped Wetland Area - In accordance with approved 2013 RFI Work Plan, ARCADIS Puerto Rico collected four soil samples in the undeveloped wetland area in the northern portion of the Facility in May 2014.

To access the vegetated area to be sampled, personnel used machete and appropriate Personal Protective Equipment. After the area was identified, the surface was cleared of vegetation and soil samples were collected under saturated conditions (1 to 2 feet water level). Samples were collected following the approximate location presented in the 2013 RFI Work Plan. To collect the samples, ARCADIS personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. Personnel labeled the samples and place them inside an ice-filled cooler for shipment to Pace Analytical Laboratory. Refer to **Appendix J** for the standard operating procedures followed during the sampling activities. Each sample was named following the nomenclature SeW- #, meaning "Soil Wetland – the number in the order in which it was collected". The four superficial soil samples were collected in the approximate locations. **Figure 14** shows the location of the samples downgradient of the Facility.

Samples were analyzed for: volatile organic compounds (Method 8260), semivolatile organic compounds (Method 8270), total petroleum hydrocarbons: oil range organics-diesel range organics (Method 8015), gasoline range organics (Method 8021), metals (vanadium, lead, arsenic and chromium) (Method 6010), and mercury (Method 7470). The analytical results of certain naturally occurring



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

constituents were compared to the Background Metal Concentration Determination (2000) by Anderson Mulholland and Associates Inc.

d. Las Lajas Creek - In accordance with the approved 2013 RFI Work Plan, ARCADIS Puerto Rico collected three sediment samples following the approximate locations presented. Samples of sediments were collected from Las Lajas Creek in the northern portion of the Facility in September 2014.

To access the vegetated area to be sampled, personnel used machete and appropriate Personal Protective Equipment. After the area was identified, the surface was cleared of vegetation and surface water samples were collected in the specified areas presented in the 2013 RFI Work Plan. To collect the samples ARCADIS personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. Personnel labeled the samples, and placed them inside an ice-filled cooler for shipment to Pace Analytical Laboratory. Refer to **Appendix J** for the standard operating procedures followed during the sampling activities. Each sample was named following the nomenclature SELC- #, meaning "Soil Lajas Creek - the number in the order in which it was collected". The three soil samples were collected in the specified areas. Figure 14 shows the location of the samples downgradient of the Facility. Appendix L includes a photolog presenting these activities. Samples were analyzed for: volatile organic compounds (Method 8260), semi-volatile organic compounds (Method 8270), total petroleum hydrocarbons; oil range organics and diesel range organics (Method 8015), gasoline range organics (Method 8021), metals (vanadium, lead, arsenic and chromium) (Method 6010), and mercury (Method 7470). The analytical results of certain naturally occurring constituents were compared to the Background Metal Concentration Determination (2000) by Anderson Mulholland and Associates Inc.

4.6.2.3 Surface Water Sampling Procedures

Sampling activities also included the collection of surface water from the undeveloped wetland area and Las Lajas Creek to the north of the terminal. Surface water samples were collected directly into appropriate laboratory containers that were sent to the analytical laboratory. **Table 4** includes information of the samples, including date and hour of collection. **Appendix M** includes the complete chain of custody forms.

Personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. The standard operating procedures

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

followed during groundwater sampling activities are provided in **Appendix J**. Personnel labeled the samples, and placed them inside an ice-filled cooler for shipment to Pace Analytical Laboratory.

a. Undeveloped Wetland Area - To access the vegetated area to be sampled, personnel used machete and appropriate Personal Protective Equipment. After the area was identified, the surface was cleared of vegetation and four surface water samples following the approximate locations presented in the 2013 RFI Work Plan. To collect the samples, ARCADIS personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. Personnel labeled the samples, and placed them inside an ice-filled cooler for shipment to Pace Analytical Laboratory. Refer to Appendix J for the standard operating procedures followed during sampling activities. Each sample was named following the nomenclature SWLC- #, meaning "Surface Water Wetland – the number in the order in which it was collected". The four surface water sample locations are presented in Figure 14. Appendix L includes a photolog presenting these activities.

Samples were analyzed for: volatile organic compounds (Method 8260), semivolatile organic compounds (Method 8270), total petroleum hydrocarbons: oil range organics and diesel range organics (Method 8015), gasoline range organics (Method 8021), metals (vanadium, lead, arsenic and chromium) (Method 6010), and mercury (Method 7470). Surface water was analyzed for both total and dissolved metals and mercury.

b. Las Lajas Creek - To access the vegetated area to be sampled, personnel used machete and appropriate personal protective equipment. After the area was identified, the surface was cleared of vegetation and surface water samples were collected in the approximate locations presented in the 2013 RFI Work Plan. To collect the samples, ARCADIS personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. Personnel labeled the samples, and placed them inside an ice-filled cooler for shipment to Pace Analytical Laboratory. Refer to **Appendix J** for the standard operating procedures followed during the sampling activities. Each sample was named following the nomenclature SWLC- #, meaning "Surface Water Lajas Creek – the number in the order in which it was collected". The three surface water sample locations are depicted in **Figure 14**.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Samples were analyzed for: volatile organic compounds (Method 8260), semivolatile organic compounds (Method 8270), total petroleum hydrocarbons: oil range organics and diesel range organics (Method 8015), gasoline range organics (Method 8021), metals (vanadium, lead, arsenic and chromium) (Method 6010), and mercury (Method 7470). Samples were analyzed for both total and dissolved metals and mercury.

4.6.2.4 Groundwater Sampling Procedures

Groundwater sampling included the development of the wells, purging and sampling to collect a representative sample from each well. The monitoring wells were first developed with a pump or bailer to remove accumulated sediment. Then, the wells were purged by removing three times their volume to be sampled with a disposable and dedicated bailer or using the low flow procedure after attaining stabilization of indicator parameters. Prior to sampling activities, a round of groundwater levels was documented by field personnel. **Appendix L** includes a photolog presenting these activities.

Personnel used dedicated and disposable nitrile gloves. The staff changed these between samples to avoid cross contamination. The standard operating procedures followed during groundwater sampling activities are provided in **Appendix J**. Personnel labeled the samples, and placed them inside an ice-filled cooler for shipment to Pace Analytical Laboratory. Well construction logs are included in **Appendix K**.

4.6.3 Groundwater Monitoring Well Installation

a. Southern and Eastern Perimeter Areas - A groundwater monitoring well was installed at each soil boring location at the southern and eastern perimeter areas (Figure 11 and Figure 12). The nine wells were installed between January and February 2014. The nomenclature followed to name the wells was PMW - #. This denotes the location of the well (perimeter monitoring well) and the sample well number. Wells were named in the order in which they were installed starting in 116 to 124 as requested by PUMA's personnel. According to the approved 2013 RFI Work Plan, well installation details were determined based on groundwater level detection at each specific boring. Appendix L includes a photolog presenting these activities.

From the nine wells, three were completed in the hydrological unit Zone A as described in Anderson Mulholland and Associated, Inc. 2004 Report



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

(**Appendix D**). These wells are PMW-116, PMW-117 and PMW-118. The remaining six were completed in the hydrological unit Zone B. These wells are PMW-119, PMW-120, PMW-121, PMW-122, PMW-123, and PMW-124 (**Figure 11, Figure 12** and **Figure 15**).

4.6.4 Presence of Free Product (Light Non-Aqueous Phase Liquid)

The presence of light non-aqueous phase liquid (LNAPL) had been identified prior to the 2009 fire and explosion. The purpose of the LNAPL evaluation in this report is to document the current condition, with changes in LNAPL presence, based on an evaluation completed in 2011 (post fire) and conditions measured in 2009 prior to the fire and explosion. The monitoring wells evaluated in the assessment were identified in the USEPA-approved 2013 RFI Work Plan.

The results of the evaluation are presented in **Table 5** and **Figure 16**. Of the 70 wells measured in 2014, three had measurable LNAPL thicknesses of more than 0.125 inches, established by the PREQB as free product for groundwater monitoring wells.

Nevertheless, comparison of 2009, 2011 and 2014 free phase product data revealed a decline in thickness in four wells located in the WWTP area (MW-EB-101, MW-B1, MW-B9 and MW-B2), a well in the tank farm area (MW-42B), and a well in Avenue D (MW-83A).

In addition, as part of the reconstruction activities at the Facility, PUMA removed contaminated soil and LNAPL encountered in the area on AOC 2 and AOC 3 (Fuel Oil Transfer Pump Areas) and SMUW 13 (Slop Oil Tank 452), as well as in other areas where plumes were previously identified. See **Figure 17** and **Figure 18**.

4.6.5 Groundwater Quality Monitoring

4.6.5.1 Groundwater Sampling

A total of 70 wells were selected for groundwater monitoring in accordance with approved 2013 RFI Work Plan. In September and October 2014, groundwater sampling was conducted to evaluate groundwater quality related to potential impacts from the former operations at the Facility and to establish baseline concentrations of analytes that can be used to evaluate the potential for natural attenuation at the Facility. Groundwater samples were collected from 70 groundwater monitoring wells.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Available information for well construction details of existing wells are provided in **Table 6**. Historical groundwater data for VOCs and metals are also provided in **Table 3** and **Table 7**.

4.6.5.2 Natural Attenuation Baseline

In accordance with the approved 2013 Work Plan monitored natural attenuation parameters were analyzed to aid in the evaluation of the potential for natural attenuation of contamination. Selected wells (24 wells) were sampled to establish a baseline for natural attenuation parameters (i.e., geochemical indicator parameters) at the Facility area. The 24 wells represent one third of the 70 wells included in the comprehensive sampling event, and were selected based on depth and location to analyze both Zone A and Zone B hydrocarbon plumes across the Facility.

To collect the samples, ARCADIS' personnel followed the procedures previously mentioned for groundwater sampling. Each sample was identified following the nomenclature: MNA-MW- #, meaning "Monitored Natural Attenuation – Monitoring Well- Well ID number". Refer to **Appendix J** for the standard operating procedures followed during the sampling activities.

The following geochemical indicator parameters were analyzed: total metals (iron and manganese) (USEPA 6010), dissolved metals (iron and manganese)(USEPA 6010), alkalinity (hydroxide CaCO₃, total CaCO₃, bicarbonate, carbonate) (SM 2320B), chloride (SM 4500-Cl-E), nitrite (SM 4500-NO3 F), nitrogen (NO2, NO3) (SM 4500-NO3 F), sulfate (ASTM D516-90, 02) and dissolved gases (methane, ethane, ethane, propane, carbon dioxide, oxygen) (AM20GX). **Appendix M** contains the laboratory reports.

4.6.6 Soil Samples Analytical Results

In accordance with the 2013 RFI Work Plan, the soil analytical results were compared with the USEPA's Industrial Regional Screening Levels (RSL) for each parameter. The most recent screening levels as of January 2015 are included in **Appendix N** of this report. The semi volatile organic compounds identified in this report include the polynuclear aromatic hydrocarbons (PAHs) list. A summary of the analytical results is provided below.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.6.6.1 Southern and Eastern Perimeter Areas

Table 8 includes the results of the soil samples, and **Table 9** includes the qualityassurance and quality control samples.

- Arsenic Arsenic content was found in all 18 soil samples above the Industrial RSL of 3 mg/kg with concentrations ranging between 3.04 and 81.7 mg/kg.
 Figure 17 depicts the sample location for this parameter. Nine of the 18 samples (SB-P-118-2-3, SB-P-119-0-1, SB-P-119-10-11, SB-P-121-0-1, SB-P-121-21-22, SB-P-122-0-1, SB-P-123-0-1, SB-P-123-21-22, and SB-P-124-0-1) collected during this study were above the background level of 23 mg/kg indicated by Anderson Mulholland and Associates Inc. (Background Metal Concentration Determination, 2000) for the Facility.
- Chromium Chromium concentrations in all 18 samples were below the MCL based SSL of 180, 000 mg/kg. The concentrations ranged from 6.22 mg/kg (19-20 ft) in soil boring SB-P-122 to 91.5 mg/kg (10-11 ft) in soil boring SB-P-119.
- Lead Lead concentrations were below the Industrial RSL of 800 mg/kg in all 18 samples. The concentrations ranged from 1.8 mg/kg (0-1 ft) in soil boring SB-P-118 to 20.2 mg/kg (0-1 ft) in soil boring SB-P-116.
- Vanadium Vanadium concentrations in all the 18 samples were below the Industrial RSL of 5, 800 mg/kg. The concentrations ranged from 45 mg/kg (19-20 ft) in soil boring SB-P-122 to 185 mg/kg (10-11 ft) in soil boring SB-P-119.
- Mercury Concentrations of mercury were below the Industrial RSL of 35 mg/kg in all the 18 samples. Concentrations ranged from 0.049 mg/kg (10-11 ft) in soil boring SB-P-119 to 0.554 mg/kg (0-1 ft) in soil boring SB-P-122.
- Acetone Concentrations of acetone were below the Industrial RSL of 67, 000 mg/kg in all the 18 samples. Concentrations ranged from non-detects to 0.036 mg/kg (2-3 ft) in soil boring SB-P-118.
- Other Reported Results TPH DRO and TPH-ORO resulted with detected concentrations, but USEPA regulatory levels (Appendix N) are not available for these parameters.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.6.6.2 Avenue D

Table 10 includes the results of the soil samples of this area, and **Table 9** includes thequality assurance and quality control samples.

 Arsenic - Arsenic concentrations were reported above the Industrial RSL of 3 mg/kg in five of the six samples with one sample with a non-detected concentration. The concentrations ranged from 3.6 to 25.5 mg/kg, with the lowest concentration at soil boring SB-AD-2 (2-3 ft) and the highest concentration at soil boring SB-AD-3 (4-5 ft) (Figure 17).

Two of the samples had concentrations above the background level for the Site of 23 mg/kg indicated by Anderson Mulholland and Associates, Inc. (Background Metal Concentration determination, 2000).

- Chromium Chromium concentrations in all the six samples were below the Industrial RSL of 180, 000 mg/kg. The concentrations ranged from 7.9 mg/kg in soil boring SB-AD-1 (2-3 ft) to 68 mg/kg in soil boring SB-AD-3 (4-5 ft).
- Lead Lead concentrations in all the six samples were below the Industrial RSL of 800 mg/kg. The concentrations ranged from 1.8 mg/kg in soil boring SB-AD-5 (3-4 ft) to 6.7 mg/kg in soil boring SB-AD-3 (4-5 ft).
- Vanadium Vanadium concentrations in all the six samples were below the Industrial RSL of 5800 mg/kg. The concentrations ranged from 46.2 mg/kg in soil boring SB-AD-5 (3-4 ft) to 125 mg/kg in soil boring SB-AD-2 (2-3 ft).
- Mercury Concentrations of mercury in all the six samples were below the RSL of 35 mg/kg. Concentrations ranged from 0.04 mg/kg in soil boring SB-AD-3 (4-5 ft) to 14 mg/kg in soil boring SB-AD-4 (2-4 ft).
- Semi-volatile Organic Compounds Semi-volatile organic compounds concentrations were detected in five of the six samples below the corresponding Industrial RSLs.
- Other Reported Results TPH-DRO resulted with detected concentrations, but a USEPA regulatory level is not available for this parameter.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.6.6.3 Undeveloped Wetland Area

Table 11 presents the results for each sample, which are summarized below:

- Arsenic Arsenic concentrations were in one sample with 3.3 mg/kg (SeW-01).
 (Figure 14).
- Chromium Chromium. concentrations were from west to east: 12.3 mg/kg (SeW-01), 21.8 mg/kg (SeW-02), 6.4 m/kg (SeW-03) and 2.9 mg/kg (SeW-04).
- Lead Lead concentrations were from west to east: 13.6 mg/kg (SeW-01), 14.7 mg/kg (SeW-02), 10.5 m/kg (SeW-03) and 2.6 mg/kg (SeW-04).
- Vanadium Vanadium concentrations were from west to east: 40.8 mg/kg (SeW-01), 56.5 mg/kg (SeW-02), 33.7 m/kg (SeW-03) and 10.2 mg/kg (SeW-04).
- Mercury Mercury concentrations were from west to east: 0.22 mg/kg (SeW-01), 0.1 mg/kg (SeW-02) and 0.043 m/kg (SeW-03) and non-detect values (SeW-04).
- Other Reported Results For the methods analyzed, TPH DRO and TPH-ORO resulted in reported concentrations, but a USEPA regulatory standard is not available.

4.6.6.4 Las Lajas Creek

Table 11 presents the results for each sample, which are summarized below:

- Arsenic Arsenic concentrations were reported above USEPA's Industrial RSL of 3 mg/kg in all the samples. The concentrations were from south to north: 5.1 mg/kg (SELC-01), 3.3 mg/kg (SELC-02) and 3.8 m/kg (SELC-03) (Figure 14).
- Chromium Chromium concentrations were reported below the USEPA's Industrial RSL of 180, 000 mg/kg in all the samples. The concentrations were from south to north: 22.9 mg/kg (SELC-01), 14.8 mg/kg (SELC-02) and 21.3 m/kg (SELC-03).



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

- Lead Lead concentrations were reported below the USEPA's Industrial RSL of 800 mg/kg in all samples. The concentrations were from south to north: 17.2 mg/kg (SELC-01), 11.7 mg/kg (SELC-02) and 8 m/kg (SELC-03).
- Vanadium Vanadium concentrations were reported below the USEPA's Industrial RSL of 580 mg/kg in all the samples. The concentrations were from south to north: 68.1 mg/kg (SELC-01), 65.6 mg/kg (SELC-02) and 60.6 m/kg (SELC-03).
- Mercury Mercury concentrations were reported below the USEPA's Industrial RSL of 35 mg/kg in all the samples. The concentrations were from south to north: 0.082 mg/kg (SELC-01), 0.064 mg/kg (SELC-02) and 0.043 m/kg (SELC-03).
- Ethylbenzene Concentrations of ethylbenzene were reported below the USEPA's Industrial RSL of 25 mg/kg in all samples. A sample showed a concentration of 0.0045 mg/kg (SELC-03), the northernmost, while the remaining samples resulted in non-detect values.
- Acetone Concentrations of acetone were reported below the USEPA's Industrial RSL of 67, 000 mg/kg in all samples. Concentrations ranged from 0.0195 mg/kg (SELC-03) to 0.0298 mg/kg (SELC-02).
- 2-Butanone Concentrations of 2-Butanone were reported below the USEPA's Industrial RSL of 19, 000 mg/kg in all samples. A sample showed a concentration of 0.0113 mg/kg (SELC-01) while the remaining samples resulted in non-detect values.
- Other Reported Results For the methods analyzed, TPH DRO and TPH ORO resulted in reported concentrations but a regulatory standard is not available for these parameters.

4.6.7 Groundwater Samples Analytical Results

4.6.7.1 Facility-Wide Groundwater Sampling

The laboratory analyzed the groundwater samples for: volatile organic compounds (Method 8260), semi-volatile organic compounds (Method 8270), total petroleum hydrocarbons: oil range organics and diesel range organics (Method 8021), metals (chromium, lead, arsenic, vanadium) (Method 6010), and mercury (Method 7470).

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 12 provides the results of the 70 groundwater samples. **Figure 19** and **Table 11** show the sampled wells. **Table 9** summarizes the quality assurance and quality control samples. **Appendix M** includes the complete chain of custody form. Groundwater results are compared to Maximum Contaminant Levels (MCLs) and Tapwater when MCLs are not available. These are summarized as follow:

- Benzene Benzene concentrations were reported above the USEPA's MCL of 5 μg/L in two of the 70 groundwater samples. Concentrations were 2, 430 μg/L and 23.8 μg/L in MW-91A and MW-AD-4, respectively. Figure 20 shows the location of these samples.
- Ethylbenzene Ethylbenzene concentration was reported above the USEPA's MCL of 700 μg/L in one of the 70 groundwater samples. The concentration was 767 μg/L in MW-91A. Figure 20 shows the location of these samples.
- Isopropyl benzene (cumene) Isopropyl benzene concentrations were reported above the USEPA's Tapwater of 45 µg/L in one of the 70 groundwater samples. The concentration was 65.5 µg/L in MW-AD-4. Figure 20 shows the location of this sample.
- Methyl-Tert-Butyl-Ether (MTBE) Concentrations of this compound were reported above the US EPA's Tapwater of 14 µg/L in five of 70 groundwater samples. Concentrations in each well were as follow: 30.7 µg/L (MW-13A), 25.2 µg/L (MW-15A), 29.8 µg/L (MW-37A), 54.4 µg/L (MW-EB-103) and 62.4 µg/L (MW-EB-104). Figure 21 shows the location of these samples.
- Trichloroethene Trichloroethene concentrations were reported above the USEPA's MCL of 5 µg/L in three of 70 groundwater samples. Concentrations in wells MW-18D, PMW-118 and PMW-119 are as follow in the same order: 65.1 µg/L, 14.7 µg/L and 10.6 µg/L. Figure 22 shows the location of these samples. These wells are located in the southern and eastern perimeters, upgradient from the Facility.
- 1, 1, 2 Trichloroethane Concentrations of this compound were reported above the USEPA's MCL of 5 μg/L in one of 70 groundwater samples. Concentration in well MW-AD-4 reported 22.7 μg/L. Figure 22 shows the location of this sample.
- Naphthalene Naphthalene concentrations were reported above the USEPA's Tapwater of 0.17 µg/L in nine of 70 groundwater samples. Concentrations in wells



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

are as follow: 0.67 μ g/L (MW-13A), 0.47 μ g/L (MW-30A), 0.74 μ g/L (MW-33A), 0.94 μ g/L (MW-37A), 0.7 μ g/L (MW-57A), 0.39 μ g/L (MW-88A), 59.5 μ g/L (MW-91A), 0.41 μ g/L (MW-98A) and 22.9 μ g/L (MW-AD-4). **Figure 23** shows the location of these samples.

- 2-Methylnaphtalene Concentrations of this compound were reported above the USEPA's Tapwater of 3.6 μg/L in three of 70 groundwater samples. Concentrations in wells are as follow: 3.8 μg/L (MW-57A), 22.9 μg/L (MW-91A) and 11.2 μg/L (MW-AD-4). Figure 23 shows the location of these samples.
- Arsenic Total arsenic concentrations were reported above the USEPA's MCL of 10 µg/L in 14 of 70 groundwater samples. The remaining samples had non-detect values. Total concentrations ranged from non-detect to 276 µg/L in sample MW-AD-2. Figure 24 shows the concentrations and location of these samples.

Dissolved arsenic concentrations were reported above the USEPA's MCL of 10 μ g/L in five of 70 samples. The remaining samples were non-detect. Concentrations ranged from non-detect to 17.9 μ g/L in sample MW-15B2. **Figure 24** shows the concentrations and location of all samples.

Chromium - Total chromium concentrations were reported above the USEPA's MCL of 100 µg/L in five of 70 samples. The remaining samples were non-detect. Total concentrations above the MCL ranged from non-detect to 630 µg/L in sample MW-AD-2. Figure 25 shows the concentrations and location of these samples.

Dissolved chromium concentrations were reported below the USEPA's MCL of 100 μ g/L in all samples.

- Lead Total Lead concentrations were reported above the USEPA's MCL/ of 15 µg/L in six of 70 samples. Total Lead concentrations above the MCL ranged from non-detect to 41.3 µg/L in sample MW-AD-2. Figure 26 shows the concentrations and location of these samples. Dissolved Lead concentrations were not reported in any of the 70 samples.
- Vanadium Total Vanadium concentrations were reported above the USEPA's Tapwater of 8.6 μg/L in eight of 70 samples. The concentrations ranged from nondetect to 1, 150 μg/L in sample MW-AD-2. Figure 27 shows the concentrations and location of these samples.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Vanadium dissolved concentrations were reported above the USEPA's Tapwater of 8.6 μ g/L in one sample. The concentration was 82 μ g/L in MW-110AB. **Figure 27** shows the concentrations and location of the sample.

Mercury - Total Mercury concentrations were reported above the USEPA's MCL of 2 µg/L in three of 70 samples. The remaining samples resulted in below the standard. Total Mercury concentrations ranged from non-detect to 7.8 µg/L in sample PMW-124. Figure 28 shows the concentrations and location of these samples. Mercury dissolved concentrations were reported below the USEPA's MCL of 2 µg/L in all samples.

4.6.7.2 Groundwater Data in Old Oil Lagoons Area (SWMU 11)

As mentioned in section 4.5.2.5, confirmatory sampling revealed that concentrations in soil were still above the Protection of Groundwater RSLs (USEPA, 2008) in SWMU 11. However, groundwater data from three surrounding wells nearby the former Old Oil Lagoons (SWMU 11) reported total and dissolved arsenic concentrations above the USEPA's MCL of 10 μ g/L. Other reported results were MTBE with concentrations below the USEPA Tapwater of 14 ug/L and some SVOCs (Fluorene and Acenapthtene) also below their corresponding Tapwater standard. The three wells are: PMW-116, MW-84A and MW-84B2. Refer to **Table 12** and **Table 13** for details.

4.6.7.3 Groundwater Data in SWMU 32 and SWMU 33 Area

As previously mentioned in Section 4.1.2, SWMU 33 and SWMU 35 refer to the Old non-hazardous disposal site and Catalytic Waste Pond, respectively, which need or may need further investigation. Some groundwater data from the closer five wells reported concentrations above the MCL for mercury (well MW-38A), lead (well MW-63A), and arsenic (wells MW-63A, MW-38A and MW-111A). Concentrations of "MTBE were also reported above the USEPA Tapwater of 14 μ g/L ranging from 29.8 to 30.7 μ g/L in two wells: MW-13A and MW-37A. Refer to **Table 12**, **Figure 20**, **Figure 21**, **Figure 26** and **Figure 28** for details.

4.6.7.4 Natural Attenuation Parameters

Table 14 presents the concentrations obtained for the geochemical indicator

 parameters in each groundwater sample. These are discussed below:



- Oxygen Oxygen was quantified by laboratory analyses. Dissolved oxygen (DO) concentrations ranged from 1.6 to 5.2 ug/L. These concentrations represent relatively high levels, suggesting aerobic conditions are generally present across the Site. However, the lowest DO values, ranging from 1.6 to 2.9 ug/L, were reported within the Facility's operational area. Relatively higher DO values were reported in the upgradient and downgradient areas of the Facility's operational area, indicating that oxygen has been partially consumed in the area of the Site where the majority of the impacts reside.
- Nitrate Analytical laboratory results indicated non-detectable levels of nitrogen at wells located in Avenue D and within the western portion of the Facility's operational areas. These results potentially indicate consumption of nitrogen in impacted areas.
- Iron Dissolved iron concentrations were relatively high at well locations within the Facility's operational area; conversely, lower and non-detectable values were observed in upgradient and downgradient areas. These results suggest that an active microbial population has catalyzed the consumption of ferric iron within the impacted area of the Site.
- Sulfate Sulfate concentrations were found be relatively lower in the Facility's operational area than upgradient or downgradient areas, potentially indicating consumption of sulfate due to bacterial activity.
- Methane Methane concentrations were highest in the Facility's operational area, ranging from 1, 100 to 8, 600 ug/L. Relatively lower methane values, ranging from 0.18 to 250 ug/L, were reported in the upgradient and downgradient areas of the Facility's operational area. The presence of methane at select well locations reveals that, albeit the generally elevated DO measurements, reducing conditions are indeed encountered within the impacted area of the Site. Notably, the subsurface environment is heterogeneous, allowing for there to be localized patches characterized by highly reducing conditions within a generally oxidizing to slightly reducing aquifer.

Overall, the geochemical parameters monitored at the site during September and October 2014 suggest ongoing biodegradation of the dissolved-phase hydrocarbon impacts, with mildly reducing conditions (nitrate reduction, iron reduction) to more strongly reducing conditions (sulfate reduction, methanogenesis) throughout the plumes.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

4.6.7.5 Surface Water from the Undeveloped Wetland Area

Table 11 presents the results for each sample, which are summarized below:

- Lead Lead concentration of sample SWW-03 (easternmost) resulted in 5.6 ug/L while the remaining samples showed non-detect values.
- 4.6.7.6 Surface Water from Lajas Creek

Table 11 presents the results for each sample, which are summarized below:

 Lead - The only constituent reported in the surface water samples of Las Lajas Creek was Lead. Lead concentrations were found in one of the three samples below the USEPA's MCL/ of 15 µg/L. The concentration resulted in 0.0059 µg/L, and corresponds to sample SWLC-02. Figure 14 depicts the location of the samples.

5. Conceptual Site Model

In accordance with the approved 2013 RFI Work Plan, a conceptual site model (CSM), which includes potential sources, fate and transport mechanisms, potential receptors, and exposure routes and exposure points was developed based on the environmental setting, land use, operational history, analytical data, and fate and transport analysis for the Facility summarized in the previous sections. The information integrates data collected as part of the RFI into the preliminary CSM included in the 2013 RFI Work Plan.

5.1 Sources and Receiving Media

VOCs, BNAs, and inorganic constituents (primarily metals) have been detected in surface soil, subsurface soil, and Zone A and Zone B groundwater samples collected from on-site monitoring wells at concentrations greater than regulatory criteria and/or screening levels. LNAPL has also been observed in multiple groundwater monitoring wells on site.

Some of these detections may be attributable to previous operations at the Facility and/or dissolution of the LNAPL plumes, while others may be attributable to background concentrations, the October 2009 incident, or potential off-site sources, which are discussed further below.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

5.1.1 On-Site Sources

As discussed in Section 2.2, the Facility historically operated as a refinery and terminal, but the refinery has been demolished. As discussed in Section 4.1.2, 30 SWMUs and 12 AOCs were identified at the site prior to the 2009 incident, and constitute the primary historical source areas of chemical constituents. Primary release mechanisms include spills and/or leakage of VOCs, BNAs, and inorganic constituents to surface soil, subsurface soil, and groundwater from the former refinery, storage tanks, pumps and associated piping, unlined pits, lagoons, and waste storage areas during routine historical operations at the Facility.

5.1.2 October 2009 Incident

On October 23, 2009, a series of explosions and fires at the Facility damaged or destroyed many of the storage tanks at the Facility. Areas specifically impacted or suspected to be impacted by the incident included the northern portion of the Tank Farm Area, the WWTP Area, storm water channels within the operational areas of the Facility, and portions of the undeveloped wetland area north of the operational areas of the Facility. An unknown quantity of petroleum was released during the incident. It is likely that much of the released material was consumed by the fire, but it was suspected that at least some was conveyed in runoff to Las Lajas Creek and an associated wetlands area to the north of the active portions of the Facility.

Immediately following the October 2009 explosions and fires, third party emergency response contractors provided emergency cleanup and assistance at the terminal. Tanks were dismantled, impacted soils were removed, and stabilization actions were implemented. Soil removal criteria were, based on visible contamination (e.g., sheen, staining).

Following the 2009 explosion and fire, visual impacts were initially observed in Las Lajas Creek and the wetland following the 2009 incident. Subsequent regular visual inspections of these areas were conducted as part of the removal action conducted by the USEPA and later by PUMA. These inspections did not identify the presence of residual hydrocarbons in Las Lajas Creek. Residual oil or related indicators (odors, sheens, or staining) were not found in the vegetation, soil, or surface waters during the Hydrogeomorphic Functional Assessment completed in 2011 (ARCADIS 2011).

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

5.1.3 Background

Inorganic constituents, such as arsenic, chromium, lead, mercury, vanadium, and others, are naturally occurring and their presence in soil on and off site is at least partially due to natural occurrence. AMAI evaluated 20 soil samples collected during four sampling events in December 1998, December1999, January 2000, and June 2003 and calculated background concentrations based on the 95th percent upper tolerance limit (UTL) for the dataset (AMAI 2006). These calculated background concentrations are presented below:

Metal	Background Concentration (mg/kg)
Antimony	1.7
Arsenic	45
Barium	883
Beryllium	1.4
Cadmium	1.2
Chromium	86
Cobalt	77
Lead	92
Mercury	0.34
Nickel	45
Selenium	4.9
Vanadium	250

Many of the soil analytical results for inorganic constituents are less than these background threshold concentrations, indicating that concentrations of inorganics in on-site soil samples are potentially within the range of background concentrations. As discussed in Section 4.6.5, arsenic has been detected in on-site soil samples at concentrations greater than the Industrial RSL, as well as the AMAI calculated background threshold concentration. Therefore, detected concentrations of arsenic may be attributable to both anthropogenic and natural background sources.

Analytical results for metals in each of the sediment samples collected in Las Lajas Creek and in the wetlands in the undeveloped area north of the operational area of the Facility were also less than the AMAI soil background concentrations. Therefore,

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

concentrations of metals in Las Lajas Creek and the associated wetlands are potentially representative of natural background conditions, rather than Facility impacts.

Surface water and groundwater background levels have not been developed for the Facility. Therefore, an evaluation of the potential contribution of background levels to surface water and groundwater analytical results was not completed.

5.1.4 Off-Site Sources

As discussed in Section 4.2, TCE and vinyl chloride have been detected in monitoring wells along the eastern and southern Facility boundary. These compounds are not associated with historical or current Facility operations, and these groundwater impacts are considered part of a larger plume located primarily on the property of Fort Buchanan, which is located east and south of the Facility. Fort Buchanan is currently in the process of identifying the source and evaluating the need for remedial actions for this plume.

In 2011, a release of oil, a viscous oil-like substance, and chemical wastes into the storm water system leading to an outfall on the Fort Buchanan property was reported. The outfall creates a stream that flows downgradient through the undeveloped wetland area, then into a channelized river and finally to San Juan Bay. USEPA investigations identified a meat processing company in the Amelia Industrial Park upgradient of Fort Buchanan as a primary contributor of oil/grease, and the other potential industrial dischargers as sources of regulated chemicals in the storm water system (USEPA 2011).

Las Lajas Creek is a low-flow, shallow stream that originates in the hills south of the Facility prior to entering the operational areas of the Facility. As a result, this stream potentially receives drainage from the surrounding properties prior to entering the Facility; therefore, some percentage of constituent concentrations may be present in Las Lajas Creek due to area-wide sources. Las Lajas Creek is channeled underground as it enters the Facility and returns to an open channel north of the Facility's wastewater treatment plant (WWTP) area. The Facility's storm water discharges into Las Lajas Creek through discharge 002 (under NPDES Permit # PR0000370). Therefore, the majority of the flow in Las Lajas Creek is the result of storm water flow from the entire drainage area.

To the west of the facility, a storm channel runs from south to north from State Road 28, and collects runoff water form adjacent properties, such as Zacarías and

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Associates, Inc. and SSW Realty and PorGasco, Inc./Tropigas. This channel is superficial until it reaches the Tropigas property, where it flows into an underground pipe that runs northwest and surfaces adjacent to the PUMA's aeration basin and flows into Las Lajas Creek. At times, oily material has been observed flowing onto the Facility. PUMA has reported these findings to the USEPA. See west side incident report in **Appendix E**.

5.2 Fate and Transport Mechanisms

Constituents may be retained in Facility soils or subject to chemical fate and transport mechanisms at the Facility. Fate and transport mechanisms include soil sorption; wind erosion and transport; migration to groundwater; biodegradation; advective/dispersive transport off site in groundwater; and volatilization into soil gas and diffusive/advective transport to outdoor or indoor air.

Organic COPCs, such as BNAs, adsorb strongly to solids and have limited potential for volatilization from or migration in soil. When bound to surface soil, compounds sorbed to soil particles may also be subject to wind erosion and windblown transport in outdoor air. Uncommon subsurface conditions may result in desorption of these compounds from soil and subsequent leaching to groundwater. Following dissolution in groundwater, dissolved-phase compounds may be transported via advective/dispersive transport to sediment, where they tend to remain due to their hydrophobicity and affinity for organic carbon. As discussed in Section 3.4, groundwater flow in Zone A is toward the north and in Zone B is toward the north to northwest (refer to Figure 29 and Figure 30). Therefore, groundwater may transport compounds from upland areas to the sediment and surface water in Las Lajas Creek and the adjacent undeveloped wetland area. Surface runoff may also transport compounds bound to surface soil from upland areas to sediment and surface water in the undeveloped wetland areas and Las Lajas Creek. Previous investigations evaluated groundwater sampling results from shallow wells nearby and adjacent to Las Lajas Creek, and analytical results for semivolatile organic compounds were less than groundwater screening levels (USEPA 2008). The data collected as part of this RFI in Las Lajas Creek and the adjacent undeveloped wetland areas indicate that organic constituents, such as Semi VOCs, were not detected in sediment and surface water in Las Lajas Creek and the adjacent undeveloped wetlands. These results indicate that Semi VOCs are not migrating significantly in groundwater or via surface runoff toward the sediment and surface water in Las Lajas Creek and the adjacent, undeveloped wetlands.

More volatile constituents, including components of lighter petroleum products (e.g., BTEX, naphthalene), associated constituents (e.g., MTBE), and solvents (e.g., TCE), have a greater potential for volatilization and dissolution in groundwater. These compounds adsorb less strongly to soil particles and more readily leach from soil to groundwater during infiltration events. Following dissolution in groundwater, dissolvedphase compounds may be transported via advective/dispersive transport to sediment and surface water in the undeveloped wetland areas and Las Lajas Creek, as discussed above. Surface runoff may also transport compounds bound to surface soil from upland areas to sediment and surface water in the undeveloped wetland areas and Las Laias Creek. However, once in surface water, these compounds tend to remain in solution or volatilize to outdoor air. As discussed above, previous investigations evaluated groundwater sampling results from shallow wells nearby and adjacent to Las Lajas Creek, and analytical results for VOCs were less than groundwater screening levels (USEPA 2008). The data collected as part of this RFI in Las Lajas Creek and the adjacent undeveloped wetland areas indicate that with the exception of acetone and 2-butanone, VOCs were not detected in sediment and surface water in Las Lajas Creek and the adjacent undeveloped wetlands. Acetone and 2-butanone were reported as detected in below USEPA's Industrial RSL in sediment samples collected in Las Lajas Creek; however, these constituents are not associated with historical site operations. Therefore, the presence of these constituents may potentially be attributable to area-wide storm water sources or other contamination. These results indicate that site-related constituents are not migrating significantly in groundwater or via surface runoff toward the sediment and surface water in Las Lajas Creek and the adjacent, undeveloped wetlands.

Volatile constituents also tend to migrate from soil or groundwater to soil gas and subsequently to outdoor or indoor air via diffusive/advective transport. Vapor transport of volatile constituents in the subsurface is typically dominated by diffusion, although near buildings, both diffusion and advection may become important transport mechanisms. Diffusion occurs through the soil gas and water present in soil pores, but diffusion occurs much more quickly through air than water. Therefore, vapor diffusion rates are lower for soils with high moisture content and low air-filled porosity, such as the low-permeability clays observed on site.

Lighter petroleum products (e.g., BTEX) are also subject to aerobic biodegradation in the subsurface. As discussed in Section 4.6.7.4, groundwater samples collected in September and October 2014 were analyzed for geochemical parameters to evaluate the potential for biodegradation on site. Groundwater analytical results for dissolved oxygen ranged from 1.6 to 5.2 ug/L, suggesting aerobic conditions are generally

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

present across the site. The lowest results for oxygen and the highest results for methane were reported in the Facility's operational area, strongly suggesting biodegradation of dissolved-phase petroleum hydrocarbons is ongoing in this portion of the site, although the rates and extent have not been evaluated quantitatively. Biodegradation of BTEX vapors may also occur in the vadose zone as long as sufficient oxygen is available. Thus, barring the presence of preferential pathways facilitating subsurface transport, petroleum hydrocarbons, particularly BTEX compounds, may degrade significantly before reaching potential receptors. As noted by the USEPA (2015b), scientific research presented in the literature, as well as many site investigations, indicate that microorganisms that aerobically degrade petroleum hydrocarbons are present in virtually all subsurface soil environments, and several field studies demonstrate extensive aerobic biodegradation of petroleum hydrocarbons in unsaturated soils. Several of these studies document vapor concentrations at least two to three orders of magnitude lower than would be predicted based on simple diffusion if biodegradation were not occurring (USEPA 2015b). For this reason, at leaking underground storage tank (UST) sites, the USEPA (2015b) currently does not require evaluation of occupied buildings more than 6 feet above dissolved-phase petroleum hydrocarbon concentrations of benzene less than 5 ug/L or TPH less than 30 ug/L, if clean, biologically active soil is present. Lateral separation distances are on the same scale, except in the downgradient direction if the plume is migrating (USEPA 2015b). USEPA (2015a) notes that these guidelines "may also be useful in informing decisions about vapor intrusion and petroleum hydrocarbons at non-UST sites," assuming conditions (e.g., size of release, availability of oxygen and quantities, distribution, types, and mixtures of vapor-forming chemicals released) are similar to those discussed in the leaking storage tank guidance.

As discussed in Section 4.5.1, LNAPL on site is essentially pushed upward by the water in the carbonate sediment layer, and trapped against the overlying clay soils due to undulations of the carbonate sediment layer. Under these conditions, floating free product in the carbonate sediments is expected to essentially be unable to migrate, or may migrate slowly (**Figure 31**). LNAPL may also dissolve slowly over time into groundwater. Previous investigations conclude that the LNAPL plumes were stable with negligible migration (USEPA 2008). The data collected as part of this RFI indicate that the extent and magnitude of LNAPL in monitoring wells at the Facility has decreased since September 2009, and hydrogeologic conditions have not changed significantly since the 2009 incident. Therefore, LNAPL is still not anticipated to migrate in groundwater.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Inorganic compounds, such as arsenic, often adsorb to soil particles, binding and integrating into the soil matrix. When bound to surface soils, inorganic compounds sorbed to soil particles may be subject to wind erosion and windblown transport in outdoor air. Inorganic constituents may also leach into groundwater, where dissolved forms may be transported to sediment and surface water. Surface runoff may also transport inorganic compounds bound to surface soil to sediment and surface water in Las Lajas Creek and the undeveloped wetland areas. As discussed above, previous investigations evaluated groundwater sampling results from shallow wells nearby and adjacent to Las Lajas Creek, and analytical results for inorganic compounds were less than groundwater screening levels (USEPA 2008). The data collected as part of this RFI in Las Lajas Creek and the adjacent undeveloped wetland areas indicate that analytical results for sediment are less than soil screening levels and/or within AMAI calculated background threshold concentrations. Groundwater concentrations are also less than screening levels, with the exception of arsenic, which may be attributable to background concentrations as well, since sediment concentrations of arsenic are within background levels. Therefore, inorganic constituents are not anticipated to migrate significantly in groundwater to sediment and surface water in Las Lajas Creek and the adjacent undeveloped wetlands.

5.3 Potential Receptors

Potential receptors were identified based on land uses at the site and surrounding properties. Human and ecological receptors are discussed separately below.

5.3.1 Potential Human Receptors

5.3.1.1 On-Site

Current land use at the site is industrial. The Facility currently operates as a terminal for storage of a variety of petroleum products. Access to the Facility is limited to PUMA employees, contractors, and visitors. Visitors may be present at the Facility, but their presence is anticipated to be infrequent, and therefore, their exposure is anticipated to be negligible.

Reconstruction and demolition in the operational areas of the Facility is ongoing. The refinery has been demolished, and environmental assessment and demolition of the existing refinery, control, and warehouse buildings at the Facility is ongoing. Therefore, construction workers may also be present on the operational portions of the Facility.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Trespassers are not anticipated to traverse the Facility. The perimeter of the operations area of the Facility is fenced and guarded 24 hours per day. Additionally, the Facility is not expected to attract trespassers because of its character and location (i.e., an industrial setting with limited access). The undeveloped wetland areas of the Facility north of the operations area are relatively inaccessible to visitors, contractors, and trespassers. The Puerto Rico Highway Authority maintains a security fence adjacent to Highway PR-22, which borders the undeveloped area. Furthermore, within the security fence landscape characteristics limit trespasser access. This area is predominantly an herbaceous community dominated by southern cattail (Typha domingensis), paja brava (Paspalum millegrana), sweet potato (Ipomoea batatas), Mexican primrose-willow (Ludwigia octovalvis), whitemouth dayflower (Commelina erecta), and coco yam (Colocasia esculenta). The unstable footing of the terrain coupled with the vegetation make traversing the wetland by foot difficult. During sampling activities in the wetland areas and along Las Laias Creek, field personnel required PPE and machetes to clear a path through the vegetation to reach sampling locations. As such, it is unlikely that trespassers traverse this area, and potential exposure pathways in these areas are assumed to be incomplete.

5.3.1.2 Off-Site

As discussed in Section 3.6, the site is surrounded by Road PR-22 and commercial/ industrial warehouses to the north; Road PR-22 and Fort Buchanan to the east; Road PR-28, Fort Buchanan, and the Julio Enrique Monagas Park to the south; and the Luchetti Industrial Park to the west. The closest residence is located 0.1 mile south of the Facility on the Fort Buchanan military base complex; additional residential properties are located approximately 1000 feet to the north/northwest of Highway PR-22 and the downgradient property boundary. Therefore, potential off-site human receptors would be limited primarily to commercial/industrial and residential receptors on the properties surrounding the Facility.

5.3.2 Potential Ecological Receptors

As discussed in Section 2.1, the operational area of the Facility consists of storage tanks, pipelines, appurtenances and supporting facilities, administrative buildings, gravel parking lots, maintained lawn and landscaped areas. Las Lajas Creek flows through the Facility, but is channeled through a concrete conduit underground and routed along the western and northern portions of the Facility. As such, based on the intended land use, this portion of the site does not contain significant habitat to support ecological receptors.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

The remaining portion of the Facility consists of undeveloped wetland areas associated with Las Lajas Creek and Diego Creek. These areas may include potential ecological receptors, such as benthic invertebrates and aquatic life that may be exposed to surface water and sediment in Las Lajas Creek and Diego Creek, as well as soil invertebrates, plants, and birds that may be exposed to wetland soil in adjacent portions of the wetland areas. However, as discussed above, site-related constituents are not anticipated to migrate significantly in groundwater to sediment and surface water toward Las Lajas Creek and the adjacent undeveloped wetlands. Given the analytical results for sediment and surface water in Las Lajas Creek and the adjacent undeveloped wetland, potential exposure to on-site and off-site ecological receptors is anticipated to be negligible.

5.4 Potential Exposure Points and Exposure Routes

On-site and off-site exposure points for human and ecological receptors are discussed further below. Three potential exposure routes were identified for the human receptors potentially present on and off site: ingestion, dermal contact, and inhalation of constituents from soil and groundwater. Ecological receptors, such as benthic invertebrates and aquatic receptors, were evaluated in terms of direct contact exposures with sediment and surface water.

5.4.1 On-Site

On-site exposure points primarily include the operational areas of the Facility. On-site commercial/industrial workers may be exposed to site-related constituents in surface soil via direct contact exposure routes (i.e., incidental ingestion, dermal contact, and/or inhalation of outdoor particulate/volatile emissions) during normal work activities in these areas.

On-site construction workers may be exposed to site-related constituents in surface and/or subsurface soil during excavation and/or construction activities during site redevelopment activities. However, it is assumed that construction workers will be wearing PPE (e.g., long sleeved shirt, long pants, safety boots, safety glasses, hard hat) during construction activities. Additionally, if construction work is to be conducted in areas of soil impacts, air monitoring will be conducted to evaluate airborne particulate and volatile emissions, and work will cease if air concentrations exceed OSHA standards. Therefore, direct contact exposure pathways from surface and subsurface soil are assumed to be incomplete for construction workers at the Facility.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

The Facility receives potable water and sanitary sewerage services from the Puerto Rico Aqueduct and Sewer Authority (PRASA). Consequently, there are no on-site exposure points for direct-contact exposure routes for groundwater (i.e., ingestion, dermal contact, and inhalation of volatile emissions from tap water), since there are no potable wells on the property, and the site is connected to public water and sewer. Therefore, these exposure pathways are currently incomplete for all human receptors at the Facility.

Given the depth to groundwater in the operational area of the Facility ranges from 1 to 13 feet below ground surface, groundwater may be encountered during potential excavation work. However, it is assumed that dewatering will occur, if excavation below the water table is planned. Therefore, direct contact exposure pathways for groundwater are assumed to be incomplete for construction workers at the Facility, as well.

Currently, there are no occupied buildings overlying or within 100 feet of observed LNAPL or site-related dissolved-phase groundwater impacts at the Facility. Therefore, there are no current anticipated exposure points for the vapor intrusion pathway at the Facility. Potential future exposure of via the vapor intrusion pathway will be evaluated in a separate submittal following submittal of this RFI Report.

5.4.2 Off-Site

There are no known downgradient wells used for public or private drinking water supply. Two public water supply wells have been identified in the communities of Frailes (2 miles southeast) and Cerro Gordo (2 miles southwest) of the Facility (Puerto Rico Department of Health, pers. comm.), but given the direction of groundwater flow in Zone A and Zone B, it is not anticipated that these wells could be impacted by siterelated constituents. Therefore, direct-contact exposure pathways (i.e., ingestion, dermal contact, and inhalation of volatile emissions from tap water) from groundwater are considered incomplete for off-site human receptors. These pathways are also assumed to be incomplete for off-site human receptors, since the communities surrounding the site are connected to the public water supply.

Currently, there are no occupied off-site buildings overlying or within 100 feet of observed LNAPL or site-related dissolved-phase groundwater impacts at the Facility. As discussed above, concentrations of TCE and vinyl chloride detected in monitoring wells along the eastern Facility boundary are attributed to a larger plume located primarily on the property of Fort Buchanan, which is located east and south (and



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

hydrologically upgradient) of the Facility. Therefore, there are no current anticipated exposure points for site-related constituents via the vapor intrusion pathway off-site.

5.4.3 Potential Ecological Exposure Points and Exposure Routes

Potential ecological receptors, such as benthic invertebrates and aquatic receptors, in Las Lajas Creek and the adjacent wetlands in the undeveloped portion of the Facility could directly contact site-related constituents in groundwater, sediment, and surface water, if present. Ecological receptors could also potentially include soil invertebrates, plants, and birds that may be exposed to wetland soil in portions of the wetland areas adjacent to Las Lajas Creek.

As discussed above, site-related constituents are not anticipated to migrate significantly in groundwater to sediment and surface water toward the undeveloped wetland areas on site.

5.5 Exposure Pathway Evaluation Summary

An exposure pathway generally comprises four elements, each of which is necessary for an exposure pathway to be considered complete:

- A source and/or release mechanism
- A retention (fate) or transport mechanism
- A receptor
- An exposure route at an exposure point

The exposure pathways evaluation process considers each of the identified human and ecological receptors to evaluate whether specific exposure pathways are potentially complete, incomplete, or are likely to result in negligible exposure. An exposure pathway requires further evaluation if it is considered potentially complete and is likely to result in significant exposure.

Soil direct contact exposure pathways for on-site commercial/industrial workers are potentially complete. Detected concentrations of arsenic in soil samples collected as part of the 2013 RFI were less than previously detected soil concentrations of arsenic. The USEPA (2004) EI Evaluation for Human Exposures calculated potential risk to on-

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

site commercial/industrial workers using the maximum detected concentration of 93.2 mg/kg, and calculated risk fell within the USEPA range of acceptable risks (1x10⁻⁶ to 1x10⁻⁴). As discussed by the USEPA, this approach is extremely conservative, and overstates actual potential risk to on-site commercial/industrial workers. Therefore, since the soil results for arsenic collected as part of the RFI were lower than the previous maximum detected concentration of 93.2 mg/kg, potential risk to on-site commercial/workers from exposure to soil is still anticipated to be within or below the USEPA range of acceptable risks.

Exposure pathways are potentially complete for future on-site construction workers, but the exposures are regulated by the Occupational Safety and Health Act (OSHA), and therefore, are unlikely to pose a health risk.

Potential future exposure of via the vapor intrusion pathway will be evaluated in a separate submittal following submittal of this RFI Report.

Exposure pathways are also potentially complete for ecological receptors in the undeveloped wetland areas north of the operational portion of the Facility. Potential exposure of ecological receptors to site-related constituent concentrations will be evaluated in a separate submittal following submittal of this RFI Report.

Exposure pathways for the remaining receptors are anticipated to be incomplete. These exposure pathways are summarized below.

- Groundwater exposure pathways are incomplete for on-site commercial/industrial workers, because groundwater is not used at the Facility for potable uses and occupied buildings are not located within 100 feet of LNAPL or dissolved-phase groundwater impacts.
- Exposure pathways are incomplete for trespassers, because trespassers are not anticipated to traverse the Facility.
- Exposure pathways are incomplete for ecological receptors on the operational portion of the Facility, because this portion of the site does not contain significant habitat to support ecological receptors.

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

6. Discussion

6.1 Summary of Results and Conclusions

The following conclusions are presented based on the previous investigations data available and 2014 investigations in accordance with the approved 2013 RCRA Facility Investigation Work Plan.

6.1.1 Soils

During 2014 investigations, only soil samples collected in area of Avenue D and the southern and eastern perimeter areas had concentrations of arsenic above USEPA's Industrial RSL; however, most of this data is comparable with the background arsenic concentration established for the Facility by previous investigations.

6.1.2 Groundwater

The results of groundwater samples collected in the southern and eastern perimeter monitoring wells in 2014 identified concentrations of TCE above the USEPA's MCL. This compound was found at the highest concentrations in the monitoring wells located hydraulically upgradient from the Facility and support the prior assumptions that TCE has migrated from the Fort Buchannan site. Although TCE concentrations had been reported historically in MW-83B2 and MW-84B2 (Avenue D and F) TCE was not detected in samples from these wells in 2014. There is no evidence of hydrocarbon related constituents in groundwater in this area.

Groundwater concentrations of methyl-tert-butyl-ether (MTBE) were reported above the USEPA Tapwater guidance levels in the former Equalization Basin area and Avenue F. These detections were limited to this area, and were only reported in five of the 70 wells sampled. The wells with elevated concentrations were all in the water table zone (Zone A). Note: this area is not used as a potable water source.

Groundwater concentrations of ethylbenzene were also detected above USEPA's MCL in the former refinery area. These detections were limited to this area and ethylbenzene was only reported above the standard in one of the 70 wells sampled. This well with elevated concentrations is in the water table zone (Zone A).

In comparing the most recent historical groundwater sampling results from prior to 2014 with the results from the 2014 groundwater sampling, concentrations of BTEX

found historically in MW-37A (Avenue F) were not detected in 2014. However, concentrations of benzene were reported in the former refinery and Avenue D. The data indicates actual benzene concentrations are in hydrologic unit Zone A. Previous historical groundwater data for benzene in the aforementioned areas had also been reported.

Historically, total and dissolved mercury had been reported at concentrations above USEPA Tapwater RSLs along the northern boundary of the Facility. During 2014 investigations, concentrations above USEPA's MCL for Mercury were also reported in the samples collected in the southern boundary of the Facility and along Avenue F. Historically, total Lead has been reported in sporadically within the Facility area. These data indicated the elevated Lead concentrations were limited to groundwater in hydrological unit Zone B. The results from the 2014 sampling identified with concentrations above USEPA's MCL of total Lead six of the 70 wells sampled. These detects were limited to groundwater in hydrological unit Zone A.

The results from the historical groundwater sampling identified concentrations of total Chromium in groundwater in the vicinity of the wastewater treatment plant (WWTP). The results from the 2014 sampling indicated concentrations of total Chromium above USEPA's MCL in groundwater from five of the 70 wells sampled. These wells are located in the vicinity or the WWTP, along Avenue D and along the southern perimeter. These samples were collected from groundwater monitoring wells in hydrological unit Zone A.

Historically, total and dissolved arsenic concentrations have been reported in areas within the Facility, including: former refinery area, WWTP area, old loading rack, old oil lagoons, sulfur lagoon area, northern tank area (hydrological unit Zone B), and isolated areas. During 2014 investigations, concentrations of arsenic were reported above USEPA's MCL in 16 of 70 wells. These wells were located in the former refinery area, the WWTP area, along Avenue D, along Avenue F, and in the undeveloped wetland area. These samples were collected from groundwater monitoring wells in hydrological unit Zone A.

Data collected in 2014 confirms natural attenuation processes are occurring according to the geochemical parameters analyzed. This data will serve as basis for future comparing results and analysis of hydrocarbon plume stability/shrinkage.

During 2014, free phase product was detected in three wells: two wells in the tank farm area and a well in the west area of Avenue D. Nevertheless, comparison of 2009,

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

2011 and 2014 free phase product data revealed a decline in thickness in four wells located in the WWTP area: a well in the tank farm area and a well in Avenue D. However, a well located in the tank farm area increased the thickness during this period.

6.1.3 Undeveloped Wetland Area

6.1.3.1 Surface Water

No concentrations of contaminants were reported above USEPA's National Recommended Water Quality Standards and Puerto Rico Water Quality Standards in the surface water samples of the wetland area.

6.1.3.2 Soils

Only Arsenic concentrations were reported in the soil samples above USEPA's Industrial RSL; however, these concentrations were all less than the arsenic background established for the Facility based in previous studies.

6.1.4 Las Lajas Creek

6.1.4.1 Surface Water

No concentrations of contaminants were reported above National Recommended Water Quality Standards and Puerto Rico Water Quality Standards in the surface water samples of the wetland area.

6.1.4.2 Soils

Only arsenic concentrations were found in the soil samples of the wetland area above USEPA's Industrial RSL. Arsenic concentrations were reported less than the arsenic background established for the Facility based in previous studies.

6.1.5 Fate and Transport Analysis

Soil direct contact exposure pathways for on-site commercial/industrial workers are potentially complete. However, the primary constituent of potential concern identified in on-site soils at concentrations greater than Industrial RSLs is arsenic. Detected

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

concentrations of arsenic in soil samples collected as part of the 2013 RFI were less than previously detected soil concentrations of arsenic.

The 2014 sampling event volatile constituent results indicate that VOCs and SVOCs are not migrating significantly in groundwater or via surface runoff toward the sediment and surface water in Las Lajas Creek and the adjacent, undeveloped wetlands.

Also, the data collected as part of this RFI indicate that the extent and magnitude of LNAPL in monitoring wells at the Facility has decreased since September 2009, and hydrogeologic conditions have not changed significantly since the 2009 incident. Therefore, LNAPL is still not anticipated to migrate in groundwater.

Groundwater concentrations of inorganic constituents are also less than screening levels, with the exception of arsenic, which may be attributable to background concentrations as well, since sediment concentrations of arsenic are within background levels. Therefore, inorganic constituents are not anticipated to migrate significantly in groundwater to sediment and surface water in Las Lajas Creek and the adjacent undeveloped wetlands.

6.2 Recommendations

Based on the results of the 2014 sampling, PUMA believes there is sufficient information to update the Groundwater Migration and Exposure Environmental Indicator (EI) reports for the Facility, and that the previous determinations made by the USEPA in the EI reports prior to the 2009 fire and explosion are unchanged.

However, recognizing that these conclusions are only based on a single sampling event, PUMA proposes to implement a periodic groundwater monitoring program that will consist of a semi-annual groundwater sampling event for the first year and an annual sampling program for 3 years. In addition,

Puma plans to complete the demolition of the WWTP by the third quarter of 2016. Once the demolition has been completed Puma will install additional monitoring wells to monitor any possible LNAPL in the area and will include them in the sampling events, but based on the initial sampling event of 2014, there is no evidence that LNAPL has migrated off the site. Therefore PUMA does not plan to implement an active LNAPL recovery system

As agreed to with EPA on August 26, 2015, a separate report will be prepared to compare the most recent sampling results to the 2015 screening levels as well as



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

ecological criteria developed for the Roosevelt Roads site in Puerto Rico. The results of this report will be used to update the strategy for completing site redevelopment and restoration under the RCRA Order.

7. References

- A.T. Kearney, Inc. and Harding Lawson Associates. 1989. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection, Caribbean Gulf Refining Corporation, Bayamón, Puerto Rico.* March 1989.
- Anderson, Mulholland & Associates, Inc. 2000a. *Technical Memorandum: RCRA* Facility Investigation, Phase I Wastewater Treatment Plant Soil. July 2000.
- Anderson, Mulholland & Associates, Inc. 2000b. Technical Memorandum: RCRA Facility Investigation, Phase II Wastewater Treatment Plant Soil. July 2000.
- Anderson, Mulholland & Associates, Inc. 2000c. *Technical Memorandum: RCRA Facility Investigation, Phase IA Soil Investigation Results.* July 2000.
- Anderson, Mulholland & Associates, Inc. 2001a. *RCRA Facility Investigation Dye Tracer Testing Program: Report on Preliminary Activities.* August 2001.
- Anderson, Mulholland & Associates, Inc. 2001b. *RCRA Facility Investigation Dye Tracer Testing Program: Geological Evaluation.* October 2001.
- Anderson, Mulholland & Associates, Inc. 2001c. *Technical Memorandum: RCRA Facility Investigation, Phase IB and 2A Soil Investigation Results*. August 2001.
- Anderson, Mulholland & Associates, Inc. 2002. Technical Memorandum: RCRA Facility Investigation, Phase 3 Soil Investigation Results. September 2002.
- Anderson, Mulholland & Associates, Inc. 2003a. *Phase II Process Sewer Assessment Report.* Revised April 2003.
- Anderson, Mulholland & Associates, Inc. 2003b. Las Lajas Creek Assessment, Supplemental Bank and sediment Sampling Report (Human Health Assessment). Revision 1. August 2003.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

- Anderson, Mulholland & Associates, Inc. 2004. *Site-wide Groundwater Monitoring Program, Draft Final Report.* January 2004.
- Anderson, Mulholland & Associates, Inc. 2008. *Technical Memorandum: Groundwater Sampling for Mercury and TCE, Evaluation of Results from Four Sampling Rounds between July 2006 and December 2007, Site-wide Groundwater Monitoring Program.* June 2008.
- Anderson, Mulholland & Associates, Inc. 2009a. Former Equalization Basin 2009 Annual RCRA Groundwater Monitoring Report. May 2009.
- Anderson, Mulholland & Associates, Inc. 2009b. Interim Corrective Measure Implementation Report, Old Oil Lagoons, Caribbean Petroleum Corporation Refinery/Terminal, Bayamón, Puerto Rico. February 2009.
- Anderson, Mulholland & Associates, Inc. 2009c. *Groundwater Quality Sampling Results, Underground Recovery System.* September 2009.
- ARCADIS Puerto Rico. 2011a. Phase I Environmental Site Assessment, Caribbean Petroleum Corporation Refinery/Terminal, Bayamón, Puerto Rico. May 9, 2011.
- ARCADIS Puerto Rico. 2011b. Work Plan, Former Caribbean Petroleum Corporation Refinery/Terminal, Bayamón, Puerto Rico, Agreement and Order on Consent for Removal Actions, Docket Num. CWA-02-2011-3021. July 5, 2011.
- ARCADIS Puerto Rico. 2011c. Hydrogeomorphic Functional Assessment Report, Former Caribbean Petroleum Corporation Refinery/Terminal, Bayamón, Puerto Rico. October 27, 2011.
- CH2MHill. 2010. *Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico.* Prepared for Department of the Navy, NAVFAC ATLANTIC. April.
- CH2MHill. 2013. *Master Ecological Risk Assessment Protocol for Vieques Environmental Restoration Program – Update 1 (Addendum)*. Prepared for Department of the Navy, NAVFAC ATLANTIC. April.
- Geraghty and Miller. 1988. *Hydrogeologic Assessment at the CARECO Refinery.* November 1988. Revised February 1989.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

- Malot. 1985. *Phase II Subsurface Product Recovery Project, Caribbean Gulf Refining Corporation.* September 1985.
- Malot. 1986. Environmental Screening Study, Gulf/Chevron Refinery. July, 21, 1986.
- Monroe, W.H. 1973. Map I-751 *Geologic Map of the Bayamón Quadrangle, Puerto Rico, Scale 1:20, 000.* USGS Miscellaneous Investigations.
- Radian Corporation. 1990. *Liquid Phase Hydrocarbon Recovery System Evaluation, Caribbean Petroleum Corporation.* August 1990.
- SCS Engineers. 2010. Evaluation of Environmental Liabilities, Caribbean Petroleum Refining, LP and Caribbean Petroleum Corporation. December 6, 2010.
- USEPA. 2004. *Current Human Exposures under Control.* Documentation of Environmental Indicator Determination. September 2004.
- USEPA. 2008. *Migration of Contaminated Groundwater under Control.* Documentation of Environmental Indicator Determination. September 2008.
- USEPA. 2015a. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. OSWER Publication 9200.2-154. Office of Solid Waste and Emergency Response. June.
- USEPA. 2015b. *Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites*. EPA 510-R-15-001. Office of Underground Storage Tanks. June.
- USEPA. ND. Envirofacts Warehouse Facility Detail Report for Caribbean Petroleum Refining. Available at: http://iaspub.epa.gov/enviro/fii_query_dtl.disp_program_ facility?p_registry_id=110008471956.
- USEPA. ND. *Gulf Refinery Pollution Reports*. Available at: http://www.epaosc.org/site/ sitrep_list.aspx?site_id=5524.
- USEPA. ND. Puerto Rico RCRA Cleanup Site Fact Sheets: Caribbean Petroleum Refining Limited Partnership. Available at: http://www.epa.gov/region2/waste/ fscpr.htm.



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

USEPA. ND. Special #6 Significant Discharge of Oil/Grease into Fort Buchanan. Fort Buchanan Pass-Through Oil Release. Pollution Report #16. Available at: http:// www.epaosc.org/site/sitrep_profile.aspx?site_id=6672.

USGS. 1969. Topographic Map of the Bayamón Quadrangle, Puerto Rico, 7.5-Minute Series, Scale 1:20, 000. Photorevised 1982.



Tables

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

2	013-2014 Decommissioned We	ells
MP-1	MW-13B	MW-22G
MP-10	MW-14	MW-23A
MP-5B2	MW-14A2	MW-23C
MP-6	MW-14AB	MW-24AB
MW-100A	MW-14B	MW-25A
MW-100B2	MW-16A	MW-26A
MW-110A	MW-16B	MW-27A
MW-112A	MW-16B2	MW-28AB
MW-113A	MW-1AB	MW-28B
MW-115B2	MW-22A	MW-29A
MW-12AB	MW-22B	MW-2AB
MW-31A	MW-43B	MW-54A
MW-32AB	MW-44B	MW-55B
MW-34AB	MW-45B	MW-56A
MW-34B	MW-46A	MW-56B
MW-34C	MW-47A	MW-58A
MW-35A	MW-49B	MW-58B
MW-36A	MW-4A	MW-59A
MW-36C	MW-50B	MW-5AB
MW-39A	MW-51B	MW-60A
MW-3AB	MW-52B	MW-60B
MW-41A	MW-53B	MW-61A
MW-62B	MW-74B	MW-8AB
MW-64A	MW-75B	MW-90A
MW-66A	MW-79B	MW-92A
MW-67A	MW-7AB	MW-93A
MW-68A	MW-80B	MW-94A
MW-69A	MW-81B	MW-95A
MW-6AB	MW-82A	MW-96A

Table 1 Decommissioned Groundwater Monitoring Wells



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

201	3-2014 Decommissioned We	ells
MW-70A	MW-83B1	MW-97A
MW-71A	MW-85A	MW-9AB
MW-72A	MW-85B2	MW-B10
MW-73B	MW-89A	MW-B23
MW-B27	MW-P3	MW-T10
MW-B3	MW-P4	MW-T3
MW-B4	MW-P5	MW-T4
MW-B5	MW-PZ1	MW-T5
MW-B6	MW-PZ2	MW-T6
MW-COB	MW-SP1	MW-TB2
MW-P1	MW-T1	MW-TB3
MW-P2		

Table 1 Decommissioned Groundwater Monitoring Wells (Cont.)

Table 2 Existing Groundwater Monitoring Wells

	Existing Wells	
EB-101	MW-48B	MW-B16
EB-102	MW-57A	MW-B17
EB-103	MW-63A	MW-B18
EB-104	MW-65A	MW-B19
EB-105	MW-75B2	MW-B21
EB-106	MW-76A	MW-B22
EB-107	MW-76B2	MW-B24
EB-108	MW-77B	MW-B25
MW-109A	MW-78B	MW-B26
MW-110AB	MW-83A	MW-B8
MW-110B2	MW-83B2	MW-B9
MW-111A	MW-84A	MW-DP-1
MW-114A	MW-84B2	MW-DP-5
MW-13A	MW-86A	MW-MP-2



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

	Existing Wells	
MW-13B2	MW-87A	MW-MP-3
MW-15A	MW-88A	MW-MP-4
MW-15B	MW-91A	MW-MP5A
MW-15B2	MW-98A	MW-MP8
MW-16C	MW-99A	MW-MP-9
MW-17B	MW-AD-1	MW-T9
MW-18D	MW-AD-2	PMW-116
MW-20B	MW-AD-3	PMW-117
MW-21B	MW-AD-4	PMW-118
MW-30A	MW-B1	PMW-119
MW-33A	MW-B11	PMW-120
MW-37A	MW-B12	PMW-121
MW-38A	MW-B13	PMW-122
MW-40B	MW-B14	PMW-123
MW-42B	MW-B15	PMW-124

Table 2 Existing Groundwater Monitoring Wells (Cont.)



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroothopo (TCC)	Sep-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (TCE)	Mar-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

⁽a) ND - Not detected; U - Compound was analyzed for, but not detected at the concentration shown; NA - Not available; UJ - Compound was analyzed for, but not detected at the concentration shown (reporting limit was estimated); J - Estimated value based on data validation; Bold black - Highlights concentrations above USEPA's MCL; B - For 1989-1995, analyte was found in trip blank (possible/probable contamination or laboratory problem indicated); B - After 1996, concentration is between the instrument detection limit (IDL) and contract required detection limit (CRDL) (Detections may be the result of instrument noise and other lab artifacts, especially near the IDL); BJ - Estimated concentration between the method Detection Limit (MDL) and the Reporting Limit (RL); E - Exceeds calibration range; N - Spiked sample recovery not within control limits; W - Post digestion for furnace atomic absorption (AA) out of control limits



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	May-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Oct-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Feb-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (TCE)	Mar-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jul-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene (PCE)	Mar-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	May-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Oct-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Sep-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Feb-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jul-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene (PCE)	Mar-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Mar-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1, 2-dichloroethene	Mar-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Sep-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1, 2-dichloroethene	Sep-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	May-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Oct-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Feb-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jul-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Sep-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1, 2-dichloroethene	Sep-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Mar-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1, 2-dichloroethene	Sep-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	May-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Oct-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1, 2-dichloroethene	Feb-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jul-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
trans-1, 2-dichloroethene	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Mar-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	Sep-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	May-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Oct-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Feb-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
View Chlorida	Jul-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	Sep-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mar-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Acatana	Sep-09	NA	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	10 U
Acetone	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Benzene	Jun-89				75							ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Jul-89				147							ND	ND
	Oct-89				10							ND	ND
	Oct-90												
	Apr-91				16							ND	ND
	Sep-92	156.6		1.5	352.3	ND	ND		3.7	0.9		ND	ND
	Apr-93	451.2		ND	190.2	ND	ND		ND	ND		ND	ND
	Oct-93	15.3		ND	24.2	ND	ND		ND	ND		ND	ND
	Apr-94	ND		ND	78.6	ND	ND		ND	11.2		ND	ND
Benzene	Oct-94	ND		ND	11.7	ND	ND		ND	15.8		ND	ND
	Mar-95	ND		ND	ND	ND	ND		ND	11.8		ND	ND
	Oct-95	ND		ND	358	ND	ND		ND	ND		1.04	ND
	Mar-96	10 U		10 U	320 E	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-96	10 U		10 U	160	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-97	10 U		9 J	60	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-97	10 U		10 U	35	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-98	10 U		10 U	21	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-98	10 U		10 U	19	10 U	10 U		10 U	10 U		10 U	10 U



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-99	10 U		22	15	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-99				2 J					10 U		10 U	10 U
	Mar-00	5 J		6 J	1 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-00				8 J					10 U		10 U	10 U
	Mar-01	10 U		10 U	3 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-01				1 U					1 U		1 U	1 U
	Mar-02	1 U		1 U	1.6	1 U	1 U		1 U	1 U		1 U	1 U
	Sep-02				1 U					1 U		1 U	1 U
Benzene	Mar-03			1 U	1 U							1 U	
	Sep-03				1.2							1 U	
	Mar-04		1 U	1.1	0.40 J	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-04				1 U						1 U	1 U	1 U
	Feb-05		1 U		0.43 J	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-05				7.7						1 U	1 U	1 U
	Mar-06		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-06				1 U						1 U	1 U	1 U
	Mar-07		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Sep-07				1 U						1 U	1 U	1 U
	Mar-08		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
Benzene	Sep-08				1 U						1 U	1 U	1 U
Delizerie	Mar-09		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-09				0.50 J						1 U	1 U	1 U
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Bromodichloromethane	Sep-09	NA	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	10 U
Bromodichioromethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Bromoform	Sep-09	NA	NA	NA	4 U	NA	NA	NA	NA	NA	4 U	4 U	4 U
БЮПОЮПП	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Dromomothono	Sep-09	NA	NA	NA	2 U	NA	NA	NA	NA	NA	2 U	2 U	2 U
Bromomethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
2 Dutenene	Sep-09	NA	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	10 U
2-Butanone	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Carbon disulfida	Sep-09	NA	NA	NA	2 U	NA	NA	NA	NA	NA	2 U	2 U	2 U
Carbon disulfide	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Carbon Tetrachloride	Sep-09	NA	NA	NA	1 UJ	NA	NA	NA	NA	NA	1 UJ	1 UJ	1 UJ



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
Carbon Tetrachloride	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Chlorobenzene	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Chioroberizene	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Chloroethane	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Chloroethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Oblanafarra	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Chloroform	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Chleremethene	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Chloromethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Dihasasashlarasashlaras	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Dibromochloromethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
1, 1-Dichlorethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Sep-09	NA	NA	NA	1 UJ	NA	NA	NA	NA	NA	1 UJ	1 UJ	1 UJ
1, 2-Dichlorethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
4.4 Disklandhana	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
1, 1-Dichlorethene	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
1 2 Dichloropropago	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	0.65 J	1 U	1 U
1, 2-Dichloropropane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
cis-1, 3-Dichloropropene	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
cis-1, 5-Dichloropropene	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
trans-1, 3-	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Dichloropropene	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Jun-89				15							ND	ND
	Jul-89				11							ND	ND
	Oct-89				13							ND	ND
	Oct-90												
	Apr-91				9							ND	ND
Ethylbenzene	Sep-92	ND		ND	7.1	ND	ND		4.1	0.6		0.4	ND
	Apr-93	ND		ND	36	ND	ND		ND	ND		ND	ND
	Oct-93	ND		ND	7.15	ND	ND		ND	ND		ND	ND
	Apr-94	ND		ND	8.91	ND	ND		ND	ND		ND	ND
	Oct-94	ND		ND	5.45	ND	ND		ND	ND		ND	ND
	Mar-95	ND		ND	ND	ND	ND		ND	ND		ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Oct-95	ND		ND	ND	ND	ND		ND	ND		ND	ND
	Mar-96	10 U		5 J	4 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-96	10 U		10 U	4 J	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-97	10 U		10 U	10 U	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-97	10 U		20 U	4 J	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-98	10 U		10 U	1 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-98	10 U		10 U	2 J	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-99	10 U		20 U	1 J	10 U	10 U		10 U	10 U		10 U	10 U
Ethylbenzene	Sep-99				4 J					10 U		10 U	10 U
	Mar-00	10 U		10 U	2 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-00				4 J					10 U		10 U	10 U
	Mar-01	10 U		10 U	1 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-01				1 J					1 U		1 U	1 U
	Mar-02	1 U		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U
	Sep-02				1.1					1 U		1 U	1 U
	Mar-03			1 U	1							1 U	
	Sep-03				1.3							1 U	



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-04		1 U	1 U	0.95 J	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-04				1.1						1 U	1 U	1 U
	Feb-05		1 U		1.1	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-05				1.1						1 U	1 U	1 U
	Mar-06		1 U	1 U	1.1	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-06				0.69 J						1 U	1 U	1 U
Ethylbenzene	Mar-07		1 U	1 U	0.56 J	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-07				0.63 J						1 U	1 U	1 U
	Mar-08		1 U	1 U	0.75 J	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-08				0.86 J						1 U	1 U	1 U
	Mar-09		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-09				0.78 J						1 U	1 U	1 U
	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
2 hovenono	Sep-09	NA	NA	NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	5 U
2-hexanone	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Mathulana ablarida	Sep-09	NA	NA	NA	2 U	NA	NA	NA	NA	NA	2 U	2 U	2 U
Methylene chloride	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
1 Mothyl 2 pontanona	Sep-09	NA	NA	NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	5 U
4-Methyl-2-pentanone	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
Sturopo	Sep-09	NA	NA	NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	5 U
Styrene	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
1, 1, 2, 2-	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
Tetrachloroethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
	Jun-89				27							ND	ND
	Jul-89				56							ND	ND
	Oct-89				ND							ND	ND
	Oct-90												
	Apr-91				2							ND	ND
Toluene	Sep-92	ND		ND	5.4	ND	ND		1.9	0.7		0.5	ND
	Apr-93	ND		ND	16.3	ND	ND		ND	ND		ND	ND
	Oct-93	ND		ND	ND	ND	ND		2.05	ND		ND	ND
	Apr-94	ND		2.46	6.27	ND	ND		13.6	1.61		ND	ND
	Oct-94	ND		ND	ND	ND	ND		ND	ND		ND	ND
	Mar-95	ND		ND	1.28	ND	ND		ND	ND		ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Oct-95	ND		ND	43.6	ND	ND		ND	ND		1.5	ND
	Mar-96	10 U		3 J	11 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-96	10 U		10 U	9 J	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-97	10 U		10 U	7 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-97	10 U		20 U	6 J	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-98	10 U		10 U	3 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-98	10 U		10 U	4 J	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-99	10 U		20 U	3 J	10 U	10 U		10 U	10 U		10 U	10 U
Toluene	Sep-99				2 J					10 U		10 U	10 U
	Mar-00	10 U		10 U	10 U	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-00				10 U					10 U		10 U	10 U
	Mar-01	10 U		10 U	1 J	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-01				1.4					1 U		1 U	1 U
	Mar-02	1 U		1 U	0.97 J	1 U	1 U		1 U	1 U		1 U	1 U
	Sep-02				0.91 J					1 U		1 U	1 U
	Mar-03			1 U	1.3							1 U	
	Sep-03				1							1 U	



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-04		1 U	1 U	1.3	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-04				1.7						1 U	1 U	1 U
	Feb-05		1 U		1.3	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-05				0.88 J						1 U	1 U	1 U
	Mar-06		1 U	1 U	0.89 J	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-06				0.47 J						1 U	1 U	1 U
Toluene	Mar-07		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-07				1 U						1 U	1 U	1 U
	Mar-08		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-08				1 U						1 U	1 U	1 U
	Mar-09		1 U	1 U	1 U	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-09				0.38 J						1 U	1 U	1 U
	Sep-14	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
1 1 1 Trichloroothana	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
1, 1, 1-Trichloroethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND
1 1 0 Trichloroothers	Sep-09	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U
1, 1, 2-Trichloroethane	Sep-14	ND	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Jun-89				53							ND	ND
	Jul-89				71							ND	ND
	Oct-89				ND							ND	ND
	Oct-90												
	Apr-91				13							ND	ND
	Sep-92	ND		11.9	22.3				0.7	0.3		1	ND
	Apr-93	ND		ND	27.3	ND	ND		ND	ND		ND	ND
	Oct-93	ND		ND	6.27	ND	ND		ND	ND		ND	ND
Xylene (total)	Apr-94	ND		ND	11	ND	ND		ND	ND		ND	ND
	Oct-94	ND		ND	13.3	ND	ND		ND	ND		ND	ND
	Mar-95	ND		ND	ND	ND	ND		ND	ND		ND	ND
	Oct-95	ND		ND	28.5	ND	ND		1.82	ND		ND	ND
	Mar-96	10 U		16	17 J	10 U	10 U		10 U	0.8 J		10 U	10 U
	Sep-96	10 U		10 U	17	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-97	10 U		31	17	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-97	10 U		24	16	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-98	10 U		1 J	7 J	10 U	10 U		10 U	10 U		10 U	10 U



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Sep-98	10 U		10 U	19	10 U	10 U		10 U	10 U		10 U	10 U
	Mar-99	10 U		42	12	10 U	10 U		10 U	10 U		10 U	10 U
	Sep-99				8 J					1 U		10 U	10 U
	Mar-00	10 U		10 U	3 J	10 U	10 U		10 U	1 U		10 U	10 U
	Sep-00				3 J					1 U		10 U	10 U
	Mar-01	10 U		10 U	6 J	10 U	10 U		10 U			10 U	10 U
	Sep-01				5.8							10 U	1 U
	Mar-02	1 U		1 U	6	1 U	1 U		1 U			1 U	1 U
Toluene	Sep-02				5.2							1 U	1 U
	Mar-03			1 U	5.2							1 U	
	Sep-03				4.9							1 U	
	Mar-04		1 U	3.5	5.8	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-04				6.7						1 U	1 U	1 U
	Feb-05		1 U		5.2	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-05				4.5						1 U	1 U	1 U
	Mar-06		1 U	1 U	4.4	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-06				3.3						1 U	1 U	1 U



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 3Historical Groundwater Data Available for VOC (Cont.)(a)

							We	II ID					
Analyte	Date	MW- 13B	MW- 13B2	MW- 14A	MW- 14B	MW- 15A	MW- 15B	MW- 15B2	MW- 16A	MW- 16B	MW- 16B2	MW- 18D	MW- 20B
	Mar-07		1 U	1 U	2.3	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-07				2.6						1 U	1 U	1 U
	Mar-08		1 U	1 U	3.2	1 U		1 U	1 U		1 U	1 U	1 U
Toluene	Sep-08				3.4						1 U	1 U	1 U
	Mar-09		1 U	1 U	2	1 U		1 U	1 U		1 U	1 U	1 U
	Sep-09				3						1 U	1 U	1 U
	Sep-14	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-96	NA	NA	NA	80	NA	NA	NA	NA			
	Sep-96	NA	NA	NA	69	NA	NA	NA	NA			
Trichloroethene (TCE)	Mar-97	NA	NA	NA	71	NA	NA	NA	NA			
· · · ·	Sep-97	NA	NA	NA	45	NA	NA	NA	NA			
	Mar-98	NA	NA	NA	45	NA	NA	NA	NA			



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Well ID MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-Analyte Date 21B 37A 63A 75B 76B 76B2 77B 78B 83B1 83B2 84B2 Sep-98 NA NA NA 50 NA NA NA NA ---------Mar-99 NA NA NA 52 NA NA NA NA ____ ----____ Sep-99 NA NA NA 78 NA NA NA NA ---____ ---Mar-00 NA NA 85 NA NA NA NA NA ---------Sep-00 NA NA NA 72 J NA NA NA NA ____ ----____ Mar-01 NA NA NA 89 NA NA NA NA ---------Sep-01 NA NA NA 90.1 NA NA NA NA ---------Mar-02 54.8 NA NA NA NA NA NA NA ------____ Trichloroethene (TCE) Sep-02 48.5 J NA NA NA NA NA NA NA ____ ----____ May-03 NA NA NA 83.8 NA NA NA NA 154 J 127 J 12.9 J Oct-03 NA NA NA 106 NA NA NA NA 138 122 68.7 Mar-04 NA NA NA 100 NA NA NA NA ____ ____ ____ Sep-04 NA 68.3 NA NA NA NA NA NA ---------Feb-05 NA NA NA 72.3 NA NA NA NA ---------Sep-05 NA NA NA 75.5 NA NA NA NA ____ ----___ Mar-06 NA NA NA 51.2 NA NA NA NA ---------Jul-06 NA NA NA NA NA NA NA 103 111 4.9 ---



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Sep-06	NA	NA	NA	60.9	NA	NA	NA	NA	71.6	120	0.44
	Mar-07	NA	NA	NA	41.5 J	NA	NA	NA	NA			
	Jun-07	NA	NA	NA	69.7	NA	NA	NA	NA	133	107	1 U
Trichloroethene (TCE)	Sep-07	NA	NA	NA	44.5	NA	NA	NA	NA			
	Dec-07	NA	NA	NA	51	NA	NA	NA	NA	126	117	0.4 J
	Sep-09	NA	NA	NA	40.2	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	ND	NA	NA	ND	ND	ND	NA	ND	ND
	Mar-96	NA	NA	NA	3 J	NA	NA	NA	NA			
	Sep-96	NA	NA	NA	10 U	NA	NA	NA	NA			
	Mar-97	NA	NA	NA	10 U	NA	NA	NA	NA			
	Sep-97	NA	NA	NA	10 U	NA	NA	NA	NA			
	Mar-98	NA	NA	NA	10 U	NA	NA	NA	NA			
Tetrachloroethene (PCE)	Sep-98	NA	NA	NA	10 U	NA	NA	NA	NA			
	Mar-99	NA	NA	NA	10 U	NA	NA	NA	NA			
	Sep-99	NA	NA	NA	1 J	NA	NA	NA	NA			
	Mar-00	NA	NA	NA	10 U	NA	NA	NA	NA			
	Sep-00	NA	NA	NA	10 U	NA	NA	NA	NA			



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-01	NA	NA	NA	2 J	NA	NA	NA	NA			
	Sep-01	NA	NA	NA	1.1	NA	NA	NA	NA			
	Mar-02	NA	NA	NA	0.70 J	NA	NA	NA	NA			
	Sep-02	NA	NA	NA	0.4 J	NA	NA	NA	NA			
	May-03	NA	NA	NA	0.8 J	NA	NA	NA	NA	3.6	2.5	1 U
	Oct-03	NA	NA	NA	1.5	NA	NA	NA	NA	3.4	2.1	1.2
	Mar-04	NA	NA	NA	2	NA	NA	NA	NA			
	Sep-04	NA	NA	NA	1	NA	NA	NA	NA			
Tetrachloroethene (PCE)	Feb-05	NA	NA	NA	1.1	NA	NA	NA	NA			
	Sep-05	NA	NA	NA	0.99 J	NA	NA	NA	NA			
	Mar-06	NA	NA	NA	0.62	NA	NA	NA	NA			
	Jul-06	NA	NA	NA		NA	NA	NA	NA	1.2	2	1 U
	Sep-06	NA	NA	NA	0.49 J	NA	NA	NA	NA	0.78 J	1.7	1 U
	Mar-07	NA	NA	NA	0.45 J	NA	NA	NA	NA			
	Jun-07	NA	NA	NA	0.61 J	NA	NA	NA	NA	1.8	2	1 U
	Sep-07	NA	NA	NA	1 U	NA	NA	NA	NA			
	Dec-07	NA	NA	NA	0.39 J	NA	NA	NA	NA	2.5	1.3	1 U



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
Tetrachloroethene (PCE)	Sep-09	NA	NA	NA	0.32 J	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	ND	NA	NA	ND	ND	ND	NA	ND	ND
	Mar-96	NA	NA	NA	44	NA	NA	NA	NA			
	Sep-96	NA	NA	NA	32	NA	NA	NA	NA			
	Mar-97	NA	NA	NA	23	NA	NA	NA	NA			
	Sep-97	NA	NA	NA	22	NA	NA	NA	NA			
	Mar-98	NA	NA	NA	10 U	NA	NA	NA	NA			
	Sep-98	NA	NA	NA	17	NA	NA	NA	NA			
	Mar-99	NA	NA	NA	24	NA	NA	NA	NA			
cis-1, 2-dichloroethene	Sep-99	NA	NA	NA	40	NA	NA	NA	NA			
	Mar-00	NA	NA	NA	49	NA	NA	NA	NA			
	Sep-00	NA	NA	NA	62	NA	NA	NA	NA			
	Mar-01	NA	NA	NA	45	NA	NA	NA	NA			
	Sep-01	NA	NA	NA	31.6	NA	NA	NA	NA			
	Mar-02	NA	NA	NA	16.5	NA	NA	NA	NA			
	Sep-02	NA	NA	NA	16.4	NA	NA	NA	NA			
	May-03	NA	NA	NA	45.3	NA	NA	NA	NA	20	15.2	2.9



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Well ID MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-83B2 Analyte Date 21B 37A 63A 75B 76B 76B2 77B 78B 83B1 84B2 Oct-03 NA NA NA 71.7 NA NA NA NA 15.6 18.1 18.4 Mar-04 NA NA NA 48 NA NA NA NA ____ ----____ Sep-04 NA NA NA 25.5NA NA NA NA ____ ------Feb-05 NA NA NA 23.6 NA NA NA NA ---------Sep-05 NA NA NA 26 NA NA NA NA ____ ----____ Mar-06 NA NA NA 17.6 NA NA NA NA ____ ------Jul-06 NA NA NA NA NA NA NA 11.1 13.3 1 --cis-1, 2-dichloroethene Sep-06 NA NA NA 25.3 NA NA NA NA 7.9 13.6 0.27 J Mar-07 NA NA NA 13.6 NA NA NA NA ____ ____ ____ Jun-07 NA NA NA 19.3 NA NA NA NA 15.7 16.2 1 U Sep-07 NA NA NA 10.8 NA NA NA NA ____ ____ ____ Dec-07 NA NA NA 12.5 NA NA NA NA 18.9 12.3 0.29 J Sep-09 NA 9.5 NA NA NA NA NA NA NA NA NA Sep-14 ND ND ND NA NA ND ND ND NA NA ND Mar-96 NA NA NA 44 NA NA NA NA ____ ____ ____ trans-1, 2-dichloroethene Sep-96 NA NA NA 32 NA NA NA NA ---------Mar-97 NA NA NA 23 NA NA NA NA ---------



MW-

84B2

5.9

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Well ID MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-Analyte Date 21B 37A 63A 75B 76B 76B2 77B 78B 83B1 83B2 Sep-97 NA NA NA 22 NA NA NA NA ------Mar-98 NA NA NA 10 U NA NA NA NA ____ ----Sep-98 NA NA NA 17 NA NA NA NA ____ ____ Mar-99 NA NA 24 NA NA NA NA NA ------Sep-99 NA NA NA 40 NA NA NA NA ____ ----Mar-00 NA NA NA 49 NA NA NA NA ------Sep-00 NA NA NA 62 NA NA NA NA ------Mar-01 NA NA NA 45 NA NA NA NA -----trans-1, 2-dichloroethene Sep-01 NA NA NA 5.5 NA NA NA NA ------Mar-02 NA NA NA 2.7 J NA NA NA NA ------2.5 Sep-02 NA NA NA NA NA NA NA ____ ___ May-03 NA NA NA 10.4 NA NA NA NA ____ ____ Oct-03 NA NA 7.6 NA NA NA NA 2.2 2.2 NA Mar-04 NA NA NA 3.3 NA NA NA NA ------Sep-04 NA NA NA 3.5 NA NA NA NA ---___ Feb-05 NA NA NA 3.4 NA NA NA NA ------Sep-05 NA NA NA 2.8 NA NA NA NA ------



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-06	NA	NA	NA	NA	NA	NA	NA	NA			
	Jul-06	NA	NA	NA		NA	NA	NA	NA	2.4	1.9	0.59 J
	Sep-06	NA	NA	NA	3.1	NA	NA	NA	NA	1.2	2.3	1 U
	Mar-07	NA	NA	NA	1.7	NA	NA	NA	NA			
trans-1, 2-dichloroethene	Jun-07	NA	NA	NA	3.3	NA	NA	NA	NA	3.9	2.1	1 U
	Sep-07	NA	NA	NA	1.9	NA	NA	NA	NA			
	Dec-07	NA	NA	NA	2.3	NA	NA	NA	NA	2.6	3.2	0.36 J
	Sep-09	NA	NA	NA	1.1	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	ND	NA	NA	ND	ND	ND	NA	ND	ND
	Mar-96	NA	NA	NA	10 U	NA	NA	NA	NA			
	Sep-96	NA	NA	NA	10 U	NA	NA	NA	NA			
	Mar-97	NA	NA	NA	10 U	NA	NA	NA	NA			
Vinyl Chloride	Sep-97	NA	NA	NA	10 U	NA	NA	NA	NA			
	Mar-98	NA	NA	NA	10 U	NA	NA	NA	NA			
	Sep-98	NA	NA	NA	10 U	NA	NA	NA	NA			
	Mar-99	NA	NA	NA	10 U	NA	NA	NA	NA			



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Well ID MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-Analyte Date 21B 37A 63A 75B 76B 76B2 77B 78B 83B1 83B2 84B2 Sep-99 NA NA NA 3 J NA NA NA NA ---------Mar-00 NA NA NA 2 J NA NA NA NA ____ ----____ Sep-00 NA NA NA 10 U NA NA NA NA ____ ____ ---Mar-01 NA NA NA NA 3 J NA NA NA ---------Sep-01 NA NA NA 2.4 NA NA NA NA ____ ----____ Mar-02 NA NA NA 2.2 NA NA NA NA ---------Sep-02 NA NA NA 1.2 NA NA NA NA ---------3.1 2.6 May-03 NA NA NA NA NA NA NA 1.2 1 U 5.8 trans-1. 2-dichloroethene Oct-03 NA NA NA NA NA NA NA 1 U 1 U 1.3 Mar-04 NA NA NA 1.6 NA NA NA NA ---------Sep-04 NA NA NA 1.7 NA NA NA NA ____ ___ ___ Feb-05 NA NA NA 1.9 NA NA NA NA ---____ ____ Sep-05 NA 1.3 NA NA NA NA NA NA ---------Mar-06 NA NA NA NA NA NA NA NA ---------Jul-06 NA NA NA NA NA NA NA 2.1 0.79 J 1 U ____ Sep-06 NA NA NA 2.3 NA NA NA NA 0.84 J 1.5 1 U Mar-07 NA NA NA 1.1 NA NA NA NA ---------



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Well ID MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-MW-83B2 Analyte Date 21B 37A 63A 75B 76B 76B2 77B 78B 83B1 84B2 Jun-07 NA NA NA 1.7 NA NA NA NA 2.8 1 U 1 U Sep-07 NA NA NA 1.6 NA NA NA NA ____ ----____ trans-1, 2-dichloroethene Dec-07 NA NA NA 1.1 NA NA NA NA 1 U 2.2 1 U Sep-09 NA NA NA NA NA NA 1 U NA NA NA NA Sep-14 ND ND ND NA NA ND ND ND NA ND ND 10 U 10 U Sep-09 NA 10 U NA 10 U 10 U 10 U NA NA NA Acetone Sep-14 ND ND 15.9 ND NA ND ND ND NA ND ND Jun-89 ND ND ND 20 ND ____ 4 ND NA NA NA Jul-89 ND ND ND ND ND ND ND NA NA NA ____ Oct-89 ND ND ND 31 ND ND ND NA NA NA ---Oct-90 ____ ND ND ____ NA NA NA ____ ____ ---___ Apr-91 ND ND ND 1 ND ND NA NA NA ____ ____ Benzene Sep-92 ND 507.2 0.7 ND ND ND NA NA NA ND ---Apr-93 ND ND ND ND ND ND ND NA NA NA ---ND ND ND Oct-93 ND ND ND ND NA NA NA ____ Apr-94 ND 8620 0.55 J ND ND ND ND NA NA NA ---4990 Oct-94 ND ND ND ND ND ND NA NA NA ---



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-95	ND	78.3	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-95	ND	83.9	ND	ND	ND		ND	ND	NA	NA	NA
	Mar-96	2 J	19 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-96	10 U	15 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-97	10 U	50 U	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-97	10 U	50 U	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-98	10 U	2 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-98	10 U	6 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-99	10 U	20 U	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-99	10 U	15		10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-00	10 U	6 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-00	10 U	2 J		10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-01	10 U		10 U	10 U	NA	NA	NA				
	Sep-01	1 U	1 U		1 U	1 U		1 U	1 U	NA	NA	NA
1	Mar-02	1 U	1 U	1 U	1 U	1 U		1 U	1 U	NA	NA	NA
	Sep-02	1 U	0.52 J		1 U	1 U		1 U	1 U	NA	NA	NA
	Mar-03		1 U	1 U		1 U		1 U		NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Sep-03		1 U					1 U		NA	NA	NA
	Mar-04	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-04	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Feb-05	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-05	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-06	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
trans-1, 2-dichloroethene	Sep-06	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
trans-1, 2-dichloroethene	Mar-07	1 U	1 U	1 U	1 U		1 U		1 U	NA	NA	NA
	Sep-07	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-08	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-08	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-09	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-09	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Due ve e die ble ve ve ether ser	Sep-09	10 U	10 U	NA	10 U	NA	10 U	10 U	10 U	NA	NA	NA
Bromodichloromethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Bromoform	Sep-09	4 U	4 U	NA	4 U	NA	4 U	4 U	4 U	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
Bromoform	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Bromomethane	Sep-09	2 U	2 U	NA	2 U	NA	2 U	2 U	2 U	NA	NA	NA
bromomethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
2 Dutanana	Sep-09	10 U	10 U	NA	10 U	NA	10 U	10 U	10 U	NA	NA	NA
2-Butanone	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Carbon diaulfida	Sep-09	2 U	2 U	NA	2 U	NA	2 U	2 U	2 U	NA	NA	NA
Carbon disulfide	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Carban Tatrashlarida	Sep-09	1 UJ	1 UJ	NA	1 UJ	NA	1 UJ	1 UJ	1 UJ	NA	NA	NA
Carbon Tetrachloride	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Chlerchenzene	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Chlorobenzene	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Chloroethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Chloroform	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Chloromethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
Dibromochloromethane	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Dibromochioromethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
1, 1-Dichlorethane	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
1. 2 Dichlerethere	Sep-09	1 UJ	1 UJ	NA	1 UJ	NA	1 UJ	1 UJ	1 UJ	NA	NA	NA
1, 2-Dichlorethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
d d Disklandhana	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
1, 1-Dichlorethene	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
1. 2 Dichlerenzenene	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
1, 2-Dichloropropane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
sia 1.2 Diablarantanana	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
cis-1, 3-Dichloropropene	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
trans-1, 3-	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Dichloropropene	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
	Jun-89	ND			ND	ND		2	ND	NA	NA	NA
Ethylbenzene	Jul-89	ND			ND	ND		ND	ND	NA	NA	NA
	Oct-89	ND			ND	ND		ND	ND	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Oct-90									NA	NA	NA
	Apr-91	ND			ND	ND		ND	ND	NA	NA	NA
	Sep-92	ND	514.2	0.9	ND	ND		ND	ND	NA	NA	NA
	Apr-93	ND	29	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-93	ND	3.45	ND	ND	ND		ND	ND	NA	NA	NA
	Apr-94	ND	8980	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-94	ND	1660	ND	ND	ND		ND	ND	NA	NA	NA
	Mar-95	ND	4510	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-95	ND	1560	ND	ND	ND		ND	ND	NA	NA	NA
	Mar-96	10 U	930 E	10 U	10 U	2 J		10 U	10 U	NA	NA	NA
	Sep-96	10 U	570	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-97	10 U		10 U	10 U	NA	NA	NA				
	Sep-97	10 U	440	10 U	10 U	10 U		2 J	10 U	NA	NA	NA
	Mar-98	10 U	69	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-98	10 U	170	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-99	10 U	54	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-99	10 U	28		10 U	10 U		10 U	10 U	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-00	10 U	6 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-00	10 U	27		10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-01	10 U	4 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-01	1 U	3.6		1 U	1 U		1 U	1 U	NA	NA	NA
	Mar-02	1 U	1.6	1 U	1 U	1 U		1 U	1 U	NA	NA	NA
	Sep-02	1 U	1.5		1 U	1 U		1 U	1 U	NA	NA	NA
	Mar-03		1.1	1 U		1 U		1 U		NA	NA	NA
	Sep-03		3.4					1 U		NA	NA	NA
	Mar-04	1 U	1.3	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-04	1 U	2		1 U		1 U	1 U	1 U	NA	NA	NA
	Feb-05	1 U	1.7	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-05	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-06	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-06	1 U	1.1		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-07	1 U	1 U	1 U	1 U		1 U		1 U	NA	NA	NA
	Sep-07	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-08	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Sep-08	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
Ethylbonzono	Mar-09	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
Ethylbenzene	Sep-09	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
0 Hevenene	Sep-09	5 U	5 U	NA	5 U	NA	5 U	5 U	5 U	NA	NA	NA
2-Hexanone	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Mathulana Oblarida	Sep-09	2 U	2 U	NA	2 U	NA	2 U	2 U	2 U	NA	NA	NA
Methylene Chloride	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
4 Mothud O nontonono	Sep-09	5 U	5 U	NA	5 U	NA	5 U	5 U	5 U	NA	NA	NA
4-Methyl-2-pentanone	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
Otherse	Sep-09	5 U	5 U	NA	5 U	NA	5 U	5 U	5 U	NA	NA	NA
Styrene	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
1, 1, 2, 2-	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
Tetrachloroethane	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND
	Jun-89	ND	ND	ND	13	31		39	ND	NA	NA	NA
Toluene	Jul-89	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-89	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Oct-90		ND	ND						NA	NA	NA
	Apr-91	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA
	Sep-92	ND	52.4	0.7	ND	ND		ND	ND	NA	NA	NA
	Apr-93	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-93	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA
	Apr-94	ND	30000	0.81 J	ND	ND		ND	ND	NA	NA	NA
	Oct-94	ND	9140	3.66	ND	ND		ND	ND	NA	NA	NA
	Mar-95	ND	10200	ND	ND	ND		ND	ND	NA	NA	NA
Ethylbenzene	Oct-95	ND	349	ND	ND	ND		ND	ND	NA	NA	NA
	Mar-96	10 U	17 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-96	1 J	16 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-97	10 U		10 U	10 U	NA	NA	NA				
	Sep-97	10 U	50 U	10 U	10 U	10 U		1 J	10 U	NA	NA	NA
	Mar-98	10 U	0.9 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
•	Sep-98	10 U	2 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-99	10 U	20 U	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-99	10 U	10 U		2 J	10 U		10 U	10 U	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-00	10 U		10 U	10 U	NA	NA	NA				
	Sep-00	10 U	1 J		10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-01	10 U		10 U	10 U	NA	NA	NA				
	Sep-01	1 U	1 U		1 U	1 U		1 U	1 U	NA	NA	NA
	Mar-02	1 U	1 U	1 U	1.2	1 U		1 U	1 U	NA	NA	NA
	Sep-02	1 U	1 U		1 U	1 U		1 U	1 U	NA	NA	NA
	Mar-03		1 U	1 U		1 U		1 U		NA	NA	NA
	Sep-03		0.44 J					1 U		NA	NA	NA
	Mar-04	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-04	1 U	0.46 J		1 U		1 U	1 U	1 U	NA	NA	NA
	Feb-05	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-05	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-06	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-06	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-07	1 U	1 U	1 U	1 U		1 U		1 U	NA	NA	NA
	Sep-07	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-08	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Sep-08	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
Ethylbonzono	Mar-09	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
Ethylbenzene	Sep-09	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-14	ND	ND	ND	NA	NA	ND	ND	ND	NA	ND	ND
1 1 1 Trichlersothers	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
1, 1, 1-Trichloroethane	Sep-14	ND	ND	1 U	ND	NA	ND	ND	ND	NA	ND	ND
4.4.0 Trickless of home	Sep-09	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	NA
1, 1, 2-Trichloroethane	Sep-14	ND	ND	1 U	ND	NA	ND	ND	ND	NA	ND	ND
	Jun-89	ND			8	ND		24	ND	NA	NA	NA
	Jul-89	ND			ND	ND		ND	ND	NA	NA	NA
	Oct-89	ND			ND	ND		ND	ND	NA	NA	NA
	Oct-90									NA	NA	NA
Xylene (total)	Apr-91	ND			ND	ND		ND	ND	NA	NA	NA
	Sep-92	ND	551.8	ND	ND	ND		ND	1.3	NA	NA	NA
	Apr-93	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-93	ND	ND	ND	ND	ND		ND	ND	NA	NA	NA
	Apr-94	ND	63100	2.67	ND	ND		ND	ND	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Oct-94	ND	10200	ND	ND	ND		ND	ND	NA	NA	NA
	Mar-95	ND	20200	ND	ND	ND		ND	ND	NA	NA	NA
	Oct-95	ND	6700	ND	ND	ND		ND	ND	NA	NA	NA
	Mar-96	1 J	2800 E	10 U	3 J	2 J		10 U	10 U	NA	NA	NA
	Sep-96	10 U	1300	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-97	10 U	1300	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-97	10 U	580	10 U	10 U	10 U		3 J	10 U	NA	NA	NA
	Mar-98	10 U	48	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
Ethylbenzene	Sep-98	10 U	230	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-99	10 U	15 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-99	10 U	10 J		2 J	10 U		10 U	10 U	NA	NA	NA
	Mar-00	10 U	1 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
	Sep-00	10 U	4 J		10 U	10 U		10 U	10 U	NA	NA	NA
	Mar-01	10 U	2 J	10 U	10 U	10 U		10 U	10 U	NA	NA	NA
•	Sep-01	1 U	1 U		1 U	1 U		1 U	1 U	NA	NA	NA
	Mar-02	1 U	1.6	1 U	1 U	1 U		1 U	1 U	NA	NA	NA
	Sep-02	1 U	0.73 J		1 U	1 U		1 U	1 U	NA	NA	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

							Well ID					
Analyte	Date	MW- 21B	MW- 37A	MW- 63A	MW- 75B	MW- 76B	MW- 76B2	MW- 77B	MW- 78B	MW- 83B1	MW- 83B2	MW- 84B2
	Mar-03		1	1 U		1 U		1 U		NA	NA	NA
	Sep-03		2.1					1 U		NA	NA	NA
	Mar-04	1 U	1.9	1 U	3.8		1 U	1 U	1 U	NA	NA	NA
	Sep-04	1 U	2.1		1 U		1 U	1 U	1 U	NA	NA	NA
	Feb-05	1 U	1.8	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-05	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-06	1 U	1.4	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
Ethylbenzene	Sep-06	1 U	0.50 J		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-07	1 U	0.49 J	1 U	1 U		1 U		1 U	NA	NA	NA
	Sep-07	1 U	0.77 J		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-08	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-08	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Mar-09	1 U	1 U	1 U	1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-09	1 U	1 U		1 U		1 U	1 U	1 U	NA	NA	NA
	Sep-14	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	Collection Date
Perimeter Borings	
SB-P-116-0-1	01/27/2014 11:13
SB-P-116-1-2	01/27/2014 11:15
SB-P-117-0-1	01/28/2014 10:02
SB-P-117-1-2	01/28/2014 10:04
SB-P-118-0-1	01/29/2014 10:08
SB-P-118-2-3	01/29/2014 10:14
SB-P-119-0-1	01/30/2014 09:32
SB-P-119-10-11	01/30/2014 10:08
SB-P-120-0-1	01/31/2014 09:47
SB-P-121-21-22	02/03/2014 15:35
SB-P-121B-17-18	02/05/2014 11:45
SB-P-122-0-1	02/06/2014 11:42
SB-P-122-19-20	02/06/2014 14:11
SB-P-123-0-1	02/10/2014 09:25
SB-P-123-21-22	02/10/2014 10:29
SB-P-124-0-1	02/11/2014 10:26
SB-P-124-34-35	02/11/2014 14:22
Las Lajas Creek	
SWLC-01	05/05/2014 14:53
SELC-01	05/05/2014 15:00
SWLC-02	05/06/2014 13:30
SELC-02	05/06/2014 13:39
SWLC-03	05/06/2014 14:40
SELC-03	05/06/2014 14:51
Wetland	
SWW-01	05/09/2014 12:10
SeW 01	05/09/2014 12:20
SWW-02	05/09/2014 13:25



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	Collection Date
SeW 02	05/09/2014 13:37
SWW-03	05/09/2014 15:21
SeW 03	05/09/2014 15:30
SWW-04	05/09/2014 16:35
SeW 04	05/09/2014 16:47
Avenue D	
SB-AD-1-2-3	09/29/2014 11:24
SB-AD-2-2-3	09/30/2014 14:44
SB-AD- 3-3-4	10/02/2014 09:54
SB-AD-3-4-5	10/02/2014 09:56
SB-AD-4-2-4	10/02/2014 14:10
SB-AD-5-3-4	10/07/2014 13:58
MNA Wells	
MNA-MW-57A	07/23/2014 14:32
MNA-MW-15B2	07/24/2014 10:06
MNA-MW-33A	07/28/2014 14:50
MNA-MW-83B2	07/29/2014 11:33
MNA-MW-83A	07/29/2014 14:38
MNA-MW-MP5A	08/05/2014 11:20
MNA-MW-15B	08/06/2014 11:06
MNA-MW-76A	08/06/2014 13:25
MNA-MW-76B2	08/06/2014 14:25
MNA-MW-13B2	08/07/2014 13:46
MNA-MW-75B2	08/11/2014 11:06
MNA-MW-98A	08/13/2014 11:20
MNA-MW-88A	08/18/2014 10:15
MNA-MW-84A	08/19/2014 11:28
MNA-MW-84B2	08/19/2014 12:15
MNA-MW-13A	08/20/2014 10:34



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	Collection Date
MNA-MW-91A	08/20/2014 15:10
MNA-MW-78B	08/25/2014 10:18
MNA-MW-48B	08/25/2014 13:02
MNA-MW-30A	08/25/2014 14:02
MNA-MW-17B	08/27/2014 11:19
MNA-PMW-120	08/27/2014 14:31
MNA-PMW-124	09/04/2014 13:08
MNA-MW-111A	09/10/2014 11:31
Monitoring Wells	
MW-90A	05/15/2014 13:20
MW-18D	07/23/2014 11:00
MW-57A	07/23/2014 14:20
MW-15B2	07/24/2014 09:56
MW-87A	07/24/2014 14:46
MW- 15A	07/28/2014 11:00
MW- 33A	07/28/2014 14:39
MW- 83B2	07/29/2014 11:20
MW- 83A	07/29/2014 14:28
MW- EB- 108	07/30/2014 11:03
MW- EB- 107	07/30/2014 13:45
MW- EB- 103	07/30/2014 15:26
MW- 16C	07/31/2014 11:15
MW- EB- 101	07/31/2014 12:47
MW- EB- 102	07/31/2014 14:32
MW- B9	08/04/2014 09:12
MW-B1	08/04/2014 10:06
MW- EB- 106	08/04/2014 11:33
MW- EB- 105	08/04/2014 14:16
MW- EB- 104	08/04/2014 15:34



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	Collection Date
MW- 86A	08/05/2014 09:33
MW- DP5	08/05/2014 10:40
MW- MP5A	08/05/2014 11:17
MW- DP1	08/05/2014 13:30
MW- MP2	08/05/2014 14:05
MW- 15B	08/06/2014 11:03
MW- 76A	08/06/2014 13:20
MW- 76B2	08/06/2014 14:22
MW- 63A	08/07/2014 10:40
MW- 38A	08/07/2014 11:54
MW- 13B2	08/07/2014 13:43
MW- 75B2	08/11/2014 11:03
MW- 114A	08/11/2014 13:30
MW- MP9	08/12/2014 10:37
MW- MP8	08/12/2014 11:01
MW- MP3	08/13/2014 09:30
MW- MP4	08/13/2014 09:59
MW- 98A	08/13/2014 11:16
MW- 99A	08/13/2014 13:43
MW- 88A	08/18/2014 10:10
PMW- 117	08/18/2014 12:00
PMW- 116	08/18/2014 14:21
MW- 84A	08/19/2014 11:25
MW- 84B2	08/19/2014 12:10
MW- 77B	08/19/2014 15:03
MW- 109A	08/20/2014 09:18
MW- 13A	08/20/2014 10:32
MW- 37A	08/20/2014 11:38
MW- 65A	08/20/2014 13:52



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	Collection Date
MW- 91A	08/20/2014 15:08
PMW- 118	08/21/2014 09:59
PMW- 119	08/21/2014 10:45
MW- 78B	08/25/2014 10:16
MW- 48B	08/25/2014 13:00
MW- 30A	08/25/2014 13:58
MW- 20B	08/27/2014 09:29
MW- 17B	08/27/2014 11:18
PMW- 120	08/27/2014 14:27
PMW- 122	08/27/2014 15:17
MW- 21B	09/03/2014 14:33
PMW- 123	09/04/2014 10:33
PMW- 124	09/04/2014 13:06
PMW- 121	09/04/2014 14:15
MW- 110AB	09/08/2014 13:27
MW- 110B2	09/08/2014 14:16
MW- 111A	09/10/2014 11:27
MW-AD-1	10/09/2014 09:58
MW-AD-4	10/09/2014 11:02
MW-AD-3	10/09/2014 13:20
MW-AD-2	10/09/2014 14:12



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 5 Comparison of Product Thickness 2009 to 2014^(b)

Product Thickness (in) ^(c)									
	200	9 ^(d)	^(d) 2011		20	14	Comments		
Well ID	<.0.125 (1/8) in	≥0.125 (1/8) in	<0.125 (1/8) in	≥0.125 (1/8) in	<0.125 (1/8) in	≥0.125 (1/8) in			
8AB	-	0.15	-	-	NI	NI	Well sealed in 2014		
12AB	sheen	-	-	0.5	NI	NI	Well sealed in 2014		
13B2	NI	NI	sheen	-	ND	ND			
39A	sheen	-	sheen	-	NI	NI	Well sealed in 2014		
40B	sheen	-	sheen	-	-	2.4			
42B	sheen	-	NA	0.21	0.12	-			
44B	sheen	-	sheen	-	NI	NI	Well sealed in 2014		
47A	NI	NI	sheen	-	NI	NI	Well sealed in 2014		
48B	sheen	-	sheen	-	ND	ND			
50B	sheen	-	sheen	-	NI	NI	Well sealed in 2014		
52B	NI	NI	-	4.15	NI	NI	Well sealed in 2014		

⁽b) The most recent data from September 2014 and the most recent past data obtained from 2011 and 2009 were used to compare the product thickness of the wells, if any. Only wells with product thickness detected during the field events are included in the table. Bold numbers indicate thickness greater than 0.125.

⁽c) in - inches; NI - no gauging information; ND - not detected

⁽d) Information obtained from Anderson Mulholland & Associates' November 2009 report.

ARCADIS PUERTO RICO

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Product Thickness (in) ^(c)									
	200	9 ^(d)	2011		2014		Comments		
55B	-	3.2	-	-	NI	NI	Well sealed in 2014		
56B	sheen	-	-	12	NI	NI	Well sealed in 2014		
70A	sheen	-	-	20	NI	NI	Well sealed in 2014		
83A	NI	NI	-	1	ND	ND			
94A	NI	NI	-	2.07	NI	NI	Well sealed in 2014		
109A	NI	NI	sheen	NA	ND	ND			
110AB	NI	NI	NI	NI	sheen	-			
AD-1	NI	NI	NI	NI	NI	NI	Product detected in 2014 before well installation; not measured		
B1	NI	NI	sheen	-	ND	ND			
B2	NI	NI	sheen	-	NI	NI	Well sealed in 2014		
B5	NI	NI	NA	0.9	NI	NI	Well sealed in 2014		
B9	NI	NI	sheen	-	ND	ND			
B17	NI	NI	0.1	-	NI	NI	Well sealed in 2014		
EB101	NI	NI	sheen	-	ND	ND			
P3	-	1.57	-	6.35	NI	NI	Well sealed in 2012		
P4	-	-	-	0.51	NI	NI			
PZ2	0.12	-	-	0.61	NI	NI			
Т9	NI	NI	NI	NI	-	2			

Table 5Comparison of Product Thickness 2009 to 2014 (Cont.)(b)



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

		Screer	n Range				
Well ID	Top of Casing (ft/msl)	Top (ft/bls)	Bottom (ft/bls)	Well Depth (ft)	Diameter (in)	Slot (in)	Other Details of Construction
MW-15A	10.62	9	19	21.7	2	0.02	concrete/bentonite/ sandpack
MW-15B	11.37	25	53	46.5	2	not available	not available
MW-16C	12.13	50	60	59.5	2	0.02	concrete/bentonite/ sandpack
MW-17B	8.53	45.5	55.5	49.5	2	not available	not available
MW-18D	3.78	24.8	39.8	39.7	2	not available	not available
MW-20B	9.13	70.1	84.6	83.3	2	not available	not available
MW-21B	6.25	39.1	54.1	52.8	2	not available	not available
MW-30A	15.59	8	23	24	2	0.02	concrete/bentonite/ sandpack
MW-33A	17.57	10	25	24.9	2	0.02	concrete/bentonite/ sandpack
MW-37A	9.41	5	20	25	2	0.02	concrete/bentonite/ sandpack
MW-38A	17.5	10	25	24.9	2	0.02	concrete/bentonite/ sandpack

Table 6 Available Construction Information of Existing and New Wells



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

		Screer	n Range				
Well ID	Top of Casing (ft/msl)	Top (ft/bls)	Bottom (ft/bls)	Well Depth (ft)	Diameter (in)	Slot (in)	Other Details of Construction
MW-40B	19.49	N/A	N/A	26.9	2	not available	not available
MW-42B	29.74	21	31	31	4	0.02	concrete/bentonite/ sandpack
MW-48B	16.72	13.5	23.5	26	4	0.02	concrete/bentonite/ sandpack
MW-57A	19.65	2	17	17	4	0.02	concrete/bentonite/ sandpack
MW-63A	18.73	3	18	18	4	0.02	concrete/bentonite/ sandpack
MW-65A	15.84	3	18	18	4	0.02	concrete/bentonite/ sandpack
PMW-116	N/A	4.2	14.2	14.2	2	0.01	concrete/bentonite/ sandpack
PMW-117	N/A	4.4	14.4	14.4	2	0.01	concrete/bentonite/ sandpack
PMW-118	N/A	7.3	17.3	17.3	2	0.01	concrete/bentonite/ sandpack
PMW-119	N/A	15	25	25	2	0.01	concrete/bentonite/ sandpack
PMW-120	N/A	16.3	26.3	26.3	2	0.01	concrete/bentonite/ sandpack

Table 6 Available Construction Information of Existing and New Wells (Cont.)



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

		Screer	n Range				
Well ID	Top of Casing (ft/msl)	Top (ft/bls)	Bottom (ft/bls)	Well Depth (ft)	Diameter (in)	Slot (in)	Other Details of Construction
PMW-121	N/A	29	42.9	42.9	2	0.01	concrete/bentonite/ sandpack
PMW-122	N/A	16.2	26.2	26.2	2	0.01	concrete/bentonite/ sandpack
PMW-123	N/A	16.3	26.3	26.3	2	0.01	concrete/bentonite/ sandpack
PMW-124	N/A	34.2	44.2	44.2	2	0.01	concrete/bentonite/ sandpack
MW-AD-1	N/A	2.15	15.15	15.15	2	0.01	concrete/bentonite/ sandpack
MW-AD-2	N/A	2.31	15.31	15.31	2	0.01	concrete/bentonite/ sandpack
MW-AD-3	N/A	5.23	15.23	15.23	2	0.01	concrete/bentonite/ sandpack
MW-AD-4	N/A	4	19	19	2	0.01	concrete/bentonite/ sandpack
B-1	N/A	2	12	12	2	0.02	fill/bentonite/filter not available
B-9	N/A	2.8	12.8	12.8	2	0.02	fill/bentonite/filter not available

Table 6 Available Construction Information of Existing and New Wells (Cont.)



Table 7 Historical Groundwater Data Available for Metals^(e)

		MV	V-13A	MV	N-13B	MW	-13B2	MV	V-14A	M	W-14B	MW	-15A	MV	V-15B	MW	-15B2
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	Mar-96			0.1 U	NA				0.1 U	NA	0.1 U		0.1 U	NA	0.1 U		
	Sep-96			0.1 U	NA				0.4	NA	0.1 U		0.1 U	NA	0.39		
	Mar-97				NA					NA				NA			
	Sep-97				NA					NA				NA			
	Mar-98				NA					NA				NA			
	Sep-98				NA					NA				NA			
	Mar-99				NA					NA				NA			
	Sep-99				NA					NA				NA			
	Mar-00				NA					NA				NA			
	Sep-00				NA					NA				NA			
	Mar-01				NA					NA				NA			
Morouny	Sep-01				NA					NA				NA			
Mercury	Mar-02				NA					NA				NA			
	Sep-02				NA					NA				NA			
	May-03	0.09 UJ	0.09 UJ		NA	0.09 UJ	0.09 UJ			NA		0.09 UJ	0.09 UJ	NA		0.09 UJ	0.09 UJ
	Jul-03				NA					NA				NA			
	Oct-03	0.08 UJ			NA	0.09 UJ				NA		0.4 U		NA		0.4 U	
	Mar-04				NA					NA				NA			
	Sep-04				NA					NA				NA			
	Mar-05				NA					NA				NA			
	Sep-05				NA					NA				NA			
	Mar-06				NA					NA				NA			
	Jul-06				NA			0.080 U	0.080 U	NA				NA		0.080 U	0.080 U
	Sep-06				NA			0.080 U		NA				NA		0.080 U	

RFI Report

⁽e) ND - Not detected; U - Compound was analyzed for, but not detected at the concentration shown; NA - Not available; UJ - Compound was analyzed for, but not detected at the concentration shown; NA - Not available; UJ - Compound was found in trip blank (possible/probable contamination or laboratory problem indicated); B - After 1996, concentration is between the instrument detection limit (IDL) and contract required detection limit (IDL). E - Exceeds calibration range; N - Spiked sample recovery not within control limits; W - Post digestion for furnace atomic absorption (AA) out of control limits

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		M	N-16A	MV	V-16B	MV	V-16B2	M۱	N-17B	M	W-18D	MV	V-20B	MV	V-21B	MW	-30A2
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	Jun-07				NA			0.33 R	0.72 R	NA				NA		0.037 U	0.037 U
Moroury	Dec-07				NA			0.41	0.31	NA				NA		0.15 UJ	0.15 U
Mercury	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	ND	ND	NA	NA	NA	NA	ND	ND	0.23	ND	ND	ND
Araopio	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	Sep-14	ND	ND	NA	NA	ND	ND	NA	NA	NA	NA	ND	12.6	ND	ND	16	17.9
	Jun-89	NA	NA		NA		NA		NA	17	NA		NA		NA		NA
	Jul-89	NA	NA		NA		NA		NA	30	NA		NA		NA		NA
	Oct-89	NA	NA		NA		NA		NA	50	NA		NA		NA		NA
	Oct-90	NA	NA		NA		NA		NA		NA		NA		NA		NA
	Apr-91	NA	NA		NA		NA		NA	ND	NA		NA		NA		NA
	Sep-92	NA	NA	ND	NA		NA		NA	ND	NA	ND	NA	ND	NA		NA
	Apr-93	NA	NA	ND	NA		NA		NA	ND	NA	ND	NA	ND	NA		NA
	Oct-93	NA	NA	ND	NA		NA	ND	NA	ND	NA	ND	NA	ND	NA		NA
	Apr-94	NA	NA	ND	NA		NA		NA	ND	NA	ND	NA	ND	NA		NA
	Oct-94	NA	NA	ND	NA		NA		NA	ND	NA	ND	NA	ND	NA		NA
Lead	Mar-95	NA	NA	ND	NA		NA		NA	ND	NA	ND	NA	ND	NA		NA
Leau	Oct-95	NA	NA	ND	NA		NA		NA	ND	NA	ND	NA	ND	NA		NA
	Mar-96	NA	NA	2.7 U	NA		NA	2.7 U	NA	2.7 UW	NA	2.7 U	NA	2.7 U	NA		NA
	Sep-96	NA	NA	2.7 UNW	NA		NA	2.7 UNW	NA	2.7 UN	NA	2.7 UNW	NA	2.7 UN	NA		NA
	Mar-97	NA	NA	2.2 U	NA		NA	2.2 U	NA	2.2 U	NA	2.2 U	NA	2.2 U	NA		NA
	Sep-97	NA	NA	0.67 U	NA		NA	1 B	NA	0.67 U	NA	0.67 U	NA	0.67 U	NA		NA
	Mar-98	NA	NA	2.6 UW	NA		NA	2.6 UW	NA	2.6 UW	NA	2.6 U	NA	2.6 UW	NA		NA
	Sep-98	NA	NA	1.9 U	NA		NA	1.9 U	NA	1.9 UW	NA	1.9 U	NA	1.9 U	NA		NA
	Mar-99	NA	NA	1.3 U	NA		NA	1.3 U	NA	1.3 U	NA	4.1	NA	1.3 U	NA		NA
	Sep-99	NA	NA		NA		NA		NA	1.7 U	NA	1.7 U	NA		NA		NA
	Mar-00	NA	NA	1.8 U	NA		NA	1.8 U	NA	1.8 U	NA	1.8 U	NA	1.8 U	NA		NA
	Sep-00	NA	NA		NA		NA		NA	1.3 UJ	NA	1.3 UJ	NA		NA		NA

RFI Report

MW-16A MW-16B MW-16B2 **MW-17B MW-18D MW-20B** Analyte (ug/L) Date Total Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved То 1.0 Mar-01 NA NA 1.0 U NA NA 1.0 U NA 1.0 U NA 1.0 U NA ---Sep-01 NA NA ---NA ---NA ---NA 2.1 U NA ---NA _ NA NA 2.2 U 2.2 U 2.2 U 2.2 Mar-02 NA 7.1 NA NA NA NA ---NA NA NA Sep-02 NA NA 1.8 U NA NA -------------_--NA Mar-03 NA NA NA 2.5 U NA 2.5 U NA NA ---------___ NA NA 2.6 U Sep-03 NA NA NA NA NA ------------___ Mar-04 NA NA ---NA 1.7 U NA 1.7 U NA 1.7 U NA 1.7 U NA _--Sep-04 NA NA NA NA NA 2.3 U NA NA ---____ ___ ------Feb-05 NA 1.9 U NA 1.9 U NA NA 1.9 U NA NA NA ------___ NA NA NA NA NA 2.7 U NA Sep-05 NA Lead ------------_ NA Mar-06 NA ---NA 2.6 U NA 2.6 U NA 2.6 U NA 2.6 U NA ___ Sep-06 NA NA NA ----NA NA 2.6 U NA ---NA ------___ Mar-07 NA NA NA 2.8 U NA 3.4 NA 3.9 NA 3.4 NA ---_--Sep-07 NA NA NA NA NA 2.4 B NA NA ---------------Mar-08 NA NA NA 1.4 U NA 2.3 B NA 1.4 U NA 3 NA ---___ NA Sep-08 NA NA ----NA NA 1.8 B NA NA ---------_--NA 1.7 U NA 1.7 U NA NA 1.7 U Mar-09 NA NA 1.7 U NA ------NA Sep-09 NA NA ---NA NA 1.7 U NA ---NA ---------ND ND NA NA ND ND NA NA NA NA ND ND N Sep-14 Mar-96 ---0.1 U NA 0.1 U ------NA 0.1 U ---0.1 U ---------Sep-96 0.1 U NA 0.1 U NA 0.1 U 0.1 U --------------------Mar-97 NA NA ----____ -------------____ ----------___ Sep-97 NA NA -----------____ ------------------___ Mercury Mar-98 -------NA ---------------NA ---------_ NA NA Sep-98 ------------------------------_ Mar-99 NA NA ----____ ---------____ ____ -----------Sep-99 NA NA --------------------------------_ Mar-00 -------NA ---------------NA -------------

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

RFI Report

) U 	NA NA	Total	Dissolved NA
			NA
	NA		
			NA
2 U	NA		NA
	NA	1.7 U	NA
	NA		NA
	NA	1.9 U	NA
	NA		NA
	NA	2.6 U	NA
	NA		NA
	NA	2.8 U	NA
	NA		NA
	NA	1.9 B	NA
	NA		NA
	NA	1.7 U	NA
	NA		NA
ID	ND	ND	ND
	7.8		
	8.1		
	5.8		
	0.51		
	3.3		
	4.6		
	2.4		
	0.57		
	1.0 J		

MW-16A MW-16B MW-16B2 MW-17B **MW-18D MW-20B** Dissolved Analyte (ug/L) Date Total Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved Total То NA Sep-00 NA -------------------------------------Mar-01 ------NA NA --------------------------Sep-01 NA NA ----------------------------------Mar-02 NA NA ----------____ ____ ___ ____ ___ --------___ Sep-02 NA NA --------------------____ --------------0.09 R 0.09 R 0.09 UJ 0.09 UJ 0.09 U 0.09 U 0.09 May-03 NA NA ------------Jul-03 ----NA NA ____ -------___ ____ --------____ ---___ Oct-03 0.4 U NA 0.04 U NA 0.4 B 3. ---____ -------------___ Mar-04 ----NA ------NA -----------------------___ 8. Mercury Sep-04 NA NA ---------------------------------Mar-05 ---NA ---NA ------------------___ ----------Sep-05 NA NA -------------------------------___ Mar-06 NA NA --------------------------------___ Jul-06 NA 0.080 U 0.080 U NA 0.080 U 0.080 U 2.: -------------------Sep-06 NA 0.080 U 0.080 U NA 0.080 U 0.080 U 0.8 ----____ ---____ ------0.037 U 0.088 B 0.037 U 0.088 B 0.4 Jun-07 NA NA ------------------0.15 U NA 0.15 UJ 1.7 Dec-07 NA 0.15 U 0.15 U ------------------NA Sep-09 NA 0.08 Sep-14 NA NA NA NA NA NA ND ND ND ND ND ND N Sep-09 NA 2.4 U N NA NA NA NA NA NA NA NA NA 2.4 U Arsenic NA NA ND ND ND ND ND ND N Sep-14 NA NA NA NA 8 Jun-89 NA NA NA NA NA 13 NA NA 2 -----------N Lead Jul-89 NA NA NA NA NA 19 NA 4 NA -----------10 3 NE Oct-89 NA NA NA NA NA ---NA ------NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

RFI Report

N/14	/-21B	- 5/114/	-30A2
otal	Dissolved	Total	Dissolved
	1.0 J		
	1.0 J		
	1.4		
	1.5		
	0.43 J		
9 U	2.2	0.09 UJ	0.09 UJ
.4		0.18 U	
	0.55 J		
.3	0.05 BJ		
	0.54		
	0.27		
	0.61		
.3	0.74		
81	0.57		
46	0.037 U		
7 J	0.15 U		
32 U	NA	NA	NA
ID	ND	NA	NA
IA	NA	NA	NA
ID	ND	NA	NA
2	NA	NA	NA
ID	NA	NA	NA
ID	NA	NA	NA

MW-16A MW-16B MW-16B2 **MW-17B MW-18D MW-20B** Analyte (ug/L) Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved Tot Date Total Oct-90 NA NA NA NA NA NA NA ----------------------ND 2 Apr-91 ---NA ---NA ---NA NA NA ND NA NA ND ND NA ND 49 B N Sep-92 NA NA NA NA NA NA ---ND ND NA 82 31 N Apr-93 NA NA NA NA NA NA ____ ND N Oct-93 NA ND NA NA NA NA ND NA ND NA ---ND ND NA ND ND N Apr-94 NA NA NA NA NA NA ---Oct-94 ND NA ND NA NA NA NA ND NA ND NA N ----Mar-95 ND NA ND NA NA NA NA ND NA ND NA N ____ Oct-95 ND NA ND NA ND ND N NA NA NA NA NA ---Mar-96 2.7 U NA 2.7 U NA NA NA 2.7 B 2.7 U NA 2.7 NA NA ---2.7 UNW 2.7 UNW 2.7 U Sep-96 NA NA ____ NA NA NA 2.7 UNW NA 2.7 UNW NA 2.2 U 2.2 U 2.2 Mar-97 NA 2.2 U NA NA NA NA 2.2 U NA NA ---0.67 U 0.67 U 0.67 Sep-97 NA NA NA NA NA 0.67 U NA 0.67 UW NA ---Mar-98 2.6 UW NA 2.6 UW NA NA NA NA 2.6 U NA 2.6 U NA 2.6 ---Lead 1.9 U NA 1.9 U NA NA NA NA 1.9 U NA 1.9 U 1.9 Sep-98 ____ NA 1.3 Mar-99 1.3 U NA 1.3 U NA NA NA NA 1.3 U NA 1.3 U NA ---1.7 U NA NA NA 1.7 U 1.7 Sep-99 NA NA NA 1.7 U NA -------1.8 U 1.8 U Mar-00 NA NA NA NA NA 1.8 U NA 1.8 U NA 1.8 ----NA 1.3 UJ NA NA NA NA 1.3 UJ NA 1.3 UJ 1.3 Sep-00 ---____ NA Mar-01 1.0 U NA 1.0 U NA ----NA NA NA 1.0 U NA 1.0 U NA 1.0 NA 2.1 Sep-01 NA 2.1 U NA NA NA 1.1 U NA 2.1 U NA ------3 2.2 U 2.2 Mar-02 NA 2.2 U NA NA NA NA NA 2.2 U NA ----1.8 Sep-02 NA 3.2 NA NA NA NA 1.8 U NA 1.8 U NA ------Mar-03 NA NA ---NA ---NA ---NA 2.5 U NA ---NA ----Sep-03 NA NA NA NA NA 2.6 U NA NA ---------------Mar-04 1.7 U NA NA 1.7 U NA NA NA 1.7 U NA 1.7 U 1.7 ____ NA 2.3 U NA NA NA 2.6 U 2.6 Sep-04 ---NA NA 2.3 U NA NA ---Feb-05 1.9 U 1.9 U NA NA NA 1.9 U 1.9 NA ---NA 1.9 U NA NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

RFI Report

otal	Dissolved NA	Total	Dissolved
	NA		
		NA	NA
2	NA	NA	NA
D	NA	NA	NA
D	NA	NA	NA
D	NA	NA	NA
D	NA	NA	NA
D	NA	NA	NA
D	NA	NA	NA
D	NA	NA	NA
7 U	NA	NA	NA
JNW	NA	NA	NA
2 U	NA	NA	NA
UW	NA	NA	NA
6 U	NA	NA	NA
ÐU	NA	NA	NA
3 U	NA	NA	NA
7 U	NA	NA	NA
3 U	NA	NA	NA
UJ	NA	NA	NA
) U	NA	NA	NA
U	NA	NA	NA
2 U	NA	NA	NA
3 U	NA	NA	NA
	NA	NA	NA
	NA	NA	NA
7 U	NA	NA	NA
6 U	NA	NA	NA
ÐU	NA	NA	NA

		M۱	N-16A	M۱	N-16B	MV	V-16B2	M	W-17B	MV	V-18D	M	V-20B	M١	N-21B	MW	/-30A2
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	Sep-05		NA		NA	2.7 U	NA	NA	NA	2.7 UNW	NA	2.7 U	NA	2.7 U	NA	NA	NA
	Mar-06	2.6 U	NA		NA	2.6 U	NA	NA	NA	2.6 U	NA	2.6 U	NA	2.6 U	NA	NA	NA
	Sep-06		NA		NA	2.6 U	NA	NA	NA	2.6 U	NA	2.6 U	NA	2.6 U	NA	NA	NA
	Mar-07	2.8 U	NA		NA	2.8 U	NA	NA	NA	2.8 U	NA	4	NA	2.8 U	NA	NA	NA
Lood	Sep-07		NA		NA	0.94 U	NA	NA	NA	1.0 B	NA	0.94 U	NA	1.3 B	NA	NA	NA
Lead	Mar-08	2.2 B	NA		NA	2.2 B	NA	NA	NA	1.4 U	NA	2.1 BJ	NA	2.9 BJ	NA	NA	NA
	Sep-08		NA		NA	2.2 B	NA	NA	NA	1.5 B	NA	3.1	NA	1.4 U	NA	NA	NA
	Mar-09	1.7 U	NA		NA	1.7 U	NA	NA	NA	1.7 U	NA	1.7 U	NA	1.7 U	NA	NA	NA
	Sep-09		NA		NA	1.7 U	NA	NA	NA	1.7 U	NA	1.7 U	NA	1.7 U	NA	NA	NA
	Sep-14	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MV	V-37A	M٧	V-61A	M١	N-63A	M۱	W-72A	M	W-75B	M	N-76A	MV	V-76B	MW	/-76B2
Analyte (ug/L)	Date	Total	Dissolved														
	Mar-96	NA	0.1 U				1.5				0.1 U			NA	0.1 U		
	Sep-96	NA	0.1 U				1.8				0.23			NA	0.1 U		
	Mar-97	NA												NA			
	Sep-97	NA												NA			
	Mar-98	NA												NA			
	Sep-98	NA												NA			
Manager	Mar-99	NA												NA			
Mercury	Sep-99	NA												NA			
	Mar-00	NA												NA			
	Sep-00	NA												NA			
	Mar-01	NA												NA			
	Sep-01	NA												NA			
	Mar-02	NA												NA			
	Sep-02	NA												NA			

RFI Report

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		M	N-37A	MV	V-61A	M١	N-63A	M۱	N-72A	MV	V-75B	MW	/-76A	MV	V-76B	MW	-76B2
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	May-03	NA		0.1 U	0.1 U			0.1 U	0.1 U	0.2 B	0.1 U			NA			
	Jul-03	NA										0.10 UJ	0.10 UJ	NA		0.10 UJ	0.10 UJ
	Oct-03	NA		0.04 U				0.04 U		0.24 U		0.10 UJ		NA		0.44 U	
	Mar-04	NA												NA			
	Sep-04	NA												NA			
	Mar-05	NA												NA			
Maroury	Sep-05	NA												NA			
Mercury	Mar-06	NA												NA			
	Jul-06	NA				0.26	0.10 B			0.088 B	0.080 U			NA			
	Sep-06	NA				0.22	0.10 B			0.080 U	0.080 U			NA			
	Jun-07	NA				0.86	0.044 B			0.044 B	0.037 U			NA			
	Dec-07	NA				0.21 J	0.15 U			0.15 U	0.15 U			NA			
	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	NA	NA	0.8	ND	NA	NA	NA	NA	0.58	ND	NA	NA	ND	ND
Arsenic	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	2.4 U	NA	NA	NA	NA	NA	2.4 U	NA
Alsenic	Sep-14	25.3	ND	NA	NA	13.9	ND	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND
	Jun-89		NA	NA	NA		NA	NA	NA	1	NA	NA	NA	ND	NA		NA
	Jul-89		NA	NA	NA		NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Oct-89		NA	NA	NA		NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Oct-90		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA		NA
	Apr-91		NA	NA	NA		NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
Lead	Sep-92	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
Leau	Apr-93	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Oct-93	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Apr-94	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Oct-94	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Mar-95	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA
	Oct-95	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA		NA

RFI Report

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MV	I-37A	M١	N-61A	MV	V-63A	M	W-72A	MV	N-75B	MV	N-76A	MV	V-76B	MM	/-76B2
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	Mar-96	2.7 UW	NA	NA	NA	2.7 U	NA	NA	NA	5.2	NA	NA	NA	2.7 U	NA		NA
	Sep-96	2.7 UNW	NA	NA	NA	2.7 UNW	NA	NA	NA	2.7 UN	NA	NA	NA	2.7 UNW	NA		NA
	Mar-97	2.2 UW	NA	NA	NA	2.2 UW	NA	NA	NA	2.2 U	NA	NA	NA	2.2 UW	NA		NA
	Sep-97	0.67 UW	NA	NA	NA	0.67 U	NA	NA	NA	5.9	NA	NA	NA	17.8	NA		NA
	Mar-98	2.4 UW	NA	NA	NA	2.6 UW	NA	NA	NA	2.6 UW	NA	NA	NA	2.6 U	NA		NA
	Sep-98	1.9 U	NA	NA	NA	1.9 U	NA	NA	NA	1.9 U	NA	NA	NA	1.9 U	NA		NA
	Mar-99	1.3 U	NA	NA	NA	6	NA	NA	NA	1.3 U	NA	NA	NA	2.2 B	NA		NA
	Sep-99	1.7 U	NA	NA	NA	1.7 U	NA	NA	NA	1.7 U	NA	NA	NA	1.7 U	NA		NA
	Mar-00	1.8 U	NA	NA	NA	1.8 U	NA	NA	NA	1.8 U	NA	NA	NA	1.8 U	NA		NA
	Sep-00	1.3 UJ	NA	NA	NA	1.3 UJ	NA	NA	NA	1.3 UJ	NA	NA	NA	1.4 BJ	NA		NA
	Mar-01	1.0 U	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA		NA
	Sep-01	2.1 U	NA	NA	NA		NA	NA	NA	2.1 U	NA	NA	NA	2.1 U	NA		NA
	Mar-02	2.2 U	NA	NA	NA	2.2 U	NA	NA	NA	2.2 U	NA	NA	NA	2.2 U	NA		NA
	Sep-02	1.8 U	NA	NA	NA		NA	NA	NA	1.8 U	NA	NA	NA	1.8 U	NA		NA
Lead	Mar-03	2.5 U	NA	NA	NA	2.5 U	NA	NA	NA		NA	NA	NA	2.5 U	NA		NA
	Sep-03	2.6 U	NA	NA	NA		NA	NA	NA		NA	NA	NA		NA		NA
	Mar-04	1.7 U	NA	NA	NA	1.7 U	NA	NA	NA	1.7 U	NA	NA	NA		NA	1.7 U	NA
	Sep-04	2.3 U	NA	NA	NA		NA	NA	NA	2.3 U	NA	NA	NA		NA	2.3 U	NA
	Feb-05	1.9 U	NA	NA	NA	1.9 U	NA	NA	NA	1.9 U	NA	NA	NA		NA	1.9 U	NA
	Sep-05	2.7 U	NA	NA	NA		NA	NA	NA	2.7 U	NA	NA	NA		NA	2.7 U	NA
	Mar-06	2.6 U	NA	NA	NA	2.6 U	NA	NA	NA	2.6 U	NA	NA	NA		NA	2.6 U	NA
	Sep-06	5.1	NA	NA	NA		NA	NA	NA	2.6 U	NA	NA	NA		NA	2.6 U	NA
	Mar-07	2.8 U	NA	NA	NA	4.3	NA	NA	NA	4.2	NA	NA	NA		NA	7.6	NA
	Sep-07	1.1 B	NA	NA	NA		NA	NA	NA	0.94 U	NA	NA	NA		NA	0.94 U	NA
	Mar-08	20	NA	NA	NA	1.4 U	NA	NA	NA	1.4 U	NA	NA	NA		NA	2.5 B	NA
	Sep-08	6.3	NA	NA	NA		NA	NA	NA	1.4 U	NA	NA	NA		NA	1.4 U	NA
	Mar-09	1.7 U	NA	NA	NA	1.7 U	NA	NA	NA	1.7 U	NA	NA	NA		NA	1.7 U	NA
	Sep-09	1.7 U	NA	NA	NA		NA	NA	NA	1.7 U	NA	NA	NA		NA	1.7 U	NA
	Sep-14	ND	ND	NA	NA	21.3	ND	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND

RFI Report

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MV	V-77B	M	N-78B	MV	V-83A	MW	-83B1	MW	/-83B2	MV	/-84A	MW	-84B2	MV	V-85A
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	Mar-96	NA	0.1 U		3.3												
	Sep-96	NA	0.1 U		0.1 U												
	Mar-97	NA			2.4												
	Sep-97	NA			3.3												
	Mar-98	NA			3												
	Sep-98	NA			2.5												
	Mar-99	NA			2.9												
	Sep-99	NA															
	Mar-00	NA			2.8 J												
	Sep-00	NA															
	Mar-01	NA			2.0 J												
	Sep-01	NA			2.6												
	Mar-02	NA			1.5												
Mercury	Sep-02	NA			2.3 J												
inercury	May-03	NA		1.4	0.1 U	0.09 UJ	0.09 UJ										
	Jul-03	NA															
	Oct-03	NA		2.3		0.10 UJ		0.10 UJ		0.12 UJ		0.07 UJ		0.12 UJ		0.11 UJ	
	Mar-04	NA			0.55 J												
	Sep-04	NA			1.1												
	Mar-05	NA			1.9												
	Sep-05	NA			1.4												
	Mar-06	NA			1.9												
	Jul-06	NA		1.9	1.8												
	Sep-06	NA		1.7	1.6												
	Jun-07	NA		2.2	1.6												
	Dec-07	NA		1.5 J	1.3												
	Sep-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-14	ND	ND	0.9	ND	ND	ND	NA	NA	0.78	0.64	ND	ND	ND	ND	NA	NA
Arsenic	Sep-09	2.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

RFI Report

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MV	V-77B	MV	V-78B	M	W-83A	M	V-83B1	MV	V-83B2	M	V-84A	MV	V-84B2	MV	N-85A
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Arsenic	Sep-14	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	17.3	14.4	10.6	NA	NA
	Jun-89	3	NA	ND	NA	NA	NA										
	Jul-89	2	NA	ND	NA	NA	NA										
	Oct-89	ND	NA	ND	NA	NA	NA										
	Oct-90		NA		NA	NA	NA										
	Apr-91	2	NA	6	NA	NA	NA										
	Sep-92	46 B	NA	122 B	NA	NA	NA										
	Apr-93	34	NA	ND	NA	NA	NA										
	Oct-93	ND	NA	ND	NA	NA	NA										
	Apr-94	ND	NA	ND	NA	NA	NA										
	Oct-94	ND	NA	ND	NA	NA	NA										
	Mar-95	ND	NA	ND	NA	NA	NA										
	Oct-95	ND	NA	ND	NA	NA	NA										
	Mar-96	2.7 U	NA	2.7 U	NA	NA	NA										
Lood	Sep-96	2.7 UNW	NA	2.7 UN	NA	NA	NA										
Lead	Mar-97	2.2 UW	NA	2.2 U	NA	NA	NA										
	Sep-97	17.8	NA	0.67 UW	NA	NA	NA										
	Mar-98	2.6 U	NA	2.6 U	NA	NA	NA										
	Sep-98	1.9 U	NA	1.9 U	NA	NA	NA										
	Mar-99	2.2 B	NA	1.3 U	NA	NA	NA										
	Sep-99	1.7 U	NA	2.7 B	NA	NA	NA										
	Mar-00	1.8 U	NA	1.8 U	NA	NA	NA										
	Sep-00	1.4 BJ	NA	1.3 UJ	NA	NA	NA										
	Mar-01	1.0 U	NA	1.0 U	NA	NA	NA										
	Sep-01	2.1 U	NA	3.8	NA	NA	NA										
	Mar-02	2.2 UW	NA	2.2 U	NA	NA	NA										
	Sep-02	1.8 U	NA	1.8 U	NA	NA	NA										
	Mar-03	2.5 U	NA		NA	NA	NA										
	Sep-03		NA		NA	NA	NA										

RFI Report

		MV	N-77B	MV	N-78B	M۱	N-83A	MV	V-83B1	MV	V-83B2	M۱	V-84A	MW	/-84B2	MV	N-85A
Analyte (ug/L)	Date	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
	Mar-04		NA	1.7 U	NA	NA	NA										
	Sep-04		NA	2.3 U	NA	NA	NA										
	Feb-05		NA	1.9 U	NA	NA	NA										
	Sep-05		NA	2.7 U	NA	NA	NA										
	Mar-06		NA	2.6 U	NA	NA	NA										
	Sep-06		NA	2.6 U	NA	NA	NA										
Lead	Mar-07		NA	3.3	NA	NA	NA										
	Sep-07		NA	0.94 U	NA	NA	NA										
	Mar-08		NA	3.4 J	NA	NA	NA										
	Sep-08		NA	6.4	NA	NA	NA										
	Mar-09		NA	1.7 U	NA	NA	NA										
	Sep-09		NA		NA	NA	NA										
	Sep-14	ND	ND	ND	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MV	/-85B2	M۱	N-86A	-	ГВ-2	-	TB-3		MP-1	Μ	P-5A	MI	P-5B2	N	/IP-9
Analyte (ug/L)	Date	Total	Dissolved														
	Mar-96																
	Sep-96																
	Mar-97																
	Sep-97																
	Mar-98																
Mercury	Sep-98																
	Mar-99																
	Sep-99																
	Mar-00																
	Sep-00																
	Mar-01																

RFI Report

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MW	-85B2	MV	V-86A	Т	B-2	1	ГВ-3	N	/IP-1	М	P-5A	MP	-5B2	N	IP-9
Analyte (ug/L)	Date	Total	Dissolved														
	Sep-01																
	Mar-02																
	Sep-02																
	May-03	0.09 UJ	0.09 UJ			0.09 UJ	0.09 UJ	0.2 B	0.1 U								
	Jul-03			0.10 UJ	0.10 UJ					0.09 UJ	0.09 UJ	0.12 BJ	0.24 J	0.16 BJ	0.14 BJ	0.10 UJ	0.10 UJ
	Oct-03	0.10 UJ		0.04 U		0.07 U		0.18 U		0.04 U		0.10 UJ		0.15 UJ		0.18 U	
	Mar-04																
	Sep-04																
Mercury	Mar-05																
	Sep-05																
	Mar-06																
	Jul-06							0.080 U	0.080 U			0.080 U	0.080 U	0.080 U	0.080 U		
	Sep-06							0.080 U	0.080 U			0.080 U		0.080 U			
	Jun-07							0.037 U	0.037 U			0.037 U	0.037 U	0.037 U	0.037 U		
	Dec-07							0.15 U	0.15 U			0.15 U	0.15 UJ	0.15 U	0.15 UJ		
	Sep-09	NA	NA														
	Sep-14	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND
Arsenic	Sep-09	NA	NA														
Arsenic	Sep-14	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND
	Jun-89	NA	NA														
	Jul-89	NA	NA														
	Oct-89	NA	NA														
	Oct-90	NA	NA														
Lead	Apr-91	NA	NA														
Leau	Sep-92	NA	NA														
	Apr-93	NA	NA														
	Oct-93	NA	NA														
	Apr-94	NA	NA														
	Oct-94	NA	NA														

RFI Report

MW-85B2 **MW-86A** TB-2 **TB-3** MP-1 MP-5A Analyte (ug/L) Date Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved Total Dissolved То Total Mar-95 NA Oct-95 NA Mar-96 NA Sep-96 NA Mar-97 NA Sep-97 NA Mar-98 NA Sep-98 NA Mar-99 NA Sep-99 NA Mar-00 NA Sep-00 NA Mar-01 Sep-01 NA Lead Mar-02 NA Sep-02 NA Mar-03 NA NA NA NA NA NA NA Sep-03 NA Mar-04 NA Sep-04 NA Feb-05 NA Sep-05 NA Mar-06 NA Sep-06 NA Mar-07 NA Sep-07 NA NA NA Mar-08 NA Sep-08 NA NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

Mar-09

NA

RFI Report

			1P-9
Total	Dissolved	Total	Dissolved
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA



Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		MW	V-85B2	M۱	W-86A	٦	TB-2		TB-3	I	MP-1	М	P-5A	M	P-5B2	N	/IP-9
Analyte (ug/L)	Date	Total	Dissolved														
Lood	Sep-09	NA	NA														
Lead	Sep-14	NA	NA	ND	ND	NA	NA	ND	ND								

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		М	P-10	E	3-1		B-2	E	3-6		B-9	В	-11	В	-15	В	-16
Analyte (ug/L)	Date	Total	Dissolved														
	Mar-96																
	Sep-96																
	Mar-97																
	Sep-97																
	Mar-98																
	Sep-98																
	Mar-99																
	Sep-99																
	Mar-00																
	Sep-00																
Mercury	Mar-01																
Mercury	Sep-01																
	Mar-02																
	Sep-02																
	May-03																
	Jul-03	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ			0.10 UJ	0.10 UJ	0.09 UJ	0.09 UJ	0.10 UJ	0.10 UJ	0.09 UJ	0.09 UJ
	Oct-03	0.18 U		0.18 U		0.04 U				0.18 U		0.82 B		0.18 U		0.18 U	
	Mar-04																
	Sep-04																
	Mar-05																
	Sep-05																
	Mar-06							0.09 UJ	0.09 UJ			0.09 UJ	0.09 UJ				

RFI Report

MP-10 **B-1 B-2 B-6 B-9** B-11 Analyte (ug/L) Dissolved Dissolved Total Dissolved Total Dissolved Dissolved Total Dissolved То Date Total Total Total Jul-06 0.09 UJ 0.09 UJ --------------------------------------Sep-06 ---0.080 U ---------------------------------0.037 U 0.037 U Jun-07 ---------------------------------Mercury 0.15 U Dec-07 0.15 U -------___ ____ ____ ____ ___ ____ ___ ---___ Sep-09 NA ND ND NA ND ND N Sep-14 NA NA NA NA NA NA Sep-09 NA N Arsenic Sep-14 NA NA ND ND NA NA NA NA 84.1 ND NA NA N NA NA N Jun-89 NA Jul-89 NA NA NA NA NA NA N NA NA NA NA NA NA NA Oct-89 NA N Oct-90 NA N NA N Apr-91 Sep-92 NA N Apr-93 NA NA NA NA NA NA NA NA NA N NA NA NA Oct-93 NA N NA NA NA NA NA N Apr-94 NA NA NA NA NA NA NA Oct-94 NA N NA N Lead Mar-95 Oct-95 NA N N Mar-96 NA Sep-96 NA N NA Mar-97 NA N NA N Sep-97 NA Mar-98 NA N NA N Sep-98 NA NA NA NA N Mar-99 NA NA NA NA NA NA NA NA NA N Sep-99 NA Mar-00 NA N

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

RFI Report

	3-15	E	3-16
otal	Dissolved	Total	Dissolved
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA
IA	NA	NA	NA

		Μ	IP-10		B-1		B-2		B-6		B-9	E	3-11	E	3-15	E	3-16
Analyte (ug/L)	Date	Total	Dissolved														
	Sep-00	NA	NA														
	Mar-01	NA	NA														
	Sep-01	NA	NA														
	Mar-02	NA	NA														
	Sep-02	NA	NA														
	Mar-03	NA	NA														
	Sep-03	NA	NA														
	Mar-04	NA	NA														
	Sep-04	NA	NA														
Lead	Feb-05	NA	NA														
Leau	Sep-05	NA	NA														
	Mar-06	NA	NA														
	Sep-06	NA	NA														
	Mar-07	NA	NA														
	Sep-07	NA	NA														
	Mar-08	NA	NA														
	Sep-08	NA	NA														
	Mar-09	NA	NA														
	Sep-09	NA	NA														
	Sep-14	NA	NA	ND	ND	NA	NA	NA	NA	16.9	ND	NA	NA	NA	NA	NA	NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		E	3-101	MV	V-109A	MV	V-110A	MV	/-110B	MW	-115B2
Analyte (ug/L)	Date	Total	Dissolved								
	Mar-96										
Manageme	Sep-96										
Mercury	Mar-97										
	Sep-97										

RFI Report



EB-101 MW-109A **MW-110A** MW-110B Analyte (ug/L) Date Total Dissolved Total Dissolved Total Dissolved Total Dissolved Mar-98 ----____ ____ ____ ---------------Sep-98 --------------------------Mar-99 ------------------------Sep-99 ------___ ____ ___ ------___ Mar-00 ----------------------------Sep-00 ------------------------Mar-01 -------------------------Sep-01 ---____ ____ ---------------Mar-02 --------------------------Sep-02 ----------------------------May-03 ---------------------------Jul-03 0.10 UJ 0.1 -------------------Mercury 0.04 U Oct-03 ---------------------Mar-04 ---------------------------Sep-04 0.06 U 0.06 U 1.6 0.05 B ------____ ---Mar-05 -----------------------------Sep-05 ------------------------Mar-06 0.09 UJ 0.09 UJ ------____ ---------Jul-06 0.080 U 0.080 U ____ ___ ___ ---------Sep-06 ----------------0.080 U 0.080 U ---Jun-07 0.059 B 0.062 B --------------------0.15 U 0.15 U Dec-07 ---____ ------------NA NA NA NA NA NA NA Sep-09 NA Sep-14 ND ND ND ND NA NA NA NA Sep-09 NA NA NA NA NA NA NA NA Arsenic ND ND ND Sep-14 ND NA NA NA NA NA NA Jun-89 NA NA NA NA NA NA Jul-89 NA NA NA NA NA NA NA NA Lead Oct-89 NA NA NA NA NA NA NA NA

Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

RFI Report

MW-	115B2
Total	Dissolved
0.11 BJ	0.04 UJ
0.080 U	0.080 U
0.080 U	0.080 U
0.037 U	0.037 U
0.15 U	0.15 U
NA	NA



Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		E	B-101	MV	/-109A	MM	V-110A	MW	-110B	MW	-115B2
Analyte (ug/L)	Date	Total	Dissolved								
	Oct-90	NA	NA								
	Apr-91	NA	NA								
	Sep-92	NA	NA								
	Apr-93	NA	NA								
	Oct-93	NA	NA								
	Apr-94	NA	NA								
	Oct-94	NA	NA								
	Mar-95	NA	NA								
	Oct-95	NA	NA								
	Mar-96	NA	NA								
	Sep-96	NA	NA								
	Mar-97	NA	NA								
	Sep-97	NA	NA								
	Mar-98	NA	NA								
ead	Sep-98	NA	NA								
	Mar-99	NA	NA								
	Sep-99	NA	NA								
	Mar-00	NA	NA								
	Sep-00	NA	NA								
	Mar-01	NA	NA								
	Sep-01	NA	NA								
	Mar-02	NA	NA								
	Sep-02	NA	NA								
	Mar-03	NA	NA								
	Sep-03	NA	NA								
	Mar-04	NA	NA								
	Sep-04	NA	NA								
	Feb-05	NA	NA								
	Sep-05	NA	NA								

RFI Report



Table 7 Historical Groundwater Data Available for Metals (Cont.)^(e)

		EB	3-101	MW	/-109A	MW	/-110A	MW	-110B	MW·	115B2
Analyte (ug/L)	Date	Total	Dissolved								
	Mar-06	NA	NA								
	Sep-06	NA	NA								
	Mar-07	NA	NA								
	Sep-07	NA	NA								
Lead	Mar-08	NA	NA								
	Sep-08	NA	NA								
	Mar-09	NA	NA								
	Sep-09	NA	NA								
	Sep-14	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA

Table 8 Sample Results from Soil Borings in Southern and Eastern Perimeters^(f)

Sample ID	SB-P- 116-0-1	SB-P- 116-1-2	SB-P- 117-0-1	SB-P- 117-1-2	SB-P- 118-0-1	SB-P- 118-2-3	SB-P- 119-0-1	SB-P-119- 10-11	SB-P- 120-0-1	SB-P-120- 17-18	SB-P- 121-0-1	SB-P- 121-21-22	SB-P- 122-0-1	SB-P-122- 19-20	SB-P- 123-0-1	SB-P-123- 21-22	SB-P- 124-0-1	SB-P-124- 34-35
Method 8015																		
ORO ² (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	182	ND							
DRO ² (mg/kg)	10.8	ND	ND	ND	10.5	12.5	ND	ND	35.5	ND								
Method 8021																		
GRO ² (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Method 6010																		
Arsenic¹ (mg/kg) <i>BL - 45 mg/kg</i> ⁴	21.6	17.4	4.63	3.45	1.73	40	81.7	43.1	15.5	3.04	35.4	28.2	30.3	11.2	43	33.6	30.7	8.75
Chromium³ (mg/kg) <i>BL - 86 mg/kg</i> ⁴	69.5	55.4	26.8	31.7	14.5	26.3	58.2	91.5	30.2	8.91	46.9	36.8	43.5	6.22	66.5	31.8	46.9	25
Lead¹ (mg/kg) <i>BL - 92 mg/kg</i> ⁴	20.2	40	9.99	3.03	1.8	7.68	45	5.47	2.31	ND	16	4.67	2.06	1.99	17.2	4.87	10.3	2.14
Vanadium¹ (mg/kg) <i>BL - 250 mg/kg</i> ⁴	132	130	109	138	109	71.4	135	185	110	12.5	101	62.7	136	45	140	87.8	135	71.3

RFI Report

⁽f) 1 - highlighted bold black based on USEPA's Industrial Regional Screening Level (RSL) Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 3 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 3 - USEPA standard is not available; 3 - USEPA's MCL based RSL Summary 3 - USEPA's MCL based

Sample ID	SB-P- 116-0-1	SB-P- 116-1-2	SB-P- 117-0-1	SB-P- 117-1-2	SB-P- 118-0-1	SB-P- 118-2-3	SB-P- 119-0-1	SB-P-119- 10-11	SB-P- 120-0-1	SB-P-120- 17-18	SB-P- 121-0-1	SB-P-121- 21-22	SB-P- 122-0-1	SB-P-122- 19-20	SB-P- 123-0-1	SB-P-123- 21-22	SB-P- 124-0-1	SB-P- 124-34-35
Method 7470																		
Mercury¹ (mg/kg) BL - 0.34 mg/kg⁴	0.211	0.338	0.162	0.215	ND	0.0886	0.0944	0.049	0.185	ND	0.197	0.396	0.554	ND	0.136	0.112	0.125	0.155
Method 8260																		
Acetone ¹ (mg/kg)	ND	ND	ND	ND	23.8	36.8	ND	ND	ND	ND	ND	12.3	ND	10	ND	13.6	ND	ND
Benzene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Bromodichloromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Bromoform ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Bromomethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
2-butanone1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Carbon disulfide ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Carbon tetrachloride ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Chlorobenzene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Chloroethane1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Chloroform ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Chloromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Dibromochloromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 2-dibromo-3- chloropropane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 2-dibromoethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Dichlorofluoromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 1-dichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 1-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 2-dichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
cis-1, 2-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							

Table 8 Sample Results from Soil Borings in Southern and Eastern Perimeters (Cont.)^(f)

RFI Report

Table 8 Sample Results from Soil Borings in Southern and Eastern Perimeters (Cont.)^(f)

Sample ID	SB-P- 116-0-1	SB-P- 116-1-2	SB-P- 117-0-1	SB-P- 117-1-2	SB-P- 118-0-1	SB-P- 118-2-3	SB-P- 119-0-1	SB-P-119- 10-11	SB-P- 120-0-1	SB-P-120- 17-18	SB-P- 121-0-1	SB-P- 121-21-22	SB-P- 122-0-1	SB-P-122- 19-20	SB-P- 123-0-1	SB-P-123- 21-22	SB-P- 124-0-1	SB-P- 124-34-35
cis-1, 3-dichloropropene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 2-dichloropropane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Ethylbenzene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
2-Hexanone ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Isopropyl benzene ¹ (cumene) (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Methyl acetate ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
4-Methyl-2-pentanone ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Methyl-tert-butyl-ether ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Methylene chloride ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Styrene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Tetrachloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 1, 2, 2- tetrachloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Toluene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Trichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 1, 1-trichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
1, 1, 2-trichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Trichlorofuoromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Vinyl chloride ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
m&p-xylene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
o-xylene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
trans-1, 2-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
trans-1, 3- dichloropropene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							

RFI Report

Sample ID	SB-P- 116-0-1	SB-P- 116-1-2	SB-P- 117-0-1	SB-P- 117-1-2	SB-P- 118-0-1	SB-P- 118-2-3	SB-P- 119-0-1	SB-P-119- 10-11	SB-P- 120-0-1	SB-P-120- 17-18	SB-P- 121-0-1	SB-P- 121-21-22	SB-P- 122-0-1	SB-P-122- 19-20	SB-P- 123-0-1	SB-P-123- 21-22	SB-P- 124-0-1	SB-P-124- 34-35
Method 8270	110-0-1	110-1-2	117-0-1	117-1-2	110-0-1	110-2-3	113-0-1	10-11	120-0-1	17-16	121-0-1	121-21-22	122-0-1	19-20	123-0-1	21-22	124-0-1	34-33
1-methylnaphtalene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
2-methylnaphtalene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Acenaphthylene ² (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Anthracene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Benzo(a)antracene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Benzo(a)pyrene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Benzo(b)fluoranthene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Benzo(g, h, i)perylene ² (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Acenaphthene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Benzo(k)fluoranthene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Chrysene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Dibenz(a, h)anthracene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Fluoranthene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Fluorene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Indeno(1, 2, 3-cd)pyrene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Naphthalene1 (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Phenanthrene ² (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
Pyrene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							

Table 8 Sample Results from Soil Borings in Southern and Eastern Perimeters (Cont.)^(f)

RFI Report

Table 9 Quality Assurance/Quality Control Samples^(g)

	EB-	FB-	TB-	TB-	EB-	FB-	EB-											
Sample ID	082514	082514	082514	072414	072414	072414	072914	073114	080414	080514	080614	080714	081114	081214	081914	082014	082714	090314
Method 6010																		
Aluminum, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Antimony, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Arsenic (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Arsenic, Dissolved (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Barium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Beryllium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Cadmium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Calcium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Chromium (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Chromium, Dissolved (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Cobalt, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Copper, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Iron, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Lead (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Lead, Dissolved (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Magnesium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Manganese, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Nickel, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Potassium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										

RFI Report

⁽g) ND - not detected; NA - not applicable; FD - field duplicate

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 082514	FB- 082514	TB- 082514	TB- 072414	EB- 072414	FB- 072414	EB- 072914	EB- 073114	EB- 080414	EB- 080514	EB- 080614	EB- 080714	EB- 081114	EB- 081214	EB- 081914	EB- 082014	EB- 082714	EB- 090314
Selenium, Dissolved	NA	ND	ND	ND	ND	ND	NA	NA										
(mg/L) Silver, (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Silver, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
	NA		NA	NA				NA	NA		NA	ND	ND	ND	ND	ND		
Sodium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Thallium, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Vanadium (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Vanadium, Dissolved (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Zinc, Dissolved (mg/L)	NA	ND	ND	ND	ND	ND	NA	NA										
Method 7470																		
Mercury (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Mercury, Dissolved (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Method 8015/8021																		
Gasoline Range Organics (mg/L)	ND																	
Method 8015B Mod.																		
Diesel Range Organic (C10-C28) (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Oil Range Organics (>C28-C40) (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Method 8260																		
1, 1, 1-Trichloroethane (mg/L)	ND																	
1, 1, 2, 2-Tetrachloro- ethane (mg/L)	ND																	
1, 1, 2-Trichloroethane (mg/L)	ND																	
1, 1-Dichloroethane (mg/L)	ND																	
1, 1-Dichloroethene (mg/L)	ND																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 082514	FB- 082514	TB- 082514	TB- 072414	EB- 072414	FB- 072414	EB- 072914	EB- 073114	EB- 080414	EB- 080514	EB- 080614	EB- 080714	EB- 081114	EB- 081214	EB- 081914	EB- 082014	EB- 082714	EB- 090314
1, 2-Dibromo-3- chloropropane (mg/L)	ND																	
1, 2-Dibromoethane (EDB) (mg/L)	ND																	
1, 2-Dichloroethane (mg/L)	ND																	
1, 2-Dichloroethene (Total) (mg/L)	NA																	
1, 2-Dichloropropane (mg/L)	ND																	
2-Butanone (MEK) (mg/L)	ND																	
2-Hexanone (mg/L)	ND																	
4-Methyl-2-pentanone (MIBK) (mg/L)	ND																	
Acetone (mg/L)	ND	16.9	ND	ND														
Benzene (mg/L)	ND																	
Bromodichloromethane (mg/L)	ND																	
Bromoform (mg/L)	ND																	
Bromomethane (mg/L)	ND																	
Carbon disulfide (mg/L)	ND																	
Carbon tetrachloride (mg/L)	ND																	
Chlorobenzene (mg/L)	ND																	
Chloroethane (mg/L)	ND																	
Chloroform (mg/L)	ND																	
Chloromethane (mg/L)	ND																	
Dibromochloromethane (mg/L)	ND																	
Dichlorodifluoromethane (mg/L)	ND																	
Ethanol (mg/L)	NA																	
Ethylbenzene (mg/L)	ND																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 082514	FB- 082514	TB- 082514	TB- 072414	EB- 072414	FB- 072414	EB- 072914	EB- 073114	EB- 080414	EB- 080514	EB- 080614	EB- 080714	EB- 081114	EB- 081214	EB- 081914	EB- 082014	EB- 082714	EB- 090314
. <u> </u>																		
Isopropylbenzene (Cumene) (mg/L)	ND																	
Methyl acetate (mg/L)	ND																	
Methyl-tert-butyl ether (mg/L)	ND																	
Methylene Chloride (mg/L)	ND																	
Styrene (mg/L)	ND																	
Tetrachloroethene (mg/L)	ND																	
Toluene (mg/L)	ND																	
Trichloroethene (mg/L)	ND																	
Trichlorofluoromethane (mg/L)	ND																	
Vinyl chloride (mg/L)	ND																	
cis-1, 2-Dichloroethene (mg/L)	ND																	
cis-1, 3-Dichloropropene (mg/L)	ND																	
m&p-Xylene (mg/L)	ND																	
o-Xylene (mg/L)	ND																	
tert-Butyl Alcohol (mg/L)	NA																	
trans-1, 2- Dichloroethene (mg/L)	ND																	
trans-1, 3- Dichloropropene (mg/L)	ND																	
Method 8270																		
1-Methylnaphthalene (mg/L)	NA																	
2-Methylnaphthalene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Acenaphthene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Acenaphthylene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Anthracene (mg/L)	ND	NA	NA	NA	ND	NA	ND											

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 082514	FB- 082514	TB- 082514	TB- 072414	EB- 072414	FB- 072414	EB- 072914	EB- 073114	EB- 080414	EB- 080514	EB- 080614	EB- 080714	EB- 081114	EB- 081214	EB- 081914	EB- 082014	EB- 082714	EB- 090314
Benzo(a)anthracene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Benzo(a)pyrene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Benzo(b)fluoranthene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Benzo(g, h, i)perylene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Benzo(k)fluoranthene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Chrysene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Dibenz(a, h)anthracene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Fluoranthene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Fluorene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Indeno(1, 2, 3-cd)pyrene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Naphthalene (mg/L)	ND	NA	NA	NA	ND	NA	ND											
Phenanthrene (mg/L)	ND	NA	NA	NA	0.11	NA	ND											
Pyrene (mg/L)	ND	NA	NA	NA	ND	NA	ND											

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 090414	EB- 090814	EB- 072314	FB- 072914	FB- 073014	FB- 073114	FB- 080414	FB- 080514	FB- 080614	FB- 080714	FB- 081114	FB- 081214	FB- 081314	FB- 081814	FB- 081914	FB- 082014	FB- 082114	FB- 082714
Method 6010																		
Aluminum, Dissolved (mg/L)	NA																	
Antimony, Dissolved (mg/L)	NA																	
Arsenic (mg/L)	ND	ND	ND	NA														
Arsenic, Dissolved (mg/L)	ND	ND	ND	NA														
Barium, Dissolved (mg/L)	NA																	
Beryllium, Dissolved (mg/L)	NA																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 090414	EB- 090814	EB- 072314	FB- 072914	FB- 073014	FB- 073114	FB- 080414	FB- 080514	FB- 080614	FB- 080714	FB- 081114	FB- 081214	FB- 081314	FB- 081814	FB- 081914	FB- 082014	FB- 082114	FB- 082714
Cadmium, Dissolved (mg/L)	NA																	
Calcium, Dissolved (mg/L)	NA																	
Chromium (mg/L)	ND	ND	ND	NA														
Chromium, Dissolved (mg/L)	ND	ND	ND	NA														
Cobalt, Dissolved (mg/L)	NA																	
Copper, Dissolved (mg/L)	NA																	
Iron, Dissolved (mg/L)	NA																	
Lead (mg/L)	ND	ND	ND	NA														
Lead, Dissolved (mg/L)	ND	ND	ND	NA														
Magnesium, Dissolved (mg/L)	NA																	
Manganese, Dissolved (mg/L)	NA																	
Nickel, Dissolved (mg/L)	NA																	
Potassium, Dissolved (mg/L)	NA																	
Selenium, Dissolved (mg/L)	NA																	
Silver, (mg/L)	NA																	
Silver, Dissolved (mg/L)	NA																	
Sodium, Dissolved (mg/L)	NA																	
Thallium, Dissolved (mg/L)	NA																	
Vanadium (mg/L)	ND	ND	ND	NA														
Vanadium, Dissolved (mg/L)	ND	ND	ND	NA														
Zinc, Dissolved (mg/L)	NA																	
Method 7470																		
Mercury (mg/L)	ND	ND	ND	NA														

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

-	-	•	、 <i>,</i>															
Sample ID	EB- 090414	EB- 090814	EB- 072314	FB- 072914	FB- 073014	FB- 073114	FB- 080414	FB- 080514	FB- 080614	FB- 080714	FB- 081114	FB- 081214	FB- 081314	FB- 081814	FB- 081914	FB- 082014	FB- 082114	FB- 082714
Mercury, Dissolved (mg/L)	ND	ND	ND	NA														
Method 8015/8021																		
Gasoline Range Organics (mg/L)	ND	53.9	ND	ND														
Method 8015B Mod.																		
Diesel Range Organic (C10-C28) (mg/L)	ND	ND	ND	NA														
Oil Range Organics (>C28-C40) (mg/L)	ND	ND	ND	NA														
Method 8260																		
1, 1, 1-Trichloroethane (mg/L)	ND																	
1, 1, 2, 2-Tetrachloro- ethane (mg/L)	ND																	
1, 1, 2-Trichloroethane (mg/L)	ND																	
1, 1-Dichloroethane (mg/L)	ND																	
1, 1-Dichloroethene (mg/L)	ND																	
1, 2-Dibromo-3- chloropropane (mg/L)	ND																	
1, 2-Dibromoethane (EDB) (mg/L)	ND																	
1, 2-Dichloroethane (mg/L)	ND																	
1, 2-Dichloroethene (Total) (mg/L)	NA																	
1, 2-Dichloropropane (mg/L)	ND																	
2-Butanone (MEK) (mg/L)	ND																	
2-Hexanone (mg/L)	ND																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 090414	EB- 090814	EB- 072314	FB- 072914	FB- 073014	FB- 073114	FB- 080414	FB- 080514	FB- 080614	FB- 080714	FB- 081114	FB- 081214	FB- 081314	FB- 081814	FB- 081914	FB- 082014	FB- 082114	FB- 082714
4-Methyl-2-pentanone (MIBK) (mg/L)	ND																	
Acetone (mg/L)	ND	19.3	20.4	ND														
Benzene (mg/L)	ND																	
Bromodichloromethane (mg/L)	ND																	
Bromoform (mg/L)	ND																	
Bromomethane (mg/L)	ND																	
Carbon disulfide (mg/L)	ND																	
Carbon tetrachloride (mg/L)	ND																	
Chlorobenzene (mg/L)	ND																	
Chloroethane (mg/L)	ND																	
Chloroform (mg/L)	ND																	
Chloromethane (mg/L)	ND																	
Dibromochloromethane (mg/L)	ND																	
Dichlorodifluoromethane (mg/L)	ND																	
Ethanol (mg/L)	NA																	
Ethylbenzene (mg/L)	ND																	
Isopropylbenzene (Cumene) (mg/L)	ND																	
Methyl acetate (mg/L)	ND																	
Methyl-tert-butyl ether (mg/L)	ND																	
Methylene Chloride (mg/L)	ND																	
Styrene (mg/L)	ND																	
Tetrachloroethene (mg/L)	ND																	
Toluene (mg/L)	ND																	
Trichloroethene (mg/L)	ND																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

	FD	FD	50	FD	ED	FD	FD	FD	50	ED	FD							
Sample ID	EB- 090414	EB- 090814	EB- 072314	FB- 072914	FB- 073014	FB- 073114	FB- 080414	FB- 080514	FB- 080614	FB- 080714	FB- 081114	FB- 081214	FB- 081314	FB- 081814	FB- 081914	FB- 082014	FB- 082114	FB- 082714
Trichlorofluoromethane (mg/L)	ND																	
Vinyl chloride (mg/L)	ND																	
cis-1, 2-Dichloroethene (mg/L)	ND																	
cis-1, 3-Dichloropropene (mg/L)	ND																	
m&p-Xylene (mg/L)	ND																	
o-Xylene (mg/L)	ND																	
tert-Butyl Alcohol (mg/L)	NA																	
trans-1, 2- Dichloroethene (mg/L)	ND																	
trans-1, 3- Dichloropropene (mg/L)	ND																	
Method 8270																		
1-Methylnaphthalene (mg/L)	NA																	
2-Methylnaphthalene (mg/L)	ND	ND	ND	NA														
Acenaphthene (mg/L)	ND	ND	ND	NA														
Acenaphthylene (mg/L)	ND	ND	ND	NA														
Anthracene (mg/L)	ND	ND	ND	NA														
Benzo(a)anthracene (mg/L)	ND	ND	ND	NA														
Benzo(a)pyrene (mg/L)	ND	ND	ND	NA														
Benzo(b)fluoranthene (mg/L)	ND	ND	ND	NA														
Benzo(g, h, i)perylene (mg/L)	ND	ND	ND	NA														
Benzo(k)fluoranthene (mg/L)	ND	ND	ND	NA														
Chrysene (mg/L)	ND	ND	ND	NA														

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	EB- 090414	EB- 090814	EB- 072314	FB- 072914	FB- 073014	FB- 073114	FB- 080414	FB- 080514	FB- 080614	FB- 080714	FB- 081114	FB- 081214	FB- 081314	FB- 081814	FB- 081914	FB- 082014	FB- 082114	FB- 082714
Dibenz(a, h)anthracene (mg/L)	ND	ND	ND	NA														
Fluoranthene (mg/L)	ND	ND	ND	NA														
Fluorene (mg/L)	ND	ND	ND	NA														
Indeno(1, 2, 3-cd)pyrene (mg/L)	ND	ND	ND	NA														
Naphthalene (mg/L)	ND	ND	ND	NA														
Phenanthrene (mg/L)	ND	ND	ND	NA														
Pyrene (mg/L)	ND	ND	ND	NA														

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 090314	FB- 090414	FB- 090814	FB- 091014	FB- 072314	TB- 073014	TB- 073114	TB- 080414	TB- 080514	TB- 080614	TB- 080714	TB- 081114	TB- 081214	TB- 081314	TB- 081814	TB- 081914	TB- 082014	TB- 082114
Method 6010																		
Aluminum, Dissolved (mg/L)	NA																	
Antimony, Dissolved (mg/L)	NA																	
Arsenic (mg/L)	NA																	
Arsenic, Dissolved (mg/L)	NA																	
Barium, Dissolved (mg/L)	NA																	
Beryllium, Dissolved (mg/L)	NA																	
Cadmium, Dissolved (mg/L)	NA																	
Calcium, Dissolved (mg/L)	NA																	
Chromium (mg/L)	NA																	
Chromium, Dissolved (mg/L)	NA																	
Cobalt, Dissolved (mg/L)	NA																	
Copper, Dissolved (mg/L)	NA																	

RFI Report



Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

	FB-	FB-	FB-	FB-	FB-	TB-												
Sample ID	090314	090414	090814	091014	072314	073014	073114	080414	080514	080614	080714	081114	081214	081314	081814	081914	082014	082114
Iron, Dissolved (mg/L)	NA																	
Lead (mg/L)	NA																	
Lead, Dissolved (mg/L)	NA																	
Magnesium, Dissolved (mg/L)	NA																	
Manganese, Dissolved (mg/L)	NA																	
Nickel, Dissolved (mg/L)	NA																	
Potassium, Dissolved (mg/L)	NA																	
Selenium, Dissolved (mg/L)	NA																	
Silver, (mg/L)	NA																	
Silver, Dissolved (mg/L)	NA																	
Sodium, Dissolved (mg/L)	NA																	
Thallium, Dissolved (mg/L)	NA																	
Vanadium (mg/L)	NA																	
Vanadium, Dissolved (mg/L)	NA																	
Zinc, Dissolved (mg/L)	NA																	
Method 7470																		
Mercury (mg/L)	NA																	
Mercury, Dissolved (mg/L)	NA																	
Method 8015/8021																		
Gasoline Range Organics (mg/L)	ND																	
Method 8015B Mod.																		
Diesel Range Organic (C10-C28) (mg/L)	NA																	
Oil Range Organics (>C28-C40) (mg/L)	NA																	

RFI Report



Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 090314	FB- 090414	FB- 090814	FB- 091014	FB- 072314	TB- 073014	TB- 073114	TB- 080414	TB- 080514	TB- 080614	TB- 080714	TB- 081114	TB- 081214	TB- 081314	TB- 081814	TB- 081914	TB- 082014	TB- 082114
Method 8260																		
1, 1, 1-Trichloroethane (mg/L)	ND																	
1, 1, 2, 2-Tetrachloro- ethane (mg/L)	ND																	
1, 1, 2-Trichloroethane (mg/L)	ND																	
1, 1-Dichloroethane (mg/L)	ND																	
1, 1-Dichloroethene (mg/L)	ND																	
1, 2-Dibromo-3- chloropropane (mg/L)	ND																	
1, 2-Dibromoethane (EDB) (mg/L)	ND																	
1, 2-Dichloroethane (mg/L)	ND																	
1, 2-Dichloroethene (Total) (mg/L)	NA																	
1, 2-Dichloropropane (mg/L)	ND																	
2-Butanone (MEK) (mg/L)	ND																	
2-Hexanone (mg/L)	ND																	
4-Methyl-2-pentanone (MIBK) (mg/L)	ND																	
Acetone (mg/L)	ND	ND	ND	12.4	ND	18.1	19.7											
Benzene (mg/L)	ND																	
Bromodichloromethane (mg/L)	ND																	
Bromoform (mg/L)	ND																	
Bromomethane (mg/L)	ND																	
Carbon disulfide (mg/L)	ND																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB-	FB-	FB- 090814	FB-	FB-	TB-	TB-	TB- 080414	TB- 080514	TB-	TB-	TB-	TB- 081214	TB- 081314	TB-	TB-	TB- 082014	TB-
Carbon tetrachloride	090314 ND	090414 ND	090814 ND	091014 ND	072314 ND	073014 ND	073114 ND	080414 ND	080514 ND	080614 ND	080714 ND	081114 ND	081214 ND	081314 ND	081814 ND	081914 ND	082014 ND	082114 ND
(mg/L)		NB		ND	ND	ND	ND			NB	ND	ND	ND	ND	ND	NB	ND	
Chlorobenzene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene (Cumene) (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl acetate (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl ether (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1, 2-Dichloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1, 3-Dichloropropene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report



Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 090314	FB- 090414	FB- 090814	FB- 091014	FB- 072314	TB- 073014	TB- 073114	TB- 080414	TB- 080514	TB- 080614	TB- 080714	TB- 081114	TB- 081214	TB- 081314	TB- 081814	TB- 081914	TB- 082014	TB- 082114
tert-Butyl Alcohol (mg/L)	NA																	
trans-1, 2- Dichloroethene (mg/L)	ND																	
trans-1, 3- Dichloropropene (mg/L)	ND																	
Method 8270																		
1-Methylnaphthalene (mg/L)	NA																	
2-Methylnaphthalene (mg/L)	NA																	
Acenaphthene (mg/L)	NA																	
Acenaphthylene (mg/L)	NA																	
Anthracene (mg/L)	NA																	
Benzo(a)anthracene (mg/L)	NA																	
Benzo(a)pyrene (mg/L)	NA																	
Benzo(b)fluoranthene (mg/L)	NA																	
Benzo(g, h, i)perylene (mg/L)	NA																	
Benzo(k)fluoranthene (mg/L)	NA																	
Chrysene (mg/L)	NA																	
Dibenz(a, h)anthracene (mg/L)	NA																	
Fluoranthene (mg/L)	NA																	
Fluorene (mg/L)	NA																	
Indeno(1, 2, 3-cd)pyrene (mg/L)	NA																	
Naphthalene (mg/L)	NA																	
Phenanthrene (mg/L)	NA																	
Pyrene (mg/L)	NA																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	TB- 082714	TB- 090314	TB- 090414	TB- 090814	TB- 091014	TB- 072314	TB- 072914	FB 050914	FB- 050514	FB- 050614	FB- 051514	TB- 050514	TB- 050614	TB- 050914	TB- 150514	FB- 100914	TB- 100914	EB- 100714
Method 6010	002714	030314	030414	030014	031014	012014	012314	000014	000014	000014	001014	000014	030014	030314	130314	100314	100314	100714
Aluminum, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Antimony, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Arsenic (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Arsenic, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Barium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Beryllium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Cadmium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Calcium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Chromium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Chromium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Cobalt, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Copper, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Iron, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Lead (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Lead, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Magnesium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Manganese, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Nickel, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Potassium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Selenium, Dissolved (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Silver, (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

	TB-	FB	FB-	FB-	FB-	TB-	TB-	TB-	TB-	FB-	TB-	EB-						
Sample ID	082714	090314	090414	090814	091014	072314	072914	050914	050514	050614	051514	050514	050614	050914	150514	100914	100914	100714
Silver, Dissolved (mg/L)	NA																	
Sodium, Dissolved (mg/L)	NA																	
Thallium, Dissolved (mg/L)	NA																	
Vanadium (mg/L)	NA	ND																
Vanadium, Dissolved (mg/L)	NA	ND																
Zinc, Dissolved (mg/L)	NA																	
Method 7470																		
Mercury (mg/L)	NA	ND																
Mercury, Dissolved (mg/L)	NA	ND																
Method 8015/8021																		
Gasoline Range Organics (mg/L)	ND																	
Method 8015B Mod.																		
Diesel Range Organic (C10-C28) (mg/L)	NA	ND																
Oil Range Organics (>C28-C40) (mg/L)	NA	ND																
Method 8260																		
1, 1, 1-Trichloroethane (mg/L)	ND																	
1, 1, 2, 2-Tetrachloro- ethane (mg/L)	ND																	
1, 1, 2-Trichloroethane (mg/L)	ND																	
1, 1-Dichloroethane (mg/L)	ND																	
1, 1-Dichloroethene (mg/L)	ND																	

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	TB- 082714	TB- 090314	TB- 090414	TB- 090814	TB- 091014	TB- 072314	TB- 072914	FB 050914	FB- 050514	FB- 050614	FB- 051514	TB- 050514	TB- 050614	TB- 050914	TB- 150514	FB- 100914	TB- 100914	EB- 100714
1, 2-Dibromo-3- chloropropane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
1, 2-Dibromoethane (EDB) (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
1, 2-Dichloroethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
1, 2-Dichloroethene (Total) (mg/L)	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA						
1, 2-Dichloropropane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
2-Butanone (MEK) (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
2-Hexanone (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
4-Methyl-2-pentanone (MIBK) (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Acetone (mg/L)	ND	ND	ND	ND	13.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Bromodichloromethane (mg/L)	ND	ND	ND	5.4	ND													
Bromoform (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Bromomethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Carbon disulfide (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Carbon tetrachloride (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Chlorobenzene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Chloroethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Chloroform (mg/L)	ND	ND	ND	8.3	ND													
Chloromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Dibromochloromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Dichlorodifluoromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Ethanol (mg/L)	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA						

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

-	-	-	. ,															
Sample ID	TB- 082714	TB- 090314	TB- 090414	TB- 090814	TB- 091014	TB- 072314	TB- 072914	FB 050914	FB- 050514	FB- 050614	FB- 051514	TB- 050514	TB- 050614	TB- 050914	TB- 150514	FB- 100914	TB- 100914	EB- 100714
Ethylbenzene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Isopropylbenzene (Cumene) (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Methyl acetate (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Methyl-tert-butyl ether (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Methylene Chloride (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Styrene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Tetrachloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Toluene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Trichloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Trichlorofluoromethane (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Vinyl chloride (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
cis-1, 2-Dichloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
cis-1, 3-Dichloropropene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
m&p-Xylene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
o-Xylene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
tert-Butyl Alcohol (mg/L)	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA						
trans-1, 2- Dichloroethene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
trans-1, 3- Dichloropropene (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
Method 8270																		
1-Methylnaphthalene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
2-Methylnaphthalene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Acenaphthene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	TB- 082714	TB- 090314	TB- 090414	TB- 090814	TB- 091014	TB- 072314	TB- 072914	FB 050914	FB- 050514	FB- 050614	FB- 051514	TB- 050514	TB- 050614	TB- 050914	TB- 150514	FB- 100914	TB- 100914	EB- 100714
Acenaphthylene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Anthracene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Benzo(a)anthracene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Benzo(a)pyrene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Benzo(b)fluoranthene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Benzo(g, h, i)perylene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Benzo(k)fluoranthene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Chrysene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Dibenz(a, h)anthracene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Fluoranthene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Fluorene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Indeno(1, 2, 3-cd)pyrene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Naphthalene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Phenanthrene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						
Pyrene (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND						

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 100714	TB- 100714	EB- 100214	FB- 100214	TB- 100214	EB- 072814	EB- 092914	EB- 093014	FB- 072814	FB- 092914	FB- 093014	TB- 100114	TB- 072814	FB 100814	TB 100814	MW-87A- FD	MW- 20B- FD	PMW- 117-FD
Method 6010																		
Aluminum, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Antimony, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Arsenic (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 100714	TB- 100714	EB- 100214	FB- 100214	TB- 100214	EB- 072814	EB- 092914	EB- 093014	FB- 072814	FB- 092914	FB- 093014	TB- 100114	TB- 072814	FB 100814	TB 100814	MW-87A- FD	MW- 20B- FD	PMW- 117-FD
Arsenic, Dissolved (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Barium, Dissolved (mg/L)	NA	NA	NA	NA	NA	321												
Beryllium, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Cadmium, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Calcium, Dissolved (mg/L)	NA	NA	NA	NA	NA	5820												
Chromium (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	26.1	ND	ND
Chromium, Dissolved (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	22.0	ND	ND
Cobalt, Dissolved (mg/L)	NA	NA	NA	NA	NA	27.7												
Copper, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Iron, Dissolved (mg/L)	NA	NA	NA	NA	NA	1840												
Lead (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Lead, Dissolved (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Magnesium, Dissolved (mg/L)	NA	NA	NA	NA	NA	4820												
Manganese, Dissolved (mg/L)	NA	NA	NA	NA	NA	2030												
Nickel, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Potassium, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Selenium, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Silver, (mg/L)	NA	NA	NA	NA	NA	NA												
Silver, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Sodium, Dissolved (mg/L)	NA	NA	NA	NA	NA	37500												
Thallium, Dissolved (mg/L)	NA	NA	NA	NA	NA	ND												
Vanadium (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Vanadium, Dissolved (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 100714	TB- 100714	EB- 100214	FB- 100214	TB- 100214	EB- 072814	EB- 092914	EB- 093014	FB- 072814	FB- 092914	FB- 093014	TB- 100114	TB- 072814	FB 100814	TB 100814	MW-87A- FD	MW- 20B- FD	PMW- 117-FD
Zinc, Dissolved (mg/L)	NA	NA	NA	NA	NA	79.7												
Method 7470																		
Mercury (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	0.30
Mercury, Dissolved (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Method 8015/8021																		
Gasoline Range Organics (mg/L)	ND	NA	NA	ND	ND	ND												
Method 8015B Mod.																		
Diesel Range Organic (C10-C28) (mg/L)	NA	NA	ND	NA	NA	ND	0.80	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Oil Range Organics (>C28-C40) (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Method 8260																		
1, 1, 1-Trichloroethane (mg/L)	ND	NA	NA	ND	ND	ND												
1, 1, 2, 2-Tetrachloro- ethane (mg/L)	ND	NA	NA	ND	ND	ND												
1, 1, 2-Trichloroethane (mg/L)	ND	NA	NA	ND	ND	ND												
1, 1-Dichloroethane (mg/L)	ND	NA	NA	ND	ND	ND												
1, 1-Dichloroethene (mg/L)	ND	NA	NA	ND	ND	ND												
1, 2-Dibromo-3- chloropropane (mg/L)	ND	NA	NA	ND	ND	ND												
1, 2-Dibromoethane (EDB) (mg/L)	ND	NA	NA	ND	ND	ND												
1, 2-Dichloroethane (mg/L)	ND	NA	NA	ND	ND	ND												
1, 2-Dichloroethene (Total) (mg/L)	NA	NA	NA	NA	NA	NA												
1, 2-Dichloropropane (mg/L)	ND	NA	NA	ND	ND	ND												
2-Butanone (MEK) (mg/L)	ND	NA	NA	ND	ND	ND												
2-Hexanone (mg/L)	ND	NA	NA	ND	ND	ND												

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 100714	TB- 100714	EB- 100214	FB- 100214	TB- 100214	EB- 072814	EB- 092914	EB- 093014	FB- 072814	FB- 092914	FB- 093014	TB- 100114	TB- 072814	FB 100814	TB 100814	MW-87A- FD	MW- 20B- FD	PMW- 117-FD
4-Methyl-2-pentanone (MIBK) (mg/L)	ND	NA	NA	ND	ND	ND												
Acetone (mg/L)	ND	NA	NA	ND	ND	ND												
Benzene (mg/L)	ND	ND	ND	ND	ND	5.1												
Bromodichloromethane (mg/L)	ND	NA	NA	ND	ND	ND												
Bromoform (mg/L)	ND	NA	NA	ND	ND	ND												
Bromomethane (mg/L)	ND	NA	NA	ND	ND	ND												
Carbon disulfide (mg/L)	ND	NA	NA	ND	ND	ND												
Carbon tetrachloride (mg/L)	ND	NA	NA	ND	ND	ND												
Chlorobenzene (mg/L)	ND	NA	NA	ND	ND	ND												
Chloroethane (mg/L)	ND	NA	NA	ND	ND	ND												
Chloroform (mg/L)	ND	NA	NA	ND	ND	ND												
Chloromethane (mg/L)	ND	NA	NA	ND	ND	ND												
Dibromochloromethane (mg/L)	ND	NA	NA	ND	ND	ND												
Dichlorodifluoromethane (mg/L)	ND	NA	NA	ND	ND	ND												
Ethanol (mg/L)	NA	NA	NA	NA	NA	NA												
Ethylbenzene (mg/L)	ND	ND	ND	ND	ND	ND												
Isopropylbenzene (Cumene) (mg/L)	ND	NA	NA	ND	ND	ND												
Methyl acetate (mg/L)	ND	NA	NA	ND	ND	ND												
Methyl-tert-butyl ether (mg/L)	ND	ND	ND	ND	ND	ND												
Methylene Chloride (mg/L)	ND	NA	NA	ND	ND	ND												
Styrene (mg/L)	ND	NA	NA	ND	ND	ND												
Tetrachloroethene (mg/L)	ND	NA	NA	ND	ND	ND												
Toluene (mg/L)	ND	ND	ND	ND	ND	ND												
Trichloroethene (mg/L)	ND	NA	NA	ND	ND	ND												

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 100714	TB- 100714	EB- 100214	FB- 100214	TB- 100214	EB- 072814	EB- 092914	EB- 093014	FB- 072814	FB- 092914	FB- 093014	TB- 100114	TB- 072814	FB 100814	TB 100814	MW-87A- FD	MW- 20B- FD	PMW- 117-FD
Trichlorofluoromethane (mg/L)	ND	NA	NA	ND	ND	ND												
Vinyl chloride (mg/L)	ND	NA	NA	ND	ND	ND												
cis-1, 2-Dichloroethene (mg/L)	ND	NA	NA	ND	ND	ND												
cis-1, 3-Dichloropropene (mg/L)	ND	NA	NA	ND	ND	ND												
m&p-Xylene (mg/L)	ND	ND	ND	ND	ND	ND												
o-Xylene (mg/L)	ND	ND	ND	ND	ND	ND												
tert-Butyl Alcohol (mg/L)	NA	NA	NA	NA	NA	NA												
trans-1, 2-Dichloroethene (mg/L)	ND	NA	NA	ND	ND	ND												
trans-1, 3- Dichloropropene (mg/L)	ND	NA	NA	ND	ND	ND												
Method 8270																		
1-Methylnaphthalene (mg/L)	NA	NA	NA	NA	NA	NA												
2-Methylnaphthalene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Acenaphthene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Acenaphthylene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Anthracene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Benzo(a)anthracene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Benzo(a)pyrene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Benzo(b)fluoranthene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Benzo(g, h, i)perylene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Benzo(k)fluoranthene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Chrysene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND

RFI Report

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	FB- 100714	TB- 100714	EB- 100214	FB- 100214	TB- 100214	EB- 072814	EB- 092914	EB- 093014	FB- 072814	FB- 092914	FB- 093014	TB- 100114	TB- 072814	FB 100814	TB 100814	MW-87A- FD	MW- 20B- FD	PMW- 117-FD
Dibenz(a, h)anthracene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Fluoranthene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Fluorene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Indeno(1, 2, 3-cd)pyrene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Naphthalene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Phenanthrene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Pyrene (mg/L)	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND

RFI Report

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SWLC- 03-FD	MW- AD-1-FD	MW- AD-4-FD	BD 100814
Method 6010				100014
Aluminum, Dissolved (mg/L)	NA	NA	NA	NA
Antimony, Dissolved (mg/L)	NA	NA	NA	NA
Arsenic (mg/L)	ND	59.6	324	NA
Arsenic, Dissolved (mg/L)	ND	ND	ND	NA
Barium, Dissolved (mg/L)	NA	NA	NA	NA
Beryllium, Dissolved (mg/L)	NA	NA	NA	NA
Cadmium, Dissolved (mg/L)	NA	NA	NA	NA
Calcium, Dissolved (mg/L)	NA	NA	NA	NA
Chromium (mg/L)	ND	122	587	NA
Chromium, Dissolved (mg/L)	ND	ND	ND	NA
Cobalt, Dissolved (mg/L)	NA	NA	NA	NA
Copper, Dissolved (mg/L)	NA	NA	NA	NA
Iron, Dissolved (mg/L)	NA	NA	NA	NA
Lead (mg/L)	ND	14.1	32.8	NA
Lead, Dissolved (mg/L)	ND	ND	ND	NA
Magnesium, Dissolved (mg/L)	NA	NA	NA	NA
Manganese, Dissolved (mg/L)	NA	NA	NA	NA
Nickel, Dissolved (mg/L)	NA	NA	NA	NA
Potassium, Dissolved (mg/L)	NA	NA	NA	NA
Selenium, Dissolved (mg/L)	NA	NA	NA	NA
Silver, (mg/L)	ND	ND	NA	NA
Silver, Dissolved (mg/L)	ND	ND	NA	NA
Sodium, Dissolved (mg/L)	NA	NA	NA	NA
Thallium, Dissolved (mg/L)	NA	NA	NA	NA
Vanadium (mg/L)	NA	268	996	NA
Vanadium, Dissolved (mg/L)	NA	ND	ND	NA
Zinc, Dissolved (mg/L)	NA	NA	NA	NA

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)

Sample ID	SWLC- 03-FD	MW- AD-1-FD	MW- AD-4-FD	BD 100814
Method 7470				
Mercury (mg/L)	NA	ND	ND	NA
Mercury, Dissolved (mg/L)	ND	ND	ND	NA
Method 8015/8021				
Gasoline Range Organics (mg/L)	ND	420	1950	NA
Method 8015B Mod.				
Diesel Range Organic (C10- C28) (mg/L)	ND	ND	2.1	1.4
Oil Range Organics (>C28- C40) (mg/L)	ND	ND	ND	NA
Method 8260				
1, 1, 1-Trichloroethane (mg/L)	ND	ND	ND	NA
1, 1, 2, 2-Tetrachloro-ethane (mg/L)	ND	ND	ND	NA
1, 1, 2-Trichloroethane (mg/L)	ND	ND	25.4	NA
1, 1-Dichloroethane (mg/L)	ND	ND	ND	NA
1, 1-Dichloroethene (mg/L)	ND	ND	ND	NA
1, 2-Dibromo-3-chloropropane (mg/L)	ND	ND	ND	NA
1, 2-Dibromoethane (EDB) (mg/L)	ND	ND	ND	NA
1, 2-Dichloroethane (mg/L)	ND	ND	ND	NA
1, 2-Dichloroethene (Total) (mg/L)	NA	NA	NA	NA
1, 2-Dichloropropane (mg/L)	ND	ND	ND	NA
2-Butanone (MEK) (mg/L)	ND	ND	ND	NA
2-Hexanone (mg/L)	ND	ND	ND	NA
4-Methyl-2-pentanone (MIBK) (mg/L)	ND	ND	ND	NA
Acetone (mg/L)	ND	ND	ND	NA

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SWLC- 03-FD	MW- AD-1-FD	MW- AD-4-FD	BD 100814
Benzene (mg/L)	ND	ND	27.5	NA
Bromodichloromethane (mg/L)	ND	ND	ND	NA
Bromoform (mg/L)	ND	ND	ND	NA
Bromomethane (mg/L)	ND	ND	ND	NA
Carbon disulfide (mg/L)	ND	ND	ND	NA
Carbon tetrachloride (mg/L)	ND	ND	ND	NA
Chlorobenzene (mg/L)	ND	ND	ND	NA
Chloroethane (mg/L)	ND	ND	ND	NA
Chloroform (mg/L)	ND	ND	ND	NA
Chloromethane (mg/L)	ND	ND	ND	NA
Dibromochloromethane (mg/L)	ND	ND	ND	NA
Dichlorodifluoromethane (mg/L)	ND	ND	ND	NA
Ethanol (mg/L)	ND	NA	NA	NA
Ethylbenzene (mg/L)	ND	ND	8.6	NA
Isopropylbenzene (Cumene) (mg/L)	ND	7.3	72.2	NA
Methyl acetate (mg/L)	ND	ND	ND	NA
Methyl-tert-butyl ether (mg/L)	ND	ND	10.2	NA
Methylene Chloride (mg/L)	ND	ND	ND	NA
Styrene (mg/L)	ND	ND	ND	NA
Tetrachloroethene (mg/L)	ND	ND	ND	NA
Toluene (mg/L)	ND	ND	ND	NA
Trichloroethene (mg/L)	ND	ND	ND	NA
Trichlorofluoromethane (mg/L)	ND	ND	ND	NA
Vinyl chloride (mg/L)	ND	ND	ND	NA
cis-1, 2-Dichloroethene (mg/L)	ND	ND	ND	NA
cis-1, 3-Dichloropropene (mg/L)	ND	ND	ND	NA
m&p-Xylene (mg/L)	ND	ND	ND	NA

Table 9 Quality Assurance/Quality Control Samples (Cont.)^(g)



o-Xylen	e (mg/L)	ND	ND	ND	NA
able 9	Quality Assurance/Qual	ity Control Sa	mples (Cont.) ^{(c}	1)	
Sample	e ID	SWLC- 03-FD	MW- AD-1-FD	MW- AD-4-FD	BD 100814
tert-But	yl Alcohol (mg/L)	ND	NA	NA	NA
trans-1, (mg/L)	2-Dichloroethene	ND	ND	ND	NA
trans-1, (mg/L)	3-Dichloropropene	ND	ND	ND	NA
Method	1 8270				
1-Meth	ylnaphthalene (mg/L)	ND	NA	NA	NA
2-Meth	ylnaphthalene (mg/L)	ND	ND	13.0	NA
Acenap	hthene (mg/L)	ND	ND	0.43	NA
Acenap	hthylene (mg/L)	ND	ND	ND	NA
Anthrac	ene (mg/L)	ND	ND	ND	NA
Benzo(a	a)anthracene (mg/L)	ND	ND	ND	NA
Benzo(a	a)pyrene (mg/L)	ND	ND	ND	NA
Benzo(b)fluoranthene (mg/L)	ND	ND	ND	NA
Benzo(g, h, i)perylene (mg/L)	ND	ND	ND	NA
Benzo(k)fluoranthene (mg/L)	ND	ND	ND	NA
Chryse	ne (mg/L)	ND	ND	ND	NA
Dibenz((a, h)anthracene (mg/L)	ND	ND	ND	NA
Fluoran	thene (mg/L)	ND	ND	ND	NA
Fluoren	e (mg/L)	ND	ND	0.74	NA
Indeno((mg/L)	(1, 2, 3-cd)pyrene	ND	ND	ND	NA
Naphth	alene (mg/L)	ND	ND	20.6	NA
Phenar	threne (mg/L)	ND	ND	0.20	NA
Pyrene	(mg/L)	ND	ND	ND	NA



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SB-AD-1-2-3	SB-AD-2-2-3	SB-AD-3-3-4	SB-AD-3-4-5	SB-AD-4-2-4	SB-AD-5-3-4
Method 8015						
ORO ² (mg/kg)	ND	ND	ND	ND	ND	ND
DRO ² (mg/kg)	ND	19	10.3	ND	ND	591
Method 8021						
GRO ² (mg/kg)	ND	ND	ND	ND	ND	ND
Method 6010						
Arsenic ¹ (mg/kg) <i>BL - 45 mg/kg</i> ⁴	ND	3.6	24.9	25.5	15.1	6.2
Chromium ³ (mg/kg) BL - 86 mg/kg ⁴	7.9	20.3	66.6	68	42	34.5
Lead ¹ (mg/kg) <i>BL - 92 mg/kg</i> ⁴	2.7	3.6	2	3.1	6.7	1.8
Vanadium¹ (mg/kg) <i>BL - 250 mg/kg</i> ⁴	58.8	125	115	112	91	46.2
Method 7470						
Mercury¹ (mg/kg) <i>BL – 0.34 mg/kg</i> ⁴	0.11	0.047	0.11	0.04	14	0.19

Table 10 Sample Results from Soil Borings in Avenue D^(h)

(h) 1 - highlighted bold black based on USEPA Industrial Regional Screening Level (RSL) Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 2 - USEPA standard is not available; 3 - USEPA MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015; 4 - Background levels (Anderson Mulholland 2011)

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SB-AD-1-2-3	SB-AD-2-2-3	SB-AD-3-3-4	SB-AD-3-4-5	SB-AD-4-2-4	SB-AD-5-3-4
Method 8260						
Acetone ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Benzene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Bromodichloromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Bromoform ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Bromomethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
2-Butanone ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Carbon disulfide1 (mg/kg)	ND	ND	ND	ND	ND	ND
Carbon tetrachloride ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Chlorobenzene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Chloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Chloroform ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Chloromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Dibromochloromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Dibromofluoromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
1, 1-Dichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SB-AD-1-2-3	SB-AD-2-2-3	SB-AD-3-3-4	SB-AD-3-4-5	SB-AD-4-2-4	SB-AD-5-3-4
1, 1-Dichloroethene1 (mg/kg)	ND	ND	ND	ND	ND	ND
1, 2-Dichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
1, 2-Dichloropropane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
1, 2-Dibromo-3- chloropropane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
1, 2-Dibromoethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Ethylbenzene1 (mg/kg)	ND	ND	ND	ND	ND	ND
2-Hexanone ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
lsopropyl benzene (cumene) ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Methyl acetate ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl-ether ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Methylene chloride ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Styrene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SB-AD-1-2-3	SB-AD-2-2-3	SB-AD-3-3-4	SB-AD-3-4-5	SB-AD-4-2-4	SB-AD-5-3-4
Tetrachloroethene1 (mg/kg)	ND	ND	ND	ND	ND	ND
1, 1, 2, 2- tetrachloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Toluene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Trichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
1, 1, 1-trichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
1, 1, 2-trichloroethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Vinyl chloride ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
cis 1, 2-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
cis 1, 3-dichloropropene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
m&p-xylene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
o-xylene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
trans-1, 2-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SB-AD-1-2-3	SB-AD-2-2-3	SB-AD-3-3-4	SB-AD-3-4-5	SB-AD-4-2-4	SB-AD-5-3-4
trans-1, 3- dichloropropene ¹ (mg/kg)	ND	ND	ND	ND	ND	ND
Method 8270						
Acenaphthene1 (mg/kg)	10.1	ND	ND	ND	ND	27.7
Acenaphthylene ² (mg/kg)	ND	ND	ND	ND	ND	35.1
Anthracene ¹ (mg/kg)	17.5	ND	ND	ND	ND	9
Benzo(a)antracene ¹ (mg/kg)	43.5	ND	ND	ND	ND	ND
Benzo(a)pyrene1 (mg/kg)	40	ND	ND	ND	ND	ND
Benzo(b)fluoranthene ¹ (mg/kg)	44	ND	ND	ND	ND	ND
Benzo(g, h, i)perylene ² (mg/kg)	20.2	6.1	ND	ND	ND	ND
Benzo(k)fluoranthene ¹ (mg/kg)	22	ND	ND	ND	ND	ND
Chrysene ¹ (mg/kg)	40.1	ND	ND	ND	ND	ND
Dibenz(a, h)anthracene ¹ (mg/kg)	6.1	ND	ND	ND	ND	ND
Fluoranthene1 (mg/kg)	71.9	ND	ND	ND	ND	ND
2-methylnaphtalene ¹ (mg/kg)	ND	ND	ND	ND	ND	3.4

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SB-AD-1-2-3	SB-AD-2-2-3	SB-AD-3-3-4	SB-AD-3-4-5	SB-AD-4-2-4	SB-AD-5-3-4
Methane, chlorodifluoro1 (mg/kg)	ND	255	4560	3940	ND	ND
Fluorene ¹ (mg/kg)	10	ND	ND	ND	ND	17.2
Indeno(1, 2, 3-cd)pyrene ¹ (mg/kg)	17.4	ND	ND	ND	ND	ND
Naphthalene ¹ (mg/kg)	8.9	ND	4.8	ND	ND	ND
Phenanthrene ² (mg/kg)	53.2	ND	7.4	ND	ND	4.4
Pyrene ¹ (mg/kg)	55	ND	ND	ND	ND	7.3



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SWLC-01	SWLC-02	SWLC-03
Method 8015			
ORO ⁴ (ug/L)	ND	ND	ND
DRO ⁴ (ug/L)	ND	ND	ND
Method 8021			
GRO ⁴ (ug/L)	ND	ND	ND
Method 6010			
Chromium total ¹ (ug/L)	ND	ND	ND
Lead total ¹ (ug/L)	ND	5.9	ND
Vanadium total ³ (ug/L)	ND	ND	ND
Chromium dissolved ¹ (ug/L)	ND	ND	ND
Lead dissolved ¹ (ug/L)	ND	ND	ND
Vanadium dissolved ³ (ug/L)	ND	ND	ND
Arsenic total ¹ (ug/L)	ND	ND	ND
Arsenic dissolved ¹ (ug/L)	ND	ND	ND
Method 7470			
Mercury total ¹ (ug/L)	ND	ND	ND
Method 245.2			
Mercury dissolved ¹ (ug/L)	ND	ND	ND
Method 8260			
Benzene ¹ (ug/L)	ND	ND	ND
Ethybenzene1 (ug/L)	ND	ND	ND
Methyl-tert-butyl-ether ³ (ug/L)	ND	ND	ND
Toluene ¹ (ug/L)	ND	ND	ND
m&p Xylene ³ (ug/L)	ND	ND	ND

Table 11 Surface Water and Results from Las Lajas Creek⁽ⁱ⁾

⁽i) 1 - highlighted bold black based on USEPA's MCL (Regional Screening Level (RSL) Summary Table (TR = 1E-6, THQ = 0.1)) January 2015;
2 - highlighted bold black based on USEPA's Industrial RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015;
3 - highlighted bold black based on USEPA's Industrial RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015;
4 - USEPA standard not available;
5 - USEPA's MCL based RSL Summary Table (TR = 1E-6, THQ = 0.1) January 2015;
6 - Background Levels (Anderson Mulholland 2011)



Table 11 Su	urface Water Results from Las Lajas Creek (Cont.) ⁽ⁱ⁾
-------------	--

Sample ID	SWLC-01	SWLC-02	SWLC-03
o Xylene ³ (ug/L)	ND	ND	ND
1, 1, 1-trichloroethane ¹ (ug/L)	ND	ND	ND
1, 1, 2, 2-tetrachloroethane ³ (ug/L)	ND	ND	ND
1, 1, 2-Trichloroethane ¹ (ug/L)	ND	ND	ND
1, 1-dichloroethane3 (ug/L)	ND	ND	ND
1, 1-dichloroethene ¹ (ug/L)	ND	ND	ND
1, 2-dibromo-3- chloropropane ¹ (ug/L)	ND	ND	ND
1, 2-dibromoethane (EDB) ³ (ug/L)	ND	ND	ND
1, 2-dichloroethane1 (ug/L)	ND	ND	ND
1, 2-dichloropropane ¹ (ug/L)	ND	ND	ND
2-butanone (MEK) ³ (ug/L)	ND	ND	ND
2-hexanone ³ (ug/L)	ND	ND	ND
4-methyl-2-pentanone (MIBK) ³ (ug/L)	ND	ND	ND
Acetone ³ (ug/L)	ND	ND	ND
Bromodichloromethane ¹ (ug/L)	ND	ND	ND
Bromoform ¹ (ug/L)	ND	ND	ND
Bromomethane ³ (ug/L)	ND	ND	ND
Carbon disulfide ³ (ug/L)	ND	ND	ND
Carbon tetrachloride ¹ (ug/L)	ND	ND	ND
Chlorobenzene1 (ug/L)	ND	ND	ND
Chloroethane ³ (ug/L)	ND	ND	ND
Chloroform ¹ (ug/L)	ND	ND	ND

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SWLC-01	SWLC-02	SWLC-03
Chloromethane ³ (ug/L)	ND	ND	ND
Dibromochloromethane ¹ (ug/L)	ND	ND	ND
Dichlorodifluoromethane ³ (ug/L)	ND	ND	ND
Ethanol ⁴ (ug/L)	ND	ND	ND
Isopropylbenzene (cumene) ³ (ug/L)	ND	ND	ND
Methyl acetate ³ (ug/L)	ND	ND	ND
Methylene chloride ¹ (ug/L)	ND	ND	ND
Styrene ¹ (ug/L)	ND	ND	ND
Tetrachloroethene ¹ (ug/L)	ND	ND	ND
Trichloroethene ¹ (ug/L)	ND	ND	ND
Trichlorofluoromethane ³ (ug/L)	ND	ND	ND
Vinyl chloride ¹ (ug/L)	ND	ND	ND
cis-1, 2-dichloroethene1 (ug/L)	ND	ND	ND
cis-1, 3-cichloropropene ³ (ug/L)	ND	ND	ND
tert-butyl alcohol ⁴ (ug/L)	ND	ND	ND
trans-1, 2-dichloroethene ¹ (ug/L)	ND	ND	ND
trans-1, 3-dichloro-propene ³ (ug/L)	ND	ND	ND
Method 8270			
1-methylnaphthalene ³ (ug/L)	ND	ND	ND
2-methylnaphthalene3 (ug/L)	ND	ND	ND
Acenaphthene ³ (ug/L)	ND	ND	ND

Table 11 Surface Water Results from Las Lajas Creek (Cont.)⁽ⁱ⁾



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SWLC-01	SWLC-02	SWLC-03
Acenaph-thylene4 (ug/L)	ND	ND	ND
Anthracene ¹ (ug/L)	ND	ND	ND
Benzo(a)anthracene3 (ug/L)	ND	ND	ND
Benzo(a)pyrene1 (ug/L)	ND	ND	ND
Benzo(b)fluoranthene ³ (ug/L)	ND	ND	ND
Benzo(g, h, i)perylene4 (ug/L)	ND	ND	ND
Benzo(k)fluoranthene ³ (ug/L)	ND	ND	ND
Chrysene ³ (ug/L)	ND	ND	ND
Dibenz(a, h) anthracene ³ (ug/L)	ND	ND	ND
Fluoranthene ³ (ug/L)	ND	ND	ND
Fluorene ³ (ug/L)	ND	ND	ND
Indeno(1, 2, 3 cd)pyrene ³ (ug/L)	ND	ND	ND
Naphtalene ³ (ug/L)	ND	ND	ND
Phenanthrene ⁴ (ug/L)	ND	ND	ND
Pyrene ³ (ug/L)	ND	ND	ND

Table 11 Surface Water Results from Las Lajas Creek (Cont.)⁽ⁱ⁾

Sample ID	SELC-01	SELC-02	SELC-03
Method 8015			
ORO ⁴ (mg/kg)	153	64.8	52.3
DRO ⁴ (mg/kg)	66	ND	ND
Method 8021			
GRO ⁴ (mg/kg)	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SELC-01	SELC-02	SELC-03
Method 6010			
Chromium⁵ (mg/kg) <i>BL - 86 mg/kg</i> ⁶	22.9	14.8	21.3
Lead² (mg/kg) <i>BL - 92 mg/kg</i> ⁶	17.2	11.7	8
Vanadium² (mg/kg) <i>BL - 250 mg/kg</i> ⁶	68.1	65.6	60.6
Arsenic² (mg/kg) <i>BL - 45 mg/kg</i> ⁶	5.1	3.3	3.8
Method 7471			
Mercury² (mg/kg) BL – 0.34 mg/kg ⁶	0.082	0.064	0.043
Method 8260			
Acetone ² (mg/kg)	29.6	29.8	19.5
Benzene ² (mg/kg)	ND	ND	ND
Bromodichloromethane ² (mg/kg)	ND	ND	ND
2-butanone ² (mg/kg)	11.3	ND	ND
Bromochloromethane ² (mg/kg)	ND	ND	ND
Bromoform ² (mg/kg)	ND	ND	ND
Bromomethane ² (mg/kg)	ND	ND	ND
Carbon disulfide ² (mg/kg)	ND	ND	ND
Carbon tetrachloride ² (mg/kg)	ND	ND	ND
Chlorobenzene ² (mg/kg)	ND	ND	ND
Chloroethane ² (mg/kg)	ND	ND	ND
Chloroform ² (mg/kg)	ND	ND	ND
1, 1, 1-trichloroethane ² (mg/kg)	ND	ND	ND
Chloromethane ² (mg/kg)	ND	ND	ND
Dibromochloromethane ² (mg/kg)	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SELC-01	SELC-02	SELC-03
Dichlorodifluoromethane ² (mg/kg)	ND	ND	ND
1, 1 Dichloroethene ² (mg/kg)	ND	ND	ND
1, 1 Dichloroethane ² (mg/kg)	ND	ND	ND
1, 2 Dibromo-3- chloropropane ² (mg/kg)	ND	ND	ND
1, 2 Dibromoethane ² (mg/kg)	ND	ND	ND
1, 2 Dichloroethane ² (mg/kg)	ND	ND	ND
1, 2 Dichloroethene total ² (mg/kg)	ND	ND	ND
1, 2 Dichloropropane total ² (mg/kg)	ND	ND	ND
Ethanol ⁴ (mg/kg)	ND	ND	ND
Ethybenzene ² (mg/kg)	ND	ND	4.5
2-hexanone ² (mg/kg)	ND	ND	ND
4-methyl-2-pentanone (MIBK) ² (mg/kg)	ND	ND	ND
4-methyl-2-pentanone (MIBK) ² (mg/kg)	ND	ND	ND
Isopropylbenzene (cumene) ² (mg/kg)	ND	ND	ND
Methyl acetate ² (mg/kg)	ND	ND	ND
Methyl-tert-butyl-ether ² (mg/kg)	ND	ND	ND
Methylene chloride ² (mg/kg)	ND	ND	ND
Styrene ² (mg/kg)	ND	ND	ND
Tetrachloroethene ² (mg/kg)	ND	ND	ND
1, 1, 2, 2-tetrachloroethane ² (mg/kg)	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SELC-01	SELC-02	SELC-03
Trichloroethene ² (mg/kg)	ND	ND	ND
1, 1, 1-trichloroethene ² (mg/kg)	ND	ND	ND
1, 1, 2-trichloroethane ² (mg/kg)	ND	ND	ND
Trichlorofluoromethane ² (mg/kg)	ND	ND	ND
Toluene ² (mg/kg)	ND	ND	ND
Vinyl chloride ² (mg/kg)	ND	ND	ND
cis-1, 2-dichloroethene ² (mg/kg)	ND	ND	ND
cis-1, 3-dichloropropene ² (mg/kg)	ND	ND	ND
m&p-xylene ² (mg/kg)	ND	ND	ND
o-xylene ² (mg/kg)	ND	ND	ND
Tert-butyl alcohol4 (mg/kg)	ND	ND	ND
Trans-1, 2-dichloroethene ² (mg/kg)	ND	ND	ND
Trans-1, 3-dichloropropene ² (mg/kg)	ND	ND	ND
Method 8270			
1-methylnaphthalene ² (mg/kg)	ND	ND	ND
2-methylnaphthalene ² (mg/kg)	ND	ND	ND
Acenaphthene ² (mg/kg)	ND	ND	ND
Acenaph-thylene4 (mg/kg)	ND	ND	ND
Anthracene ² (mg/kg)	ND	ND	ND
Benzo(a)anthracene ² (mg/kg)	ND	ND	ND
Benzo(a)pyrene ² (mg/kg)	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SELC-01	SELC-02	SELC-03
Benzo(b)fluoranthene ² (mg/kg)	ND	ND	ND
Benzo(g, h, i)perylene ⁴ (mg/kg)	ND	ND	ND
Benzo(k)fluoranthene ² (mg/kg)	ND	ND	ND
Chrysene ² (mg/kg)	ND	ND	ND
Dibenz(a, h) anthracene ² (mg/kg)	ND	ND	ND
Fluoranthene ² (mg/kg)	ND	ND	ND
Fluorene ² (mg/kg)	ND	ND	ND
Indeno(1, 2, 3 cd)pyrene ² (mg/kg)	ND	ND	ND
Naphtalene ² (mg/kg)	ND	ND	ND
Phenanthrene4 (mg/kg)	ND	ND	ND
Pyrene ² (mg/kg)	ND	ND	ND

Table 11 Soil Sample Results from Las Lajas Creek (Cont.)⁽ⁱ⁾

Table 11 Surface Water from Wetland Area (Cont.)⁽ⁱ⁾

Sample ID	SWW-01	SWW-02	SWW-03	SWW-04
Method 8015				
ORO ⁴ (ug/L)	ND	ND	ND	ND
DRO ⁴ (ug/L)	ND	ND	ND	ND
Method 8021				
GRO ⁴ (ug/L)	ND	ND	ND	ND
Method 6010				
Chromium total ¹ (ug/L)	ND	ND	ND	ND
Lead total ¹ (ug/L)	ND	ND	5.6	5.2
Vanadium total ³ (ug/L)	ND	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 11 Surface Water Results from Wetland Area (Cont.)⁽ⁱ⁾

Sample ID	SWW-01	SWW-02	SWW-03	SWW-04
Chromium dissolved ¹ (ug/L)	ND	ND	ND	ND
Lead dissolved ¹ (ug/L)	ND	ND	ND	ND
Vanadium dissolved ³ (ug/L)	ND	ND	ND	ND
Arsenic total ¹ (ug/L)	ND	ND	ND	ND
Arsenic dissolved ¹ (ug/L)	ND	ND	ND	ND
Method 7470				
Mercury total ¹ (ug/L)	ND	ND	ND	ND
Method 245.2				
Mercury dissolved ¹ (ug/L)	ND	ND	ND	ND
Method 8260				
Acetone ³ (ug/L)	ND	ND	ND	ND
Benzene ¹ (ug/L)	ND	ND	ND	ND
Bromodichloromethane ¹ (ug/L)	ND	ND	ND	ND
Bromoform ¹ (ug/L)	ND	ND	ND	ND
Bromomethane ³ (ug/L)	ND	ND	ND	ND
2-butanone (MEK) ³ (ug/L)	ND	ND	ND	ND
Carbon disulfide ³ (ug/L)	ND	ND	ND	ND
Carbon tetrachloride ¹ (ug/L)	ND	ND	ND	ND
Chlorobenzene1 (ug/L)	ND	ND	ND	ND
Chloroethane ³ (ug/L)	ND	ND	ND	ND
Chloroform ¹ (ug/L)	ND	ND	ND	ND
Chloromethane ³ (ug/L)	ND	ND	ND	ND
Dibromochloromethane ¹ (ug/L)	ND	ND	ND	ND
Dichlorodifluoromethane ³ (ug/L)	ND	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 11 Surface Water Results from Wetland (Cont.)⁽ⁱ⁾

Sample ID	SWW-01	SWW-02	SWW-03	SWW-04
1, 1 Dichloroethane ³ (ug/L)	ND	ND	ND	ND
1, 1 Dichloroethene ¹ (ug/L)	ND	ND	ND	ND
1, 2 Dibromo-3- chloropropane ¹ (ug/L)	ND	ND	ND	ND
1, 2 Dibromoethane ³ (ug/L)	ND	ND	ND	ND
1, 2 Dichloroethane ¹ (ug/L)	ND	ND	ND	ND
1, 2 Dichloroethene total ¹ (ug/L)	ND	ND	ND	ND
1, 2 Dichloropropane ¹ (ug/L)	ND	ND	ND	ND
Ethanol ⁴ (ug/L)	ND	ND	ND	ND
Ethylbenzene1 (ug/L)	ND	ND	ND	ND
2-hexanone ³ (ug/L)	ND	ND	ND	ND
Isopropylbenzene (cumene) ³ (ug/L)	ND	ND	ND	ND
Methyl acetate ³ (ug/L)	ND	ND	ND	ND
Methyl-tert-butyl-ether ³ (ug/L)	ND	ND	ND	ND
Methylene chloride ¹ (ug/L)	ND	ND	ND	ND
4-methyl-2-pentanone ³ (ug/L)	ND	ND	ND	ND
Styrene ¹ (ug/L)	ND	ND	ND	ND
Tetrachloroethene1 (ug/L)	ND	ND	ND	ND
1, 1, 2, 2-tetrachloroethane ³ (ug/L)	ND	ND	ND	ND
Trichloroethene1 (ug/L)	ND	ND	ND	ND
1, 1, 1-trichloroethane1 (ug/L)	ND	ND	ND	ND
1, 1, 2-trichloroethane ¹ (ug/L)	ND	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Sample ID	SWW-01	SWW-02	SWW-03	SWW-04
Trichlorofluoromethane ³ (ug/L)	ND	ND	ND	ND
Toluene ¹ (ug/L)	ND	ND	ND	ND
Vinyl chloride ¹ (ug/L)	ND	ND	ND	ND
cis-1, 2-dichloroethene1 (ug/L)	ND	ND	ND	ND
cis-1, 3-dichloropropene ³ (ug/L)	ND	ND	ND	ND
m&p-xylene ³ (ug/L)	ND	ND	ND	ND
o-xylene ³ (ug/L)	ND	ND	ND	ND
Tert-butyl alcohol ⁴ (ug/L)	ND	ND	ND	ND
Trans-1, 2-dichloroethene ¹ (ug/L)	ND	ND	ND	ND
Trans-1, 3-dichloropropene ³ (ug/L)	ND	ND	ND	ND
Method 8270				
1-methylnaphthalene ³ (ug/L)	ND	ND	ND	ND
2-methylnaphthalene ³ (ug/L)	ND	ND	ND	ND
Acenaphthene ³ (ug/L)	ND	ND	ND	ND
Acenaph-thylene ⁴ (ug/L)	ND	ND	ND	ND
Anthracene ¹ (ug/L)	ND	ND	ND	ND
Benzo(a)anthracene3 (ug/L)	ND	ND	ND	ND
Benzo(a)pyrene1 (ug/L)	ND	ND	ND	ND
Benzo(b)fluoranthene3 (ug/L)	ND	ND	ND	ND
Benzo(g, h, i)perylene4 (ug/L)	ND	ND	ND	ND
Benzo(k)fluoranthene ³ (ug/L)	ND	ND	ND	ND

Table 11 Surface Water Results from Wetland Area (Cont.)⁽ⁱ⁾



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 11 Surface Water Results from Wetland (Cont.)⁽ⁱ⁾

Sample ID	SWW-01	SWW-02	SWW-03	SWW-04
Chrysene ³ (ug/L)	ND	ND	ND	ND
Dibenz(a, h)anthracene ³ (ug/L)	ND	ND	ND	ND
Fluoranthene ³ (ug/L)	ND	ND	ND	ND
Fluorene ³ (ug/L)	ND	ND	ND	ND
Indeno(1, 2, 3 cd)pyrene ³ (ug/L)	ND	ND	ND	ND
Naphtalene ³ (ug/L)	ND	ND	ND	ND
Phenanthrene4 (ug/L)	ND	ND	ND	ND
Pyrene ³ (ug/L)	ND	ND	ND	ND
Method 8015				
ORO ⁴ (mg/kg)	ND	ND	ND	73
DRO⁴ (mg/kg)	14	16	9.8	71.1
Method 8021				
GRO⁴ (mg/kg)	ND	ND	ND	ND
Method 6010				
Chromium⁵ (mg/kg) <i>BL</i> - 86 <i>mg/kg</i> ⁶	12.3	21.8	6.4	2.9
Lead² (mg/kg) <i>BL - 92 mg/kg</i> ⁶	13.6	14.7	10.5	2.6
Vanadium² (mg/kg) <i>BL - 250 mg/kg</i> ⁶	40.8	56.5	33.7	10.2
Arsenic² (mg/kg) BL - 45 mg/kg ⁶	3.3	2.5	2.8	0.98
Method 7471				
Mercury² (mg/kg) BL – 0.34 mg/kg ⁶	0.22	0.1	0.043	ND
Method 8260				
Acetone ² (mg/kg)	ND	ND	ND	ND
Benzene ² (mg/kg)	ND	ND	ND	ND

RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 11 Soil Sample Results from Wetland Area (Cont.)⁽ⁱ⁾

Sample ID	SeW-01	SeW-02	SeW-03	SeW-04
2-butanone ² (mg/kg)	ND	ND	ND	ND
Bromodichloromethane ¹ (mg/kg)	ND	ND	ND	ND
Bromoform ¹ (mg/kg)	ND	ND	ND	ND
Bromomethane ³ (mg/kg)	ND	ND	ND	ND
Carbon disulfide ³ (mg/kg)	ND	ND	ND	ND
Carbon tetrachloride ¹ (mg/kg)	ND	ND	ND	ND
Chlorobenzene1 (mg/kg)	ND	ND	ND	ND
Chloroethane ³ (mg/kg)	ND	ND	ND	ND
Chloroform ¹ (mg/kg)	ND	ND	ND	ND
Chloromethane ³ (mg/kg)	ND	ND	ND	ND
Dibromochloromethane ¹ (mg/kg)	ND	ND	ND	ND
1, 1 Dichloroethane ³ (mg/kg)	ND	ND	ND	ND
1, 1 Dichloroethene ¹ (mg/kg)	ND	ND	ND	ND
1, 2 Dibromo-3- chloropropane ¹ (mg/kg)	ND	ND	ND	ND
1, 2 Dibromoethane ³ (mg/kg)	ND	ND	ND	ND
1, 2 Dichloroethane ¹ (mg/kg)	ND	ND	ND	ND
1, 2 Dichloroethene total ¹ (mg/kg)	ND	ND	ND	ND
1, 2 Dichloropropane ¹ (mg/kg)	ND	ND	ND	ND
Ethanol ⁴ (mg/kg)	ND	ND	ND	ND
Ethylbenzene1 (mg/kg)	ND	ND	ND	ND
2-hexanone ³ (mg/kg)	ND	ND	ND	ND



Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 11 Soil Sample Results from Wetland Area (Cont.)⁽ⁱ⁾

Sample ID	SeW-01	SeW-02	SeW-03	SeW-04
Isopropylbenzene (cumene) ³ (mg/kg)	ND	ND	ND	ND
Methyl acetate ³ (mg/kg)	ND	ND	ND	ND
Methyl-tert-butyl-ether ³ (mg/kg)	ND	ND	ND	ND
Methylene chloride ¹ (mg/kg)	ND	ND	ND	ND
4-methyl-2-pentanone ³ (mg/kg)	ND	ND	ND	ND
Styrene ¹ (mg/kg)	ND	ND	ND	ND
Tetrachloroethene1 (mg/kg)	ND	ND	ND	ND
1, 1, 2, 2-tetrachloroethane ³ (mg/kg)	ND	ND	ND	ND
1, 1, 1-trichloroethane ¹ (mg/kg)	ND	ND	ND	ND
1, 1, 2-trichloroethane ¹ (mg/kg)	ND	ND	ND	ND
Trichlorofluoromethane ³ (mg/kg)	ND	ND	ND	ND
Toluene ¹ (mg/kg)	ND	ND	ND	ND
Vinyl chloride ¹ (mg/kg)	ND	ND	ND	ND
cis-1, 2-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND
cis-1, 3-dichloropropene ³ (mg/kg)	ND	ND	ND	ND
m&p-xylene ³ (mg/kg)	ND	ND	ND	ND
o-xylene ³ (mg/kg)	ND	ND	ND	ND
Tert-butyl alcohol ⁴ (mg/kg)	ND	ND	ND	ND
Trans-1, 2-dichloroethene ¹ (mg/kg)	ND	ND	ND	ND
Trans-1, 3-dichloropropene ³ (mg/kg)	ND	ND	ND	ND



RFI Report

Former Caribbean Petroleum Refining Facility Bayamón, Puerto Rico

Table 11 Soil Sample Results from Wetland Area (Cont.)⁽ⁱ⁾

Sample ID	SeW-01	SeW-02	SeW-03	SeW-04
Bromochloromethane ² (mg/kg)	ND	ND	ND	ND
Dichlorodifluoromethane ² (mg/kg)	ND	ND	ND	ND
Trichloroethene ² (mg/kg)	ND	ND	ND	ND
Method 8270				
1-Methylnaphthalene ² (mg/kg)	ND	ND	ND	ND
2-Methylnaphthalene ² (mg/kg)	ND	ND	ND	ND
Acenaphthene ² (mg/kg)	ND	ND	ND	ND
Acenaph-thylene ⁴ (mg/kg)	ND	ND	ND	ND
Anthracene ² (mg/kg)	ND	ND	ND	ND
Benzo(a)anthracene ² (mg/kg)	ND	ND	ND	ND
Benzo(a)pyrene ² (mg/kg)	ND	ND	ND	ND
Benzo(b)fluoranthene² (mg/kg)	ND	ND	ND	ND
Benzo(g, h, i)perylene ⁴ (mg/kg)	ND	ND	ND	ND
Benzo(k)fluoranthene ² (mg/kg)	ND	ND	ND	ND
Chrysene ² (mg/kg)	ND	ND	ND	ND
Dibenz(a, h)anthracene² (mg/kg)	ND	ND	ND	ND
Fluoranthene ² (mg/kg)	ND	ND	ND	ND
Fluorene ² (mg/kg)	ND	ND	ND	ND
Indeno(1, 2, 3 cd)pyrene ² (mg/kg)	ND	ND	ND	ND
Naphtalene ² (mg/kg)	ND	ND	ND	ND
Phenanthrene ⁴ (mg/kg)	ND	ND	ND	ND
Pyrene ² (mg/kg)	ND	ND	ND	ND



Groundwater Sample Results^(j) Table 12

Sample ID	MW-110AB	MW-111A	MW-114A	MW-13A	MW-13B2	MW-15A	MW-15B	MW-15B2	MW-18D	MW-30A	MW-33A	MW-37A	MW-38A	MW-48B
Method 8015														
ORO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DRO ³ (ug/L)	0.86	0.8	ND	0.28	ND	0.48	ND	ND	ND	0.61	ND	0.27	ND	ND
Method 8021														
GRO ³ (ug/L)	ND	ND	ND	1180	103	66.6	ND	ND	ND	257	262	2250	ND	ND
Method 6010														
Arsenic total ¹ (ug/L)	ND	13.6	ND	ND	ND	ND	ND	16	ND	14.8	12.7	25.3	ND	ND
Arsenic dissolved ¹ (ug/L)	ND	11.8	ND	ND	ND	12.6	ND	17.9	ND	ND	11.3	ND	ND	ND
Chromium total ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead total ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17.8
Lead dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium total ² (ug/L)	92.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium dissolved ² (ug/L)	82	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method 7470														
Mercury total ¹ (ug/L)	ND	ND	ND	ND	ND	ND	0.23	ND	ND	ND	ND	ND	2.60	ND
Mercury dissolved ¹ (ug/L)	ND	ND	0.54	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.00	ND
Method 8260														
Acetone ¹ (ug/L)	ND	12.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report

⁽j) 1 - highlighted bold black based on USEPA's Maximum Contaminant Level (Regional Screening Level Summary Table (TR = 1E-6, HQ = 0.1)) January 2015; 2 - highlighted bold black based on the USEPA Tapwater; 3 - USEPA standard is not available; Non Detection Wells (wells with non-detection values for any of the methods analyzed): MW-109A, MW-90A, MW-110B2, MW-16C, MW-17B, MW-20B, MW-21B, MW-76B2, MW-77B, MW-B1, MW-DP5, MW-EB-107, MW-EB-108, MW-MP5A, MW-MP9, PMW-120, and PMW-121



Sample ID	MW-110AB	MW-111A	MW-114A	MW-13A	MW-13B2	MW-15A	MW-15B	MW-15B2	MW-18D	MW-30A	MW-33A	N
Carbon tetrachloride ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chlorobenzene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloromethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromo-3- chloropropane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2 Butanone ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromoethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dichloropropane¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-dichloroethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2-dichloroethane¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 2-dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	7.1	ND	ND	
cis-1, 3-dichloropropene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dibromochloromethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dichlorodifluoromethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethybenzene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2 Hexanone ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Isopropyl benzene (cumene) ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl acetate ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4 Methyl-2-pentanone ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl-tert-butyl-ether ² (ug/L)	ND	ND	ND	30.7	8	25.2	ND	ND	ND	ND	5.5	

RFI Report

MW-37A	MW-38A	MW-48B
ND	ND	ND
21.2	ND	ND
ND	ND	ND
ND	ND	ND
29.8	ND	ND



Sample ID	MW-110AB	MW-111A	MW-114A	MW-13A	MW-13B2	MW-15A	MW-15B	MW-15B2	MW-18D	MW-30A	MW-33A	M
Methylene chloride ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
m&p xylene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
o-xylene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Styrene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2, 2 Tetrachloro- ethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans 1, 2 Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans 1, 3 Dichloropropene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2 Trichloro-ethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 1 Trichloro-ethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichlorofluoromethane ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	65.1	ND	ND	
Vynil chloride1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 8270												
Acenaphthene ² (ug/L)	0.69	ND	ND	0.19	ND	ND	ND	ND	ND	0.16	0.82	
Acenaph-thylene ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	
Anthracene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(a)anthracene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(a)pyrene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(b)fluoranthene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(g, h, i)perylene ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(k)fluoranthene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-37A	MW-38A	MW-48B
ND	ND	ND
0.44	ND	ND
ND	ND	ND



Sample ID	MW-110AB	MW-111A	MW-114A	MW-13A	MW-13B2	MW-15A	MW-15B	MW-15B2	MW-18D	MW-30A	MW-33A	MW-37A	MW-38A	MW-48B
Chrysene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a, h)anthracene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	0.18	0.22	ND	ND
2-Methylnaphthalene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	0.53	ND	ND
Indeno(1, 2, 3, cd)pyrene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene ² (ug/L)	ND	ND	ND	0.67	ND	ND	ND	ND	ND	0.47	0.74	0.94	ND	ND
Phenanthrene ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene ² (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-57A	MW-63A	MW-65A	MW-75B2	MW-76A	MW-78B	MW-83A	MW-83B2	MW-84A	MW-84B2	MW-86A	MW-87A	MW-88A	MW-91A
Method 8015														
ORO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DRO ³ (ug/L)	1	ND	ND	ND	ND	ND	0.57	ND	ND	0.66	0.63	ND	0.39	2.4

RFI Report

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-57A	MW-63A	MW-65A	MW-75B2	MW-76A	MW-78B	MW-83A	MW-83B2	MW-84A	MW-84B2	MW-86A	
Method 8021												
GRO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	52.1	ND	ND	ND	
Method 6010												
Arsenic ¹ total (ug/L)	ND	13.9	ND	ND	ND	ND	ND	ND	ND	14.4	ND	
Arsenic dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	17.3	10.6	ND	
Chromium total ¹ (ug/L)	ND	44.1	56.2	41.7	ND	ND	ND	ND	ND	ND	ND	
Chromium dissolved ¹ (ug/L)	ND	ND	20.2	39.6	ND	ND	ND	ND	ND	ND	ND	
Lead total ¹ (ug/L)	ND	21.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Lead dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vanadium total (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vanadium dissolved (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 7470												
Mercury total ¹ (ug/L)	ND	0.80	ND	1.10	0.58	0.9	ND	0.78	ND	ND	ND	
Mercury dissolved ¹ (ug/L)	ND	ND	ND	0.86	ND	ND	ND	0.64	ND	ND	ND	
Method 8260												
Acetone (ug/L)	ND	15.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromodichloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromoform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromomethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon disulfide (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon tetrachloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chlorobenzene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromo-3- chloropropane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-87A	MW-88A	MW-91A
ND	64.3	22500
ND	ND	16.9
ND	ND	13
25.8	ND	ND
24	ND	ND
ND	ND	ND
ND	ND	ND
ND	ND	ND
ND	ND	ND
ND	ND	2430
ND	ND	ND



Sample ID	MW-57A	MW-63A	MW-65A	MW-75B2	MW-76A	MW-78B	MW-83A	MW-83B2	MW-84A	MW-84B2	MW-86A	N
2 Butanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromoethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dichloropropane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-Dichloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2-Dichloroethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-Dichloroethene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 2-Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 3-Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dibromochloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dichlorodifluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethybenzene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2 Hexanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Isopropyl benzene (cumene) (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl Acetate (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4 Methyl-2-pentanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl-tert-butyl-ether ³ (ug/L)	9.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methylene Chloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
m&p Xylene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
o Xylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Styrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2, 2 Tetrachloro- ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-87A	MW-88A	MW-91A
ND	ND	ND
ND	ND	767
ND	ND	ND



Sample ID	MW-57A	MW-63A	MW-65A	MW-75B2	MW-76A	MW-78B	MW-83A	MW-83B2	MW-84A	MW-84B2	MW-86A	Ν
trans 1, 2 Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans 1, 3 Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 1 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichlorofluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloro-ethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vynil Chloride ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 8270												
Acenaphthene (ug/L)	1.9	ND	ND	ND	ND	ND	ND	ND	ND	0.16	ND	
Acenaph-thylene (ug/L)	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Anthracene (ug/L)	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (a) anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (a) pyrene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (b) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (g, h, i)perylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (k) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chrysene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dibenz(a, h)anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Fluorene (ug/L)	3.8	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	
2-Methylnaphthalene (ug/L)	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Indeno (1, 2, 3, cd)pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-87A	MW-88A	MW-91A
ND	ND	ND
ND	0.86	0.34
ND	0.11	0.12
ND	ND	ND
ND	0.26	0.96
ND	0.43	22.9
ND	ND	ND



Sample ID	MW-57A	MW-63A	MW-65A	MW-75B2	MW-76A	MW-78B	MW-83A	MW-83B2	MW-84A	MW-84B2	MW-86A	MW-87A	MW-88A	MW-91A
Naphthalene (ug/L)	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39	59.5
Phenanthrene (ug/L)	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	ND	0.36
Pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-98A	MW-99A	MW-AD-1	MW-AD-2	MW-AD-3	MW-AD-4	MW-B9	MW-DP-1	MW-EB-101	MW-EB-102	MW-EB-103	MW-EB-104	MW-EB-105	MW-EB-106
Method 8015														
ORO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DRO ³ (ug/L)	0.68	ND	0.56	1.6	ND	2	ND	ND	ND	ND	ND	ND	ND	0.73
Method 8021														
GRO ³ (ug/L)	151	ND	393	52.5	ND	2220	ND	ND	ND	ND	51	59.8	ND	ND
Method 6010														
Arsenic ¹ total (ug/L)	ND	ND	59.5	276	33	273	84.1	ND	ND	ND	ND	ND	ND	ND
Arsenic dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium total ¹ (ug/L)	ND	ND	121	630	47.4	521	252	17.5	ND	ND	ND	ND	ND	ND
Chromium dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead total ¹ (ug/L)	ND	ND	14.1	41.3	ND	29	16.9	ND	ND	ND	ND	ND	ND	ND
Lead dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium total (ug/L)	ND	ND	265	1, 150	80.8	892	56.6	57.4	ND	ND	ND	ND	ND	ND
Vanadium dissolved (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method 7470														
Mercury total ¹ (ug/L)	ND	1.30	0.52	0.61	ND	0.26	ND	ND	ND	0.50	ND	ND	ND	ND
Mercury dissolved ¹ (ug/L)	ND	0.74	ND	ND	ND	ND	ND	ND	ND	0.36	ND	ND	ND	ND
Method 8260														
Acetone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene¹ (ug/L)	ND	ND	ND	ND	ND	23.8	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report



Sample ID	MW-98A	MW-99A	MW-AD-1	MW-AD-2	MW-AD-3	MW-AD-4	MW-B9	MW-DP-1	MW-EB-101	MW-EB-102	MW-EB-103	MW-EB-104	MW-EB-105	MW-EB-106
Bromomethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 2 Dibromo-3- chloropropane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2 Butanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 2 Dibromoethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 2 Dichloropropane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 1-Dichloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 2-Dichloroethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 1-Dichloroethene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1, 2-Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1, 3-Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethybenzene1 (ug/L)	ND	ND	ND	ND	ND	8.2	ND	ND	ND	ND	ND	ND	ND	ND
2 Hexanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl benzene (cumene) (ug/L)	ND	ND	6.6	ND	ND	65.5	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	62.7	ND	ND	ND
4 Methyl-2-pentanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report



Sample ID	MW-98A	MW-99A	MW-AD-1	MW-AD-2	MW-AD-3	MW-AD-4	MW-B9	MW-DP-1	MW-EB-101	MW-EB-102	MW-EB-103	MW-EB-104	MW-EB-105	MW-EB-106
Methyl-tert-butyl-ether ³ (ug/L)	ND	ND	ND	9.7	ND	9.5	ND	ND	ND	ND	54.4	62.4	11.9	ND
Methylene Chloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p Xylene¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o Xylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 1, 2, 2 Tetrachloro- ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans 1, 2 Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans 1, 3 Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1, 1, 2 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	22.7	ND	ND	ND	ND	ND	ND	ND	ND
1, 1, 1 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloro-ethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vynil chloride1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method 8270														
Acenaphthene (ug/L)	5.5	ND	ND	ND	ND	0.39	ND	ND	0.4	ND	ND	ND	ND	ND
Acenaph-thylene (ug/L)	0.43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene (ug/L)	0.16	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a) anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a) pyrene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g, h, i)perylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report



Sample ID	MW-98A	MW-99A	MW-AD-1	MW-AD-2	MW-AD-3	MW-AD-4	MW-B9	MW-DP-1	MW-EB-101	MW-EB-102	MW-EB-103	MW-EB-104	MW-EB-105	MW-EB-106
Benzo (k) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a, h)anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene (ug/L)	ND	ND	0.1	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene (ug/L)	ND	ND	0.12	0.12	ND	0.66	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene (ug/L)	ND	ND	ND	ND	ND	11.2	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1, 2, 3, cd)pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene (ug/L)	0.41	ND	0.16	0.12	0.11	22.9	ND	ND	0.13	ND	ND	ND	ND	ND
Phenanthrene (ug/L)	ND	ND	ND	0.52	ND	0.22	ND	ND	0.18	ND	ND	ND	ND	ND
Pyrene (ug/L)	0.16	ND	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-MP2	MW-MP3	MW-MP4	MW-MP8	PMW-116	PMW-117	PMW-118	PMW-119	PMW-122	PMW-123	PMW-124	MW-109A	MW-90A	MW-110B2
Method 8015														
ORO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DRO ³ (ug/L)	ND	0.27	ND	ND	ND	ND	ND	ND	ND	0.54	ND	ND	ND	ND
Method 8021														
GRO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method 6010														
Arsenic1 total (ug/L)	ND	ND	ND	18.8	ND	ND	ND							
Arsenic dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium total ¹ (ug/L)	28.3	11.2	20.8	81.9	ND	ND	ND	ND	ND	ND	121	ND	ND	ND
Chromium dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead total ¹ (ug/L)	6.9	35.7	6	5.8	ND	ND	ND							
Lead dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium total (ug/L)	86.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-MP2	MW-MP3	MW-MP4	MW-MP8	PMW-116	PMW-117	PMW-118	PMW-119	PMW-122	PMW-123	PMW-124	Ν
Vanadium dissolved (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 7470												
Mercury total ¹ (ug/L)	ND	0.23	ND	ND	ND	0.31	0.96	ND	ND	2.2	7.8	
Mercury dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	0.29	ND	ND	0.68	1	
Method 8260												
Acetone (ug/L)	ND	ND	ND	ND	ND	ND	13.9	ND	ND	ND	ND	
Benzene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromodichloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromoform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromomethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon disulfide (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon tetrachloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chlorobenzene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromo-3- chloropropane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2 Butanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromoethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dichloropropane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-Dichloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2-Dichloroethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-Dichloroethene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 2-Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 3-Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-109A	MW-90A	MW-110B2
ND	ND	ND
ND	ND	ND
ND	ND	ND
ND	ND	ND

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-MP2	MW-MP3	MW-MP4	MW-MP8	PMW-116	PMW-117	PMW-118	PMW-119	PMW-122	PMW-123	PMW-124	N
Dibromochloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dichlorodifluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethybenzene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2 Hexanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
lsopropyl benzene (cumene) (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl Acetate (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4 Methyl-2-pentanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl-tert-butyl-ether ³ (ug/L)	ND	ND	ND	ND	5.5	ND	ND	ND	ND	ND	ND	
Methylene Chloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
m&p Xylene¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
o Xylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Styrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2, 2 Tetrachloro- ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans 1, 2 Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans 1, 3 Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 1 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichlorofluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	14.7	10.6	ND	ND	ND	
Vynil Chloride ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-109A	MW-90A	MW-110B2
ND	ND	ND

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-MP2	MW-MP3	MW-MP4	MW-MP8	PMW-116	PMW-117	PMW-118	PMW-119	PMW-122	PMW-123	PMW-124	MW-109A	MW-90A	MW-110B2
Method 8270														
Acenaphthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaph-thylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (a) anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (a) pyrene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (b) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (g, h, i)perylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (k) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a, h)anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	ND	ND	ND	ND
2-Methylnaphthalene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno (1, 2, 3, cd)pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	0.15	0.14	ND	ND	ND	ND
Pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 12 Groundwater Sample Results (Cont.)^(j)

Sample ID	MW-16C	MW-17B	MW-20B	MW-21B	MW-76B2	MW-77B	MW-B1	MW-DP5	MW-EB-107	MW-EB-108	MW-MP5A	MW-MP9	PMW-120	PMW-121
Method 8015														
ORO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DRO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RFI Report



Sample ID	MW-16C	MW-17B	MW-20B	MW-21B	MW-76B2	MW-77B	MW-B1	MW-DP5	MW-EB-107	MW-EB-108	MW-MP5A	N
Method 8021												
GRO ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 6010												
Arsenic ¹ total (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Arsenic dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chromium total ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chromium dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Lead total ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Lead dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vanadium total (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vanadium dissolved (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 7470												
Mercury total ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Mercury dissolved ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 8260												
Acetone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromodichloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromoform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Bromomethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon disulfide (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Carbon tetrachloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chlorobenzene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromo-3- chloropropane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-MP9	PMW-120	PMW-121
ND	ND	ND
ND	ND	ND
ND	ND	ND
ND	ND	ND
ND	ND	ND



Sample ID	MW-16C	MW-17B	MW-20B	MW-21B	MW-76B2	MW-77B	MW-B1	MW-DP5	MW-EB-107	MW-EB-108	MW-MP5A	Ν
2 Butanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dibromoethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2 Dichloropropane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-Dichloroethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 2-Dichloroethane ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1-Dichloroethene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 2-Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
cis-1, 3-Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dibromochloromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dichlorodifluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ethybenzene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2 Hexanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Isopropyl benzene (cumene) (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl Acetate (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4 Methyl-2-pentanone (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methyl-tert-butyl-ether ³ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Methylene Chloride (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
m&p Xylene¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
o Xylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Styrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2, 2 Tetrachloro- ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-MP9	PMW-120	PMW-121
ND	ND	ND



Sample ID	MW-16C	MW-17B	MW-20B	MW-21B	MW-76B2	MW-77B	MW-B1	MW-DP5	MW-EB-107	MW-EB-108	MW-MP5A	Ν
trans 1, 2 Dichloroethene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans 1, 3 Dichloropropene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 2 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1, 1, 1 Trichloro-ethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichlorofluoromethane (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloro-ethene1 (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Vynil Chloride ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Method 8270												
Acenaphthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Acenaph-thylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (a) anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (a) pyrene ¹ (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (b) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (g, h, i)perylene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo (k) fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Chrysene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dibenz(a, h)anthracene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Fluoranthene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Fluorene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2-Methylnaphthalene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Indeno (1, 2, 3, cd)pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

RFI Report

MW-MP9	PMW-120	PMW-121
ND	ND	ND
ND	ND	ND



Groundwater Sample Results (Cont.)^(j) Table 12

Sample ID	MW-16C	MW-17B	MW-20B	MW-21B	MW-76B2	MW-77B	MW-B1	MW-DP5	MW-EB-107	MW-EB-108	MW-MP5A	MW-MP9	PMW-120	PMW-121
Naphthalene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Sampled Groundwater Monitoring Wells Table 13

2014 Sampled Groundwater Monitoring Wells											
MW-109A	MW-16C	MW-57A	MW-84A	MW-AD-2	MW-EB-104	MW-MP9					
MW-110AB	MW-17B	MW-63A	MW-84B2	MW-AD-3	MW-EB-105	PMW-116					
MW-110B2	MW-18D	MW-65A	MW-86A	MW-AD-4	MW-EB-106	PMW-117					
MW-111A	MW-20B	MW-75B2	MW-87A	MW-B1	MW-EB-107	PMW-118					
MW-114A	MW-21B	MW-76A	MW-88A	MW-B9	MW-EB-108	PMW-119					
MW-13A	MW-30A	MW-76B2	MW-90A	MW-DP-1	MW-MP2	PMW-120					
MW-13B2	MW-33A	MW-77B	MW-91A	MW-DP5	MW-MP3	PMW-121					
MW-15A	MW-37A	MW-78B	MW-98A	MW-EB-101	MW-MP4	PMW-122					
MW-15B	MW-38A	MW-83A	MW-99A	MW-EB-102	MW-MP5A	PMW-123					
MW-15B2	MW-48B	MW-83B2	MW-AD-1	MW-EB-103	MW-MP8	PMW-124					

Groundwater Sample Results for Geochemical Parameters^(k) Table 14

Sample ID	MNA-MW-75B2	MNA-MW-17B	MNA-MP-5A	MNA-MW-15B	MNA-MW-15B2	MNA-MW-13A	MNA-MW-13B2	MNA-MW-84A	MNA-MW-84B2	MNA-MW-76A	MNA-MW-76B2	MNA-MW-30A
Total Metals (ug/L)												
Iron	ND	1420	594	196	2360	17800	4740	635	2050	169	2170	6140
Manganese	41.3	223	158	323	750	2890	1070	1540	12800	362	868	636
Dissolved Metals (ug/L)												
Iron	ND	ND	211	56.2	421	16100	1110	272	643	ND	1980	ND
Manganese	40.2	136	147	301	687	2690	1010	1490	11700	329	819	598
Alkalinity (ug/L)												
Hydroxide (CaCO ₃)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

(k) U - Indicates the compound was analyzed for, but not detected, at or above the noted concentration; J - Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL); ND - Not Detected

RFI Report



Sample ID MNA-MW-75B2 MNA-MW-17B MNA-MP-5A MNA-MW-15B MNA-MW-15B2 MNA-MW-13A MNA-MW-13B2 MNA-MW-84A MNA-MW-84B2 MNA-MV ND Phenol-phtalein ND ND ND ND ND ND ND ND ND 322 182 291 258 Total CaCO₃ 333 150 312 333 387 54.5 258 Bicarbonate 333 150 312 322 333 182 387 291 54.5 Carbonate ND 60.1 60.3 76 44.2 61.8 Chloride (ug/L) 151 51.3 37.8 44.7 53.5 Nitrite as N (ug/L) ND Nitrogen (NO₂, NO₃) (ug/L) 0.055 ND 0.24 1.8 ND 0.083 0.068 0.73 0.11 0.1 Sulfate (ug/L) 30.3 13.9 39 57.3 41.5 68.8 0.61 12 19.2 57.2 **Dissolved Gases** Methane (ug/L) 6.8 2 9.2 22 78 6.6 110 700 1400 120 0.0059 J 0.0090J 0.96 0.075 0.83 0.34 0.083 0.018J 0.007 Ethane (ug/L) 0.17 0.0044J 0.010J Ethene (ug/L) 0.0067 J 0.0097J 0.0056J 0.019J 0.025 U 0.014J 0.0087J 0.01 Propane (ug/L) 0.05 0.024J 0.029J 0.065 0.08 0.15 0.050 U 0.087 0.017J 0.01 Carbon Dioxide (ug/L) 48 54 54 57 60 260 69 56 190 120 5.2 2.5 4.1 2.6 2.7 2.9 2.9 4.4 3 4.3 Oxygen (ug/L)

Groundwater Sample Results for Geochemical Parameters (Cont.)^(k) Table 14

Groundwater Sample Results for Geochemical Parameters (Cont.)^(k) Table 14

Sample ID	MNA-MW-33A	MNA-MW-57A	MNA-MW-83A	MNA-MW-83B2	MNA-MW-48B	MNA-MW-98A	MNA-MW-91A	MNA-PMW-124	MNA-PMW-120	MNA-MW-88A	MNA-MW-78B	MNA-MW-111A
Total Metals (ug/L)												
Iron	9930	31000	9920	ND	1340	42900	17600	12900	ND	20700	97.2	4560
Manganese	1380	19500	1010	114	483	883	4480	672	18.6	1900	54.2	2470
Dissolved Metals (ug/L)												
Iron	9050	10800	699	ND	232	275	14600	ND	ND	19600	ND	ND
Manganese	1250	18600	928	111	415	772	3820	22.8	13.6	1730	45	2400
Alkalinity (ug/L)												
Hydroxide (CaCO ₃)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol-phtalein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total CaCO ₃	90	68	280	333	164	172	191	318	336	6	218	300
Bicarbonate	90	68	280	333	164	172	191	318	336	6	218	300

Groundwater Sample Results for Geochemical Parameters (Cont.)^(k) Table 14

RFI Report

W-76A	MNA-MW-76B2	MNA-MW-30A				
D	ND	ND				
8	150	273				
8	150	273				
D	ND	ND				
.8	9.9	33.2				
D	ND	ND				
16	0.11	ND				
.2	71.7	19.6				
6	42	8600				
75J	0.013J	8.3				
11J	0.012J	0.016J				
16J	0.050U	0.042J				
20	220	59				
3	3.6	2.3				

Sample ID	MNA-MW-33A	MNA-MW-57A	MNA-MW-83A	MNA-MW-83B2	MNA-MW-48B	MNA-MW-98A	MNA-MW-91A	MNA-PMW-124	MNA-PMW-120	MNA-MW-88A	MNA-MW-78B	MNA-MW-111A
Carbonate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride (ug/L)	10.7	35.5	33.5	111	13.2	14.8	46.3	28.5	23.4	540	610	194
Nitrite as N (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrogen (NO ₂ , NO ₃) (ug/L)	ND	ND	ND	0.97	0.069	ND	0.062	1.5	0.32	ND	0.5	0.1
Sulfate (ug/L)	26.9	ND	92.1	49.3	35.2	10.5	ND	30.3	28.1	ND	52.5	1240
Dissolved Gases												
Methane (ug/L)	1100	1500	680	59	22	1500	3100	0.34	0.18	12	0.96	250
Ethane (ug/L)	1.2	0.11	0.82	0.051J	0.012J	0.42	2.3	0.039	0.020J	0.016J	0.0037J	0.17
Ethene (ug/L)	0.29	0.019J	0.013J	0.02J	0.028	0.019J	0.62	0.042	0.038	0.024J	0.011J	0.014J
Propane (ug/L)	0.028J	0.015	0.025J	0.035J	0.0084	0.029J	7.6	0.020J	0.036J	0.046J	0.050U	0.065
Carbon Dioxide (ug/L)	85	140	98	64	21	150	320	78	87	210	47	150
Oxygen (ug/L)	2.3	2.6	2.5	2.9	3.3	1.6	1.9	3.9	4.2	2.7	2.5	3.9

RFI Report



Figures