WATER QUALITY INVESTIGATION AT THE PROPOSED VAN DE MARK CHEMICAL CO., INC. WASTE DISPOSAL SITE, LOCKPORT, NEW YORK

FOR

W.W.W. Consulting Engineers
50 West Genesee Street
Lockport, New York 14094

BY

Great Lakes Laboratory
State University College at Buffalo
1300 Elmwood Avenue
Buffalo, New York 14222

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INTRODUCTION

The purpose of this investigation was two (2)-fold: (a) provide a chemical baseline for Eighteenmile Creek in a reach adjacent to a proposed industrial waste disposal site for solid materials from the Van De Mark Chemical Co., Inc.; and (b) to ascertain if contaminants from the proposed site were adversely impacting the ground and surface waters. The latter was done because the site did contain solid wastes from Van De Mark as well as other industries in the Lockport region. Major consideration was given to general chemical water quality indicators as well as those heavy metals and nutrients that possibly could be released directly or indirectly from the material that is proposed to be placed in the landfill. The latter is located on a bluff above Eighteenmile Creek and is between Mill Street (south), West Jackson Street (north), and Gooding Street (west) in Lockport, Niagara County, New York.

METHODS

Six (6) transects were established on Eighteenmile Creek (Figure 1). These collection areas were so located that regions above, within, and downstream from the area most apt to be impacted by surface runoff and groundwater from the site would be sampled. Three (3) sampling points were located on each transect. Sites designated "A" were one-quarter (1/4) the distance from the right bank when facing downstream. The "B" sites were located in mid-stream while the "C" sites were one-

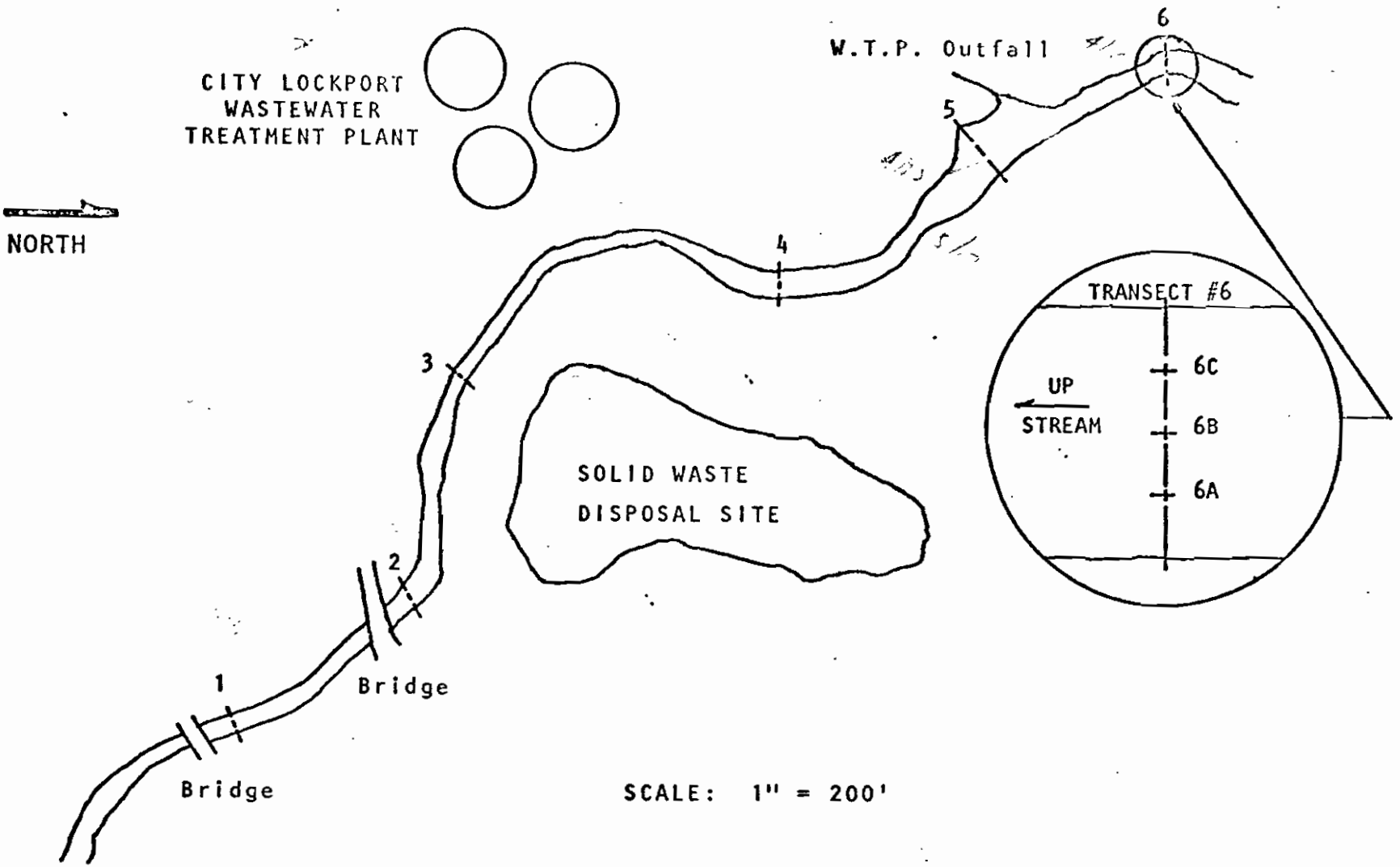


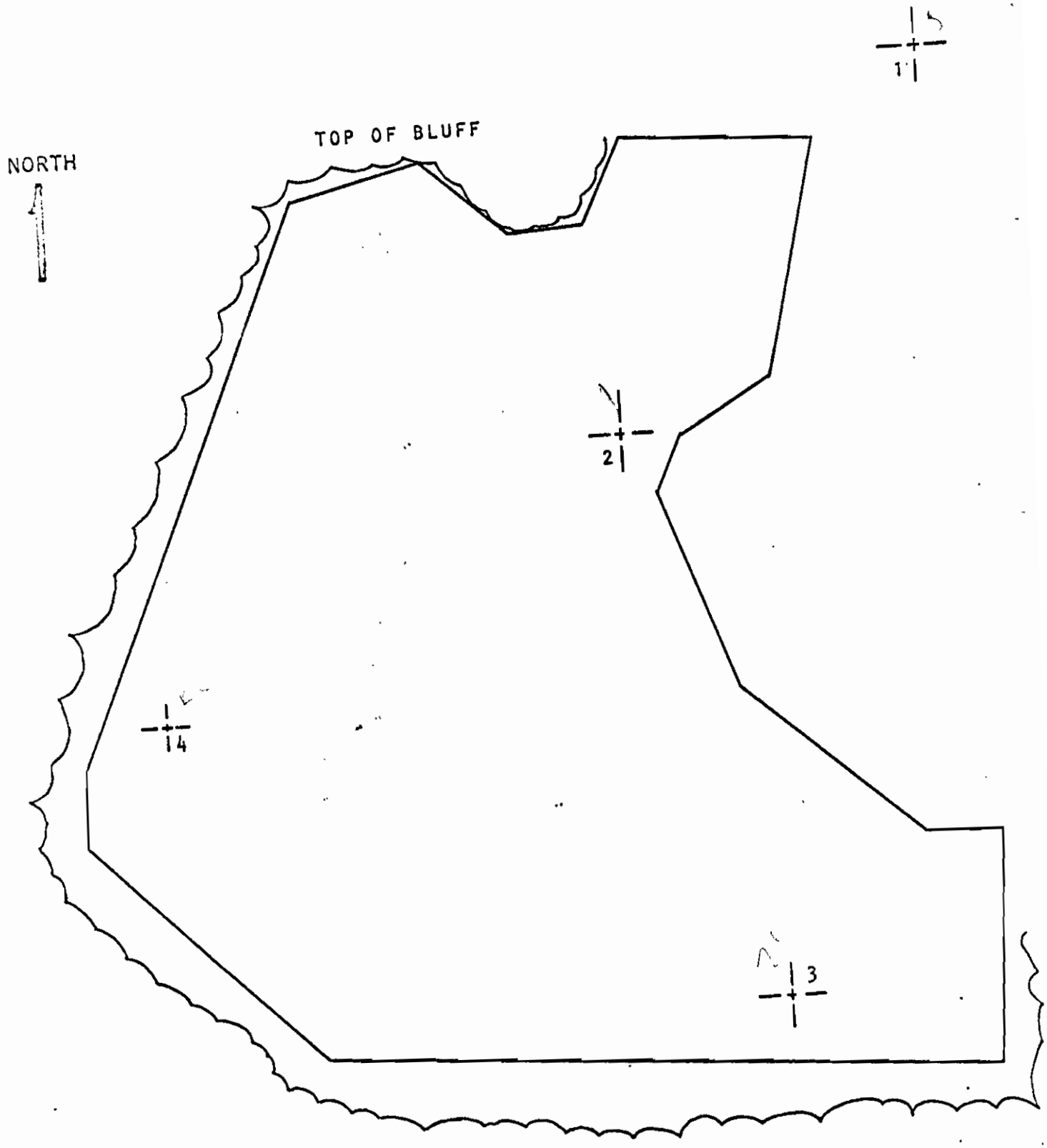
FIGURE 1. Sampling Sites - Eighteenmile Creek

quarter (1/4) the distance from the left bank when facing downstream.

Each of the eighteen (18) stations were sampled on three (3) occasions. Those were: 15 April - during a dry period when the discharge was low; 23 April - following two (2) days of rain - much of which was intense - which increased stream-flow and caused runoff from the disposal site; 17 May - after the overflow to Eighteenmile Creek from the New York State Barge Canal was initiated. On the latter date, three (3) replicate samples also were gathered from each of the four (4) test borings completed after 23 April by Empire Soils within or adjacent to the disposal area. The well coations are shown on Figure 2.

Water from the Creek was collected at mid-depth with a 5.2 L PVC Van Dorn Water Bottle (horizontal). Well samples were gathered with a weighted PVC 300 ml test-tube that was lowered into the well on a nylon line. Samples were taken from the mid-depth of the standing water in each well. The collection depths for Wells 1, 2, 3, and 4 were 4, 4, 13, and 13 m, respectively.

All samples were preserved and analyzed according to procedures previously approved by the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers, and the New York State Department of Environmental Conservation. All laboratory analysis were initiated on the same day that each set of samples were collected in the field.



SCALE: 1" = 50' 2' cont.

FIGURE 2. Sampling Sites - Ground Water

The same quality control program, including spikes and blanks, that had been approved by EPA for the Erie-Niagara Counties 208 Study also was employed.

Dissolved oxygen and temperature was measured in the field utilizing a YSI Dissolved Oxygen-Temperature Meter. The latter was air-calibrated for oxygen with a standardized thermometer. The pH also was determined immediately after each collection was made using a Leeds and Northrup pH Meter. The latter was checked for accuracy against pH 7.00 and 8.00 buffers.

A detailed description of each lab and field procedure will be furnished upon request.

The field phase of the project was supervised by the Great Lakes Laboratory's Field Coordinator, George Moretti; the laboratory analyses were directed by the GLL's Chemical Coordinator, Robert Wyeth. The GLL Director, Robert A. Sweeney, oversaw the entire project.

RESULTS - DISCUSSION

The results from the analyses of the water samples from Eighteenmile Creek collected on 15 April, 23 April, and 17 May 1977 are shown on Tables I, II, and III, respectively. The data from the testing of the well samples gathered on 17 May are given on Table IV.

It should be noted that Transects 5 and 6 were impacted by discharges from the Lockport Wastewater Treatment Plant,

TABLE I

WATER QUALITY - EIGHTEENMILE CREEK

15 APRIL 1977

PARAMETERS	STATION 1: A	B	C	STATION 2: A	B	C
Dissolved Oxygen (mg/l)	10.60	10.65	10.65	11.00	10.95	10.95
Temperature (C°)	11.8	11.1	11.8	11.2	11.5	12.0
Percent Saturation	98%	96%	97%	99%	100%	101%
pH	8.10	8.15	8.00	8.05	8.00	8.05
Silica Dioxide (mg/l)	2.80	2.85	2.85	2.80	2.77	2.77
Chlorides (mg/l)	43.4	43.2	43.1	49.6	47.0	45.8
Total Organic Carbon (mg/l)	18.8	15.7	19.8	18.4	21.8	21.9
Total Inorganic Carbon (mg/l)	45.3	49.0	44.9	47.5	45.5	45.3
Alkalinity (mg/l as $CaCO_3$)	153.90	156.9	156.1	155.4	153.7	151.8
Calcium (mg/l)	61.9	61.8	62.2	62.6	62.2	62.2
Magnesium (mg/l)	18.7	19.0	18.8	18.6	18.6	19.0
Iron (mg/l)	0.050	0.025	<0.025	<0.025	<0.025	0.025
Zinc (mg/l)	0.156	0.096	0.084	0.150	0.150	0.270
Potassium (mg/l)	3.1	3.2	3.1	3.6	3.5	3.6
Sodium (mg/l)	20.7	20.6	20.6	21.2	20.7	21.5
Orthophosphorus (mg P/l)	0.0268	0.0264	0.0240	0.0093	0.0082	0.0037
Total Phosphorus (mg P/l)	0.110	0.126	0.035	0.045	0.030	0.055
Nitrate-Nitrite (mg N/l)	1.03	1.02	1.00	1.30	1.35	1.47
Ammonia (mg N/l)	0.080	0.059	0.101	0.073	0.034	0.090

TABLE 1 (CONTINUED)

PARAMETERS	STATION 3: A	B	C	STATION 4: A	B	C
Dissolved Oxygen (mg/l)	10.60	10.55	10.70	10.50	10.50	10.50
Temperature (C°)	11.2	11.1	11.2	12.0	12.0	12.0
Percent Saturation	96%	95%	97%	96%	96%	96%
pH	8.10	8.00	8.00	8.05	8.10	8.10
Silica Dioxide (mg/l)	2.93	2.87	2.86	2.88	2.87	2.86
Chlorides (mg/l)	49.2	49.2	50.0	51.3	52.3	52.1
Total Organic Carbon (mg/l)	29.0	31.2	26.8	19.2	25.5	27.8
Total Inorganic Carbon (mg/l)	47.1	47.0	46.9	48.2	45.1	45.5
Alkalinity (mg/l as $CaCO_3$)	158.0	155.6	158.2	159.1	157.6	159.1
Calcium (mg/l)	63.1	63.1	63.6	63.1	62.5	62.5
Magnesium (mg/l)	19.0	18.4	18.6	18.6	19.3	19.5
Iron (mg/l)	0.025	<0.025	<0.025	0.025	0.025	0.025
Zinc (mg/l)	0.078	0.078	0.131	0.131	0.125	0.144
Potassium (mg/l)	3.1	3.0	3.0	3.0	3.1	3.1
Sodium (mg/l)	20.6	20.6	20.5	20.7	20.4	20.8
Orthophosphorus (mg P/l)	0.0274	0.0253	0.0278	0.0268	0.0267	0.0274
Total Phosphorus (mg P/L)	0.116	0.113	0.147	0.144	0.110	0.101
Nitrate-Nitrite (mg N/l)	0.960	0.980	1.00	0.936	0.930	0.932
Ammonia (mg N/l)	<0.003	0.065	0.114	0.004	<0.003	0.053

TABLE I (CONCLUDED)

PARAMETERS	STATION 5: A	B	C	STATION 6: A	B	C
Dissolved Oxygen (mg/l)	10.3	9.4	9.1	9.50	9.35	9.40
Temperature (C°)	14.5	14.7	14.8	13.0	12.5	13.0
Percent Saturation	100%	91%	88%	89%	87%	88%
pH	7.95	7.65	7.60	7.80	7.70	7.70
Silica Dioxide (mg/l)	2.95	4.29	4.65	3.55	3.63	3.63
Chlorides (mg/l)	51.1	+ 106.0	122.1	+ 132.7	159.3	201.0
Total Organic Carbon (mg/l)	20.7	22.0	32.4	31.3	21.7	22.1
Total Inorganic Carbon (mg/l)	45.3	48.7	53.9	47.1	46.6	46.5
Alkalinity (mg/l as $CaCO_3$)	160.2	168.1	173.0	163.7	162.2	163.1
Calcium (mg/l)	61.9	68.9	86.8	72.5	80.5	87.7
Magnesium (mg/l)	19.4	17.7	18.0	18.1	18.1	17.5
Iron (mg/l)	<0.025	<0.025	0.025	0.025	0.025	<0.025
Zinc (mg/l)	0.090	0.255	0.290	0.230	0.275	0.197
Potassium (mg/l)	2.9	5.2	6.1	+ 10.3	16.8	20.5
Sodium (mg/l)	20.9	37.0	41.0	36.2	40.5	46.5
Orthophosphorus (mg P/l)	0.0240	0.0420	0.0431	0.0405	0.0391	0.0385
Total Phosphorus (mg P/l)	0.120	0.125	0.209	0.183	0.133	0.145
Nitrate-Nitrite (mg N/l)	0.940	0.898	0.860	1.19	1.33	1.56
Ammonia (mg N/l)	0.004	+ 1.73	3.00	+ 1.44	1.65	1.48

TABLE II

WATER QUALITY - EIGHTEENMILE CREEK

23 APRIL 1977

PARAMETERS	STATION 1: A	B	C	STATION 2: A	B	C
Dissolved Oxygen (mg/l)	10.3	10.4	10.45	10.4	10.55	10.4
Temperature (C°)	11.7	11.4	11.3	10.5	10.3	10.3
Percent Saturation	93%	95%	94%	93%	92%	92%
pH	7.4	7.6	7.6	7.6	7.7	7.8
Silica Dioxide (mg/l)	2.04	2.33	2.70	2.24	2.44	2.56
Chlorides (mg/l)	47.8	46.2	45.6	48.2	47.6	46.4
Total Organic Carbon (mg/l)	30.1	37.3	34.4	33.4	36.9	31.9
Total Inorganic Carbon (mg/l)	34.3	35.6	34.9	34.7	34.6	31.0
Alkalinity (mg/l as $CaCO_3$)	119.0	121.6	120.7	117.0	119.9	117.9
Calcium (mg/l)	46.0	48.3	47.0	47.5	48.0	46.9
Magnesium (mg/l)	12.9	13.3	13.2	13.1	13.3	13.6
Iron (mg/l)	<0.025	<0.025	<0.025	0.025	<0.025	<0.025
Zinc (mg/l)	0.060	0.042	0.019	0.066	0.131	0.037
Potassium (mg/l)	2.8	2.8	2.8	3.0	2.9	2.9
Sodium (mg/l)	23.2	23.7	23.2	23.6	23.8	23.5
Orthophosphorus (mg P/l)	0.1060	0.0760	0.0942	0.0690	0.0684	0.1005
Total Phosphorus (mg P/l)	0.355	0.340	0.444	0.399	0.430	0.438
Nitrate-Nitrite (mg N/l)	0.610	0.605	0.604	0.616	0.620	0.630
Ammonia (mg N/l)	0.373	0.450	0.582	0.334	0.364	0.469

TABLE II (CONTINUED)

PARAMETERS	STATION 3: A	B	C	STATION 4: A	B	C
Dissolved Oxygen (mg/l)	10.5	10.4	10.55	10.45	10.40	10.40
Temperature (C°)	11.1	11.1	11.0	10.7	10.7	10.7
Percent Saturation	95%	99%	95%	93%	94%	94%
pH	7.55	7.65	7.75	7.75	7.80	7.80
Silica Dioxide (mg/l)	2.46	2.40	2.45	2.46	2.36	2.45
Chlorides (mg/l)	48.6	47.8	47.6	48.8	48.6	48.4
Total Organic Carbon (mg/l)	42.8	43.4	39.4	48.1	51.2	33.4
Total Inorganic Carbon (mg/l)	34.3	32.9	33.6	32.4	31.3	33.1
Alkalinity (mg/l as $CaCO_3$)	116.0	119.2	115.9	116.4	116.7	114.7
Calcium (mg/l)	46.6	46.1	46.3	46.0	44.9	46.6
Magnesium (mg/l)	12.6	12.4	12.4	12.5	12.4	12.7
Iron (mg/l)	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Zinc (mg/l)	0.042	0.042	0.037	0.060	0.060	0.042
Potassium (mg/l)	3.0	2.9	2.8	3.2	2.8	2.9
Sodium (mg/l)	24.7	24.0	23.9	23.9	24.0	24.0
Orthophosphorus (mg P/l)	0.0645	0.0706	0.0575	0.0668	0.0704	0.702
Total Phosphorus (mg P/l)	0.381	0.475	0.619	0.469	0.445	0.491
Nitrate-Nitrite (mg N/l)	0.630	0.618	0.640	0.626	0.640	0.630
Ammonia (mg N/l)	0.300	0.300	0.304	0.273	0.330	0.253

TABLE II (CONCLUDED)

PARAMETERS	STATION 5: A	B	C	STATION 6: A	B	C
Dissolved Oxygen (mg/l)	10.40	10.45	10.35	9.95	9.9	9.85
Temperature (°C)	10.7	10.5	10.8	9.9	10.0	9.9
Percent Saturation	94%	93%	94%	86%	86%	86%
pH	7.6	7.5	7.6	7.55	7.65	7.55
Silica Dioxide (mg/l)	2.60	2.53	2.54	2.96	2.89	2.93
Chlorides (mg/l)	48.0	47.8	47.4	103.4	106.5	107.4
Total Organic Carbon (mg/l)	41.0	41.5	43.0	41.3	53.1	45.2
Total Inorganic Carbon (mg/l)	28.5	31.4	25.8	23.2	25.6	27.8
Alkalinity (mg/l as $CaCO_3$)	109.5	113.1	112.9	87.9	88.8	89.8
Calcium (mg/l)	45.6	44.2	44.9	48.1	47.6	48.4
Magnesium (mg/l)	12.2	11.8	11.9	9.3	9.5	9.6
Iron (mg/l)	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Zinc (mg/l)	0.031	0.078	0.049	0.078	0.096	0.096
Potassium (mg/l)	2.9	2.8	2.9	12.5	12.5	12.7
Sodium (mg/l)	24.1	24.0	23.9	33.8	33.8	33.9
Orthophosphorus (mg P/l)	0.1535	0.0873	0.0597	0.0197	0.0127	0.0235
Total Phosphorus (mg P/l)	0.570	0.343	0.436	0.950	0.635	0.391
Nitrate-Nitrite (mg N/l)	0.658	0.660	0.666	0.848	0.918	0.950
Ammonia (mg N/l)	0.343	0.455	0.297	0.886	0.892	0.860

TABLE III

WATER QUALITY - EIGHTEENMILE CREEK

17 MAY 1977

PARAMETERS	STATION 1: A	B	C	STATION 2: A	B	C
Dissolved Oxygen (mg/l)	9.2	9.2	9.2	9.1	9.1	9.0
Temperature (C°)	19.0	18.5	18.5	19.0	19.0	19.0
Percent Saturation	98%	96%	96%	97%	97%	96%
pH	7.45	7.60	7.60	7.80	7.75	7.82
Silica Dioxide (mg/l)	0.84	0.83	1.89	1.95	0.82	1.53
Chlorides (mg/l)	46.2	47.4	44.1	43.4	42.5	43.4
Total Organic Carbon (mg/l)	35.9	39.4	53.2	52.5	25.4	28.7
Total Inorganic Carbon (mg/l)	43.5	40.1	49.2	39.2	42.8	41.3
Alkalinity (mg/l as $CaCO_3$)	163.1	161.8	161.6	161.7	161.9	166.3
Calcium (mg/l)	75.2	74.2	71.3	74.8	75.0	75.0
Magnesium (mg/l)	19.3	18.7	18.8	19.4	19.3	17.6
Iron (mg/l)	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Zinc (mg/l)	0.114	0.060	0.084	0.060	0.072	0.090
Potassium (mg/l)	3.2	2.8	2.7	2.8	2.8	2.5
Sodium (mg/l)	22.3	20.7	20.8	20.5	20.5	20.5
Orthophosphorus (mg P/l)	0.472	0.447	0.412	0.273	0.272	0.276
Total Phosphorus (mg P/l)	0.610	0.455	0.418	0.326	0.355	0.284
Nitrate-Nitrite (mg N/l)	0.399	0.390	0.380	0.375	0.375	0.370
Ammonia (mg N/l)	<0.003	0.066	<0.003	<0.003	<0.003	<0.003

TABLE III (CONTINUED)

PARAMETERS	STATION 3: A	B	C	STATION 4: A	B	C
Dissolved Oxygen (mg/l)	9.2	9.3	9.05	9.25	9.40	9.35
Temperature (C°)	19.0	18.5	18.7	18.8	18.8	18.8
Percent Saturation	98%	97%	100%	97%	99%	99%
pH	7.80	7.82	7.80	7.80	7.82	7.82
Silica Dioxide (mg/l)	0.83	0.80	0.76	0.80	0.78	0.82
Chlorides (mg/l)	44.9	45.1	44.0	46.2	45.8	46.2
Total Organic Carbon (mg/l)	25.3	51.4	28.5	23.1	22.0	39.9
Total Inorganic Carbon (mg/l)	25.4	41.8	41.4	37.9	48.1	39.8
Alkalinity (mg/l as $CaCO_3$)	162.5	164.4	164.4	161.8	159.7	162.6
Calcium (mg/l)	73.3	73.3	72.8	72.8	72.5	87.5
Magnesium (mg/l)	18.7	18.6	18.4	18.7	18.5	18.8
Iron (mg/l)	0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Zinc (mg/l)	0.042	0.072	0.048	0.090	0.049	0.060
Potassium (mg/l)	2.6	2.8	2.7	2.7	2.6	2.7
Sodium (mg/l)	19.3	19.5	19.3	19.4	19.3	19.3
Orthophosphorus (mg P/l)	0.230	0.243	0.249	0.208	0.229	0.215
Total Phosphorus (mg P/l)	0.288	0.286	0.221	0.251	0.315	0.285
Nitrate-Nitrite (mg N/l)	0.374	0.370	0.454	0.361	0.360	0.362
Ammonia (mg N/l)	<0.003	0.049	0.089	<0.003	0.011	<0.003

TABLE III (CONCLUDED)

PARAMETERS	STATION: 5 A	STATION: 5 B	STATION: 5 C	STATION 6: A	STATION 6: B	STATION 6: C
Dissolved Oxygen (mg/l)	7.0	7.0	7.05	8.45	8.45	8.40
Temperature (C°)	19.0	19.0	19.0	19.0	19.0	19.0
Percent Saturation	75%	75%	80%	90%	90%	90%
pH	7.45	7.5	7.45	7.55	7.55	7.55
Silica Dioxide (mg/l)	3.43	3.70	4.45	2.00	1.80	2.26
Chlorides (mg/l)	106.5	114.3	117.1	132.7	111.9	149.7
Total Organic Carbon (mg/l)	22.1	25.8	24.1	24.8	23.9	26.1
Total Inorganic Carbon (mg/l)	33.2	32.2	34.7	33.7	43.3	36.0
Alkalinity (mg/l as $CaCO_3$)	141.2	133.7	147.8	149.9	136.7	145.7
Calcium (mg/l)	66.2	64.2	63.9	77.7	74.3	78.3
Magnesium (mg/l)	16.4	15.7	15.4	16.5	17.2	17.1
Iron (mg/l)	<0.025	<0.025	0.050	0.050	0.025	0.025
Zinc (mg/l)	0.290	0.255	0.325	0.176	0.114	0.189
Potassium (mg/l)	5.9	6.1	6.1	13.6	10.5	15.4
Sodium (mg/l)	40.8	41.9	42.8	35.7	33.0	40.8
Orthophosphorus (mg P/l)	0.333	0.329	0.320	0.238	0.248	0.267
Total Phosphorus (mg P/l)	0.388	0.475	0.390	0.320	0.260	0.268
Nitrate-Nitrite (mg N/l)	0.482	0.480	0.480	3.15	1.44	0.848
Ammonia (mg N/l)	1.03	1.15	1.17	1.11	0.836	1.19

TABLE IV

WATER QUALITY - WELL SITES

17 MAY 1977

PARAMETER	STATION 1: A	B	C	STATION 2: A	B	C
Dissolved Oxygen (mg/l)	5.55	5.20	4.40	8.85	8.60	8.95
Temperature (C°)	32	32	33	27	28	28
Percent Saturation	75%	70%	62%	110%	109%	112%
pH	8.05	7.95	7.75	8.75	9.35	8.70
Silica Dioxide (mg/l)	4.60	8.78	6.75	+ 28.8	28.8	19.0
Chlorides (mg/l)	51.7	55.0	57.6	> 424.4	407.1	468.8
Total Organic Carbon (mg/l)	< 19.6	112.0	124.0	284.0	252.0	224.0
Total Inorganic Carbon (mg/l)	37.6	129.0	123.0	33.0	22.0	38.0
Alkalinity (mg/l as $CaCO_3$)	> 946	812	1366	157	174	306
Calcium (mg/l)	39.5	37.7	34.5	52.0	54.2	62.1
Magnesium (mg/l)	8.8	9.1	8.2	11.0	11.6	<1.0
Iron (mg/l)	0.070	0.088	0.050	0.107	0.025	<0.025
Zinc (mg/l)	0.084	0.181	0.167	0.060	0.042	0.048
Potassium (mg/l)	9.4	9.4	9.2	> 19.5	21.4	28.3
Sodium (mg/l)	33.0	32.0	30.0	> 185.0	185.0	195.0
Orthophosphorus (mg P/l)	0.0050	0.0270	0.0140	0.0325	0.0470	0.0080
Total Phosphorus (mg P/l)	0.565	> 3.13	4.38	> 2.49	2.40	2.82
Nitrate-Nitrite (mg N/l)	0.086	0.100	0.110	> 0.600	0.885	0.675
Ammonia (mg N/l)	0.416	0.385	0.374	> 1.47	1.49	3.30

TABLE IV (CONCLUDED)

PARAMETER	STATION 3: A	B	C	STATION 4: A	B	C
Dissolved Oxygen (mg/l)	6.50	6.90	7.40	7.80	8.50	9.50
Temperature (C°)	26	24	23	20.5	17.5	17.0
Percent Saturation	80%	80%	84%	86%	87%	97%
pH	7.30	7.15	7.15	7.45	7.45	7.00
Silica Dioxide (mg/l)	5.06	4.80	5.74	5.62	5.86	6.15
Chlorides (mg/l)	>202.6	208.6	211.2	54.6	57.1	63.6
Total Organic Carbon (mg/l)	515.0	484.0	476.0	440.0	415.0	407.0
Total Inorganic Carbon (mg/l)	19.0	13.0	32.0	4.0	22.0	39.0
Alkalinity (mg/l as $CaCO_3$)	91	90	89	134	138	135
Calcium (mg/l)	>78.4	80.8	79.9	43.1	45.5	46.6
Magnesium (mg/l)	>18.7	20.1	19.5	8.3	8.8	9.4
Iron (mg/l)	0.050	<0.025	<0.025	<0.025	<0.025	<0.025
Zinc (mg/l)	0.102	0.078	0.107	0.144	0.078	0.270
Potassium (mg/l)	7.1	7.2	7.2	7.2	7.2	8.1
Sodium (mg/l)	31.8	33.3	32.8	23.5	24.0	25.8
Orthophosphorus (mg P/l)	0.0125	<0.0005	0.0075	<0.0005	<0.0005	0.0010
Total Phosphorus (mg P/l)	0.230	0.223	0.240	0.250	0.384	0.435
Nitrate-Nitrite (mg N/l)	0.075	0.180	0.200	0.050	0.098	0.120
Ammonia (mg N/l)	0.423	0.523	0.514	0.142	0.256	0.538

whose effluent entered Eighteenmile Creek from the west (left bank), just downstream of Transect 5. Within the latter, collections from Site 5A were less affected by the releases from the sewage treatment facility than were those from Sites 5B and 5C. These differences between the results from the samples from Sites 5 and 6 as contrasted with those from the collections at other stations were quite evident from an examination of the chloride, potassium, and ammonia data.

With the exception of the Transect 5 results, chemical quality was fairly uniform across each transect. Similarly, there were few differences among the results from Stations 1A through 4 C. There was no evidence that the samples from the collection sites along the right (east) bank, which were more apt to be impacted from surface runoff and groundwater from the industrial solid waste disposal site, differed in quality from those from the mid-stream or left side (west) of the stream.

Aside from a marked drop in the silica dioxide levels in the third sampling, which could have been due to increased uptake of that chemical by diatoms and a decrease in the pH levels after the initial collection, there were few chemical differences among the results from the three (3) stream surveys. The slightly higher organic carbon, ammonia, and total phosphorus values observed among the 23 April sampling results may have been from general surface runoff (i.e. tannins and other breakdown products from vegetation). No explanation is offered for the slightly lower calcium and

magnesium levels also noted during the analysis of the second collection samples. Increased algal activity probably was a major factor accounting for the decrease in nitrate-nitrite with time over the course of the study.

There were considerably more variations among the results of the well samples than those from the stream transects. Also chemical stratification with depth is common in unstirred well water.

The results from Test Wells 1 and 2, which were shallower, and outside of the region where it was known that solid industrial wastes had previously been placed, generally were markedly different from those from Wells 3 and 4. However, there were considerable differences in the results from the analysis of samples from Wells 1 and 2. The higher pH levels at Well 2 may have contributed to the increased solubility of silica dioxide, inorganic carbon, calcium carbonate (alkalinity), potassium, sodium, total phosphorus, ammonia, and nitrite-nitrates.

While the lower pH levels noted in the water from Wells 1 and 2 may have been a function of the releases from the previously-discarded industrial wastes, which allegedly generated hydrochloric acid, there was no evidence of abnormally high quantities of heavy metals or other chemicals that are subject to acid leaching.

CONCLUSIONS

The chemical quality of Eighteenmile Creek is fairly uniform above the Lockport Wastewater Treatment Plant. The latter does have a major impact on the quality of the stream.

There is no evidence from the April-May 1977 sampling that water from the disposal site was impacting the stream.

The chemical analysis of the stream water provided an adequate baseline against which the results from subsequent monitoring can be contrasted, if and when a permit to use the disposal site to contain industrial solid wastes is approved.

The quality of the ground water in the vicinity of the proposed disposal site is not homogeneous with respect to the physical and chemical parameters that were measured. Nevertheless, the data generated could be used as a baseline for future monitoring by Van De Mark and/or regulatory agencies. None of the chemical levels in the ground water exceed the USPHS recommended quantities for public drinking water.