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Commissioner

Town of Tonawanda Landfill Vicinity Residential Sump Water Testing Report August 2008

Purpose

This report has been prepared to discuss the results of a basement sump sampling program which was conducted in residential areas north of the town of Tonawanda landfill during the period March 10 -13, 2008. The residential sump sampling program was designed to address the concerns of local residents living in close proximity to the landfill about potential impacts from the possible migration of contaminants from waste materials known to be deposited in the landfill. Of particular concern was the potential for migration through the shallow groundwater into the sumps as a result of pumping. Information about the water quality in individual residents sumps and the potential for adverse health effects was gathered during this program.

Background

The Town of Tonawanda landfill is currently under an order on consent with the Department of Environmental Conservation ("DEC" or "the Department") with limited activities allowed which are designed to prepare the site for final closure in accordance with the NYS Solid Waste Management Facilities regulations (6NYCRR Part 360). These activities include the importation of approved soils in order to raise the grades to allow final capping of the site and promote proper drainage off the cap. The landfill is located in the northwestern portion of the town, with a portion of the landfill property directly abutting a residential neighborhood in the City of Tonawanda, generally referred to as the Riverview Heights area. The backyards of a number of homes located on Hackett Drive and Wadsworth Court are adjacent to the landfill property (See Figure 1).

Because of residents and public officials concerns regarding the presence of radioactive wastes in the landfill, the Department undertook an investigation in May and June of 2007. Radiological surveys were conducted on certain properties near the landfill, including the backyards of homes bordering the landfill and the yard areas of the Riverview Elementary

School. The results of this investigation are described in the Site Visit Report released by the Department in August 2007. That report concluded that "there is no evidence of radioactive wastes from uranium ore processing in the areas surveyed". Continued concerns led to the current activities discussed in this report.

Selection of Sampling Locations

Residents along the south side of Hackett Drive and Wadsworth Court bordering the landfill were invited by the Department to participate, on a voluntary basis, in the sump sampling program. Forty-three letters were sent to individual home owners. Twelve responses indicating a willingness to participate were received back by the Department. The Department learned that not every home on these streets has a sump pump. Based on follow-up conversations with the homeowners interested in participating, two locations were deemed unsuitable for sampling, and the remaining ten were selected to participate. These ten locations ranged from the far western end of Wadsworth Court to the eastern end of Hackett Drive and provided for a fairly good aerial coverage of the study area. In addition, two homes located in areas several blocks to the north were selected as suitable background, or control, samples.

Sampling Activities

The sump sampling program was conducted from March 10th through March 13th, 2008. Staff from the DEC Region 9 Buffalo, DEC Albany and NYS Department of Health (DOH), Buffalo office were present for all of the sample collection activities. The weather during the sampling was generally cold, in the mid- 20 degrees Fahrenheit in the morning, with some warm-up to the mid 30's by the afternoon. The heavy snowfall of about two feet from the prior weekend was beginning to melt. All of the sumps contained a relatively good volume of water for sample collection. A street map indicating the approximate locations sampled is attached (see Figure 2). The specific addresses of homes are not provided in this report so that the privacy of individual homeowners can be maintained.

While the sampling was being conducted, an inventory of the basements was completed to document the presence of any chemicals, paints, cleaning fluids, and other items that could possibly release contaminants into the sumps and/or air. A sketch of each basement noting the general locations of such materials, along with a product inventory sheet was completed for each home. Samples of these are provided in Attachment A. DOH staff surveyed the basement air using a ppbRAE meter to monitor for VOC's (volatile organic compounds). No unusual or significantly elevated readings were detected, with typical basement air concentration ranging from 70/80 ppb (parts per billion) to 300 ppb total VOCs.

All locations were sampled for the full NYCRR Part 360 baseline parameter list, which includes volatile organics, metals, and leachate indicator parameters. Also analyzed were

semi-volatile organics, and radiological parameters. Appropriate quality control samples, including trip blanks, an equipment blank, matrix spike samples, and a blind duplicate, were also prepared. Trip blanks are vials of laboratory-prepared water which are handled and transported in the same manner as all of the rest of the samples, and returned to the testing laboratory at the end of each sampling day. Trip blanks are then analyzed for volatile organics and serve to check on whether any contamination has been introduced during the sampling or laboratory analytical process. Equipment blanks are prepared by pouring distilled deionized water through the field sampling equipment, and then analyzing these samples. This is a check on whether the sampling equipment is contributing any contaminants to the samples. Matrix spike samples are used by the laboratory. A known amount of a certain parameter is added to the sample, and the amount recovered during the analysis is recorded. This is a check on whether the sample matrix is producing any interference that could affect the accurate recovery of the parameter being analyzed. A blind duplicate is a second set of samples taken from one sampling location, but not identified as to location when sent to the laboratory. The results from the blind duplicate are compared to the identified set of samples from that location to see how closely they agree with each other, and serves as a check on the analytical process.

During the actual sampling the Department staff performed field measurements of pH, specific conductance, turbidity and temperature at each sampling location. The turbidity meter was set to factory calibration prior to the initiation of sampling activities. The pH/conductivity meter was calibrated each morning prior to sampling, utilizing a two-point calibration at pH 7.01 and pH 10.01, and a conductivity solution of 1413 uS/cm.

Samples were taken from the sumps either by direct-fill (for the volatiles samples) or by use of a pre-cleaned stainless steel ladle. A separate ladle was used for each sampling location, and all ladles were pre-cleaned and individually wrapped in the DEC Region 9 lab. An equipment blank was prepared by ladling distilled deionized water into a set of sample bottles on the morning of the first day of sampling.

All sample bottles were received pre-cleaned and pre-preserved, except for the volatiles vials, from Test America Laboratory, a New York State DOH approved testing lab, which is also one of the Department's approved contract labs. Because volatiles vials were to be filled directly from each sump, without the use of a ladle, in order to minimize the potential for volatilization of any parameters, they were not pre-preserved. They were analyzed within the seven-day holding time for unpreserved samples. A total of seventeen bottles were filled at each sampling location. All samples were directly driven to the analytical laboratory at the end of each sampling day, except for the samples to be analyzed for radiological parameters, which were taken back to Albany. The radiological samples were then sent to Pace Analytical Services, Inc., the analytical laboratory under contract with the Department's Radiation Section.

Results

Chemicals

Table 1 summarizes the results of the sampling. Individual locations have not been identified. Each homeowner will receive the results of his or her own sump sampling in a separate letter. The NYCRR Part 703 class GA groundwater standard is provided on the left side of the table for comparison purposes. This standard represents the regulatory limits for use of groundwater as a source of drinking water. Where no standard is listed, one has not been established for that parameter. Results followed by a "J" indicate that the laboratory detected the parameter, but the level was below the laboratory's quantifiable limit (the laboratory could not accurately quantify the amount because it was too small). A result followed by a "B" indicates that the parameter was found in an associated blank, indicating the potential origin for the parameter from a source other than the sump water. A "<" indicates the parameter was not detected at the laboratory 's detection limit. The results which exceed class GA standards for the use of groundwater as a source of drinking water are highlighted on the table.

In general, the sampling results do not indicate contamination of the sumps by landfill leachate, nor do they indicate any potential impacts to the health of residents of the homes tested. The results appear to be typical of those expected in this area, where the natural groundwater quality exhibits levels of total dissolved solids, sulfate, magnesium, sodium, and chloride related to the presence of clayey soils derived from the underlying Camillus shale, which contains gypsum (calcium magnesium sulfate containing mineral), and the use of road salt. Some of the samples are more turbid than others, and the exceedences for metals were generally associated with higher turbidities, since the samples were analyzed whole and were not filtered. Two samples from homes in close proximity to each other exhibited higher nitrate levels. One of the homeowners indicated that fertilizers were used on the property, which could account for the higher nitrate levels in this area.

Both volatile organics and semi-volatile organics were analyzed as part of this sampling event. Low levels of acetone were found in two samples. Acetone was also detected in one of the trip blanks. Acetone is a common laboratory solvent and the detected values likely represent artifacts from the laboratory analytical process. Chloroform was detected below the class GA standard at one location, but was also detected at a background location. Bromodichloromethane was detected at one location below quantifiable levels, and also at a background location. Several phthalates were detected in the samples. Most of the detections were very low "J" values, and di-n-butyl phthalate was also detected in blanks associated with the sampling, including the equipment blank and the method blank. The low levels of diethyl phthalate present in almost every sampling location, including the background locations, suggests that this parameter is associated with the sampling/analytical process and materials, and not actual water quality in the sumps. A higher level of bis(2-ethylhexyl) phthalate was found in one location, and a similar level of butyl benzyl phthalate was found in another location. Phthalates are "plastisizers" added to plastics to make them more flexible. As such, there can be numerous potential sources of phthalates, including plastic tubing and plastic pump parts.

Radionuclides

As explained above, ten houses which border the landfill were sampled for radiological contaminants in addition to two background houses (houses H and M) which are located several blocks away from the landfill. In addition to a sample being collected from each house, a duplicate sample was collected from one of the houses, making a total number of 13 radiological samples collected. The samples were analyzed for the following radionuclides: radium 226 (Ra-226), radium 228 (Ra-228), thorium 228 (Th-228), thorium 230 (Th-230), thorium 232 (Th-232), uranium 234 (U-234), uranium 235 (U-235), uranium 238 (U-238) and americium 241 (Am-241).

Table 2 summarizes the radiological analytical results. As noted, Ra-226 values are all less than the minimum detectable concentration (MDC). Ra-228 was detected in one sample, Th-230 in two and Th-232 in one. U-234 and U-238 were detected in all samples. All of these results are in the range of normal background concentrations. U-235 was not detected in any samples. This isotope is naturally present in much smaller quantities than U-234 and U-238.

As can be expected, the concentrations of radionuclides in water are influenced by the types of geology through which the water passes, as naturally occurring radionuclides, as well as other constituents of water, become dissolved. These concentrations would be described as natural background concentrations. Naturally occurring Radium ranges from less than 1 to 100 picoCuries per liter (pCi/l), however locally, it ranges from less than 1 into the single digits. Typical values for Uranium range from less than 1 into the single digits as well. For Uranium, however, after establishing background one can determine whether the uranium detected is naturally occurring or has resulted from the presence of contamination based on the ratio of U-234 to U-238. If the ratio is greater than or equal to 1.0 (the U-234 value is equal to or larger than the U-238 value), this indicates that the water is older water from natural sources and not water that is contaminated from the landfill or some other source. One has to take into account the analytical errors and if the results with consideration of the errors overlap, for all intents and purposes the numbers are equal. For these sump sample analyses, the values demonstrate that the Uranium in this water is older water from natural sources. To place these numbers in perspective, the United States Environmental Protection Agency (EPA), to protect public health, has established drinking water standards for several types of radioactive contaminants as follows; combined radium 226/228 (5 pCi/L); beta emitters (4 mrem); gross alpha standard (15 pCi/L); and uranium (30 micrograms per liter (27 pCi/l)).

With regard to Americium, initially the laboratory reported traces of Am-241, very close to the detection limit, in four samples. One of those samples was a duplicate of another in the group of four, so these four samples represent three homes. Am-241 is known to be present in the Tonawanda Landfill. All previous studies of the solubility and mobility of that radionuclide have concluded that the Am-241 in the landfill is not soluble and is not moving through the groundwater. Because of the extremely low concentrations of Am-241 reported by the laboratory, which were very close to the instrument detection limits, and the fact that there has been no

historical evidence of americium migration from the landfill, the Department had reason to suspect that these could be "false positive" results for Am-241. Therefore, the Department took several steps to confirm these initial results.

The samples had been prepared by chemically separating out the americium and then plating it out on a disc for alpha counting to determine the Am-241 concentration. Upon evaluation of the data, as stated above, it was suspected that the four samples with positive numbers could be "false positives" so the Department first requested that the laboratory recount the original sample plating. In addition to the samples from the positive detected houses, one background house sample (Sample M) was included for additional analysis as a check on the analytical process. This produced similar, positive results. The Department then directed the laboratory to repeat the entire analytical process, using water from the original samples collected from the sumps. For each original house sample which was to undergo re-analysis, two separate aliquots were created, for which one would be analyzed as a filtered sample and the other as an unfiltered sample. No Am-241 was detected in this re-analysis. As a final check, the New York State Department of Health analyzed the samples at their Wadsworth Laboratory in Albany, using a different analytical method. Those results too, were negative. All of these results are included in Table 2 under the column for Am-241.

The Department has reviewed all of the analytical results and consulted with the New York State Department of Health. Both agencies agree that there is no evidence that Am-241 is moving through the groundwater, and most likely, the initial results are false positives. It is possible that minute traces of Am-241 are present in the area, as a result of the incineration of Am-241 contaminated sewage sludge in the Town's incinerator during the 1970s. Even if the initial positive analytical results were actually true values, these extremely low concentrations are far less than any comparable standard, and would pose no radiation hazard.

Conclusions and Recommendations

The results of this sump sampling program indicate that contaminants from the landfill are not entering the sumps of homes immediately bordering the Town of Tonawanda landfill. As stated above, the results appear to be typical of those expected in this area, where the natural groundwater quality exhibits levels of certain chemical parameters. The results do not indicate that there is a potential threat to the health of the residents of the homes tested. All homes in the area are supplied by public water and there are no known users of groundwater in the area; therefore, exposures to groundwater are not expected.

No further actions are required at this time. Routine sampling of the groundwater monitoring well network at the landfill will continue. If future monitoring results, or additional information is uncovered, that would suggest a potential threat to the public health or environment, then follow-up investigations may be appropriate. The Department will continue to evaluate this on an on-going basis.

Figure 1 - Town of Tonawanda Landfill Study Area

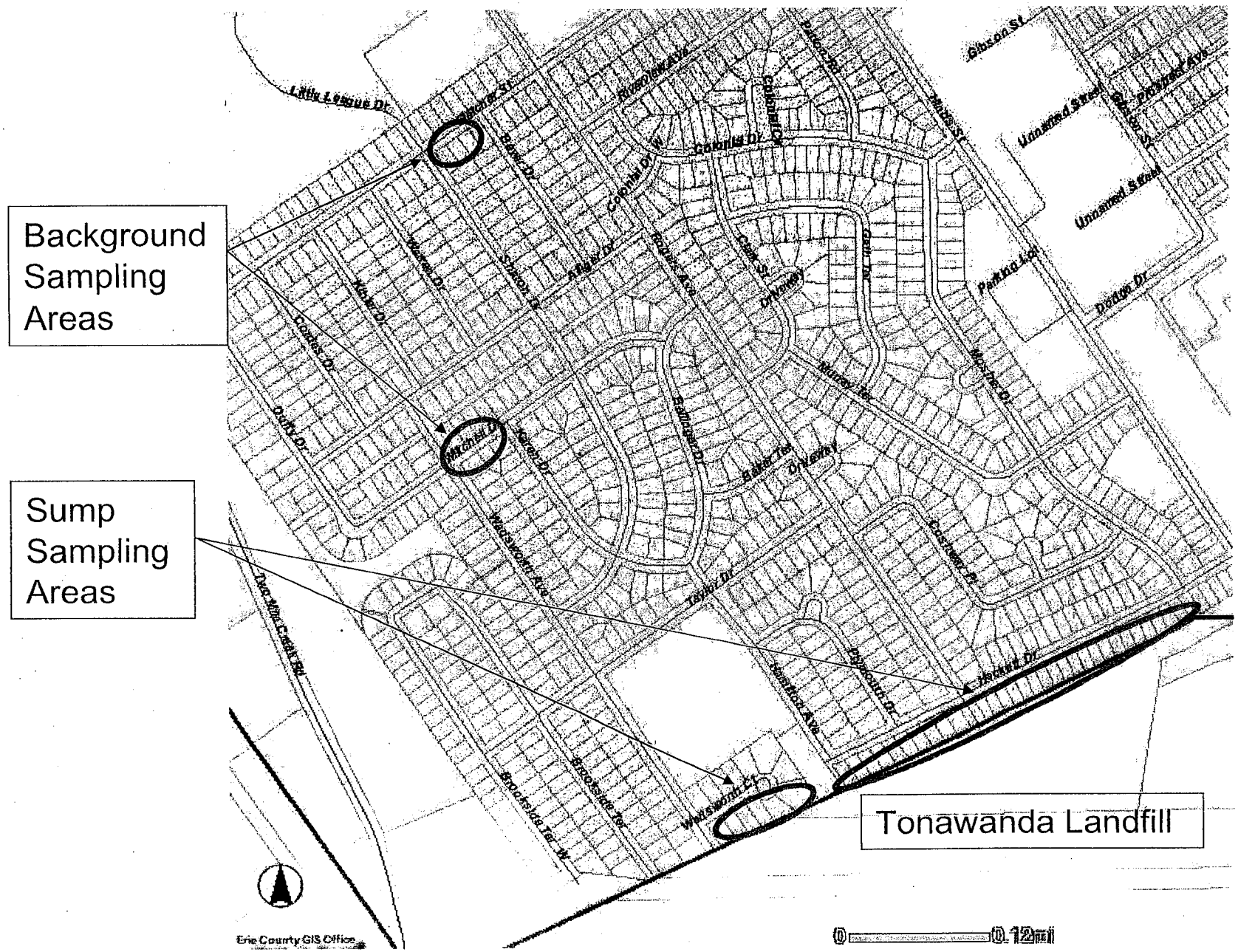


Figure 2 - Town of Tonawanda Landfill Sump Sampling Locations

TABLE 1

Analytical Results for Chemical Parameters

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	A	B Eq. Blank	C	D Blind Dup of C	E	F	G
Detected Volatile Organics (ppb)								
bromodichloromethane		.4J						
chloroform	7	1.0						
acetone							3J	
dibromochloromethane								
Detected Semi-volatile Organics (ppb)								
bis (2-ethylhexyl) phthalate	5	**12**						
di-n-butyl phthalate	50	.6BJ	.3BJ	.3BJ	.4BJ	.3BJ	.3BJ	.4BJ
diethyl phthalate		.9J		.7J	.8J	.2J	.6J	.4J
1, 3 dichlorobenzene	3		.2J					
butyl benzyl phthalate								
Metals (ppm)								
aluminum		1.11	0.0269	0.106	.167	3.72	<0.0194	4.09
antimony	.003	<.0055	<0.0055	<0.0055	<0.0055	<0.0055	<0.0055	<0.0055

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	A	B Equip blk	C	D Blind Dup of C	E	F	G
Metals (continued) ppm								
arsenic	.025	<.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	**0.0369**
barium	1.0	0.0333	<0.00028	0.105	0.107	0.135	0.0274	0.0809
beryllium		<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
cadmium	.005	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
calcium		41.2	<0.10	99.2	105.0	111.0	56.3	59.0
chromium	.050	0.0287	<0.00084	0.0014	0.0013	0.0063	0.002	0.008
cobalt		0.00096	<0.00071	<0.00071	<0.00071	0.0018	<0.00071	0.0013
copper	.200	0.0672	<0.0013	0.0101	0.0043	0.008	0.0027	0.0135
iron	.300	**4.23**	<0.0193	0.056	0.0918	**3.62**	0.231	**3.28**
lead	.025	0.0029	<0.0029	<0.0029	<0.0029	0.0128	<0.0029	0.0041
magnesium		19.9	<0.0423	87.9	81.7	51.9	18.5	53.4
manganese	.300	0.0451	0.00018	0.0025	0.0044	0.0833	0.0032	0.0594
nickel	.100	0.0082	<0.001	0.0012	0.001	0.0048	0.0022	0.0042
potassium		2.24	<0.050	2.89	3.04	8.18	7.94	3.44
selenium	.010	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**0.011**	<0.0061

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	A	B Equip Blk	C	D Blind Dup of C	E	F	G
silver	.050	<0.0011	<0.0011	<0.011	<0.0011	<0.0011	<0.0011	<0.0011
mercury	.0007	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012
sodium	20	**33.7**	<0.339	**79.4**	**98.4**	**128.0**	**56.8**	9.35
thallium		<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034
vanadium		0.0028	<0.00098	0.0015	0.0016	0.0069	0.0208	0.0073
zinc		0.0795	<0.0036	0.0136	0.0103	0.051	<0.0036	0.0311
Wet Chemistry (ppm)								
ammonia	2.0	0.041	<0.020	<0.020	<0.020	<0.020	0.18	0.035
biological oxygen demand		9.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
bromide		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.86
chemical oxygen demand		19.2	13.5	<10	10.3	<10	<10	<10
chloride	250	69.6	<1.0	163	188	**295**	67.0	9.2
color	15	**30**	<0	<0	<0	**50**	<0	**120**
cyanide	.200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
total dissolved solids	500	264	35.0	**790**	**866**	**919**	**506**	398

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	A	B Equip Blk	C	D Blind Dup of C	E	F	G
Wet Chemistry (con't) ppm								
hex. chrome	.050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
nitrate	10	0.88	<0.050	0.67	.074	2.2	0.72	1.9
sulfate	250	30.1	<5.0	120	120	33.7	121	35.1
total alkalinity		157	<10	460	434	278	67.3	316
total hardness		147	4.0	562	577	476	144	389
total Kjeldahl nitrogen		<0.20	<0.20	<0.20	<0.20	<0.20	0.22	<0.20
total organic carbon		3.7	<1.0	3.1	2.9	2.3	2.9	2.6
total recoverable phenols	.001	<0.010	0.010	**0.011**	<0.010	<0.010	<0.010	<0.010
Field Parameters								
pH	6.5-8.5	7.67	**5.76**	7.88	7.89	7.80	**8.88**	8.04
specific conductance uS/cm		488	4	1407	1529	1599	742	650
turbidity NTU's	5.0	**38.3**	0.42	2.31	2.87	**38.1**	2.47	**81.4**
temperature ^{0}F		59.7	61.2	58.2	59.2	48.5	61.1	51.9

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	H background	I	J	K	L	M background	N
Detected Volatile Organics (ppb)								
bromodichloromethane							2	
chloroform	7						4	
acetone				4J				
dibromochloromethane							0.7J	
Detected Semi-volatile Organics (ppb)								
bis (2-ethylhexyl) phthalate	5							
di-n-butyl phthalate	50	0.3BJ	0.3BJ					
diethyl phthalate		0.4J	0.4J	0.4J	0.4J	0.4J	0.9J	0.4J
1, 3 dichlorobenzene	3							
butyl benzyl phthalate						12		
Metals (ppm)								
aluminum		0.0616	0.0453	0.0368	0.088	0.233	0.307	0.422
antimony	.003	<0.0055	<0.0055	<0.0055	<0.0055	**0.0056**	<0.0055	<0.0055

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	H background	I	J	K	L	M background	N
Metals (continued) ppm								
arsenic	.025	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032
barium	1.0	0.115	0.0735	0.0567	0.0417	0.0613	0.0476	0.0685
beryllium		<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
cadmium	.005	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
calcium		71.0	76.2	77.3	50.1	90.8	48.7	79.9
chromium	.050	0.0018	<0.00084	0.0098	<0.00084	0.0457	<0.00084	0.0015
cobalt		<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
copper	.200	0.0164	0.0025	0.0052	0.0037	0.0096	0.0171	0.0097
iron	.300	0.049	<0.0193	0.0628	0.0997	**0.380**	0.164	0.252
lead	.025	<0.0029	<0.0029	<0.0029	<0.0029	<0.0029	<0.0029	<0.0029
magnesium		49.9	39.4	94.7	47.1	44.7	34.4	35.8
manganese	.300	0.0034	0.00036	0.0012	0.0116	0.0086	0.020	0.0077
nickel	.100	<0.001	<0.001	0.0017	0.0012	0.0243	0.0014	<0.001
potassium		1.9	2.16	2.31	2.36	5.02	1.97	2.51
selenium	.010	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061
silver	.050	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	H background	I	J	K	L	M background	N
Metals (continued) ppm								
mercury	.0007	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012
sodium	20	33.9	20.7	34.5	32.9	57.5	11.3	118
thallium		<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034
vanadium		<0.00098	<0.00098	0.0016	<0.00098	0.0023	<0.0098	<0.0098
zinc		0.0116	<0.0036	0.0539	0.011	0.0145	0.0412	0.0113
Wet Chemistry (ppm)								
ammonia	2.0	<0.020	<0.020	<0.020	<0.020	0.032	0.060	0.084
biological oxygen demand		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
bromide		<0.20	<0.20	0.73	<0.20	<0.20	<0.20	<0.20
chemical oxygen demand		<10	<10	13.8	<10	18.5	<10	<10
chloride	250	62.9	39.4	54.7	25.6	77.8	18.6	167.0
color	15	<0	<0	10	5	10	<0	8
cyanide	.200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
total dissolved solids	500	469	**587**	**708**	403	**598**	**705**	322

New York State DEC Tonawanda Sump Sampling Results								
		Location						
Parameter	Class GA Standard	H background	I	J	K	L	M background	N
Wet Chemistry (con't) ppm								
hex. chrome	.050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
nitrate	10	2.9	2.6	2.0	2.7	**11.4**	0.30	**13.7**
sulfate	250	30.2	34.2	137	78.2	68.6	53.6	64.0
total alkalinity		340	286	534	343	317	194	263
total hardness		365	327	606	314	394	265	348
total Kjeldahl nitrogen		<0.20	<0.20	3.0	<0.20	<0.20	<0.20	<0.20
total organic carbon		1.7	1.8	7.8	3.3	4.6	2.4	3.5
total recoverable phenols	.001	<0.010	<0.010	**0.013**	<0.010	<0.010	<0.010	<0.010
Field Parameters								
pH	6.5-8.5	8.06	7.89	7.72	7.89	7.80	8.12	7.70
specific conductance uS/cm		747	724	1223	694	990	322	1260
turbidity NTU's	5.0	1.6	.22	.90	.83	**8.32**	.74	**6.88**
temperature ^{0}F		53.0	56.5	57.8	57.8	54.7	58.7	57.2

TABLE 2

Analytical Results for Radionuclides

New York State DEC Tonawanda Sump Sampling Radiological Results

	Ra-226 +/- Error	Ra-228 +/- Error	Th-228 +/- Error	Th-230 +/- Error	Th-232 +/- Error	U-234 +/- Error	U-235 +/- Error	U-238 +/- Error	Am-241 +/- Error
A	<0.39 +/-	<0.70 +/-	<0.27 +/-	<0.24 +/-	<0.23 +/-	1.07 +/- 0.57	<0.47 +/-	0.74 +/- 0.45	0.11 +/- 0.06
B	<0.45 +/-	<0.74 +/-	<0.30 +/-	<0.27 +/-	<0.26 +/-	1.16 +/- 0.52	<0.36 +/-	1.03 +/- 0.48	0.09 +/- 0.06
C	<0.40 +/-	<0.67 +/-	<0.30 +/-	<0.29 +/-	<0.27 +/-	2.65 +/- 0.98	<0.45 +/-	1.97 +/- 0.81	0.32 +/- 0.11
E	<0.36 +/-	<0.59 +/-	<0.23 +/-	<0.22 +/-	<0.22 +/-	2.97 +/- 1.14	<0.54 +/-	3.4 +/- 1.25	0.35 +/- 0.12
F	<0.37 +/-	<0.72 +/-	<0.23 +/-	<0.23 +/-	<0.23 +/-	1.06 +/- 0.5	<0.37 +/-	1.05 +/- 0.49	<0.07 +/-
G	<0.59 +/-	<0.73 +/-	0.88 +/- 0.37	0.42 +/- 0.24	0.46 +/- 0.25	4.38 +/- 1.4	<0.45 +/-	3.57 +/- 1.2	<0.06 +/-
H	<0.51 +/-	<0.68 +/-	<0.45 +/-	<0.50 +/-	<0.51 +/-	1.06 +/- 0.53	<0.43 +/-	1.23 +/- 0.58	<0.07 +/-
I	<0.43 +/-	<0.66 +/-	<0.25 +/-	<0.25 +/-	<0.23 +/-	1.17 +/- 0.63	<0.49 +/-	0.81 +/- 0.59	<0.08 +/-
J	<0.64 +/-	<0.63 +/-	<0.37 +/-	1.44 +/- 0.58	<0.33 +/-	2.29 +/- 1.01	<0.60 +/-	2.58 +/- 1.08	<0.06 +/-
K	<0.38 +/-	0.85 +/- 0.46	<0.23 +/-	<0.22 +/-	<0.21 +/-	3.57 +/- 1.35	<0.59 +/-	3.12 +/- 1.23	<0.05 +/-
L	<0.65 +/-	1.01 +/- 0.37	<0.26 +/-	<0.25 +/-	<0.25 +/-	2.71 +/- 0.95	<0.41 +/-	1.99 +/- 0.78	<0.10 +/-
M	<0.37 +/-	0.94 +/- 0.42	<0.37 +/-	<0.33 +/-	<0.32 +/-	1.67 +/- 0.75	<0.49 +/-	1.54 +/- 0.71	<0.08 +/-
N	<0.56 +/-	0.75 +/- 0.4	<0.25 +/-	<0.22 +/-	<0.23 +/-	1.71 +/- 0.74	<0.46 +/-	2.06 +/- 0.83	<0.12 +/-

	Re-count
A	<0.21
B	<0.19
C	0.55 +/- 0.27
E	0.43 +/- 0.23
M	<0.29

	Re-analysis	Am-241 Unfiltered	Filtered
A		<0.09	<0.08
B		<0.08	<0.09
C		<0.12	<0.07
E		<0.07	<0.10
M		<0.07	<0.09

	DOH Nuclear Chemistry Laboratory
A	<0.24
B	<0.19
C	<0.23
E	<0.25
M	<0.23

All results have pCi/l units

Letter B is a Duplicate of A - For reviewers, Letter B of the Chemical Table is an equipment blank sample so no direct comparison of the data can be made.

Letter D is Intentionally missing since the Chemical Table Letter D represents a duplicate sample and a radiological duplicate sample was collected as letter B.

Attachment A

Town of Tonawanda Landfill Sump Sampling

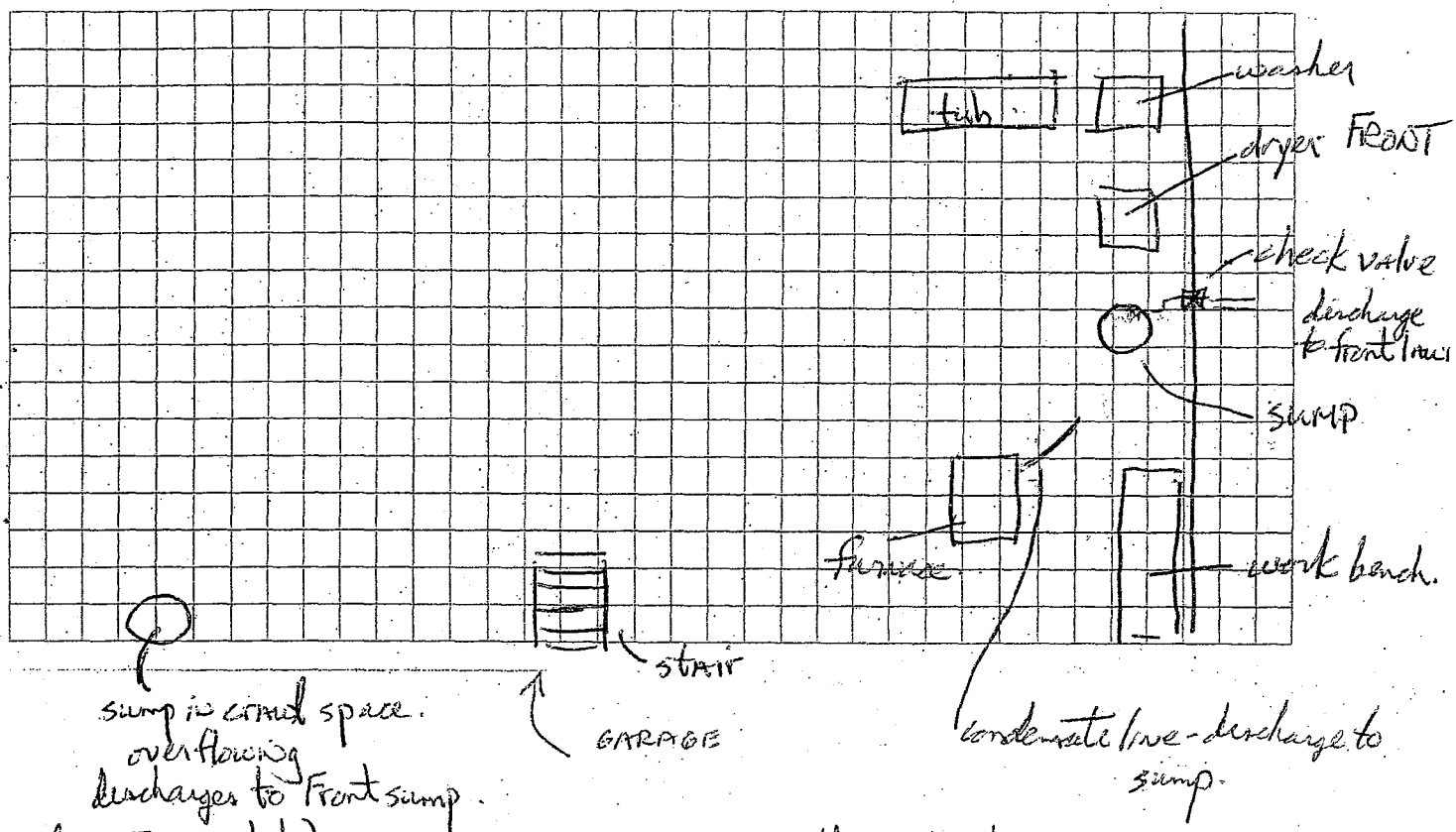
Sample Basement/Sump Location Sketches
and Product Inventory Sheets

New York State Department of Environmental Conservatio
Division of Solid and Hazardous Materials, Region 9

Town of Tonawanda Landfill Project
Residential Indoor Sump Sampling

Floor Plan - Basement

Draw a plan view of basement area showing location of sump, possible indoor sources of pollution sources, laundry, floor drains, PID meter readings, etc.



- sump pump - ≈ 13 yrs old (original pump)
- About 8-10, 1 gal. pail-ish cans partly full and/or empty.

- Prior to sampling
  - kick on pump - 1x
  - rust present on pump
  - water is cloudy - brown colored

Sample # RR 900 0310 - 01
" 01 MS
" 01 MSD

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: ppb RAE - 79-90-100 ppb.

List specific products found in the residence that have the potential to affect indoor air quality.

Begin sampling ~ 12:20 PM
end 1:20 PM.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y / N
work area	linoleum paste	1 qt	closed	—	70-100 ppb.	
"	Minwax - wood stain					
	3 ea.	1 qt.				
"	polyurethane varnish					
	2 ea.	1 qt.				
	Paints - 1 gallon.					
	Approx 8-10 partly filled.					
	starch - laundry					
	spray cans	2 ea.				
	lawn - fertilizer - Scott's 4/x/yr treat. (none stored inside)					

* Describe the condition of the product containers as **Unopened (UO)**, **Used (U)**, or **Deteriorated (D)**

** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

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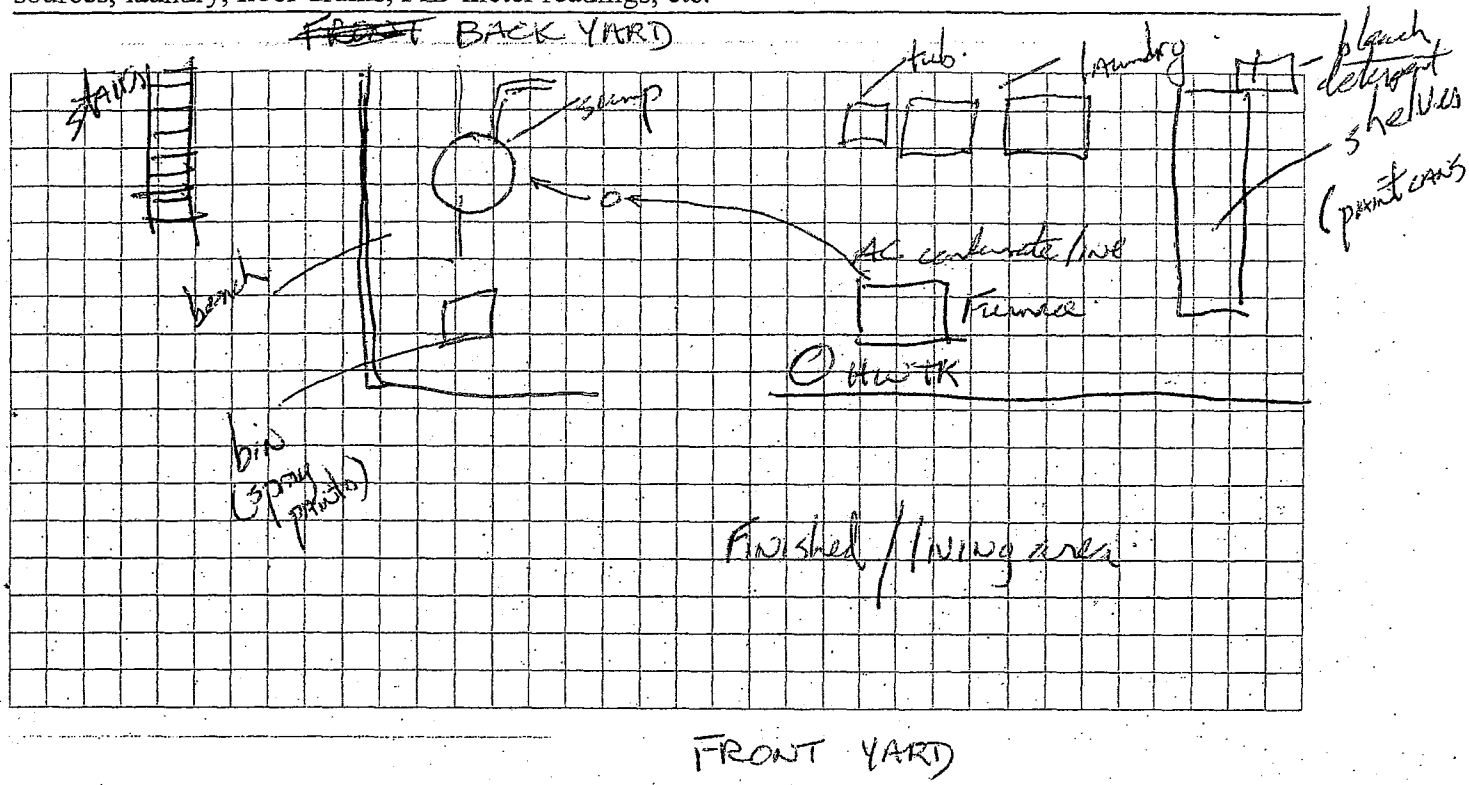

Sample # RR9 080310-10

time - 9:00 AM.

Sump - discharge to front yard

temp. - pipe break - discharge to wash basin

Fertilize lawn - 5 x/yr - Scotts

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: ppb RAE 110-120 ppb

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo ** Y / N
shelf	paint can	1 qt	sealed			
along						
stairwell	paint - spray cans 2 ea.					
	moth ball 2 boxes.			naphthalene.	ND.	
	engine oil 3.2oz					
	polyurethane. spray can.					
on top of old layer	latex paint 7 primers can	6-7 1 gal.				

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
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