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Post Office Box I, Winston-Salem, NC 27108

Alleghany County Landfill

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P.O. Box 1, Winston-Salem, NC 27108 (919) 724-6994

August 12, 1992

Alleghany County Landfill
Attn: Mr. Dan McMillan
P.O. Box 366
Sparta, NC 38675

Dear Mr. McMillan:

Enclosed are copies of laboratory reports of analysis for three groundwater samples collected from monitoring wells at the Alleghany County Landfill on June 23, 1992. I apologize in the delay in providing these results to you. The cause for the delay was an error in the original laboratory analyses which required that the samples be re-analyzed for cadmium and mercury to meet state required detection limits. A copy of the original laboratory report is included for your information only. A copy of the revised report dated August 5, 1992 has been submitted to the NC Department of Environment, Health & Natural Resources, Division of Health Services on your behalf.

Also enclosed is an invoice for the collection and analysis of these samples. The invoice exceeds the amount of our original proposal because of the additional analyses which were required by the state. It is my understanding that Jeff Wyatt, of our office, verbally informed you of the cost of the additional analyses.

A review of the laboratory results indicates that the groundwater in the area of well MW-1 has been degraded. Although pH, Iron, and Manganese concentrations in wells MW-2 and MW-3 exceed the NC Drinking Water Limits, they are well within normally occurring concentrations in groundwater.

Two semi-volatile organic compounds were detected and quantified in the groundwater sample from MW-1. Diethyl Phthalate was present at a concentration of 24 parts per billion (ppb). This compound is a solvent and could have been placed in the landfill in almost any form. Asphalt, paints, wood preservatives, plastics, cleaning fluids, and solvent mixtures are possible sources. Bis(2-ethylhexyl)Phthalate was detected at a concentration of 10 ppb. This compound is known to leach from many plastics. Based on the presence of this compound in the method blank (a sample of distilled water which is analyzed in the same manner as

the samples) and in each of the other samples analyzed, it is likely that this compound was not present in the groundwater at the landfill but was introduced at the laboratory during the analytical procedures. Although neither of these semi-volatile compounds is included in the list of compounds which have specific concentrations specified in Water Quality Standards Applicable to the Groundwaters of North Carolina (Commonly known as the 2L standards which are NC Administrative Code, Title 15, Subchapter 2L), the 2L standards specify that "substances which are not naturally occurring and for which no standard is specified shall not be permitted in detectable concentrations".

Several volatile organic compounds were detected and quantified in the groundwater sample from MW-1. Of the volatile organics quantified, Methylene Chloride at a concentration of 30 ppb is the only one which exceeds the 2L standard of 5 ppb. Methylene Chloride is also a solvent which could have been placed in the landfill in many different forms. The other volatile organic compounds which were detected in the groundwater sample from MW-1 include Toluene, Ethylbenzene, and Xylenes which are all petroleum hydrocarbons. These hydrocarbons are most commonly associated with fuels such as gasoline, kerosene, diesel fuel, and heating oil.

Metals detected in the groundwater samples from the landfill were limited to Iron and Manganese for which limits have been set to protect the aesthetic qualities of drinking water including taste, odor or appearance. Iron and Manganese are naturally occurring in the soils and leach into the groundwater. The fact that the concentrations are much higher in well MW-1 than in the other wells may be due to the presence of other compounds or may simply be due to natural variations in the soil composition.

The indicator parameters generally do not reflect the presence of a hazard, but include low cost tests to indicate the possible presence of hazardous compounds which would require that more extensive analysis be performed to determine whether hazardous compounds are present.

Total Organic Halogens include all organic compounds which contain chlorine, iodine, bromine and fluorine. Many organic halogens are toxic including Methylene Chloride, most halogenated hydrocarbons, and PCBs, but there are some relatively harmless ones. Total

Organic Carbon tests for all organic compounds.

Conductivity is a measure of how well a substance conducts electricity. Although water is fair conductor of electricity, when other compounds are dissolved in the water it may become a much better conductor. The fact that the conductivity in MW-1 is much greater than the conductivity in the other wells at the landfill is probably due to the chloride concentration.

Chloride is the ionic form of chlorine. By itself, chloride is not a serious health concern, but it can cause a salty or metallic taste in water, is very reactive with other substances and is present in many toxic chemicals. Chloride also increases the conductivity of water.

pH is an indication of the acidity or alkalinity of water. pH levels below 7 are acidic, with lower pH levels indicating greater acidity.

Total Dissolved Solids indicate the amount of solids which are dissolved in the water. This does not indicate that the solids which are dissolved are in any way harmful, however, if the total amount dissolved is high this may indicate that the water is acidic or contains solvents.

The amount of Nitrate-Nitrogen indicates the amount of nitrates present in the water. Although nitrates are not generally harmful to adults unless ingested in extremely high quantities, nitrates can cause health problems for young children.

Biochemical Oxygen Demand indicates the amount of oxygen used by living organisms in the water. If the BOD concentration is high, this would indicate a need for testing for harmful bacteria prior to using the water as a source of drinking water.

Chemical Oxygen Demand indicates the amount of oxygen used by chemical reactions occurring in the water. If the COD concentration is high, additional analyses should be performed to determine whether the reactions involve toxic chemicals.

As far as what this means for the future, a strict interpretation of the law requires you to either "demonstrate, through predictive calculations or modeling, that natural site conditions, facility design and operational controls will prevent a violation of standards" at the property boundary or a boundary established 500 feet from the fill, whichever is closer to the fill, OR "assess the cause, significance and extent of the violation of groundwater quality standards and submit the results of the investigation and a plan for groundwater quality restoration". I have personally never seen this enforced. What is likely to happen is that the county will be required by the state to do additional analyses, which may include testing for volatile and

semi-volatile organics each time the water is tested, testing the water more frequently, and/or installing additional monitoring wells at the landfill.

New federal regulations have been passed which will begin to be phased in during 1993. The state has proposed regulation which is expected to be more specific than the federal regulations. At this point in time, no one knows exactly what impact the state regulations will have, or how quickly they will be phased in. The federal regulations require testing for volatile and semi-volatile organics at all landfills twice a year, determination of groundwater flow direction during each sample collection event, and a determination of hydraulic conductivity on an annual basis. We estimate that the additional requirements will increase the cost of water quality monitoring by a factor of 2 to 2.5 times the current cost.

Should you have any questions concerning this correspondence, or if I may be of any further assistance, please do not hesitate to contact me.

Sincerely:

ENGINEERING TECTONICS, P.A.



Julianne M. Braun
Staff Geochemist

Enclosures: Laboratory Report - July 8, 1992
 Laboratory Report - August 5, 1992
 Table - Summary of Lab Results
 Copy - Letter to Bobby Lutfy, NC DHS Solid Waste Branch



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P.O. Box 1, Winston-Salem, NC 27108 (919) 724-6994

August 12, 1992

NC Department of Environment, Health & Natural Resources
Division of Health Services
Solid Waste Branch
Attn: Mr. Bobby Lutfy
P.O. Box 27687
Raleigh, North Carolina 27611-7687

Dear Mr. Lutfy:

Enclosed is a copy of the laboratory report of analyses performed on 3 groundwater samples collected from the Alleghany County Sanitary Landfill on June 23, 1992. I apologize for not having these to you sooner. The reason for the delay is that the samples had to be re-run for cadmium and mercury to obtain acceptable detection limits.

Should you have any questions concerning this correspondence, the analytical results, or the manner of sample collection or analysis, please do not hesitate to contact me or Jeff Wyatt at the letterhead address.

Sincerely:

ENGINEERING TECTONICS, P.A.

Julianne M. Braun
Staff Geochemist

cc: Mr. Dan McMillan, Alleghany County
ET files