UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

September 28, 2017

Michael Harris
Environmental Compliance Manager
New Castle County Dept. of Special Services
187-A Old Churchmans Road
New Castle, DE 19720

Michael Sherrier, Chairman
Army Creek Landfill Remedial Trust
Du Pont Corporation Remediation Group
974 Centre Road
Chestnut Run Plaza 715-230
Wilmington, DE 19805

Re: Army Creek Landfill Superfund Site, New Castle, Delaware

Dear Mr. Harris and Mr. Sherrier:

This letter is to notify you of EPA's determination that additional field investigations are necessary at the Army Creek Landfill Site (Site) to determine if the remedial action continues to be protective of human health and the environment. This letter is also a request that New Castle County and the Army Creek Landfill Remedial Trust (collectively the "Settlors") undertake those additional field investigations pursuant to Section VIII.B of the Consent Decree in United States v. BP America, Inc., et al., Civil Action Nos. 91-409 JJF and 91-418 (Consent Decree).

Background

EPA's Fourth Five-Year Review Report for the Site, dated September 8, 2014 (2014 FYR), recommended an evaluation of the sources, fate and transport of dissolved metals in the Upper Potomac Aquifer to assess the potential for Site impacts at Artesian Water Company's Llangollen well field. In response, New Castle County's consultant, Ruth Associates, Inc., submitted a draft report in December 2016, evaluating the stability of manganese, iron and cobalt in groundwater in the vicinity of the Army Creek and Delaware Sand & Gravel Landfills and Artesian's Llangollen well field. The draft report identifies statistically significant increases in the concentrations of these metals at monitoring well P-4, located downgradient of the western lobe of the Army Creek Landfill, between 2006 and 2016. In addition, based on Ruth Associates' semi-annual monitoring reports, 1,2-dichloroethane has frequently been detected in groundwater samples collected from well P-4 at concentrations that exceed the MCL. Furthermore, perfluorooctanoic acid (PFOA) and/or perfluorooctanyl sulfonate (PFOS) have been detected at levels of concern in monitoring wells located downgradient of the Army Creek Landfill, including wells P-4, MW-29 and MW-31 (see attached Table 2 from Golder Associates' April 2017 *Addendum to Semi-Annual Monitoring Report July – December 2016*).

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Necessary Actions to be Implemented

Based on the recommendations in the 2014 FYR, EPA has determined that additional investigations are necessary at the Site. Specifically, additional Site characterization field work is needed to determine: 1) the extent of the dissolved metals and 1,2-dichloroethane contamination in groundwater within the Upper Potomac Aquifer downgradient of the western lobe of the Army Creek Landfill; 2) whether the Army Creek Landfill is a source of per- and polyfluoroalkyl substances (PFAS) in groundwater within the Upper Potomac Aquifer; and 3) the vulnerability of the Llangollen well field to contaminant releases from the western lobe of the Army Creek Landfill.

In accordance with Section VIII.B of the Consent Decree, EPA requests that, within thirty (30) days of your receipt of this letter, the Settlors submit a work plan for additional Site characterization activities to EPA and DNREC. The work plan should include, but not be limited to, the following: a comprehensive summary of known Site conditions, including a conceptual site model (CSM); a discussion of data gaps; the methodology for obtaining information to address the data gaps and update the CSM; data quality objectives; a sampling and analysis plan; a health and safety plan; and a schedule for completing field investigations and submitting a supplemental Site characterization report to EPA and DNREC.

If you have any questions, please call me at (215) 814-3228.

Sincerely,

Debra Rossi

Debra Rossi
Remedial Project Manger
DE, VA, WV Remedial Branch

Attachment

cc: Christina Wirtz, DNREC
George Weiner, Esq.
Margaret Hill, Esq.
John Andrade, Esq.
Charlie Root, EPA
Michael Hendershot, Esq., EPA

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

			Sample ID	DDA-05			DDA-01			DDA-02			DDA-03			DDA-07-US			DDA-10-US			DDA-11-LS			DDA-11-US			DDA-12-US			DDA-15-US			DGC-8S			DGC-8D			DGC-10D			DGC-10S		
			Sample Date	9/27/2016			9/27/2016			9/28/2016			9/29/2016			10/10/2016			10/5/2016			9/27/2016			9/27/2016			9/29/2016			10/6/2016			10/6/2016			10/6/2016			9/29/2016			9/29/2016		
			N=Normal, FD=Field Duplicate	N			N			N			N			N			N			N			N			N			N			N			N			N			N		
Parameter	Unit	CAS	HA	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL
Perfluorohexanoic acid	ng/l	307-24-4	NE	29	J-	1	29		1	25		1	61		1	25		1	43	J	1	25		1	27		1	60		1	21		1	31	J-	1	13		1	21		1	20		1
Perfluoroheptanoic acid	ng/l	375-85-9	NE	13		1	22		1	22	J-	1	48	J-	1	16		1	23	J	1	20	J+	1	23		1	34		1	17		1	8		1	8		1	13		1	13		1
Perfluorooctanoic acid (PFOA)	ng/l	335-67-1	70	76	J-	1	180		1	150		1	600		10	150		1	180	J	1	140		1	150		1	230		1	200		1	34		1	49		1	110		1	38		1
Perfluorononanoic acid	ng/l	375-95-1	NE	2	J	1	10		1	12		1	12		1	9		1	7	J	1	10	J	1	13		1	13		1	5	J+	1	5		1	3	J+	1	3		1	13		1
Perfluorodecanoic acid	ng/l	335-76-2	NE		U	1	2	J+	1	1	J	1	7		1	1	J	1	2	J	1	2	J+	1	3		1	2	J	1	1	J+	1	2		1	1	J+	1	5		1	12		1
Perfluoroundecanoic acid	ng/l	2058-94-8	NE		U	2		U	2		U	2		UJ	2		U	2		UJ	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2	4	J	2
Perfluorododecanoic acid	ng/l	307-55-1	NE		UJ	3		U	3		U	3		UJ	3		U	3		UJ	3		U	3		U	3		U	3		U	3		U	3		U	3		U	3		U	3
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		UJ	2		U	2		U	2		UJ	2		U	2		UJ	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		UJ	3		U	3		U	3		UJ	3		U	3		UJ	3		U	3		U	3		U	3		U	3		U	3		U	3		U	3		U	3
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		UJ	4		UJ	4	6	J	4		U	4		U	4		UJ	4		UJ	4		UJ	4		U	4		U	4		U	4		U	4		U	4		U	4
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE		U	4	41		4	19		4	73		4	21		4	53	J	4	14	J+	4	7	J	4	25		4	26		4		U	4	17		4	35		4	18		4
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70	7	J	5	29		5	18		5	64		5	19		5	16	J+	5	14	J	5	23		5	19		5	22		5		U	5	12		5	24		5	15		5
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		U	4		U	4		UJ	4	4	J	4		U	4		UJ	4		U	4		U	4		UJ	4		U	4		U	4		U	4		UJ	4		UJ	4
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE		UJ	5		UJ	5		U	5		UJ	5		U	5		UJ	5		UJ	5		UJ	5		U	5		U	5		U	5		U	5		UJ	5		UJ	5
Total PFOA + PFOS	ng/l	NA	70	83			209			168			664			169			196			154			173			249			222			34			61			134			53		

Table 2
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Delaware Sand & Gravel Superfund Site
New Castle, Delaware

			Sample ID	DDA-16-US			DDA-17			DGC-2S			DGC-5			DGC-5			DGC-7S			MHW-1D			DGC-11D			DGC-11S			RT-1-UP			UPA-01			UPA-02D			UPA-02S			UPA-03D		
			Sample Date	9/27/2016			9/28/2016			9/27/2016			10/10/2016			10/10/2016			10/10/2016			10/6/2016			10/3/2016			10/3/2016			10/5/2016			10/6/2016			9/29/2016			9/29/2016			10/3/2016		
			N=Normal, FD=Field Duplicate	N			N			N			FD			N			N			N			N			N			N			N			N			N			FD		
Parameter	Unit	CAS	HA	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL
Perfluorohexanoic acid	ng/l	307-24-4	NE	29		1	57		1	34		1	44		1	55		1	23		1	``		1	22	J	1		UJ	1	3		1	38	J-	1	27		1	44		1	45	J	1
Perfluoroheptanoic acid	ng/l	375-85-9	NE	20	J+	1	34	J+	1	23	J+	1	29		1	31	J+	1	16		1	31		1	12	J	1		UJ	1		U	1	23		1	18		1	21		1	26	J	1
Perfluorooctanoic acid (PFOA)	ng/l	335-67-1	70	200		1	290		1	200		1	160		1	190		1	130		1	280		1	43	J+	1		UJ	1	2		1	120		1	180		1	60		1	170	J	1
Perfluorononanoic acid	ng/l	375-95-1	NE	7	J	1	7	J+	1	9	J+	1	5	J+	1	6	J+	1	10		1	13	J+	1	13	J	1		UJ	1		U	1	6		1	9		1	2		1	8	J	1
Perfluorodecanoic acid	ng/l	335-76-2	NE	1	J+	1	2	J+	1		U	1		U	1		U	1	1	J	1	2		1	3	J	1		UJ	1		U	1	5		1	3		1		U	1	13	J+	1
Perfluoroundecanoic acid	ng/l	2058-94-8	NE		U	2		U	2		U	2		U	2		U	2		U	2		U	2		UJ	2		UJ	2		U	2		U	2		U	2		U	2		UJ	2
Perfluorododecanoic acid	ng/l	307-55-1	NE		U	3		U	3		U	3		U	3		U	3		U	3		U	3		UJ	3		UJ	3		U	3		U	3		U	3		UJ	3		UJ	3
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		U	2		U	2		U	2		U	2		U	2		U	2		U	2		UJ	2		UJ	2		U	2		U	2		U	2		UJ	2		UJ	2
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		U	3		U	3		U	3		U	3		U	3		U	3		U	3		UJ	3		UJ	3		U	3		U	3		U	3		UJ	3		UJ	3
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		UJ	4		U	4		UJ	4		U	4		U	4		U	4		U	4		UJ	4		UJ	4		U	4		U	4		U	4		U	4		UJ	4
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE	17		4	56	J+	4	6	J	4	7	J	4	7	J	4	9	J	4	14		4		UJ	4		UJ	4		U	4	52		4	34		4	5	J	4	110	J+	4
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70	17	J+	5	34	J+	5	12	J+	5	9	J	5	12		5	15		5	16		5	7	J+	5		UJ	5		U	5	29		5	21		5		U	5	50	J+	5
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		U	4		U	4		U	4		U	4		U	4		U	4		U	4		UJ	4		UJ	4		U	4		U	4		UJ	4		UJ	4		UJ	4
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE		UJ	5		U	5		UJ	5		U	5		U	5		U	5		U	5		UJ	5		UJ	5		U	5		U	5		UJ	5		UJ	5		UJ	5
Total PFOA + PFOS	ng/l	NA	70	217			324			212			169			202			145			296			50			0			2			149			201			60			220		

Table 2
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Delaware Sand & Gravel Superfund Site
New Castle, Delaware

			Sample ID	UPA-03D			AWC-E1			AWC-E1			BW-1			BW-2			MW-18			MW-26N			MW-28			MW-29			MW-29			MW-31			MW-34			P-4_UPA			P-5L		
			Sample Date	10/3/2016			10/13/2016			10/13/2016			10/4/2016			10/4/2016			10/7/2016			10/3/2016			10/5/2016			10/5/2016			10/5/2016			10/5/2016			10/7/2016			10/14/2016			10/7/2016		
			N=Normal, FD=Field Duplicate	N			FD			N			N			N			N			N			N			FD			N			N			N			N			N		
Parameter	Unit	CAS	HA	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL
Perfluorohexanoic acid	ng/l	307-24-4	NE	51	J	1	29		1	29		1	25	J	1	20	J	1	28	J-	1	20	J	1	40		1	30	J	1	31	J	1	40	J-	1	18		1	86		1	9		1
Perfluoroheptanoic acid	ng/l	375-85-9	NE	29	J+	1	16		1	16		1	16	J	1	13	J	1	20		1	11	J+	1	23		1	19	J	1	19	J	1	28		1	10		1	33		1	5	J+	1
Perfluorooctanoic acid (PFOA)	ng/l	335-67-1	70	180	J	1	86		1	84		1	130	J	1	83	J	1	150	J-	1	87	J	1	54		1	130	J	1	120	J	1	190	J-	1	66		1	170		1	35		1
Perfluorononanoic acid	ng/l	375-95-1	NE	8	J+	1	10		1	10		1	10	J+	1	9	J	1	6		1	4	J+	1	3	J+	1	9	J	1	9	J	1	6		1	5		1	68		1	1	J+	1
Perfluorodecanoic acid	ng/l	335-76-2	NE	13	J+	1	2		1	3		1		UJ	1	2	J	1	2	J	1	1	J+	1		U	1	2	J	1	2	J	1		U	1		U	1	1	J	1		U	1
Perfluoroundecanoic acid	ng/l	2058-94-8	NE		UJ	2		U	2		U	2		UJ	2		UJ	2		U	2		UJ	2		U	2		UJ	2		UJ	2		U	2		U	2		U	2		U	2
Perfluorododecanoic acid	ng/l	307-55-1	NE		UJ	3		U	3		U	3		UJ	3		UJ	3		U	3		UJ	3		U	3		UJ	3		UJ	3		UJ	3		U	3		U	3		U	3
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		UJ	2		U	2		U	2		UJ	2		UJ	2		U	2		UJ	2		U	2		UJ	2		UJ	2		UJ	2		U	2		U	2		U	2
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		UJ	3		U	3		U	3		UJ	3		UJ	3		U	3		UJ	3		U	3		UJ	3		UJ	3		UJ	3		U	3		U	3		U	3
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		UJ	4		U	4		U	4		UJ	4		UJ	4		U	4		UJ	4	6	J	4		UJ	4		UJ	4	4	J	4		U	4	29		4		U	4
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE	110	J	4	10	J	4	9	J	4	16	J	4	11	J	4	25		4	17	J	4	8	J	4	10	J	4	10	J	4	10		4	14		4	190		4	7	J	4
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70	55	J+	5	11		5	10	J	5	18	J+	5	17	J	5	47		5	11	J+	5	9	J	5	120	J	5	130	J	5	100		5	14		5	28		5	5	J	5
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		UJ	4		U	4		U	4		UJ	4		UJ	4		U	4		UJ	4		U	4		UJ	4		UJ	4		U	4		U	4		U	4		U	4
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE		UJ	5		U	5		U	5		UJ	5		UJ	5		U	5		UJ	5		U	5		UJ	5		UJ	5	25		5		U	5		U	5		U	5
Total PFOA + PFOS	ng/l	NA	70	235			97			94			148			100			197			98			63			250			250			290			80			198			40		

Table 2
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Delaware Sand & Gravel Superfund Site
New Castle, Delaware

			Sample ID	P-5U			P-6_UPA			UPA-101-TZ			UPA-101-US			AWC-E1			AWC-E2			AWC-E2			AWC-K1		
			Sample Date	10/7/2016			9/28/2016			9/28/2016			9/28/2016			10/13/2016			10/13/2016			10/13/2016			10/13/2016		
			N=Normal, FD=Field Duplicate	N			N			N			N			N			N			N			N		
Parameter	Unit	CAS	HA	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL
Perfluorohexanoic acid	ng/l	307-24-4	NE	46		1	38	J-	1	47	J-	1	52		1	30		1	30		1	33		1	7		1
Perfluoroheptanoic acid	ng/l	375-85-9	NE	23		1	33		1	22	J+	1	29	J+	1	15	J+	1	12		1	15		1	4	J+	1
Perfluorooctanoic acid (PFOA)	ng/l	335-67-1	70	76		1	140	J-	1	130		1	210		1	76		1	110		1	130		1	23		1
Perfluorononanoic acid	ng/l	375-95-1	NE	8		1	10		1	4		1	8		1	12	J+	1	6		1	5		1	2	J+	1
Perfluorodecanoic acid	ng/l	335-76-2	NE	4		1	4		1		U	1	5		1	4		1	3		1	3		1		U	1
Perfluoroundecanoic acid	ng/l	2058-94-8	NE	5		2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Perfluorododecanoic acid	ng/l	307-55-1	NE		U	3		U	3		U	3		U	3		U	3		U	3		UJ	3		U	3
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		U	2		U	2		U	2		U	2		U	2		U	2		UJ	2		U	2
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		U	3		U	3		U	3		U	3		U	3		U	3		UJ	3		U	3
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		U	4		U	4		U	4		U	4		U	4		U	4		U	4		U	4
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE		U	4	44		4	8	J	4	50	J+	4	8	J	4	30		4	26		4	6	J	4
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70		U	5	21		5		U	5	37		5	11		5	14		5	15		5	6	J	5
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		U	4		U	4		UJ	4		U	4		U	4		U	4		U	4		U	4
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE		U	5		U	5		UJ	5		U	5		U	5		U	5		U	5		U	5
Total PFOA + PFOS	ng/l	NA	70	76			161			130			247			87			124			145			29		

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Notes:
Green highlight = Concentration exceeds HA

Abbreviations:
HA = the May 19, 2016 USEPA health advisory (HA) of 70 nanograms per liter (ng/l; parts per trillion [ppt]) for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and/or the combined concentrations of PFOA and PFOS
ng/L = nanograms per liter
Qual = interpreted qualifier
RDL = reporting detection limit
NE = standard does not exist
PFCs = perfluorinated compounds
Qualifiers:
J - The analyte is present; however, the reported value may not be accurate or precise.
J+ - The analyte is present; however, the reported value may not be accurate or precise. The result is biased high.
J- - The analyte is present; however, the reported value may not be accurate or precise. The result is biased low.
U - not detected above RDL
UJ - not detected above RDL, RDL is estimated

Prepared by: AZ
Checked by: BPC
Reviewed by: RWB