EDWARD H. RICHARDSON ASSOCIATES, INC.
CONSULTING ENGINEERS
63 NORTH DU PONT HIGHWAY • DOVER • DELAWARE
MAIL ADDRESS: P.O. BOX 935 • DOVER • DELAWARE 19901 • PHONE (302) 674-3838

November 30, 1971

12 and 13

Mr. Frank Landa, General Manager
Woodlawn Gravel Company
P.O. Box 2501
Wilmington, Delaware 19805

Dear Mr. Landa:

We elected not to duplicate the analytical work conducted by Dr. Larry L. Olson, which clearly shows the extent of the bacteria problem. Our work was directed primarily at the "black "water problem.

Our analyses of the fresh water pond - clear (sample taken 10/28/71 Lab sample No.1621) and "black" (sample taken 11/1/71 Lab sample No. 1617) are summarized in the attached laboratory report. In essence, the black material is suspended in the fresh water pond. The black flake-like particles appear to be what a colleague of ours calls "juice". This septic sewage-like material is not water soluble and represents only 22 mg/l (22 pounds of material per 120,000 gallons of water). It is readily removed by filtering or long term settling. This accounts for your ability to remove the black color by recirculating the "fresh" water through your settling ponds. As the combination of slow settling and filtration will remove the color.

We cannot identify the composition of the "juice" except to state that it is a very complex organic mixture, most probably derived from the putrefaction of the garbage in the landfill. All of the black "juice" gathered in the landfill area, appear to be similiar to each other and to the black suspended material in the "fresh" water pond.

We examined the samples taken from the fresh water pond for several heavy metals (filtered and unfiltered) to check for metal content in the system. These analyses also show the suspended material to be essentially organic in composition.

WOODLAWN GRAVEL CO.

33 00-0670 DEC 1 1971 028009

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Because this "juice" is insoluble in water, it is difficult to see how it can be transported any distance, through the soil, unless it is of such chemical composition which becomes water insoluble upon exposure to the air. The flake-like appearance of the particles tends to indicate they came from the black films which are visible seeping out of the landfill. A heavy rain will mechanically break up the black film, forming the suspended particles which are washed to the lower pond (fresh water pond). Further, a heavy rain could agitate the pond to re-suspend the particles which have settled on the bottom. It is possible, the upper ponds do not suffer from this re-agitation/suspension phenomina because the black flakes have been covered by the settled soil/clay during the normal operation of the pond system.

The actual mechanism whereby the black particles are introduced to the "fresh" water pond can be resolved by sampling of the area during a hard rain. The black flakes should be visible in samples taken from the ditches leading to the lower pond area. Further, the actual break-up and suspension of one of the black seepage films could be observed.

When the method or methods of contamination have been firmly established, a prevention program can be worked out. We can arrange to furnish a sampling crew to conduct the rain observations if you so desire. A meeting with you and Mr. Ward might be fruitful. Our Mr. Dudley Willis is a knowledgeable engineer with considerable current experience with landfill operation and has been responsible for the operation of a sand/gravel pit. We appreciate this opportunity to be of service to you, should you desire additional information, please let us know.

Very truly yours,

EDWARD H. RICHARDSON ASSOCIATES, INC.
Environmental Sciences Laboratory

Logan N. Miller

Logan N. Miller, Branch Manager

LVM/bll
Encl.

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EDWARD H. RICHARDSON ASSOCIATES, INC.
ENVIRONMENTAL SCIENCES LABORATORY

P. O. BOX 935 PHONE 302-674-3838
63 N. DUPONT HIGHWAY DOVER, DELAWARE 19901

CLIENT: Woodlawn Gravel Company
ADDRESS: P.O.Box 2501, Wilmington, Delaware 19805
REQUESTED BY: Mr. Frank Landa, General Manager
SAMPLED BY: Logan Miller & James Melvin of EHR
NOTES ON SAMPLING (MODE, TEMP., FLOW, ETC.):

COMM. NO. 5066
PHONE 328-1040
DATE RECEIVED See below
DATE SAMPLED See below

LABORATORY ANALYSIS REPORT (PAGE 1 OF 2)

SAMPLE NUMBER	SAMPLE DESCRIPTION
1 1617	Fresh Water Pond-Sampled 11/1/71
2 1617F	Same as above after filtration Sampled 11/1/71
3 1621	Fresh Water Pond-Sampled 10/28/71
4 1660	Red Lion Creek at Rt 13-Sampled 11/16/71
5	
6	

(A) RESULTS OF WASTE ANALYSES

SAMPLE NUMBER	1617	1617F	1621	1660		
pH, UNITS						
BOD_5, mg/l						
COD, mg/l						
TOTAL PHOSPHATE, mg/l, PO_4						
ORTHO PHOSPHATE, mg/l, PO_4						
PHENOL, mg/l						
OIL AND GREASE, mg/l						
MBAS (DETERGENT), mg/l						
SULFATES, mg/l						
SULFIDES, mg/l						
FLUORIDES, mg/l						
CYANIDE, mg/l						
SILICA, mg/l						

(B) RESULTS OF METAL ANALYSES

ARSENIC, mg/l	<0.1	<0.1	<0.1	<0.1		
CADMIUM, mg/l	<0.1	<0.1	<0.1	0.02		
CHROMIUM, mg/l	0.15	0.15	0.1	0.10		
COBALT, mg/l	<0.1	<0.1	<0.1	0.05		
COPPER, mg/l	<0.1	<0.1	<0.1	0.05		
IRON, mg/l	12.9	11.6	8.1	1.8		
LEAD, mg/l	0.18	0.18	<0.1	0.1		
MAGNESIUM, mg/l						
MANGANESE, mg/l	8.0	7.7	3.96	0.36		
MERCURY, mg/						
NICKEL, mg/l	0.11	<0.1	<0.1	0.08		
ZINC, mg/l	<0.1	<0.1	0.18	0.12		

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ESL NO.5-1: 61571

LABORATORY ANALYSIS REPORT (PAGE 2 OF 2)

(C) RESULTS OF BACTERIOLOGICAL ANALYSES

SAMPLE NUMBER	1617	1621				
TOTAL COLIFORM, #/100 ml						
FECAL COLIFORM, #/100 ml						
FECAL STREPTOCOCCI, #/100 ml						

(D) RESULTS OF MINERAL ANALYSES

ACIDITY, mg/l, $CaCO_3$						
ALKALINITY, mg/l, $CaCO_3$						
CALCIUM, mg/l						
CARBON DIOXIDE, mg/l, CO_2						
CHLORIDE, mg/l, Cl						
CONDUCTIVITY, MICROMHOS/cm						
HARDNESS, mg/l $CaCO_3$						

(E) RESULTS OF PHYSICAL ANALYSES

COLOR, UNITS						
TURBIDITY, JTU						
ODOR						
DISSOLVED OXYGEN, mg/l						
TEMPERATURE, °C.						
% OXYGEN SATURATION						

(F) SOLIDS BALANCE ANALYSES

SETTLEABLE SOLIDS, ml/l						
TOTAL SUSPENDED SOLIDS, mg/l	50	63				
NON VOL. SUSPENDED SOLIDS, mg/l	28	23				
VOL. SUSPENDED SOLIDS, mg/l	22	40				
TOTAL SOLIDS, mg/l	519	450				
NON VOL. TOTAL SOLIDS, mg/l	246	220				
VOLATILE TOTAL SOLIDS, mg/l	273	230				

(G) NITROGEN BALANCE, mg/l as N

TOTAL KJELDAHL NITROGEN						
ORGANIC NITROGEN						
AMMONIA NITROGEN						
NITRITE NITROGEN						
NITRATE + NITRITE NITROGEN						

(H) MISCELLANEOUS ANALYSES

REMARKS:

DELIVER TO:
MAIL ☐ TELEPHONE ☐

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LABORATORY MANAGER

ESL NO. 5-1: 61571: 2 of 2

LABORATORY DATA

SOIL TESTS SUMMARY

TYBOUTS CORNER LANDFILL (PHASE II) COMM. NO. 1233-47

TEST BORING & DEPTH OF SAMPLE	NATURAL (1) WATER CONTENT	PERCENT PASSING (2) No. 200 SIEVE
MP-1*		
20.5 FT.	18.6%	45.3%
25.5 FT.	26.2%	
30.5 FT.	20.8%	6.9%
35.5 FT.	28.7%	
40.5 FT.	17.5%	72.0%
MP-2*		
25.5 FT.	17.5%	29.9%
MP-3*		
2.5 FT.	13.9%	
25.5 FT.	15.3%	55.2%
30.5 FT.	38.0%	50.5%
35.5 FT.	25.1%	17.3%
40.5 FT.	21.2%	
MP-4*		
25.5 FT.	28.8%	61.3%
MP-13		
5.5 FT.	21.0%	78.1%
MP-15		
5.5 FT.	36.8%	90.0%
MP-16		
10.5 FT.	19.5%	59.1%
15.5 FT.	26.6%	14.8%
20.5 FT.	25.5%	7.1%

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*DRILLER'S LOGS IN "GROUNDWATER MONITORING AT TYBOUT'S CORNER LANDFILL" REPORT BY E. H. RICHARDSON ASSOCS. (26 MARCH 1974).

SOIL TESTS SUMMARY (CONTINUED)

TYHOUTS CORNER LANDFILL (PHASE II) COMM. NO. 1233-47

Test Boring & Depth of Sample	Natural[1] Water Content	Percent Passing[2] No. 200 Sieve
MP-17		
10.5 FT.	16.1%	
MP-18		
55.5 FT.	20.8%	99.2%
MP-20		
15.5 FT.	21.5%	97.8%
MP-23		
20.5 FT.	26.7%	14.8%
25.5 FT.	24.5%	18.1%
39.5 FT.	22.9%	9.8%
MP-24		
10.5 FT.	77.3%	95.6%
MP-26		
20.5 FT.	27.8%	55.6%
25.5 FT.	23.7%	
30.5 FT.	25.9%	61.4%
MP-27		
5.5 FT.	21.7%	
10.5 FT.	12.6%	
15.5 FT.	11.0%	
20.5 FT.	26.4%	43.8%
25.5 FT.	30.2%	62.8%
30.5 FT.	24.2%	60.6%
35.5 FT.	16.4%	86.4%
40.5 FT.	22.7%	
45.5 FT.	21.2%	

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TYBOUTS CORNER LANDFILL (PHASE II)

COMM. NO. 1233-47

TEST BORING & DEPTH OF SAMPLE	NATURAL (1) WATER CONTENT	PERCENT PASSING (2) No. 200 SIEVE
MP-28		
35.5 FT.	27.9%	15.4%
MP-29		
10.5 FT.	23.9%	9.9%
20.5 FT.	20.8%	98.4%
MP-30		
5.5 FT.	12.9%	7.6%
15.5 FT.	27.7%	
TB-2		
10.5 FT.	24.5%	4.3%
20.5 FT.	24.5%	
TB-3		
5.5 FT.	41.8%	88.0%
10.5 FT.	31.0%	82.0%

NOTES:

(1) A.S.T.M.: D 2216-71
(2) A.S.T.M.: D 1140-54 (1971)

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MONITOR COMPLETION DATA

MONITOR NUMBER	ELEVATION[1] GROUND	ELEVATION[1][2] SAMPLING INTERVAL	AQUIFER TYPE	STRATIGRAPHIC[3] UNIT
P-1	63.5 FT.	——— TO 34.5 FT.[4]	(5)	(5)
P-2	64.8 FT.	——— TO 28.7 FT.[4]	(5)	(5)
P-3	47.0 FT.	——— TO 15.8 FT.[4]	(5)	(5)
P-5	52.8 FT.	——— TO 18.3 FT.[4]	(5)	(5)
P-7	57.9 FT.	——— TO 24.2 FT.[4]	(5)	(5)
MP-1	56.3 FT.	29.5 FT. TO 26.5 FT.	UNCONFINED	PLEISTOCENE
MP-2	50.0 FT.	22.8 FT. TO 25.8 FT.	UNCONFINED	PLEISTOCENE
MP-3	55.5 FT.	20.0 FT. TO 17.0 FT.	(UNCONFINED(?))[10]	(POTOMAC(?))
MP-3A	55.6 FT.	-0.2 FT. TO -3.2 FT.	(UNCONFINED(?))[10]	POTOMAC
MP-4	50.6 FT.	29.4 FT. TO 26.4 FT.	UNCONFINED	PLEISTOCENE
MP-5F	58.5 FT.	7.6 FT. TO 4.6 FT.	CONFINED	POTOMAC
MP-5G	58.7 FT.	35.4 FT. TO 32.4 FT.	UNCONFINED	FILL/PLEIST.
MP-6	29.2 FT.	-1.3 FT. TO -4.3 FT.	UNCONFINED	POTOMAC
MP-7	50.0 FT.	27.2 FT. TO 24.2 FT.	UNCONFINED	FILL/PLEIST.
MP-8	26.3 FT.	26.1 FT. TO 23.1 FT.	UNCONFINED	PLEISTOCENE
[illegible][6]	24.6 FT.	24.3 FT. TO 21.3 FT.	UNCONFINED	PLEISTOCENE
MP-10	37.4 FT.	23.3 FT. TO 18.3 FT.	UNCONFINED	PLEISTOCENE
MP-11	43.2 FT.	28.5 FT. TO 23.5 FT.	UNCONFINED	PLEISTOCENE
MP-12	56.3 FT.	37.1 FT. TO 32.1 FT.	UNCONFINED	PLEISTOCENE
MP-13	28.1 FT.	17.1 FT. TO 14.1 FT.	UNCONFINED	PLEISTOCENE
MP-14	45.6 FT.	24.6 FT. TO 21.6 FT.	UNCONFINED	PLEISTOCENE
MP-15	24.3 FT.	13.6 FT. TO 10.6 FT.	(CONFINED(?))[10]	POTOMAC
MP-16	17.2 FT.	0.8 FT. TO -2.2 FT.	(CONFINED(?))[10]	POTOMAC
MP-17	20.3 FT.	8.3 FT. TO 5.3 FT.	UNCONFINED	POTOMAC
MP-18[7]	46.5 FT.	6.0 FT. TO 3.0 FT.	(UNCONFINED(?))[10]	(POTOMAC(?))
MP-18A	46.4 FT.	25.0 FT. TO 22.0 FT.	UNCONFINED	(PLEISTOCENE(?))
MP-19	14.9 FT.	-5.9 FT. TO -8.9 FT.	UNCONFINED	POTOMAC
MP-20	18.5 FT.	-2.6 FT. TO -5.6 FT.	CONFINED	POTOMAC
MP-21	7.0 FT.	-3.0 FT. TO -6.0 FT.	CONFINED	POTOMAC
MP-22[8]	37.5 FT.	16.5 FT. TO 13.5 FT.	UNCONFINED	POTOMAC
MP-23	15.1 FT.	-31.1 FT. TO -34.1 FT.	(UNCONFINED (?))[10]	POTOMAC
MP-24	5.1 FT.	-13.1 FT. TO -16.1 FT.	CONFINED	POTOMAC
MP-26[9]	57.2 FT.	37.2 FT. TO 34.2 FT.	(9)	POTOMAC
-27	60.1 FT.	20.1 FT. TO 17.1 FT.	CONFINED	POTOMAC
[illegible] 28	8.0 FT.	-20.8 FT. TO -25.8 FT.	(UNCONFINED (?))[10]	POTOMAC
MP-29	21.3 FT.	9.1 FT. TO 6.1 FT.	CONFINED	[illegible] (?))
MP-30	28.4 FT.	17.8 FT. TO 14.8 FT.	UNCONFINED	(PLEISTOCENE (?))

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MONITOR COMPLETION DATA (CONTINUED)

NOTES:

(1) PROJECT DATUM
(2) APPROXIMATE, DUE TO BENDING OF PIPE, COUPLINGS, ETC...
(3) ASSUMPTION, BASED ON VISUAL DESCRIPTION OF SAMPLES
(4) UNIVERSITY OF DELAWARE MONITOR, MEASURED WITH DROP TAPE, BOTTOM DEPTH ONLY.
(5) UNIVERSITY OF DELAWARE MONITOR, ESTIMATED TO BE UNCONFINED; PLEISTOCENE AQUIFER BASED ON DATA EXTRAPOLATED FROM TEST BORING PROGRAM.
(6) MP-9 DESTROYED JUNE, 1974.
(7) MP-8 NOT FUNCTIONING PROPERLY - PLUGGED (?).
(8) MP-22 DRY, WATER LEVEL BELOW BOTTOM OF CONFINING UNIT.
(9) MP-26 DRY, POINT WITHIN CONFINING UNIT.
(10) UNCERTAINTY DUE TO MIXED SAND-SILT TEXTURE OF OVERLYING STRATA.

GROUNDWATER QUALITY SUMMARY
(SAMPLED 24 OCTOBER 1974)

UTS CORNER LANDFILL (PHASE II) COMM. NO.: 1233-47

	MP-1	MP-2	MP-5G	MP-7
pH	6.6	5.7	6.5	6.3
BOD_5 (MG/L)	3,800	33,500	15,000	13,000
COD (MG/L)	5,000	43,500	18,000	19,000
$NO_3 + NO_2$ (MG/L AS N)	0.095	0.12	0.15	0.18
IRON (MG/L)	200	2,000	1,000	1,000
CONDUCTIVITY (MICROMHO/CM)	3,500	11,800	6,900	8,200

	MP-12	MP-15	MP-23	MP-27
pH	6.3	6.0	6.1	6.9
BOD_5 (MG/L)	71	44	43	99
COD (MG/L)	97	100	100	190
$NO_3 + NO_2$ (MG/L AS N)	0.04	<0.04	<0.04	<0.04
IRON (MG/L)	2	0.3	5	0.2
CONDUCTIVITY (MICROHO/CM)	300	200	230	230

	MP-28	MP-30
pH	6.0	6.6
BOD_5 (MG/L)	37	9.8
COD (MG/L)	54	23
$NO_3 + NO_2$ (MG/L AS N)	3.7	0.44
IRON (MG/L)	0.4	0.4
CONDUCTIVITY (MICROMHO/CM)	140	120

NOTES: ALL SAMPLES FILTERED THROUGH A 0.45 MICRON FILTER.

ADDITION QUALITY DATA SHOWN ON THE "WATER QUALITY" MAP (SHEET 4 OF 5) IN THIS APPENDIX.

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V. CONCLUSIONS

1. THE GROUND SURFACE FORMED BY THE TRASH FILL SOIL COVER IS IRREGULAR, BEING MARKED BY MANY LOCALIZED DEPRESSIONS AND SWALES. THE RESULT IS LIMITED OVERLAND RUNOFF OF INCIDENT PRECIPITATION FROM THE BULK OF THE FILL AREA.

2. GROUND COVER IS GENERALLY SPARSE AND FOR THE MOST PART THE VEGETATION APPEARS TO BE TYPES WHICH HAVE LOW RATES OF EVAPOTRANSPIRATION.

3. NO SINGLE, CONTINUOUS, FINE TEXTURED CONFINING BED SEPARATES THE SANDS OF THE POTOMAC FORMATION FROM THOSE OF THE OVERLYING PLEISTOCENE FORMATION.

4. ACROSS MOST OF THE SITE GROUNDWATER LEVELS WITHIN BOTH FORMATIONS APPEAR TO COMBINE INTO ONE (1) UNCONFINED FLOW REGIME.

5. GROUNDWATER FLOW DIRECTIONS THROUGH THE FILL AREAS, WESTERLY ON THE EAST SIDE OF PIGEON RUN AND SOUTHERLY ON THE WEST SIDE, APPEAR TO BE AWAY FROM RESIDENTIAL AREAS AND POTENTIAL SHALLOW WELLS.

6. PIGEON RUN APPEARS TO INTERCEPT MOST OF THE GROUNDWATER FLOWING NEAR THE WATER-TABLE.

7. SINCE THE LANDFILLING OPERATION HAS BEEN COMPLETED, THE WATER-TABLE PROBABLY HAS RISEN ABOVE THE BASE OF THE TRASH FILL ACROSS THE SOUTHEASTERN AND CENTRAL PORTION OF THE FILL AREA, APPARENTLY IN

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V. CONCLUSIONS (CONTINUED)

RESPONSE TO THE ABOVE AVERAGE PRECIPITATION OF THE PAST THREE (3) YEARS. THIS TREND MAY REVERSE WITH SEVERAL YEARS OF AVERAGE OR BELOW PRECIPITATION.

8. THIS REGION OF SATURATED TRASH APPEARS TO BE THE SOURCE OF MOST CONTAMINANT PRESENTLY ENTERING THE FLOW REGIME.

9. QUALITY ANALYSES OF GROUNDWATER SAMPLES OBTAINED FROM MONITORS DOWN FLOW GRADIENT FROM THE FILL AREAS APPEAR TO BE ONLY MINIMALLY MORE CONTAMINATED THAN SAMPLES FROM UP GRADIENT AREAS.

10. THE IMPACT OF THE DISCHARGING GROUNDWATER UPON THE QUALITY OF THE WATER FLOWING IN PIGEON RUN APPEARS TO BE MINIMAL.

11. THE DATA GATHERED DURING THE INVESTIGATION INDICATES THAT THE ENVIRONMENTAL IMPACT OF THE TYBOUTS CORNER LANDFILL TO DATE HAS BEEN MINIMAL DUE TO:

A. THE POSITION OF THE MAIN MASS OF TRASH, ISOLATED FROM AND LINKED TO THE GROUNDWATER SYSTEM ONLY BY INFILTRATION, WHICH AS OF THE PRESENT DOES NOT APPEAR TO BE A MAJOR FACTOR,

028020

V. CONCLUSIONS (CONTINUED)

B. THE VOLUME OF TRASH REACHED BY LATTERAL FLOW FROM THE SOUTHEAST IS RELATIVELY SMALL AND THE CONTACT TIME WITH THE TRASH APPEARS TO HAVE BEEN RELATIVELY SHORT, MAXIMUM OF THREE (3) YEARS (MAXIMUM RATE OF LEACHATE PRODUCTION MAY NOT BE REACHED FOR SEVERAL YEARS), AND

C. THE NATURAL COLLECTION SYSTEM AND SOIL ATTENUATION CONSISTING OF THE GROUNDWATER FLOW REGIME, THE PIGEON RUN, AND WESTWARD TRENDING SURFACE DITCHES.

028021

MONUMENT ALONG RT. 71 AND ELEVATION (52.88')
TAKEN FROM PLAN REFERENCED IN NOTE NO. 3.

LEGEND

MP#2 — E.H. RICHARDSON MONITORING LOCATION

P-1 — UNIV. OF DELAWARE MONITORING LOCATION (INSTALLED AT START OF LANDFILLING OPERATION)

TB#2 — E.H. RICHARDSON ASSOC. TEST BORING

BH-2 — N.C.CO. TEST BORE HOLE (PERFORMED IN 1968, PRIOR TO START OF LANDFILLING OPERATIONS)

SW#2 — E.H. RICHARDSON SURFACE WATER SAMPLE

#57 — D.P.&L. TOWER

EDGE OF STREAM OR POND

"MARSHY AREA"

CLUMP OF TREES

CHAIN LINK FENCE

DITCH

LINE OF STRATIGRAPHIC SECTION (SEE SHEET 2 OF 5)

SURFACE WATER

APPROXIMATE LIMIT OF TRASH

DOVER

028022

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C. SUBSURFACE STRATIGRAPHY (CONTINUED)

5. THE MORE DETAILED SUBSURFACE INVESTIGATION POINTS OUT THAT PIGEON RUN IS NOT INCISED INTO AND FOUNDED ON AN IMPERVIOUS CLAY STRATUM. THE POSSIBILITY OF WHICH WAS INDICATED IN THE PRELIMINARY REPORT.

D. GROUNDWATER FLOW

1. THIRTY-THREE (33) FUNCTIONING MONITORS, FIFTEEN (15) INTO THE POTOMAC AND EIGHTEEN (18) INTO THE PLEISTOCENE (SEE TABULATED "MONITOR COMPLETION DATA" IN THE APPENDIX), HAVE BEEN UTILIZED TO EVALUATE GROUNDWATER FLOW CONDITIONS.

2. WITHIN THE DEPTHS INVESTIGATED (A MAXIMUM OF 50 FEET BELOW THE GROUND SURFACE) AND WITH THE EXCEPTION OF THE SOUTHEAST CORNER, WHEN BOTH CONFINED PIEZOMETRIC LEVELS AND WATER-TABLE LEVELS WERE RECORDED, THE WATER LEVELS WITHIN BOTH FORMATIONS APPEAR TO COMBINE INTO ONE (1) UNCONFINED GROUNDWATER FLOW REGIME.

THIS INTERPRETATION IS PRESENTED ON THE "WATER-TABLE CONTOUR MAP" (SHEET 4 OF 5) IN THE APPENDIX OF THIS REPORT.

3. AS INDICATED ON THE ABOVE REFERENCED WATER-TABLE MAP, GROUNDWATER FLOW IS GENERALLY WESTERLY, TOWARD PIGEON RUN.

028023

Drilling Contractor
P. O. BOX 1097, NEWARK, DELAWARE 19711

BORING LOG

YBOUTS CORNER LANDFILL ..... PROJECT NO. 1233-47

..... SUPERVISOR .....

G NO. MP-23	DRILLER S. BETHARD	DATE 9-20-74
ER TLY CLOUDY & MILD	SURFACE ELEVATION 15.1 FT.	DATUM PROJECT

Sample Depth - Feet From	Sample Depth - Feet To	Depth Strata Feet From	Depth Strata Feet To	Driller's Description of Materials	*Blows A		
		0	1.0	TOP SOIL			
1.0	2.5	1.0	3.0	BRN. & GRAY SILT W/TR. CLAY, SAND &	3	3	4
				GRAVEL			
4.0	5.5	3.0	7.5	BRN. F/M SILTY SAND TR. CLAY & GRAVEL	12	17	19
9.0	10.5	7.5	13.0	BRN. SILTY FINE SAND W/IRON DEPOSITS	19	16	14
14.0	15.5	13.0	18.0	BRN. CLAYEY FINE SAND W/TR. OF GRAVEL	8	13	22
				(WET)			
19.0	20.5	18.0		RED & BRN. SILTY FINE SAND	14	22	22
24.0	25.5			RED & BRN. SILTY FINE SAND	19	32	52
29.0	29.8			RED & BRN. SILTY FINE SAND	42	61/.3	
34.0	34.8			RED & BRN. SILTY FINE SAND	40	61/.3	
39.0	39.5			RED & BRN. SILTY FINE SAND	65		
44.0	44.9			NO RECOVERY (USED PLASTIC TRAP)	26	61/.4	
					17	104	39/.2
49.0	50.5		50.5	RED & BRN. SILTY FINE SAND	14	47	150
		MATERIALS:		46.0' PVC PLASTIC PIPE 1/2 BOX PELLETS IG.			
				1 JOHNSON SCREEN 1/2 BOX PELLETS SMALL			
				1 ADAPTER & PLUG INSTALLATION TIME 2-1/2			
				2 COUPLINGS HOURS			
				1 SLIP CAP 4 BUCKETS SAND			
				1 BAG SAKRETE			
				1 5" NIPPLE & CAP TO GROUND LEVEL			

Number of blows of 140 lb. hammer dropped 30 in. required to drive 2 in. split-spoon sampler for each of three increments.

Number of blows of 300 lb. hammer dropped 18 in. required to drive ..... in. casing 12 inches.

S: .....

.....

.....

.....

GROUND WATER

CASING B

0- 1
1- 2
2- 3
3- 4
4- 5
5- 6
6- 7
7- 8
8- 9
9-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
17-18
18-19
19-20
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Drilling Contractor
P. O. BOX 1097, NEWARK, DELAWARE 19711

BORING LOG

...ME TYBOUTS CORNER LANDFILL ..... PROJECT NO. 1233-47

..... SUPERVISOR .....

...RING NO. MP-11	DRILLER S. BETHARD	DATE 8-19-74
...ATHER CLEAR & HOT	SURFACE ELEVATION 43.2 FT.	DATUM PROJECT

...mple No.	Sample Depth - Feet From	Sample Depth - Feet To	Depth Strata Feet From	Depth Strata Feet To	Driller's Description of Materials	*Blows A		
			0	1.0	TOP SOIL			
	1.0	2.5	1.0	2.5	BRN. SILT & SAND	8	8	9
	4.0	5.5	2.5	8.0	BRN. F/M SAND & GRAVEL	32	28	20
	9.0	10.5	8.0	12.0	BRN. & BLK. F/M SAND	72	10	10
	14.0	15.5	12.0	17.5	BRN. M/C SAND (WET)	7	4	6
	19.0	20.5	17.5	20.5	GRAY & BRN. F/C SAND TR. GRAV.	4	6	8
					MATERIALS			
					15.0' 1-1/4" PLASTIC PIPE			
					1 5.0 1-1/4" PLASTIC SCREEN SLOTTED			
					1-1/4" ADAPTER			
					1-1/4" PLASTIC CAP			
					1/4 BAG SAND			
					1/2 BOX PELLETS			

A Number of blows of 140 lb. hammer dropped 30 in. required to drive 2 in. split-spoon sampler for each of three in. increments.

B Number of blows of 300 lb. hammer dropped 18 in. required to drive ..... in. casing 12 inches.

...RKS: 1 HOUR INSTALLATION TIME

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GROUND WATER

000686

BLOWS ON CASING B
0- 1
1- 2
2- 3
3- 4
4- 5
5- 6
6- 7
7- 8
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