



July 23, 2015

Mrs. Jeannette DeBartolomeo
Maryland Department of the Environment (MDE)
Oil Control Program
1800 Washington Boulevard
Baltimore, Maryland 21230-1719

Re: **Rebound Evaluation – Month Two**
Royal Farms Store # 96
500 Mechanics Valley Road
North East, MD
OCP Case No. 2011-0729-CE
MDE Facility No. 13326

Dear Mrs. DeBartolomeo,

Advantage Environmental Consultants, LLC (AEC), on behalf of Royal Farms / Two Farms, Inc. (Royal Farms), is presenting this data and analysis package for the second month of the Rebound Evaluation following deactivation of the of the Vapor Extraction / Groundwater Extraction (VE/GE) remediation system located at 500 Mechanics Valley Road in North East, MD (i.e. the “Site”). Sampling procedures and analysis parameters used for this Rebound Evaluation are as outlined in AEC’s Rebound Evaluation Work Plan – Revised dated April 20, 2015 and approved by MDE in a letter dated May 21, 2015.

The rebound test will continue for 12 months unless the evaluation determines that a restart of the VE/GE system is necessary. Data for the evaluation is obtained by sampling select representative wells on a monthly basis for the first 6 months and then quarterly for the remainder of the rebound test. Eight wells are utilized for the purposes of this evaluation including: MW-8, RW-1, RW-2, RW-4, RW-6, RW-8, RW-11, and RW-12. A figure depicting the well locations is included as Figure 1 of Attachment A.

Established Baseline

The rebound in the selected wells is assessed for the following fuel constituents: benzene, total BTEX (benzene, toluene, ethylbenzene, and xylenes), and naphthalene. Baseline concentrations for these constituents in each respective well have been established based on results reported from sampling events after the discovery of the release and prior to the start-up of the VE/GE system. The baseline concentrations for the rebound study are listed in Table 1 of Attachment B.

Evaluation Parameters

Laboratory results from each Rebound Evaluation event are compared to the baseline concentrations for benzene, total BTEX, and naphthalene in each well independently. A ratio is generated for each constituent in each well using the most recent lab results in relation to the established baseline concentration. The current rebound concentration ratios are listed in Table 1 of Attachment B. For analysis of the data obtained from each Rebound Evaluation sampling event, rebound response for benzene, total BTEX, and naphthalene in each well is classified under one of the following three cases:

- Case A – Little-to-No Rebound, defined as the rebound ratio less than 0.25 (25 percent);
- Case B – Gradual Rebound, defined as the rebound ratio greater than or equal to 0.25 percent but less than 0.75 ; and,
- Case C - Rapid Rebound, defined as the rebound ratio greater than or equal to 0.75 (75 percent).

If a rebound ratio for benzene, total BTEX, or naphthalene is greater than 75 percent (Case C - Rapid Rebound) in the same well during two consecutive sampling events, then the rebound test will be terminated and the VE/GE system will be restarted. Case C threshold concentrations for each constituent of concern in each selected well are included in Table 1 of Attachment B.

Sampling Event

The VE/GE system was shut down to begin the Rebound Evaluation on May 27, 2015. AEC performed sampling for the second month of the Rebound Evaluation on June 29, 2015. Samples were collected using the purge and bail method in accordance with standard operating procedures for groundwater sampling at the Site.

Results

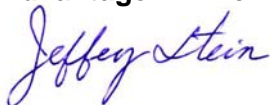
Sampling results indicate that the Case C criteria has been met for naphthalene in RW-11 with a rebound ratio of .929 or 92.9%. The Case C criteria has not been met for any other constituents of concern in any of the other selected wells. The next greatest rebound for any rebound evaluation constituent in any selected well is only 0.204 or 20.4% for naphthalene in RW-8 (Case A).

According to the Rebound Evaluation Work Plan, if the Case C rebound criteria is met for a constituent in a single well during two consecutive sampling events in the same well, the VE/GE System will be restarted. Under those conditions, a similar result for naphthalene in RW-11 during the next sampling event will trigger a system restart. Given the wide disparity between the rebound response of naphthalene in RW-11 and constituents in other wells, this localized result is not indicative of overall rebound. This highly localized and constituent specific response was not anticipated during the conception of the rebound evaluation. It should also be noted that higher reported concentrations of naphthalene which fall into the normal data drift may qualify as Case C due to the low relative concentrations of naphthalene encountered during the lifetime of this project. Based on these factors, AEC requests to include the following condition to the re-start criteria: Case C rebound must be observed in more than one well or more than one constituent in a single well for a sampling period to be counted toward the restart criteria.

In addition to benzene, total BTEX, and naphthalene; MTBE is also included in all laboratory analysis for this Rebound Evaluation at the request of MDE. MTBE was not reported above laboratory detection limits in samples from the selected rebound evaluation wells. MTBE results are included in Table 1 of Attachment B. Laboratory analytical results and chain of custody documentation is included as Attachment C.

Sincerely,

Advantage Environmental Consultants, LLC

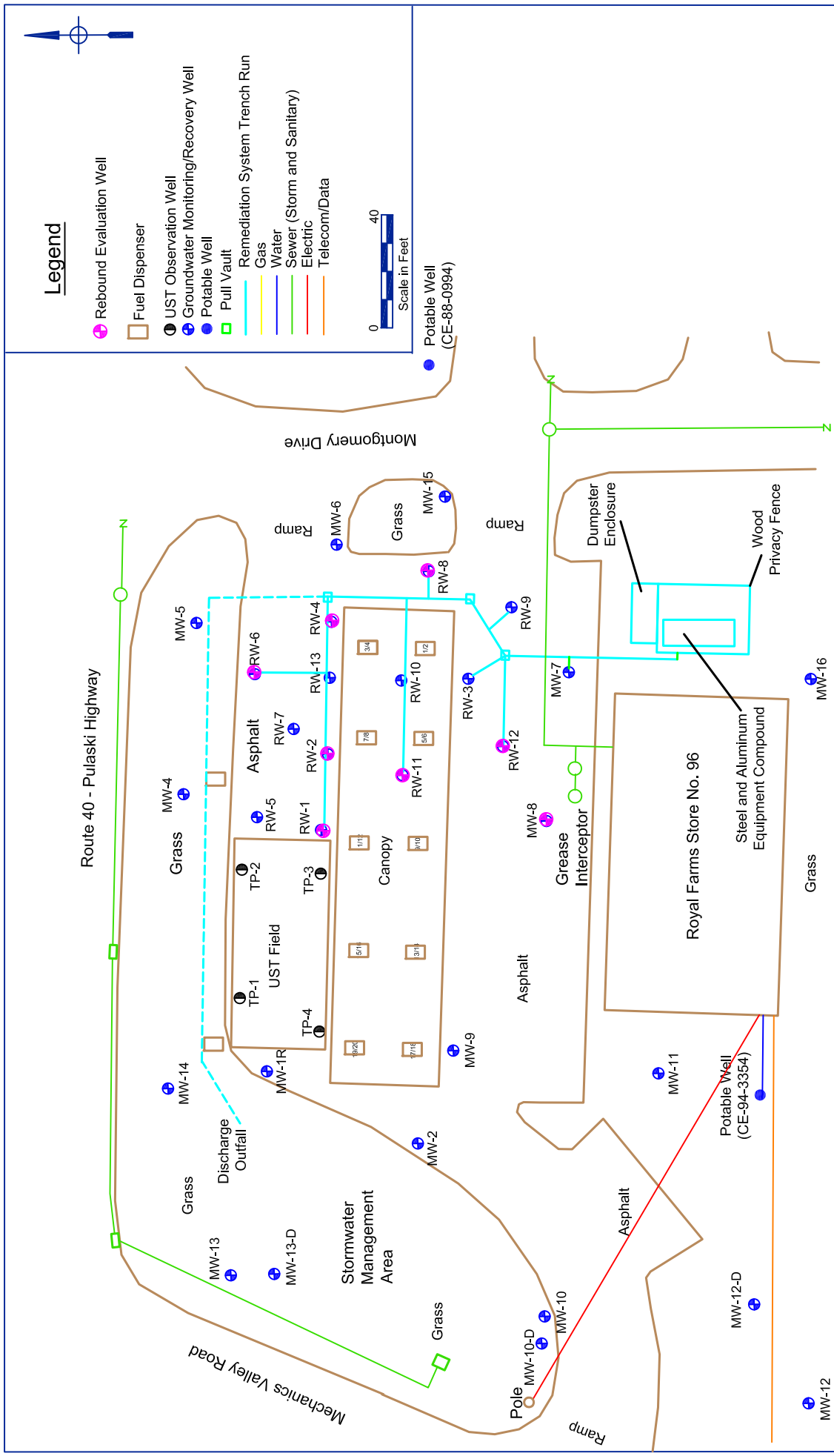


Jeffery Stein
Principal

Attachments

cc: T. Ruszin

ATTACHMENT A



Advantage Environmental Consultants, LLC 8610 Washington Blvd. Suite 217 Jessup, MD 20794 Phone 301-776-0500 Fax 301-776-1123	Project No.: 05-056 Task No.: RF96 File: Site Features	Drawn by: JDW Date: 2-16-2015 Revision No.: 2	Figure 1 - Site Features Map with Selected Rebound Evaluation Wells Royal Farms No. 96 500 Mechanics Valley Road North East, MD
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ATTACHMENT B

Rebound Evaluation Analysis Worksheet
Gasoline Fueling Station – Royal Farms #96
500 Mechanics Valley Road, North East, MD 21901

Well ID	Sample Date	Analyte	Pre-Start-up Mean (C _o):	Case C Threshold	Current Concentration (C)	Rebound Ratio (C/C _o)	Rebound Condition	Restart VE/GE System?
MW-8	5/28/2015	Benzene	15	11.3	0.1	0.007	Case A	No
	6/29/2015		15	11.3	0.1	0.007	Case A	No
	5/28/2015	Total BTEX	356.8	267.6	0.1	0.000	Case A	No
	6/29/2015		356.8	267.6	0.1	0.000	Case A	No
	5/28/2015	Naphthalene	26	19.5	0.1	0.004	Case A	No
	6/29/2015		26	19.5	0.1	0.004	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-1	5/29/2015	Benzene	959.3	719.5	0.1	0.000	Case A	No
	6/29/2015		15	11.3	0.1	0.007	Case A	No
	5/29/2015	Total BTEX	205428.3	154071.2	0.1	0.000	Case A	No
	6/29/2015		205428.3	154071.2	0.1	0.000	Case A	No
	5/29/2015	Naphthalene	1351.8	1013.9	0.1	0.000	Case A	No
	6/29/2015		1351.8	1013.9	0.1	0.000	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-2	5/29/2015	Benzene	8731	6548.3	5.4	0.001	Case A	No
	6/29/2015		8731	6548.3	0.1	0.000	Case A	No
	5/29/2015	Total BTEX	35956	26967.0	41.9	0.001	Case A	No
	6/29/2015		35956	26967.0	116.6	0.003	Case A	No
	5/28/2015	Naphthalene	26	19.5	0.1	0.004	Case A	No
	6/29/2015		26	19.5	0.1	0.004	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-4	5/29/2015	Benzene	14250	10687.5	139	0.010	Case A	No
	6/29/2015		14250	10687.5	215	0.015	Case A	No
	5/29/2015	Total BTEX	59880	44910.0	2397	0.040	Case A	No
	6/29/2015		59880	44910.0	5661	0.095	Case A	No
	5/29/2015	Naphthalene	1629	1221.8	81.9	0.050	Case A	No
	6/29/2015		1629	1221.8	202	0.124	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-6	5/29/2015	Benzene	1378	1033.5	0.1	0.000	Case A	No
	6/29/2015		1378	1033.5	0.1	0.000	Case A	No

	5/29/2015	Total BTEX	7674.6	5756.0	0.1	0.000	Case A	No
	6/29/2015		7674.6	5756.0	0.1	0.000	Case A	No
	5/29/2015	Naphthalene	400.3	300.2	0.1	0.000	Case A	No
	6/29/2015		400.3	300.2	0.1	0.000249813	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-8	5/29/2015	Benzene	2460	1845.0	0.1	0.000	Case A	No
	6/29/2015		2460	1845.0	0.1	0.000	Case A	No
	5/29/2015	Total BTEX	10688	8016.0	1174.8	0.110	Case A	No
	6/29/2015		10688	8016.0	683.2	0.064	Case A	No
	5/29/2015	Naphthalene	100	75.0	19.0	0.190	Case A	No
	6/29/2015		100	75.0	20.4	0.204	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-11	5/29/2015	Benzene	5065	3798.8	278	0.055	Case A	No
	6/29/2015		5065	3798.8	193	0.038	Case A	No
	5/29/2015	Total BTEX	25170	18877.5	1550	0.062	Case A	No
	6/29/2015		25170	18877.5	4067	0.162	Case A	No
	5/29/2015	Naphthalene	304.5	228.4	158	0.519	Case B	No
	6/29/2015		304.5	228.4	283	0.929392447	Case C	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA
RW-12	5/29/2015	Benzene	184	138.0	0.1	0.001	Case A	No
	6/29/2015		184	138.0	0.1	0.001	Case A	No
	5/29/2015	Total BTEX	2045.9	1534.4	0.1	0.000	Case A	No
	6/29/2015		2045.9	1534.4	0.1	0.000	Case A	No
	5/29/2015	Naphthalene	26.3	19.7	0.1	0.004	Case A	No
	6/29/2015		26.3	19.7	0.1	0.004	Case A	No
	5/28/2015	MTBE	NA	NA	BDL	NA	NA	NA
	6/29/2015		NA	NA	BDL	NA	NA	NA

VE/GE - Vapor Extraction / Groundwater Extraction

VE/GE System restart is necessary if an analyte in a single well meets the Case C criteria during two consecutive sampling events

Case C - Rapid Rebound Criteria (Rebound ratio greater than or equal to 0.75)

Case B - Gradual Rebound Criteria (Rebound ratio between 0.25 and 0.75)

Case A - Little-to-No Rebound Scenario (Rebound ratio less than or equal to 0.25)

0.1 - placeholder for a result reported below detection limits for computational purposes

COC - Contaminant of Concern

B = Benzene; T = Toluene; E = Ethylbenzene; X = Xylene

ATTACHMENT C

Analytical Results

1500 Caton Center Dr Suite G
Baltimore MD 21227
410-247-7600
www.mdspectral.com
VELAP ID 460040

Project: RF-096

Project Number: 05-056-RF96

Project Manager: James Wolf

Report Issued: 07/06/15 13:43

Advantage Environmental Consultants, LLC

8610 Baltimore Washington Blvd, Suite 217

Jessup MD, 20794

CLIENT SAMPLE ID:	MW-8	RW-1	RW-2	RW-4	RW-6	RW-8
LAB SAMPLE ID:	5063001-01	5063001-02	5063001-03	5063001-04	5063001-05	5063001-06
SAMPLE DATE:	06/29/15	06/29/15	06/29/15	06/29/15	06/29/15	06/29/15
RECEIVED DATE:	06/30/15	06/30/15	06/30/15	06/30/15	06/30/15	06/30/15
MATRIX	Units	Water	Water	Water	Water	Water

VOLATILE ORGANICS (MBTEXN+) BY EPA METHOD 8260B (GC/MS) (Water)

Benzene	ug/L	<2.0	<2.0	<2.0	215	<2.0	<4.0
Ethylbenzene	ug/L	<2.0	<2.0	3.2 [1]	336	<2.0	62.0
Methyl tert-butyl ether (MTBE)	ug/L	<2.0	<2.0	<2.0	<40.0	<2.0	<4.0
Naphthalene	ug/L	<2.0	<2.0	2.5 [1]	202	<2.0	20.4
Toluene	ug/L	<2.0	<2.0	9.3	2060	<2.0	44.2
o-Xylene	ug/L	<2.0	<2.0	41.3	1230	<2.0	228
m- & p-Xylenes	ug/L	<2.0	<2.0	62.8	1820	<2.0	349
1,2-Dichloroethane-d4	[surr]	<u>90.1%</u>	<u>91.1%</u>	<u>91.4%</u>	<u>90.6%</u>	<u>90.7%</u>	<u>91.6%</u>
Toluene-d8	[surr]	<u>97.9%</u>	<u>98.3%</u>	<u>98.1%</u>	<u>98.3%</u>	<u>98.1%</u>	<u>96.7%</u>
4-Bromofluorobenzene	[surr]	<u>96.8%</u>	<u>95.9%</u>	<u>97.6%</u>	<u>97.8%</u>	<u>96.0%</u>	<u>98.1%</u>

1 = Detected but below the reporting limit; therefore, result is an estimated concentration (CLP J-Flag).

Analytical Results

1500 Caton Center Dr Suite G
Baltimore MD 21227
410-247-7600
www.mdspectral.com
VELAP ID 460040

Project: RF-096

Project Number: 05-056-RF96

Project Manager: James Wolf

Report Issued: 07/06/15 13:43

Advantage Environmental Consultants, LLC

8610 Baltimore Washington Blvd, Suite 217

Jessup MD, 20794

CLIENT SAMPLE ID:	RW-11	RW-12
LAB SAMPLE ID:	5063001-07	5063001-08
SAMPLE DATE:	06/29/15	06/29/15
RECEIVED DATE:	06/30/15	06/30/15
MATRIX	Units Water	Water

VOLATILE ORGANICS (MBTEXN+) BY EPA METHOD 8260B (GC/MS) (Water)

Benzene	ug/L	<u>193</u>	<2.0
Ethylbenzene	ug/L	<u>673</u>	<2.0
Methyl tert-butyl ether (MTBE)	ug/L	<20.0	<2.0
Naphthalene	ug/L	<u>283</u>	<2.0
Toluene	ug/L	<u>887</u>	<2.0
o-Xylene	ug/L	<u>654</u>	<2.0
m- & p-Xylenes	ug/L	<u>1660</u>	<2.0
1,2-Dichloroethane-d4	[surr]	<u>92.5%</u>	<u>90.9%</u>
Toluene-d8	[surr]	<u>99.4%</u>	<u>98.8%</u>
4-Bromofluorobenzene	[surr]	<u>99.0%</u>	<u>96.3%</u>

1 = Detected but below the reporting limit; therefore, result is an estimated concentration (CLP J-Flag).

CHAIN-OF-CUSTODY RECORD

Maryland Spectral Services, Inc.
 1500 Caton Center Drive, Suite G
 Baltimore, MD 21227
 410-247-7600 • Fax 410-247-7602
 labman@mdspectral.com

Matrix Codes: NW (non-potable water) PW (potable water)

Preservative: 1+1
 HCl, H₂SO₄,
 Methanol,
 Na₂S₂O₃, NaHCO₃

Field pH, Residual
 Chlorine, QC
 Request, Trip
 Blank, Field Blank

MSS Lab ID

5063001-01

Field Sample ID	Date	Time	Water	Soil	Other	No. of Containers	Analysis Requested	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
MW-8	6/27/15	16:12	X			2	BREX + Naphthalene + MTBE 8260			
RW-1		16:14								
RW-2		16:21								
RW-4		16:24								
RW-6		16:28								
RW-8		16:36								
RW-11		16:41								
RW-12		16:46								

Company Name: **AEC**
 Project Manager: **J. Wolf**
 Project ID: **05-056-RF96**
 Sampler(s): **R. Swamy**
 P.O. Number:

Relinquished by: (Signature) **[Signature]**
 Date/Time: **8/3/15**
 Received by: (Signature) **[Signature]**
 Date/Time: **6/30/15**

Relinquished by: (Signature) **[Signature]**
 Date/Time: **6/30/15**
 Received by Lab: (Signature) **Laura Spitter**
 Date/Time: **6/30/15**
 Turn Around Time: **Normal (7 day)**

Lab Use: **Temp: 8.8 °C**
 Received on ice
 Received same day
 Preservation Appropriate
 Sample Disposal:
 Return to Client
 Disposal by lab
 Archive for _____ days

Special Instructions/QC Requirements & Comments:
Emis results: J Wolf R Swamy

Delivery Method:
 Courier
 Client
 UPS
 FedEx
 USPS
 Other: