TABLES

Table 1
Sludge Drying Site Well Information
Remedial Investigation and Risk Assessment Addendum
Hay Road Sludge Drying Site (DE-024)
Wilmington, Delaware

DuPont Well ID	DNREC Permit #	Location		Elevation		Interpreted Hydrogeologic Zone
		Northing	Easting	Inner Casing		
		DE State Plane	NAD 83 (meters)	NAVD 88 (feet)	NAVD 88 (meters)	
MW-33R	109881	192629.3831	192236.6243	20.52	6.25	DM:LPU
MW-34A	71338	192626.3558	192240.2471	19.34	5.89	DM:WBZ
MW-35	NA	192301.0927	192375.0216	21.25	6.48	DM:WBZ
MW-36A	98879	192295.8050	192373.3888	20.87	6.36	DM:WBZ
MW-37	NA	192187.5020	192311.6071	22.42	6.83	FA
MW-40	NA	192406.7294	191906.8900	22.87	6.97	FA
MW-41A	98877	192404.9396	191901.8998	21.17	6.45	DM:WBZ
MW-46R	181521	192622.9851	192241.3044	20.59	6.28	DM:WBZ
MW-47R	181646	192414.3395	191895.2929	21.56	6.57	DM:WBZ
MW-71	221921	192325.9313	192197.1578	17.33	5.28	DM:WBZ
MW-72	221922	192190.1418	192311.3911	21.77	6.64	DM:WBZ
MW-73	221923	192526.2093	192330.4699	20.13	6.14	DM:WBZ
PILE-1*	221924	192497.5060	192211.4208	46.20	14.08	DM:WBZ

Notes:

Surveyed March 13, 2008, by S. Mead and D. Phillips (URS), except for MW-47R, which was damaged.
Information for MW-47R is from November 14, 2001, survey.
DM:WBZ: Dredge Material Water-Bearing Zone
DM:LPU: Dredge Material Low Permeability Unit
FA: First Aquifer
NA: Not Available
*Temporary well

Table 2
Hydraulic Conductivity Summary
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Wilmington, Delaware

Sample Location	Sample Depth (ft bgs)	Elevation (ft) NAVD88	Measurement Orientation	Sample Type	Hydraulic Conductivity (cm/sec)		
					Measured Values	Harmonic Mean at Sample Location	Notes
Staged Iron-Rich Material (IRM)							
Pile-1	4.0	41.6	vertical	lab	1.20E-05	2.81E-07	Representative value calculated as arithmetic mean of harmonic means from Piles 1, 2, and 3.
	23.3	22.3	vertical	lab	4.70E-07		
	28.2	17.4	vertical	lab	1.30E-07		
	34.8	10.8	vertical	lab	2.30E-07		
Pile-2	3.3	42.3	vertical	lab	2.40E-05	8.41E-06	
	26.4	19.2	vertical	lab	5.10E-06		
Pile-3	3.3	34.5	vertical	lab	1.30E-06	1.30E-06	
Dredge Material Low Permeability Unit (DM:LPU) Within IRM Pile Footprint							
Pile-1	41.3	4.3	vertical	lab	3.30E-08	4.03E-08	Representative value calculated as arithmetic mean of harmonic mean from Piles 1, 2, 3, 4, 5, 6.
	44.4	1.2	vertical	lab	3.90E-08		
	46.9	-1.3	vertical	lab	5.40E-08		
Pile-2	31.7	13.9	vertical	lab	6.30E-08	6.04E-08	
	37.2	8.4	vertical	lab	5.80E-08		
Pile-3	29.5	8.3	vertical	lab	6.50E-08	6.50E-08	
Pile-4	4.3	12.4	vertical	lab	3.10E-07	3.10E-07	
Pile-5	2.9	13.2	vertical	lab	4.70E-06	2.33E-07	
	5.8	10.3	vertical	lab	3.50E-06		
	6.7	9.4	vertical	lab	1.50E-07		
	8.4	7.7	vertical	lab	1.00E-07		
Pile-6	3.0	12.1	vertical	lab	2.20E-07	2.20E-07	
Dredge Material Low Permeability Unit (DM:LPU) Outside of IRM Pile Footprint							
MW-72	4.7	14.2	vertical	lab	1.40E-04	1.40E-04	Measurements outside of IRM footprint are not representative of vertical flow through IRM.
MW-73	7.6	10.0	vertical	lab	1.50E-07	1.50E-07	
MW-33R	15.3-19.3	1.1	horizontal	slug test	2.60E-05	2.60E-05	
T-8	6-9	8.0	vertical	lab	4.70E-07	4.70E-07	
PZ-14	22-23.3	5.0	vertical	lab	1.10E-05	1.10E-05	
PZ-15	22-24	7.0	vertical	lab	1.70E-06	1.70E-06	
T-23	12-14	-3.0	vertical	lab	4.30E-07	4.30E-07	
Dredge Material Water-Bearing Zone (DM:WBZ)							
MW PILE-1	47-54	-4.9	horizontal	slug test	2.10E-04	2.10E-04	Representative value for horizontal flow in WBZ calculated as geometric average.
MW-71	10.5-15.5	2.1	horizontal	slug test	1.60E-03	1.60E-03	
MW-72	18-24	-2.0	horizontal	slug test	3.53E-04	3.53E-04	
MW-73	20-27	-5.9	horizontal	slug test	4.23E-03	4.23E-03	

Notes:

bgs = below ground surface
ft = feet
cm/sec = centimeters per second
Includes earlier Dredge Material results from outside the Sludge Drying Area.

Table 3
Additional Supplemental Investigation Geotechnical Sample Results
Remedial Investigation and Risk Assessment Addendum
Hay Road Sludge Drying Site (DE-024)
Wilmington, Delaware

Hay Road Sludge Drying Site - Supplemental Investigation Geotechnical Laboratory Testing Summary											
IDENTIFICATION TESTS											
Boring No.	Depth (ft)	Water Content (%)	USCS Class. (1)	Sieve Minus NO. 200 (%)	Hydro. % Minus 2 mm (%)	Organic Content (burnoff) (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Assumed Specific Gravity (2)	Hydraulic Conductivity (cm/sec)	Comments
PILE-1	2.5-5						85.7				Staged IRM
PILE-1	2.65	103.8									Staged IRM
PILE-1	3.1	101.2									Staged IRM
PILE-1	3.65	109.1									Staged IRM
PILE-1	4	99.5	OH	79.7	36	18.3	91.9	46.1	3.206	1.2E-5	Staged IRM
PILE-1	4.2	107.0									Staged IRM
PILE-1	21-23						94.1				Staged IRM
PILE-1	21.6	100.8									Staged IRM
PILE-1	22.05	104.7									Staged IRM
PILE-1	22.6	108.1									Staged IRM
PILE-1	23.3	103.2	OH	89.2	*	22.0	93.4	46.0	3.528	4.7E-7	Staged IRM - flocculation
PILE-1	28.25	37.2	OH	90.1	25	6.5	114.4	83.4	2.849	1.3E-7	Staged IRM
PILE-1	34-36						94.6				Staged IRM
PILE-1	34	92.8									Staged IRM
PILE-1	34.6	95.3									Staged IRM
PILE-1	34.8	121.8	OH	88.6	*	19.4	89.5	40.4	3.482	2.3E-7	Staged IRM - flocculation
PILE-1	38-40						106.1				DM:LPU
PILE-1	38.9	37.1									DM:LPU
PILE-1	38.35	97.4									DM:LPU
PILE-1	39.65	36.0									DM:LPU

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IDENTIFICATION TESTS											
Boring No.	Depth (ft)	Water Content (%)	USCS Class. (1)	Sieve Minus NO. 200 (%)	Hydro. % Minus 2 mm (%)	Organic Content (burnoff) (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Assumed Specific Gravity (2)	Hydraulic Conductivity (cm/sec)	Comments
PILE-1	40.5-43						108.6				DM:LPU
PILE-1	41.05	35.3									DM:LPU
PILE-1	41.35	32.7	OL	92.1	25	5.2	115.0	86.7	2.621	3.3E-8	DM:LPU
PILE-1	41.65	35.9									DM:LPU
PILE-1	42.2	57.2									DM:LPU
PILE-1	43-45.5						94.0				DM:LPU
PILE-1	43.6	59.8									DM:LPU
PILE-1	43.6	40.4									DM:LPU
PILE-1	44.15	53.2									DM:LPU
PILE-1	44.4	58.3	OL	92.2	38	7.6	104.6	66.1	2.661	3.9E-8	DM:LPU
PILE-1	44.7	65.1									DM:LPU
PILE-1	45.5-48						94.8				DM:LPU
PILE-1	46	71.1									DM:LPU
PILE-1	46.55	66.5									DM:LPU
PILE-1	46.9	64.8	OH	97.8	43	9.7	99.2	60.2	2.392	5.4E-8	DM:LPU
PILE-1	47.1	60.5									DM:LPU
PILE-2	2-4						90.8				Staged IRM
PILE-2	2.5	113.5									Staged IRM
PILE-2	3.05	110.1									Staged IRM
PILE-2	3.3	111.7	PT	86.1	34	13.2	92.2		3.682	2.4E-5	Staged IRM
PILE-2	25-27						102.2				Staged IRM
PILE-2	25.65	72.8									Staged IRM
PILE-2	26.2	81.0									Staged IRM
PILE-2	26.45	75.2	OH	63.7	*	8.1	104.2	59.5	4.041	5.1E-6	Staged IRM - flocculation

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IDENTIFICATION TESTS											
Boring No.	Depth (ft)	Water Content (%)	USCS Class. (1)	Sieve Minus NO. 200 (%)	Hydro. % Minus 2 mm (%)	Organic Content (burnoff) (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Assumed Specific Gravity (2)	Hydraulic Conductivity (cm/sec)	Comments
PILE-2	30-32						102.5				DM:LPU
PILE-2	30.35	114.5									DM:LPU
PILE-2	30.9	90.7									DM:LPU
PILE-2	31.45	62.5									DM:LPU
PILE-2	31.7	62.4	OH	85.4	*	13.4	109.4	67.4	3.665	6.3E-8	DM:LPU - flocculation observed
PILE-2	35.5-37.5						97.1				DM:LPU
PILE-2	35.9	54.5									DM:LPU
PILE-2	36.45	54.7									DM:LPU
PILE-2	37	68.4									DM:LPU
PILE-2	37.25	67.5	OH	98.9	41	12.0	99.3	59.3	2.764	5.8E-8	DM:LPU
PILE-3	2-4						91.9				Staged IRM
PILE-3	2.55	107.8									Staged IRM
PILE-3	3.1	84.3									Staged IRM
PILE-3	3.35	113.5	OH	83.2	32	13.0	93.0	43.6	3.692	1.3E-6	Staged IRM
PILE-3	28-30						93.7				DM:LPU
PILE-3	28.75	84.4									DM:LPU
PILE-3	29.3	69.8									DM:LPU
PILE-3	29.55	65.7	OH	98.3	44	9.6	96.8	58.4	2.546	6.5E-8	DM:LPU
PILE-4	3-5						99.3				DM:LPU
PILE-4	3.55	178.1									DM:LPU
PILE-4	4.1	37.1									DM:LPU
PILE-4	4.35	36.3	OL	94.2	25	5.9	115.7		2.745	3.1E-7	DM:LPU
PILE-5	2-4						118.6				DM:LPU
PILE-5	2.65	28.7									DM:LPU

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IDENTIFICATION TESTS											
Boring No.	Depth (ft)	Water Content (%)	USCS Class. (1)	Sieve Minus NO. 200 (%)	Hydro. % Minus 2 mm (%)	Organic Content (burnoff) (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Assumed Specific Gravity (2)	Hydraulic Conductivity (cm/sec)	Comments
PILE-5	2.9	28.1	OL	90.8	24	4.6	121.6	95.0	2.740	4.7E-6	DM:LPU - vertical root observed
PILE-5	4-6						113.8				DM:LPU
PILE-5	4.45	27.0									DM:LPU
PILE-5	5.0	32.3									DM:LPU
PILE-5	5.55	57.7									DM:LPU
PILE-5	5.8	52.0	OH	97.7	38	6.7	104.7	68.9	2.616	3.5E-6	DM:LPU - vertical root observed
PILE-5	6-8						108.8				DM:LPU
PILE-5	6.45	32.7									DM:LPU
PILE-5	6.7	50.4	OH	91.6	27	7.8	107.4	71.4	2.814	1.5E-7	DM:LPU
PILE-5	7.0	33.1									DM:LPU
PILE-5	7.55	70.7									DM:LPU
PILE-5	8-10										DM:LPU
PILE-5	8.15	50.0									DM:LPU
PILE-5	8.4	60.0	OH	81.5	33	5.2	103.5	64.6	2.751	1.0E-7	DM:LPU
PILE-6	2-4						105.2				DM:LPU
PILE-6	2.2	41.6									DM:LPU
PILE-6	2.75	56.8									DM:LPU
PILE-6	3.0	45.5	OL	96.7	11	7.8	109.0	74.9	2.654	2.2E-7	DM:LPU
PILE-6	3.3	36.7									DM:LPU
MW-72	4-6						99.3				DM:LPU
MW-72	4.15	77.6									DM:LPU
MW-72	4.7	71.8									DM:LPU

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IDENTIFICATION TESTS											
Boring No.	Depth (ft)	Water Content (%)	USCS Class. (1)	Sieve Minus NO. 200 (%)	Hydro. % Minus 2 mm (%)	Organic Content (burnoff) (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Assumed Specific Gravity (2)	Hydraulic Conductivity (cm/sec)	Comments
MW-72	4.75	70.4	OH	93.0	37	8.2	96.6	56.7	2.785	1.4E-4	DM:LPU - vertical root observed
MW-72	5.2	85.9									DM:LPU
MW-73	6-8						96.7				DM:LPU
MW-73	6.3	68.4									DM:LPU
MW-73	6.85	67.5									DM:LPU
MW-73	7.4	62.9									DM:LPU
MW-73	7.65	67.8	OH	97.4	37	10.4	97.5	58.1	2.676	1.5E-7	DM:LPU

Notes:

(1) Unified Soil Classification System (USCS) based on observation or sieve analysis.
(2) Assumed value for Specific Gravity, based on permeability saturation data
IRM - Iron Rich Material
DM:LPU - Dredge Material Low Permeability Unit
cm/sec = centimeters per second
*IRM - flocculation observed

Table 4
Summary of COCs by Media
Remedial Investigation and Risk Assessment Addendum
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Wilmington, Delaware

Analytes	Primary IRM COC[2]	2004 RI/RA						2007/2008 Supplemental Investigation[1]										URS[5]			
		Staged IRM		DM:LPU		GW[3]		Staged IRM		DM:LPU		GW[4]		SW		SED		Soil	GW	SW	SED
		Max Detect mg/kg	No. Detects > URS / No. Samples	Max Detect mg/kg	No. Detects > URS / No. Samples	Max Detect ug/L	No. Detects > URS / No. Samples	Max Detect mg/kg	No. Detects > URS / No. Samples	Max Detect mg/kg	No. Detects > URS / No. Samples	Max Detect ug/L	No. Detects > URS / No. Samples	Max Detect ug/L	No. Detects > URS / No. Samples	Max Detect mg/kg	No. Detects > URS / No. Samples				
Metals																					
Antimony	X	2.14E+00	0/3	ND (2.1)	-	NA	-	ND (10)	-	ND (1.5)	-	1.16E+01	1/6	NA	-	1.90E+00	0/3	8.20E+01	6.00E+00	3.00E+01	2.00E+00
Arsenic	X	1.49E+01	1/3	6.20E+00	0/3	1.84E+01	1/1	5.73E+00	0/7	4.97E+01	9/14	8.42E+01	6/6	ND (10)	-	1.68E+01	3/3	1.10E+01	1.00E+01	1.50E+02	8.20E+00
Iron	X	2.34E+05	3/3	9.62E+04	2/3	3.87E+05	16/16	3.32E+05	7/7	4.49E+04	0/14	1.22E+06	6/6	7.37E+03	2/2	4.25E+04	-	6.10E+04	3.00E+02	1.00E+03	-
Manganese	X	2.82E+04	3/3	5.86E+03	1/3	3.63E+04	16/16	3.60E+04	7/7	1.32E+03	0/14	1.17E+05	6/6	8.45E+02	2/2	7.92E+02	-	4.10E+03	5.00E+01	8.00E+01	-
Thallium	X	5.87E+01	0/3	4.90E+00	0/3	NA	-	1.87E+01	0/7	1.94E+00	0/14	1.10E+02	3/6	NA	-	5.57E+00	-	2.20E+02	2.00E+00	9.00E+00	-
Organics																					
Hexachlorobenzene	X	5.50E+01	6/8	1.20E+00	0/3	NA	-	1.90E+01	4/7	ND (0.057)	0/14	ND (1)	0/6	NA	-	NA	-	3.60E+00	1.00E+00	7.50E-04	-
Hexachlorobutadiene	X	4.80E+00	0/8	1.40E-01	0/3	NA	-	2.20E+00	0/7	ND (0.11)	0/14	ND (1)	0/6	NA	-	NA	-	7.30E+01	1.00E+00	4.40E-01	-
Octachlorostyrene[6]	X	NA	-	NA	-	NA	-	ND (0.66)	-	ND (0.52)	-	ND (10)	-	NA	-	ND (0.62)	-	-	-	-	-
Pentachlorobenzene	X	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	1.60E+02	3.00E+00	5.00E-01	7.00E-01
Polychlorinated biphenyls (PCBs)																					
PCB 209	X	1.61E+00	-	NA	-	NA	-	6.71E-01	-	1.51E-01	-	1.31E-03	-	2.35E-03	-			-	-	-	-
Total PCBs		1.63E+00	1/8	ND	-	NA	-	7.25E-01	0/7	1.22E+00	2/14	5.96E-03	0/6	2.20E-02	2/2	1.87E-01	3/3	1.00E+00	5.00E-01	2.00E-03	2.00E-03
Chlorinated Dioxin/Furans																					
OCDF	X	9.67E-01	-	NA	-	NA	-	1.27E+00	-	8.11E-03	-	3.87E-05	-	4.39E-05	-	3.99E-04	-	-	-	-	-
2,3,7,8-TCDD		ND (9.30E-07)	-	NA	-	NA	-	ND (1.39E-06)	-	3.25E-06	0/14	ND (1.63E-06)	-	ND (1.40E-06)	-	9.11E-07	-	4.00E-05	1.00E-05	-	-
1,2,3,7,8,9-HxCDD		3.46E-06	0/5	NA	-	NA	-	ND (8.75E-03)	-	3.83E-05	0/14	ND (4.07E-06)	-	ND (3.55E-06)	-	7.88E-06	-	1.00E-03	3.00E-05	-	-
Additional Parameters[7]																					
Acetone								2.40E-01	0/7	1.10E-01	0/14	6.90E+01	1/6	NA	-	NA	-	5.00E+03	6.10E+01	1.50E+03	9.10E-03
Aluminum		2.45E+04	0/3	1.31E+04	0/3	NA	-	2.30E+04	0/7	3.52E+04	0/14	4.54E+02	1/6	NA	-	2.40E+04	-	2.00E+05	2.00E+02	8.70E+01	-
Barium		3.78E+02	0/3	2.63E+02	0/3	NA	-	2.74E+02	0/7	9.04E+02	0/14	1.07E+04	1/6	NA	-	1.24E+02	3/3	1.40E+04	2.00E+03	4.00E+00	2.00E+01
Cadmium		6.00E-01	0/3	ND (8.4E-02)	-	3.40E+00	0/1	4.01E+01	0/7	8.25E+00	0/14	3.33E+01	1/6	ND (0.9)	-	9.27E-01	0/3	1.00E+02	5.00E+00	1.00E+00	1.20E+00
Copper		5.61E+01	0/3	1.45E+02	0/3	ND (2.6)	-	4.73E+01	0/7	4.80E+02	0/14	1.12E+01	0/6	7.30E+00	0/2	5.47E+01	3/3	8.20E+03	1.30E+03	1.20E+01	3.40E+01
Lead		8.10E+02	0/3	1.45E+02	0/3	ND (8.9)	-	5.41E+02	0/7	3.92E+02	0/14	ND (6.9)	-	1.03E+01	1/2	6.41E+01	3/3	1.00E+03	1.50E+01	3.00E+00	4.67E+01
Mercury		4.84E-01	0/3	3.00E-01	0/3	NA	-	4.45E-02	0/7	1.53E+00	0/14	ND (1.1)	-	NA	-	2.36E-01	2/3	6.10E+02	2.00E+00	1.00E+00	1.50E-01
Nickel		2.27E+02	0/3	9.24E+01	0/3	2.50E+01	0/15	3.12E+02	0/7	1.81E+02	0/14	9.10E+00	0/6	NA	-	3.71E+01	3/3	4.10E+03	1.00E+02	1.60E+02	2.10E+01
Selenium		1.39E+01	0/3	7.40E+00	0/3	ND (4.8)	-	ND (10.8)	0/7	4.24E+00	0/14	1.37E+01	0/6	9.50E+00	1/2	2.50E+00	-	1.00E+03	5.00E+01	4.00E-01	-
Silver		9.50E+00	0/3	2.20E+00	0/3	NA	-	1.05E+01	0/7	8.12E+00	0/14	2.45E+01	0/6	NA	-	1.35E+00	2/3	1.00E+03	1.00E+02	4.00E-01	1.00E+00
Vanadium		6.25E+02	0/3	4.78E+02	0/3	NA	-	2.68E+03	7/7	1.03E+02	0/14	8.73E+01	1/6	NA	-	7.24E+01	-	1.40E+03	2.60E+01	1.90E+01	-
Zinc		3.28E+02	0/3	2.91E+02	0/3	3.34E+03	1/15	4.10E+02	0/7	1.10E+03	0/14	ND (162)	-	NA	-	2.70E+02	3/3	6.10E+04	2.00E+03	1.10E+02	1.50E+02
Chloride		NA	-	NA	-	8.10E+06	18/19	8.06E+04	-	2.57E+04	-	3.67E+07	6/6	9.56E+05	2/2	1.69E+03	-	-	2.50E+05	2.30E+05	-

NA - Not analyzed
ND - Not detected at stated reporting limit.

1 - Summary of SI data collected by DuPont, field duplicates included.
2 - Primary IRM constituents of concern (COCs) defined to include 1) constituents identified by EPA as major COCs in the Agency's groundwater risk assessment for Iron Rich (EPA, 2000) and 2) constituents identified by DuPont based on process knowledge.
3 - Data from first-water bearing zone location MW-36A collected between 1993 and 2002. For metals, dissolved (filtered) analyses shown.
4 - Data from first-water bearing zone locations sampled during SI (MW-36A, MW-71, MW-72, MW-73 and PILE-1-WBZ).
5 - DNREC uniform risk-based standards (URS), 12/99. Value for chloride is National Secondary Drinking Water Standard (groundwater) or National Ambient Water Quality Criteria (surface water).
6 - Octachlorostyrene results from DNREC split samples.
7 - List of other detected constituents identified above DNREC's generic URS values.

Highlighted yellow cells indicate an exceedance of screening criteria.

Table 5
RAIS Risk Calculator Output
Remedial Investigation and Risk Assessment Addendum
Hay Road Sludge Drying Site (DE-024)
Wilmington, Delaware

On-Site Industrial Exposure Scenario
Exposure to Soil Pathways (IRM)

Analyte	CAS Number	Maximum Detected Concentration in Soil (mg/kg)	Ingestion of Soil HI	Inhalation of Soil Particulates and Volatiles HI	Dermal Soil HI	Total Soil HI	Ingestion of Soil Risk	Inhalation of Soil Particulates and Volatiles Risk	Dermal Soil Risk	Total Soil Risk
Hexachlorobenzene	118741	19	0.01	-	0.00	0.01	5.E-06	2.E-05	0.E+00	3.E-05
Iron	7439896	332000	0.2	-	0.0	0.2	-	-	-	-
Manganese	7439965	36000	0.4	0.1	0.0	0.5	-	-	-	-
Vanadium	7440622	2680	0.2	-	0.0	0.2	-	-	-	-
Total Risk/HI	-	-	0.8	0.1	0.0	1.0	5.E-06	**2.E-05**	0.E+00	**3.E-05**

Analyte	CAS Number	Average Detected Concentration in Soil (mg/kg)	Ingestion of Soil HI	Inhalation of Soil Particulates and Volatiles HI	Dermal Soil HI	Total Soil HI	Ingestion of Soil Risk	Inhalation of Soil Particulates and Volatiles Risk	Dermal Soil Risk	Total Soil Risk
Hexachlorobenzene	118741	8	0.005	-	0.000	0.005	2.E-06	1.E-05	0.E+00	1.E-05
Iron	7439896	273143	0.2	-	0.0	0.2	-	-	-	-
Manganese	7439965	27800	0.3	0.1	0.0	0.4	-	-	-	-
Vanadium	7440622	1386	0.1	-	0.0	0.1	-	-	-	-
*Total Risk/HI	-	-	0.6	0.1	0.0	0.7	2.E-06	1.E-05	0.E+00	1.E-05

On-Site Industrial Exposure Scenario
Exposure to Soil Pathways (DM)

Analyte	CAS Number	Maximum Detected Concentration in Soil (mg/kg)	Ingestion of Soil HI	Inhalation of Soil Particulates and Volatiles HI	Dermal Soil HI	Total Soil HI	Ingestion of Soil Risk	Inhalation of Soil Particulates and Volatiles Risk	Dermal Soil Risk	Total Soil Risk
Arsenic	7440382	50	0.08	-	0.00	0.08	1.E-05	2.E-08	0.E+00	1.E-05
Polychlorinated Biphenyls	1336363	1	-	-	-	-	4.E-07	1.E-07	0.E+00	5.E-07
Total Risk/HI	-	-	0.08	-	0.00	0.08	1.E-05	1.E-07	0.E+00	1.E-05

Analyte	CAS Number	Average Detected Concentration in Soil (mg/kg)	Ingestion of Soil HI	Inhalation of Soil Particulates and Volatiles HI	Dermal Soil HI	Total Soil HI	Ingestion of Soil Risk	Inhalation of Soil Particulates and Volatiles Risk	Dermal Soil Risk	Total Soil Risk
Arsenic	7440382	23	0.04	-	0.00	0.04	6.E-06	7.E-09	0.E+00	6.E-06
Polychlorinated Biphenyls (high risk)	1336363	0.5	-	-	-	-	2.E-07	5.E-08	0.E+00	2.E-07
*Total Risk/HI	-	-	0.04	-	0.00	0.04	6.E-06	5.E-08	0.E+00	6.E-06

Table 5
RAIS Risk Calculator Output
Remedial Investigation and Risk Assessment Addendum
Hay Road Sludge Drying Site (DE-024)
Wilmington, Delaware

On-Site Industrial Exposure Scenario
Exposure to Groundwater Pathways

Analyte	CAS Number	Concentration in Ground Water (mg/L)	Ingestion of Ground Water HI	Ingestion of Ground Water Risk
Acetone	67641	0.07	0.0008	-
Aluminum	7429905	0.5	0.004	-
Antimony	7440360	0.01	0.3	-
Arsenic	7440382	0.08	**3**	**4.E-04**
Barium	7440393	11	0.5	-
Cadmium	7440439	0.03	0.7	-
Chloride	16887006	36700	-	-
Iron	7439896	1140	**16**	-
Manganese	7439965	113	**24**	-
Thallium	7440280	0.1	-	-
Vanadium	7440622	0.1	0.1	-
Total Risk/HI	-	-	**44**	**4.E-04**

Notes:

HI = Hazard Index

Table 6
Summary of Closure Screening Levels
Remedial Investigation and Risk Assessment Addendum
Hay Road Sludge Drying Site (DE-024)
Wilmington, Delaware

COC[1]	Maximum Detect in Leachate/Pore Water (mg/L)	CSL_L (mg/L)[2]	Maximum Detect in Staged IRM (mg/kg)	CSL_S (mg/kg)[2]	Maximum Detect in GW (mg/L)	Groundwater Compliance Standard[3] (mg/L)
Metals						
Arsenic	<1.0E-02	2.46E+02	1.49E+01	4.91E+04	8.42E-02	5.08E-01
Iron	<5.2E-02	2.12E+04	3.32E+05	5.29E+05	1.22E+03	3.63E+03
Manganese	7.87E+00	2.30E+03	3.60E+04	3.31E+05	1.17E+02	2.90E+02
Organics						
Hexachlorobenzene	NA	1.40E+00	5.50E+01	1.54E+02	<1.0E-03	4.94E-04
Total PCBs	NA	5.82E-01	1.63E+00	3.60E+02	6.00E-06	2.87E-05

Notes:

1) Primary constituents of concern (COCs) identified above URS values in Staged IRM solids (see Table 4).

2) CSL - Derivation of closure screening levels (CSL) for Staged IRM leachate/pore water (CSL_L) and Staged IRM solids (CSL_S) presented in Appendix L. Values presented are the lowest of those derived for protection of human health or aquatic life.

3) Consistent with page 25 in the RI/RA report, groundwater compliance standards (CS) were calculated to represent the maximum detected concentration in groundwater, which will not exceed water quality criteria presented in Tables 3a-3c of Appendix L.

CS_{gw} = water quality criteria x $Flow_{river}$(600 cf/min)/$Flow_{gw}$(0.165 cf/min)

NA - Not analyzed in this sample