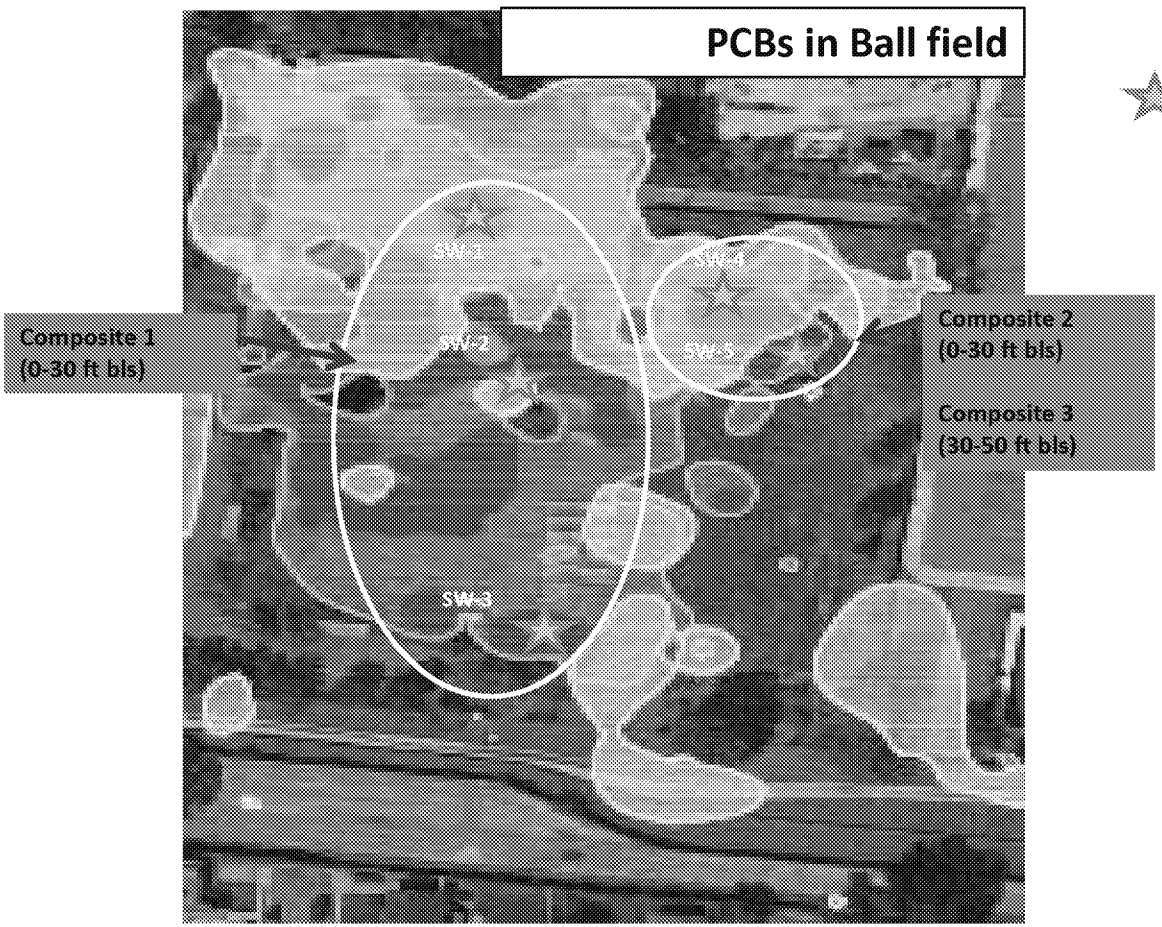
Soils Washing Treatability Plan



Proposed Soil Washing Treatability Boring Location

- Sample IDs SW-1 through SW-5
- The circled sets of borings will be composited at the lab
- Locations subject to mark out of utilities and review of soil type from existing borings

Key

PCBs > 1 ppm 0-2 ft

PCBs > 10 ppm 2-10 ft

PCBs > 50 ppm

Soil Washing Bench Test Summary
May 28, 2015

Field Work

- Collected five soil borings
  - SW-1 - 0-30 feet
  - SW-2 – 0-30 feet
  - SW-3 – 0-30 feet
  - SW-4 – 0-30 feet, 30-50 feet
  - SW-5 – 0-30 feet, 30-50 feet
- Cores shipped to ART in Tampa

Soil Washing Bench Test Summary
May 28, 2015

- Bench Work
  - Composite #1
    - SW-1 - 0-30 feet
    - SW-2 – 0-30 feet
    - SW-3 – 0-30 feet
  - Composite #2
    - SW-4 – 0-30 feet
    - SW-5 – 0-30 feet
  - Deep samples (30-50 feet) were sent just for visual observation
  - Composite samples shipped for analysis
  - Step #1 – physical separation performed on the composite samples

Table 1: Results Initial Soil Analysis - Composites 1, 2 and 3

Analytical Parameter	Units	Composite 1 NG-C1-01	Composite 2 NG-C2-01	NYSDEC Part 375 Restricted Residential SCO (0 - 40 ft)	Composite 3 NG-C3-01	NYSDEC Part 375 Protection of GW SCO (40 - 50 ft)
Acetone	mg/kg	0.014 J	N.D.	100	N.D.	0.05
Benzene	mg/kg	N.D.	N.D.	4.8	N.D.	0.06
Methyl Ethyl Ketone (2-Butanone)	mg/kg	N.D.	N.D.	100	N.D.	0.12
Carbon Disulfide	mg/kg	0.003 J	N.D.	NS	N.D.	NS
Carbon Tetrachloride	mg/kg	N.D.	N.D.	2.4	N.D.	0.76
Chlorobenzene	mg/kg	N.D.	N.D.	100	N.D.	1.1
Chloroform	mg/kg	N.D.	N.D.	49	N.D.	0.37
1,2-Dichlorobenzene	mg/kg	0.002 J	N.D.	100	N.D.	1.1
1,3-Dichlorobenzene	mg/kg	N.D.	N.D.	49	N.D.	2.4
1,4-Dichlorobenzene	mg/kg	N.D.	N.D.	13	N.D.	1.8
1,1-Dichloroethane	mg/kg	0.003 J	0.096 J	26	N.D.	0.27
1,2-Dichloroethane	mg/kg	N.D.	N.D.	3.1	N.D.	0.02
1,1-Dichloroethene	mg/kg	N.D.	N.D.	100	N.D.	0.33
cis-1,2-Dichloroethene	mg/kg	0.080	8.0	100	[redacted]	0.25
trans-1,2-Dichloroethene	mg/kg	N.D.	N.D.	100	N.D.	0.19
Ethylbenzene	mg/kg	0.003 J	8.0	41	[redacted]	1
Isopropylbenzene	mg/kg	0.002 J	1.3	NS	0.33	NS
Methyl Acetate	mg/kg	N.D.	1.3	NS	0.20 J	NS
Methyl Tertiary Butyl Ether	mg/kg	N.D.	N.D.	100	N.D.	0.93
Methylcyclohexane	mg/kg	0.024	0.99	NS	0.47	NS
Methylene Chloride	mg/kg	0.006	N.D.	100	N.D.	0.05
Tetrachloroethene	mg/kg	N.D.	0.51	19	0.062 J	1.3
Toluene	mg/kg	0.027	30	100	[redacted]	0.7
1,1,1-Trichloroethane	mg/kg	0.007	0.68	100	N.D.	0.68
Trichloroethene	mg/kg	0.067	[redacted]	21	[redacted]	0.47
Vinyl Chloride	mg/kg	0.004 J	0.26	0.9	N.D.	0.02
Xylene (Total)	mg/kg	0.012	47	100	[redacted]	1.6

Analytical Parameter	Units	Composite 1 NG-C1-01	Composite 2 NG-C2-01	NYSDEC CP-51 Treatment Goal	Composite 3 NG-C3-01	NYSDEC CP-51 Treatment Goal
Total PCBs	mg/kg	29	11	< 2 ft: 1 2-10ft: 10 >10 ft: 50	4.2	< 2 ft: 1 2-10ft: 10 >10 ft: 50

Analytical Parameter	Units	Composite 1 NG-C1-01	Composite 2 NG-C2-01	NYSDEC Part 375 Restricted Residential SCO	Composite 3 NG-C3-01	NYSDEC Part 375 Restricted Residential SCO
Arsenic	mg/kg	7.0	3.8 J	16	3.5 J	16
[redacted]	mg/kg	[redacted]	[redacted]	4.3	2.9	4.3
[redacted]	mg/kg	[redacted]	[redacted]	180	[redacted]	180

NS: Standard not Specified in "Allowable Constituent Levels for Imported Fill or Soil Subdivision 5.4 (e)
N.D.: Not Detected
J: J-Flag represents Estimated Value
[redacted]
Exceeds PCB treatment goal for 0-10 ft bls
Exceeds PCB treatment goal for 0-2 ft bls

Soil Particle Size Distribution

Fraction	Composite C1 SW1+SW2+SW3 (0 - 30 ft)	Composite C2 SW4+SW5 (0 - 30 ft)	Average
	Distribution	Distribution	Distribution
	(%)	(%)	(%)
+12.5 mm	8.9%	10.4%	9.6%
4.75-12.5 mm	13.4%	15.1%	14.3%
2.0-4.75 mm	14.3%	15.7%	15.0%
1.0-2.0 mm	11.8%	12.7%	12.3%
0.5-1.0 mm	17.4%	19.8%	18.6%
0.25-0.5 mm	16.4%	15.3%	15.8%
0.125-0.25 mm	4.8%	3.7%	4.3%
0.063-0.125mm	2.1%	1.6%	1.8%
0.038-0.063 mm	2.0%	0.9%	1.5%
<0.038 mm (fines)	8.7%	4.8%	6.8%
Total	100.0%	100.0%	100.0%

Projected Soil Washing Plant Product Mass Distribution on Dry Weight Basis

Product	Composites 1 & 2 (0-30 ft) Average
Washed Gravel (>2.0 mm)	38.9%
Washed Sand (0.063 - 2.0 mm)	52.8%
Fines (<0.063 mm)	8.3%
Total	100.0%

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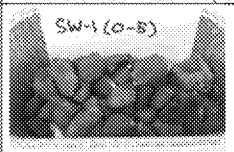
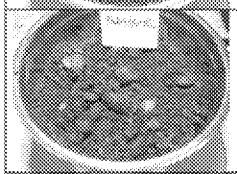
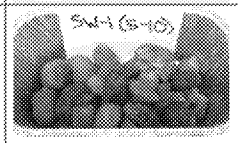
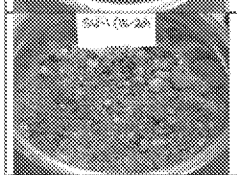
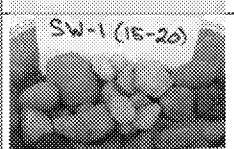
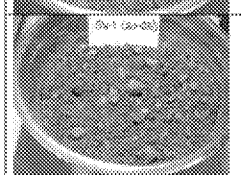
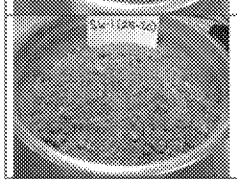
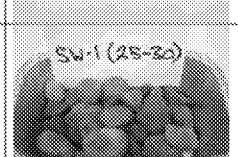
Boring SW1 (0 – 30 ft) – Soil Lithology

Soil Core Sample as Received	Oversize Fraction +12.5 mm (+0.5")	Comments
		Gravelly Sand No odor
		Gravelly Sand "Very Light" VOC odor
		Gravelly Sand No odor
		Gravelly Sand No odor
		Gravelly Sand No odor
		Gravelly Sand No odor

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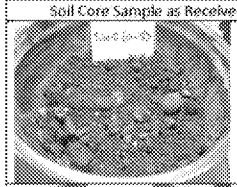
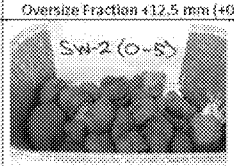
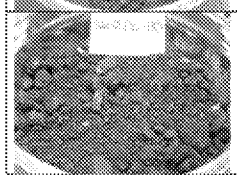
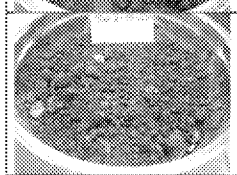
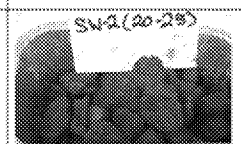
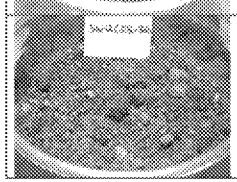
Boring SW2 (0 – 30 ft) – Soil Lithology

Soil Core Sample as Received	Oversize Fraction +12.5 mm (+0.5")	Comments
		Gravelly Sand No odor
		Gravelly Sand "Very Light" VOC odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC odor

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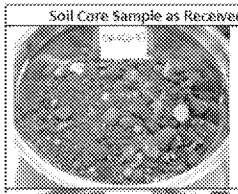
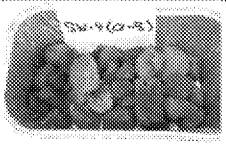
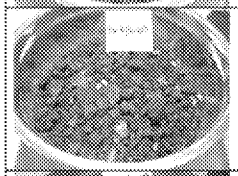
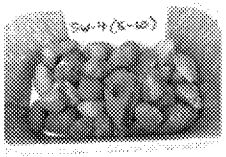
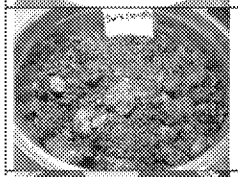
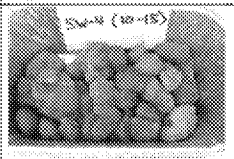
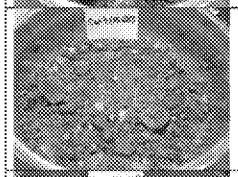
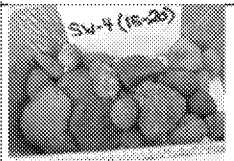
Boring SW4 (0 – 30 ft) – Soil Lithology

Soil Core Sample as Received	Oversize Fraction +12.5 mm (+0.5")	Comments
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Moderate" VOC Odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC odor

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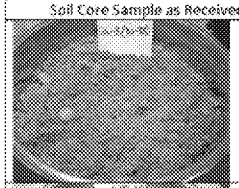
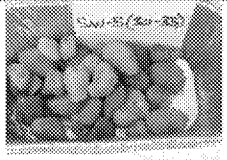
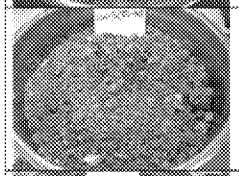
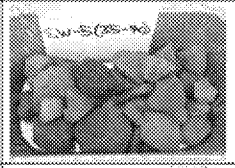
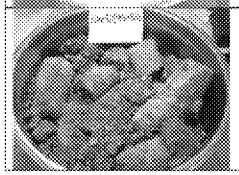
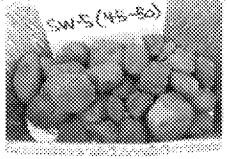
Boring SW4 (30 – 50 ft) – Soil Lithology

Soil Core Sample as Received	Oversize Fraction +12.5 mm (+0.5")	Comments
		Gravelly Sand "Light" VOC odor
		Gravelly Sand with "Light" VOC odor
		Silty Clay with some Sand and Gravel
		Silty Clay with some Gravel

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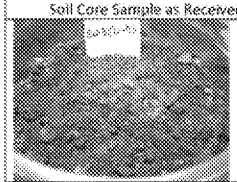
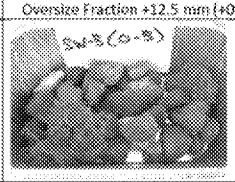
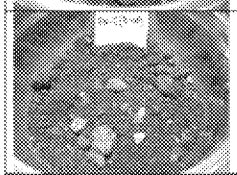
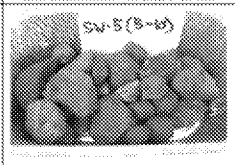
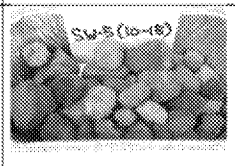
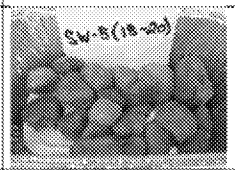
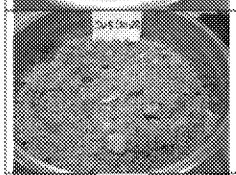
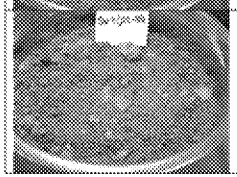
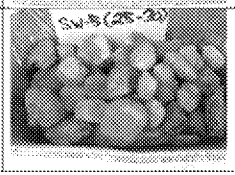
Boring SW5 (0 – 50 ft) – Soil Lithology

Soil Core Sample as Received	Oversize Fraction +12.5 mm (+0.5")	Comments
		Gravelly Sand No odor
		Gravelly Sand No odor
		Gravelly Sand "Light" VOC odor
		Gravelly Sand "Light" VOC Odor
		Gravelly Sand No odor
		Gravelly Sand "Very Light" odor

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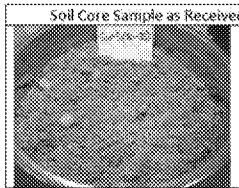
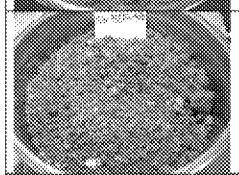
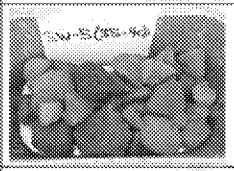
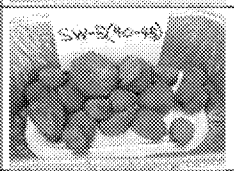
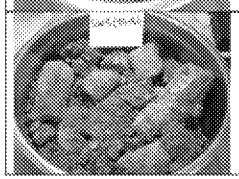
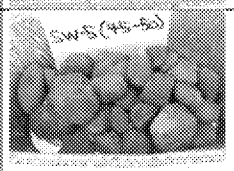
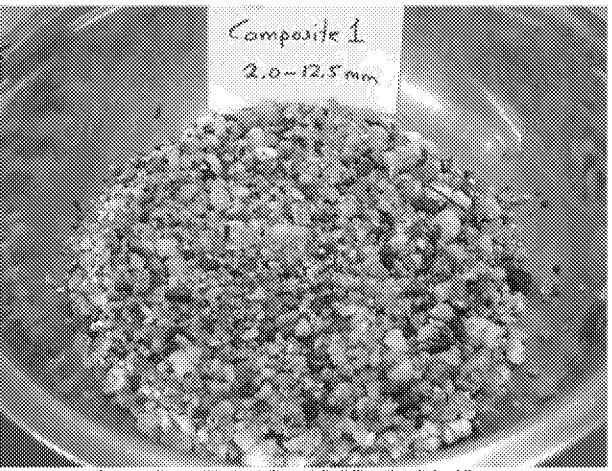
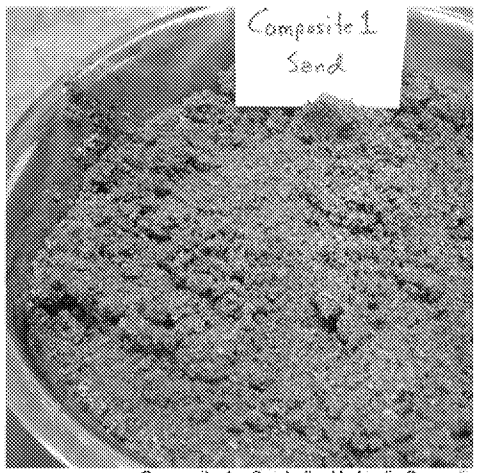
Boring SW4 (30 – 50 ft) – Soil Lithology

Soil Core Sample as Received	Oversize Fraction +12.5 mm (+0.5")	Comments
		Gravelly Sand "Light" VOC odor
		Gravelly Sand with "Light" VOC odor
		Silty Clay with some Sand and Gravel
		Silty Clay with some Gravel



Composite 1 - Washed Gravel Soil Fraction 2.0 - 25 mm

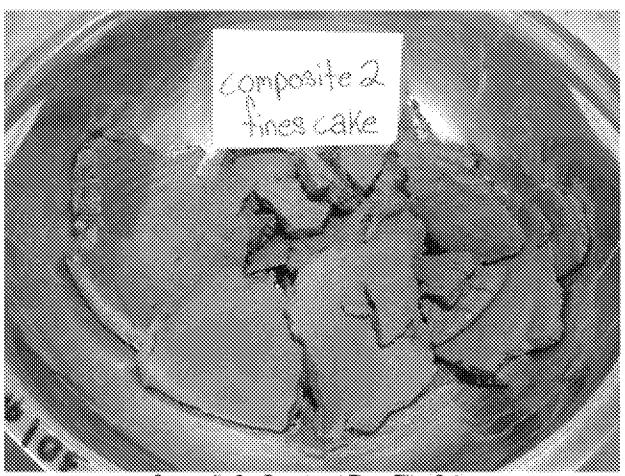
Composite 2 - Washed Gravel Soil Fraction 2.0 - 25 mm



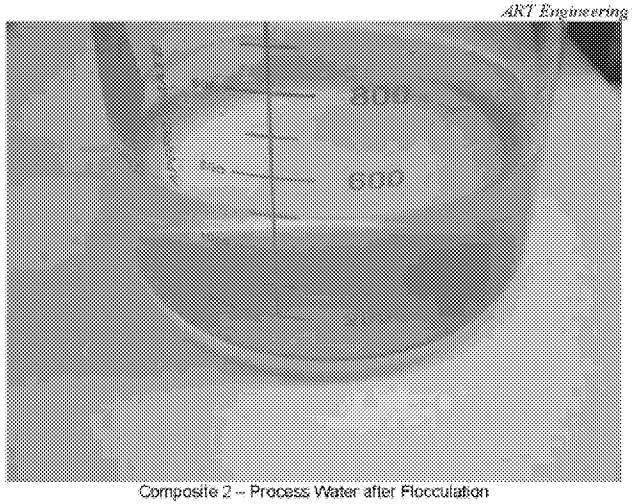
Composite 1 – Sand after Hydraulic Separatic

Composite 2 – Sand after Hydraulic Separatic

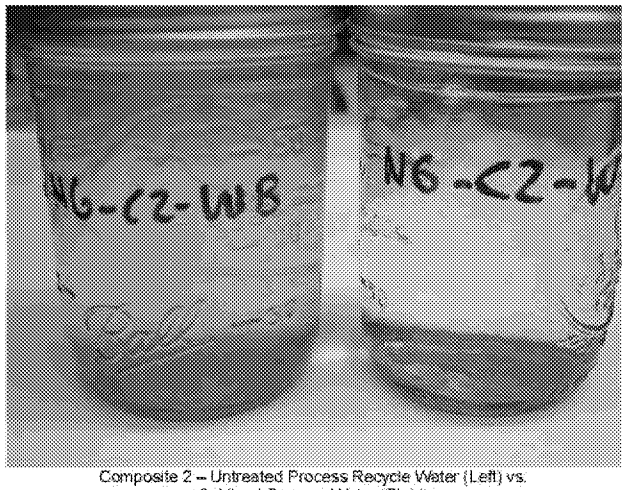
Composite 1 – Dewatered Fines Filter Cake



Composite 2 – Dewatered Fines Filter Cake



Composite 2 – Process Water after Flocculation



Composite 2 – Untreated Process Recycle Water (Left) vs.
Oxidized Process Water (Right)

Table 2: Results Basic Soil Washing Separation - Composite 1

Analytical Parameter	Units	Soil < 12.5 mm NG-C1-01	Oversize 2.0-12.5 mm NG-C1-02	Sand after Hydraulic Separation NG-C1-03	Sand after Hydraulic Separation & Scrubbing NG-C1-05	Fines Filter Cake NG-C1-04	NYSDEC Part 375 Restricted Residential SCO (0 - 40 ft)
Acetone	mg/kg	0.014 J	N.D.	0.044	0.051	0.028 J	100
Benzene	mg/kg	N.D.	0.001 J	0.002 J	0.001 J	N.D.	4.8
Methyl Ethyl Ketone (2-Butanone	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Carbon Disulfide	mg/kg	0.003 J	N.D.	N.D.	N.D.	0.004 J	NS
Carbon Tetrachloride	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	2.4
Chlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Chloroform	mg/kg	N.D.	N.D.	N.D.	N.D.	0.006 J	49
1,2-Dichlorobenzene	mg/kg	0.002 J	N.D.	N.D.	N.D.	0.002 J	100
1,3-Dichlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	49
1,4-Dichlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	13
1,1-Dichloroethane	mg/kg	0.003 J	N.D.	N.D.	N.D.	0.013 J	26
1,2-Dichloroethane	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	3.1
1,1-Dichloroethene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
cis-1,2-Dichloroethene	mg/kg	0.060	0.021	0.035	0.022	0.49	100
trans-1,2-Dichloroethene	mg/kg	N.D.	N.D.	N.D.	N.D.	0.003 J	100
Ethylbenzene	mg/kg	0.003 J	0.006	0.013	0.009	0.048	41
Isopropylbenzene	mg/kg	0.002 J	N.D.	N.D.	N.D.	0.005 J	NS
Methyl Acetate	mg/kg	N.D.	0.004 J	N.D.	N.D.	N.D.	NS
Methyl Tertiary Butyl Ether	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Methylcyclohexane	mg/kg	0.024	N.D.	0.002 J	N.D.	0.040	NS
Methylene Chloride	mg/kg	0.006	N.D.	0.003 J	0.004 J	N.D.	100
Tetrachloroethene	mg/kg	N.D.	0.007	0.016	0.010	0.009	19
Toluene	mg/kg	0.027	0.050	0.024	0.064	0.14	100
1,1,1-Trichloroethane	mg/kg	0.007	N.D.	N.D.	N.D.	0.004 J	100
Trichloroethene	mg/kg	0.067	0.072	0.130	0.062	5.6	21
Vinyl Chloride	mg/kg	0.004 J	N.D.	0.002 J	N.D.	0.017	0.9
Xylene (Total)	mg/kg	0.012	0.013	0.028	0.041	0.097	100
Total PCBs	mg/kg	29	2.1	7.1	3.0	130	< 2 ft: 1 2-10ft: 10 >10 ft: 50
Metals							
Arsenic	mg/kg	7.0	2.2 J	0.92 J	1.1 J		16
	mg/kg		0.93	0.65 J	0.42 J		4.3
	mg/kg		16	22	79		180

NS: Standard not Specified in "Allowable Constituent Levels for Imported Fill or Soil Subdivision 5.4 (e)

N.D.: Not Detected

J: J-Flag represents Estimated Value

Soil Parameters Meet Backfill Criteria for > 2 ft bls

Table 3: Results Basic Soil Washing Separation - Composite 2

Analytical Parameter	Units	Soil < 12.5 mm NG-C2-01	Oversize 2.0-12.5 mm NG-C2-02	Sand after Hydraulic Separation NG-C2-03	Sand after Hydraulic Separation & Scrubbing NG-C2-05	Fines Filter Cake NG-C2-04	NYSDEC Part 375 Restricted Residential SCO (0 - 40 ft)
Acetone	mg/kg	N.D.	0.018 J	N.D.	N.D.	N.D.	100
Benzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	4.8
Methyl Ethyl Ketone (2-Butanone)	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Carbon Disulfide	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	NS
Carbon Tetrachloride	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	2.4
Chlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Chloroform	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	49
1,2-Dichlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
1,3-Dichlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	49
1,4-Dichlorobenzene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	13
1,1-Dichloroethane	mg/kg	0.096 J	N.D.	N.D.	N.D.	0.24 J	26
1,2-Dichloroethane	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	3.1
1,1-Dichloroethene	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
cis-1,2-Dichloroethene	mg/kg	6.0	0.043	1.0	0.72	23	100
trans-1,2-Dichloroethene	mg/kg	N.D.	N.D.	N.D.	N.D.	0.10 J	100
Ethylbenzene	mg/kg	8.0	0.076	1.8	0.76	16	41
Isopropylbenzene	mg/kg	1.3	0.011	0.37	0.18 J	2.8	NS
Methyl Acetate	mg/kg	1.3	N.D.	0.12 J	0.12 J	1.6	NS
Methyl Tertiary Butyl Ether	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Methylcyclohexane	mg/kg	0.99	0.003 J	0.21 J	0.066 J	1.3	NS
Methylene Chloride	mg/kg	N.D.	N.D.	N.D.	N.D.	N.D.	100
Tetrachloroethene	mg/kg	0.51	0.011	0.34	0.15	2.8	19
Toluene	mg/kg	30	0.24	4.5	1.5	35	100
1,1,1-Trichloroethane	mg/kg	0.66	0.005 J	0.14 J	N.D.	1.4	100
Trichloroethene	mg/kg		0.15	3.4	1.1	35	21
Vinyl Chloride	mg/kg	0.28	0.002 J	0.094 J	0.095 J	0.31 J	0.9
Xylene (Total)	mg/kg	47	0.48	12	5.3	84	100
Total PCBs	mg/kg	11	2.6	1.0	3.6	58	< 2 ft: 1 2-10ft: 10 >10 ft: 50
Metals							
Arsenic	mg/kg	3.6 J	1.7 J	3.6 J	N.D.		16
	mg/kg		1.5	2.9	2.2		4.3
	mg/kg						180

NS: Standard not Specified in "Allowable Constituent Levels for Imported Fill or Soil Subdivision 5.4 (e)

N.D.: Not Detected

J: J-Flag represents Estimated Value

Soil Parameters Meet Backfill Criteria for > 2 ft bls