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REPORT ON THE INVESTIGATION OF THE BABCOCK STREET SITE

July 1985

Prepared for:

THE CITY OF BUFFALO
DEPARTMENT OF COMMUNITY DEVELOPMENT

ecology and environment, inc.

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International Specialists in the Environment

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EXECUTIVE SUMMARY

Ecology and Environment, Inc., (E & E) investigated a site bounded by Fleming, Lewis, Lyman, and Babcock streets in Buffalo. The site is owned by the City of Buffalo and proposed for a neighborhood park. The site had formerly been used for the manufacture and distribution of agricultural chemicals and also as an automobile wrecking and salvage yard. Samples of surface soil, fill from boreholes, and groundwater were taken and analyzed for a wide variety of organic compounds and metals. No hazardous waste was found and levels of organics were insignificent. Elevated levels of heavy metals, particularly lead, were noted. Except in one instance, the levels were typical of urban areas. The one markedly elevated sample is thought to have contained a fragment of lead or lead oxide. It was checked by the Extraction Procedure toxicity test used to define hazardous waste, and the test results were negative. Three locations on-site were checked for underground tanks on the basis of city records and a geophysical survey, and one empty tank was found. The other locations showed only demolition rubble and fill. Samples from an adjoining sewer in Fleming Street suggests that the site is discharging water containing elevated metal levels to the storm sewers. The site appears to have no significant environmental or health impacts, but is typical of urban industrial areas. Development of the site, especially if it is covered with clean fill, will mitigate what slight adverse impact the site now has on surrounding areas.

1. SITE BACKGROUND

1.1 INTRODUCTION

In November 1984, the City of Buffalo, Department of Community Development, purchased the property bounded by Fleming, Lewis, Lyman, and Babcock streets (see Figure 1-1) in downtown Buffalo for development as a neighborhood park or playground. The Babcock Street site was used in the past primarily for the manufacture and formulation of agricultural chemicals and as a car wrecking and salvage yard. At present, all but three small buildings on the site have been demolished, although railroad tracks, a truck scale, and various paved areas and building foundations remain. There are two large mounds of fill on-site, one behind the community center at the northwest corner of the site and the other in the southeast corner.

15 Acres

Prior to purchase, the City retained Buffalo Drilling Company to investigate the site. The investigation, which was conducted from May 18 to June 4, 1984, involved 14 soil borings at 12 locations and the analysis of samples for heavy metals and pesticides, as well as polychlorinated biphenyls (PCBs). Figure 1-2 shows the locations of boreholes on the Babcock Street site. Appendices A and B contain the boring logs and laboratory test results, respectively, of the Buffalo Drilling Company investigation.

The investigation determined that there were elevated levels of several metals in the soils on-site. Pesticides and PCBs were also checked and found to be at low levels. Other organics were not analyzed for, but their presence was suspected because of odors in the

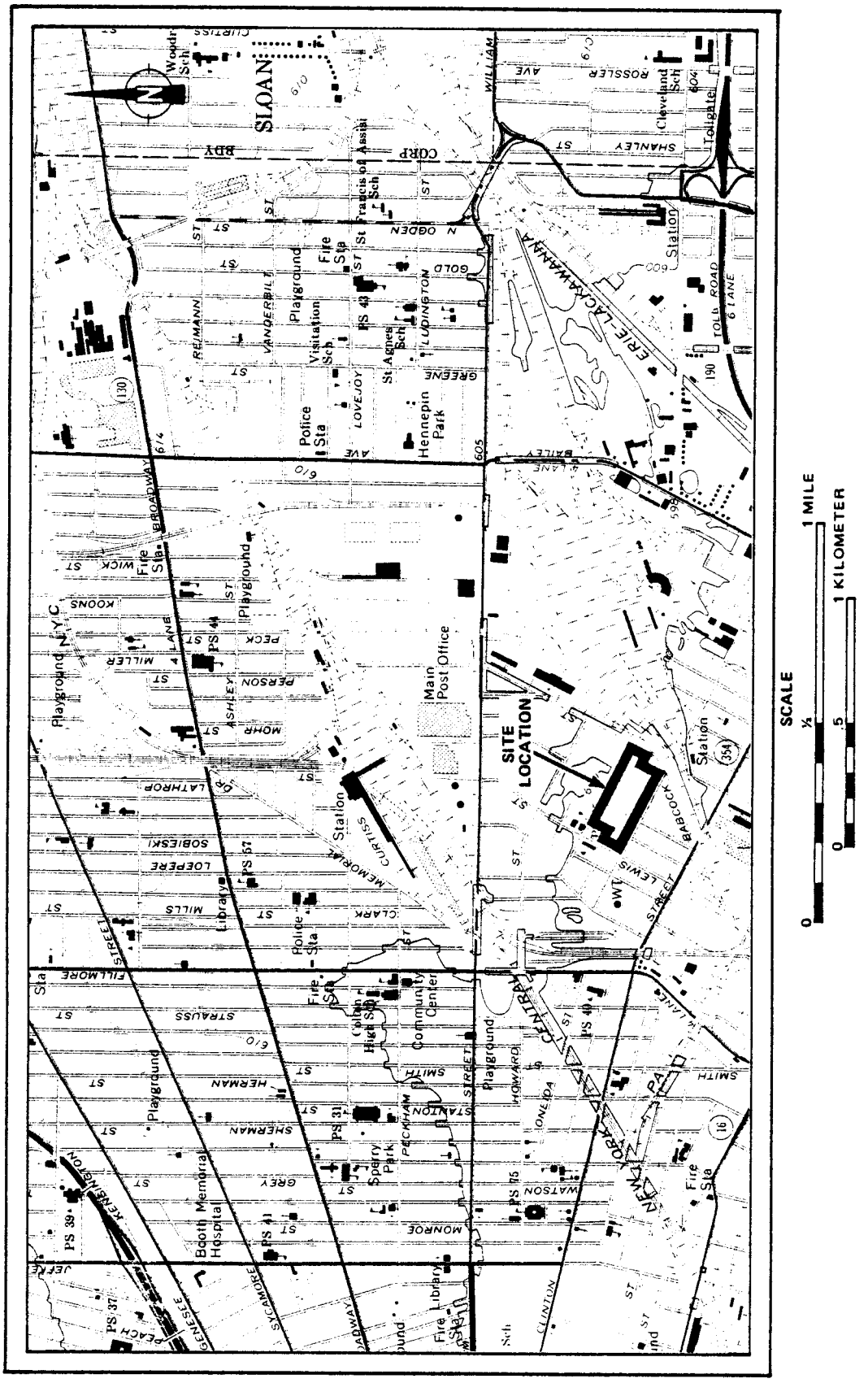


Figure 1–1 BABCOCK STREET SITE LOCATION

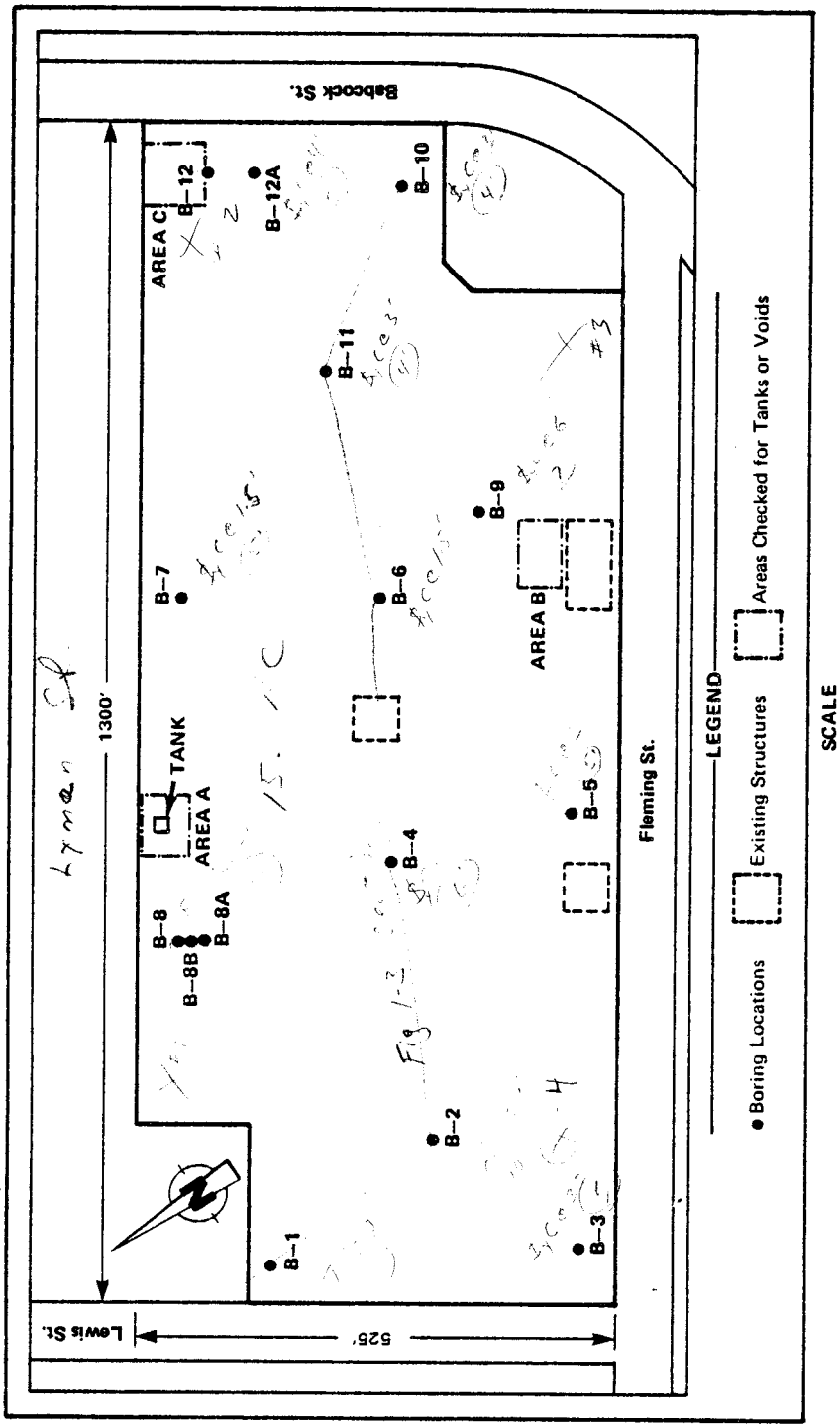


Figure 1-2 LOCATION OF BOREHOLES ON BABCOCK STREET SITE

groundwater. During the soils investigation, a "foamy purple liquid" was encountered in borehole B-9 and an "odorous-gray foamy liquid" was encountered in borehole B-2. These fluids were suspected of containing toxic materials.

In January 1985, the City Department of Community Development asked Ecology and Environment, Inc., (E & E) to review the Buffalo Drilling Company investigation data for the Babcock Street site. The Department requested that E & E develop a sampling plan for further work to determine if the site contained hazardous waste and to assess the site for materials that might present a risk to the public, both now and if the property is developed as proposed. A draft sampling plan was prepared and submitted to interested state and county agencies for their comments, which were then incorporated into a fieldwork proposal. Agencies approached included the Erie County Department of Environmental Planning, the New York State Department of Health, and the New York State Department of Environmental Conservation (DEC). A field investigation involving a geophysical survey, surface and subsurface soil sampling, groundwater sampling, and sewer sampling was carried out by E & E in April and May 1985. Based on city records and the geophysical results, a search was made for tanks or voids beneath the surface during June 1985.

Section 2 of this report outlines the purpose and scope of the E & E investigation as well as the fieldwork performed. Section 3 discusses the results of the investigation. Based on these results, Section 4 presents E & E's conclusions and recommendations for the site.

1.2 SITE HISTORY

As part of its investigation, E & E conducted a review of historical records and a title search to determine the previous owners of the Babcock Street site and associated uses of the property. This information is summarized below.

The Babcock Street site was used for agricultural chemical manufacture from at least 1930 to January 1974. In 1941, the southeast corner of the site was sold by American Agricultural Chemical Co. to Economy Reduction Corporation. American Agricultural Chemical was taken over by Continental Oil Co. in December 1965, and at that time

the remainder of the site was conveyed to its subsidiary Agrico Chemical Company. Agrico sold its holdings to Frit Industries Inc. in January 1974. In March 1975, Frit Industries sold the northwest corner of the site to the Thaddeus Joseph Dulski Community Center, Inc. In November 1976, Frit Industries sold the remainder of the site to Industrial Refining Corporation, which in turn sold the property to Car Salvage World, Inc., in December 1977. Car Salvage World filed for bankruptcy in July 1980 and the site passed by foreclosure to the Brondy Real Estate Co. in August 1981. In November 1984, the site was sold by Brondy Real Estate to the City of Buffalo.

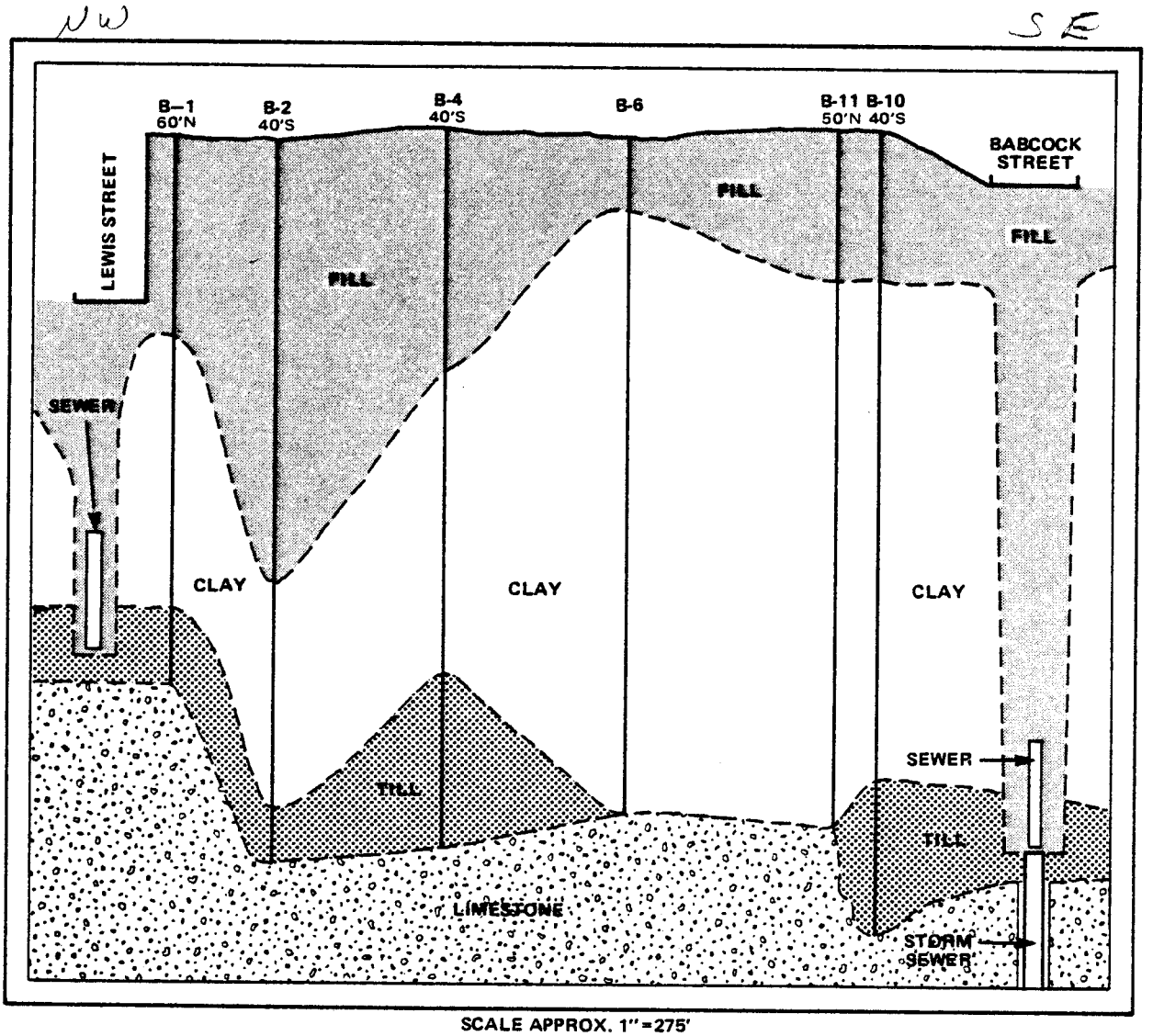
The Agrico Chemical Company operated the plant on the site for the manufacture of superphosphate, hydrofluorosilicic acid, sodium silicofluoride, and mixed granular fertilizers of various NPK grades. They also received, stored, and shipped packaged herbicides, pesticides, and lawn fertilizers. It is known that sulfuric acid was manufactured on the site sometime prior to 1968 (see Appendix C).

The other main use of the site for commercial purposes was for car wrecking and salvage from December 1977 to July 1980.

1.3 SITE GEOLOGY AND HYDROLOGY

The following information on the geology and hydrology of the Babcock Street site is based on the investigation conducted by Buffalo Drilling Company in May and June of 1984. Appendix A contains the Buffalo Drilling Company boring logs.

Bedrock under the site is Onondaga Limestone of Middle Devonian Age (Rickard and Fisher 1970). Refusal occurred in all the boreholes from 10.5 feet to 16.5 feet below the surface. Refusal was interpreted as indicating the top of bedrock, except in boreholes 8 and 8a, the bottoms of which were in fill. This depth to bedrock is supported by the contractors, CM & H Co., who installed an 11-foot concrete box flume sewer along the eastern edge of the site (CM & H Co. 1985). Above the bedrock there is a thin discontinuous layer of till, generally consisting of silty sand with some clay and gravel, ranging from 8.3 feet thick in borehole B-7 to undetected in boreholes B-6 and B-11 (see Appendix A and Figure 1-3). This layer of till appears to be relatively impervious in some wells, yielding no water in boreholes



SCALE APPROX. 1"=275'
VERTICAL EXAGGERATION 175:1

Figure 1–3 SCHEMATIC CROSS SECTION ALONG CENTERLINE OF SITE

B-3, B-4, and B-10, but is probably water-bearing in B-5, B-7, and B-12 based on Buffalo Drilling investigation results. A silty clay was encountered overlying the till in all boreholes except B-8 and B-8a. In borehole B-1 it was described as silty clay and probably incorrectly identified by Buffalo Drilling as fill, but elsewhere was recorded as natural soils (see Appendix A). This silty clay material was generally hard and relatively impervious, and ranged in thickness from about 4 feet to 12 feet. Above the silty clay in all the boreholes was a heterogeneous layer of fill described in some instances as topsoil (boreholes B-1 and B-2) and in others as random fill, with concrete, brick, glass, coal, wood, cinders, slag, etc. A layer of water perched on top of the clay layer was found in the fill in boreholes B-1, B-2, B-8, and B-9. This included the "foamy fluid" encountered in boreholes B-2 and B-9.

No flow direction can be postulated for the perched water in the fill. It might drain to any sewer or storm drain trench around the site. The water in the till may be contiguous with the bedrock aquifer, and quite probably drains southeast to the box flume sewer trench, which most likely creates a lowered hydraulic head and a channel of more rapid movement within the aquifer. The box flume sewer was installed with its base from 20 to 24 feet below pavement along Babcock Street (see Figure 1-3). Most of the sewer was within a rock trench. There are no known wells in the vicinity of the site, and the entire area is on city water, which is taken from Lake Erie.

From a general understanding of climate and geology of the site area, the Onondaga Limestone very probably naturally discharges groundwater south to the Buffalo River in this area, although near-surface water may well be diverted into the sewer systems as noted.

2. E & E FIELD INVESTIGATION

2.1 PURPOSE AND SCOPE

The fieldwork conducted by E & E was primarily directed to determining if the site contained hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). A secondary objective was to determine if toxic or dangerous substances were present at levels which might present a hazard to the public, either now or after the proposed development. A related concern is whether the site is now impacting or has the potential to adversely impact the environment.

With these objectives in mind, it was proposed to:

- Conduct geophysical surveys to locate anomalies which might suggest the presence of waste or drums buried beneath the site.

- Resample areas of fill shown by the initial site investigation to contain elevated concentrations of heavy metals (borehole locations B-1, B-2, B-4, B-9, and B-12); composite surface soil samples and trench samples from the two mounds of fill on-site; and, by running an EP toxicity test, determine if these samples contain hazardous waste as defined by RCRA.

- Simultaneously check all soil samples for United States Environmental Protection Agency (EPA) priority pollutants* and for the herbicide Alachlor, as requested by the New York State Department of Health.

- Collect a composite sample of the solid yellow material found in the center of the site to determine its identity.

- Install temporary monitoring wells through the entire thickness of the fill at boreholes B-1, B-2, B-8, and B-9, and one temporary well into the till below the clay and above bedrock at borehole B-7. Collect water samples from these locations and analyze for EPA priority pollutants as well as substances listed in the EPA Drinking Water Standards which are not priority pollutants.**

- If feasible, collect water from a sewer in a street adjoining the site, both upgradient and downgradient of the site, and analyze for the same parameters listed above for groundwater samples.

- Test all water samples for pH.

Based on these results, the following were to be determined:

- If hazardous waste (EP toxic waste), as defined by RCRA, is present on-site;

- If levels of toxic organics or metals on-site are high enough to represent a public health or environmental hazard; and

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*EPA priority pollutants are a wide variety of metals, pesticides, volatile organics, and other organic compounds considered to be representative of industrial pollutants of concern for human health and environmental reasons.

**Barium, methoxychlor, 2,4-D, 2,4,5-TP, and toxaphene.

- What precautionary measures should be taken in the event the site is developed as a neighborhood park, or put to some other beneficial use.

2.2 FIELDWORK

Fieldwork began on April 8, 1985, with an initial survey of the site for organic vapors using an Organic Vapor Analyzer (OVA). No readings of organic vapors above background were recorded. In addition, three empty drums on-site were checked using the OVA. Again, no readings above background levels were recorded. A grid for the geophysical survey and soil sampling was laid out based on 200-foot centers starting from a point on the mid-line of the east gate 50 feet from Babcock Street. The geophysical survey, soil sampling, groundwater sampling, and sewer sampling effort is described below. Results of the investigation are given in Section 3 and Appendix E.

2.2.1 Geophysical Survey

A magnetometer and electromagnetic conductivity (EM) survey of the site was conducted on April 9 based on 50-foot centers. One hundred and fifty-nine readings were recorded (see Figure 3-1 and Appendix D). Interiors of buildings and the irregular surface of the eastern mounds of fill were not included in this survey. Results of the geophysical survey are discussed in Section 3.1.

2.2.2 Soil Sampling

On April 12 and 13, borings were made at borehole locations B-1, B-2, B-4, B-7, B-9, and B-12 (see Figure 1-2) using the same hollow-stem auger rig used by Buffalo Drilling to sample the site previously. Composite samples were taken from boreholes B-1, B-2, B-4, B-9, and B-12 using a split-spoon sampler advanced ahead of a hollow-stem auger. Three surface soil samples were collected and composited from 200-foot intervals along grid lines on the south, north, and center of the site. In addition, one off-site soil sample was collected from behind the Dulski Community Center. It should be noted that this area was once owned by Agrico Chemical Co., and prior to that by the American Agricultural Chemical Company.

On April 18, a backhoe was brought on-site to cut trenches into each of the two mounds of fill. Five trenches were cut into the edges of the eastern mound, and a composite soil sample was made up of material taken from the trenches. No organic vapors were recorded by the Organic Vapor Analyzer used during the trench-cutting operation. The backhoe was then used to cut four trenches into the edges of the west mound. Again one composite soil sample was made up from the material taken from the trenches. No organic vapor readings above background were recorded on the OVA.

All soil samples were tested for EP toxicity as well as EPA priority pollutants. Results are discussed in Section 3.2.

In addition, one grab sample of the solid yellow material found on the surface at the center of the site was taken for identification purposes (see Section 3.2).

2.2.3 Groundwater Sampling

As outlined in the draft work plan, temporary monitoring wells were proposed for boreholes B-1, B-2, B-7, B-8, and B-9 to allow sampling of the groundwater noted in the Buffalo Drilling investigation, including the "foamy" liquids encountered in boreholes B-2 and B-9. On April 12, temporary wells were installed in boreholes B-7 and B-9. Borehole B-9 recharged very slowly; it had a high content of reddish-purple clay which caused the sample to have a "foamy purple" appearance, as noted in the Buffalo Drilling boring logs (see Appendix A). Borehole B-7 was dry at first, and so it was taped closed and allowed to stand overnight. On April 13, the well at borehole B-7 was sampled, and temporary wells were installed in boreholes B-1, B-2, and B-8b, and sampled. Recharge at borehole B-2 was very slow, and a complete sample could not be taken. A high gray clay content in the soil at this location produced the "gray foamy" liquid reported in the earlier investigation. For B-2, only volatile organics, base/neutral extractables, pesticides, and acid extractables on the priority pollutant list were measured.

The analytical results for the groundwater sampling are discussed in Section 3.3.

All well casings were withdrawn after sampling and the boreholes filled in. At borehole B-7 the hole was filled with cement grout to

the surface to prevent migration down the borehole into the till below the clay.

2.2.4 Sewer Sampling

An attempt was made to sample sewers along Fleming Street on April 13 but, because there was no water in the upgradient sewer for comparison purposes, no sample was taken. On April 22, after a rainfall, the sewers were sampled. However, flow was so low that only 40-ml bottles for volatile organics analysis were collected. On May 28, after another period of rain, the sewers were again sampled, this time for metals, since based on preliminary analytical results metals appear to be the only contaminants present on site at levels of potential concern. Section 3.4 discusses the results of the sewer sampling.

2.2.5 Excavations for Buried Tanks or Voids

On June 27, E & E checked two locations on-site where city records showed underground tanks had been installed, and one where the geophysical investigation indicated low conductivity, possibly suggesting a void below the surface. At each location, a backhoe was used to excavate several trenches down to undisturbed natural clay.

3. DISCUSSION OF RESULTS

3.1 GEOPHYSICAL SURVEY

Aside from the interiors of buildings and the mounds of fill at the southeast corner of the site, the entire site was covered by a magnetometer survey with readings taken at 50-foot intervals based on the grid system. An EM survey was also conducted, with readings taken at 50-foot intervals as well as between points to check for major anomalies. The locations at which measurements were taken and the readings that were recorded are given on Figure 3-1. Magnetometer readings which are underlined on the figure indicate steep gradients typical of metal scrap areas.

The results of the geophysical survey for the majority of the site generally show abrupt magnetic gradients typical of areas with buried ferromagnetic scrap metal, particularly in the northern and eastern parts of the site. One small area just southeast of borehole B-8 showed a relatively high conductivity reading without a corresponding reading indicating the presence of magnetic metal. Borehole B-8a showed no scrap metal in the soil and the relatively conductive clay layer was only 3 to 4 feet below surface, which explains the discrepancy between the two types of readings. Because the hole was dry and a water sample was needed, the rig was moved to a point between boreholes B-8 and B-8a, and borehole B-8b was drilled. At borehole B-7, clay was also encountered at a shallow depth, but the soil was full of scrap metal. In fact, the first attempt to install a well failed when the drilling bit struck metal 1 foot below surface.

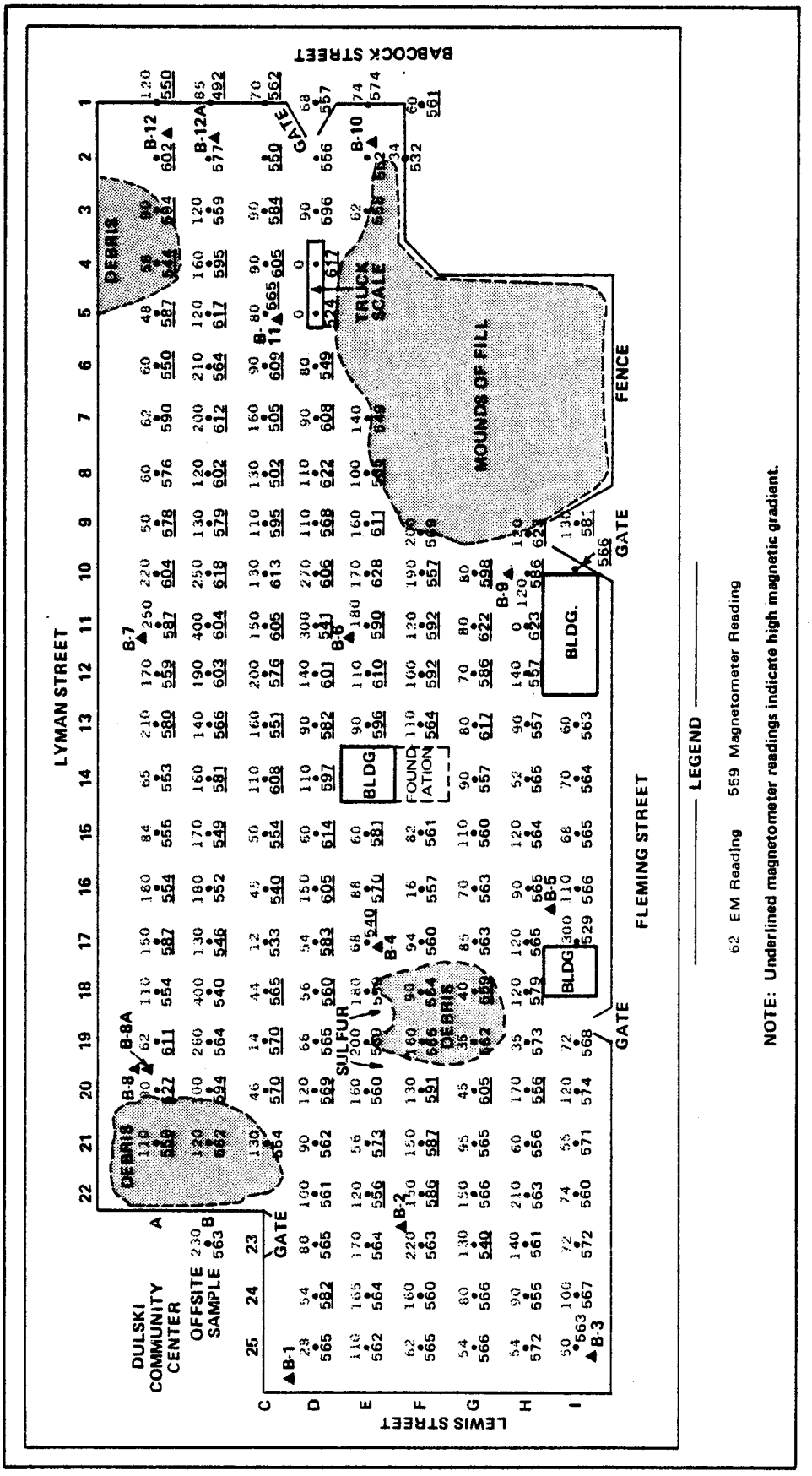

Figure 3–1 MAGNETOMETER READINGS (gammas x 10^2) AND EM READINGS (micromhos/meter) FOR THE BABCOCK STREET SITE

No evidence was discovered of any anomalies which might correspond to excavations in bedrock, large concentrations of buried drums, or high levels of conductive groundwater plumes.

There were some highly resistive areas which appeared to correlate with massive foundations or thicknesses of rock fill, such as along a railroad spur in the northwest quarter of the site (points C 15-20), and over the truck scale (points D 4-5) where there is a large void. It seemed possible that point H 11, near borehole 9, which also showed 0 conductivity, was also over a void. This was later checked (see subsections 3.2.5 and 3.6).

3.2 SOIL SAMPLING

Tables E-1 through E-20 in Appendix E give analytical results for soil sampling as well as quality assurance data.

EP Toxicity

Analysis of the soil samples collected during the E & E investigation showed that none of the samples contained hazardous waste as defined by RCRA. Any sample which, after extraction by the required procedure, shows a parameter exceeding a maximum allowable level is hazardous waste by definition. Of the eight metals and six organics tested, only lead and barium were above levels of detection. Barium is of relatively low toxicity and the maximum level found was only 11% of the maximum allowable. Most of the samples were relatively low in soluble lead, averaging one part per million (ppm) or 20% of the maximum allowable (5 ppm). One sample, fill from borehole B-2, had 4.45 ppm soluble lead, which is close to, but below, the maximum allowable.

Organics

Total priority pollutant organics were low, with values for pesticides showing a maximum of 2.9 ppm (for DDT in the east mound), and no sample showed detectable levels of the pesticide Alachlor. Aside from traces of 4-nitrophenol in four samples, the chemicals found are all of the type associated with asphalt and tar, although combustion products from air pollution are also possible sources. 4-nitrophenol is a relatively toxic compound. However, at the maximum

level found (1.3 milligrams per kilogram [mg/kg] in soil from borehole B-2), any reasonably anticipated exposure scenario would not present a hazard to human health. The organics levels are generally below 1 ppm. The composite sample from the east mound, however, showed 42 ppm of fluoranthene, 13 ppm benzo(a)pyrene, and 30 ppm of phenanthrene (see Table 3-1). These compounds are typical of asphalt and are within the normal limits for roadside dust (Pucknat 1981). Since the mound contained obvious quantities of asphalt debris, this is probably the origin of the organics. As might be expected, the "off-site" sample taken from behind the Dulski Community Center is comparable to other soils on-site and probably similar to most industrial areas in the city.

Inorganics

The metals are of somewhat greater concern than the organics. In particular, lead averaged 2,527 ppm (see Table 3-2), which is clearly elevated above background; however, in roadside dust in urban areas levels of lead may range from 1,000 to 20,000 ppm (Page and Ganje 1970). If the sample with the highest concentration of lead (i.e., the composite soil sample taken from the centerline of the site) is removed, the average level concentration drops to 703 ppm, which is typical of levels of lead in soil in industrial areas. The one high value, 17,800 ppm, is probably the result of a small piece of lead metal or lead oxide from a lead acid battery or battery clamp being in the sample. Its significance is greatly reduced when it is considered that the EP toxicity test for the same sample gives 0.247 ppm (see Table E-1 in Appendix E). This indicates that the lead in the sample is insoluble under normal conditions. It should also be noted that in soils taken from the boreholes in the center of the site (boreholes B-1, B-2, B-4, sampled during the E & E investigation; and B-6, B-11, and B-10, sampled by Buffalo Drilling), the average lead content was less than 400 mg/kg (ppm) when E & E and Buffalo Drilling results are combined (see Appendices A and E).

Elevated levels of arsenic (302 mg/kg) and mercury (585 mg/kg) were found in soil samples taken from borehole B-9 and the west mound, respectively. However, EP toxicity test results for these samples (see Table E-1 in Appendix E) indicate that the arsenic and mercury

Table 3-1

ORGANICS IN SOIL

(mg/kg)

Compound or Parameter	Sample Numbers										
	B1	B2	B4	B9	B12	Surface N Side	Surface S Side	Surface Center	East Mound	West Mound	Surface Off-Site
4-nitrophenol	ND*	1.3	ND	ND	ND	ND	0.16	ND	4.6	1.2	ND
Acenaphthlene	ND	0.89	ND	0.04	ND	ND	0.13	0.09	3.3	1.3	--
Fluoranthene	0.16	4.3	0.21	0.6	0.52	0.28	1.31	1.73	42	18	1.18
Naphthalene	ND	1.7	ND	0.04	ND	ND	0.13	0.08	2.5	0.78	ND
di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	0.79	0.81	ND
Benzo(a)anthracene	0.2	1.9	ND	0.22	0.19	0.13	0.61	0.51	14	8.2	0.56
Benzo(a)pyrene	0.53	2.0	ND	0.23	ND	ND	0.12	0.52	13	4.9	0.7
Benzo(b)fluoranthene	0.53	1.3	ND	0.20	0.11	ND	0.56	0.56	8.8	6.7	0.51
Benzo(k)fluoranthene	0.43	1.3	ND	0.16	0.13	ND	0.46	0.46	8.8	5.1	0.44
Chrysene	0.25	1.7	0.13	0.24	0.21	ND	0.61	0.66	13	7.9	0.67
Anthracene	ND	1.5	ND	0.67	ND	ND	ND	0.15	9.0	4.0	0.14
Benzo(ghi)perylene	0.58	0.59	ND	ND	ND	ND	0.33	0.25	4.0	2.9	0.24
Fluorene	ND	1.0	ND	ND	ND	ND	0.13	ND	3.4	ND	ND
Dibenzo-(a,h) anthracene	0.07	0.16	ND	ND	ND	ND	0.08	ND	1.5	0.46	ND
Indeno-(1,2,3-cd) pyrene	0.6	0.74	ND	0.1	ND	ND	0.36	0.28	5.4	3.3	0.26
Pyrene	0.16	2.6	0.13	0.36	0.31	0.2	0.94	0.97	21	1.2	1.25
Phenanthrene	ND	5.1	ND	0.53	0.41	0.21	1.04	1.6	30	13	0.82
Aldrin	ND	ND	ND	ND	0.028	ND	ND	ND	ND	ND	ND
Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND	0.25	ND	ND
4,4'-DDT	ND	0.09	ND	ND	ND	ND	0.11	0.067	2.9	ND	0.091
Dieldrin	ND	ND	ND	ND	ND	ND	0.027	0.016	ND	ND	ND

*ND = below limit of detection

Table 3-2

INORGANICS IN SOIL

(mg/kg)

	Sample Numbers										
Metal	B1	B2	B4	B9	B12	SS N Side	SS S Side	SS Center	East Mound	West Mound	SS Off-Site
Antimony	ND*	ND	ND	4.84	ND	6.43	ND	ND	ND	1.41	5.34
Arsenic	198	ND	135	302	94.3	5.21	ND	64.1	39.2	16.7	6.02
Cadmium	0.438	0.658	ND	10.9	1.9	1.42	1.39	0.56	ND	ND	1.09
Chromium	9.38	ND	28.1	ND	22.4	12.4	46.6	11.2	ND	ND	ND
Copper	172	4.2	111	1,280	90.0	41.6	169	185	117	175.3	49.1
Lead	412	1,750	155	1,760	520	88.8	3,220	17,800	794	747	563
Mercury	0.710	4.52	0.49	15.42	1.24	9.6	0.42	1.53	6.23	585	0.419
Nickel	14.1	7.54	12.3	16.6	20.3	29.8	21.8	23.9	24	69.6	20.6
Silver	2.98	ND	0.839	6.38	0.495	0.503	1.39	2.3	0.912	4.94	0.791
Thallium	3.5	1.39	0.639	7.45	0.941	ND	0.943	1.06	1.65	ND	ND
Zinc	174	39.6	71	7,510	396	457	348	286	405	1,630	372

*ND = below the limit of detection

in these samples are insoluble, and therefore not mobile, under normal conditions.

Soils adsorb metals in a number of ways which are generally related to clay content, free iron oxide content, soil lime (pH) effect, and the volume of water passing through the soil (EPA 1978). The site has a high clay content in the soil and fill, as well as an underlying layer of clay. The magnetometer survey indicated a high content of ferromagnetic material in the till, which suggests that plentiful sources of iron oxide are available. Of the four factors, the two which can be modified are the pH, by a regular program of liming, and infiltration, by surface water drainage and maintaining a good vegetation cover.

The sample of yellow material collected from the center of the site was checked for its solubility in carbon disulfide and also by its melting point and its color and odor when molten, and was identified as elemental sulfur (see Table E-7 in Appendix E). This is not considered a toxic or hazardous substance.

3.3 GROUNDWATER SAMPLING

Water samples were run unfiltered, to get "worst case" results since the analysis exaggerates the levels of contaminants by including material adsorbed on sediment in the sample. This was particularly the case where a high proportion of clay was in the sample, as in borehole B-9. To check the effect, the sample from borehole B-9 was rerun for the two most significant toxic metals, lead and arsenic, with the sediment filtered out. In each case, a reduction of the level of metals by more than an order of magnitude was recorded. These levels in the filtered water, 2.87 mg/l for lead and 0.71 mg/l for arsenic, were very close to the levels found by the EP toxicity test (2.2 mg/l and 0.29 mg/l, respectively) on soil from the same borehole.

Organics

The organics levels in the water were measured in parts per billion and, from the results, it is clear that contaminant levels of

organics at the site are of negligible concern (see Tables E-23 through E-26 in Appendix E).

Inorganics

As expected, the recorded levels of metals were much higher than the organics. However, with the exception of borehole B-9, which, as noted, contained a large amount of clay, the level of metals in the water samples (Table E-22 in Appendix E) is relatively low compared to the heavy metals found in the soil samples. Obviously the groundwater beneath the site is not fit for drinking. However, the clay mixed with the fill and the clay layer underlying the fill will adsorb and effectively immobilize much of the metal content in the water as it migrates off-site. Moreover, the rate of water movement through the fill will be slow because of the high clay content. When the site is properly graded, rates of infiltration will be low, the volume of water entering the groundwater or sewers by traversing the fill will be low, and consequently only small quantities of metals will be carried off-site. This is confirmed by the results of the metals analyses of the water sample taken from the sewer.

The water sample taken from the temporary well installed in borehole B-7 showed an unexpectedly high level of barium (10.2 mg/l), which may be the result of a number of factors, such as recharge from another site, or natural content of the till or underlying limestone. This level of barium is well above drinking water standards, but as there is no known use of groundwater in this area, it does not affect human health. What it does suggest is that the till at this location is not in direct connection with the till overlying the clay and that the clay is an effective barrier to direct downward migration. That lead is everywhere in the urban area is suggested by the fact that even this well has lead at levels exceeding drinking water standards by a factor of 10.

3.4 SEWER SAMPLING

The slight trace of trichloroethylene (11 ppb; see Table E-21 in Appendix E) found in the Babcock Street/Fleming Street sewer near the southeast corner of the site only seems to implicate another source of contamination in the area, since trichloroethylene was not detected

on-site. The organics found on-site are generally immobile or are only slowly leached out of soils. In any event, their levels were so low that they could not have any detectable impact on the sewers.

The metals results show that metals concentrations at the junction of Fleming and Lewis streets at the southwest and "downstream" end of the site are less than those at the southeast or "upstream" end of the site. A water sample from the Fleming and Babcock streets sewer manhole yielded the following results: arsenic, 0.366 mg/l; barium, 0.268 mg/l; lead, 1.52 mg/l; and nickel, 0.121 mg/l. The results for the Fleming and Lewis streets manhole were: arsenic, <0.05 mg/l; barium, 0.104 mg/l; lead, 0.26 mg/l; and nickel <0.02. (see Appendix E, Table E-29). These results imply metals movement from the site, but dilution from other sources within a short distance in the sewer

3.5 QUALITY ASSURANCE

All samples were recorded in the field logbook and on chain-of-custody forms. Samples were immediately placed on ice in coolers and taken directly to E & E's laboratory for preservation and extraction the same day they were collected. Blanks were run of the volatile organics and metals samples from the sewers to check on the sample bottles and on field procedures in the case of volatiles. Checks were run in the lab for accuracy by the analysis of spiked samples and by recoveries of a surrogate standard. In the case of the soil samples, "blanks" could not be used. However, a replicate sample spiked with pesticides was used to check for accuracy and precision. Quality assurance data are included in Appendix E.

3.6 EXCAVATIONS FOR BURIED TANKS OR VOIDS

One intact empty tank was found in Area A. The air inside the tank showed no trace of organics when checked with an Organic Vapour Analyzer. The site of a tank installed in 1928 (Area C) showed nothing but fill. Area B was thickly covered with concrete demolition debris, which adequately explained the low conductivity found during the geophysical investigation (See Section 3-1).

4. CONCLUSIONS AND RECOMMENDATIONS

Overall, the results of the site investigation show exactly what would be expected from a review of the site's history. The soils samples show elevated levels of heavy metals, particularly lead, but are generally within normal limits for urban areas, with one exception. This sample, the composite of soils from the centerline of the site, very probably contained a piece of lead metal, and in any case was low in metals extractable under site conditions. No evidence of dumping or burial of hazardous waste was discovered. Pesticide levels are low.

No sample was found to be a hazardous waste as defined by RCRA, nor does any material on-site appear to pose a significant hazard to public health. While it is probable that environmental impact on groundwater is occurring, this currently does not pose a risk to human health.

The site is suitable for development as an industrial, commercial, or recreational site with the following provisions:

- To reduce contact with the soil and to prevent blowing dust, the site should be paved or covered, and the cover protected from erosion and drying. A 4- to 6-inch cover of clean fill is recommended.

- Any fill excavated (to install subsurface utilities, for example) should be reburied or removed for the same reason given above.

- To minimize infiltration, a minimum 2% slope should be maintained on grassy areas and a 1% slope on paved areas, and any bare areas or ponding should be corrected by revegetation or filling as needed.

- A regular program of liming should be enforced to maintain soil pH between 6 and 7.

It should be noted that the present condition of the site and its impact on the environment can only be improved by development.

5. REFERENCES

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APPENDIX A

BORINGS LOGS
(APPENDIX A OF
SUBSURFACE EXPLORATION REPORT AND
LABORATORY TEST RESULTS FOR
LEWIS, FLEMING, BABCOCK AND LYMAN ST.
ENVIRONMENTAL BORINGS AND TESTING)

Submitted to:

BUFFALO URBAN RENEWAL AGENCY
Buffalo, New York

by:

BUFFALO DRILLING CO.

Confidential

FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock, Lyman St.
File No.: 84-117 Boring No.: B-1

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/18/84 Completed: 5/18/84

Overburden Samples: Disturbed 3 Undist.
Total Depth of Hole: 10.5 ft.
Depth Drilled into Rock: 0 ft.

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 3.8 ft

Depth (ft.)	Blows per .5 ft.	Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	5 16	S-1	22		Topsoil - black, organic - 4-in.thick	
	6 7				Brown/orange, medium dense to stiff, Silty Clay, little f. Sand, mixed with fragments of brick, slag, concrete, moist (Random Fill)	S-1: 0-2'
5	4					
	7 7	S-2	14		Greenish gray, stiff, Clayey Silt, some f. Sand, moist, slight plasticity, tr. organics (FILL)	S-2: 4.5-6.5'
	7					
10	7				Brownish gray, dense, Silty Sand and f/m Gravel and angular pieces of bedrock, some Clay, wet (TILL).	
	21 100/5"	S-3	+100			S-3: 9.5-11.0' (lab sample)
15					Bottom of Hole - 11.0 ft. Refusal with augers	
20						

Notes:

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-2

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/18/84 Completed: 5/18/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 14.5 ft.
Depth Drilled into Rock: 0 ft.

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 3.0 ft

Depth (ft.)	Blows per .5 ft.	Sample No.	ft	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	4 5	S-1	8		Topsoil - black, organic - 6 in. thick	
	3 3				Black/orange, loose, Silty Sand, mixed with fragments of brick, glass, wood (Random Fill).	S-1: 0-2'
5	1					
	8 2	S-2	10		Gray, loose, Silty Sand, tr. Clay, mixed with fragments of wood, slag, brick, saturated (Random Fill)	S-2: 4.5-6.5' (odorous - gray foamy liquid filled boring when augers were pulled).
10	1					
	2 8	S-3	10		Brown, stiff, Silty CLAY, moist, moderately plastic (CL).	S-3: 9.5-11.5' (lab sample).
	2					
		S-4			. . .grade: Gravelly Silty SAND, some Clay, wet (TILL).	S-4: 14.5'
	50/1"					
15					Bottom of Hole - 14.5 ft. Refusal with augers.	
20						

Notes:

1. A strong odor was detected for samples S-2 and S-2.
2. A foamy gray liquid filled the bore hole as the augers were pulled.

Sheet 1 of 1

FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-3

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/18/84 Completed: 5/18/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 14.0 ft.
Depth Drilled into Rock: 0 ft

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: No water at completion

Depth (ft.)	Blows per .5 ft.		Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	3	10	S-1	18		Topsoil - black, organic, some debris. Black/brown, medium dense, Silty Sand, mixed with fragments of slag, glass, brick, trace organics, wet (Random Fill)	S-1: 0-2'
	8	6					
5		10					
	17	22	S-2	39		Brown, hard, Silty CLAY, little f. Sand, damp, slight plasticity (CL).	S-2: 4.5-6.5' (lab sample)
	30						
10		4					
	6	12	S-3	18		Grayish brown, medium dense, Silty Sand, some Clay, little f/m Gravel, moist, slight plasticity (TILL).	S-3: 9.5-11.5'
	14						
15	50/1"		S-4	-		Bottom of Hole - 14.0 ft. Refusal with augers.	
20							

Notes:

Sheet 1 of 1

FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-4

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/18/84 Completed: 5/18/84

Overburden Samples: Disturbed: 4 Undist.:
Total Depth of Hole: 14.5 ft.
Depth Drilled into Rock: 0 ft

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: No water at completion

Depth (ft.)	Blows per .5 ft.		Sample no.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	5	4	S-1	10		Black/brown, loose to medium dense, Silty Sand, mixed with fragments of slag, brick, concrete, odorous; moist (Random Fill).	S-1: 0-2' (lab sample)
	6	7					
5		5					
	10	14	S-2	24		Brown, hard, Silty CLAY, little f. Sand, moist, slight plasticity (CL).	S-2: 4.5=6.5'
	20						
10		7					
	14	17	S-3	31		Grayish brown, dense, Silty Sand, some Clay, little f/m Gravel, moist, slight plasticity (TILL).	S-3: 9.5-11.5'
	17						
15		50/1"	S-4	-		Bottom of Hole 14.5 ft. Refusal with augers.	
20							

Notes:

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-5

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/19/84 Completed: 5/19/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 16.0 ft.
Depth Drilled into Rock: 0 ft

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 13 ft. at completion

Depth (ft.)	Blows per .5 ft.		Sample No.	R	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	32	7	S-1	13		Black/gray, loose, Silty Sand and f/c Gravel, mixed with fragments of slag, concrete, brick, trace organics, moist (Random Fill).	S-1: 0-2'
	6	4					
5		3				Brown, v. stiff, Silty CLAY, little f. Sand, moist, slight plasticity, (CL).	S-2: 4.5-6.5'
	8	10	S-2	18			
	13						
10		4				. . .grade: reddish brown, moderate plasticity	S-3: 9.5-11.5' (lab sample)
	8	7	S-3	15			
	14						
15		8				Grayish brown, medium dense, Silty Sand, come Clay, little f/m Gravel, moist, slight plasticity (TILL).	S-4: 14.5-16'
	7	19	S-4	26			
20						Bottom of Hole - 16.0 ft.	

Notes:

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-6

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/19/84 Completed: 5/19/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 13.5 ft
Depth Drilled into Rock: 0 ft

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 12.5 ft. at completion

Depth (ft.)	Blows per .5 ft.		Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	3	5	S-1	12		Black, loose, Silty Sand, moist (Random Fill).	S-1: 0-2'
	7	9				Brown, stiff, Silty CLAY, little f. Sand, moist, moderate plasticity (CL).	
5		5					
	15	17	S-2	32		Brown, hard, Silty CLAY, little f. Sand, moist, slight plasticity (CL).	S-2: 4.5-6.5'
	19						
10		3					
	5	7	S-3	12		. . .grade: reddish brown/gray, moist, plastic	S-3: 9.5-11.5' (lab sample).
	9						
		50/1"	S-4				S-4: 13.5'
15						Bottom of Hole - 13.5 ft. Refusal with augers	
20							

Notes:

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St
File No.: 84-117 Boring No.: B-7

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/19/84 Completed: 5/19/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 14.3 ft.
Depth Drilled into Rock: 0 ft.

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 7.0 at completion

Depth (ft.)	Blows per .5 ft.		Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	18	21	S-1	44		Black/brown, dense, Silty Sand, some Clay, mixed with fragments of brick, concrete, slag, tr. organics moist (Random Fill).	S-1: 0-2' (rubble obstructed penetration of sample spoon).
	23						
5		5					
	14	26	S-2	40		Brown, hard, Silty CLAY, little f. Sand, moist, slight plasticity (CL).	S-2: 4.5-6.5' (lab sample).
	26						
10		6					
	4	5	S-3	9		Grayish brown, loose, Silty Sand, trace Clay, trace f. Gravel, wet (TILL).	S-3: 9.5-11.5'
	4						
	50/1"		S-4				S-4: 14.3'
15						Bottom of Hole - 14.3 ft. Refusal with augers	
20							

Notes:
1. A sulphur odor was detected at completion of boring.

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-8

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/19/84 Completed: 5/19/84

Overburden Samples: Disturbed 3 Undist.
Total Depth of Hole: 10.5 ft.
Depth Drilled into Rock: 0 ft

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 5.0 at completion

Depth (ft.)	Blows per .5 ft.		Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	5	7	S-1	17		Brown/gray, medium dense, Sand and Silt, mixed with fragments of brick, coal, slag, little organics, trace Gravel, moist, slight odor (Random Fill).	S-1: 0-2'
	10	6					
5		WH					
	5	6	S-2	11		Black/orange, loose, Sand, little Silt and f/m Gravel, mixed with fragments of timber, brick, slag, odorous, saturated (Random Fill).	S-2: 4.5-6.5'
	1						
10		10				Brown, dense, Sand and Silt, some Gravel, mixed with fragments brick and wood, saturated, slight odor (Random Fill).	S-3: 8.5-10.5' (lab sample)
	10	17	S-3	27			
						Bottom of Hole - 10.5 ft. Refusal with augers	Refusal with augers in rubble fill
15							
20							

Notes:

1. Boring relocated 10 ft. southwest of the original boring location. Refusal with augers for bore hole B-8A occurred at approximately the same depth as for boring B-8.

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-9

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/22/84 Completed: 5/22/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 14.0 ft.
Depth Drilled into Rock: 0 ft.

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 2.6 at completion

Depth (ft.)	Blows per .5 ft.	Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1					Dense, cinders and slag (FILL).	Augered to 1.0 ft. without sampling
	4 4	S-1	16		Brown/purple, medium dense, Silty Sand and Gravel, mixed with fragments of cinders, slag, brick, concrete, moist, slight odor (Random Fill).	S-1: 1-3' (lab sample). (foamy liquid fill bore hole).
	12 6					
5	4					
	2 2	S-2	4			S-2: (4.5-6.5')
	9				Brown, v. stiff, Silty CLAY, little Sand, moist, moderate plasticity (CL).	
	7					
10	10 14	S-3	24		Same as S-2	S-3: (9.5-11.5')
	15				Grayish brown, medium dense, Silty Sand, some Clay, little f/m Gravel, wet, moderate plasticity (TILL).	
	6 5	S-4	-			S-4: (13-14')
	50/0"					
15					Bottom of Hole - 14.0 ft.	
20						

Notes:

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-10

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 5/22/84 Completed: 5/22/84

Overburden Samples: Disturbed 3 Undist.
Total Depth of Hole: 16.5 ft.
Depth Drilled into Rock: 0 ft

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: No water at completion

Depth (ft.)	Blows per .5 ft.	Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1					Very dense, gravel and rubble (Random Fill)	Augered to 4.5' without sampling- sample spoon would not penetrate rubble.
5	6					
	7 12	S-1	19		Brown, v. stiff, Silty CLAY, trace f. Sand, moist, slight plasticity. (CL).	S-1: 4.5-6.5' (lab sample).
	14					
10	10					
	17 21	S-2	38		. . .grade: hard	S-2: 9.5-11.5'
	28					
15	12					
	24 21	S-3	45		Grayish brown, dense, Silty Sand, some Clay, little f/c Gravel, moist (TILL).	S-3: 14.5-16.5'
	24					
20					Bottom of Hole - 16.5 ft.	

Notes:

Sheet 1 of 1

Confidential

FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client Buffalo Urban Renewal Agency
Project Lewis, Fleming, Babcock Lyman St.
File No. 84-117 Boring No. B-11

Driller John Sniderhan
Type of Drill Rig Mobile B-47
Sampling Method Standard split spoon
Size & Type of Bit 3-3/4" ID augers

Surface Elevation -
Datum -
Location Refer to sketch
Date Started 5/22/84 Completed 5/22/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole 14.0 ft.
Depth Drilled into Rock 0 ft.

Top of Rock Elevation -
Bottom of Hole Elevation -
Ground Water Depth No water at completion

Depth (ft.)	Blows per .5 ft.		Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	8	7	S-1	11		Brown/gray, Sand and Gravel, Deteriorated Concrete.	S-1: 0-2'
	4	2					
5		7					
	12	18	S-2	30		Brown, hard, Silty CLAY, little f. Sand, moist, moderate plastic (CL).	S-2: 4.5-6.5' (lab sample)
	20						
10		7					
	10	13	S-3	23		Same as S-2	S-3: 9.5-11.5'
	20						
15	50/0"					Bottom of Hole - 14.0 ft. Refusal with augers	
20							

Notes:

Sheet 1 of 1

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FIELD BORING LOG

BUFFALO DRILLING COMPANY, INC.
1965 Sheridan Drive
Kenmore, New York 14223

Client: Buffalo Urban Renewal Agency
Project: Lewis, Fleming, Babcock Lyman St.
File No.: 84-117 Boring No.: B-12 & 12

Driller: John Sniderhan
Type of Drill Rig: Mobile B-47
Sampling Method: Standard split spoon
Size & Type of Bit: 3-3/4" ID augers

Surface Elevation: -
Datum: -
Location: Refer to sketch
Date Started: 6/4/84 Completed: 6/4/84

Overburden Samples: Disturbed 4 Undist.
Total Depth of Hole: 16.2 ft.
Depth Drilled into Rock: 0 ft.

Top of Rock Elevation: -
Bottom of Hole Elevation: -
Ground Water Depth: 15' at completion.

Depth (ft.)	Blows per .5 ft.	Sample No.	N	% Rec (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS
1	4 12 / 20	S-1	32		B-12 Random Fill - refusal w/augers on timber at 3.5 ft. / B-12A Augered to 4.5' without sampling	S-1: 0-2' (lab sample).
5	7 / 12 14 / 17	S-2	26		Brown, v. stiff, Silty CLAY, little f. Sand, damp, slight plasticity (CL).	S-2: 4.5-6.5'
10	6 / 9 13 / 17	S-3	22		. . .grade: moderate plasticity	S-3: 9.5-11.5'
15	3 / 4 4 / 50/3"	S-4	8		Grayish brown, loose, Silty Sand, some f/c Gravel, some Clay, wet (TILL).	S-4: 14.5-16.2'
20					Bottom of Hole - 16.2 ft.	

Notes:

Sheet 1 of 1

APPENDIX B

REPORT OF LABORATORY TEST RESULTS (APPENDIX B OF SUBSURFACE EXPLORATION REPORT AND LABORATORY TEST RESULTS FOR LEWIS, FLEMING, BABCOCK AND LYMAN ST. ENVIRONMENTAL BORINGS AND TESTING)

Submitted to:

BUFFALO URBAN RENEWAL AGENCY
Buffalo, New York

by:

BUFFALO DRILLING CO.
James S. Barron, P.E.
Job No. 84-117
June 14, 1984

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Buffalo, New York 14223
716-877-3155

SOIL CORE ANALYSIS FOR BABCOCK-LYMAN PROJECT

Prepared for:

James S. Barron, P.E.
President

BUFFALO DRILLING COMPANY, INC.

June 21, 1984

TERMINI ASSOCIATES

ORIGINAL SIGNED
C. R. Termini

C. R. Termini
President

Project Code: BD-225-001

TECHNICAL REPORT

1.0 TITLE

Soil Core Analysis for Babcock-Lyman Project

2.0 PURPOSE

Analyze twelve soil borings for selected list of parameters.

3.0 SAMPLES

Twelve soil core samples were received at TERMINI ASSOCIATES from Mr. James S. Barron, P.E., Buffalo Drilling, Company, Inc., on May 23, 1984. The soil cores were extracted on the dates listed in Section 3.1.

3.1 IDENTITY

The samples were assigned the following Log Numbers:

Log Number	Date Extracted	Boring Number	Soil Section	Percent Water by Mass
40332	05/18/84	B-1	S-3	22.6
40333	05/18/84	B-2	S-3	26.1
40334	05/18/84	B-3	S-2	17.1
40335	05/19/84	B-4	S-1	25.2
40336	05/19/84	B-5	S-3	19.2
40337	05/19/84	B-6	S-3	14.4
40338	05/19/84	B-7	S-2	16.6
40339	05/19/84	B-8	S-3	13.0
40340	05/22/84	B-9	S-1	26.5
40341	05/23/84	B-10	S-2	17.4
40342	05/22/84	B-11	S-2	16.2
40343	05/22/84	B-12	S-1	36.3

4.0 RESULTS

The analytical test results are presented in Tables I and II. Table I contains the heavy metal concentrations and pH, while Table II lists the results for herbicides and PCB's. All mass concentrations are expressed on a dry weight basis.

5.0 METHODOLOGY

All analyses were conducted in accordance with "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" EPA SW-846, July 1982.

TABLE I

HEAVY METALS (TOTAL) AND pH

Parameter / Log Number	Boring 1 40332	Boring 2 40333	Boring 3 40334	Boring 4 40335	Boring 5 40336
Arsenic, ppm	0.129	< 0.034	0.06	< 0.033	0.093
Barium, ppm	494.	292.	452.	755.	452.
Cadmium, ppm	0.84	0.95	0.24	1.0	0.56
Chromium, ppm	472.	345.	522.	933.	493.
Lead, ppm	18.2	49.1	11.2	333.	18.4
Mercury, ppm	< 0.007	< 0.007	< 0.006	0.013	< 0.006
Selenium, ppm	< 0.032	< 0.034	< 0.030	0.067	< 0.031
Silver, ppm	< 0.032	< 0.034	< 0.030	0.033	< 0.031
Copper, ppm	18.6	93.4	31.1	101.	61.0
Nickel, ppm	39.8	103.	48.3	16.2	52.4
pH Units*	9.40	3.72	9.01	3.52	9.02

Parameter / Log Number	Boring 6 40337	Boring 7 40338	Boring 8 40339	Boring 9 40340	Boring 10 40341
Arsenic, ppm	0.058	0.060	< 0.029	< 0.034	0.091
Barium, ppm	380.	462.	347.	244.	369.
Cadmium, ppm	0.088	0.36	0.17	1.1	0.22
Chromium, ppm	374.	495.	243.	630.	406.
Lead, ppm	8.39	12.4	18.3	189.	18.3
Mercury, ppm	< 0.006	< 0.006	< 0.006	0.010	< 0.006
Selenium, ppm	< 0.029	< 0.030	< 0.029	< 0.034	< 0.030
Silver, ppm	< 0.029	< 0.030	< 0.029	< 0.034	< 0.030
Copper, ppm	18.8	30.3	14.7	524.	30.9
Nickel, ppm	33.6	47.1	24.2	38.5	50.8
pH Units*	9.10	8.50	8.20	6.80	7.62

Parameter / Log Number	Boring 11 40342	Boring 12 40343
Arsenic, ppm	< 0.060	< 0.039
Barium, ppm	368.	239.
Cadmium, ppm	0.24	2.17
Chromium, ppm	389.	1090.
Lead, ppm	6.80	295.
Mercury, ppm	< 0.006	0.016
Selenium, ppm	< 0.030	0.118
Silver, ppm	< 0.030	< 0.039
Copper, ppm	29.5	832.
Nickel, ppm	45.3	65.6
pH Units*	8.68	5.41

*pH was performed on a 5 percent solids content slurry

TABLE II

TRACE ORGANICS

Parameter / Log Number	Boring 1 40332	Boring 2 40333	Boring 3 40334	Boring 4 40335	Boring 5 40336
Lindane, ppb	< 0.3	< 0.3	0.2	< 0.3	0.4
Endrin, ppb	< 0.3	< 0.3	< 0.3	< 0.3	0.6
Methoxychlor, ppb	< 0.3	< 0.3	< 0.2	< 0.3	< 0.2
Toxaphene, ppb	< 8	< 7	< 6	< 7	< 6
2,4-Dichlorophenoxyacetic Acid, ppb	< 2	< 1	1.7	2.8	< 1
2,4,5-Trichlorophenoxy, ppb	< 2	< 1	< 1	< 1	< 1
Polychlorinated Biphenyls, ppb	< 0.8	< 0.7	< 0.6	< 0.7	< 0.6

Parameter / Log Number	Boring 6 40337	Boring 7 40338	Boring 8 40339	Boring 9 40340	Boring 10 40341
Lindane, ppb	< 0.2	0.24	< 0.2	< 0.3	< 0.2
Endrin, ppb	< 0.2	< 0.2	< 0.2	< 0.3	< 0.2
Methoxychlor, ppb	< 0.2	< 0.2	< 0.2	< 0.3	< 0.2
Toxaphene, ppb	< 6	< 6	< 6	< 7	< 6
2,4-Dichlorophenoxyacetic Acid, ppb	< 1	2.3	< 1	< 1	2.7
2,4,5-Trichlorophenoxy, ppb	< 1	1.3	< 1	< 1	< 1
Polychlorinated Biphenyls, ppb	< 0.6	< 0.6	< 0.6	< 0.7	< 0.6

Parameter / Log Number	Boring 11 40342	Boring 12 40343
Lindane, ppb	0.2	1.3
Endrin, ppb	< 0.2	< 0.3
Methoxychlor, ppb	< 0.2	< 0.3
Toxaphene, ppb	< 6	< 8
2,4-Dichlorophenoxyacetic Acid, ppb	< 1	1.9
2,4,5-Trichlorophenoxy, ppb	< 1	1.9
Polychlorinated Biphenyls, ppb	< 0.6	< 0.8

APPENDIX C

Letter from B.L. Latham,
Agrico Chemical, to NYSDEC

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AGRICO CHEMICAL COMPANY
ONE WILLIAMS CENTER
TULSA, OKLAHOMA 74101
918/ 589-3832

B. L. LATHAM
VICE PRESIDENT, MANUFACTURING

January 24, 1985

Peter J. Burke,
Regional Attorney
New York State Department of
Environmental Conservation
600 Delaware Avenue
Buffalo, New York 14202-1073

Dear Mr. Burke:

This is in response to your letter of December 28, 1984 requesting information concerning a parcel of land located at 564 Babcock Street, Buffalo, New York. I am pleased, on behalf of Agrico Chemical Company, to provide you with the following information:

1. Agrico Chemical Company (a Delaware Corporation), a wholly-owned subsidiary of The Williams Companies (a Nevada Corporation), purchased various properties from Continental Oil Company (a Delaware Corporation), in February, 1972. One piece of property so purchased was located in Buffalo, New York, and bounded by Lewis Street, Fleming Street, Babcock Street and Lyman Street. This property appears to correspond to the property shown on your June 4, 1984 sketch. Agrico sold this property to Frit Industries, Inc. (an Alabama Corporation) in January, 1974.

2. Agrico operated a fertilizer manufacturing facility on this property from the time it acquired the property until July, 1973. Products manufactured were normal superphosphate, hydrofluosilicic acid, sodium silicofluoride and mixed granular fertilizers of various NPK grades. The facility also was used to receive, store and reship packaged herbicides, pesticides and lawn fertilizer. The plant was usable, although not being used at the time, when purchased by Frit Industries, Inc.

3. At the time Agrico owned and operated the facility, it was authorized to discharge cooling water from the wet mix plant and scrubber wash water from the sodium silicofluoride plant into the Buffalo city sewer system.

4. At the time Agrico owned and operated the facility, it had, in compliance with state emission regulations, controls on air emissions from stacks which emitted ammonia, particulates and fluoride gases.

5. Attached is a site map dated June 23, 1960. With the exceptions noted below, that map represents and designates the structures in place when Agrico purchased the property in 1972, and when it sold the property in 1974. The exceptions are that the sulfuric acid plant located on the West side of the property (outlined in red) did not exist when Agrico purchased the property -- we believe it was torn down in 1968 -- and the specialty storage and truck shipping shed buildings located near the center of the property (outlined in green) were larger than shown -- we believe they were extended in 1965.

6. We do not know of any designated waste disposal areas on site, and we have no information concerning any of the "mounds" shown on your June 4, 1984 sketch of the property. We have no documentation concerning solid waste disposal, but we believe solid wastes were disposed of off site by contract haulers.

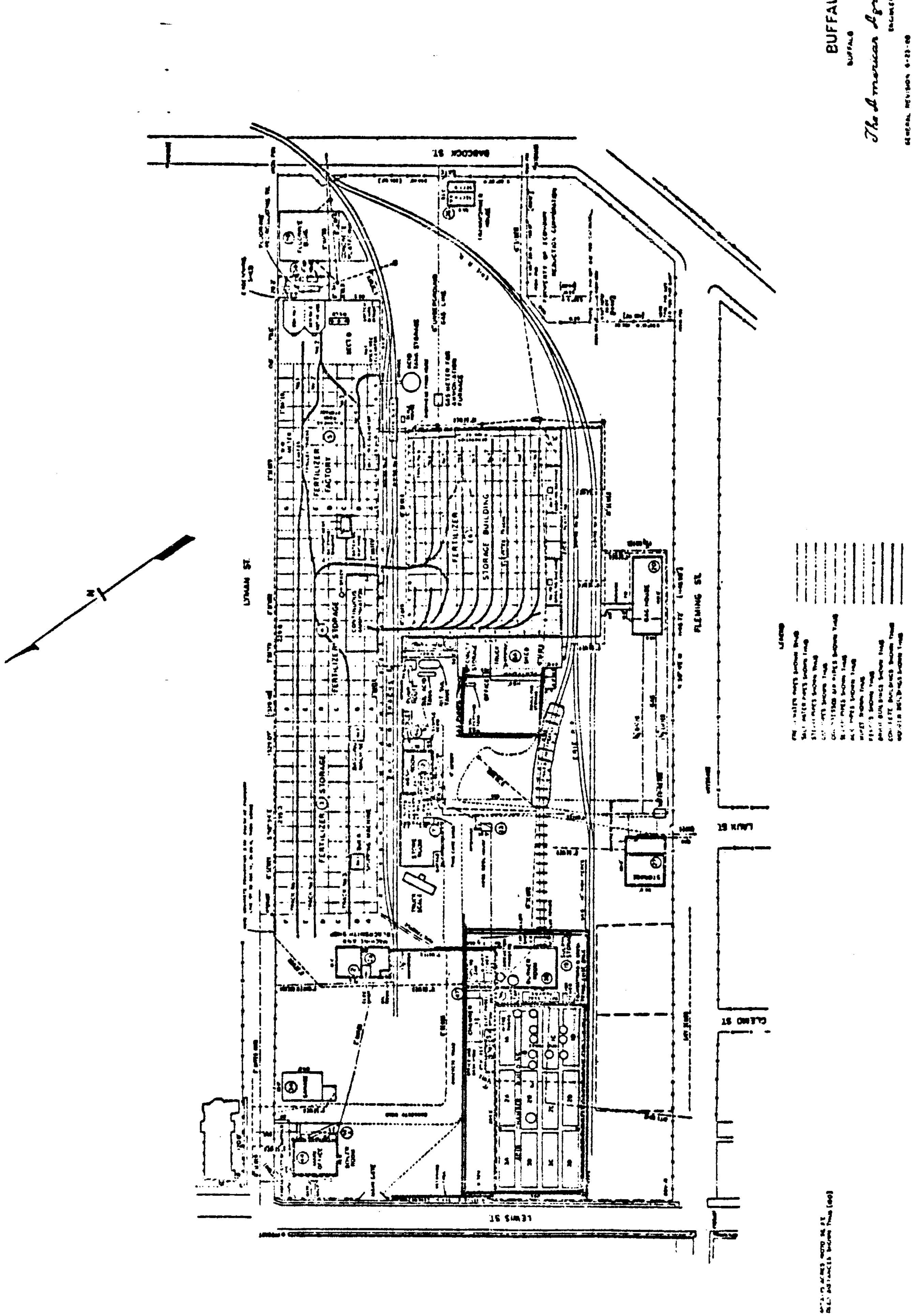
Yours truly,

B. L. Latham

B. L. Latham

BLL/ds
Enclosure

Confidential



APPENDIX D

EM CONDUCTIVITY AND MAGNETOMETER SURVEY READINGS

Table D-1

EM SURVEY AND MAGNETOMETER SURVEY RESULTS

Station	Measurements (mmhos/m)	Measurements (gammas)	Station	Measurements (mmhos/m)	Measurements (gammas)
1A	120	550--*	7A	62	56988
1B	85	492--	7B	200	612--
1C	70	562--	7C	160	505--
1D	68	55765	7D	90	608--
1E	74	57437	7E	140	54892
1F	60	561--	7F	(4)	
2A	160	602--	8A	60	576--
2B	120	57689	8B	120	602--
2C	110	550--	8C	130	502--
2D	66	55584	8D	110	622--
2E	68	56164	8E	100	565--
2F	34 (1)	53214	8F	(4)	
3A	90	594--	9A	50	578--
3B	120	55851	9B	130	579--
3C	90	584--	9C	110	595--
3D	90	59615	9D	110	568--
3E	62	558--	9E	160	611--
3F	64 (2)	Not taken	9F	200	565--
			9G	(4)	
4A	58	544--	9H	(4)	
4B	160	595--	9I	120	623--
4C	90	605--	9J	130	581--
4D	0 (3)	617--			
4E	(4)		10A	220	604--
4F	(4)		10B	250	618--
			10C	130	613--
5A	48	587--	10D	270	606--
5B	120	617--	10E	170	628--
5C	80	565--	10F	190	557--
5D	0 (3)	524--	10G	80	598--
5E	(4)		10H	120	586--
5F	(4)		10I	Not taken	586--
6A	60	550--	11A	250	587--
6B	210	564--	11B	400	604--
6C	90	609--	11C	150	605--
6D	80	549--	11D	300	541--
6E	(4)		11E	180	590--
6F	(4)		11F	120	592--
			11G	80	622--
			11H	0	623--

*Three numbers only for a magnetometer measurement indicates a steep magnetic gradient i.e., presence of metal.

Table D-1 (Cont.)

Station	Measurements (mmhos/m)	(gammas)	Station	Measurements (mmhos/m)	(gammas)
12A	170	559--	16A	180	554--
12B	190	603--	16B	180	55174
12C	200	576--	16C	45	540--
12D	140	601--	16D	150	605--
12E	110	610--	16E	88	570--
12F	100	592--	16F	16 (5)	55691
12G	70	586--	16G	70	56265
12H	140	557--	16H	90	56476
12I	(6)	-----	16I	110	56564
13A	210	580--	17A	150	587--
13B	140	566--	17B	130	646--
13C	160	551--	17C	12	53346
13D	90	582--	17D	54	583--
13E	90	596--	17E	68	540--
13F	110	564--	17F	94	56002
13G	80	617--	17G	85	56325
13H	90	55667	17H	120	56499
13I	60	56326	17I	300	56869
14A	65	55319	18A	110	55388
14B	160	581--	18B	400	54011
14C	110	608--	18C	44	565--
14D	110	597--	18D	56	560--
14E	(6)	-----	18E	180	55944
14F	(6)	-----	18F	90	56365
14G	90	55685	18G	40	559--
14H	52	56509	18H	120	579--
14I	70	56433	18I	(6)	-----
15A	84	55512	19A	62	611--
15B	170	549--	19B	260	56399
15C	50	554--	19C	14	570--
15D	60	614--	19D	66	56528
15E	60	581--	19E	200	55901
15F	82	56128	19F	160	56575
15G	110	559973	19G	35 (5)	56230
15H	120	56400	19H	35 (5)	57297
15I	68	56508	19I	72	56809

Table D-1 (Cont.)

Station	Measurements (mmhos/m)	Measurements (gammas)	Station	Measurements (mmhos/m)	Measurements (gammas)
20A	90	527--	24A	(7)	-----
20B	100	594--	24B	(7)	-----
20C	46	570--	24C	(7)	-----
20D	120	569--	24D	54	582--
20E	160	55991	24E	165	56403
20F	130	591--	24F	160	55986
20G	45 (5)	605--	24G	80	56611
20H	170	556--	24H	95	55540
20I	120	57401	24I	100	56688
21A	110	559--	25A	(7)	-----
21B	120	56155	25B	(7)	-----
21C	130	55387	25C	(7)	-----
21D	90	56196	25D	28	56466
21E	56	573--	25E	40	56156
21F	150	587--	25F	62	56489
21G	95	565--	25G	54	56597
21H	60	55560	25H	54	57232
21I	55	57119	25I	50	56302
22A	(7)	-----			
22B	230 (7)	56290			
22C	(7)	-----			
22D	100	56076			
22E	120	556--			
22F	150	586--			
22G	150	56592			
22H	210	56336			
22I	74	56037			
23A	(7)	-----			
23B	(7)	-----			
23C	(7)	-----			
23D	80	56557			
23E	170	56434			
23F	220	56268			
23G	130	540--			
23H	140	56106			
23I	72	57255			

NOTES:

(1) 10 foot north offset from station.

(2) 10 foot south offset from station.

(3) Over truck scale.

(4) Soil mound, no EMI measurement taken.

(5) North-south instrument orientation indicated 0 mmohs/m, this figure was averaged with a second measurement taken with an east-west instrument orientation.

(6) A structure prevented measurement at this station.

(7) Off-site location.

APPENDIX E

ANALYTICAL RESULTS OF SOIL, GROUNDWATER, AND SEWER SAMPLING

Table E-1

RESULTS OF CHEMICAL ANALYSIS OF EXTRACTS FROM EP TOXICITY TESTS

(All results in mg/L)

Sample Date: 4/12-13/85 Date Received: 4/12-13/85 Sample Type: Soil

Compound	Sample Identity/E & E Lab No. 85- B1-Comp/ 2436	B2-Comp/ 2438	B4-Comp/ 2407	B9-Comp/ 2409	B12-Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434	Maximum Allowable Concentration
Arsenic	<0.050	<0.050	0.259	0.290	0.139	<0.050	<0.050	<0.050	<0.050	5.0
Barium	<1.0	<1.0	1.0	<1.0	2.0	<1.0	11.0	<1.0	<1.0	100.0
Cadmium	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	0.20	1.0
Chromium	0.6	<0.1	<1.0	2.0	<1.0	<1.0	<0.1	<0.1	<0.1	5.0
Lead	0.048	4.45	1.25	2.20	2.08	1.72	0.294	0.247	0.369	5.0
Mercury	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.2
Selenium	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.032	<0.020	1.0
Silver	<0.1	<0.1	<1.0	<1.0	<1.0	<1.0	<0.1	<0.1	<0.1	5.0
Endrin	<0.0001	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.0001	0.02
Lindane	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.4
Methoxychlor	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	10.0
Toxaphene	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.5
2,4-D	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	10.0
2,4,5-TP (Silvex)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	1.0

Analytical References: "Test Methods for Evaluating Solid Waste Physical/Chemical Methods," SW-846 Second Edition, U.S. EPA, 1982.

Table E-2

RESULTS OF SOIL ANALYSIS FOR PRIORITY POLLUTANTS
VOLATILE ORGANIC COMPOUNDS

(All results in mg/kg as received)

PP No.	CAS No.	Compound	Sample Identity/E & E Lab No. 85- B1-Comp/ 2436	B2-Comp/ 2438	B4-Comp/ 2407	B9-Comp/ 2409	B12-Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434
(4V)	71-43-2	benzene	<0.05	<0.05	<0.05*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(6V)	56-23-5	carbon tetrachloride	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(7V)	108-90-7	chlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(10V)	107-06-2	1,2-dichloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(11V)	71-55-6	1,1,1-trichloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(13V)	75-34-3	1,1-dichloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(14V)	79-00-5	1,1,2-trichloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(15V)	79-34-5	1,1,2,2-tetrachloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(16V)	75-00-3	chloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(19V)	110-75-8	2-chloroethylvinyl ether	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(23V)	67-66-3	chloroform	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(29V)	75-35-4	1,1-dichloroethene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(30V)	156-60-5	trans-1,2-dichloroethene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(32V)	78-87-5	1,2-dichloropropane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(33V)	10061-02-6	trans-1,3-dichloropropene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	10061-01-05	cis-1,3-dichloropropene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(38V)	100-41-4	ethylbenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(44V)	75-09-2	methylene chloride	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(45V)	74-87-3	chloromethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(46V)	74-83-9	bromomethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(47V)	75-25-2	bromoform	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(48V)	75-27-4	bromodichloromethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(49V)	75-69-4	fluorotrichloromethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(50V)	75-71-8	dichlorodifluoromethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(51V)	124-48-1	chlorodibromomethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(85V)	127-18-4	tetrachloroethene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(86V)	108-88-3	toluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(87V)	79-01-6	trichloroethene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(88V)	75-01-4	vinyl chloride	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

*Compound present below measurable detection limit

Table E-3

RESULTS OF SOIL ANALYSIS FOR PRIORITY POLLUTANTS
ACID COMPOUNDS

(All results in mg/kg as received)

PP No.	CAS No.	Compound	Sample Identity/E & E Lab No. 85- B1-Comp/ 2436	B2-Comp/ 2438	B4-Comp/ 2407	B9-Comp/ 2409	B12-Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434
(21A)	88-06-2	2,4,6-trichlorophenol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(22A)	59-50-7	p-chloro-m-cresol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(24A)	95-57-8	2-chlorophenol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(31A)	120-83-2	2,4-dichlorophenol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(34A)	105-67-9	2,4-dimethylphenol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(57A)	88-75-5	2-nitrophenol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(58A)	100-02-7	4-nitrophenol	<0.05	1.3	<0.05	<0.05	<0.05	<0.05	0.16	<0.05	<0.05
(59A)	51-28-5	2,4-dinitrophenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
(60A)	534-52-1	4,6-dinitro-2-methylphenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
(64A)	87-86-5	pentachlorophenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
(65A)	108-95-2	phenol	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Table E-4

RESULTS OF SOIL ANALYSIS FOR PRIORITY POLLUTANTS
BASE/NEUTRAL COMPOUNDS

(All results in mg/kg as received)

PP No.	CAS No.	Compound	Sample Identity/E & E Lab No. 85- B1-Comp/ 2436	B2-Comp/ 2438	B4-Comp/ 2407	B9-Comp/ 2409	B12-Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434
(1B)	83-32-9	acenaphthene	<0.02	0.89	<0.02	0.04	<0.02	<0.02	0.13	0.09	<0.02
(5B)	92-87-5	benzidine	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
(8B)	120-82-1	1,2,4-trichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(9B)	118-74-1	hexachlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(12B)	67-72-1	hexachloroethane	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(18B)	111-44-4	bis(2-chloroethyl)ether	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(20B)	91-58-7	2-chloronaphthalene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(25B)	95-50-1	1,2-dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(26B)	541-73-1	1,3-dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(27B)	106-46-7	1,4-dichlorobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(28B)	91-94-1	3,3'-dichlorobenzidine	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
(35B)	121-14-2	2,4-dinitrotoluene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(36B)	606-20-2	2,6-dinitrotoluene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(37B)	122-66-7	1,2-diphenylhydrazine	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(39B)	206-44-0	fluoranthene	0.16	4.3	0.21	0.60	0.52	0.28	1.31	1.73	1.18
(40B)	7005-72-3	4-chlorophenyl phenyl ether	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(41B)	101-55-3	4-bromophenyl phenyl ether	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(42B)	39638-32-9	bis(2-chloroisopropyl)ether	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(43B)	111-91-1	bis(2-chloroetoxy)methane	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(52B)	87-68-3	hexachlorobutadiene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(53B)	77-47-4	hexachlorocyclopentadiene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(54B)	78-59-1	isophorone	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(55B)	91-20-1	naphthalene	<0.02	1.7	<0.02	0.04	<0.02	<0.02	0.13	0.08	<0.02
(56B)	98-95-3	nitrobenzene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Table E-4 (Cont.)

PP No.	CAS No.	Compound	Sample Identity/E & E Lab No. 85- B1-Comp/ 2436	B2-Comp/ 2438	B4-Comp/ 2407	B9-Comp/ 2409	B12-Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434
(62B)	86-30-6	N-nitrosodiphenylamine	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(63B)	621-64-7	N-nitrosodipropylamine	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(66B)	117-81-0	bis(2-ethylhexyl) phthalate	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(67B)	85-68-7	benzyl butyl phthalate	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(68B)	84-74-2	di-n-butyl phthalate	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(69B)	117-84-0	di-n-octyl phthalate	<0.02*	<0.02	<0.02	<0.02	<0.02*	<0.02*	<0.02*	<0.02*	<0.02
(70B)	84-66-2	diethyl phthalate	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(71B)	131-11-3	dimethyl phthalate	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(72B)	56-55-3	benzo(a)anthracene	0.20	1.9	<0.02	0.22	0.19	0.13	0.61	0.51	0.56
(73B)	50-32-8	benzo(a)pyrene	0.53	2.0	<0.02	0.23	<0.02	<0.02	0.12	0.52	0.70
(74B)	205-99-2	benzo(b)fluoranthene	0.53	1.3	<0.02	0.20	0.11	<0.02	0.56	0.56	0.51
(75B)	207-08-9	benzo(k)fluoranthene	0.43	1.3	<0.02	0.16	0.13	<0.02	0.46	0.46	0.44
(76B)	218-01-9	chrysene	0.25	1.7	0.13	0.24	0.21	<0.02	0.61	0.66	0.67
(77B)	208-96-8	acenaphthylene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(78B)	120-12-7	anthracene	<0.02	1.5	<0.02	0.67	<0.02	<0.02	<0.02	0.15	0.14
(79B)	191-24-2	benzo(ghi)perylene	0.58	0.59	<0.02	<0.02	<0.02	<0.02	0.33	0.25	0.24
(80B)	86-73-7	fluorene	<0.02	1.0	<0.02	<0.02	<0.02	<0.02	0.13	<0.02	<0.02
(81B)	85-01-8	phenanthrene	<0.02	5.1	<0.02	0.53	0.40	0.21	1.04	1.16	0.82
(82B)	53-70-3	dibenzo(a,h)anthracene	0.07	0.16	<0.02	<0.02	<0.02	<0.02	0.08	<0.02	<0.02
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	0.60	0.74	<0.02	0.10	<0.02	<0.02	0.36	0.28	0.26
(84B)	129-00-0	pyrene	0.16	2.6	0.13	0.36	0.31	0.20	0.94	0.97	1.25

*Compound present below measurable detection limits.

Table E-5

RESULTS OF SOIL ANALYSIS FOR
PESTICIDES AND PCBs

(All results in mg/kg as received)

Compound	Sample Identity/E & E Lab No. 85-								
	B-1 Comp/ 2436	B-2 Comp/ 2438	B-4 Comp/ 2407*	B-9 Comp/ 2409	B-12 Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434
Aldrin	<0.008	<0.008	<0.08	<0.008	0.028	<0.008	<0.008	<0.008	<0.008
a-BHC	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
b-BHC	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
g-BHC	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
d-BHC	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Chlordane	<0.08	<0.08	<0.80	<0.08	<0.08	<0.08	<0.08	<0.08	1.7
4,4'-DDD	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
4,4'-DDE	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
4,4'-DDT	<0.016	0.090	<0.16	<0.016	<0.016	<0.016	0.11	0.067	0.091
Dieldrin	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	0.027	0.016	<0.016
Endosulfan I	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Endosulfan II	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Endosulfan sulfate	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Endrin	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Endrin aldehyde	<0.016	<0.016	<0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Heptachlor	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Heptachlor epoxide	<0.008	<0.008	<0.08	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
PCB - 1016	<0.08	<0.08	<0.80	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PCB - 1221	<0.08	<0.08	<0.80	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PCB - 1232	<0.08	<0.08	<0.80	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PCB - 1242	<0.08	<0.08	<0.80	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PCB - 1248	<0.08	<0.08	<0.80	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
PCB - 1254	<0.16	<0.16	<1.6	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
PCB - 1260	<0.16	<0.16	<1.6	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
Toxaphene	<0.16	<0.16	<1.6	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16

Table E-5 (Cont.)

	Sample Identity/E & E Lab No. 85-								
	B1A-Comp/ 2437	B2A-Comp/* 2439	B4A-Comp/ 2408	B9A Comp/* 2410	B12A Comp/ 2412	North A Comp/ 2429	South A Comp/ 2431	Center A Comp/ 2433	Off-Site A/ 2435
Alachlor**	<0.10	<0.35	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10

*Higher detection limit due to high organic content of sample.
**Analysis subcontracted

Table E-6

RESULTS OF SOIL ANALYSES
FOR PRIORITY POLLUTANT METALS

(All results in mg/kg as received)

	Sample Identify/E & E Lab No. 85-								
Compound	B1-Comp/ 2436	B2-Comp/ 2438	B4-Comp 2407	B9-Comp 2409	B12-Comp/ 2411	North Comp/ 2428	South Comp/ 2430	Center Comp/ 2432	Off-Site/ 2434
Antimony	<6	<60	<6	4.84	<6	6.43	<6	<6	5.34
Arsenic	198	<50	135	302	94.5	5.21	<50	64.1	6.02
Beryllium	<2	<2	<2	<2	<2	<2	<2	<2	<2
Cadmium	0.438	0.658	<0.4	10.9	1.90	1.42	1.39	0.524	1.09
Chromium	9.38	<11	28.1	<10	22.4	12.4	46.6	11.2	<10
Copper	172	4.20	111	1280	90.0	41.6	169	185	49.1
Lead	412	1750	155	1760	520	88.8	3220	17,800	563
Mercury	0.71	4.52	0.49	15.4	1.24	9.60	0.42	1.53	0.42
Nickel	14.1	7.54	12.3	16.6	20.3	29.8	21.8	23.9	20.6
Selenium	<20	<20	<20	<20	<20	<2	<20	<20	<2
Silver	2.98	<550	0.839	6.38	0.495	0.503	1.39	2.30	0.791
Thallium	3.50	1.39	0.639	7.45	0.941	<0.5	0.943	1.06	<0.5
Zinc	174	39.6	71.0	7510	396	457	348	286	372

Table E-7

IDENTIFICATION OF SOLID YELLOW MATERIAL
FOUND AT CENTER OF SITE

Date Received: 4/12-13/85	Sample Type: Solid
E & E Lab Number 85-2440	Sample Identity: Sulfur

OBJECTIVE: To confirm that a solid yellow material identified as sample number 2440.01 is elemental sulfur.

PROCEDURE: The material melts at approximately 100°C and has the characteristic blue color and odor of molten sulfur. The material is insoluble in water and soluble in carbon disulfide.

CONCLUSION: The material is elemental sulfur.

Table E-8

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED WATER SAMPLES
EP TOXICITY

Compound	E & E Lab No. 84-	Original Value	Amount Added	Amount Determined	Percent Recovery
		ug/L			
2,4-D	DI SPIKE	<0.50	10.0	6.2	62
Silvex	DI SPIKE	<0.05	10.0	7.5	75

Table E-9

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF REPLICATE
ANALYSES OF SAMPLES

Compound	Sample Identity/ E & E Lab No. 85-	Original Analysis	Replicate Analysis	Relative Percent Difference (RPD)
Benzene	B4-Comp/ 2407	<0.05*	0.08	--
Dieldrin	Center Comp/2432	0.014	0.017	19
4,4'-DDT	Center Comp/2432	0.067	0.038	55

Table E-10

QUALITY CONTROL FOR ACCURACY:
PERCENT DIFFERENCE--EPA QUALITY ASSURANCE MATERIALS

	Concentrations in ug/L		
Compound	Known	Determined	Percent Difference
Antimony	8.2	8.20	0
Arsenic	27	26.1	3.3
Cadmium	39	39	0
Chromium	261	271	3.8
Copper	339	356	5.0
Lead	435	440	1.1
Mercury	8.7	8.2	5.7
Nickel	207	222	7.2
Selenium	11	10.8	1.8
Silver	28	29	3.6
Thallium	25.2	29.6	17
Zinc	418	428	2.4

Note: These results are within the 95% confidence interval for these parameters.

Table E-11

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOIL SAMPLE

Compound	E & E Lab No. 85- (North Comp)	Original Value	Amount Added	Amount Determined	Percent Recovery
		(mg/kg)			
Methylene chloride	2428	<0.05	0.37	0.25	68
1,1-dichloroethane	2428	<0.05	0.37	0.20	55
Chloroform	2428	<0.05	0.37	0.20	55
Benzene	2428	<0.05	0.37	0.23	62
Toluene	2428	<0.05	0.37	0.20	55

Table E-12

RESULTS OF CHEMICAL ANALYSIS OF EXTRACTS FROM
EP TOXICITY TESTS: EAST AND WEST MOUNDS

(All results in mg/L)

Sample Date: 4/18/85 Date Received: 4/18/85 Sample Type: Soil

Compound	Sample Identity/E & E Lab No. 85- East Mound/ 2574	West Mound/ 2575	Maximum Allowable Concentration
Arsenic	<0.050	<0.050	5.0
Barium	<0.020	<0.020	100.0
Cadmium	<0.050	0.0075	1.0
Chromium	<0.020	<0.020	5.0
Lead	<0.010	<0.010	5.0
Mercury	<0.0004	<0.0004	0.2
Selenium	<0.020	<0.020	1.0
Silver	<0.020	<0.02	5.0
Endrin	<0.0001	<0.0001	0.02
Lindane	<0.00005	<0.00005	0.4
Methoxychlor	<0.0005	<0.0005	10.0
Toxaphene	<0.0025	<0.0025	0.5
2,4-D	<0.005	<0.005	10.0
2,4,5-TP (Silvex)	<0.0005	<0.0005	1.0

Analytical References: "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", SW-846 Second Edition, U.S. EPA, 1982.

Table E-13

RESULTS OF SOIL ANALYSIS OF PRIORITY POLLUTANT
VOLATILE ORGANIC COMPOUNDS: EAST AND WEST MOUNDS

(All results in mg/kg as received)

			Sample Identity/E & E Lab No. 85-	
PP No.	CAS No.	Compound	East Mound/ 2574	West Mound/ 2575
(4V)	71-43-2	benzene	<0.05	<0.05
(6V)	56-23-5	carbon tetrachloride	<0.05	<0.05
(7V)	108-90-7	chlorobenzene	<0.05	<0.05
(10V)	107-06-2	1,2-dichloroethane	<0.05	<0.05
(11V)	71-55-6	1,1,1-trichloroethane	<0.05	<0.05
(13V)	75-34-3	1,1-dichloroethane	<0.05	<0.05
(14V)	79-00-5	1,1,2-trichloroethane	<0.05	<0.05
(15V)	79-34-5	1,1,2,2-tetrachloroethane	<0.05	<0.05
(16V)	75-00-3	chloroethane	<0.05	<0.05
(19V)	110-75-8	2-chloroethylvinyl ether	<0.05	<0.05
(23V)	67-66-3	chloroform	<0.05	<0.05
(29V)	75-35-4	1,1-dichloroethene	<0.05	<0.05
(30V)	156-60-5	trans-1,2-dichloroethene	<0.05	<0.05
(32V)	78-87-5	1,2-dichloropropane	<0.05	<0.05
(33V)	10061-02-6	trans-1,3-dichloropropene	<0.05	<0.05
	10061-01-05	cis-1,3-dichloropropene	<0.05	<0.05
(38V)	100-41-4	ethylbenzene	<0.05	<0.05
(44V)	75-09-2	methylene chloride	<0.05	<0.05
(45V)	74-87-3	chloromethane	<0.05	<0.05
(46V)	74-83-9	bromomethane	<0.05	<0.05
(47V)	75-25-2	bromoform	<0.05	<0.05
(48V)	75-27-4	bromodichloromethane	<0.05	<0.05
(49V)	75-69-4	fluorotrichloromethane	<0.05	<0.05
(50V)	75-71-8	dichlorodifluoromethane	<0.05	<0.05
(51V)	124-48-1	chlorodibromomethane	<0.05	<0.05
(85V)	127-18-4	tetrachloroethene	<0.05	<0.05
(86V)	108-88-3	toluene	<0.05	<0.05
(87V)	79-01-6	trichloroethene	<0.05	<0.05
(88V)	75-01-4	vinyl chloride	<0.05	<0.05

*Compound present below measurable detection limit.

Table E-14

RESULTS OF SOIL ANALYSIS FOR PRIORITY POLLUTANT ACID COMPOUNDS: EAST AND WEST MOUNDS

(All results in mg/kg as received)

			Sample Identity/E & E Lab No. 85-	
PP No.	CAS No.	Compound	East Mound/ 2574	West Mound/ 2575*
(21A)	88-06-2	2,4,6-trichlorophenol	<0.02	<0.2
(22A)	59-50-7	p-chloro-m-cresol	<0.02	<0.2
(24A)	95-57-8	2-chlorophenol	<0.02	<0.2
(31A)	120-83-2	2,4-dichlorophenol	<0.02	<0.2
(34A)	105-67-9	2,4-dimethylphenol	<0.02	<0.2
(57A)	88-75-5	2-nitrophenol	<0.02	<0.2
(58A)	100-02-7	4-nitrophenol	4.6	1.2
(59A)	51-28-5	2,4-dinitrophenol	<0.1	<1
(60A)	534-52-1	4,6-dinitro-2-methylphenol	<0.1	<1
(64A)	87-86-5	pentachlorophenol	<0.1	<1
(65A)	108-95-2	phenol	<0.02	<0.2

*Higher detection limits resulting from high organic content of sample.

Table E-15

RESULTS OF SOIL ANALYSIS FOR PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS: EAST AND WEST MOUNDS

(All results in mg/kg as received)

PP No.	CAS No.	Compound	Sample Identity/E & E Lab No. 85- East Mound/ 2574	West Mound/ 2575*
(1B)	83-32-9	acenaphthene	3.3	1.3
(5B)	92-87-5	benzidine	<0.1	<1
(8B)	120-82-1	1,2,4-trichlorobenzene	<0.02	<0.2
(9B)	118-74-1	hexachlorobenzene	<0.02	<0.2
(12B)	67-72-1	hexachloroethane	<0.02	<0.2
(18B)	111-44-4	bis(2-chloroethyl)ether	<0.02	<0.2
(20B)	91-58-7	2-chloronaphthalene	<0.02	<0.2
(25B)	95-50-1	1,2-dichlorobenzene	<0.02	<0.2
(26B)	541-73-1	1,3-dichlorobenzene	<0.02	<0.2
(27B)	106-46-7	1,4-dichlorobenzene	<0.02	<0.2
(28B)	91-94-1	3,3'-dichlorobenzidine	<0.1	<1
(35B)	121-14-2	2,4-dinitrotoluene	<0.02	<0.2
(36B)	606-20-2	2,6-dinitrotoluene	<0.02	<0.2
(37B)	122-66-7	1,2-diphenylhydrazine	<0.02	<0.2
(39B)	206-44-0	fluoranthene	42	18
(40B)	7005-72-3	4-chlorophenyl phenyl ether	<0.02	<0.2
(41B)	101-55-3	4-bromophenyl phenyl ether	<0.02	<0.2
(42B)	39638-32-9	bis(2-chloroisopropyl)ether	<0.02	<0.2
(43B)	111-91-1	bis(2-chloroetoxy)methane	<0.02	<0.2
(52B)	87-68-3	hexachlorobutadiene	<0.02	<0.2
(53B)	77-47-4	hexachlorocyclopentadiene	<0.02	<0.2
(54B)	78-59-1	isophorone	<0.02	<0.2
(55B)	91-20-1	naphthalene	2.5	0.78
(56B)	98-95-3	nitrobenzene	<0.02	<0.2
(62B)	86-30-6	N-nitrosodiphenylamine	<0.02	<0.2
(63B)	621-64-7	N-nitrosodipropylamine	<0.02	<0.2
(66B)	117-81-0	bis(2-ethylhexyl) phthalate	<0.02	<0.2
(67B)	85-68-7	benzyl butyl phthalate	<0.02	<0.2
(68B)	84-74-2	di-n-butyl phthalate	<0.02	<0.2
(69B)	117-84-0	di-n-octyl phthalate	0.79	0.81
(70B)	84-66-2	diethyl phthalate	<0.02	<0.2
(71B)	131-11-3	dimethyl phthalate	<0.02	<0.2
(72B)	56-55-3	benzo(a)anthracene	14	8.2
(73B)	50-32-8	benzo(a)pyrene	13	4.9
(74B)	205-99-2	benzo(b)fluoranthene	8.8	6.7
(75B)	207-08-9	benzo(k)fluoranthene	8.8	5.1
(76B)	218-01-9	chrysene	13	7.9
(77B)	208-96-8	acenaphthylene	<0.02	<0.2
(78B)	120-12-7	anthracene	9.0	4.0
(79B)	191-24-2	benzo(ghi)perylene	4.0	2.9
(80B)	86-73-7	fluorene	3.4	<0.2
(81B)	85-01-8	phenanthrene	30	13
(82B)	53-70-3	dibenzo(a,h)anthracene	1.5	0.46
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	5.4	3.3
(84B)	129-00-0	pyrene	21	12

*Higher detection limits resulting from high organic content of sample.

Table E-16

RESULTS OF SOIL ANALYSIS FOR PESTICIDES
AND PCBs: EAST AND WEST MOUNDS

(All results in mg/kg as received)

Compound	Sample Identity/E & E Lab No. 85- East Mound/ 2574	West Mound/ 2575
Aldrin	<0.008	<0.008
a-BHC	<0.008	<0.008
b-BHC	<0.008	<0.008
g-BHC	<0.008	<0.008
d-BHC	<0.008	<0.008
Chlordane	<0.08	<0.08
4,4'-DDD	0.25	<0.016
4,4'-DDE	<0.016	<0.016
4,4'-DDT	2.9	<0.016
Dieldrin	<0.016	<0.016
Endosulfan I	<0.008	<0.008
Endosulfan II	<0.016	<0.016
Endosulfan sulfate	<0.016	<0.016
Endrin	<0.016	<0.016
Endrin aldehyde	<0.016	<0.016
Heptachlor	<0.008	<0.008
Heptachlor epoxide	<0.008	<0.008
PCB - 1016	<0.08	<0.08
PCB - 1221	<0.08	<0.08
PCB - 1232	<0.08	<0.08
PCB - 1242	<0.08	<0.08
PCB - 1248	<0.08	<0.08
PCB - 1254	<0.16	<0.16
PCB - 1260	<0.16	<0.16
Toxaphene	<0.16	<0.16
Alachlor	<0.10	<0.12

Table E-17

RESULTS OF SOIL ANALYSES
FOR PRIORITY POLLUTANT METALS

(All results in mg/kg)

Compound	Sample Identity/E & E Lab No. 85- East Mound/ 2574	 West Mound/ 2575
Antimony	<1.0	1.41
Arsenic	39.2	16.7
Beryllium	<4	<4
Cadmium	<2	<20*
Chromium	<19	<19
Copper	117	175
Lead	794	747
Mercury	6.23	5.85
Nickel	24.0	69.6
Selenium	<2	<0.4
Silver	0.912	4.94
Thallium	1.65	<1
Zinc	405	1630

*Matrix interference

Table E-18

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SAMPLES

Compound	E & E Lab No. 85- (West Mound)	Original Value	Amount Added	Amount Determined	Percent Recovery
		(ug/L)			
Y-BHC (Lindane)	2575	<0.008	0.067	0.067	100
Heptachlor	2575	<0.008	0.067	0.076	113
Aldrin	2575	<0.008	0.067	0.064	96
Dieldrin	2575	<0.016	0.17	0.16	94
Endrin	2575	<0.016	0.17	0.18	106
4,4'-DDT	2575	<0.016	0.17	0.19	112

Table E-19

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED WATER SAMPLES

Compound	E & E Lab No. 85-	Original Value	Amount Added	Amount Determined	Percent Recovery
		(ug/L)			
Silvex	DI SPIKE	<0.05	10.0	6.7	67

Table E-20

QUALITY CONTROL: PERCENT RECOVERY
OF SURROGATE STANDARD

Sample Identity/ E & E Sample No. 85-	Surrogate	Amount Added (mg/kg)	Amount Found (mg/kg)	% Recovery
East Mound/ 2574	Fluorobenzene	0.4	0.47	117
West Mound/ 2575	Fluorobenzene	0.4	0.42	106

MEMORANDUM

TO: Bob Nelson

FROM: Gary Hahn

DATE: May 24, 1985

SUBJECT: City of Buffalo - Babcock St. Report, Job No U-1610

CC: Lab File, R. Enos

Attached is the laboratory report of the analysis conducted on four samples received at the Analytical Services Center on April 22, 1985. Analysis was performed according to the procedures set forth in "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater" EPA-600/4-82-057, July 1982.

GH/cp
enclosure

Table E-21

RESULT OF WATER ANALYSIS FOR PRIORITY POLLUTANTS
VOLATILE ORGANIC COMPOUNDS: SEWER SAMPLING

(All results in ug/L)

			Sample Identity/E & E Lab No. 85-			
PP No.	CAS No.	Compound	Fleming** & Lewis/ 2628	Babcock & Fleming/ 2629	Inst. Blank/ 2630	Trip Blank/ 2631
(4V)	71-43-2	benzene	<5	<5	<5	<5
(6V)	56-23-5	carbon tetrachloride	<5	<5	<5	<5
(7V)	108-90-7	chlorobenzene	<5	<5	<5	<5
(10V)	107-06-2	1,2-dichloroethane	<5	<5	<5	<5
(11V)	71-55-6	1,1,1-trichloroethane	<5	<5	<5	<5
(13V)	75-34-3	1,1-dichloroethane	<5	<5	<5	<5
(14V)	79-00-5	1,1,2-trichloroethane	<5	<5	<5	<5
(15V)	79-34-5	1,1,2,2-tetrachloroethane	<5	<5	<5	<5
(16V)	75-00-3	chloroethane	<5	<5	<5	<5
(19V)	110-75-8	2-chloroethylvinyl ether	<5	<5	<5	<5
(23V)	67-66-3	chloroform	<5*	<5	<5	<5*
(29V)	75-35-4	1,1-dichloroethene	<5	<5	<5	<5
(30V)	156-60-5	trans-1,2-dichloroethene	<5	<5	<5	<5
(32V)	78-87-5	1,2-dichloropropane	<5	<5	<5	<5
(33V)	10061-02-6	trans-1,3-dichloropropene	<5	<5	<5	<5
	10061-01-05	cis-1,3-dichloropropene	<5	<5	<5	<5
(38V)	100-41-4	ethylbenzene	<5	<5	<5	<5
(44V)	75-09-2	methylene chloride	<10	<10	<10	<10
(45V)	74-87-3	chloromethane	<5	<5	<5	<5
(46V)	74-83-9	bromomethane	<5	<5	<5	<5
(47V)	75-25-2	bromoform	<5	<5	<5	<5
(48V)	75-27-4	bromodichloromethane	<5	<5	<5	<5
(49V)	75-69-4	fluorotrichloromethane	<5	<5	<5	<5
(50V)	75-71-8	dichlorodifluoromethane	<5	<5	<5	<5
(51V)	124-48-1	chlorodibromomethane	<5	<5	<5	<5
(85V)	127-18-4	tetrachloroethene	<5	<5	<5	<5
(86V)	108-88-3	toluene	<5	<5	<5	<5
(87V)	79-01-6	trichloroethene	<5*	11	<5*	<5*
(88V)	75-01-4	vinyl chloride	<5	<5	<5	<5

*Compound present below measurable detection limit.
**Incorrectly identified on chain-of-custody form as Babcock and Lewis.

Table E-22

RESULTS OF WATER ANALYSES
FOR PRIORITY POLLUTANT METALS, BARIUM, CYANIDE, pH

(All results in mg/L unless noted)

	Sample Identity/E & E Lab No. 85-			
Compound	B1/ 2424	B7/ 2426	B8/ 2427	B9/ 2400
Antimony	0.142	0.357	0.108	0.355
Arsenic	0.411	<0.05	0.152	11.8
Beryllium	<0.02	<0.02	<0.02	<0.02
Cadmium	<0.005	<0.005	<0.005	0.173
Chromium	<0.1	<0.1	<0.1	1.50
Copper	0.474	0.710	0.167	35.6
Lead	0.79	0.53	0.26	30.0
Mercury	0.0024	0.00082	0.0082	1.320
Nickel	0.154	0.338	0.185	0.460
Selenium	0.040	<0.20	<0.020	0.970
Silver	<0.005	<0.005	<0.005	0.019
Thallium	0.0161	<0.050	<0.050	0.220
Zinc	0.72	0.64	2.80	62.0
Barium	0.464	10.2	1.54	3.61
Cyanide	<0.020	<0.020	<0.020	0.021
pH, S.U.	7.87	7.95	7.88	6.82

Table E-23

RESULTS OF WATER ANALYSIS FOR PRIORITY POLLUTANTS
ACID COMPOUNDS

(All results in ug/L)

			Sample Identity/E & E Lab No. 85-				
PP No.	CAS No.	Compound	B1/ 2424	B2/ 2425	B7/ 2526	B8/ 2427	B9/ 2400
(21A)	88-06-2	2,4,6-trichlorophenol	<10	<10	<10	<10	<10
(22A)	59-50-7	p-chloro-m-cresol	<10	<10	<10	<10	<10
(24A)	95-57-8	2-chlorophenol	<10	<10	<10	<10	<10
(31A)	120-83-2	2,4-dichlorophenol	<10	<10	<10	<10	<10
(34A)	105-67-9	2,4-dimethylphenol	<10	<10	<10	<10	<10
(57A)	88-75-5	2-nitrophenol	<10	<10	<10	<10	<10
(58A)	100-02-7	4-nitrophenol	<10	<10	<10	<10	<10
(59A)	51-28-5	2,4-dinitrophenol	<10	<10	<10	<10	<10
(60A)	534-52-1	4,6-dinitro-2-methylphenol	<10	<10	<10	<10	<10
(64A)	87-86-5	pentachlorophenol	<10	<10	<10	<10	<10
(65A)	108-95-2	phenol	<10	<10	<10	<10	<10

Table E-24

RESULTS OF WATER ANALYSIS FOR PRIORITY POLLUTANTS
BASE/NEUTRAL COMPOUNDS

(All results in ug/L)

PP No.	CAS No.	Compound	Sample Identity/E & E Lab No. 85- B1/ 2424	B2/ 2425	B7/ 2426	B8/ 2427	B9/ 2400
(1B)	83-32-9	acenaphthene	<3	<3	<3	<3	<3*
(5B)	92-87-5	benzidine	<10	<10	<10	<10	<10
(8B)	120-82-1	1,2,4-trichlorobenzene	<3	<3	<3	<3	<3
(9B)	118-74-1	hexachlorobenzene	<3	<3	<3	<3	<3
(12B)	67-72-1	hexachloroethane	<3	<3	<3	<3	<3
(18B)	111-44-4	bis(2-chloroethyl)ether	<3	<3	<3	<3	<3
(20B)	91-58-7	2-chloronaphthalene	<3	<3	<3	<3	<3
(25B)	95-50-1	1,2-dichlorobenzene	<3	<3	<3	<3	<3
(26B)	541-73-1	1,3-dichlorobenzene	<3	<3	<3	<3	<3
(27B)	106-46-7	1,4-dichlorobenzene	<3	<3	<3	<3	<3
(28B)	91-94-1	3,3'-dichlorobenzidine	<10	<10	<10	<10	<10
(35B)	121-14-2	2,4-dinitrotoluene	<3	<3	<3	<3	<3
(36B)	606-20-2	2,6-dinitrotoluene	<3	<3	<3	<3	<3
(37B)	122-66-7	1,2-diphenylhydrazine	<3	<3	<3	<3	<3
(39B)	206-44-0	fluoranthene	<3	<3	<3	<3	<3
(40B)	7005-72-3	4-chlorophenyl phenyl ether	<3	<3	<3	<3	<3
(41B)	101-55-3	4-bromophenyl phenyl ether	<3	<3	<3	<3	<3
(42B)	39638-32-9	bis(2-chloroisopropyl)ether	<3	<3	<3	<3	<3
(43B)	111-91-1	bis(2-chloroetoxy)methane	<3	<3	<3	<3	<3
(52B)	87-68-3	hexachlorobutadiene	<3	<3	<3	<3	<3
(53B)	77-47-4	hexachlorocyclopentadiene	<3	<3	<3	<3	<3
(54B)	78-59-1	isophorone	<3	<3	<3	<3	<3
(55B)	91-20-1	naphthalene	<3	3	<3	<3	11
(56B)	98-95-3	nitrobenzene	<3	<3	<3	<3	<3
(62B)	86-30-6	N-nitrosodiphenylamine	<3	<3	<3	<3	<3
(63B)	621-64-7	N-nitrosodipropylamine	<3	<3	<3	<3	<3
(66B)	117-81-0	bis(2-ethylhexyl) phthalate	14	18	23	11	24
(67B)	85-68-7	benzyl butyl phthalate	<3	<3	<3	<3	<3
(68B)	84-74-2	di-n-butyl phthalate	5	<3	<3	<3	<3
(69B)	117-84-0	di-n-octyl phthalate	11	24	250	21	32
(70B)	84-66-2	diethyl phthalate	<3	12	11	<3	<3
(71B)	131-11-3	dimethyl phthalate	<3	<3	22	<3	<3
(72B)	56-55-3	benzo(a)anthracene	<3	<3	<3	<3	<3
(73B)	50-32-8	benzo(a)pyrene	<3	<3	<3	<3	<3
(74B)	205-99-2	benzo(b)fluoranthene	<3	<3	<3	<3	<3
(75B)	207-08-9	benzo(k)fluoranthene	<3	<3	<3	<3	<3
(76B)	218-01-9	chrysene	<3	<3	<3	<3	<3
(77B)	208-96-8	acenaphthylene	<3	<3	<3	<3	<3
(78B)	120-12-7	anthracene	<3	<3	<3	<3	5
(79B)	191-24-2	benzo(ghi)perylene	<3	<3	<3	<3	<3
(80B)	86-73-7	fluorene	<3	<3	<3	<3	<3
(81B)	85-01-8	phenanthrene	<3	<3	<3	<3	4
(82B)	53-70-3	dibenzo(a,h)anthracene	<3	<3	<3	<3	<3
(83B)	193-39-5	indeno(1,2,3-cd)pyrene	<3	<3	<3	<3	<3
(84B)	129-00-0	pyrene	<3	<3	<3	<3	<3

Table E-25

RESULTS OF WATER ANALYSIS FOR PRIORITY POLLUTANTS
VOLATILE ORGANIC COMPOUNDS

(All results in ug/L)

			Sample Identity/E & E Lab No. 85-				
PP No.	CAS No.	Compound	B1/ 2424	B2/ 2425	B7/ 2426	B8 2427	B9/ 2400
(4V)	71-43-2	benzene	<5	<5	<5	<5*	<5
(6V)	56-23-5	carbon tetrachloride	<5	<5	<5	<5	<5
(7V)	108-90-7	chlorobenzene	<5	<5	<5	<5	<5
(10V)	107-06-2	1,2-dichloroethane	<5	<5	<5	<5	<5
(11V)	71-55-6	1,1,1-trichloroethane	<5	<5	<5	<5	<5
(13V)	75-34-3	1,1-dichloroethane	<5	<5	<5	<5	<5
(14V)	79-00-5	1,1,2-trichloroethane	<5	<5	<5	<5	<5
(15V)	79-34-5	1,1,2,2-tetrachloroethane	<5	<5	<5	<5	<5
(16V)	75-00-3	chloroethane	<5	<5	<5	<5	<5
(19V)	110-75-8	2-chloroethylvinyl ether	<5	<5	<5	<5	<5
(23V)	67-66-3	chloroform	<5	<5	<5	<5	<5
(29V)	75-35-4	1,1-dichloroethene	<5	<5	<5	<5	<5
(30V)	156-60-5	trans-1,2-dichloroethene	<5	<5	<5	<5	<5
(32V)	78-87-5	1,2-dichloropropane	<5	<5	<5	<5	<5
(33V)	10061-02-6	trans-1,3-dichloropropene	<5	<5	<5	<5	<5
	10061-01-05	cis-1,3-dichloropropene	<5	<5	<5	<5	<5
(38V)	100-41-4	ethylbenzene	<5	<5	<5	<5	<5
(44V)	75-09-2	methylene chloride	<5	<5	<5	<5	<5
(45V)	74-87-3	chloromethane	<5	<5	<5	<5	<5
(46V)	74-83-9	bromomethane	<5	<5	<5	<5	<5
(47V)	75-25-2	bromoform	<5	<5	<5	<5	<5
(48V)	75-27-4	bromodichloromethane	<5	<5	<5	<5	<5
(49V)	75-69-4	fluorotrichloromethane	<5	<5	<5	<5	<5
(50V)	75-71-8	dichlorodifluoromethane	<5	<5	<5	<5	<5
(51V)	124-48-1	chlorodibromomethane	<5	<5	<5	<5	<5
(85V)	127-18-4	tetrachloroethene	<5	<5	<5	<5	<5
(86V)	108-88-3	toluene	<5	<5	<5	<5	<5
(87V)	79-01-6	trichloroethene	<5	<5	<5	<5	<5
(88V)	75-01-4	vinyl chloride	<5	<5	<5	<5	<5

*Compound present below measurable detection limit.

Table E-26

RESULTS OF GROUNDWATER ANALYSIS FOR
ORGANOCHLORINE PESTICIDES AND PCBS

(All results in ug/L)

Compound	Sample Identity/E & E Lab No. 85-				
	B1/ 2424	B2/ 2425	B7/ 2426	B8/ 2427	B9/ 2400
Aldrin	<0.05	<0.05	<0.10	<0.10	<0.05
a-BHC	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	<0.05	<0.05	<0.05	<0.05	<0.05
g-BHC	<0.05	<0.05	<0.05	<0.05	<0.05
d-BHC	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane	<0.50	<0.50	<1.0	<0.50	<0.50
4,4'-DDD	<0.10	<0.10	<0.20	<0.20	<0.10
4,4'-DDE	<0.10	<0.10	<0.20	<0.10	<0.10
4,4'-DDT	<0.10	<0.10	<0.20	<0.10	<0.10
Dieldrin	<0.10	<0.10	<0.20	<0.10	<0.10
Endosulfan I	<0.05	<0.05	<0.10	<0.10	<0.05
Endosulfan II	<0.10	<0.10	<0.20	<0.10	<0.10
Endosulfan sulfate	<0.10	<0.10	<0.20	<0.10	<0.10
Endrin	<0.10	<0.10	<0.20	<0.10	<0.10
Endrin aldehyde	<0.10	<0.10	<0.20	<0.10	<0.10
Heptachlor	<0.05	<0.05	<0.10	<0.10	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.10	<0.10	<0.05
PCB - 1016	<0.50	<0.50	<1.0	<1.0	<0.50
PCB - 1221	<0.50	<0.50	<1.0	<1.0	<0.50
PCB - 1232	<0.50	<0.50	<1.0	<1.0	<0.50
PCB - 1242	<0.50	<0.50	<1.0	<1.0	<0.50
PCB - 1248	<0.50	<0.50	<1.0	<1.0	<0.50
PCB - 1254	<1.0	<1.0	<2.0	<2.0	<1.0
PCB - 1260	<1.0	<1.0	<2.0	<2.0	<1.0
Toxaphene	<1.0	<1.0	<2.0	<2.0	<1.0
Methoxychlor	<0.50	<0.50	<1.0	<1.0	<0.50
2,4-D	<0.50	<0.50	<0.50	<0.50	3.6
Silvex	<0.05	<0.05	<0.05	<0.05	2.7

Table E-27

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKDED WATER SAMPLES

Compound	E & E Lab No. 85-(87)	Original Value	Amount Added	Amount Determined	Percent Recovery
		(ug/L)			
g-BHC	2426	<0.10	3.33	2.66	80
Heptachlor	2426	<0.10	3.33	2.53	76
Aldrin	2426	<0.10	3.33	2.27	68
Dieldrin	2426	<0.20	8.33	7.07	85
4,4'-DDT	2426	<0.20	8.33	6.03	72

Table E-28

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED WATER SAMPLES

Compound	E & E Lab No. 85-	Original Value	Amount Added	Amount Determined	Percent Recovery
		ug/L			
2,4-D	DI SPIKE	<0.5	10.0	6.2	62
Silvex	DI SPIKE	<0.05	10.0	7.5	75

Table E-29

LABORATORY REPORT

FOR

City of Buffalo - Babcock St.

Job No.: U-1817

Sample Date: 5/28/85 Sampled By: E & E, Inc.

Date Received: 5/28/85 Delivered By: E & E, Inc.

Sample Type: Water Grab

E & E Lab Number 85-		3551	3552	3553
Customer Number		SS 2 Fleming and Babcock	SS 2 Lewis and Fleming	Trip Blank
		All Results in mg/l		
Antimony	Sb	<0.050	<0.005	<0.005
Arsenic	As	0.366	<0.050	<0.050
Barium	Ba	0.268	0.104	<0.020
Beryllium	Be	<0.015	<0.015	<0.015
Cadmium	Cd	0.0044	0.0035	<0.0001
Chromium	Cn	0.087	0.015	<0.015
Copper	Cu	0.438	0.074	<0.015
Lead	Pb	1.52	0.260	0.002
Mercury	Hg	<0.0004	<0.0004	<0.0004
Nickel	Ni	0.121	<0.020	<0.020
Selenium	Se	<0.050	<0.050	<0.005
Silver	Ag	<0.020	<0.020	<0.020
Thallium	Th	<0.50	<0.050	<0.005
Zinc	Zn	2.42	0.842	<0.015

Analytical References:

"Methods for the Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983.