NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
REGION 3 OFFICE

Leachate Investigation
at
Mamaroneck Taylor Lane Leaf Compost Site
Site Number 360021

December 2004

Leachate Investigation at Mamaroneck Taylor Lane Leaf Compost Site (Site Number 360021)

Sampling carried out by

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Division of Environmental Remediation
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Report prepared by Steven Parisio

December 13, 2004

Table of Contents

Executive Summary

I. Background

II. Methods

III. Results & Discussion

IV. Conclusions & Recommendations

Tables

Figures

Appendix A. Laboratory Report

Appendix B. Background Levels of Heavy Metals in Soils of the Lower Hudson Valley

Executive Summary

The Mamaroneck Taylor Lane Compost Site is a former landfill located in the Village of Mamaroneck, Westchester County and is listed as a "Class 2" site on NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites. After the site was capped, problems developed with uncontrolled discharges of leachate onto adjacent properties. On November 2, 2004, staff from NYSDEC and NYSDOH collected samples of water, sediments and soil to assess the potential impact of these discharges on public health and environmental quality. Specifically, samples were collected to determine whether orange-colored iron flocculate deposits contain elevated concentrations of arsenic similar to what has been found in similar deposits at a number of solid waste landfills. Sample collection points included the interior (basement) of a residence adjacent to the landfill, the lawn of a second adjacent residence, a stormwater drain entering a catch basin on Taylor Lane, a stream flowing into Magid Pond, and soil in a seep area along the shoulder of Taylor Lane. All samples exhibited arsenic concentrations which exceed the NYSDEC recommended soil cleanup objective (7.5 mg/kg). In three of the samples, arsenic exceeded the range characteristic of natural soils in the lower Hudson Valley region (2.2 - 23.1 mg/kg) and in two of the samples, arsenic exceeded the (aquatic life) "severe effects level" for sediments (33.0 mg/Kg). Water samples from these locations did not indicate the presence of high strength or concentrated leachate. It is recommended that these results be evaluated by the Department of Health to determine if arsenic found in sediments and soils on the residential properties poses a theat to public health. It is also recommended that an evaluation be done by the Division of Fish, Wildlife & Marine Resources to determine if arsenic in sediment poses a threat to wildlife. Regardless of the outcome of these evaluations, it is apparent that the landfill cap is not effective in preventing leachate generation and migration. The Village will be required to evaluate and implement further remedial measures.

I. Background:

The "Mamaroneck Taylor Lane Leaf Compost Site" is a former sand and gravel mine and solid waste management facility located on an eight acre property in the Village of Mamaroneck, Westchester County. Waste management activities carried out at the site have included composting of leaves and disposal of various wastes including land clearing debris, municipal solid waste, industrial waste, drums and incinerator ash. The site was placed on the NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites in December of 1988 as a "Class 2" site. The Village entered into an Order on Consent in August of 1989 and carried out a Remedial Investigation/Feasibility Study. The alternative selected for remediation of the site was construction of a 6 NYCRR Part 360 cap with a contingency of adding a slurry wall and containment wells if groundwater monitoring indicate that capping is not effective in preventing contaminant migration. A Record of Decision was issued in December of 1993, construction of the cap was completed in the spring of 1997, and the site is now in the monitoring and maintenance phase.

Subsequent to capping of the site, problems developed with migration of leachate onto adjacent

residential properties. At one residence, leachate or leachate-impacted groundwater is infiltrating into the basement where it is collecting in a sump. Operation of a sump pump is required to prevent flooding of the basement. At a second residence, leachate is discharging to the surface and ponding on the front and side lawn areas. In both cases, the discharge can be identified as leachate or leachate impacted groundwater based on the presence of an orange-colored ferric hydroxide flocculate or "iron floc" which is characteristic of leachate discharge zones downgradient of many solid waste landfills. Evidence of leachate discharge (iron floc) is also present at other points downgradient of the landfill including Magid Pond, a catch basin on Taylor Lane, several flowing (artesian) monitoring wells, and a seepage zone along the Taylor Lane road shoulder.

Recent experience with monitoring of landfills by the NYSDEC/Region 3 Solid Waste Program indicates that iron floc deposits associated with landfill leachate discharge zones often contain arsenic at concentrations which exceed levels of concern applicable to soils or sediments. If present at the Mamaroneck Taylor Lane Compost Site, such elevated concentrations of arsenic could pose a risk to public health or wildlife habitat because of the site's proximity to sensitive environmental receptors including residential properties and surface water bodies. To address this specific concern, a limited sampling event was carried out on November 2, 2004, by staff from NYSDEC and the New York State Department of Health, as described below. This sampling is intended to provide data which supplements that obtained through routine monitoring carried out by the Village.

II. Methods:

Samples were collected from five locations along the perimeter of the site. At each location, one aqueous sample and one solid sample was collected. Sample location points are shown in Figure 1, which is a digital (infrared) orthophoto of the site and its surrounding area. The orthophoto was downloaded from the "New York State GIS Clearinghouse" website (http://www.nysgis.state.ny.us) and represents conditions in the period between year 2000 and 2003. Sample collection points are described below and are illustrated in Figures 2 through 8.

Sample 1 was a liquid sample collected from a sump in the basement of a residence on Shadow Lane, adjacent to the landfill, on its eastern perimeter. Sample 2 consisted of iron floc deposits removed from the sump by the homeowner using a wet/dry vacuum dedicated for that purpose. Since the homeowner had cleaned out the sump just prior to our visit, the floc deposits were sampled from the vacuum. Prior to placing the sample into the sample jar, a plastic pail was used to allow partial settling of the suspended floc deposits and concentration of the solids by decanting the supernatant liquid.

Sample 3 was a liquid sample collected from a ponded area on the lawn of a residence located on Shadow Lane at the southeast perimeter of the landfill. A peristaltic pump with dedicated plastic tubing was used to collect the sample. Sample 4 was a soil sample taken as a composite from several locations in the lawn area where surface soils exhibited orange or gray staining

characteristic of leachate discharge areas.

Sample 5 was a liquid sample taken from a small stream which discharges through a culvert under Taylor Lane and flows into Magid Pond. The sample was collected by dipping and pouring from a laboratory-cleaned, unpreserved sample bottle. Sample 6 was a sample of iron floc suspended in surface water in the stream which flows into Magid Pond. The sample was collected using a clean plastic scoop. An attempt was made to concentrate the solids by decanting liquid over the sides of the scoop prior to placement in the sample bottle and by periodically decanting from the sample bottle after allowing the contents to settle.

Sample 7 was a liquid sample collected from a catch basin on Taylor Lane, on the western perimeter of the site. A peristaltic pump with dedicated plastic tubing was used to collect this sample. Sample 8 was a sample of thick iron floc deposit accumulated in a drain pipe entering into the catch basin. This sample was collected using a clean plastic scoop.

Sample 9 was a sample of groundwater collected using a disposal bailer, from monitoring well MW-2S, which is installed as a flush-mount well in the Taylor Lane road surface. At the time of the sampling, this was a flowing well and a brownish iron-staining was observed on the road surface in the area wetted by the discharging groundwater. Sample 10 was a soil sample taken as a composite from several locations in the Taylor Lane road shoulder where surface soils exhibited orange or gray staining.

Immediately after sampling, all samples were placed in an insulated cooler and transported to Severn Trent Laboratories in Newburgh, NY for analysis. Samples were delivered to the lab within four hours of collection.

Liquid samples were analyzed for leachate indicator parameters including chloride, alkalinity, ammonia and chemical oxygen demand. Solid samples were analyzed for total arsenic, iron, aluminum and manganese. Results of the analyses are summarized in Tables 1 and 2, and are discussed below. A copy of the laboratory report is attached as Appendix A.

III. Results & Discussion:

Sample 2 (residential basement), sample 6 (Magid Pond) and sample 8 (Taylor Lane storm drain) all exhibited a relatively high iron hydroxide content (40 to 50 % of dry weight) consistent with a fairly pure deposit of iron flocculate. Measured concentrations do not approach 100% because the digestion method used, EPA Method 3050B, is not a total digestion method and because variable proportions of the sample mass may be attributable to other minor components such as alumina, silica, and organic carbon (iron bacterial biomass).

Arsenic concentrations in all three iron floc samples (samples 2, 6 and 8) exceeded the range of background concentrations found in natural soils of the lower Hudson Valley Region. That range was reported to be between 2.2 and 23.1 mg/Kg in a study carried out by staff from the

NYSDEC's Region 3/Solid Waste Program. (A copy of that study is provided as Appendix B.) The arsenic concentration found in two of the iron floc samples (samples 2 and 8) was also well in excess of the NYSDEC guidance value (aquatic life severe effects level) for sediments which is 33 mg/Kg. Whether or not this poses a threat to aquatic life will require further evaluation. Sample 2 was collected within the interior of a residence where there would be no wildlife exposure. Sample 8, which was collected within a storm drain, is of greater concern because stormwater flowing through the drain discharges into the Magid Pond wetland area. The key environmental sample with respect to wildlife impact was sample 6, collected in Magid Pond. This sample exhibited an arsenic concentration of 25.8 mg/Kg, which is below the severe effects level (33.0 mg/kg) but above the least effects level (6 mg/Kg).

Other findings which may have significance for wildlife or wildlife habitat include iron, which exceeded the severe effects level (4%) in all samples, and manganese, which exceeded the severe effects level (1,000 ppm) in samples 2 and 8.

Unlike samples 2, 6 and 8, which represent relatively pure iron flocculate precipitated from leachate, samples 4 and 10 represent soils which have been contaminated due to contact with leachate. As might be expected, concentrations of iron and arsenic are considerably lower than what is found in the iron floc samples, but arsenic levels, measured at 17.7 mg/Kg in both samples, are still elevated above levels characteristic of natural soils. For comparison, NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) # 4046, entitled "Determination of soil cleanup objectives and cleanup levels" sets the recommended soil cleanup objective for inactive hazardous waste disposal sites at site background or 7.5 mg/Kg. Although, no site-specific background value is available in this case, the previously referenced background study (Appendix B) found the 90% upper confidence level for arsenic in soils of the lower Hudson Valley, based on 60 samples, to be 7.4 mg/Kg, which is essentially the same as the default value given in the TAGM 4046.

To provide a basis for comparing relative leachate strength or degree of water quality impact, four leachate indicator parameters were analyzed in aqueous samples from each sampling point. The parameters chosen, alkalinity, chloride, ammonia and COD, are four of the parameters most consistently found at elevated concentrations in water which is impacted by landfill leachate. As shown in Table 2, by ranking the parameter concentrations at each monitoring point and comparing the rank totals, a qualitative determination can be made of the relative degree of water quality impact between the various sampling points. This analysis shows a relatively low degree of impact in groundwater infiltrating the residential basement (sample 1) and discharging from the monitoring well (sample 9) and a somewhat higher degree of impact in surface water flowing through the catch basin (sample 7) or ponded in the residential lawn area (sample 3).

The apparent lack of correlation between arsenic concentrations in soils and sediments and leachate indicator parameters in water is consistent with experience in monitoring impacts at other solid waste landfills. Typically, elevated arsenic concentrations in groundwater are associated with the moderately reducing conditions at the fringe of the contamination plume

rather than the more strongly reducing conditions at the center of the plume. Thus, highly elevated concentrations of arsenic in soils or sediments are more likely to be observed in groundwater discharge zones where concentrations of leachate indicator parameters are only moderately elevated.

IV. Conclusions & Recommendations:

Based on concentrations of leachate indicator parameters observed, it is apparent that none of the locations sampled are being impacted by concentrated or high strength landfill leachate. These areas are being impacted, however, by deposition of iron floc containing elevated concentrations of arsenic. It is recommended that the Department of Health be asked to evaluate whether the presence of arsenic on residential properties poses a threat to health. It is also recommended that the Division of Fish, Wildlife and Marine Resources (DFWMR) be asked to evaluate potential risks to wildlife and wildlife habitat.

Regardless of what determination is made by the Department of Health and/or DFWMR, it is clear that the landfill cap has not been effective in controlling the discharge of leachate and/or leachate impacted groundwater beyond the site boundaries. It is also clear that vertical infiltration of precipitation was not the only source of leachate generation at this facility and that there must be a significant component of lateral groundwater inflow or upward discharge through the base of the landfill as evidenced by the apparent worsening of conditions subsequent to capping and the artesian conditions observed at shallow monitoring wells at the downgradient perimeter of the landfill. As the Village was advised by NYSDEC in July of 2004, a hydrologic evaluation of the landfill must be conducted by the Villages's engineering consultants in order to determine what actions are needed to abate the uncontrolled discharges of leachate.

Table 1
Leachate Investigation at Mamaroneck Taylor Lane Leaf Compost Site
Analysis of Iron Floc Samples

Sample ID	Sampling Point	Iron, ppm	Iron as $Fe(OH)_3$, %	Arsenic, ppm	Manganese, ppm
A893-02	Residence east of landfill: orange iron floc deposits collected from basement sump (see figure 2)	**222,000**	42	**71.3**	**3,260**
A893-04	Residence southeast of landfill: orange and gray-stained soil, composite of several locations on front lawn (see figure 3)	**51,000**	9.7	17.7	898
A893-06	Orange iron floc deposits in small stream flowing through culvert under Taylor Lane and into Magid Pond (see figure 5)	**227,000**	43	25.8	537
A893-08	Orange iron floc deposit in pipe discharging to catch basin on Taylor Lane (see figure 7)	**263,000**	50	**76.8**	**1,670**
A893-10	Gray-stained soil in leachate seepage zone on shoulder of Taylor Lane, west of landfill	**55,900**	10.6	17.7	992

Notes:
1. Samples were collected by staff from NYSDEC and NYSDOH on 11/2/04 and were delivered to the Severn Trent Laboratories in Newburgh for analysis.
2. Samples were digested using concentrated nitric and hydrochloric acids and hydrogen peroxide (30%) in accordance with USEPA Method 3050B. This method, which is not a total digestion, dissolves "environmentally available metals" but not metals bound in silicate structures.
3. Samples were analyzed using Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in accordance with USEPA Method 6010B.
4. Samples 02, 06 and 08 consisted of relatively pure iron flocculate deposits as indicated by the relatively high percentage of iron, presumed to be in the form of the mineral ferrihydrite, $Fe(OH)_3$, % . Samples 04 and 10 consisted of soils with only a thin coating of iron flocculate.
5. Arsenic concentrations in samples 02 and 08 exceed the NYSDEC's sediment guidance value (severe effects level for aquatic life) which is 33.0 ppm. Arsenic concentrations in all samples exceed NYSDEC's recommended soil cleanup objective which is 7.5 ppm and also exceed the 90% upper confidence level for background arsenic in lower Hudson Valley soils which is 7.4 ppm . Manganese concentrations in samples 02 and 08 exceed the NYSDEC's sediment guidance value (severe effects level for aquatic life) which is 1,100 ppm.
6. Concentrations of iron in all samples exceed the NYSDEC's sediment guidance value (severe effects level for aquatic life) which is 4%.

Table 2
Leachate Investigation at Mamaroneck Taylor Lane Leaf Compost Site
Analysis of Leachate Samples

Sample ID	Sampling Point	Alkalinity, as $CaCO_3$, ppm		Chloride,ppm		Ammonia, as N, ppm		COD, ppm		Total Rank
		Value	Rank	Value	Rank	Value	Rank	Value	Rank	
A893-01	Residence east of landfill: groundwater collected from basement sump (see figure 2)	272	2	110	1	1.0U	1	11.6	1	5
A893-03	Residence southeast of landfill: leachate seepage on front lawn (see figure 3)	360	5	150	3	1.0U	1	249	5	14
A893-05	Small stream flowing through culvert under Taylor Lane and into Magid Pond (see figure 4)	265	1	170	4	1.0U	1	17.5	3	9
A893-07	Catch Basin on Taylor Lane (see figure 6)	291	3	210	5	1.15	5	109	4	17
A893-09	Monitoring well 2S (see figure 8)	292	4	110	1	1.0U	1	14.5	2	8

Notes:
1. Samples were collected by staff from NYSDEC and NYSDOH on 11/2/04 and were delivered to the Severn Trent Laboratories in Newburgh for analysis.
2. Parameters analyzed are landfill leachate indicators which are more or less proportional to the strength and concentration of leachate. Ammonia is a non-conservative parameter which can be attenuated in soil by adsorption (as the NH_4 cation) to mineral surfaces.
3. Ranks reflect relative magnitude of concentrations for individual parameters measured at the various monitoring points. Total ranks reflect the relative degree of water quality impact based on all four parameters at the various monitoring points. Based on this analysis, the relative degree of water quality impact is as follows: Sample 7 > Sample 3 > Sample 5 > Sample 9 > Sample 1.

Figure 1. Triangles mark the approximate location of sample collection points. North is towards the top of the page. Taylor Lane is the road between the landfill and Magid Pond.

Figure 2. Sample 1 is a liquid sample collected from a sump in the basement of a residence adjacent to the landfill. Sample 2 consisted of solids (iron floc) removed from the sump.

Figure 3. Sample 3 was a liquid sample collected from a leachate seep on the front lawn of a residence adjacent to the landfill. Sample 4 was a solid sample taken as a composite from several locations within the lawn area exhibiting orange or gray iron staining.

Figure 4. Sample 5 was a surface water sample collected from a culvert conveying flow from the landfill area, under Taylor Lane, and into Magid Pond.

Figure 5. Sample 6 was a sample of the thick iron floc deposit in the small stream entering Magid Pond from the culvert under Taylor Lane.

Figure 6. Sample 7 was a liquid sample collected from a catch basin on Taylor Lane immediately adjacent to (west of) the landfill.

Figure 7. Sample 8 was a solid sample of iron floc accumulating in a pipe conveying groundwater from the landfill site to the catch-basin on Taylor Lane.

Figures 8a and 8b. Sample 9 was collected from monitoring well 2S, a flush-mounted well installed in the road surface of Taylor Lane just west of the landfill. This well, and three other nearby monitoring wells were observed to be in a continuously flowing (artesian) state. Sample 10 was a solid sample of iron-stained (gray) soil collected from a leachate seep zone in the road shoulder (east side) of Taylor Lane.

APPENDIX A

STL-Newburgh
Laboratory Report
(Selected Pages)

SAMPLE DATA SUMMARY PACKAGE

NYSDEC Albany
Case #: SH304
SDG #: 1102
STL Lab. #: 242143
Matrix: Water & Sediment
1 of 1

STL Newburgh
315 Fullerton Avenue
Newburgh, NY 1255
Tel (845) 562-08
Fax (845) 562-08

SAMPLE INFORMATION
Date: 11/22/2004

Job Number.: 242143
Customer...: NYS Dept. of Environmental Conservation
Attn.....: Steve Parisio

Project Number.....: 20000048
Customer Project ID....: TAYLORS LANE SITE
Project Description....: NYSDECA

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
242143-1	A893-01	Water	11/02/2004	11:15	11/02/2004	15:00
242143-2	A893-02	Sediment	11/02/2004	11:30	11/02/2004	15:00
242143-3	A893-03	Water	11/02/2004	11:50	11/02/2004	15:00
242143-4	A893-04	Sediment	11/02/2004	12:15	11/02/2004	15:00
242143-5	A893-05	Water	11/02/2004	12:20	11/02/2004	15:00
242143-6	A893-06	Sediment	11/02/2004	12:25	11/02/2004	15:00
242143-7	A893-07	Water	11/02/2004	12:30	11/02/2004	15:00
242143-8	A893-08	Sediment	11/02/2004	12:45	11/02/2004	15:00
242143-9	A893-09	Water	11/02/2004	13:00	11/02/2004	15:00
242143-10	A893-10	Sediment	11/02/2004	13:15	11/02/2004	15:00

STL Newburgh
315 Fullerton Avenue
Newburgh, NY 12550
Tel (845) 562-0890
Fax (845) 562-0841

LABORATORY CHRONICLE

Job Number: 242143

Date: 11/22/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Lab ID: 242143-1 Client ID: A893-01

METHOD	DESCRIPTION
SM18 2320B	Alkalinity
HACH 8000	Chemical Oxygen Demand (HACH)
SM18 4500Cl	Chloride
	Electronic Data Deliverable
SM18 4500NH3E	Nitrogen, Ammonia (Distillation)
QA Services	Quality Assurance Services

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	79900		11/05/2004 1444	
1	79255		11/04/2004 0800	
1	78855		11/03/2004 1341	
1				
1	79901		11/03/2004 2200	
1	79508		11/12/2004 0000	

Lab ID: 242143-2 Client ID: A893-02

METHOD	DESCRIPTION
SW846 3050B	Acid Digestion (ICP) Solids
SW846 6010B	Metals Analysis (ICAP)
QA Services	Quality Assurance Services
EPA 160.3	Solids, Total

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	78768		11/04/2004 1345	
1	79339	78768	11/05/2004 1341	
1	79508			
1	79044		11/04/2004 1500	

Lab ID: 242143-3 Client ID: A893-03

METHOD	DESCRIPTION
SM18 2320B	Alkalinity
HACH 8000	Chemical Oxygen Demand (HACH)
SM18 4500Cl	Chloride
	Electronic Data Deliverable
SM18 4500NH3E	Nitrogen, Ammonia (Distillation)
QA Services	Quality Assurance Services

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	79900		11/05/2004 1452	
1	79224		11/04/2004 1000	
1	78855		11/03/2004 1344	
1				
1	79901		11/03/2004 2200	
1	79508			

Lab ID: 242143-4 Client ID: A893-04

METHOD	DESCRIPTION
SW846 3050B	Acid Digestion (ICP) Solids
SW846 6010B	Metals Analysis (ICAP)
QA Services	Quality Assurance Services
EPA 160.3	Solids, Total

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	78768		11/04/2004 1345	
1	79339	78768	11/05/2004 1401	
1	79508			
1	79044		11/04/2004 1500	

Lab ID: 242143-5 Client ID: A893-05

METHOD	DESCRIPTION
SM18 2320B	Alkalinity
HACH 8000	Chemical Oxygen Demand (HACH)
SM18 4500Cl	Chloride
	Electronic Data Deliverable
SM18 4500NH3E	Nitrogen, Ammonia (Distillation)
QA Services	Quality Assurance Services

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	79900		11/05/2004 1500	
1	79255		11/04/2004 0800	
1	78855		11/03/2004 1347	
1				
1	79901		11/03/2004 2200	
1	79508			

Lab ID: 242143-6 Client ID: A893-06

METHOD	DESCRIPTION
SW846 3050B	Acid Digestion (ICP) Solids
SW846 6010B	Metals Analysis (ICAP)
QA Services	Quality Assurance Services
EPA 160.3	Solids, Total

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	78768		11/04/2004 1345	
1	79339	78768	11/05/2004 1405	
1	79508			
1	79044		11/04/2004 1500	

Lab ID: 242143-7 Client ID: A893-07

METHOD	DESCRIPTION
SM18 2320B	Alkalinity
HACH 8000	Chemical Oxygen Demand (HACH)
SM18 4500Cl	Chloride
	Electronic Data Deliverable
SM18 4500NH3E	Nitrogen, Ammonia (Distillation)
QA Services	Quality Assurance Services

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	79900		11/05/2004 1508	
1	79255		11/04/2004 0800	
1	78855		11/03/2004 1350	
1				
1	79901		11/03/2004 2200	
1	79508			

Lab ID: 242143-8 Client ID: A893-08

METHOD	DESCRIPTION
SW846 3050B	Acid Digestion (ICP) Solids

Date Recvd: 11/02/2004 Sample Date: 11/02/2004

RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
1	78768		11/04/2004 1345	

STL Newburgh
315 Fullerton Avenue
Newburgh, NY 12550
Tel (845) 562-0890
Fax (845) 562-0841

LABORATORY CHRONICLE

Job Number: 242143

Date: 11/22/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Lab ID: 242143-8 Client ID: A893-08

METHOD	DESCRIPTION	Date Recvd: 11/02/2004 Sample Date: 11/02/2004 RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
SW846 6010B	Metals Analysis (ICAP)	1	79339	78768	11/05/2004	1554	2
QA Services	Quality Assurance Services	1	79508				
EPA 160.3	Solids, Total	1	79044		11/04/2004	1500	

Lab ID: 242143-9 Client ID: A893-09

METHOD	DESCRIPTION	Date Recvd: 11/02/2004 Sample Date: 11/02/2004 RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
SM18 2320B	Alkalinity	1	79900		11/05/2004	1516	
HACH 8000	Chemical Oxygen Demand (HACH)	1	79255		11/04/2004	0800	
SM18 4500Cl	Chloride	1	78855		11/03/2004	1354	
	Electronic Data Deliverable	1					
SM18 4500NH3E	Nitrogen, Ammonia (Distillation)	1	79901		11/03/2004	2200	
QA Services	Quality Assurance Services	1	79508				

Lab ID: 242143-10 Client ID: A893-10

METHOD	DESCRIPTION	Date Recvd: 11/02/2004 Sample Date: 11/02/2004 RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
SW846 3050B	Acid Digestion (ICP) Solids	1	78768		11/04/2004	1345	
SW846 6010B	Metals Analysis (ICAP)	1	79339	78768	11/05/2004	1430	
QA Services	Quality Assurance Services	1	79508				
EPA 160.3	Solids, Total	1	79044		11/04/2004	1500	

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements					
		*VOA GC/MS Method #	*BNA GC/MS Method #	*VOA GC Method #	*PEST PCBs Method #	*Metals	*Other
A893-01	242143-01						2, 20, 16, 3
A893-02	242143-02					55	124
A893-03	242143-03						2, 20, 16, 3
A893-04	242143-04					55	124
A893-05	242143-05						2, 20, 16, 3
A893-06	242143-06					55	124
A893-07	242143-07						2, 20, 16, 3
A893-08	242143-08					55	124
A893-09	242143-09						2, 20, 16, 3
A893-10	242143-10					55	124

*See attached summary of methodology for method numbers.

000003A

SUMMARY OF METHODOLOGY

Analysis	Aqueous	Ground Water Liquid/Solid Matrices
1 % Solid	EPA 160.3(A)	EPA 160.3(A)
2 Alkalinity-Tit.	SM182320-B(Q)	
3 Ammonia	SM184500-NH3E(Q)	
4 Ammonia	SM184500-NH3F(Q)	
5 Ammonia	LAC107061A(U)	
6 Antimony	EPA 204.2(A,D)	
7 Antimony	SM183113B(Q)	
8 Arsenic	EPA 206.2(A,D)	
9 Arsenic		SW846-7060A(B,D)
10 Arsenic	SM183113B(Q)	
11 Beryllium	SM183113B(Q)	
12 BOD	SM185210-B(Q)	
13 Bromide	EPA 300(A)	
14 Cadmium	SM183113B(Q)	
15 CBOD	SM185210-B(Q)	
16 Chloride	SM184500-CL-B(Q)	
17 Chloride(DW)	SM174500-CL-B(N)	
18 Chloride-IC	EPA 300(A)	
19 COD (high)	EPA 410.4(A)	
20 COD (low)	HACH 8000(W)	
21 Color	SM18 2120-B(Q)	
22 Coliform, Total-MF	SM18 9222B(Q)	
23 Coliform, Total	SM18 9223-MPN(Q)	
24 Conductivity	SM182510-B(Q)	
25 Cyanide	SM184500-CNE(Q)	
26 Cyanide		SW846-9010B(B)
27 Cyanide	LAC204001A(R)	
28 Cyanide, Amenable	SM184500-CNG(Q)	SW846-9010B(B)
29 Dissolved Oxygen	SM184500-O-C(Q)	
30 DRO		EPA DRO Draft Rev.5 (Y)
31 Enterococcus	ENTEROLERT	
32 E.Coli	SM18 9223-MPN(Q)	
33 Eptox		SW846-1310A(B)
34 Ethylene glycol	NYSDEC 89-9(M)	
35 ETPH	(AA)	
36 F. Coli-MF	SM189222C(Q)	
37 F. Coli-MF	SM189222D(Q)	
38 F. Coli-MPN	SM189221C(Q)	
39 Ferrous Iron	SM183500-FED(Q)	

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40 Flashpoint		SW846-1010(B)
41 Fluoride, Total	EPA 340.2(A)	EPA 340.2(A)
42 Fluoride, Total	EPA 300(A)	
43 Grease & Oil	SM185520-B(Q)	
44 Grease & Oil	EPA 413.1 (A)	
45 Grease & Oil	EPA 1664(A)	
46 GRO		EPA GRO Draft Rev. 5(Y)
47 Hardness, Total	EPA 200.7(A)	
48 Hardness, Total	EPA 130.2(A)	
49 Heat of Combustion	D2015(X)	
50 Herbicides		SW846-8151A(B)
51 Herbicides	EPA 515.1(L)	
52 Heterotropic Plate Count	SM18 9215B(Q)	SM18 9215B(Q)
53 Hex Chrome		SW846-7196A(B)
54 Hex Chrome	SM183500-Cr-D(Q)	
55 ICP Metals		SW846-6010B(B)
56 ICP Metals	EPA 200.7(A)	
57 Langlier Index	SM182330B(Q)	
58 Lead		SW846-7421(B,C)
59 Lead	EPA 239.2(A,D)	
60 Lead		SW846-7420(B,D)
61 Lead	SM183113B(Q)	
62 MBAS	SM185540-C(Q)	
63 Mercury		SW846-7470A(B)
64 Mercury		SW846-7471A(B)
65 Mercury	EPA 245.1(A)	
66 Mercury	EPA 245.2(A)	
67 Methanol	Modified 8015(B)	
68 Nitrate-AA	SM174500-NO3F(N)	
69 Nitrate-IC	EPA 300(A)	
70 Nitrate-Nitrite	SM184500-NO3F(Q)	
71 Nitrate-Nitrite	LAC107041A(T)	
72 Nitrite	EPA 354.1(A)	
73 Nitrite	SM184500-NO2-B(Q)	
74 Odor	SM182150(Q7)	
75 Organochlorine PSTs		SW846-8081A(B)
76 Organochlorine PSTs	EPA 608(F)	
77 Paint Filter Test		SW846-9095A(B)
78 PCB's	EPA 508(H)	
79 Pesticides/PCB's		SW846-8082(B)
80 Pesticides/PCB's	95.3(Z)	95.3(Z)
81 Pesticides/PCB's	EPA 505(H)	
82 pH		SW846-9045C(B)

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83 pH	SM184500-H-B(Q)	
84 Phenols		SW846-9065(B)
85 Phenols	EPA 420.A(A)	
86 Phenols	LAC210001A(S)	
87 Phosphate, Ortho	SM184500-PE(Q)	
88 Phosphate, Total	EPA 365.3(A)	
89 Propylene glycol	Modified 8015(B)	
90 Reactivity		SW846-7.3.2(B)
91 Selenium		SW846-7740(B,D)
92 Selenium	EPA 270.2(A,D)	
93 Selenium	SM183113B(Q)	
94 Semi-Volatiles		SW846-8270C(B)
95 Semi-Volatiles	EPA 625(E)	
96 Semi-volatiles	95.2(Z)	95.2(Z)
97 Semi-Volatiles	EPA 525.1(H)	
98 Specific Gravity		D1298-83
99 Specific Conductance	SM182510B(Q)	
100 SS	EPA 160.5(A)	
101 Sulfate		EPA 375.4(A)
102 Sulfate	EPA 375.4(A)	
103 Sulfate	EPA 300(A)	
104 Sulfide		SM184500-S2E(Q)
105 Sulfide	SM184500-S2D(Q)	
106 Sulfite	SM184500-SO3B(Q)	
107 Sulfite		SM184500SO3B(Q)
108 TCLP		SW846-1311(B)
109 TDS	EPA 160.1(A)	
110 TDS	SM182540C(Q)	
111 Temperature	EPA 170.1(A)	
112 Thallium		SW846-7841(B,D)
113 Thallium	EPA 279.2(A,D)	
114 Thallium	EPA 200.9(A)	
115 Tin	EPA 282.2 (A)	
116 TOC	SM185310-B(Q)	
117 Total Kjeldahl Nitrogen	SM184500NH3-F(Q)	
118 Total Kjeldahl Nitrogen	LAC107062D(V)	
119 TOX		SW846-9020B(B)
120 TPH	EPA 418.1(A)	
121 TPH 310.13		LOAC 310.13(P)
122 TPH	EPA 1664 (A)	
123 TPH-Calif.	Calif. DHS 8015	Calif. DHS 8015
124 TS	EPA 160.3(A)	
125 TSS	EPA 160.2(A)	

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126 TVS	EPA 160.4(A)	
127 Turbidity	SM182130-B(Q) and EPA 180.1(A)	
128 Volatiles Organics		SW846-8260B(B)
129 Volatiles Organics	EPA 624(E)	
130 Volatiles Organics	EPA 524.2(H)	
131 Volatiles Organics	EPA 502.2(K)	
132 Volatiles Organics	EPA 504.1(H)	
133 Volatiles Organics		SW846-8021B(B)
134 Volatiles Organics	EPA 601(F)	
135 Volatiles Organics	EPA 602(F)	
136 Volatiles Organics	95.1(Z)	95.1(Z)
137 Volatiles Organics	95.4(Z)	95.4(Z)
138 Volatiles Organics	OLC02.1(AB)	
139 Volatiles Organics	OLM03.2(AC)	

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Inorganics

Other

Due to the high non-detect value for arsenic, sample number A893-06 (242143-06) was subsequently re-digested and re-analyzed as per a phone conversation with Steve Parisio. The attached report is an appendix to the initial data report package and has a suffix of "A" attached to each page number indicating an appendix.

Sample number 242143-06 was diluted at a 20x dilution due to the presence of iron at a concentration over the linear calibration range of the instrument.

ICP

Matrix Spike

The percent spike recovery of manganese in spike sample number A893-02MS (242143-02MS) is outside of the established control limits. A post digestion spike was analyzed for manganese.

Sample Dilutions

The following sample was diluted at the indicated amount and reanalyzed due to the interference of iron on the undiluted sample at a concentration above the linear range of the instrument:

A893-08 (242143-08): 2x

Wet Chemistry

Matrix Spike/Duplicate

The matrix spike/duplicate for alkalinity, ammonia and chloride were not performed on a sample from laboratory number 242143.

Alkalinity

Matrix Spike

The percent spike recovery of alkalinity in spike sample number ZZZZZMS (242115-01MS) is outside of the established control limits.

Chloride

Sample Dilution

Due to the results of the initial titration the following samples were diluted for chloride at the indicated amount:

A893-03 (242143-02): 10x
A893-05 (242143-03): 5x
A893-07 (242143-07): 5x

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LABORATORY TEST RESULTS

Job Number: 242143

Date:11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation

PROJECT: TAYLORS LANE SITE

ATTN: Steve Parisio

Customer Sample ID: A893-02
Date Sampled.....: 11/02/2004
Time Sampled.....: 11:30
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-2
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	IDL	RL	DILUTION	UNITS	DT	DATE	TECH
SW846 6010B	Metals Analysis (ICAP)										
	Aluminum (Al)*	5540			56.2	690	1	mg/Kg		11/05/04	mad
	Arsenic (As)*	71.3			9.3	34.5	1	mg/Kg		11/05/04	mad
	Iron (Fe)*	222000			60.7	345	1	mg/Kg		11/05/04	mad
	Manganese (Mn)*	3260		N	3.8	34.5	1	mg/Kg		11/05/04	mad

* In Description = Dry Wgt.

LABORATORY TEST RESULTS

Date:11/19/2004

Job Number: 242143

CUSTOMER: NYS Dept. of Environmental Conservation

PROJECT: TAYLORS LANE SITE

ATTN: Steve Parisio

Customer Sample ID: A893-04
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:15
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-4
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	IDL	RL	DILUTION	UNITS	DT	DATE	TECH
SW846 6010B	Metals Analysis (ICAP)									11/05/04	mad
	Aluminum (Al)*	7900			6.3	77.3	1	mg/Kg		11/05/04	mad
	Arsenic (As)*	17.7			1.0	3.9	1	mg/Kg		11/05/04	mad
	Iron (Fe)*	51000			6.8	38.7	1	mg/Kg		11/05/04	mad
	Manganese (Mn)*	898		N	0.43	3.9	1	mg/Kg			

* In Description = Dry Wgt.

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NYSDOH 10142
NJDEP 73015
CTDOHS PH-0564
EPA NY049
PA 68-378
M-NY049

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LABORATORY TEST RESULTS

Job Number: 242143

Date:12/14/2004

CUSTOMER: NYS Dept. of Environmental Conservation

PROJECT: TAYLORS LANE SITE 36

ATTN: Steve Parisio

Customer Sample ID: A893-06
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:25
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-6
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	DT	DATE	TECH
SW846 6010B	Metals Analysis (ICAP)										
	Aluminum (Al)*	481	B		219	2690	1	mg/Kg		11/05/04	[illegible]
	Arsenic (As)*	36.3	U		36.3	134	1	mg/Kg		11/05/04	[illegible]
	Arsenic (As)*	25.8	B		8.0	2580	20.00	mg/Kg		12/08/04	[illegible]
	Iron (Fe)*	227000			237	1340	1	mg/Kg		11/05/04	[illegible]
	Manganese (Mn)*	537		N	14.8	134	1	mg/Kg		11/05/04	[illegible]

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* In Description = Dry Wgt.

LABORATORY TEST RESULTS

Job Number: 242143

Date:11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation

PROJECT: TAYLORS LANE SITE

ATTN: Steve Parisio

Customer Sample ID: A893-08
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:45
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-8
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	IDL	RL	DILUTION	UNITS	DT	DATE	TECH
SW846 6010B	Metals Analysis (ICAP)										
	Aluminum (Al)*	146	B		31.7	388	2	mg/Kg		11/05/04	mad
	Arsenic (As)*	76.8			5.2	19.4	2	mg/Kg		11/05/04	mad
	Iron (Fe)*	263000			34.2	194	2	mg/Kg		11/05/04	mad
	Manganese (Mn)*	1670		N	2.1	19.4	2	mg/Kg		11/05/04	mad

* In Description = Dry Wgt.

LABORATORY TEST RESULTS

Job Number: 242143

Date:11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation

PROJECT: TAYLORS LANE SITE

ATTN: Steve Parisio

Customer Sample ID: A893-10
Date Sampled.....: 11/02/2004
Time Sampled.....: 13:15
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-10
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	IDL	RL	DILUTION	UNITS	DT	DATE	TECH
SW846 6010B	Metals Analysis (ICAP)										
	Aluminum (Al)*	14300			9.5	116	1	mg/Kg		11/05/04	mad
	Arsenic (As)*	17.7			1.6	5.8	1	mg/Kg		11/05/04	mad
	Iron (Fe)*	55900			10.2	58.0	1	mg/Kg		11/05/04	mad
	Manganese (Mn)*	992		N	0.64	5.8	1	mg/Kg		11/05/04	mad

* In Description = Dry Wgt.

LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-01
Date Sampled.....: 11/02/2004
Time Sampled.....: 11:15
Sample Matrix.....: Water

Laboratory Sample ID: 242143-1
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
SM18 2320B	Alkalinity, Total as CaCO3	272		N	5.00	mg/L	11/05/04	se
SM18 4500Cl	Chloride	110			5.0	mg/L	11/03/04	se
SM18 4500NH3E	Ammonia (NH3), as N	1.00	U		1.00	mg/L	11/03/04	jpp
HACH 8000	Chemical Oxygen Demand (COD)	11.6			10.0	mg/L	11/04/04	bg

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-02
Date Sampled.....: 11/02/2004
Time Sampled.....: 11:30
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-2
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
EPA 160.3	% Moisture	94.6			0.10	%	11/04/04	mwh
EPA 160.3	% Solids	5.4			0.10	%	11/04/04	mwh

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-03
Date Sampled.....: 11/02/2004
Time Sampled.....: 11:50
Sample Matrix.....: Water

Laboratory Sample ID: 242143-3
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
SM18 2320B	Alkalinity, Total as CaCO3	360		N	5.00	mg/L	11/05/04	se
SM18 4500Cl	Chloride	150			50	mg/L	11/03/04	se
SM18 4500NH3E	Ammonia (NH3), as N	1.00	U		1.00	mg/L	11/03/04	jpp
HACH 8000	Chemical Oxygen Demand (COD-High)	249			150	mg/L	11/04/04	bg

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-04
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:15
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-4
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
EPA 160.3	% Moisture	53.8			0.10	%	11/04/04	mwh
EPA 160.3	% Solids	46.2			0.10	%	11/04/04	mwh

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-05
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:20
Sample Matrix.....: Water

Laboratory Sample ID: 242143-5
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
SM18 2320B	Alkalinity, Total as CaCO3	265		N	5.00	mg/L	11/05/04	se
SM18 4500Cl	Chloride	170			25	mg/L	11/03/04	se
SM18 4500NH3E	Ammonia (NH3), as N	1.00	U		1.00	mg/L	11/03/04	jpp
HACH 8000	Chemical Oxygen Demand (COD)	17.5			10.0	mg/L	11/04/04	bg

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-06
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:25
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-6
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
EPA 160.3	% Moisture	98.4			0.10	%	11/04/04	mwh
EPA 160.3	% Solids	1.6			0.10	%	11/04/04	mwh

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-07
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:30
Sample Matrix.....: Water

Laboratory Sample ID: 242143-7
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
SM18 2320B	Alkalinity, Total as CaCO3	291		N	5.00	mg/L	11/05/04	se
SM18 4500Cl	Chloride	210			25	mg/L	11/03/04	se
SM18 4500NH3E	Ammonia (NH3), as N	1.15			1.00	mg/L	11/03/04	jpp
HACH 8000	Chemical Oxygen Demand (COD)	109			10.0	mg/L	11/04/04	bg

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-08
Date Sampled.....: 11/02/2004
Time Sampled.....: 12:45
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-8
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
EPA 160.3	% Moisture	79.8			0.10	%	11/04/04	mwh
EPA 160.3	% Solids	20.2			0.10	%	11/04/04	mwh

* In Description = Dry Wgt.

LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-09
Date Sampled.....: 11/02/2004
Time Sampled.....: 13:00
Sample Matrix.....: Water

Laboratory Sample ID: 242143-9
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
SM18 2320B	Alkalinity, Total as CaCO3	292		N	5.00	mg/L	11/05/04	se
SM18 4500Cl	Chloride	110			5.0	mg/L	11/03/04	se
SM18 4500NH3E	Ammonia (NH3), as N	1.00	U		1.00	mg/L	11/03/04	jpp
HACH 8000	Chemical Oxygen Demand (COD)	14.5			10.0	mg/L	11/04/04	bg

* In Description = Dry Wgt.

LABORATORY TEST RESULTS

Job Number: 242143

Date: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Customer Sample ID: A893-10
Date Sampled.....: 11/02/2004
Time Sampled.....: 13:15
Sample Matrix.....: Sediment

Laboratory Sample ID: 242143-10
Date Received.....: 11/02/2004
Time Received.....: 15:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	REPORTING LIMIT	UNITS	ANALYZED	TECH
EPA 160.3	% Moisture	65.5			0.10	%	11/04/04	mwh
EPA 160.3	% Solids	34.5			0.10	%	11/04/04	mwh

* In Description = Dry Wgt.

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6
DUPLICATES

EPA SAMPLE NO.

A893-02D

Lab Name: STL Newburgh Contract: _____

Lab Code: 10142 Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): SOIL Level (low/med): _____

% Solids for Sample: 5.37 % Solids for Duplicate: 5.37

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		5541.4761		5623.5329		1.5		P
Arsenic	34	71.3425		71.0769		0.4		P
Calcium								NR
Iron		222071.9290		220980.9670		0.5		P
Magnesium								NR
Manganese		3261.6599		3255.4203		0.2		P

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

A893-02S

Lab Name: STL Newburgh Contract: _____

Lab Code: 10142 Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): SOIL Level (low/med): _____

% Solids for Sample: 5.37

Concentration Units (ug/L or mg/Kg dry weight): mg/Kg

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Arsenic	75-125	179.9870		71.3425		140.54	77.3		P
Calcium									NR
Iron									NR
Magnesium									NR
Manganese	75-125	3270.3773		3261.6599		1633.52	0.5	N	P

Comments:

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5B

POST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

A893-02

Lab Name: Severn Trent Laboratories Contract: _____

Lab Code: 10142 Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): Sedimen Level (low/med): _____

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									P
Manganese	50-150	3120.81		945.79		2000.0	108.8		NR
Nickel									NR
Potassium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									

Comments:

QUALITY CONTROL RESULTS

Job Number.: 242143

Report Date.: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE ATTN: Steve Parisio

Test Method.....: SM18 2320B
Method Description.: Alkalinity
Parameter.....: Alkalinity, Total as CaCO3

Batch.....: 79900
Units.....: mg/L

Analyst...: se
Test Code.: ALK

QC	Lab ID	Reagent	QC Result	Q	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
ICV		WO3ALKSTD1	99.99			100		100.0	87-119		11/05/2004	1030
ICB			0.13								11/05/2004	1038
CCV		WO3ALKSTD2	54.32			50		108.6	87-119		11/05/2004	1208
CCB			-0.18								11/05/2004	1216
CCV		WO3ALKSTD2	54.48			50		109.0	87-119		11/05/2004	1346
CCB			0.14								11/05/2004	1355
LCS		WO4ALKLCS2	35.51			34.2		103.8	80-114		11/05/2004	1403
MD	242115-1		122.23				122.91	0.6	8-8		11/05/2004	1419
MS	242115-1	WO4ALKSPK1	160.19			25.0	122.91	149.1	60-139	N	11/05/2004	1427
CCV		WO3ALKSTD2	54.58			50		109.2	87-119		11/05/2004	1525
CCB			-0.09								11/05/2004	1533
CCV		WO3ALKSTD2	54.33			50		108.7	87-119		11/05/2004	1622
CCB			0.01								11/05/2004	1630

Test Method.....: SM18 4500NH3E
Method Description.: Nitrogen, Ammonia (Distillation)
Parameter.....: Ammonia (NH3), as N

Batch.....: 79901
Units.....: mg/L

Analyst...: jpp
Test Code.: NH3

QC	Lab ID	Reagent	QC Result	Q	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
ICV		WO4NH3ICV1	2.076			2.0		103.8	87-109		11/03/2004	2200
MB			0.000								11/03/2004	2200
MS	242132-2	WO4NH3SPK1	9.575			10.0	0.000	95.8	84-123		11/03/2004	2200
MD	242132-2		0.000				0.000	0.0	20-20		11/03/2004	2200

Test Method.....: HACH 8000
Method Description.: Chemical Oxygen Demand (HACH)
Parameter.....: Chemical Oxygen Demand (COD)

Batch.....: 79224
Units.....: mg/L

Analyst...: bg
Test Code.: COD

QC	Lab ID	Reagent	QC Result	Q	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
LCS		WO4CODLCSH	216			218		99.1			11/04/2004	1000
CCB			0								11/04/2004	1000
CCV		WO4CODLCSH	216			218		99.1			11/04/2004	1000
MS	242192-1	WO2CODSPKH	940				393	99.1			11/04/2004	1000
MD	242192-1		399				393	1.5	20-20		11/04/2004	1000
RS		WO3CODRS01	151			150		100.7			11/04/2004	1000
MB			0								11/04/2004	1000

Test Method.....: HACH 8000
Method Description.: Chemical Oxygen Demand (HACH)
Parameter.....: Chemical Oxygen Demand (COD)

Batch.....: 79255
Units.....: mg/L

Analyst...: bg
Test Code.: COD

QC	Lab ID	Reagent	QC Result	Q	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
MB			0								11/04/2004	0800
RS		WO2CODSTD1	47.2			50		94.4	84-116		11/04/2004	0800
LCS		WO4CODLCSL	107			109		98.2	86-115		11/04/2004	0800
CCV		WO4CODLCSL	112			109		102.8			11/04/2004	0800
CCB			0								11/04/2004	0800

* = %REC, R=RPD, A=ABS Diff., D=% Diff.

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QUALITY CONTROL RESULTS

Job Number.: 242143

Report Date.: 11/19/2004

CUSTOMER: NYS Dept. of Environmental Conservation PROJECT: TAYLORS LANE SITE

ATTN: Steve Parisio

Test Method.....: HACH 8000
Method Description.: Chemical Oxygen Demand (HACH)
Parameter.....: Chemical Oxygen Demand (COD)

Batch.....: 79255
Units.....: mg/L

Analyst...: bg
Test Code.: COD

QC	Lab ID	Reagent	QC Result	Q	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
MD	242143-9		14.5				14.5	0.0	10-10		11/04/2004	0800
MS	242143-9	WO2CODSPKL	62.1			50	14.5	95.2	58-133		11/04/2004	0800

Test Method.....: SM18 4500Cl
Method Description.: Chloride
Parameter.....: Chloride

Batch.....: 78855
Units.....: mg/L

Analyst...: se
Test Code.: CHL

QC	Lab ID	Reagent	QC Result	Q	QC Result	True Value	Orig. Value	Calc. Result *	Limits	F	Date	Time
MB			0.0000								11/03/2004	1325
ICV		WO4CLICV01	50.7289			50.0		101.5	92-109		11/03/2004	1328
LCS		WO4MINLCS2	78.4863			76.8		102.2	90-105		11/03/2004	1331
MD	242115-1		62.2148				63.1719	1.5	19-19		11/03/2004	1357
MS	242115-1	WO4CLSPK01	85.1864			25.0	63.1719	88.1	74-126		11/03/2004	1400

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3
BLANKS

Lab Name: STL Newburgh Contract: _____

Lab Code: 10142 Case No.: _____ SAS No.: _____ SDG No.: _____

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	16.3	U	16.3	U	-18.2	B	16.3	U	3.3	U	P
Arsenic	2.7	U	2.7	U	2.7	U	3.4	B	0.5	U	P
Calcium	104.0	U	104.0	U	104.0	U	104.0	U			P
Iron	17.6	U	17.6	U	17.6	U	17.6	U	4.8	B	P
Magnesium	11.2	U	11.2	U	11.2	U	11.2	U			P
Manganese	1.1	U	1.1	U	1.1	U	1.1	U	0.2	U	P

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3
BLANKS

Lab Name: STL Newburgh Contract: _____

Lab Code: 10142 Case No.: _____ SAS No.: _____ SDG No.: _____

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			16.3	U							P
Arsenic			2.7	U							P
Calcium			104.0	U							P
Iron			17.6	U							P
Magnesium			24.7	B							P
Manganese			1.1	U							P

FORM III - IN

ILM04.0

APPENDIX B

NYSDEC, Region 3/Solid Waste Program
Background Levels of Heavy Metals in Soils of the Lower Hudson Valley

New York State Department of Environmental Conservation
Region 3 Office/Solid Waste Program

Background Levels of Heavy Metals in Soils of the Lower Hudson Valley

Preliminary Summary of Results
July 1, 2003

In March of 2003, a study was carried out by Solid Waste Program staff in the Region 3 Office of the New York State Department of Environmental Conservation (DEC) to characterize background concentrations of heavy metals in soils of the lower Hudson Valley. This preliminary report provides a summary of the methods and results. A full report is in preparation and will be issued after evaluation of the data has been completed.

This study area is the lower Hudson Valley region of southeastern New York State, an area of 4,552 square miles which includes the counties of Westchester, Rockland, Putnam, Orange, Sullivan, Dutchess and Ulster. Twenty sites were selected for collection of soil samples and three replicate samples were collected at each sampling location to provide a total of sixty samples. The locations selected for sampling were undeveloped sites exhibiting mature natural vegetation with no apparent signs of fill placement, waste disposal or other types of recent anthropogenic disturbance. Care was taken to select sites where the only likely source of anthropogenic contamination would be atmospheric deposition. The sites selected were on publically owned properties managed by the DEC, the State Department of Parks or the Westchester County Department of Parks. The geographic coordinates of each sampling location were determined in the field using a global positioning satellite (GPS) receiver and these data were imported into a geographic information system (GIS) file which was used to create a map of the sampling locations (Figure 1). Names and geographic coordinates of each sampling location are provided in Table 1.

At each sampling location, the three replicate samples were collected within a 10-foot radius. The samples were collected from the upper six inches of the mineral soil (excluding the O horizon, where present) using a core sampler incorporating a 2-inch diameter stainless steel core barrel, a removable stainless steel cutting head, a 2-inch diameter removable butyrate plastic liner and a sliding-weight drive hammer. A new liner was used for each sample and sealed with plastic end-caps to serve as a sample container for shipment of the sample to the laboratory. Based on the design of the sampler, samples come in contact with the inside surface of the cutting head and the inside surface of the core liner only. To prevent cross-contamination, the cutting head was removed and cleaned with de-ionized water after collection of each sample.

Samples were stored at less that 4 degrees centigrade prior to and during shipment to the contract laboratory for analysis. All samples arrived at the laboratory within acceptable holding times, properly preserved and with appropriate chain of custody seals and documentation.

At the contract laboratory, all samples were analyzed for eleven heavy metals using methods consistent with EPA's SW-846 protocols and the DEC Analytical Services Protocol (ASP). The metals analyzed included arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc. In accordance with SW-846 protocols, prior to analysis for all metals, one gram of sample was digested using nitric acid, hydrogen peroxide and hydrochloric acid. All metals determinations, with the exception of mercury, were carried out using inductively coupled plasma atomic emission spectrometry (ICP-AES). Mercury was determined using the cold vapor atomic absorption method.

Table 2 provides summary statistics for each of the metals analyzed along with comparisons of the results to DEC guidance values and results from other studies. The full data set is provided in Table 3. It is anticipated that the results of this study will be useful to DEC/Region 3 staff in evaluating environmental impacts at sites which are filled using imported soils or soil-like wastes.

Questions regarding this preliminary report should be directed to Steven Parisio at 845-256-3139.

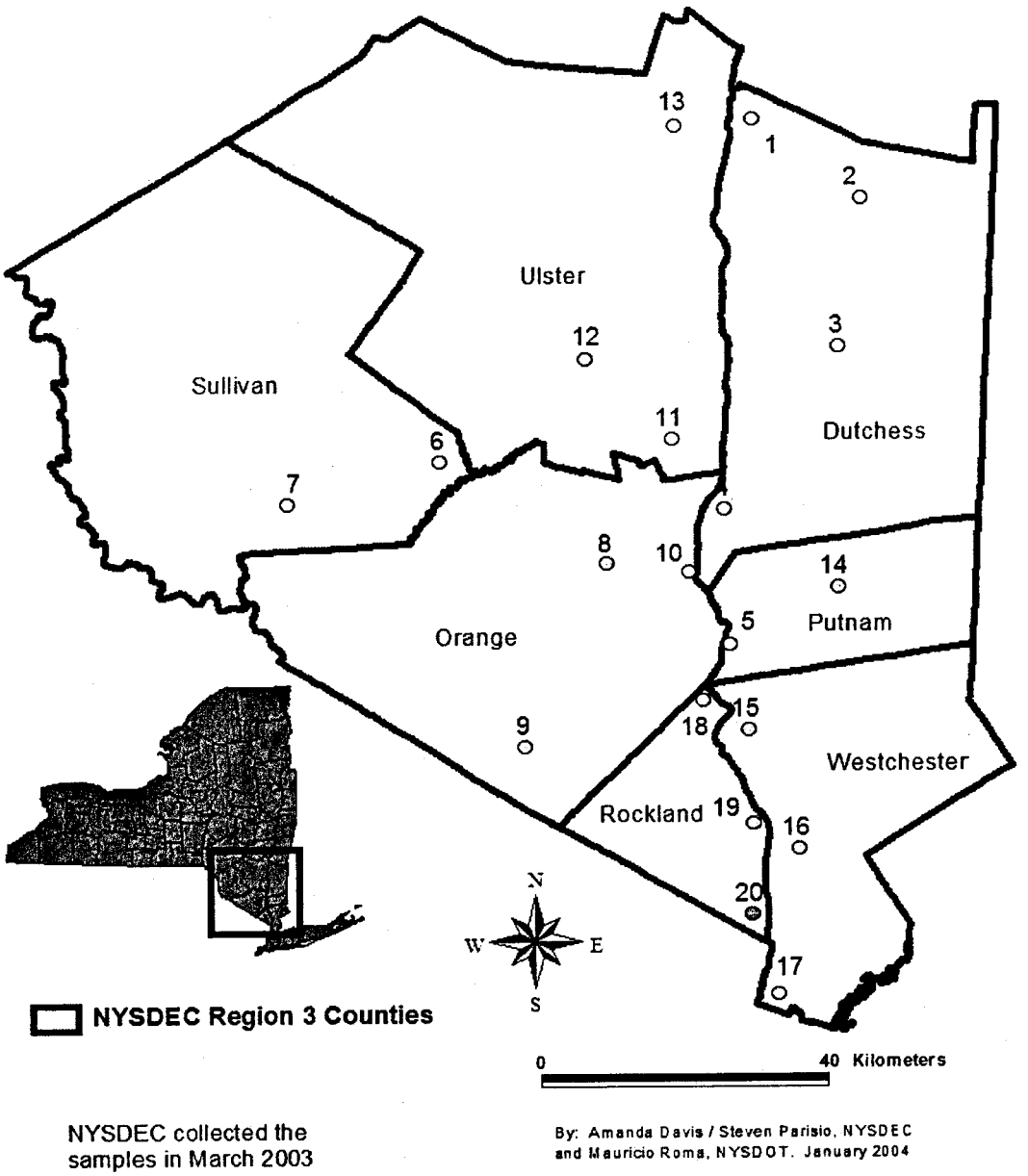

FIGURE 1. Sampling Locations for Background Soil Metals Concentrations, New York

Refer to Table 1 for names of sampling locations

Table 1. Soil Sampling Locations					
Site No.	County	Park/Property Name	Managed By	Date Sampled	Geographic Coordinates
1	Dutchess	Tivoli Bay	DEC	3/10/03	N:42.03632, W:73.89645
2	Dutchess	Stissing Mtn	DEC	3/10/03	N:41.93383, W:73.7179
3	Dutchess	Taconic/Hereford	DEC	3/10/03	N:41.74659, W:73.76030
4	Dutchess	Stony Kill Farm	DEC	3/10/03	N:41.54293, W:73.95121
5	Putnam	Castle Rock	DEC	3/10/03	N:41.37013, W:73.94498
6	Sullivan	Wurtsboro Ridge	DEC	3/11/03	N:41.60621, W:74.42667
7	Sullivan	Neversink River	DEC	3/11/03	N:41.55457, W:74.68181
8	Orange	Stewart State Forest	DEC	3/11/03	N:41.47451, W:74.14892
9	Orange	Mt. Peter Hawk Watch Trailway	DEC	3/11/03	N:41.24484, W:74.28831
10	Orange	Kowawese	DEC	3/11/03	N:41.46286, W:74.01263
11	Ulster	Hemlock Ridge	DEC	3/12/03	N:41.63142, W:74.03738
12	Ulster	Shawangunk	DEC	3/12/03	N:41.73427, W:74.18067
13	Ulster	Highwoods	DEC	3/12/03	N:42.02909, W:74.02744
14	Putnam	California Hill	DEC	3/24/03	N:41.44169, W:73.76609
15	Westchester	Blue Mountain Reservation	Westchester Co. Parks	3/24/03	N:41.26223, W:73.91644
16	Westchester	Rockefeller Preserve	State Parks	3/24/03	N:41.11065, W:73.83748
17	Westchester	Tibbetts Brook Park	Westchetser Co. Parks	3/24/03	N:40.92714, W:73.87445
18	Rockland	Bear Mountain	State Parks	3/35/03	N:41.30057, W:73.99174
19	Rockland	Hook Mountain	State Parks	3/35/03	N:41.14383, W:73.91217
20	Rockland	Tallman Mountain	State Parks	3/25/03	N:41.02887, W:73.91627

Table 2. Region 3 Background Soils Heavy Metals Concentrations - Summary Statistics and Comparisons

	As	Ba	Be	Cd	Cr	Cu	Pb	Hg	Ni	Se	Zn
Minimum	2.2	38.5	0.24	0.04U	11.2	5.8	6.9	0.04	8.7	0.20	35.7
Maximum	23.1	187	2.2	1.2	51.2	64.8	303	0.92	54.5	2.9	225
Median	5.5	61.9	0.58	0.12	17.9	17.6	33.1	0.13	16.7	0.73	75.4
Mean	6.6	74.2	0.67	0.18	19.4	20.9	57.8	0.20	19.2	0.88	80.2
Standard Deviation	3.8	31.8	0.34	0.20	7.1	11.4	67.5	0.18	8.1	0.60	31.7
Coefficient of Variation	0.58	0.43	0.51	1.1	0.37	0.55	1.2	0.9	0.42	0.68	0.40
90 % UCL	7.4	81.1	0.75	0.22	20.9	23.4	72.5	0.24	21.0	1.0	87.1
TAGM 4046	7.5	300	0.16	1	10	25	-	0.1	13	2	20
% Values Exceeding TAGM 4046	24	0	100	2	100	22	-	66	80	5	100
Mean for NJ Soils	4.46	-	0.93	0.37	12.3	17.2	58.4	0.46	10.3	0.07	73.4
Mean for Eastern US Soils (USGS)	7.4	-	0.85	-	22	22	17	0.12	18	0.45	50

NOTES:

1. All concentrations are given in mg/kg.
2. In order to perform statistical calculations, non-detect values were assigned a value of one half of the detection limit.
3. "TAGM 4046" refers to DEC's Technical & Administrative Guidance Memorandum (TAGM) #4046, entitled "Determination of soil cleanup objectives and cleanup levels".
4. Mean metals concentrations for NJ soils were taken from the 1993 study by the New Jersey Department of Environmental Protection.
5. Mean metals concentrations for Eastern US soils were taken from Shacklette and Boerngen (1984) Element concentrations in soils and other surficial materials of the coterminous United States. USGS Professional Paper 1270.

Table 3. Background Heavy Metals Concentrations in Undisturbed Natural Soils of the Lower Hudson Valley (Page 1 of 3)

Site No./County/Name	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc
01/Dutchess/Tivoli Bay	5.8	74.7	0.58	0.11	14.4	16.1	26.4	0.06	16.4	0.81	57.9
	4.7	58.7	0.47	0.06	11.8	12.6	22.2	0.04	13.3	0.48	45.2
	5.2	59.2	0.49	0.06U	12.8	13.1	19.9	0.05	14.3	0.54	48.2
02/Dutchess/Stissing Mountain	4.4	47.7	0.57	0.11	24.5	17.6	23.8	0.07	29.4	0.48	91.6
	5.1	46.1	0.59	0.06	25	17.9	43.2	0.06	30.4	1.2	96.9
	4.8	46.6	0.62	0.05U	22.3	16.5	17.4	0.06	28.5	0.73	89.6
03/Dutchess/Taconic-Hereford	7.0	55.6	0.78	0.04U	17.3	17.6	16.6	0.05	22.7	0.71	79.3
	8.5	55.7	0.79	0.06	17.9	18.6	43	0.12	26.6	0.73	91.9
	7.5	48.8	0.70	0.10	15.5	16.6	19.3	0.09	22.4	0.62	78.6
04/Dutchess/Stony Kill Farm	6.9	53.7	0.57	0.09	12.6	13.5	74.7	0.18	15.8	1.1	68.1
	7.6	53.0	0.56	0.11	14.4	15.2	42.2	0.14	16.6	1.4	72.7
	6.5	56.0	0.53	0.07	13.6	14.4	33.1	0.14	16.7	0.82	70.3
05/Putnam/Castle Rock	14.3	99.7	1.4	0.19	29.4	32.4	59.1	0.34	31.0	0.83U	135
	23.1	187	2.2	0.42	51.2	64.8	82.6	0.36	54.5	2.9	225
	11.2	82.6	1.2	0.21	24.3	30.0	49.6	0.29	26.3	1.2	124
06/Sullivan/Wurtsboro Ridge	8.8	99.9	1.0	0.18	26.8	29	33.8	0.10	26.6	1.3	99.4
	15.5	136	1.6	0.12	39.1	44.2	24.9	0.06	41.5	0.96	132
	8.9	96.6	0.91	0.31	21.5	25.6	102	0.14	23.7	1.4	89.9
07/Sullivan/Neversink River	6.6	66.2	0.29	0.17	13.8	25.5	215	0.24	8.7	1.1	97.8
	5.5	42.0	0.24	0.06	11.3	49.4	59.9	0.23	9.3	0.49	52.8
	7.3	50.7	0.32	0.11	13.2	12.1	50.5	0.15	10.8	0.84	59.2

Notes:
1. All concentrations are given in mg/kg.
2. Concentrations below the method detection limit (MDL) are designated by the MDL followed by the "U" data qualifier.

Table 3. Background Heavy Metals Concentrations in Undisturbed Natural Soils of the Lower Hudson Valley (Page 2 of 3)

Site No./County/Name	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc
08/Orange/Stewart State Forest	17.7	90.9	0.34	0.42	11.2	16.6	95.1	0.10	14.9	0.62	88.1
	4.7	92.2	0.57	0.17	13.5	18.1	209	0.69	15.8	0.60	91.5
	5.4	141	0.63	0.30	14.9	19.5	303	0.92	18	0.69	125
09/Orange/Mt Peter Hawk Watch Trailway	6.0	61.9	0.98	0.25	15.4	14.3	51.3	0.18	16.0	0.51	84.2
	3.8	61.1	1.4	0.19	15.7	11.1	20	0.1	17.4	0.38	80.8
	6.5	60.9	1.4	0.18	18.7	18.1	36.1	0.11	20.5	0.45U	91.4
10/Orange/Kowawese	4.7	38.5	0.45	0.11	14.1	20.4	12.7	0.08	22.4	0.37U	59.7
	5.3	48	0.58	0.14	19.3	24.9	17.1	0.05	28	0.49U	76.6
	4.4	42.4	0.54	0.17	14.6	20	13.1	0.09	24.1	0.37U	57.4
11/Ulster/Hemlock Ridge	6.4	77.8	0.40	0.27	13.5	11	89.9	0.14	13	1.3	74
	2.2	72.8	0.56	0.05U	17.4	5.8	6.9	0.12	12.8	0.48U	67.2
	4.1	56.5	0.62	0.04U	22.6	14.8	12.6	0.09	22	0.04U	72
12/Ulster/Shawangunk	5.2	83.2	0.83	0.11	17.3	10.8	15.9	0.10	19.5	0.47U	71.9
	5.6	82.4	0.64	0.20	13.9	14	53.8	0.11	15.6	0.53	75.1
	5.7	92.1	0.72	0.27	14.7	11.5	43.3	0.11	16.6	0.55	84.9
13/Ulster/Highwoods	6.0	85.3	0.52	0.32	16.8	12.2	29.6	0.12	14.2	0.76	72.3
	4.8	58.8	0.49	0.10	16.3	11.7	19.3	0.09	15.2	0.61	54.9
	7.6	67.4	0.59	0.08	20.3	12.7	26.8	0.13	17.9	0.57U	60.4
14/Putnam/California Hill	2.9	141	0.38	0.41	14.8	23.2	60.4	0.15	10.5	1.9	93.8
	2.9	107	0.67	0.19	22	33	24.8	0.13	10.9	0.63	77
	2.2	90.7	0.65	0.11	22.2	24.5	13.9	0.15	11.6	0.53	66.4

Notes:
1. All concentrations are given in mg/kg.
2. Concentrations below the method detection limit (MDL) are designated by the MDL followed by the "U" data qualifier.

Table 3. Background Heavy Metals Concentrations in Undisturbed Natural Soils of the Lower Hudson Valley (Page 3 of 3)

Site No./County/Name	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc
15/Westchester/Blue Mountain Reservation	5.5	68.7	0.57	0.19	21.5	15.9	26.5	0.38	18.2	0.83	67.1
	4.5	94.5	0.69	0.15	31.3	20.3	13.2	0.48	27.5	1.1	75.4
	3.3	80	0.54	0.06	21.9	15.1	7.4	0.42	18.3	0.66	53.8
16/Westchester/ Rockefeller Preserve	3.5	50	0.60	0.06	18.5	8.5	10.5	0.05	11.3	0.39U	35.7
	3.3	58.6	0.66	0.08	19.7	9.6	15.2	0.20	12.7	0.45U	41
	4.9	49.4	0.61	0.11	18.7	10.9	24.3	0.26	12.5	0.78	41.7
17/Westchester/Tibbetts Brook Park	7.8	126	0.51	0.94	23.8	31.3	208	0.41	20.8	1.5	126
	15.0	57.1	0.43	0.28	29.7	48.6	190	0.52	18.9	2.6	89.9
	9.6	165	0.45	1.2	30.9	42.8	301	0.65	28.3	2.5	161
18/Rockland/Bear Mountain State Park	4.6	39.9	0.72	0.05	13.7	14.5	15.5	0.05	13.5	0.88	42.5
	3.1	57.7	0.44	0.15	17.9	13.9	33.0	0.22	14.0	1.8	51.6
	3.9	44.6	0.80	0.05U	14.7	17.1	9.5	0.36	14.0	0.89	43.3
19/Rockland/Hook Mountain State Park	4.0	89.8	0.53	0.20	18.5	23.2	47.7	0.30	20.4	1.4	76.4
	5.3	64.2	0.52	0.12	17.8	27.7	113	0.29	19.5	0.92	79.3
	9.6*	1060*	0.40*	9.2*	15.9*	29.2*	1380*	0.20*	17.6*	1.5*	1750*
20/Rockland/Tallman Mountain State Park	6.4	46.5	0.31	0.06U	22.9	19.4	48.2	0.11	12.5	1.6	68.2
	6.8	79.0	0.55	0.36	22.0	21.9	69.7	0.17	14.0	1.3	89.2
	7.6	39.5	0.46	0.09	20.7	20.6	64.6	0.13	12.0	1.1	59.1

Notes:
1. All concentrations are given in mg/kg.
2. Concentrations below the method detection limit (MDL) are designated by the MDL followed by the "U" data qualifier.
3. Values marked with an asterisk are considered to be outlier values or are values associated with a sample which is being omitted from statistical calculations because it exhibits values for one or more metals which are considered to be outlier values.