Pesek, Adam

From: Jason Goodling <jgoodling@amref.com>
Sent: Monday, March 05, 2012 3:52 PM
To: Pesek, Adam
Subject: NPDES Amendment Application
Attachments: Outfall 004_3800-PM-WSFR0008f_MOD3.doc; January GW Sampling Results-NPDES Permit.pdf; Outfall 004_3800-PM-WSFR0008e_MOD2.doc

Adam,
The NPDES amendment application for the inclusion of the groundwater recovery wells @ Foster Brook Outfall 004 is attached. Please let me know if you need any additional information.
Thanks,
Jason

Jason Goodling
Manager of Environmental Affairs
American Refining Group
(P) 814-368-1223
(M) 814-331-7690
(F) 814-368-1427
jgoodling@amref.com

Applicant Name: American Refining Group, Inc.

Outfall: 004

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

SOURCES OF WASTEWATER
MODULE 3

Before completing this form, read the step-by-step instructions provided in Appendix 1.

APPLICANT NAME	American Refining Group, Inc.
OUTFALL NUMBER	004

1. Process Wastewater

a. Describe process and type of wastewater.

N/A

b. Production Rate.

Referring to the instructions in Appendix 1 for this question, complete a Module 15, Production Rate, for each process subject to an effluent limitation listed in 40 CFR Subchapter N (Parts 400-471). Indicate the number of completed Module 15s attached to this application.

c. Discharge Occurs. _____ hrs/day; _____ days/wk; _____ days/yr; _____ months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	_____	MGD
The monthly average discharge rate.	_____	MGD
The long-term average discharge rate.	_____	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

2. All Other Wastewater Contributing to this Outfall

a. Describe the wastewater.

Water from groundwater recovery wells (30 gpm) and steam condensate (10 gpm)

b. Source(s). Recovery wells located in Foster Brook facility used to promote separate phase liquid recovery. Water from steam condensate (excluding railcar unloading rack).

c. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	0.057	MGD
The monthly average discharge rate.	0.057	MGD
The long-term average discharge rate.	_____	MGD

For batch discharges report:

Number of decant cycles.	_____	Cycles/day
Length of each decant cycle.	_____	MIN.
Average decant discharge rate.	_____	GPM

Applicant Name: American Refining Group, Inc.

Outfall: 004

3. Total Process, Miscellaneous Noncontact Cooling, and Sanitary Wastewater

a. Source(s). Groundwater pumping, steam condensate, storm water.

b. Discharge Occurs. 24 hrs/day; 7 days/wk; 365 days/yr; 12 months/yr.

During which months?

Report the discharge rate as:

The maximum daily discharge rate.	0.065	MGD
The monthly average discharge rate.	0.065	MGD
The long-term average discharge rate.	_____	MGD

4. Stormwater

Complete Module 12 or Module 14 for the stormwater contribution.

February 20, 2012

Mr. Adam Pesek
Pennsylvania Department of Environmental Protection
Northwest Regional Office
230 Chestnut Street
Meadville, Pennsylvania 16335

Subject: **TRANSMITTAL LETTER**
Permit Amendment Request – Outfall 004
American Refining Group Facility - Bradford, Pennsylvania
AMEC Project: 3410100746

Dear Mr. Pesek:

Based on our recent conversations, please be advised that ARG wishes to amend the current National Pollutant Discharge Elimination System (NPDES) Permit at its outfall identified as Outfall 004. The outfall currently includes water from steam condensate and storm water. The future flow will also include water generated by operation of a groundwater pumping system. That recovery system will include a total of seven wells to be pumped at a combined total flow of approximately 30 gallons per minute (gpm). Currently, two of the recovery wells have been installed and sampled at the request of the Pennsylvania Department of Environmental Protection (PADEP). Sampling was conducted on January 31, 2012 to characterize groundwater quality for potential discharge utilizing Outfall 004. This letter summarizes the results of the sampling completed at those wells.

Background

ARG has proposed installation of a groundwater recovery system to enhance recovery of separate phase liquids (SPL) at the Foster Brook facility. The system will include a total of seven recovery wells, producing a total flow of approximately 30 gpm. Two of the wells were installed in September 2011 and the additional wells will be installed in March 2012. These wells have been designed and constructed to permit recovery of SPL using a dedicated skimmer pump while groundwater is to be depressed using a dedicated groundwater pump. The groundwater pump will be installed with its intake at the lower portion of the recovery well. The data provided in this transmittal represent the actual quality of water produced from the two wells which were installed in September 2011.

Groundwater samples were collected from recovery wells identified as RW-SPL-22/24-01 and RW-SPL-26-01 concurrently with pumping tests conducted in September and October of 2011. Samples were collected from each well at three time intervals during pumping: following one-hour of pumping, eight-hours of pumping, and 24-hours of pumping. Each sample was then sent to TestAmerica, Inc. of Pittsburgh, PA for analyses of benzene, toluene, ethylbenzene, and total xylenes via method SW 8260B as well as total iron, total manganese, and dissolved iron analyses via method EPA 200.7 Rev. 4.4. The results of this sampling event are summarized in Table 1.

In response to PADEP's request, additional sampling was conducted to further characterize groundwater to be recovered at the recovery wells. The additional sampling event was completed by Amec on January 31, 2012 at recovery wells RW-SPL-22/24 and RW-SPL-26 for a comprehensive list of parameters to assess the quality of groundwater to be produced by the recovery system. Sampling was conducted by pumping each well for approximately one-hour using a submersible pump at a constant pumping rate (maximum achievable flow rate) to simulate recovery pumping conditions. The submersible pump was

set approximately one foot from the bottom of each well to draw groundwater from the surrounding aquifer, as will be the conditions during recovery system operation. Following purging, samples were collected from each well and submitted to TestAmerica, Inc. of Pittsburgh, PA for analyses of Target Compound List Volatile Organic Compounds (TCL VOC), TCL Semi-Volatile Organic Compounds (SVOC), and total iron and total manganese using SW-846 analytical methods SW 8260B, SW 8270C, and EPA 200.7 Rev. 4.4, respectively. The results of the analyses are summarized on Table 2.

Sampling Results

Purging at RW-SPL-22/24 was completed for 75 minutes at an average pumping rate of 2.6 gallons per minute; a drawdown of 1.08 feet was observed. No SPL was detected during purging activities. Analyses of the sample collected at RW-SPL-22/24 (indicated as sample RW-SPL-22/24-0112 on Table 2) detected benzene (0.022 milligrams per liter [mg/l]), chloroform (0.00077 mg/l), ethylbenzene (0.00091 mg/l), methylene chloride (0.00023 mg/l), toluene (0.00036 mg/l), 1,3,5-trimethylbenzene (0.00033 mg/l), and 1,2,4-trimethylbenzene (0.0021 mg/l). Total iron was detected at a concentration of 46.0 mg/l and total manganese was detected at a concentration of 20 mg/l. Analysis of this sample for SVOCs only detected diethyl phthalate (0.0016 mg/l).

Purging at RW-SPL-26 was completed for 60 minutes at an average pumping rate of 2.5 gallons per minute; a drawdown of 0.82 feet was observed. No SPL was detected during purging activities. Analyses of the sample collected at RW-SPL-26 (indicated as sample RW-SPL-26-0112 on Table 2) detected benzene (estimated concentration of 0.049 mg/l and analysis at a higher dilution detected a concentration of 0.033 mg/l), ethylbenzene (0.0075 mg/l), methylene chloride (0.00037 mg/l), toluene (0.00032 mg/l), 1,3,5-trimethylbenzene (0.0043 mg/l), and 1,2,4-trimethylbenzene (0.023 mg/l). Total iron was detected at a concentration of 54.0 mg/l and total manganese was detected at a concentration of 13 mg/l. Analysis of this sample for SVOCs detected diethyl phthalate (0.0015 mg/l), fluorine (0.00026 mg/l), Naphthalene (0.0016 mg/l), and phenanthrene (0.0055 mg/l).

A replicate sample was collected from well RW-SPL-26 (indicated as RW-SPL-26D-0112 on Table 2). Analyses of the replicate sample detected benzene (estimated concentration of 0.040 mg/l and analysis at a higher dilution detected a concentration of 0.036 mg/l), ethylbenzene (0.0064 mg/l), toluene (0.00024 mg/l), 1,3,5-trimethylbenzene (0.0041 mg/l), and 1,2,4-trimethylbenzene (0.022 mg/l). Total iron was detected at a concentration of 54.0 mg/l and total manganese was detected at a concentration of 13 mg/l. Analysis of this sample for SVOCs detected diethyl phthalate (0.0016 mg/l), fluorine (0.00039 mg/l), Naphthalene (0.0016 mg/l), and phenanthrene (0.0063 mg/l).

If you have any questions or comments, please do not hesitate to contact us at (412) 279-6661.

Sincerely,

AMEC Environment & Infrastructure, Inc.

Dayne M. Crowley, P.G.
Senior Principal Hydrogeologist

DMC:anw
Attachments

P:\PROJECTS\American Refining Group\Bradford Refinery\3410100746 - COA Remedial Action\FINAL DELIVERABLES\FB_NPDES Amendment\January GW Sampling Results-NPDES Permit.docx

Table 1
Groundwater Analytical Results
Foster Brook Aquifer Testing
AMEC Project No. 3410100746.123.01

Sample Location	RW-SPL22/24-01			
Sample I.D.	RW-SPL22/24-01-1Hr	RW-SPL22/24-01-8Hr	RW-SPL22/24-01-24Hr	RW-SPL22/24-01-24Hr-R[1]
Sample Date and Time	9/27/11 10:05	10/3/11 20:30	10/4/11 12:35	10/4/11 12:35
Total Manganese	18,000	21,000	22,000	22,000
Total Iron	96,000 B[2]	47,000	42,000	44,000
Dissolved Iron	53,000 B	46,000	39,000	44,000
Benzene	40	27	31	25
Toluene	1.1	0.66 J	0.71 J	0.60 J
Ethylbenzene	1.4	0.52 J	0.53 J	0.40 J
Total Xylenes	2.4 J[3]	1.2 J	1.3 J	1.2 J

Sample Location	RW-SPL26-01		
Sample I.D.	RW-SPL26-01-1Hr	RW-SPL26-01-8Hr	RW-SPL26-01-24Hr
Sample Date and Time	10/6/11 12:07	10/6/11 19:07	10/7/11 11:07
Total Manganese	21,000	17,000	16,000
Total Iron	48,000	47,000	48,000
Dissolved Iron	32,000	38,000	48,000
Benzene	110	100	91
Toluene	20	<5.0	<5.0
Ethylbenzene	<5.0[4]	16	15
Total Xylenes	37	21	21

All results reported in micrograms per liter or parts per billion.
1 - "R" denotes a replicate sample.
2 - "B" indicates compound was detected in the laboratory blank sample.
3 - "J" indicates result less than reporting limit but greater than method detection limit, concentration is an approximate value.
4 - "<" indicates concentration below laboratory detection limit.

Table 2 - Final Data - Feb 13, 2012
Groundwater Sampling Summary
Recovery Wells RW-SPL-22/24 and RW-SPL-26

Samples collected January 31, 2012					RW-SPL-22/24-0112		RW-SPL-26-0112		RW-SPL-26D-0112	
CAS Number	Analyte	Units	Limit[1]	Reporting Limit	Result	Qualifier[2]	Result	Qualifier[2]	Result	Qualifier[2]
7439-89-6	Iron	ug/L	8.5	100	46000		54000		54000	
7439-96-5	Manganese	ug/L	0.5	30	20000		13000		13000	
107-02-8	Acrolein	ug/L	2.6	20	ND		ND		ND	
107-13-1	Acrylonitrile	ug/L	0.55	20	ND		ND		ND	
71-43-2	Benzene[3]	ug/L	0.11	1.0	22		49	E	40	E
71-43-2	Benzene[3]	ug/L	0.21	1.0			33		36	
75-27-4	Dichlorobromomethane	ug/L	0.13	1.0	ND		ND		ND	
75-25-2	Bromoform	ug/L	0.19	1.0	ND		ND		ND	
74-83-9	Bromomethane	ug/L	0.31	1.0	ND		ND		ND	
56-23-5	Carbon tetrachloride	ug/L	0.14	1.0	ND		ND		ND	
108-90-7	Chlorobenzene	ug/L	0.14	1.0	ND		ND		ND	
75-00-3	Chloroethane	ug/L	0.21	1.0	ND		ND		ND	
110-75-8	2-Chloroethyl vinyl ether	ug/L	0.25	2.0	ND		ND		ND	
67-66-3	Chloroform	ug/L	0.17	1.0	0.77	J	ND		ND	
74-87-3	Chloromethane	ug/L	0.28	1.0	ND		ND		ND	
124-48-1	Chlorodibromomethane	ug/L	0.14	1.0	ND		ND		ND	
75-34-3	1,1-Dichloroethane	ug/L	0.12	1.0	ND		ND		ND	
107-06-2	1,2-Dichloroethane	ug/L	0.21	1.0	ND		ND		ND	
75-35-4	1,1-Dichloroethene	ug/L	0.3	1.0	ND		ND		ND	
156-60-5	trans-1,2-Dichloroethene	ug/L	0.17	1.0	ND		ND		ND	
78-87-5	1,2-Dichloropropane	ug/L	0.095	1.0	ND		ND		ND	
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.19	1.0	ND		ND		ND	
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.15	1.0	ND		ND		ND	
100-41-4	Ethylbenzene	ug/L	0.23	1.0	0.91	J	7.5		6.4	
75-09-2	Methylene Chloride	ug/L	0.15	1.0	0.23	J B	0.37	J B	ND	
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.2	1.0	ND		ND		ND	
127-18-4	Tetrachloroethene	ug/L	0.15	1.0	ND		ND		ND	
108-88-3	Toluene	ug/L	0.15	1.0	0.36	J	0.32	J	0.24	J
71-55-6	1,1,1-Trichloroethane	ug/L	0.29	1.0	ND		ND		ND	
79-00-5	1,1,2-Trichloroethane	ug/L	0.2	1.0	ND		ND		ND	
79-01-6	Trichloroethene	ug/L	0.14	1.0	ND		ND		ND	
75-01-4	Vinyl chloride	ug/L	0.23	1.0	ND		ND		ND	
95-50-1	1,2-Dichlorobenzene	ug/L	0.15	1.0	ND		ND		ND	
541-73-1	1,3-Dichlorobenzene	ug/L	0.11	1.0	ND		ND		ND	
106-46-7	1,4-Dichlorobenzene	ug/L	0.21	1.0	ND		ND		ND	
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.22	1.0	0.33	J	4.3		4.1	
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.12	1.0	2.1		23		22	

1 Limit indicates Method Detection limit used for the set of samples
2 Qualifier notes at end of Table
3 Benzene concentrations were estimated ("E" qualifier) when run at a dilution of 1.0 and the samples were analyzed at a dilution of 2.0 and those results are presented separately.

Checked By: DMC

Table 2 - Final Data - Feb 13, 2012
Groundwater Sampling Summary
Recovery Wells RW-SPL-22/24 and RW-SPL-26

Samples collected January 31, 2012					RW-SPL-22/24-0112		RW-SPL-26-0112		RW-SPL-26D-0112	
CAS Number	Analyte	Units	Limit[1]	Reporting Limit	Result	Qualifier[2]	Result	Qualifier[2]	Result	Qualifier[2]
83-32-9	Acenaphthene	ug/L	0.14	1.9	ND		ND		ND	
208-96-8	Acenaphthylene	ug/L	0.15	1.9	ND		ND		ND	
120-12-7	Anthracene	ug/L	0.15	1.9	ND		ND		ND	
92-87-5	Benzidine	ug/L	33	190	ND		ND		ND	
56-55-3	Benzo[a]anthracene	ug/L	0.14	1.9	ND		ND		ND	
50-32-8	Benzo[a]pyrene	ug/L	0.13	1.9	ND		ND		ND	
205-99-2	Benzo[b]fluoranthene	ug/L	0.15	1.9	ND		ND		ND	
191-24-2	Benzo[g,h,i]perylene	ug/L	0.15	1.9	ND		ND		ND	
207-08-9	Benzo[k]fluoranthene	ug/L	0.53	1.9	ND		ND		ND	
111-91-1	Bis(2-chloroethoxy)methane	ug/L	0.56	9.6	ND		ND		ND	
111-44-4	Bis(2-chloroethyl)ether	ug/L	0.24	1.9	ND		ND		ND	
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	0.19	1.9	ND		ND		ND	
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	12	19	ND		ND		ND	
101-55-3	4-Bromophenyl phenyl ether	ug/L	0.61	9.6	ND		ND		ND	
85-68-7	Butyl benzyl phthalate	ug/L	1.4	9.6	ND		ND		ND	
91-58-7	2-Chloronaphthalene	ug/L	0.15	1.9	ND		ND		ND	
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	0.48	9.6	ND		ND		ND	
218-01-9	Chrysene	ug/L	0.13	1.9	ND		ND		ND	
53-70-3	Dibenzo(a,h)-anthracene	ug/L	0.15	1.9	ND		ND		ND	
91-94-1	3,3'-Dichlorobenzidine	ug/L	1.1	9.6	ND		ND		ND	
84-66-2	Diethyl phthalate	ug/L	1.4	9.6	**1.6**	**J B**	**1.5**	**J B**	**1.6**	**J B**
131-11-3	Dimethyl phthalate	ug/L	0.74	9.6	ND		ND		ND	
84-74-2	Di-n-butyl phthalate	ug/L	1.2	9.6	ND		ND		ND	
121-14-2	2,4-Dinitrotoluene	ug/L	0.52	9.6	ND		ND		ND	
606-20-2	2,6-Dinitrotoluene	ug/L	0.77	9.6	ND		ND		ND	
117-84-0	Di-n-octyl phthalate	ug/L	2	9.6	ND		ND		ND	
122-66-7	1,2-Diphenylhydrazine(as Azobenzene)	ug/L	0.63	9.6	ND		ND		ND	
206-44-0	Fluoranthene	ug/L	0.16	1.9	ND		ND		ND	
86-73-7	Fluorene	ug/L	0.21	1.9	ND		**0.26**	**J**	**0.39**	**J**
118-74-1	Hexachlorobenzene	ug/L	0.18	1.9	ND		ND		ND	
87-68-3	Hexachlorobutadiene	ug/L	0.16	1.9	ND		ND		ND	
77-47-4	Hexachlorocyclopentadiene	ug/L	0.5	9.6	ND	*	ND	*	ND	*
67-72-1	Hexachloroethane	ug/L	0.6	9.6	ND		ND		ND	
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	0.19	1.9	ND		ND		ND	
78-59-1	Isophorone	ug/L	0.62	9.6	ND		ND		ND	
91-20-3	Naphthalene	ug/L	0.13	1.9	ND		**1.6**	**J**	**1.6**	**J**
98-95-3	Nitrobenzene	ug/L	0.81	19	ND		ND		ND	
62-75-9	N-Nitrosodimethylamine	ug/L	0.71	1.9	ND		ND		ND	
621-64-7	N-Nitrosodi-n-propylamine	ug/L	0.3	1.9	ND		ND		ND	
86-30-6	N-Nitrosodiphenylamine	ug/L	0.82	9.6	ND		ND		ND	
85-01-8	Phenanthrene	ug/L	0.41	1.9	ND		**5.5**		**6.3**	
129-00-0	Pyrene	ug/L	0.15	1.9	ND		ND		ND	
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.68	1.9	ND		ND		ND	

1 Limit indicates Method Detection limit used for the set of samples
2 Qualifier Notes:
* - Denotes LCS or LCSD exceedss control limits
E - Denotes result exceeds calibration range
J - Denotes result is less than the reporting limit but higher or equal to the MDL and the concentration is approximate
B - Denotes compound was found in a blank and the sample.

Checked By: DMC

Applicant Name: **American Refining Group**

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

WASTEWATER TREATMENT TECHNOLOGIES
MODULE 2

APPLICANT NAME	American Refining Group	
Outfall Number	Treatment Unit Description (list in sequence)	Method for Handling and Disposal of Solid or Liquid Residue Resulting from Treatment (list in sequence)
004	Equalization Tank	Flow equalization gravity flow to oil/water separator
004	Oil/Water Separator	Oil to oil tank; water to oxidation tank
004	Oxidation/Neutralization Tank	Air oxidized iron precipitate to coagulation tank
004	Coagulation Tank	Coagulated solids to DAF
004	Dissolved Air Floatation	Solids to thickener; subnatent to carbon filter
004	Thickener	Thickened solids hauled off-site
004	Carbon/Clay Filter	Organic polished effluent to Outfall 004

Pesek, Adam

From: Shane Reid <SReid@amref.com>
Sent: Thursday, February 16, 2012 9:58 AM
To: Pesek, Adam; Jason Goodling
Subject: RE: Flow Rate Question
Attachments: 004 Graph.xlsx

Adam,

Please see my response to the original question from Jason, along with the flow data for 004:

The expected average is 15 gpm ~21,600 gpd from 004, total expected flow between 004 and GW is 45 gpm, or 64,800 gallons/day.

The highest predicted flow with the storm water addition would be 50 gpm 004 water, so a total of 80 gpm through the system. Please note that for the peak flow I am predicting with the best Information that I have but it may not be perfect. To do this I removed the peak discharges and ran the 95% point. So giving a fair chance for the water to evacuate the system I will call it 8 hours to discharge the storm water and return to normal operation. This is only an estimate and in reality it will be tiered but with the method I am using I am attempting to be conservative to the higher discharge volumes. This is about 40,000 gallons of 004, so a total discharge of 112,000 gallons. From looking at the data I would predict that we should never exceed that volume, but as you know you cannot predict a worst case because there can always be one that exceeds. I would call a typical high flow day somewhere closer to the 95,000 mark for total daily flow.

I would suspect that the water in this treatment plant is more stable than the 004 flows currently, perhaps even the 15 gpm number is high but this is the monthly average over the course of 12 months, including both the high flow months and the low flow months.

To be fair in the original email to Jason I did have a math error (I had the total volume calculated at 65 gpm instead of 45), the calculation is in the hidden cells and can easily be unhidden. It is a simple weighted average of the total number of points. The average that I came up with removed the anomalies instead of taking the cumulative flow data. This was to make every point as important as every other one and to take into account higher flows and tiered volumes since I only had one point per hour. My goal was to be conservative to the higher flow without being substantially off. The average that it shows is 16.5 gpm which was with only the off the chart readings removed, where in reality some of the points in between the normal flows and peak flows will be reduced as well. This is because with the removal of the ponds there will be less area for water to infiltrate when we flux high (that is where the 95% point comes into play).

Also, I am not sure what your long term data includes, mine only goes back to February 2011.

Please use the 30 gpm from the groundwater and 15 gpm from 004 which should be a total of 0.0648 MGD. I would be more comfortable to use more recent data, I am not entirely confident that we will maintain 11 gpm from 004 with the variations from wet season to dry season. We will likely be at the 0.0591 MGD for periods of the year, and removing infiltration maybe this will be our true average. We came up with our average based on the flow from February 1 to December 5, 2011, so since this is the most recent data that we had at the time of the question, we should use the 0.0648 MGD figure.

If you have any questions feel free to call.

Regards,

Shane Reid
Process Engineer
American Refining Group Inc.
77 North Kendall Ave.
Bradford, PA 16701
Phone: (814)-368-**1224**
Fax: (814)-368-1307
sreid@amref.com

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From: Pesek, Adam [mailto:apesek@pa.gov]
Sent: Thursday, February 16, 2012 8:20 AM
To: Jason Goodling
Cc: Shane Reid
Subject: RE: Flow Rate Question

Jason,

I have been running toxic modeling using the 0.0648 MGD figure provided below. However, yesterday afternoon I talked with Dayne about the modules he was to complete and we seem to have found an error in this number or a misunderstanding how it was found.

46 gpm converts to 0.06624 MGD.

If you take 30 gpm converted to MGD it is 0.0432 MGD and add 0.0159 MGD (long term average) you get 0.0591 MGD.

Please check into and let me know what number should be used and how you came up with the number ASAP.

Thanks,
Adam

Adam J. Pesek, E.I.T. | Environmental Engineering Specialist
PA Department of Environmental Protection
Northwest Regional Office – Water Management Program
230 Chestnut Street Meadville, PA 16335
Phone: 814-332-6331| Fax: 814-332-6121
apesek@pa.gov

From: Jason Goodling [mailto:jgoodling@amref.com]
Sent: Friday, January 13, 2012 1:04 PM
To: Balog, David; Pesek, Adam

Cc: Shane Reid
Subject: RE: Flow Rate Question

Dave,
We're estimating a 46 gpm (0.0648 MGD) average daily flow rate. That's based on 30 gpm groundwater and 16 gpm from the existing 004 contributors. Do you need our 004 NPDES renewal sampling data from 2009 or do you have it on file?
Thanks,
Jason

Jason Goodling
Manager of Environmental Affairs
American Refining Group
(P) 814-368-1223
(M) 814-331-7690
(F) 814-368-1427
jgoodling@amref.com

From: Balog, David [mailto:dbalog@pa.gov]
Sent: Friday, January 13, 2012 9:29 AM
To: Jason Goodling; Pesek, Adam
Subject: RE: Flow Rate Question

Adam's out today so I'll answer since time is of the essence....We'll probably wind up using the daily average flow for the modeling. I'm thinking we run Pentoxsd at Q7-10 low streamflow conditions, and the daily average flow would match up better with that condition. The max daily flow would be higher due to the stormwater input.

But...(there's always a but)...we'd still like to know the predicted max daily flow (which I'd assume you'll be using to design the new Foster Brook treatment system). So to answer the question, we'd like both, but the avg daily flow is what we need for now to run Pentoxsd.

David G. Balog, P.E. | Environmental Engineering Manager
PA Department of Environmental Protection
Northwest Regional Office – Water Management Program
230 Chestnut Street Meadville, PA 16335
Phone: 814-332-6328| Fax: 814-332-6121
www.depweb.state.pa.us

From: Jason Goodling [mailto:jgoodling@amref.com]
Sent: Friday, January 13, 2012 9:08 AM
To: Balog, David; Pesek, Adam
Subject: Flow Rate Question

Dave/Adam,
What type of flow rate do you need us to predict for the PenTox model input? Daily average, max daily, system design, etc.
Thanks,
Jason

Jason Goodling
Manager of Environmental Affairs

Pesek, Adam

From: Crowley, Dayne <DMCROWLEY@mactec.com>
Sent: Monday, February 13, 2012 12:06 PM
To: Pesek, Adam; Hegburg, Don
Cc: Jason Goodling; Williams, Vance; Oslosky, Greg
Subject: RE: Sampling data from ARG - Foster Brook Remediation Wells
Attachments: GW_Sample results_FINAL.pdf; J7901-1 UDS Level 2 Report Final Report.pdf

The attached table includes all of the analyses for the wells at Foster Brook and updates the copy provided last week by adding manganese results for the sample from Well RW-SPL-22/24. No other data have changed. I have however added a column to include the Laboratory Reporting Limits. I have also included a copy of the laboratory report.

From: Crowley, Dayne
Sent: Thursday, February 09, 2012 3:31 PM
To: 'Pesek, Adam'; Hegburg, Don (dhegburg@pa.gov)
Cc: Jason Goodling; Williams, Vance; Oslosky, Greg (GSOSLOSKY@mactec.com)
Subject: RE: Sampling data from ARG - Foster Brook Remediation Wells

Adam,

The attached is the latest information from the lab. The manganese for well RW-SPL-22/24 has not yet been provided and the lab has provided a preliminary report, which I do not expect to change with exception to addition of the manganese data. Table 2 has been updated to include the SVOC results and the text has been revised accordingly. I have also added a paragraph to the letter to explain that these data are more representative of groundwater quality conditions to be encountered by pumping than the previously considered samples from monitoring wells.

From: Crowley, Dayne
Sent: Thursday, February 09, 2012 11:04 AM
To: 'Pesek, Adam'
Subject: RE: Sampling data from ARG - Foster Brook Remediation Wells

I received a set of preliminary data from the lab yesterday and should get the final today. I have the data table ready to go but want to get a final from the lab before I release.

As far as the results from the other wells, those data were excluded because they come from monitoring wells where samples were collected from wells with purging techniques that gather samples over very short purging periods at very low flow rates, from the upper portion of the zone of saturation. Our recovery wells will recover groundwater from deeper portions of the aquifer over very long periods at flow rates on the order of 4 to 6 gpm. In essence, the data produced from the other wells are not as representative of the water quality that will be produced in this system as the data produced by sampling recovery wells RW-SPL-22/24 and RW-SPL-26 over longer pumping periods (i.e., minimum of one hour), with the pumps set low in the water column. I think we are seeing the effects of stratification of the pollutants in the water column where higher concentrations are present in the very highest portion of the water column, which also contains SPL. Because we are pumping the wells with pumps who are set deeper in the aquifer, we see lower levels of the pollutants.

Dayne M Crowley, P.G.
Senior Principal Hydrogeologist – Chief Scientist
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From: Pesek, Adam [mailto:apesek@pa.gov]
Sent: Thursday, February 09, 2012 10:05 AM
To: Crowley, Dayne
Subject: RE: Sampling data from ARG - Foster Brook Remediation Wells

Good Morning Dayne,

Have you received the analytical results for the semi-volatile compounds yet?

Looking over what you submitted below, I noticed you left results for MW-TF-29, 32, 18 and MAB-MW09 submitted previously, were left out of the new spreadsheets completely. Some of this data from these monitoring points were considered representative previously. Please explain.

Thanks,
Adam

From: Crowley, Dayne [mailto:DMCROWLEY@mactec.com]
Sent: Tuesday, February 07, 2012 2:58 PM
To: Pesek, Adam; Hegburg, Don
Cc: Jason Goodling; Williams, Vance
Subject: Sampling data from ARG - Foster Brook Remediation Wells

Adam,
The attached includes a set of analytical data from the existing recovery wells (which will be pumped for remediation at Foster Brook). I have not received the SVOCs yet and expect them by tomorrow. I wanted to get this information to you as soon as possible and will call you shortly.

Dayne M Crowley, P.G.
Senior Principal Hydrogeologist – Chief Scientist
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Email: dmcrowley@mactec.com or dayne.crowley@amec.com
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February 8, 2012

Mr. Donald Hegburg
Pennsylvania Department of Environmental Protection
White Memorial Building
Knox, Pennsylvania 16232

Subject: **TRANSMITTAL LETTER**
Groundwater Sampling Analytical Results: Foster Brook Recovery Wells
American Refining Group Facility - Bradford, Pennsylvania
AMEC Project: 3410100746

Dear Mr. Hegburg:

This letter is provided to revise the letter provided on February 6, 2012 by including data which were unavailable at that time for the analyses of semi-volatile organic compounds. At the request of the Pennsylvania Department of Environmental Protection (PADEP), additional groundwater samples were collected from the recently installed recovery wells, RW-SPL-22/24-01 and RW-SPL-26-01, within the Foster Brook portion of the American Refining Group (ARG) operated refinery located in Bradford, Pennsylvania. Sampling was conducted on January 31, 2012 and was completed to characterize groundwater quality for potential discharge utilizing the existing NPDES permit.

Background

Groundwater samples were collected from recovery wells denoted as RW-SPL-22/24-01 and RW-SPL-26-01 concurrently with pumping tests conducted in September and October of 2011. Samples were collected from each well at three time intervals during pumping: following one-hour of pumping, eight-hours of pumping, and 24-hours of pumping. Each sample was then sent to TestAmerica, Inc. of Pittsburgh, PA for benzene, toluene, ethylbenzene, and total xylenes analyses via method SW 8260B as well as total iron, total manganese, and dissolved iron analyses via method EPA 200.7 Rev. 4.4. The results of this sampling event are summarized in Table 1. Subsequent to our meeting on January 12, 2012, PADEP requested additional sampling be conducted to further characterize groundwater to be recovered at RW-SPL-22/24 and RW-SPL-26. As such, an additional sampling event was conducted by Amec on January 31, 2012.

Sampling of the recovery wells included in this transmittal represents a comprehensive list of parameters for samples from actual groundwater recovery wells which will supply water to a future treatment system to be installed in the Foster Brook portion of the ARG facility. These wells have been constructed to permit recovery of SPL while groundwater is to be depressed using a dedicated groundwater pump, installed with its intake at the lower portion of the recovery well. The data provided in this transmittal represent the actual quality of water to be produced from these two wells during their operation. An additional five recovery wells are planned to be installed in late February or March and similar samples will be collected from those at that time.

On January 31, 2012, sampling was conducted by pumping each well for approximately one-hour using a submersible pump at a pumping rate of approximately 2.5 gallons per minute (maximum achievable flow rate) to simulate recovery pumping conditions. The submersible pump was set approximately one foot from the bottom of each well to draw groundwater from the surrounding aquifer, as will be the conditions during recovery system operation. Following purging, samples were collected from each well and

submitted to TestAmerica, Inc. of Pittsburgh, PA for analyses of Target Compound List Volatile Organic Compounds (TCL VOC), TCL Semi-Volatile Organic Compounds (SVOC), and total iron and total manganese using SW-846 analytical methods SW 8260B, SW 8270C, and EPA 200.7 Rev. 4.4, respectively. The results of the analyses are summarized on Table 2.

Sampling Results

Purging at RW-SPL-22/24 was completed for a duration of 75 minutes at an average pumping rate of 2.6 gallons per minute; a drawdown of 1.08 feet was observed. In addition, no SPL was detected during purging activities. Analyses of the sample collected at RW-SPL-22/24 (indicated as sample RW-SPL-22/24-0112 on Table 2) detected benzene (0.022 milligrams per liter [mg/l]), chloroform (0.00077 mg/l), ethylbenzene (0.00091 mg/l), methylene chloride (0.00023 mg/l), toluene (0.00036 mg/l), 1,3,5-trimethylbenzene (0.00033 mg/l), and 1,2,4-trimethylbenzene (0.0021 mg/l). Total iron was detected at a concentration of 46.0 mg/l. Total manganese analytical data have not been provided at this time. Analysis of this sample for SVOCs only detected diethyl phthalate (0.0016 mg/l).

Purging at RW-SPL-26 was completed for a duration of 60 minutes at an average pumping rate of 2.5 gallons per minute; a drawdown of 0.82 feet was observed. In addition, no SPL was detected during purging activities. Analyses of the sample collected at RW-SPL-26 (indicated as sample RW-SPL-26-0112 on Table 2) detected benzene (estimated concentration of 0.049 mg/l and analysis at a higher dilution detected a concentration of 0.033 mg/l), ethylbenzene (0.0075 mg/l), methylene chloride (0.00037 mg/l), toluene (0.00032 mg/l), 1,3,5-trimethylbenzene (0.0043 mg/l), and 1,2,4-trimethylbenzene (0.023 mg/l). Total iron was detected at a concentration of 54.0 mg/l and total manganese was detected at a concentration of 13 mg/l. Analysis of this sample for SVOCs detected diethyl phthalate (0.0015 mg/l), fluorine (0.00026 mg/l), Naphthalene (0.0016 mg/l), and phenanthrene (0.0055 mg/l).

A replicate sample was collected from well RW-SPL-26 (indicated as RW-SPL-26D-0112 on Table 2). Analyses of the replicate sample detected benzene (estimated concentration of 0.040 mg/l and analysis at a higher dilution detected a concentration of 0.036 mg/l), ethylbenzene (0.0064 mg/l), toluene (0.00024 mg/l), 1,3,5-trimethylbenzene (0.0041 mg/l), and 1,2,4-trimethylbenzene (0.022 mg/l). Total iron was detected at a concentration of 54.0 mg/l and total manganese was detected at a concentration of 13 mg/l. Analysis of this sample for SVOCs detected diethyl phthalate (0.0016 mg/l), fluorine (0.00039 mg/l), Naphthalene (0.0016 mg/l), and phenanthrene (0.0063 mg/l).

If you have any questions or comments, please do not hesitate to contact Mr. Dayne Crowley at (412) 279-6661.

Sincerely,
AMEC Environment & Infrastructure, Inc.

amec

Dayne M. Crowley, P.G.
Senior Principal Hydrogeologist

DMC:anw
Attachments

P:\PROJECTS\American Refining Group\Bradford Refinery\3410100746 - COA Remedial Action\WORK\Foster brook RAP 1-11\RW-SPL-22-24 and 26 Groundwater Sampling (01-2012)\REV_Transmittal Letter to PADEP—January GW Sampling Results-NPDES Permit.docx

Table 2 - Final Data - Feb 13, 2012
Groundwater Sampling Summary
Recovery Wells RW-SPL-22/24 and RW-SPL-26

Samples collected January 31, 2012					RW-SPL-22/24-0112		RW-SPL-26-0112		RW-SPL-26D-0112	
CAS Number	Analyte	Units	Limit[1]	Reporting Limit	Result	Qualifier[2]	Result	Qualifier[2]	Result	Qualifier[2]
7439-89-6	Iron	ug/L	8.5	100	46000		54000		54000	
7439-96-5	Manganese	ug/L	0.5	30	20000		13000		13000	
107-02-8	Acrolein	ug/L	2.6	20	ND		ND		ND	
107-13-1	Acrylonitrile	ug/L	0.55	20	ND		ND		ND	
71-43-2	Benzene[3]	ug/L	0.11	1.0	22		49	E	40	E
71-43-2	Benzene[3]	ug/L	0.21	1.0			33		36	
75-27-4	Dichlorobromomethane	ug/L	0.13	1.0	ND		ND		ND	
75-25-2	Bromoform	ug/L	0.19	1.0	ND		ND		ND	
74-83-9	Bromomethane	ug/L	0.31	1.0	ND		ND		ND	
56-23-5	Carbon tetrachloride	ug/L	0.14	1.0	ND		ND		ND	
108-90-7	Chlorobenzene	ug/L	0.14	1.0	ND		ND		ND	
75-00-3	Chloroethane	ug/L	0.21	1.0	ND		ND		ND	
110-75-8	2-Chloroethyl vinyl ether	ug/L	0.25	2.0	ND		ND		ND	
67-66-3	Chloroform	ug/L	0.17	1.0	0.77	J	ND		ND	
74-87-3	Chloromethane	ug/L	0.28	1.0	ND		ND		ND	
124-48-1	Chlorodibromomethane	ug/L	0.14	1.0	ND		ND		ND	
75-34-3	1,1-Dichloroethane	ug/L	0.12	1.0	ND		ND		ND	
107-06-2	1,2-Dichloroethane	ug/L	0.21	1.0	ND		ND		ND	
75-35-4	1,1-Dichloroethene	ug/L	0.3	1.0	ND		ND		ND	
156-60-5	trans-1,2-Dichloroethene	ug/L	0.17	1.0	ND		ND		ND	
78-87-5	1,2-Dichloropropane	ug/L	0.095	1.0	ND		ND		ND	
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.19	1.0	ND		ND		ND	
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.15	1.0	ND		ND		ND	
100-41-4	Ethylbenzene	ug/L	0.23	1.0	0.91	J	7.5		6.4	
75-09-2	Methylene Chloride	ug/L	0.15	1.0	0.23	J B	0.37	J B	ND	
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.2	1.0	ND		ND		ND	
127-18-4	Tetrachloroethene	ug/L	0.15	1.0	ND		ND		ND	
108-88-3	Toluene	ug/L	0.15	1.0	0.36	J	0.32	J	0.24	J
71-55-6	1,1,1-Trichloroethane	ug/L	0.29	1.0	ND		ND		ND	
79-00-5	1,1,2-Trichloroethane	ug/L	0.2	1.0	ND		ND		ND	
79-01-6	Trichloroethene	ug/L	0.14	1.0	ND		ND		ND	
75-01-4	Vinyl chloride	ug/L	0.23	1.0	ND		ND		ND	
95-50-1	1,2-Dichlorobenzene	ug/L	0.15	1.0	ND		ND		ND	
541-73-1	1,3-Dichlorobenzene	ug/L	0.11	1.0	ND		ND		ND	
106-46-7	1,4-Dichlorobenzene	ug/L	0.21	1.0	ND		ND		ND	
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.22	1.0	0.33	J	4.3		4.1	
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.12	1.0	2.1		23		22	

1 Limit indicates Method Detection limit used for the set of samples
2 Qualifier notes at end of Table
3 Benzene concentrations were estimated ("E" qualifier) when run at a dilution of 1.0 and the samples were analyzed at a dilution of 2.0 and those results are presented separately.

Checked By: DMC

Table 2 - Final Data - Feb 13, 2012
Groundwater Sampling Summary
Recovery Wells RW-SPL-22/24 and RW-SPL-26

Samples collected January 31, 2012					RW-SPL-22/24-0112		RW-SPL-26-0112		RW-SPL-26D-0112	
CAS Number	Analyte	Units	Limit[1]	Reporting Limit	Result	Qualifier[2]	Result	Qualifier[2]	Result	Qualifier[2]
83-32-9	Acenaphthene	ug/L	0.14	1.9	ND		ND		ND	
208-96-8	Acenaphthylene	ug/L	0.15	1.9	ND		ND		ND	
120-12-7	Anthracene	ug/L	0.15	1.9	ND		ND		ND	
92-87-5	Benzidine	ug/L	33	190	ND		ND		ND	
56-55-3	Benzo[a]anthracene	ug/L	0.14	1.9	ND		ND		ND	
50-32-8	Benzo[a]pyrene	ug/L	0.13	1.9	ND		ND		ND	
205-99-2	Benzo[b]fluoranthene	ug/L	0.15	1.9	ND		ND		ND	
191-24-2	Benzo[g,h,i]perylene	ug/L	0.15	1.9	ND		ND		ND	
207-08-9	Benzo[k]fluoranthene	ug/L	0.53	1.9	ND		ND		ND	
111-91-1	Bis(2-chloroethoxy)methane	ug/L	0.56	9.6	ND		ND		ND	
111-44-4	Bis(2-chloroethyl)ether	ug/L	0.24	1.9	ND		ND		ND	
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	0.19	1.9	ND		ND		ND	
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	12	19	ND		ND		ND	
101-55-3	4-Bromophenyl phenyl ether	ug/L	0.61	9.6	ND		ND		ND	
85-68-7	Butyl benzyl phthalate	ug/L	1.4	9.6	ND		ND		ND	
91-58-7	2-Chloronaphthalene	ug/L	0.15	1.9	ND		ND		ND	
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	0.48	9.6	ND		ND		ND	
218-01-9	Chrysene	ug/L	0.13	1.9	ND		ND		ND	
53-70-3	Dibenzo(a,h)-anthracene	ug/L	0.15	1.9	ND		ND		ND	
91-94-1	3,3'-Dichlorobenzidine	ug/L	1.1	9.6	ND		ND		ND	
84-66-2	Diethyl phthalate	ug/L	1.4	9.6	**1.6**	**J B**	**1.5**	**J B**	**1.6**	**J B**
131-11-3	Dimethyl phthalate	ug/L	0.74	9.6	ND		ND		ND	
84-74-2	Di-n-butyl phthalate	ug/L	1.2	9.6	ND		ND		ND	
121-14-2	2,4-Dinitrotoluene	ug/L	0.52	9.6	ND		ND		ND	
606-20-2	2,6-Dinitrotoluene	ug/L	0.77	9.6	ND		ND		ND	
117-84-0	Di-n-octyl phthalate	ug/L	2	9.6	ND		ND		ND	
122-66-7	1,2-Diphenylhydrazine(as Azobenzene)	ug/L	0.63	9.6	ND		ND		ND	
206-44-0	Fluoranthene	ug/L	0.16	1.9	ND		ND		ND	
86-73-7	Fluorene	ug/L	0.21	1.9	ND		**0.26**	**J**	**0.39**	**J**
118-74-1	Hexachlorobenzene	ug/L	0.18	1.9	ND		ND		ND	
87-68-3	Hexachlorobutadiene	ug/L	0.16	1.9	ND		ND		ND	
77-47-4	Hexachlorocyclopentadiene	ug/L	0.5	9.6	ND	*	ND	*	ND	*
67-72-1	Hexachloroethane	ug/L	0.6	9.6	ND		ND		ND	
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	0.19	1.9	ND		ND		ND	
78-59-1	Isophorone	ug/L	0.62	9.6	ND		ND		ND	
91-20-3	Naphthalene	ug/L	0.13	1.9	ND		**1.6**	**J**	**1.6**	**J**
98-95-3	Nitrobenzene	ug/L	0.81	19	ND		ND		ND	
62-75-9	N-Nitrosodimethylamine	ug/L	0.71	1.9	ND		ND		ND	
621-64-7	N-Nitrosodi-n-propylamine	ug/L	0.3	1.9	ND		ND		ND	
86-30-6	N-Nitrosodiphenylamine	ug/L	0.82	9.6	ND		ND		ND	
85-01-8	Phenanthrene	ug/L	0.41	1.9	ND		**5.5**		**6.3**	
129-00-0	Pyrene	ug/L	0.15	1.9	ND		ND		ND	
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.68	1.9	ND		ND		ND	

1 Limit indicates Method Detection limit used for the set of samples
2 Qualifier Notes:
* - Denotes LCS or LCSD exceedss control limits
E - Denotes result exceeds calibration range
J - Denotes result is less than the reporting limit but higher or equal to the MDL and the concentration is approximate
B - Denotes compound was found in a blank and the sample.

Checked By: DMC

Pesek, Adam

From: Crowley, Dayne <DMCROWLEY@mactec.com>
Sent: Tuesday, February 07, 2012 2:58 PM
To: Pesek, Adam; Hegburg, Don
Cc: Jason Goodling; Williams, Vance
Subject: Sampling data from ARG - Foster Brook Remediation Wells
Attachments: Transmittal Letter to PADEP--January GW Sampling Results-NPDES Permit.pdf

Adam,
The attached includes a set of analytical data from the existing recovery wells (which will be pumped for remediation at Foster Brook). I have not received the SVOCs yet and expect them by tomorrow. I wanted to get this information to you as soon as possible and will call you shortly.

Dayne M Crowley, P.G.
Senior Principal Hydrogeologist – Chief Scientist

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February 6, 2012

Mr. Donald Hegburg
Pennsylvania Department of Environmental Protection
White Memorial Building
Knox, Pennsylvania 16232

Subject: **TRANSMITTAL LETTER**
Groundwater Sampling Analytical Results: Foster Brook Recovery Wells
American Refining Group Facility - Bradford, Pennsylvania
AMEC Project: 3410100746

Dear Mr. Hegburg:

As per the request of the Pennsylvania Department of Environmental Protection (PADEP), additional groundwater samples were collected from the recently installed recovery wells, RW-SPL-22/24-01 and RW-SPL-26-01, within the Foster Brook portion of the American Refining Group (ARG) operated refinery located in Bradford, Pennsylvania. Sampling was conducted on January 31, 2012 and was completed to characterize groundwater quality for potential discharge utilizing the existing NPDES permit.

Background

Groundwater samples were collected from recovery wells denoted as RW-SPL-22/24-01 and RW-SPL-26-01 concurrently with pumping tests conducted in September and October of 2011. Samples were collected from each well at three time intervals during pumping: following one-hour of pumping, eight-hours of pumping, and 24-hours of pumping. Each sample was then sent to TestAmerica, Inc. of Pittsburgh, PA for benzene, toluene, ethylbenzene, and total xylenes analyses via method SW 8260B as well as total iron, total manganese, and dissolved iron analyses via method EPA 200.7 Rev. 4.4. The results of this sampling event are summarized in Table 1. Subsequent to our meeting on January 12, 2012, PADEP requested additional sampling be conducted to further characterize groundwater to be recovered at RW-SPL-22/24 and RW-SPL-26. As such, an additional sampling event was conducted by Amec on January 31, 2012.

JANUARY 2012 GROUNDWATER SAMPLING

Sampling Methods

Sampling was conducted by pumping each well for approximately one-hour using a submersible pump at a pumping rate of approximately 2.5 gallons per minute (maximum achievable flow rate) to simulate recovery pumping conditions. The submersible pump was set approximately one foot from the bottom of each well to draw groundwater from the surrounding aquifer, as will be the conditions during recovery system operation. Following purging, samples were collected from each well and submitted to TestAmerica, Inc. of Pittsburgh, PA for analyses of Target Compound List Volatile Organic Compounds (TCL VOC), TCL Semi-Volatile Organic Compounds (SVOC), and total iron and total manganese using SW-846 analytical methods SW 8260B, SW 8270C, and EPA 200.7 Rev. 4.4, respectively. The results of the analyses are summarized on Table 2.

Environment & Infrastructure
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Sampling Results

Purging at RW-SPL-22/24 was completed for a duration of 75 minutes at an average pumping rate of 2.6 gallons per minute; a drawdown of 1.08 feet was observed. In addition, no SPL was detected during purging activities. Analyses of the sample collected at RW-SPL-22/24 detected benzene (0.022 milligrams per liter [mg/l]), chloroform (0.00077 mg/l), ethylbenzene (0.00091 mg/l), methylene chloride (0.00023 mg/l), toluene (0.00036 mg/l), 1,3,5-trimethylbenzene (0.00033 mg/l), and 1,2,4-trimethylbenzene (0.0021 mg/l). Total iron was detected at a concentration of 46.0 mg/l. Total manganese and SVOC analytical data have not been provided at this time.

Purging at RW-SPL-26 was completed for a duration of 60 minutes at an average pumping rate of 2.5 gallons per minute; a drawdown of 0.82 feet was observed. In addition, no SPL was detected during purging activities. Analyses of the sample collected at RW-SPL-26 detected benzene (estimated concentration of 0.049 mg/l and analysis at a higher dilution detected a concentration of 0.033 mg/l), ethylbenzene (0.0075 mg/l), methylene chloride (0.00037 mg/l), toluene (0.00032 mg/l), 1,3,5-trimethylbenzene (0.0043 mg/l), and 1,2,4-trimethylbenzene (0.023 mg/l). Total iron was detected at a concentration of 54.0 mg/l and total manganese was detected at a concentration of 13 mg/l. SVOC analytical data have not been provided at this time. Analyses of the replicate sample collected at RW-SPL-26 detected benzene (estimated concentration of 0.040 mg/l and analysis at a higher dilution detected a concentration of 0.036 mg/l), ethylbenzene (0.0064 mg/l), toluene (0.00024 mg/l), 1,3,5-trimethylbenzene (0.0041 mg/l), and 1,2,4-trimethylbenzene (0.022 mg/l). Total iron was detected at a concentration of 54.0 mg/l and total manganese was detected at a concentration of 13 mg/l. SVOC analytical data have not been provided at this time.

If you have any questions or comments, please do not hesitate to contact Mr. Dayne Crowley at (412) 279-6661.

Sincerely,

AMEC Environment & Infrastructure, Inc.

amec

Dayne M. Crowley, P.G.
Senior Principal Hydrogeologist

DMC:anw

P:\PROJECTS\American Refining Group\Bradford Refinery\3410100746 - COA Remedial Action\WORK\Foster brook RAP 1-11\RW-SPL-22-24 and 26 Groundwater Sampling (01-2012)\Transmittal Letter to PADEP—January GW Sampling Results-NPDES Permit.docx

Table 1
Groundwater Analytical Results
Foster Brook Aquifer Testing
AMEC Project No. 3410100746.123.01

Sample Location	**RW-SPL22/24-01**			
Sample I.D.	**RW-SPL22/24-01-1Hr**	**RW-SPL22/24-01-8Hr**	**RW-SPL22/24-01-24Hr**	**RW-SPL22/24-01-24Hr-R[1]**
Sample Date and Time	9/27/11 10:05	10/3/11 20:30	10/4/11 12:35	10/4/11 12:35
Total Manganese	18,000	21,000	22,000	22,000
Total Iron	96,000 B[2]	47,000	42,000	44,000
Dissolved Iron	53,000 B	46,000	39,000	44,000
Benzene	40	27	31	25
Toluene	1.1	0.66 J	0.71 J	0.60 J
Ethylbenzene	1.4	0.52 J	0.53 J	0.40 J
Total Xylenes	2.4 J[3]	1.2 J	1.3 J	1.2 J

Sample Location	**RW-SPL26-01**		
Sample I.D.	**RW-SPL26-01-1Hr**	**RW-SPL26-01-8Hr**	**RW-SPL26-01-24Hr**
Sample Date and Time	10/6/11 12:07	10/6/11 19:07	10/7/11 11:07
Total Manganese	21,000	17,000	16,000
Total Iron	48,000	47,000	48,000
Dissolved Iron	32,000	38,000	48,000
Benzene	110	100	91
Toluene	20	<5.0	<5.0
Ethylbenzene	<5.0[4]	16	15
Total Xylenes	37	21	21

All results reported in micrograms per liter or parts per billion.
1 - "R" denotes a replicate sample.
2 - "B" indicates compound was detected in the laboratory blank sample.
3 - "J" indicates result less than reporting limit but greater than method detection limit, concentration is an approximate value.
4 - "<" indicates concentration below laboratory detection limit.

Table 2
Groundwater Analytical Results
Foster Brook Recovery Wells
AMEC Project No. 3410100746.123.01

				RW-SPL-22/24-0112		RW-SPL-26-0112		RW-SPL-26D-0112	
CAS Number	**Analyte**	**Units**	**Limit**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
7439-89-6	Iron	ug/L	100	**46000**		**54000**		**54000**	
7439-96-5	Manganese	ug/L	15			**13000**		**13000**	
107-02-8	Acrolein	ug/L	2.6	ND		ND		ND	
107-13-1	Acrylonitrile	ug/L	0.55	ND		ND		ND	
71-43-2	Benzene[1]	ug/L	1	**22**		**49**	E	**40**	E
71-43-2	Benzene[1]	ug/L	2			**33**		**36**	
75-27-4	Dichlorobromomethane	ug/L	0.13	ND		ND		ND	
75-25-2	Bromoform	ug/L	0.19	ND		ND		ND	
74-83-9	Bromomethane	ug/L	0.31	ND		ND		ND	
56-23-5	Carbon tetrachloride	ug/L	0.14	ND		ND		ND	
108-90-7	Chlorobenzene	ug/L	0.14	ND		ND		ND	
75-00-3	Chloroethane	ug/L	0.21	ND		ND		ND	
110-75-8	2-Chloroethyl vinyl ether	ug/L	0.25	ND		ND		ND	
67-66-3	Chloroform	ug/L	0.17	**0.77**	J	ND		ND	
74-87-3	Chloromethane	ug/L	0.28	ND		ND		ND	
124-48-1	Chlorodibromomethane	ug/L	0.14	ND		ND		ND	
75-34-3	1,1-Dichloroethane	ug/L	0.12	ND		ND		ND	
107-06-2	1,2-Dichloroethane	ug/L	0.21	ND		ND		ND	
75-35-4	1,1-Dichloroethene	ug/L	0.3	ND		ND		ND	
156-60-5	trans-1,2-Dichloroethene	ug/L	0.17	ND		ND		ND	
78-87-5	1,2-Dichloropropane	ug/L	0.095	ND		ND		ND	
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.19	ND		ND		ND	
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.15	ND		ND		ND	
100-41-4	Ethylbenzene	ug/L	1	**0.91**	J	**7.5**		**6.4**	
75-09-2	Methylene Chloride	ug/L	0.15	**0.23**	J B	**0.37**	J B	ND	
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.2	ND		ND		ND	
127-18-4	Tetrachloroethene	ug/L	0.15	ND		ND		ND	
108-88-3	Toluene	ug/L	1	**0.36**	J	**0.32**	J	**0.24**	J
71-55-6	1,1,1-Trichloroethane	ug/L	0.29	ND		ND		ND	
79-00-5	1,1,2-Trichloroethane	ug/L	0.2	ND		ND		ND	
79-01-6	Trichloroethene	ug/L	0.14	ND		ND		ND	
75-01-4	Vinyl chloride	ug/L	0.23	ND		ND		ND	
95-50-1	1,2-Dichlorobenzene	ug/L	0.15	ND		ND		ND	
541-73-1	1,3-Dichlorobenzene	ug/L	0.11	ND		ND		ND	
106-46-7	1,4-Dichlorobenzene	ug/L	0.21	ND		ND		ND	
108-67-8	1,3,5-Trimethylbenzene	ug/L	1	**0.33**	J	**4.3**		**4.1**	
95-63-6	1,2,4-Trimethylbenzene	ug/L	1	**2.1**		**23**		**22**	

1 Benzene concentrations were estimated ("E" qualifier) when run at a dilution of 1.0 and the samples were analyzed at a dilution of 2.0 and those results are presented separately.

Pesek, Adam

From: Hegburg, Don
Sent: Monday, January 09, 2012 2:45 PM
To: Pesek, Adam
Cc: Halterman, Kammy
Subject: ARG Groundwater Discharge Options
Attachments: ARG Groundwater Discharge Options.JPG

Adam

The attached map shows the location of the 3 major ARG outfalls I am aware of and a general location of the recovery wells and proposed pipeline that would convey groundwater from Foster Brook to the Main Refinery.

Permit # 02221510-001 ((Outfall 001), located a few hundred feet north of Kendall bridge)) is the outfall for the Main Refinery Groundwater Treatment Plant. They currently operate at about 50% capacity at 60 gpm and would add about 30 gpm from Foster Brook if they run the pipeline.

ARG is considering a new or modified outfall at or near 004 at Foster Brook rather than running a pipeline to the Main Refinery. I don't know much about 004 other than there is no Volatile Organic Compound (VOC) treatment.

FYI- I have also shown the approximate location of Outfall 002 (few hundred feet south of Kendall Bridge) which is the Main Refinery discharge point for the facilities industrial wastewater treatment plant.

The groundwater at Foster Brook is contaminated with light end petroleum (gasoline to diesel range organics) whereas the Main refinery is impacted by heavy end petroleum compounds (lubricating oils). Based on the type of groundwater contaminants at the Main refinery ARG demonstrated to WQM that VOCs did not require monitoring in the permit and as a result, I do not believe VOC removal was built in to the design of that plant. This is something to consider when determining what chemicals should be monitored in their discharge.

Don P. Hegburg | Licensed Professional Geologist Department of Environmental Protection Environmental Cleanup Program P.O. Box 669 | Knox, PA 16232-0669
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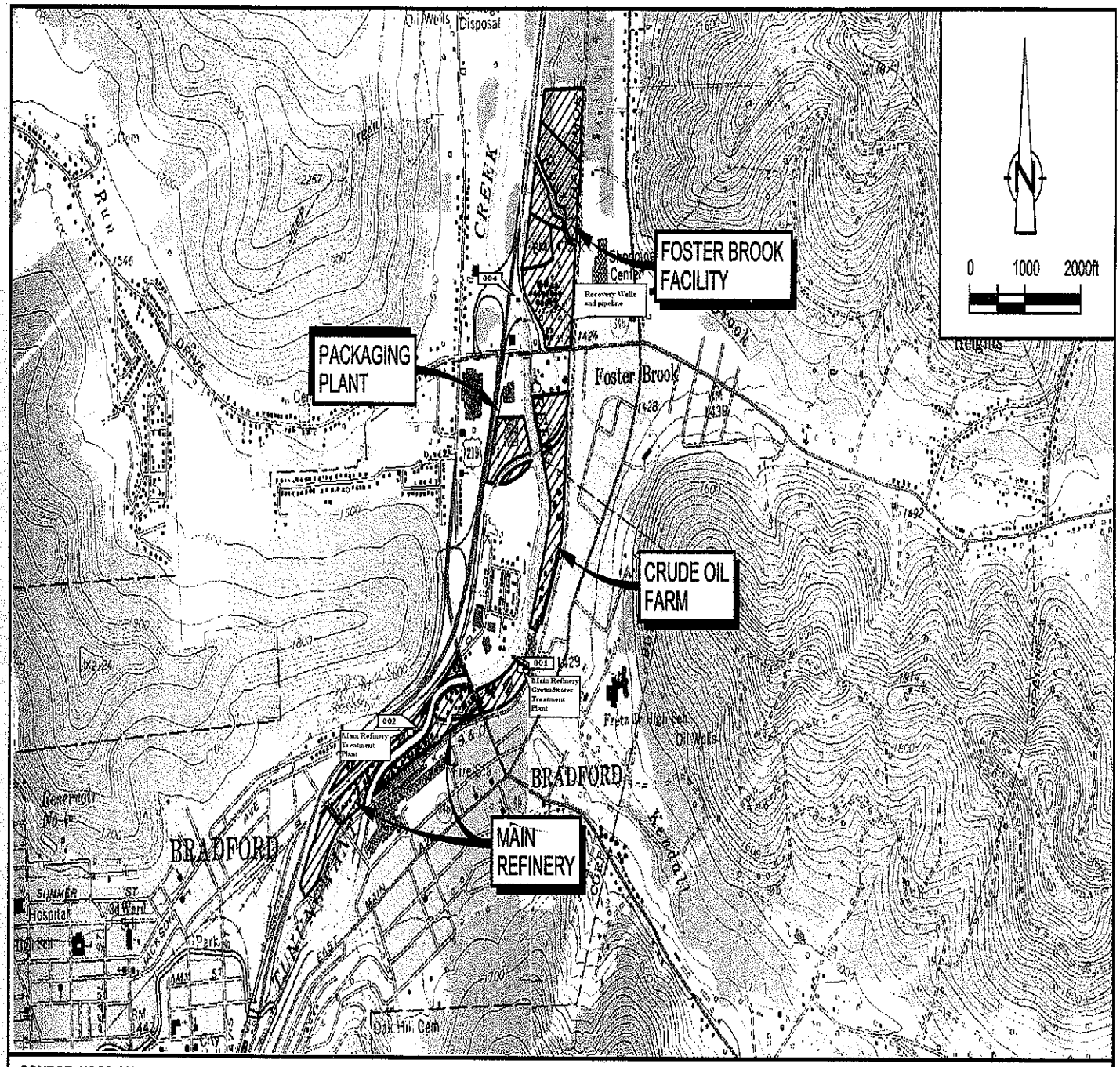

SOURCE: USGS QUADRANGLE MAP;
BRADFORD, PENNSYLVANIA
1969, PHOTOREVISED 1977, REVISED 1981
DERRICK CITY, PENNSYLVANIA
1969, PHOTOREVISED 1983, REVISED 1986

PENNSYLVANIA

figure 2.1

SITE LOCATION

ARG Refinery, Bradford, Pennsylvania

30984-30(017)GN-WA004 DEC 07/2007