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REPORT TO CHESTER AND WASHINGTON TOWNSHIPS ON THE RESULTS OF THE WATER QUALITY TESTING PROGRAM AT THE COMBE FILL LANDFILL.

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May 24, 1981

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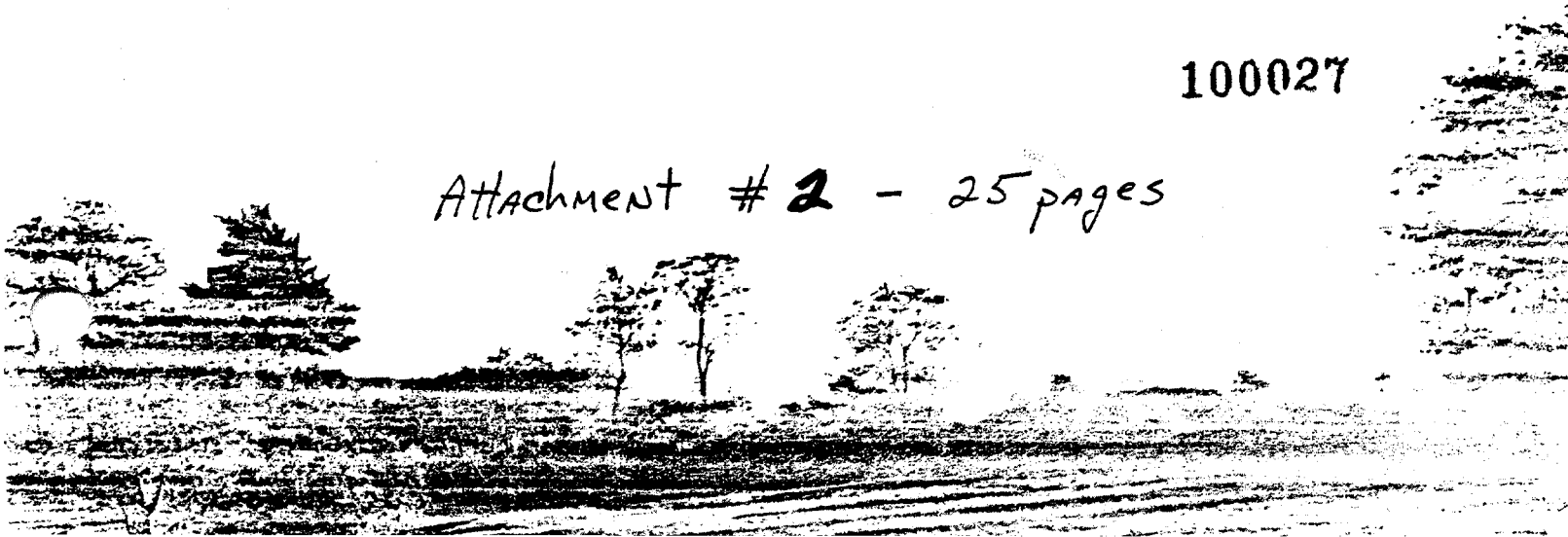
Attachment #2 - 25 pages



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ABSTRACT

This report summarizes the results of the water quality testing program at the Combe Fill Landfill located in Chester and Washington Townships, Morris County. The testing program, a joint undertaking by both T nships, the State Department of Environmental Protection and the Upper Raritan Watershed, was designed to determine if the landfill posed an existing or potential health hazard to adjacent residents who rely on surface and ground water as a drinking supply source. Surface, shallow subsurface and deep ground waters were tested for a broad range of possible contaminants consistant with State and Federally approved collection and analysis techniques.

Typical water quality characteristics indicated probable chemical contamination. Concentrations of lead and maganese were found to exceed state standards. Twenty-three identifiable and 10 unknown organic chemicals were discovered in varying concentrations from 1 ppb to 338 ppb. While the results are not indicative of "gross" contamination they are, nevertheless, significant. The results indicate the presence of substances at the landfill which should not be there, that there is "significant" contamination of surface, shallow subsurface and deep ground waters and that the contamination is migrating from the landfill.

In view of these results, it is strongly recommended that residential wells along Parker Road in the vicinity of the landfill be tested consistant with procedures followed in this program. If contamination of residential wells is discovered, there can be no doubt that the landfill constitutes a public health hazard.

COMBE FILL: DESCRIPTION and HISTORY

DESCRIPTION:

The landfill, presently named Combe Fill South, has been in existence for approximately 30-35 years and is located on Parker Road in Chester and Washington Townships, Morris County, approximately one mile west of the Chester Township Municipal Building (Figure 1). Approximately two thirds of the property lies in Washington Township with the remainder located in Chester Township. The 197-acre tract constitutes the headwaters of Trout Brook and is drained by two small tributaries; the east branch and west branch.(1) Along the west branch, on the landfill property, is an approximate 50-acre hardwood wetland which has been the subject of recent litigation. Trout Brook, classified by the State DEP as "trout production waters," the highest classification which can be given to fresh water streams, flows southeast where it joins with the Lamington River at Hacklebarney State Park. The Lamington meets the North Branch of the Raritan River which drains into the Raritan River in Somerset County near Branchburg. At Bound Brook, the Elizabethtown Water Company withdraws water from the river to supply over a million residents throughout central and northeast New Jersey. This understanding has lead to the aforementioned wetland being designated as an "environmentally critical area" by several experts and governmental agencies.(2) A small tributary of Tanners Brook, which also flows into the Lamington River, drains the western most portion of the property.

The landfill, and much of the region, is underlain by granitic gneiss; a hard, dense rock with an extremely complicated fracture pattern. The formation trends northeast and dips steeply to the southeast. Fractures occur generally vertical or transverse to the dip and with a highly variable distribution(3)

Soils consist primarily of the Califon, Parker and Edneyville Series as identified by the Morris County Soil Conservation Service.(4) Figure 2 approximates the location of the soil series on the landfill property. The Edneyville Series consists of deep, well-drained loomy soils occurring at the center of the property; the area presently being filled. Califon soils are deep, moderately well to poorly drained soils occurring in water ways or seepage areas, and have a fragipan beginning at a depth of nine inches. These soils generally underlie the wetland area. Parker soils are deep, excessively drained and contain large amounts of stones, gravel and cobbles. They occur on the higher, unused portion of the property.

Surface and ground water flows are generally portrayed in Figure 3. Surface drainage occurs from the ridges toward the branches of Trout Brook and southeasterly across Parker Road. Although bedrock fractures are quite complex, it can generally be stated that ground water flows approximate surface flow directions; again in a southeasterly direction. This does not rule out other possible directions, however, it does indicate probable flows.

FIGURE 1:

COMBE FILL: LOCATION

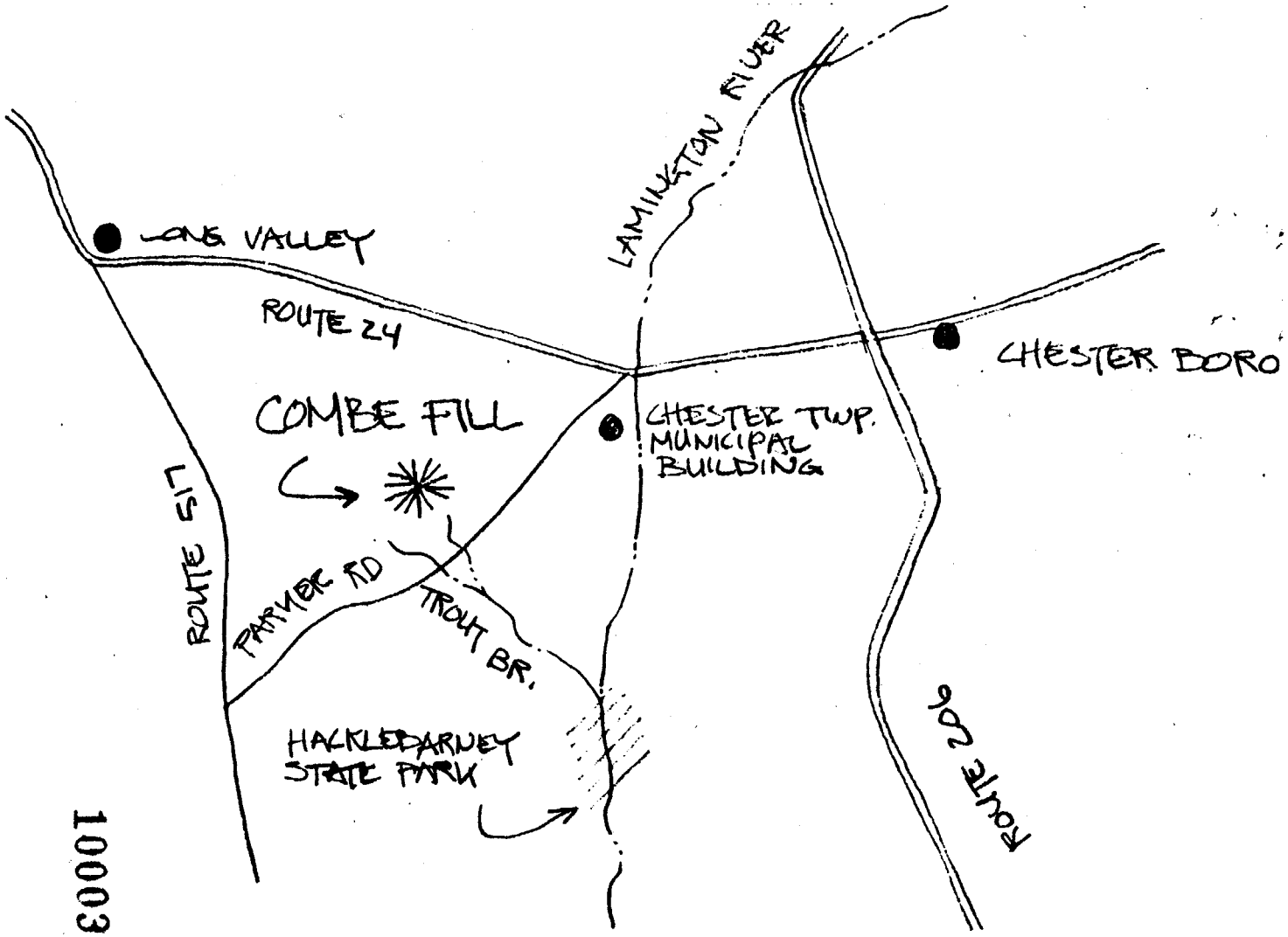

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FIGURE: 2

COMBE FILL: SOIL DISTRIBUTION

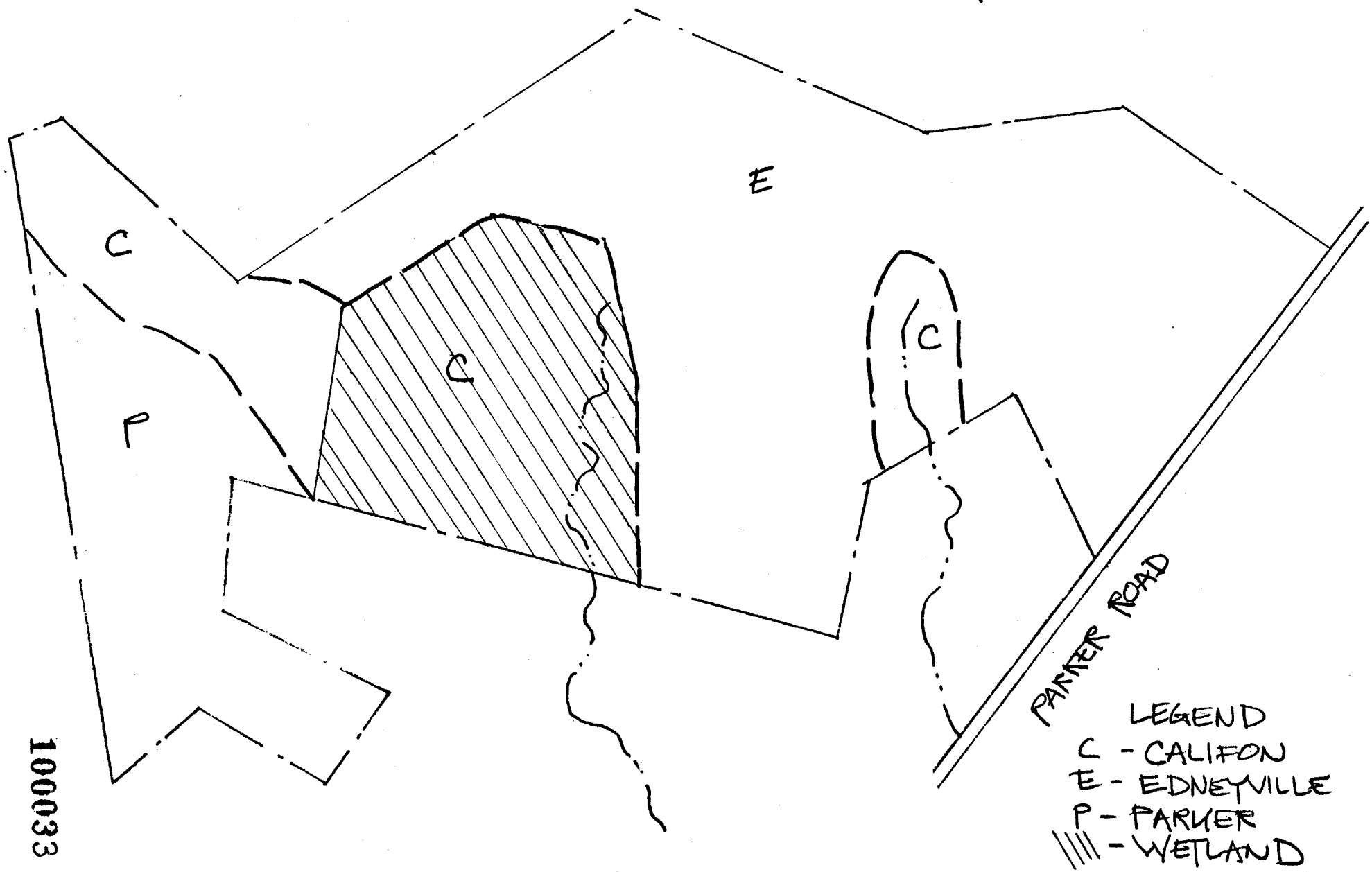

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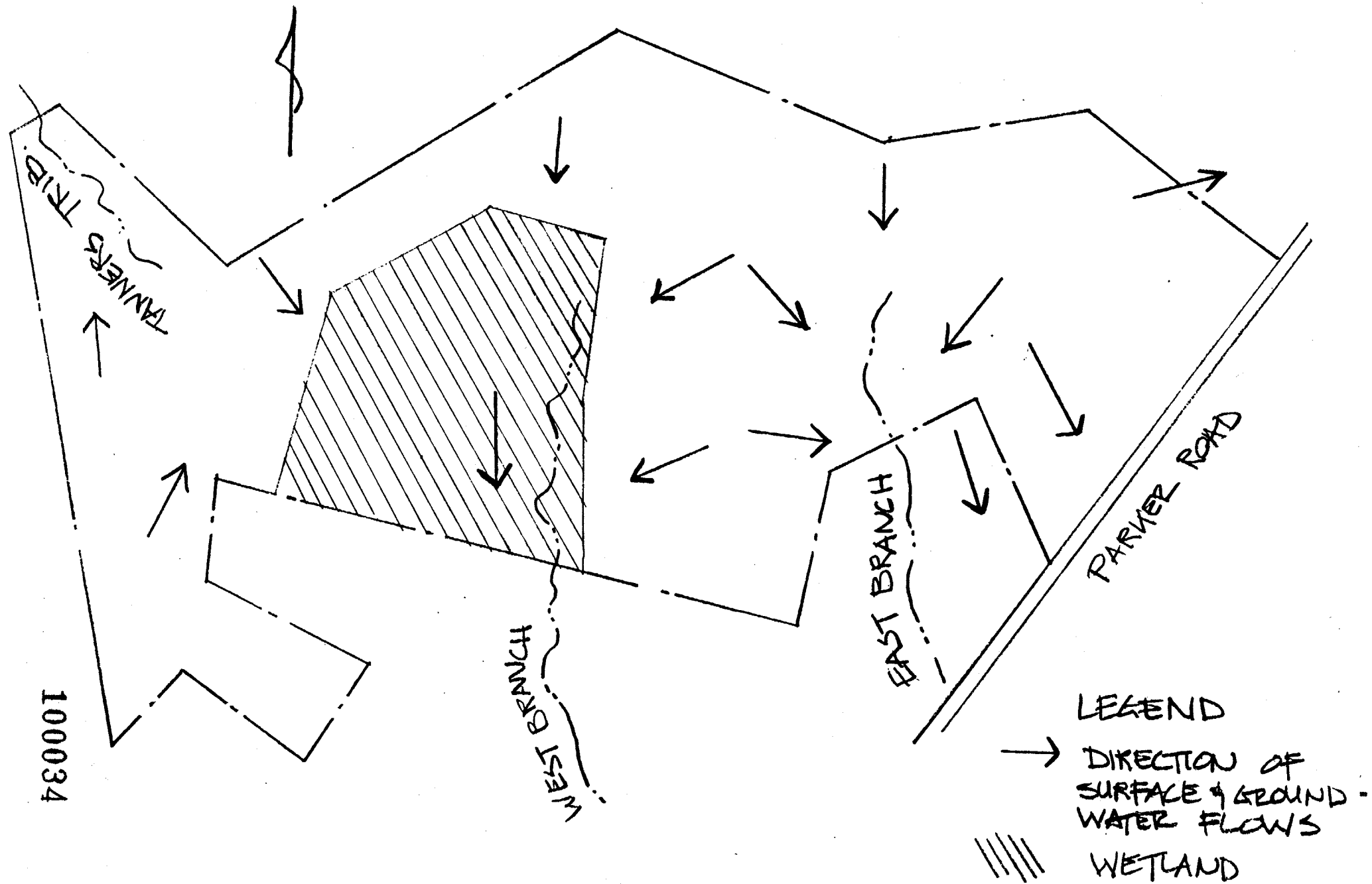
FIGURE 3:

COMBE FILL: WATER CHARACTERISTICS



HISTORY:

Filling has occurred at the site for the past 30-35 years. It must be recognized that for at least 20 years filling was allowed to occur with little governmental control over either contents or procedures. In 1971, Filliberto Sanitation, Inc. applied, pursuant to recently enacted state law, to the newly formed State DEP Bureau of solid Waste Management for a permit to continue operations at the site. In early 1972, a permit was given which allowed for, among others, the acceptance of industrial and municipal (residential) waste. Shortly after, in response to complaints by local residents and officials and the State Bureau of Fisheries Management, the owner was ordered to install several monitoring wells on the property to monitor potential ground water pollution. Visits by State DEP officials documented visible pollution originating from the landfill.(5) In 1978, a change of corporate ownership certificate was issued by the State DEP Solid Waste Administration to Combe Fill, Inc. to reflect change in ownership of the property. The certificate transferred the previous granted permit to the new owners. A fire which occurred about two years ago at the property again drew attention of concerned residents, local and state officials. Continuing investigations by DEP officials pointed out existing and potential pollution problems at the landfill.(6)

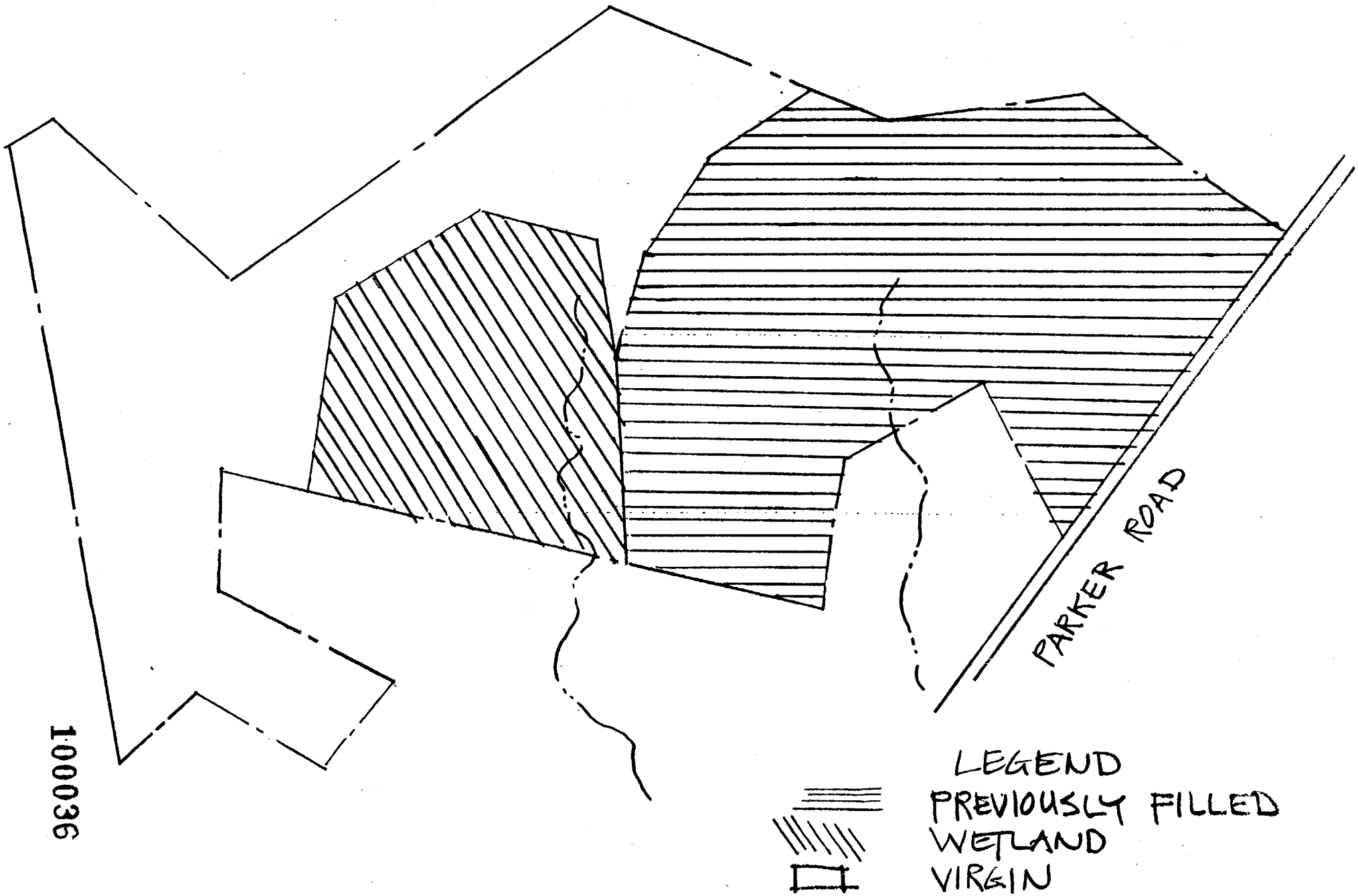
With the closing of the Mt. Olive Landfill (Combe Fill North) in January 1981, the volume dumped at Combe Fill South increased by approximately 70-75 percent.(7) In response to the clearing of a portion of the wetland area, Chester and Washington Townships successfully obtained a court injunction against the landfill which prevented clearing or filling of that area and which required the submission of new engineering designs.(8) Subsequently, the DEP Solid Waste Administration issued "An Order Modifying Registration" requiring the submission of such designs.(9) The landfill owners have requested an administrative hearing on that order. During this time, the U.S. Environmental Protection Agency, acting under Section 404e of the "Clear Water Act of 1977," issued to the landfill a cease and desist order against further activity in the wetland and ordering the landfill to submit an application to the Corps of Engineers for the required permit.(10) Also, the DEP Division of Water Resources informed the landfill that a dewatering permit for draining the wetland was required prior to any disruption of the area.(11)

In September of 1980, the Solid Waste Administration issued a Certificate of Approval of the Morris County District Solid Waste Management Plan in which the Morris County Freeholders were ordered to establish a new landfill site and have it in operation by January 31, 1982.(12)

Financial statements of both Combe Fill and Combustion Equipment Associates, Inc. (the parent company) show that both are financially unstable.(13) Indeed, the parent company has filed a bankruptcy proceeding in New York. Figure 4 portrays the present fill status of the landfill.

FIGURE 4:

COMBE FILL: FILL STATUS



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WATER QUALITY TESTING PROGRAM:

BACKGROUND:

Over the past ten years or so water quality at and adjacent to the landfill has been monitored. Results have shown elevated levels, at one time or another, of mercury, lead, phenols and arsenic.(14)

In response to growing public concerns URWA, in cooperation with the DEP Division of Water Resources and Solid Waste Administration, formulated a program for testing water quality at the landfill.(15) This program was designed to determine whether or not the landfill was a pollution threat to surface and/or groundwaters and, if so, to determine if contamination was moving beyond the boundries of the property. A consultant, Allied Biological Control Corporation of Gladstone, was chosen to collect the samples and Princeton Testing Laboratory was chosen to conduct the actual tests. Samples were collected following accepted State and Federal sampling procedures. The laboratory is a state certified testing facility.

SITE LOCATIONS:

Sample stations were carefully chosen to intercept surface and groundwater flows on and migrating from the site. Figure 5 portrays the locations of both URWA's and DEP's stations. Seven surface sample sites were chosen: one URWA and one DEP site at the headwaters of the east branch of Trout Brook on the landfill property and one URWA site on the same watercourse off the property; a URWA site at the headwaters of the western branch of Trout Brook on the property; a DEP and URWA site at a seep which flows into the waterway again still on the property; a URWA site on the same watercourse but off the property. The DEP sampled the deep monitoring well number 4 located on the older filled portion of the property and a deep monitoring well number 5 on the Filliberto property adjacent to the landfill. URWA constructed five shallow monitoring wells, 25± feet deep, and sampled two: one just off the southern boundary of the landfill on property owned by the Tingue and the other at the east property line separating the landfill from the Filliberto's property. Shallow wells were contructed by digging with a backhoe and installing a two-inch diameter pipe inside a six-inch diameter pipe with coarse, clean sand between the two. URWA samples were collected on March 23 and March 31, 1981. DEP samples were collected approximately two weeks earlier. A deep groundwater control well located a considerable distance from the landfill was also tested.

TEST PARAMETERS:

A list of water quality parameters included in the testing program was developed in conjunction with DEP chemists, engineers and geologists. The parameters were chosen based on their known occurrences in other similar landfills. Figure 6 identifies the test parameters.

FIGURE 5

COMBE FILL: WATER QUALITY TEST SITES

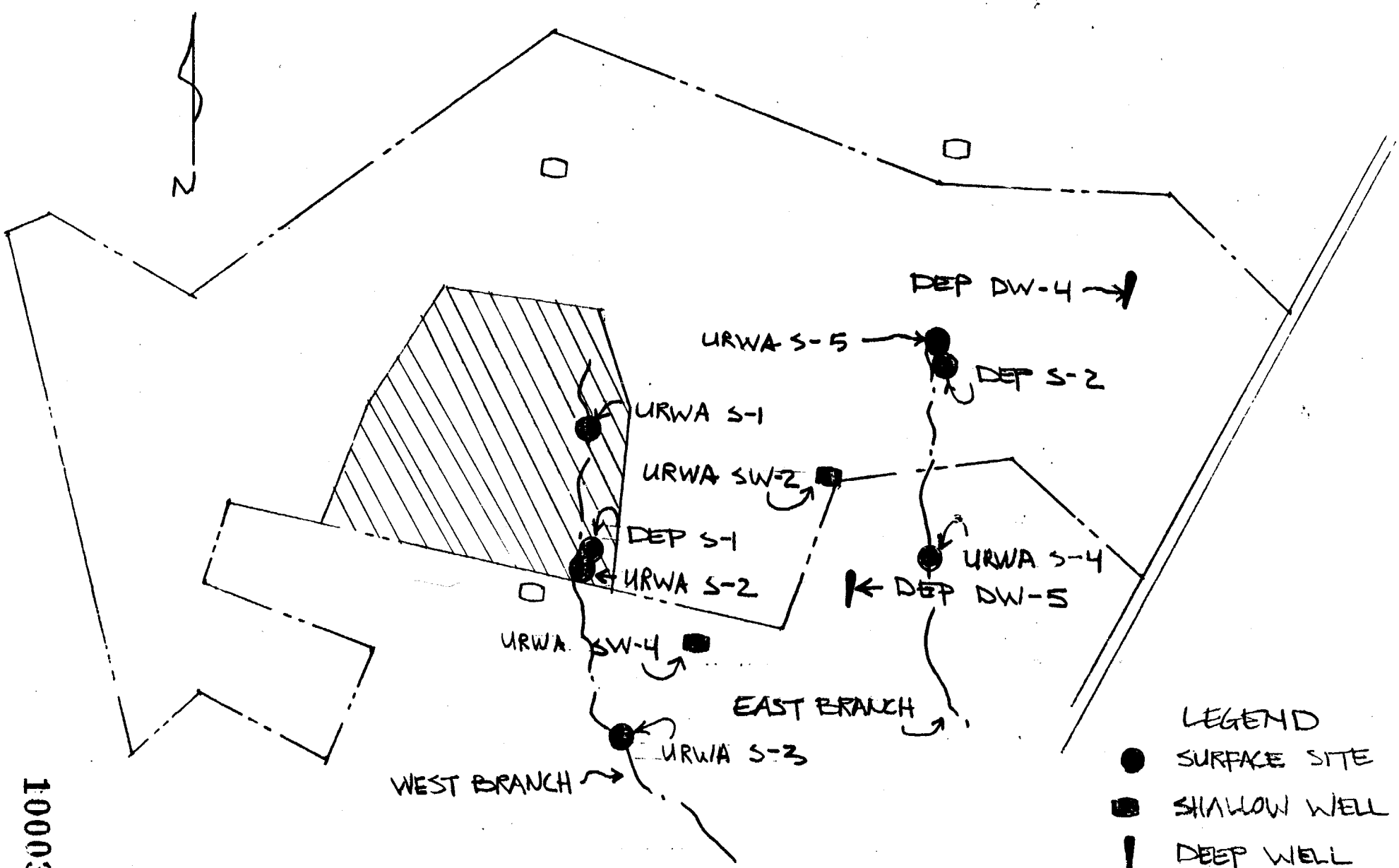

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Figure 6; Combe Fill: Parameters

BOD
COD
TOC
Total Kjeldahl Nitrogen
Nitrate
Total Dissolved Solids
Chloride
Total Coliform
Fecal Streptococci
Total Hardness

RADIOACTIVITY

Gross Alpha
Gross Beta

METALS

Arsenic
Cadmium
Lead
Manganese
Mercury
Chromium
Cyanide
Phenols

ORGANIC CHEMICALS

Volatile Organics

Chloromethane
Vinyl Chloride
Methylene Chloride
1,1 Dichloroethene
Trans-1,2 Dichloroethane
Carbon Tetrachloride
1,2 Dichloropropene
Trichloroethene
bis-1,3 Dichloropropene
Benzene
2-Chloroethylvinyl ether
Tetrachloroethene
Chlorobenzene
Arolein
Bromomethane
Chloroethane
Trechlorofluromethane
1,1 Dichloroethane
Chloroform
Bromodichloromethane
Trans-1,3 Dichloropropene
Dibromochloromethane
1,1,2-Trichloroethane
Toluene
Bromoform
1,1,2,2-Tetlachloroethane
Ethylbenzene
Acrylonitrile

PESTICIDES and PCB's

Aldrin
BHC, Alpha
BHC, Beta
Chlordane
4,4' DDD
Dieldrin
Endosulfan Sulfate
Endrin Aldehyde
BHC Gamma
DHC Delta
4,4' DDT
4,4' DDE
Endosulfan-alpha
Endosulfan-beta
Endrin
Heptachlor

Heptachlor epoxide
PCB-1242
PCB-1232
PCB-1260
Toxaphene
PCB-1254
PCB-1221
PCB-1248
PCB-1016

ACID EXTRACTS

2-Chlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
4-Nitrophenol
Pentachlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
4,6-Dinitro-o-cresol
2-Nitrophenol
P-chloro-m-cresol
Phenol

BASE/NEUTRAL EXTRACTS

Acenaphthene
Acenaphthylene
Anthracene
Benzidene
Benzo (a) anthracene
bis(2-chloroethyl) ether
4-bromophenyl phenyl ether
2-Chloronaphthalene
Chrysene
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Diethyl phthalate
Di-n-butyl phthalate
2,6-Dinitrotoluene
1,2-diphenylhydrazine (also azobenzene)
Fluorene
Hexachlorobutadiene
Hexachloroethane
Isophorone
Nitrobenzene
N-nitrosodi-n-propylamine
N-nitrosodiphenylamini
1,2,4-Trichlorobenzene
Benzo (a) Pyrene
3,4-Benzofluoranthene
Benzo (ghi) perylene
Benzo (k) Fluroranthene
bis(2-chloroethoxy) methane
bis (2-ethylhexyl) phthalate
Butylbenzyl phthalate
4-Chlorophenyl phenyl ether
Dibenzo(a,h) anthracene
1,3-Dichlorobenzene
3,3'-Dichlorobenzidine
Dimethyl phthalate
2,4-Dinitrotoluene
Di-n-octyl phthalate
Fluorathene
Hexachlorobenzene
Hexchlorocyclopentadiene
Ideno(1,2,3-cd) pyrene
Naphthalene
N-nitrosodimethylamini
Pyrene
Phenanthiene

TEST RESULTS

Metals: Typical water quality characteristics showed elevated levels of total dissolved solids, total coliform, nitrate and hardness. Results for heavy metals were generally at or below standards with two noticeable exceptions. At station URWA S-3 lead was found at a concentration of 0.13 parts per million (ppm) or about 2 1/2 times the 0.05 ppm standard for potable drinking water. Manganese was found exceeding the 0.05 ppm potable water standard at all URWA stations except URWA SW-4. Figure 7 presents the test results for manganese. URWA's control well produced results for all parameters at or below standards.

Figure 7: Combe Fill: Water Quality Test Results for Manganese

Station	Concentration Found ppm	Standard ppm	Times Exceeding the Standard
URWA S-1	4.98	.05	99.7 X
URWA S-2	.27	"	5.4 X
URWA S-3	.44	"	8.8 X
URWA S-4	1.2	"	24 X
URWA S-5	1.35	"	27 X
URWA SW-2	9.4	"	188 X
URWA SW-4	.02	"	Below
CONTROL WELL	.02	"	Below

Organic Chemicals: Organic chemicals were found in all DEP stations and all but one URWA station which was URWA S-1. No organic chemicals were found at URWA's control well. Figure 8 provides total organic chemical results for each station.

Figure 8: Combe Fill: Water Quality Test Results for Total Organic Chemical Concentration.

Station	Concentration Found (ppb) parts per billion
URWA S-1	0
URWA S-2	1005
URWA S-3	54
URWA S-4	131
URWA S-5	122
URWA SW-2	80
URWA SW-4	43
URWA Control Well	0
DEP @-1	155
DEP S-2	616
DEP DW-4	762
DEP DW-5	150

Eight unknown volatile organic compounds were found at site URWA S-2; 2 with concentrations of 200 ppb and 6 with concentrations of 10 to 20 ppb. Two unknown volatile organic compounds with concentrations of 10 to 20 ppb were found at site URWA S-3.

Concentrations of organic compounds found ranged from 1 ppb to 338 ppb. In total 33 organic chemicals were discovered five of which are known carcinogens. Eight compounds were found in individual concentrations equal to or exceeding 100 ppb. Figure 9 lists all organic chemicals found and indicates the highest concentrations of each one.

Figure 9: Combe Fill: Highest Concentrations of Found Organic Chemicals

Name	Sample Site	Concentration (ppb)
Heptane	DEP DW-4	256
Carbontetrachloride	DEP DW-4	338
Nonane	DEP S-2	252
Benzene	URWA S-4	11
Toluene	URWA SW-2	13
M,P, Xylene	DEP S-2	19
O, Xylene	DEP S-2	22
Propy. Benzene	DEP S-2	11
Dibromochloromethane	DEP S-2	78
1,4 Dichloroluetane	DEP S-2	20
1,2 Dichloroethane	URWA SW-4	22
Trichloroethylene	DEP DW-4	46
Tetrachloroethylene	DEP DW-4	100
1,1 Dichloroethane	URWA S-2	160
Tetrachloroethene	URWA SW-6	6
Methylene Chloride	URWA S-2	280
Trans 1,2 Dichloroethene	URWA S-4	120
Ehtyl Benzene	URWA SW-2	10
1,4 Dichlorobenzene	DEP S-1	9
Diethyl Phthalate	URWA S-2	54
Bis(2-ethylhexyl) Phthalate	URWA S-5	90
Naphthalene	URWA S-2	10
Endosulfan-alpha	URWA S-2	1

Carbontetrachloride was the most common chemical found and showed up in concentrations exceeding 100 ppb in all DEP sites. Heptane also appeared in all DEP sites. The most prevelant chemicals found in URWA sites were 1,1-Dichloroethane and Trans-1,2-Dichlorethene which were each found in 3 out of 7 sample locations at the landfill. With the exception of URWA S-1 more than one organic compound was found in each sample site. Figure 10 lists the total number of organic chemicals for each test site.

Figure 10: Combe Fill: Total Number of Organic Chemicals Found at Each Test Site

Site Location	Number of Organic Chemicals Found
URWA S-1	0
URWA S-2	12
URWA S-3	4
URWA S-4	2
URWA S-5	3
URWA SW-2	4
URWA SW-4	4
URWA Control Well	0
DEP S-1	3
DEP S-2	10
DEP DW-2	6
DEP DW-5	3

Standards for specific organic chemical contamination of surface water, groundwater or potable drinking water do not exist. In recognition of the fact that chlorine can react with naturally occurring substances to produce carcinogenic compounds, the U.S. Environmental Protection Agency has adopted a maximum contaminant level of 100 ppb (parts per billion) of trihalomethanes in drinking water from community water systems serving 10,000 or more persons.[16] Trihalomethanes are one of the family of organic compounds named as derivatives of methane wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure. The N.J. Department of Environmental Protection, Division of Water Resources, Bureau of Ground Water Management recommends closure of groundwater wells serving individual residences when total concentrations of organic chemicals included in the EPA pollution priority list equal or exceed 100 ppb.[17] It must be recognized that the absence of specific standards for specific organic compounds does not imply that these substances are safe. The lack of standards is due to the newness of the field, a lack of adequate scientific research and the length of time for promulgating the standards. Even though no specific standards exist for the specific organic chemicals in the EPA priority pollutant list, many are known or suspected to be toxic, carcinogenic, mutagenic or teratogenic. Also it is now accepted in the scientific literature that no safe threshold exists for a carcinogenic substance. In the absence of specific standards, the 100 ppb of total organic chemical contamination can be considered to be a reasonable threshold. It should be noted that the total organic chemical concentration exceeded 100ppb in seven of the eleven test sites.

The U.S.EPA has published estimates of cancer risk of various known carcinogens.[18] These estimates are based on extrapolations from laboratory animal data and are given in terms of the concentration of a substance which, if ingested in the given amounts over a life time, would cause one incidence of cancer in a population of 100,000 (10^{-5}), 1,000,000 (10^{-6}) or 10,000,000 (10^{-7}). Figure 11 identifies health criteria for those carcinogenic chemicals found at Combe Fill. In all five cases, concentrations found at the landfill greatly exceed EPA's health criteria. For carbon tetrachloride the found concentration of 338 ppb exceeded the health criteria by 800 times.

Figure 11: Health Criteria for Carcinogenic Substances at Combe Fill

Compound	Health Criteria	Concentration Found	Times Above Criteria
Carbon Tetrachloride	.42 ppb	338 ppb	800 X
Benzene	.67 ppb	11 ppb	16 X
1,2 Dichloroethane	.94 ppb	22 ppb	33 X
Trichloroethylene	2.79 ppb	46 ppb	17 X
Tetrachloroethylene	.88 ppb	100 ppb	112 X

DESCRIPTIONS, HEALTH EFFECTS AND TOXICITY OF SELECTED SUBSTANCES FOUND AT COMBE FILL

Below is a listing of selected organic chemicals and metals with a brief description of each and an identification of adverse health effects resulting from acute dosages. This information is taken from the current literature.[19]

ORGANIC CHEMICALS

Carbon Tetrachloride - a nonflammable colorless liquid used in fire extinguisher and as a solvent for fats and greases in cleaning solutions. Carbon tetrachloride has been linked with liver cancer and is classed by the USEPA as a carcinogen.
Exposure may result in central nervous system depression and gastrointestinal symptoms of liver and kidney damage. Nausea, vomiting, abdominal pain, diarrhea, enlarged and tender liver and jaundice result from liver damage. Diminished urinary volume, red and white blood cells in the urine, albuminuria, coma and death may result from acute kidney failure. Systemic effects worsen when used in conjunction with ingestion of alcohol.

Heptane - is a paraffin contained in light petroleum products. Irritates skin, lung and nerves.

Nonane - is also a paraffin in a liquid form, used as a solvent and irritates skin, lungs and nerves.

Benzene - is an extremely inflammable colorless liquid obtained by the fractional distillation of coal tars. It is used as a solvent for fats and in the making of lacquers, varnishes, many dyes and other organic compounds. Benzene is classed as a carcinogen by the USEPA. Benzene may also cause prolonged menstrual bleeding in humans.

Toluene - is a colorless liquid hydrocarbon generally obtained from coal tars used in making dyes, explosives and saccharin. Toluene is volatile and may be absorbad through the skin, digestive tract or by breathing. Acute exposure results predominantly in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness, incoordination with staggering gait, skin paresthesias, collapse and coma. Toluene is also associated with adverse reproductive effects in humans and may cause prolonged menstrual bleeding.

Xylene - is a liquid resembling toluene obtained from coal tar and used in dyes and as a solvent. Xylene is known to be a central nervous system depressant and to irritate the lungs.

1,2-Dichloroethane
or
Ethylene Dichloride - is an oily toxic liquid used as a solvent and in the manufacture of polyvinyl chloride. Dichloroethane effects the ner-

vous system, respiratory system, heart and liver. Inhalation may cause nausea, vomiting, mental confusion, dizziness and pulmonary edema. Chronic exposure has been associated with liver and kidney damage. There is risk to nursing infants and it is listed as a carcinogen.

Trichloroethylene or TCE - is a colorless liquid widely used as an industrial solvent in dry cleaning and as an anesthetic. It is a central nervous system depressant with such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular heart beat, sleepiness, fatigue, blurred vision and intoxication similar to that from alcohol. Unconsciousness and death have been reported. Alcohol may worsen the symptoms and the person may become flushed. Addiction and peripheral neuropathy have been reported. It is a known carcinogen.

Tetrachloroethylene (Perchlorethylene) - is a colorless non-flammable liquid used in dry cleaning. Acute exposure may cause nervous system depression, hepatic injury and anesthetic death. In animals it produces cardiac arrhythmias and renal injury. Symptoms of exposure include malaise, dizziness, headache, increased perspiration, fatigue, staggering gait and slowing of mental ability. It is a known carcinogen.

Methylane Chloride - (Dichloromethane) is a colorless volatile liquid used as a solvent refrigerant and anesthetic. It effects the central nervous system, causes heart fibrillation and symptoms similar to carbon monoxide poisoning.

Naphthalene - is one of the principal constituents of coal tar and is used as a disinfectant in moth balls and in the manufacture of dyes and explosives.

Diethyl Phthalate (ethyl phthalate) - is used as a solvent and a fixative perfume, a denaturant for alcohol and cosmetics because of its extremely bitter taste irritating to mucous membranes, central nervous system depression when absorbed.

bis-2 Ehtyl Hexyl phtalate - (Dioctyl-sodium sulfosuccinate) a powerful wetting compound used as a laxative. Can cause diarrhea and intestinal bloating.

1,4-Dichlorobenzene - used in making insecticides, phenol and dyes, engine cleaners and solvents, for resins and lacquers, moth repellants, air deodorants. Concentrates in fats and is highly resistant.

1,1-Dichloroethane - used in making vinyl chloride and tetraethyl lead. Also an insecticide fumigant and used in paint and varnishes, soaps, in wetting and penetrating agents, in ore flotation. A carcinogen.

METALS

Arsenic - is a very poisonous element used in insecticides, glass, medicines and dyes. In addition to its high toxicity, arsenic may cause matitis, lung and lymphatic cancer. Cumulative effects include disorders of alimentary tract, nausea, vomiting, diarrhea, dehydration, neuritis and paralysis of wrist and ankle muscles. Symptoms include metallic taste and odor of garlic on breath, burning pain in gastrointestinal tract, vomiting and purging, shock syndrome, coma and convulsions, paralysis and death.

Cadmium - is a soft metal used in the manufacture of fusable alloys, electroplating and control rods for nuclear reactors. It is a known carcinogen and effects jungs and kidneys.

Lead - is a poisonous metal used in paints, plumbing and alloys. Toxicity occurs if more than .5 mg/day is absorbed. Lead may impair any part of the nervous system. Lead also effects the kidneys and blood.

Manganese - is a poisonous metal used in numerous alloys which, if ingested over long periods results in muscular weakness, peculiar gait, tremors, central nervous system disturbance and salivation and kidney malfunction.

Chromium - is a metal used in electroplating and alloys. It is a know carcinogen; symptoms of poisoning are pain, diarrhea, collapse, cramping and death due to kidney failure. It is also associated with lung cancer, lung irritation and skin ulcers.

Cyanide - Cyanides are the most common and most deadly poisons known. Cyanide also effects the thyroid and has blood and respiratory effects.

Phenol - is a colorless or light pink solid and dangerous due to its rapid corrosive action on tissues. It is a hazardous substance to skin and eyes. Coma may occur within 30 minutes of skin exposure. Phenol also effects the liver and kidneys.

Chlorine - is a highly poisonous gas used as a bleaching agent and germicide. Excessive exposure can be fatal.

Mercury - is a poisonous metal which causes central nervous system breakdown and mental effects, abdominal cramps, increased salivation and kidney malfunction.

PESTICIDES

Endosulfan - also known as Thioden

CONCLUSIONS

It is necessary to understand the structure of the Combe Fill Landfill in order to draw conclusions from the test results. Figure 12 shows that structure.

Rain falling on the top of the landfill runs off the surface, picks up contaminants and flows in the direction of streams. Once infiltrating the landfill water will move laterally, again picking up contaminants, and appear at the edge of the landfill in seeps or springs. Water percolating through the alternating layers of compacted waste and cover may also move vertically, escaping from the bottom of the landfill and mixing with groundwater in the underlying bedrock. Water flowing through the landfill picks up a wide variety of contaminants and is called leachate. At Combe Fill, no provisions are made to prevent leachate from traveling to and mixing with both surface and groundwaters.

The water quality test results clearly show that the landfill is producing leachate and that within the property this leachate has contaminated surface, shallow subsurface and deep groundwaters (see results for stations URWA S-2, DEP S-1, URWA S-5, DEP S-2, URWA SW-2, DEP DW-4).

The data also indicates pollution originating from both the older and new sections of the site. Furthermore, the results indicate that contamination is migrating from the site via both surface and groundwater routes (see station results URWA SW-4, DEP SW-5, URWA S-3, URWA S-4).

While results did not indicate "gross contamination" they did indicate significant levels of surface and groundwater pollution. Of particular concern, is the pollution of groundwater since once polluted it is virtually impossible to cleanse. Also, once entering the fractures of the underlying bedrock, the pollution could travel considerable distances. The total organic chemical reading at station DEP DW-4, a 100-foot plus well, of 762 ppb indicates a potentially serious groundwater contamination problem. This problem is magnified by the presence of about 38 domestic residential wells within 1/4 mile from the landfill's active face and 60 wells within a 1/2 mile distance.

The total organic chemical reading of 1005 ppb at station URWA S-2 indicates significant surface water pollution. Since many of the organic chemicals will volatilize as they travel downstream, pollution downstream should diminish. However, this is not true in groundwater flows.

The variety of chemicals found in the test results, 33 different types, is reason for concern. Little is known about the synergetic effects of chemicals once combined. It is quite likely that two chemicals when combined could produce a new compound more harmful than either original one.

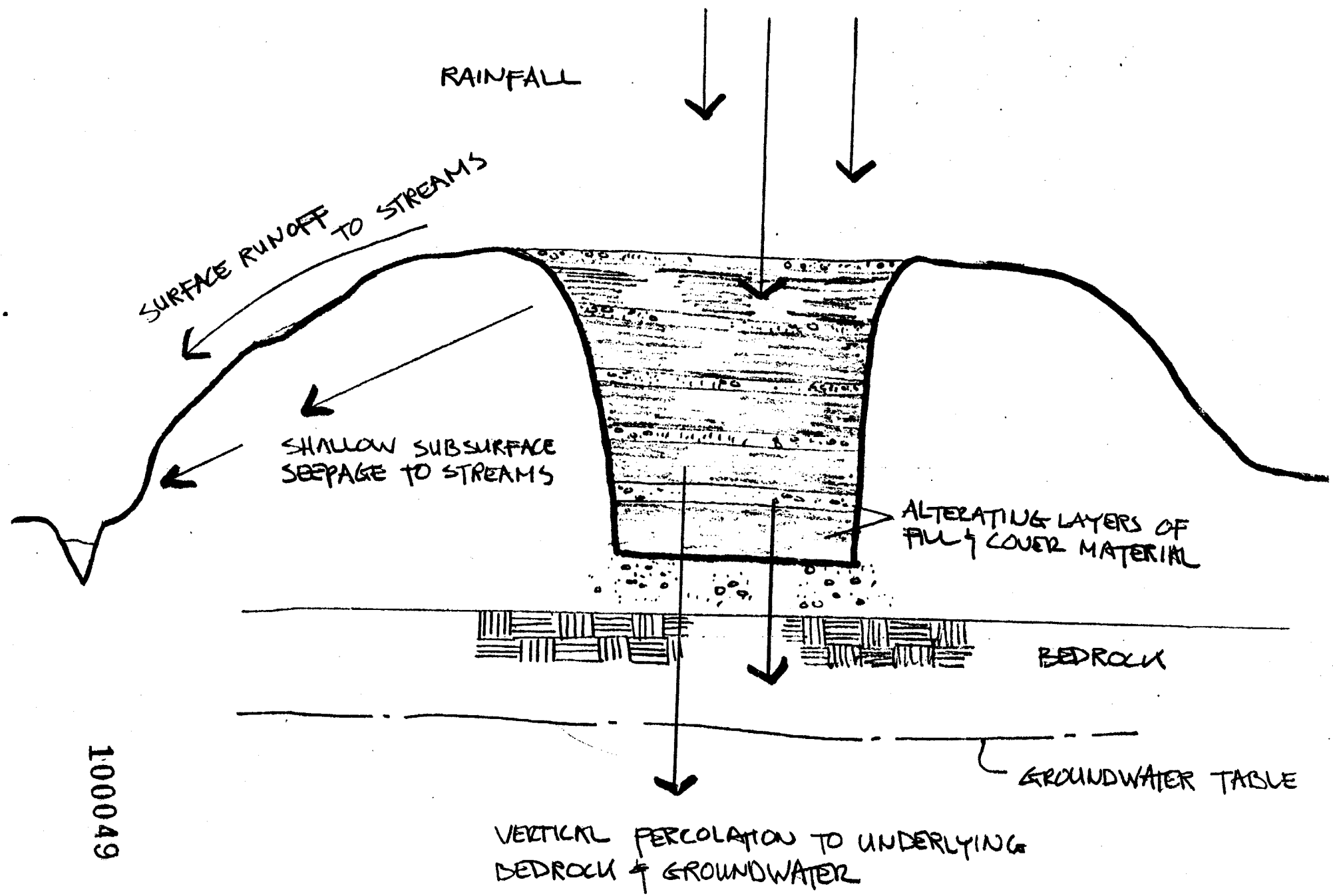
The extremely high concentrations of manganese found at most all of the sample locations is also reason for serious concern.

There is little doubt that the landfill is a source of serious pollution, however, it is not yet known how far by surface or groundwater the pollution has traveled. A testing program of residential wells along Parker Road, down gradient from the landfill, will assist in determining the magnitude of threat which the landfill poses to the public health and welfare.

Since the results indicate that there is both surface and groundwater contamination at the landfill and that the contamination is migrating from the site, it is the author's opinion that the facility should be closed.

FIGURE 12:

COMB FILL: CROSS SECTION



100049

NOTES

1. Affidavit of Robert Hordon in the matter of Township of Chester, et al. vs. Combe Fill Corporation and the N.J. Department of Environmental Protection.

2. See the following:
   a. Letter from Oliver T. Alstrom, Assistant Field Supervisor, U.S. Department of the Interior, Fish and Wildlife Service, to Edward R. Russo, Council Present, dated February 26, 1981.
   b. Affidavit of John A. Castner in the matter of Chester Township, et al. vs. Combe Fill Corporation.
   c. Affidavit of Daniel Toder in the above matter.

3. Fowler, Angela, et al. The Chester, The Mendhams: A Natural Resource Inventory and Environmental Study; 1976.

4. Morris County Soil Conservation Service, Soil Survey of Morris County, New Jersey, August 1976.

5. See especially:
   State Department of Environmental Protection Memorandum to Beatrice Tyluki, Director Solid Waste Administration, from Frank Markewicz, Supervising Geologist, re: Chester Hills Landfill Investigation, dated March 13, 1979.

6. State Department of Environmental Protection Memorandum to Lee Pereria, Solid Waste Administration from Frank J. Markewicz, Acting State Geologist, re: Combe Landfill South Field Inspection, dated February 24, 1981.

7. "Draft Report: Combe Fill South," Morris County Solid Waste Coordinator, April 9, 1981.

8. Township of Chester, et al. vs. Combe Fill Corporation, et al. Docket No. C-2094-80E, Superior Court of New Jersey, Chancery Division-Morris County.

9. "Order Modifying Registration: In the Matter of Combe Fill Corporation, Inc., Facility Registration, Number 1407A." Edward J. Landres, Assistant Director, Enforcement Branch, Solid Waste Administration, March 19, 1981.

10. U.S. Environmental Protection Agency in the Matter of Combe Fill Corporation, Proceedings Under Section 309a.3 & 4, Clean Water Act, 33 U.S.C. & 1319a(3)(4), March 19, 1981, Julio Morales-Sanchez, Director, EPA, CWA-11-81-7; Enforcement Division, Region II, USEPA.

11. Letter from Raymond A. Webster, P.E., Manager Water Allocation Section, Division of Water Resources, to Mr. Gary Molchan, Vice President, Combe Fill Corporation, dated March 16, 1981.

12. In the Matter of the Adopted and Modified Solid Waste Management Plan of the Morris County Solid Waste Management District: Certification of Approval with Modification of the Morris County District Solid Waste Management Plan, January 29, 1981, Jerry Fitzgerald English, Commissioner.

13. Dunn & Bradstreet, Review of Combe Fill Corporation and Combustion Equipment Associates, April 30, 1981.

14. See state-mandated quarterly tests from Chester Hills, Inc., January 27, 1977 through May 17, 1979. Also see files of Chester and Washington Township Boards of Health.

15. URWA, "A Proposal for Water Quality Testing at the Chester Hills Landfill."

16. Federal Register, Volume 44, Number 231, November 29, 1979.

17. Personal Communication with Haig Kasabach, Chief, Bureau of Groundwater Management, Division of Water Resources, N.J. Department of Environmental Protection, April 29, 1981.

18. Federal Register, November 28, 1980.

19. See the following:

Council on Environmental Quality, "Contamination of Groundwater by Toxic Organic Chemicals", January 1981.

Tucker, Robert Dr., Groundwater Quality in New Jersey: An Investigation of Toxic Contaminants", March 1981, Office of Cancer and Toxic Substances Research, N.J. Department of Environmental Pro-

Ross, Steven S., Ed., Toxic Substances Sourcebook, March 1978.

Ross, Steven S., Ed., Toxic Substances Sourcebook Series 2, August 1980.

Thomas, Clayton L., MD, MPH, Taber's Cyclopedic Medical Dictionary, F. A. Davis Company, 1970.

PEQUANNOCK
WATERSHED ASSOCIATION
LARGE R • OSS ROAD, RD1 BOX 30-W, GLADSTONE, N.J. 07934
(201) 234 1852

June 17, 1981

~~Mr. Thomas Foley~~ Mrs. Rita Klimkowsky
Chester Township Board of Health
Parker Road
Chester, New Jersey 07930

Mrs. Klimkowsky:
Dear ~~Mr. Foley~~:

Please find enclosed copies of DEP's test results for the following wells:

C-26619 - Monitoring Well #2 on Landfill
C-26620 - Cavazza, Parker Road
C-26621 - Manfredonia
C-2662 - Filiberto Garage

Results for metals were negative with the exception of the Manfredonia well which has a very high level - 2.250 against a standard of .05.

Volatile Organics were tested for in two classes: Aromatic Hydrocarbons and Chlorinated Hydrocarbons. All results were: <1ppb and <5ppb respectively.

Sincerely,

David Peifer

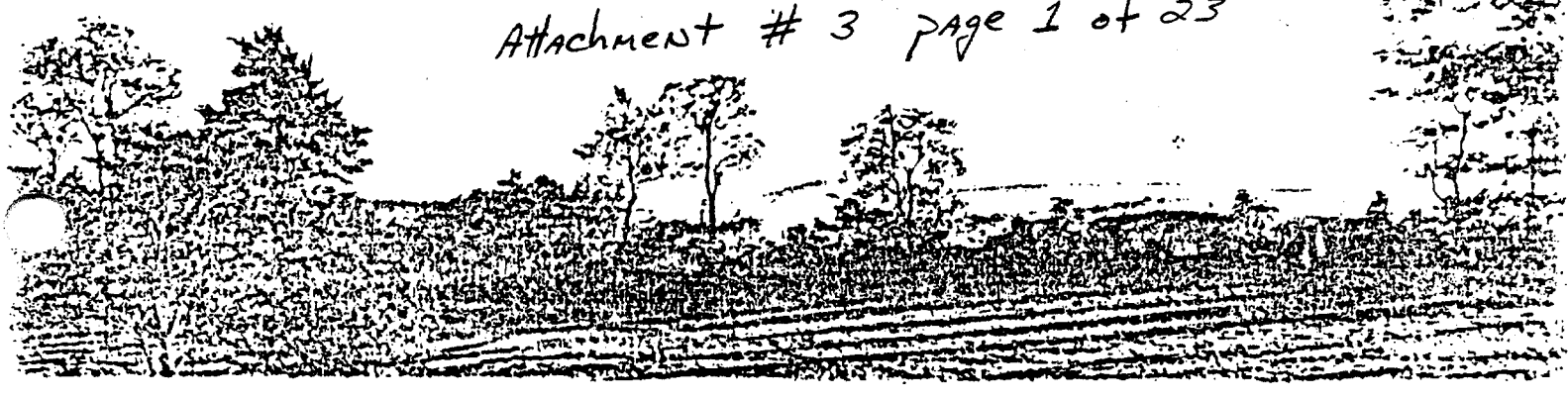
David Peifer
Acting Executive Director

DP/prb

Enc.

100052

Attachment # 3 page 1 of 23



State of New Jersey

DEPARTMENT OF ENVIRON ENTAL PROTECTION

DIVISION OF ENVIRON ENTAL QUALITY
SOLID WASTE ADM ISTRATION
32 EAST HANOVER STREET. RENTON. N. J. 08625

JACK STANTON
DIRECTOR

LINO F. PEREIRA
ADMINISTRATOR
SOLID WASTE MANAGEMENT

June 12, 1981

Dave Piefer
Upper Raritan Watershed Association
Lager Cross Road
RD 1, Box 30-W
Gladstone, NJ 07934

Dave,

Here are the results from the 4 samples taken in May. The only thing that seems to be of concern is Manfriedonia's well because of the lead content.

The organics came up clean. The two groups shown as aromatic and chlorinated hydrocarbons showed less than 1 and 5 ppb respectively. These two groups of organics include a wide range of organic compounds. Please send me copies of your results on the 5 samples recently taken when they come in.

Sincerely,

Dan Toder
Solid Waste Administration

gd

100053

Attachment # 3 page 2 of 23

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER NALYSIS

FIELD INFORMAT ON

TYPE OR PRINT
POINT PEN

Time & Date Received By Labs ____
Lab. No. ____

Date of Collection 5/6/81 19__
Hour ____ A.M. 10:30 P.M. ____
Composite Period ____ Interval ____
Collected by ____
Residual Chlorine:
Immediate ____
Developed ____
Flow Rate ____
Temperature ____

le No. C-2661?

cipality Chester Hills, Morris County

Well 2 (L.F.)

ation Combe Fill L.F. 1427 A

ription and Remarks: ~~[illegible] to A. [illegible], Solid Waste Admin.,~~
~~32 [illegible] St., Trenton~~

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

LABORATORY RESULTS
BACTERIOLOGICAL

liform MPN/100 ml. ____ (Confirmed Test); Fecal Coliform MPN/100 ml. ____
cal Streptococci:MPN/100 ml. ____ Other ____

Volatile Organics

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

Color (units)	Chloride	Sulfate	Other Determinations
Odor (cold)	Suspended Solids	Grease & Oil	AROMATIC hydrocarbons 1
Turbidity (units)	Ash	Cyanide	chlorinated 11 5
pH	Total Solids	Chromium Total	
Acidity to pH 4	Ash	Chromium Hex.	
Alkalinity to pH 4	Total PO_4	Ortho - PO_4	
Nitrite N	MBAS	Copper	
Nitrate N	Phenols	Lead	
Ammonia N	COD	Arsenic	
Total Kjel. N	Iron	Z	

100054

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O.			Seed Required:		Yes		No		
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD_5											

Attachment #3 page 3 of 23

PART 2, STREAM POLLUTION FORM (FOR TRANSMISSION) H1832

Chem 21
Sept 76

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received By Labs ______
Lab No. ______

FIELD INFORMATION

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

Date of Collection 5/6/81 19 ___
Hour ______ A.M. 10:30 P.M. ______
Composite Period ______ Interval ______
Collected by [illegible]

Sample No. C-2[illegible]

Residual Chlorine:
Immediate ______
Developed ______
Flow Rate ______
Temperature ______

Municipality [illegible] County
Plant ______
Stream L.F. Well No. 2
Location [illegible] L.F. 1427A
Description and Remarks: [illegible]
[illegible]

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. ______ (Confirmed Test); Fecal Coliform MPN/100 ml. ______
Fecal Streptococci:MPN/100 ml. ______ Other ______

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

	Color (units)		Chloride		Sulfate		Other Determinations
	Odor (cold)		Suspended Solids		Grease & Oil	✓	Hg 0.0005 K
	Turbidity (units)		Ash	✓	Cyanide 0.004		✓
	pH		Total Solids		Chromium Total		
	Acidity to pH 4		Ash		Chromium Hex.		
	Alkalinity to pH 4		Total PO_4		Ortho - PO_4		
	Nitrite N		MBAS		Copper		
	Nitrate N		Phenols	✓	Lead 0.005 K		
	Ammonia N		COD	✓	Arsenic 0.004		
	Total Kjel. N		Iron		Zinc		

100055

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O.			Seed Required:		Yes		No		
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD_5												

Attachment #3 page 4 of 23

PART 3-STREAM POLLUTION COPY (FOR TRANSMISSION)

H1832

Chem
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received _____
By Labs
Lab No. _____

FIELD INFORMATION

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

Date of Collection 5/16/81 19__
Hour _____ A.M. 11:00 P.M. _____
Composite Period _____ Interval _____
Collected by T. Kapiel
Residual Chlorine:
Immediate _____
Developed _____
Flow Rate _____
Temperature _____

Sample No. C-26626
Municipality Chester Hills, Warren Co.
Plant _____
Stream Cavazza Pit - Parker Rd - well
Location Castle - Fill L.F. 1427D
Description and Remarks: Attn: results to T. Kapiel, Solid Waste Admin., 32 Harrison St., Trenton.

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10.1	10.2	10.3	10.4	10.5	10.6

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. _____ (Confirmed Test); Fecal Coliform MPN/100 ml. _____

Fecal Streptococci:MPN/100 ml. _____ Other _____

Volatile Organics
ppb

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

Color (units)	Chloride	Sulfate	Other Determinations
Odor (cold)	Suspended Solids	Grease & Oil	Aromatic hydrocarbons 1
Turbidity (units)	Ash	Cyanide	chlorinated " 5
pH	Total Solids	Chromium Total	
Acidity to pH 4	Ash	Chromium Hex.	
Alkalinity to pH 4	Total PO_4	Ortho - PO_4	
Nitrite N	MBAS	Copper	
Nitrate N	Phenols	Lead	
Ammonia N	COD	Arsenic	
Total Kjel. N	Iron	Zinc	

100056

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.	Lab. D.O.			Seed Required:		Yes			No		
Sample Conc. % PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD_5											

Attachment #3. page 5 of 23

PART 3-STREAM POLLUTION COPY (FOR TRANSMISSION)

H1832

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received _____ By Labs
Lab No. _____

FIELD INFORMATION

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

Date of Collection 5/16/51 19__
Hour _____ A.M. 11:00 P.M. _____
Sample No. C-26622 Composite Period _____ Interval _____
Collected by A. Kapiel
Municipality Clifton, Passaic Co. Residual Chlorine: Immediate _____
Applicant _____ Developed _____
Stream Equazza - well Flow Rate _____
Location Lotte-Fill L.F. 1127A Temperature C
Description and Remarks: Methane results to A. Kapiel, Solid Waste Admin., 32 Hanover St., Trenton

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)	10	1	10-1	10-2	10-3	10-4	10-5	10-6

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. _____ (Confirmed Test); Fecal Coliform MPN/100 ml. _____
Fecal Streptococci:MPN/100 ml. _____ Other _____

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

	Color (units)		Chloride		Sulfate		Other Determinations
	Odor (cold)		Suspended Solids		Grease & Oil	✓	Hg 0.0005 K
	Turbidity (units)		Ash	✓	Cyanide 0.006		✓
	pH		Total Solids		Chromium Total		
	Acidity to pH 4		Ash		Chromium Hex.		
	Alkalinity to pH 4		Total PO_4		Ortho - PO_4		
	Nitrite N		MBAS		Copper		
	Nitrate N		Phenols	✓	Lead 0.005 K		
	Ammonia N		COD	✓	Arsenic 0.005		
	Total Kjel. N		Iron		Zinc		

100057

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.	Lab. D.O.			Seed Required:		Yes		No			
Sample Conc. % PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD_5											

Attachment #3 page 6 of 23

PART 2, STREAM POLLUTION COPY (FOR TRANSMISSION) H1832

Chem-25
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received By Labs ______
Lab. No. ______

FIELD INFORMATION

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

Date of Collection 5/6/81 19 ___
Hour ______ A.M. 11:20 P.M. ______

Sample No. C-26621

Composite Period ______ Interval ______
Collected by R. Popiel
Residual Chlorine:
Immediate ______
Developed ______

Municipality Chester Hills, Morris Co.
Plant ______
~~Stream~~ well - manifried arm
Location [illegible]

Flow Rate ______
Temperature ______

Description and Remarks: [illegible] R. Popiel, Solid Waste Admin., [illegible]

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. ______ (Confirmed Test); Fecal Coliform MPN/100 ml. ______
Fecal Streptococci:MPN/100 ml. ______ Other ______

Volatile Organics

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

Color (units)	Chloride	Sulfate	Other Determinations
Odor (cold)	Suspended Solids	Grease & Oil	AROMATIC HYDROCARBONS
Turbidity (units)	Ash	Cyanide	CHLORINATED "
pH	Total Solids	Chromium Total	
Acidity to pH 4	Ash	Chromium Hex.	
Alkalinity to pH 4	Total PO_4	Ortho - PO_4	
Nitrite N	MBAS	Copper	
Nitrate N	Phenols	Lead	
Ammonia N	COD	Arsenic	
Total Kjel. N	Iron	Zinc	

100058

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.	Lab. D.O.			Seed Required:		Yes		No		
Sample Conc. % PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD_5											

Attachment #3 page 7 of 23

PART 2 - STREAM POLLUTION COPY (FOR TRANSMISSION) H1832

Chem-25
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received By Labs ______
Lab. No. ______

FIELD INFORMATION

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

Date of Collection 5/6/81 19
Hour ______ A.M. 11:20 P.M. ______
Composite Period ______ Interval ______
Collected by [illegible signature]
Residual Chlorine:
Immediate ______
Developed ______
Flow Rate ______
Temperature ______

Sample No. C-26621
Municipality [illegible handwriting] Co.
Plant ______
Stream Well - [illegible handwriting]
Location [illegible handwriting] 1427A
Description and Remarks: [illegible handwriting]
32 [illegible handwriting]

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)	10	1	10-1	10-2	10-3	10-4	10-5	10-6

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. ______ (Confirmed Test); Fecal Coliform MPN/100 ml. ______
Fecal Streptococci:MPN/100 ml. ______ ______ Other ______

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

	Color (units)		Chloride		Sulfate		Other Determinations
	Odor (cold)		Suspended Solids		Grease & Oil	✓	Hg 0.0005K
	Turbidity (units)		Ash	✓	Cyanide 0.001K		
	pH		Total Solids		Chromium Total		
	Acidity to pH 4		Ash		Chromium Hex.		
	Alkalinity to pH 4		Total PO4		Ortho - PO4		
	Nitrite N		MBAS		Copper		
	Nitrate N		Phenols	✓	Lead 0.250		
	Ammonia N		COD	✓	Arsenic 0.005		
	Total Kjel. N		Iron		Zinc		

100059

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.	Lab. D.O.			Seed Required:			Yes		No		
Sample Conc. % PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD5											

Attachment #3 page 8 of 23

Chem-25
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received By Labs ______
Lab. No. ______

FIELD INFORMATION

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

Date of Collection 5/6/81
Hour ______ A.M. 11:45 P.M. ______
Sample No. C-26622
Composite Period ______ Interval ______
Collected by [illegible]
Residual Chlorine: Immediate ______
Municipality [illegible]
Plant ______
Developed ______
Stream [illegible]
Flow Rate ______
Location [illegible] 1127A
Temperature ______
Description and Remarks: [illegible]

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. ______ (Confirmed Test); Fecal Coliform MPN/100 ml. ______
Fecal Streptococci:MPN/100 ml. ______ Other ______

Volatile Organics

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

	Color (units)		Chloride		Sulfate		Other Determinations
	Odor (cold)		Suspended Solids		Grease & Oil		AROMATIC Hydroc[arbons]
	Turbidity (units)		Ash		Cyanide		
	pH		Total Solids		Chromium Total		CHLORINATED "
	Acidity to pH 4		Ash		Chromium Hex.		
	Alkalinity to pH 4		Total PO_4		Ortho - PO_4		
	Nitrite N		MBAS		Copper		
	Nitrate N		Phenols		Lead		
	Ammonia N		COD		Arsenic		
	Total Kjel. N		Iron		Zinc		

100060

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O.			Seed Required:			Yes		No		
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	1[00]
BOD_5												

Attachment # 3 page 9 of 23

PART 3-STREAM POLLUTION COPY (FOR TRANSMISSION)

Chem-25
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received By Labs
Lab. No.

FIELD INFORMATION

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

Date of Collection 5/6/81 19
Hour A.M. 11:45 P.M.
Composite Period Interval
Collected by
Residual Chlorine:
Immediate
Developed
Flow Rate
Temperature

Sample No. C-26622
Municipality [illegible]
Plant
Stream [illegible]
Location [illegible] 1427A
Description and Remarks: [illegible]
22 [illegible], Trenton

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. (Confirmed Test); Fecal Coliform MPN/100 ml.
Fecal Streptococci:MPN/100 ml. Other

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

	Color (units)		Chloride		Sulfate		Other Determinations
	Odor (cold)		Suspended Solids		Grease & Oil		4/1/ 0.0005 K
	Turbidity (units)		Ash	✓	Cyanide 0.001 K		✓
	pH		Total Solids		Chromium Total		
	Acidity to pH 4		Ash		Chromium Hex.		
	Alkalinity to pH 4		Total PO_4		Ortho - PO_4		
	Nitrite N		MBAS		Copper		
	Nitrate N		Phenols	✓	Lead 0.022		
	Ammonia N		COD	✓	Arsenic 0.003		
	Total Kjel. N		Iron		Zinc		

100061

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O.			Seed Required:			Yes		No	
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD5												

Attachment #3 page 10 of 23

PART 2-SYSTEM POLLUTION COPY (FOR TRANSMISSION)

H1837

HEAVY METAL ANALYSIS OF PARKER ROAD AND SCHOOLHOUSE LANE

Name	Block	Lot	Mercury	Lead
Smith, Parker Rd.	16	36	0.0009	<0.04
Jones, Parker Rd.	17	19	.0007	<0.04
Tucker, Parker Rd.	16	35	.0014	0.04
Cole, Parker Rd.	16	26	.0007	<0.04
Bullard, Parker Rd.	16	31	.0003	<0.04
McNamara, Parker Rd.	16	42	< .0001	<0.04
Compton, Parker Rd.	16	43	< .0001	<0.04
Cavazzas, Parker Rd.	17	5	0.0001	<0.04
York, Parker Rd.	17	20	0.0002	<0.04
Steinfield, Parker Rd.	17	25	< 0.0001	<0.04
Whitehead, Parker Rd.	16	37	0.0001	<0.04
Duryea, Parker Rd.	16	11	0.0002	<0.04
Township Hall, Parker Rd.	16	34	< 0.0001	<0.04
Lieberwith, Parker Rd.	16	38	0.0004	<0.04
Hobbie Heat, Parker Road	17	4	0.0001	<0.04
Beck, Parker Rd.	17	15	0.0001	<0.04
Price, Parker/Schoolhouse	17	21	0.0004	0.04
Pierson, Schoolhouse	17	26	0.0001	<0.04
Hoffman, Schoolhouse	17	24	0.0001	<0.04
Knutsen, Schoolhouse	17	43	< 0.0001	<0.04
Tingue, Parker	17	1	< 0.0001	<0.04
Pruiksma, Schoolhouse	17	22B	0.0002	0.04
Agee, Schoolhouse	17	22D	< 0.0001	<0.04
Giersch, Parker	17	28	< 0.0001	<0.04
Schroeder, Schoolhouse	17	44	< 0.0001	<0.04
Perry, Schoolhouse	17	22A	0.0002	<0.04
			(± 0.0001)	(± 0.001)
		Standard	(0.0020)	(0.05)

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Attachment # 3 page 11 of 23

Collection Date		Identification	Bl.	Lot	Lead	Mercury
1-15-81		Ram, Schoolhouse Lane	17	44-A	<0.04	<0.0001
1-26-81	★	Re, Schoolhouse Lane	17	45	<0.04	<0.0001
2-29-81		Early Childhood Center	16	12	<0.04	<0.0001
2-11-81		Glenlora Nursing Home			<0.04	<0.0001
3-3		Hollenbeck, State Park Rd.			<0.04	<0.0001
3-3		Center Early Childhood	16	12	<0.04	<0.0001
		Klimkosky, Dora Lane			<0.04	<0.0001
		Wagner, 316 Fairview, Wash.Twp.			<0.04	<0.0001
		Seickel, 9 East Gate, Wash.Twp.			<0.04	<0.0001
		Weilkind Hospital			<0.04	<0.0001
	★	Fay, Parker Road	17	38	<0.04	<0.0001
		Black River Middle School			<0.04	<0.0001
3-9	★	Knable, Schoolhouse Lane	17,44-B		<0.04	<0.0001
3-9		Knight Lamerson Rd.			<0.04	<0.0001
3-9	★	Kast, Parker Rd.	17	12	<0.04	<0.0001
3-9	★	Cannon, Parker Rd.	17	40	<0.04	<0.0001

Combe fill wells

Well #	Cadmium	Lead	Mercury
1	.003	0.04	<0.0001
2	.002	<0.04	<0.0001
3	.001	<0.04	<0.0001
4	.001	0.04	<0.0001
5	<0.005	0.04	0.0001
Drinking water limit	0.010	0.05	0.002

Well 5 V. Turbid

★ ON MAPS

100063

Attachment # 3 page 12 of 23

SUBSTANCES FOUND OVER STANDARD

Substance	Level	Standard	Well
Selenium	.015	.01 EPA	5811-PO 2 Centralia Early Childl
	.026	.01 EPA	5810-PO 1 HR SAWDUST
	.038	.01 EPA	5813-PO 4 LINE
	.02	.01 EPA	5814-PO 5 LAGASH
Lead	.07	.05	5810-PO 1 HR SAWDUST
Heptachlor	< 1	.1 EPA	5810-PO 1 HR SAWDUST
	< 1	.1 EPA	5811-PO 2 Centralia Early Child
	< 1	.1 EPA	5814-PO 5 LAGASH
	< 1	.1 EPA	5813-PO 4 LINE
Heptachlor Epoxide	< 1	.1	5813-PO 4 LINE

OTHERS NOT YET DETERMINED

4 4' DDT	< 1	5814-PO 5
Fluoranthene	< 10	5811-PO 2
Anthracene/Phenanthrene	<10	5811-PO 2

TESTS OUTSTANDING :

Gross Alpha
Gross Beta

Phenanthrene
Bis (chloromethyl) ether

100064

Attachment #3 page 13 of 23

DATE: June 29, 1981

JOB NO. 17764

AUTHORIZATION: verbal

SAMPLE: water - 5

TO:

Jason Cortell Associates
241 Main St.
Gladstone, NJ 07934

ATT: Charles Gilbert

REPORT OF ANALYSIS

	5810 P01 Mr Sweetheart	5811 P02 Center for Early Childhood	5812 P03 Tongue mg/l	5813 P04 habeas	5814 P05 hers
Beryllium	< .03 ND	< .03 ND	< .03 ND	< .03 ND	< .03 ND
Cadmium	< .01	< .01	< .01	< .01	< .01
Chromium	< .02	< .02	< .02	< .02	< .02
Copper	.18	.31	< .02	< .02	.17
Nickel	.52	< .02	< .02	< .02	< .02
Lead	.07	.02	.02	< .02	.03
Zinc	2.5	.05	3.1	.02	< .02
Silver	.02	< .02	< .02	.10	< .02
Arsenic	< .01	< .01	< .01	< .01	< .01
Antimony	< .05	< .05	< .05	< .05	< .05
Selenium	.026	.015	< .01	.038	.02
Thallium	< .03	< .03	< .03	< .03	< .03
Mercury	< .002	< .002	< .002	< .002	< .002
Phenols	< .1	.12	< .1	< .1	< .1
Cyanide	.03	< .01	.02	< .01	< .01
Chloride	40.1	4.4	3.9	4.9	2.9
Gross Alpha *	---	---	---	---	---
Gross Beta *	---	---	---	---	---

Note * - Results to follow at later date.

Samples received 6/12/81

Edna A. Alinea, Manager
Water, Waste Water and Microbiology

100065

EAA:clp

Attachment #3 page 14 of 23

DATE: June 29, 1981

JOB NO. 17764

AUTHORIZATION: verbal

SAMPLE: water - 5

TO:

Jason Cortell Associates
241 Main St
Gladstone, NJ 07934

ATT: Charles Gilbert

REPORT OF ANALYSIS

BASE/NEUTRAL EXTRACTS

	5810	5811	5812	5813	5814
			ug/l		
Acenaphthene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Acenaphthylene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Anthracene /Phenanthrene	< 20 ND	< 10	< 20 ND	< 20 ND	< 20 ND
Benzidine	< 500 ND	< 500 ND	< 500 ND	< 500 ND	< 500 ND
Benzo(a)anthracene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Benzo(a)pyrene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
3,4-Benzofluoranthene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Benzo(ghi)perylene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Benzo(k)fluoranthene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
(2-chloroethoxy)methane	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
bis(2-chloroethyl)ether	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
bis(2-chloroisopropyl)ether	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
bis(2-ethylhexyl)phthalate	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
4-bromophenyl phenyl ether	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Butylbenzyl phthalate	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
2-Chloronaphthalene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
4-Chlorophenyl phenyl ether	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Chrysene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Dibenzo(a,h)anthracene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
1,2-Dichlorobenzene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
1,3-Dichlorobenzene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
1,4-Dichlorobenzene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
3,3'-Dichlorobenzidine	< 200 ND	< 200 ND	< 200 ND	< 200 ND	< 200 ND
Diethyl phthalate	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Dimethyl phthalate	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Di-n-butyl phthalate	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
2,4-Dinitrotoluene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
2,6-Dinitrotoluene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Di-n-octyl phthalate	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
1,2-diphenylhydrazine (as azobenzene)	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
Fluoranthene	< 20 ND	< 10	< 20 ND	< 20 ND	< 20 ND

Mimi Schaaf, PhD, Manager
Organic Laboratory

MS:clp

100066

Attachment # 3 Page 15 of 23

Laboratory

DATE: June 29, 1981

TO: Jason Cortell Associates
241 Main St
Gladstone, NJ 07934

ATT: Charles Gilbert

JOB NO. 17764

AUTHORIZATION: verbal

SAMPLE: water - 5

REPORT OF ANALYSIS

BASE/NEUTRAL EXTRACTS (con't)

	5810	5811	5812	5813	5814
luorene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
exachlorobenzene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
exchlorobutadiene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
exachlorocyclopentadiene	< 500 ND	< 500 ND	< 500 ND	< 500 ND	< 500 N
exachloroethane	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
deno(1,2,3-cd)pyrene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
sophorone	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
aphthalene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
itrobenzene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
-nitrosodimethylamine	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
-nitrosodi-n-propylamine	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20
trosodiphenylamine	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND
anthrene	---	---	---	---	---
yrene	< 20 ND	< 10	< 20 ND	< 20 ND	< 20 ND
,2,4-Trichlorobenzene	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 ND

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Mimi Schaaf, PhD, Manager,
Organic Laboratory

MS:clp

Attachment #3 page 16 of 23

DATE: June 29, 1981

JOB NO. 17764

AUTHORIZATION: verbal

SAMPLE: water - 5

TO: Jason Cortell Associates
241 Main St
Gladstone, NJ 07934

ATT: Charles Gilbert-

REPORT OF ANALYSIS

PESTICIDES AND PCB'S

	5810	5811	5812	5813	5814
			ug/l		
Aldrin	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
BHC,Alpha	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
BHC,Beta	< 1	< 1	< 1	< 1 ND	< 1
BHC,Gamma	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
BHC,Delta	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Chlordane	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
4,4'DDT	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1
4,4'DDE	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
4,4'DDD	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
ldrin	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Endosulfan-alpha	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Endosulfan-beta	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Endosulfan Sulfate	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Endrin	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Endrin Aldehyde	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 NI
Heptachlor	< 1	< 1	< 1 ND	< 1	< 1
Heptachlor epoxide	< 1 ND	< 1 ND	< 1 ND	< 1	< 1 NI
PCB-1242	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
PCB-1254	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
PCB-1221	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
PCB-1232	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
PCB-1248	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
PCB-1260	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
PCB-1016	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI
Toxaphene	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 NI

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Mimi Schaaf, PhD, Manager
Organic Laboratory

MS:clp

Attachment # 3 page 17 of 23

DATE: June 29, 1981

TO:

Jason Cortell Associates
241 Main St
Gladstone, NJ 07934

ATT : Charles Gilbert

JOB NO. 17764

AUTHORIZATION: verbal

SAMPLE: water - 5

REPORT OF ANALYSIS

VOLATILE ORGANICS

	5810	5811	5812	5813	581
			ug/l		
Acrolein	< 300 ND	< 300 ND	< 300 ND	< 300 ND	< 300
Acrylonitrile	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 N
Benzene	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Bis(chloromethyl) ether *	---	---	---	---	---
Bromoform	< 6 ND	< 6 ND	< 6 ND	< 6 ND	< 6 N
Carbon Tetrachloride	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Chlorobenzene	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Chlorodibromomethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Chloroethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
2-Chloroethylvinyl ether	< 3 ND	< 3 ND	< 3 ND	< 3 ND	< 3 N
Chloroform	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Dichlorobromomethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Dichlorodifluoromethane	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 N
1,1-Dichloroethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
1,2-Dichloroethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
1,1-Dichloroethylene	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
1,2-Dichloropropane	< 3 ND	< 3 ND	< 3 ND	< 3 ND	< 3 N
1,3-Dichloropropylene	< 3 ND	< 3 ND	< 3 ND	< 3 ND	< 3 N
Ethylbenzene	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Methyl bromide	< 3 ND	< 3 ND	< 3 ND	< 3 ND	< 3 N
Methyl chloride	< 15 ND	< 15 ND	< 15 ND	< 15 ND	< 15
Methylene Chloride	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
1,1,2,2-Tetrachloroethane	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 N
Tetrachloroethylene	< 3 ND	< 3 ND	< 3 ND	< 3 ND	< 3 N
Toluene	< 2 ND	< 3	< 2 ND	< 2 ND	< 2 N
1,2-Trans-dichloroethylene	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
1,1,1-Trichloroethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	<2 N
1,1,2-Trichloroethane	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Trichloroethylene	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N
Trichlorofluoromethane	< 5 ND	< 5 ND	< 5 ND	< 5 ND	< 5 N
Vinyl Chloride	< 2 ND	< 2 ND	< 2 ND	< 2 ND	< 2 N

100069

Note * - Results to follow at later date.

Mimi Schaaf

Mimi Schaaf, PhD, Manager
Organic Laboratory

MS:clp

Attachment #3 page 18 of 23

DATE: June 29, 1981

TO:

JOB NO. 17764

Jason Cortell Associates
241 Main St
Gladstone, NJ 07934

AUTHORIZATION: verbal

SAMPLE: water - 5

ATT: Charles Gilbert

REPORT OF ANALYSIS

ACID EXTRACTS

	5810	5811	5812	5813	5814
			ug/l		
2-Chlorophenol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
2,4-Dichlorophenol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
2,4-Dimethylphenol	< 20 ND	<20 ND	< 20 ND	< 20 ND	< 20 N
4,6-Dinitro-o-cresol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
2,4-Dinitrophenol	< 200 ND	< 200 ND	< 200 ND	< 200 ND	< 200
2-Nitrophenol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
4-Nitrophenol	< 200 ND	< 200 ND	< 200 ND	< 200 ND	< 200
p-chloro-m-cresol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
Pentachlorophenol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
Phenol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N
2,4,6-Trichlorophenol	< 20 ND	< 20 ND	< 20 ND	< 20 ND	< 20 N

100070

Mimi Schaaf, PhD, Manager
Organic Laboratory

MS:clp

Attachment # 3 page 19 of 23

DATE: July 7, 1981

TO:

Jason Cortell and Associates
241 Main St
Gladstone, NJ 07934

ATT: Charles Gilbert

JOB NO. 17764

AUTHORIZATION: verbal

SAMPLE: water - 5

REPORT OF ANALYSIS

	Manganese
	mg/l
5810	< .02
5811	< .02
5812	< .02
5813	< .02
5814	< .02

100071

Gary R. Grayfield

Edna A. Alinea, Manager
Water, Waste Water and Microbiology

EAA:clp

Attachment # 3 page 20 of 23

INDUSTRIAL
CORROSION
MANAGEMENT
INCORPORATED

1152 ROUTE 10, RANDOLPH, NEW JERSEY 07869 201-584-0330

STATE CERTIFIED DRINKING WATER LABORATORY NUMBER 1417

Report Date: June 17, 1981

100072

SAMPLE SOURCE: PERRY ~~Perry~~ School House Lane Chester, NJ 07930

SAMPLE DATE: _____ TAKEN BY: _____ AT LAB DATE: 6/15/81 LAB NUMBER: 13643

Compounds detected in parts per billion (micrograms/liter)

CHLOROMETHANE		1,2-DICHLOROPROPANE	
BROMOMETHANE		t-1,3-DICHLOROPROPENE	
DICHLORODIFLUOROMETHANE		TRICHLOROETHYLENE (TCE)	5.8
VINYL CHLORIDE		DIBROMOCHLOROMETHANE	
CHLOROETHANE		BENZENE	
METHYLENE CHLORIDE		DIISOPROPYL ETHER	
TRICHLOROFLUOROMETHANE		1,1,2-TRICHLOROETHANE	
1,1-DICHLOROETHYLENE		c-1,3-DICHLOROPROPENE	
1,1-DICHLOROETHANE		2-CHLOROETHYLVINYL ETHER	
t-1,2-DICHLOROETHYLENE		BROMOFORM	
CHLOROFORM	14.0	1,1,2,2-TETRACHLOROETHANE	
1,2-DICHLOROETHANE		TETRACHLOROETHYLENE (PCE)	
1,1,1-TRICHLOROETHANE		TOLUENE	
t-BUTYLMETHYL ETHER		CHLOROBENZENE	
CARBON TETRACHLORIDE		ETHYLBENZENE	
BROMODICHLOROMETHANE		HEPTANE	

_____ For the above listed volatile priority pollutants, nothing detected at 1 ppb sensitivity level.

_____ Unknown peaks detected (Retention time, estimated amount) _____

(A) Concentration based upon response of pollutant closest in retention time
Compounds elute together (1), (2), etc.
LT = Less than, GT = Greater than, ND = Not detected

Attachment #3 page 21 of 23

MADISON PUBLIC HEALTH LABORATORY

c.c. Frank Matteo

Source: Loel Holloway
Parker Road
Chester Twp., N.J.
B. 17 - L. 11

Collection Date: October 28, 1980 M.P.H.L. #: 1367

Bacteriological Analysis

Total Coliform: _____

Fecal Coliform: _____

Fecal Streptococcus: _____

Chemical Analysis
Mg/l

Chlorine residual		Cadmium	less than 0.005
Chloride		Chromium	less than 0.002
Flouride		Copper	0.9
Hardness		Iron	0.2
Nitrate		Lead	0.04
pH	5.7	Manganese	
Sulfate		Silver	0.004
Turbidity		Selenium	less than 0.002
Arsenic	less than 0.002	Zinc	
Barium	less than 0.01	Mercury	0.0005

Remarks: The pH is below the recommended range of 6.5 to 8.5. All metals are below safe drinking water standards.

100073

INDUSTRIAL CORROSION MANAGEMENT INCORPORATED
1152 ROUTE 10, RANDOLPH, NEW JERSEY 07869 201 584 0330

STATE CERTIFIED DRINKING WATER LABORATORY NUMBER 14116

Report Date: June 17, 1981

PRICE-079-7469

SAMPLE SOURCE: Price Parker Rd & School House Lane Chester, NJ 07930

SAMPLE DATE: _____ TAKEN BY: _____ AT LAB DATE: 6/15/81 LAB NUMBER: 13644

Compounds detected in parts per billion (micrograms/liter)

CHLOROMETHANE		1,2-DICHLOROPROPANE	
BROMOMETHANE		t-1,3-DICHLOROPROPENE	
DICHLORODIFLUOROMETHANE		TRICHLOROETHYLENE (TCE)	
VINYL CHLORIDE		DIBROMOCHLOROMETHANE	
CHLOROETHANE		BENZENE	
METHYLENE CHLORIDE		DIISOPROPYL ETHER	
TRICHLOROFLUOROMETHANE	187	1,1,2-TRICHLOROETHANE	
1,1-DICHLOROETHYLENE		c-1,3-DICHLOROPROPENE	
1,1-DICHLOROETHANE		2-CHLOROETHYLVINYL ETHER	
t-1,2-DICHLOROETHYLENE		BROMOFORM	
CHLOROFORM		1,1,2,2-TETRACHLOROETHANE	
1,2-DICHLOROETHANE		TETRACHLOROETHYLENE (PCE)	
1,1,1-TRICHLOROETHANE		TOLUENE	
t-BUTYLMETHYL ETHER		CHLOROBENZENE	
CARBON TETRACHLORIDE		ETHYLBENZENE	
BROMODICHLOROMETHANE		HEPTANE	

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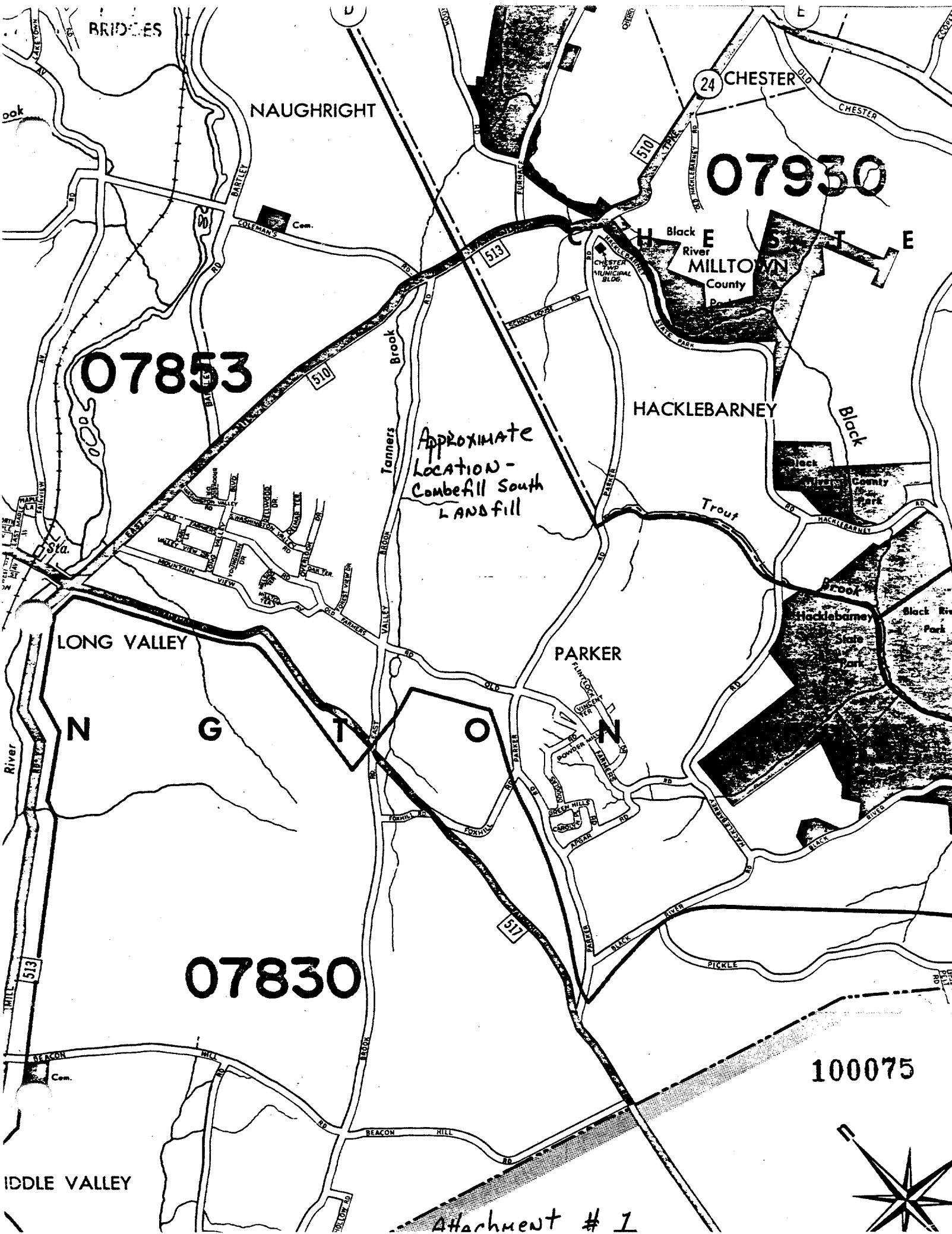
Attachment # 3 Page 23 of 23

_____ For the above listed volatile priority pollutants, nothing detected at 1 ppb sensitivity level.

_____ Unknown peaks detected (Retention time, estimated amount) _____

(A) Concentration based upon response of pollutant closest in retention time
Compounds elute together (1), (2), etc.
LT = Less than, GT = Greater than, ND = Not detected


BRIDGES
NAUGHRIGHT
CHESTER
07930
CHESTER
Black River
MILLTOWN
County Park
HACKLEBARNEY
07853
Approximate Location - Combefill South LANDfill
Tanners Brook
Black
Trout
LONG VALLEY
PARKER
N G T O N
07830
100075
IDDLE VALLEY
Attachment # 1

Facility Name: Combe-fill South Landfill

Location: Parker Rd, Chester, Morris Co, NJ

EPA Region: II

Person(s) in Charge of the Facility: Anthony Farro
John Castner

Name of Reviewer: Richard Katz Date: 7/1/82

General Description of the Facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

Inactive landfill which has been found by analysis to be releasing numerous hazardous substances to ground and surface water. Numerous residences in close proximity. NJ Dept of Environmental Protection issued several Administrative Orders culminating in closure order 9/8/81

Scores: S_M = 45.22 (S_{gw} = 73.08 S_{sw} = 27.90 S_a = 0)

S_{FE} =

S_{DC} =

Figure 1

HRS COVER SHEET

100076

GROUND WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 (1) 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			19	26	
5 Targets					3.5
Ground Water Use	0 1 2 (3)	3	9	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 (40)	1	40	40	
Total Targets Score			49	49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			41,895	57,330	
7 Divide line 6 by 57,330 and multiply by 100	S_{gw} = 73.08				

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SURFACE WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Observed Release	0 (45)	1	45	45	4.1
If observed release is given a value of 45, proceed to line [4]. If observed release is given a value of 0, proceed to line [2].					
[2] Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	1		3	
Distance to Nearest Surface Water	0 1 2 3	2		6	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
[3] Containment	0 1 2 3	1		3	4.3
[4] Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 (1) 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			19	26	
[5] Targets					4.5
Surface Water Use	0 1 2 (3)	3	9	9	
Distance to a Sensitive Environment	0 (1) 2 3	2	2	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 (10) 12 16 18 20 24 30 32 35 40	1	10	40	
Total Targets Score			21	55	
[6] If line [1] is 45, multiply [1] x [4] x [5]. If line [1] is 0, multiply [2] x [3] x [4] x [5]			17,955	64,350	
[7] Divide line [6] by 64,350 and multiply by 100	S_{sw} = 27.90				

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AIR ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Observed Release	(0) 45	1		45	5.1
Date and Location: No data available.					
Sampling Protocol:					
If line [1] is 0, the S = 0. Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
[4] Multiply [1] x [2] x [3]				35,100	
[5] Divide line [4] by 35,100 and multiply by 100	S_a = 0				

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	S	S^2
Groundwater Route Score (S_{gw})	73.08	5,340.69
Surface Water Route Score (S_{sw})	27.90	778.41
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		6,119.10
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		78.22
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} \,/\, 1.73$		$S_M = 45.22$

WORKSHEET FOR COMPUTING S_M

100080

FIRE AND EXPLOSION WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Containment	1 3	1		3	7.1
[2] Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
[3] Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Total Targets Score				24	
[4] Multiply [1] x [2] x [3]				1,440	
[5] Divide line [5] by 1,440 and multiply by 100 S_{FE} =					

DIRECT CONTACT WORK SHEET

	Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1	Observed Incident	0 45	1		45	8.1
	If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2	Accessibility	0 1 2 3	1		3	8.2
3	Containment	0 15	1		15	8.3
4	Waste Characteristics Toxicity	0 1 2 3	5		15	8.4
5	Targets					8.5
	Population Within a 1-Mile Radius	0 1 2 3 4 5	4		20	
	Distance to a Critical Habitat	0 1 2 3	4		12	
	Total Targets Score				32	
6	If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				21,600	
7	Divide line 6 by 21,600 and multiply by 100 S_{DC} =					

100082

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Combe-Fill Landfill South

LOCATION: Parker Rd, Chester, Morris Co., NJ

100083

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Carbon Tetrachloride
Tetrachloroethylene
Heptane
Trichloroethylene
1,2 Dichloroethane

} chemical analysis done by NJ Dept. of Health

Rationale for attributing the contaminants to the facility:

Contaminants detected in on-site and down-gradient wells — no other potential source of pollution exists; same contaminants detected in leachate on site.

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern: —

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/ storage:

100084

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual lake or seasonal evaporation (list months for seasonal):

Net precipitation (subtract the above figures):

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Permeability associated with soil type:

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:
Carbon Tetrachloride
Tetrachloroethylene
Trichloroethylene
Heptane
} chemical analyses done by NJ Dept of Health Labs - data in DWM, Trenton files.

Compound with highest score:
Carbon Tetrachloride (HRS User Manual)

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):
old landfill = no basis of estimating quantity directly is available.
Scored as a "1" (see discussion below)

Basis of estimating and/or computing waste quantity:
Evidence of groundwater contamination. Based on p. 3 of "Supplemental Instructions for the Hazard Ranking System", Steve Caldwell, July 29, 1982.

* * *

100086

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Potable - Precambrian Gneissic bedrock (interviews with homeowners; all aquifers linked by fracturing — see geological report, attached)

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Several private wells located along Parker Road (NJDEP on-site inspection)
Nearest well owned by Mr. Manfredonia

Distance to above well or building:

* 50 feet

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

* Public supply wells belonging to Chester Twp, Chester Boro, Washington Twp, several schools and various commercial enterprises

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

* None

Total population served by ground water within a 3-mile radius:

* 11,200

* Info supplied by Frank Matteo, Morris County Health Officer

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Carbon Tetrachloride
Heptane
Benzene
Dibromochloromethane

(Chemical analysis done by NJ Dept. of Health)

Rationale for attributing the contaminants to the facility:

Observed leachate streams entering Trout Brook

(Inspection reports filed at NJDEP Division of Water Management, Trenton)

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

100088

Is the facility completely surrounded by areas of higher elevation?

1-Year 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

100089

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

see p. 4

Compound with highest score:

Carbon Tetrachloride (HRS User Manual)

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Scored as a "1"
(see p. 4)

Basis of estimating and/or computing waste quantity:

(see p. 4)

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreational - Trout Brook was trout maintenance area; adversely impacted by contaminant. Hacklebarney State Park, Schooley's Mountain Park (Div. of Water Resources files)

Potable (Frank Matteo, Morris Co. Health Officer)

100090

Is there tidal influence?

NO

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

~ 3000' to PEM + PFO (palustrine wetlands)
(Nat'l Wetlands Inventory map, Chester quad, US Dept. of the Interior)

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

2 Intakes, located along Trout Brook (one is 2000' from leachate entry point and the other is 2 miles downstream).

(Frank Matteo, County Health Officer)

100091

[illegible] area irrigated by above[illegible]ted intake(s) and conversion to [illegible]ion (1.5 people per acre):

Total population served:

8 people in two families
(Frank Matteo, Co. H.O.)

Name/description of nearest of above water bodies:

Streams tributary to Trout Brook, former trout maintenance area

Distance to above-cited intakes, measured in stream miles.

2000' and 2 miles

100092

1 OBSERVED RELEASE

Contaminants detected: No sampling performed

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

100094

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

100095