Preliminary Report

Town of Conklin Landfills

Town of Conklin
Conklin, New York

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O'BRIEN & GERE

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PRELIMINARY REPORT

TOWN OF CONKLIN LANDFILLS

OCTOBER, 1987

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Background

The Town of Conklin owns two inactive municipal landfills (Upper and Lower) (the "Site") within the perimeter of the Broome Corporate Park (Industrial Park). O'Brien & Gere Engineers completed a two phase hydrogeologic investigation for the Broome County Industrial Development Agency in February 1985. In October 1985, a Remedial Investigation/Feasibility Study Work Plan was prepared by O'Brien & Gere and forwarded to the New York State Department of Environmental Conservation (DEC) on behalf of the Town of Conklin for review and comment. In January 1986, the field investigation was begun based on technical approval of the Work Plan by the DEC. Negotiations between the Town of Conklin and the DEC continued over the form of the Consent Order. In June 1986 the site of the Town Landfills was proposed for inclusion on the National Priorities List (NPL). On October 17, 1986, Congress passed the Superfund Amendments and Reauthorization Act of 1986 (SARA) which modified the requirements of an RI/FS. On June 12, 1987, a Consent Order was signed between the DEC and the Town of Conklin which required as a first step, the preparation of a Preliminary Report. The Preliminary Report is to include all data generated to date as part of the Remedial Investigation as well as a supplemental RI/FS Work Plan to address required changes under SARA.

Remedial Investigation Studies

Field activities associated with the Site have been conducted over the period 1983 through 1986. Site investigations have included the installation of 22 monitoring wells, permeability testing, a magnetometer survey, as well as homeowner supply well, ground water, surface water, sediment, and leachate sampling and analyses. The data and preliminary interpretation of the results of these studies are presented in this Preliminary Report.

Ground water flow across the site is from west to east towards the Susquehanna River. The Upper Landfill is underlain by relatively impermeable (2.3×10^{-7} cm/sec) glacial till at a hydraulic gradient of 0.070. The Lower Landfill is underlain by outwash sand and gravel that has a relatively high permeability on the order of 0.43 to 4.6×10^{-3} cm/sec at a hydraulic gradient of 0.01. Ground water on the site may locally discharge to wetland/surface water areas or receive recharge from these areas depending on localized subsurface conditions.

Ground water quality monitoring indicates the migration of leachate from both the Upper and Lower Landfills to ground water. Organic solvents and metals have been identified in ground water monitoring wells downgradient of each landfill.

Samples collected from wetland areas and Carlin Creek have not demonstrated a measurable change in water quality or sediment characteristics as a result of releases from the landfills at the Site.

Supplemental RI/FS Work Plan

Data generated by the field investigations completed to date suggest certain remedial technologies as feasible. To better define the applicability of these technologies and costs, it is necessary to develop additional data. In addition, the development of the Industrial Park has continued over the past two - three years, therefore the assessments of topographic conditions and land use need to be updated. These supplemental remedial investigation studies are consistent with interim guidance on the RI process provided in December 1986 after SARA.

One alternative to be evaluated includes consolidation of material from the Lower Landfill into the Upper Landfill. To define the technical feasibility and cost, a better definition of the Lower Landfill volume and subsurface conditions in the vicinity of the Upper Landfill are recommended. In addition, permeability studies on the existing Upper Landfill cover and on other onsite materials are recommended to determine remedial cost.

Ground water quality has not been determined since early 1986. Routine monitoring of the Town of Conklin Landfill site is anticipated as part of any remedial approach. Prior to completing the RI Report, another set of water quality analyses are recommended.

Leachate collection and treatment is a likely component of the selected remedial alternative. To define costs associated with this option, volume calculations must be combined with treatment cost. Supplemental tests assessing compatibility of leachate with existing wastewater treatment facilities are recommended.

PART I

REMEDIAL INVESTIGATION STUDIES

SECTION 1 - INTRODUCTION

1.01 Site Background

The Town of Conklin owns two inactive municipal landfills (upper and Lower) located south of Powers Road, approximately two kilometers (one mile) north of the Kirkwood Interchange of Interstate Route 81. The two landfills are located within the perimeter of the Broome Corporate Park (Industrial Park) in Broome County, New York. Figure 1 depicts the Industrial Park's location and Figure 2 illustrates the boundaries of both the Upper and the Lower Landfills.

The Lower Landfill was operated by the Town of Conklin from 1964 to 1969. The landfill was used to contain municipal solid waste, although some industrial wastes may have been disposed of at the site. The Lower Landfill is estimated to contain a total filled volume of approximately 40,000 m^3 (50,000 yd^3). Designated wetlands surround a large portion of the Lower Landfill, which is located in the east central portion of the Industrial Park.

The Upper Landfill was operated by the Town of Conklin from 1969 until a closure order issued by the DEC required the closing of the landfill in 1975. A large portion of the waste deposited in the landfill is municipal solid waste, although some industrial wastes may have also been deposited there. The Upper Landfill, located in the west central portion of the Industrial Park, is estimated to contain a total filled volume of approximately 140,000 m^3 (180,000 cubic yards) of waste material. Tree cover is adjacent to the south, east and north sides of the Upper Landfill.

1.02 Previous Studies

O'Brien & Gere Engineers, Inc. completed a two phase hydrogeologic investigation of the Industrial Park for the Broome County Industrial Development Agency (BIDA). The Phase I Hydrogeologic Investigation was completed in March 1984 and the investigation evaluated the potential for contamination and development limitations of the two inactive landfills located within the proposed Industrial Park. The Phase II Hydrogeologic Investigation was completed in February 1985. The investigation characterized the local hydrogeology and identified the hydrogeologic conditions that would affect development of the Industrial Park.

The two investigations have identified the presence of leachate seeps from both landfills. In addition, ground water monitoring wells located within the Industrial Park demonstrated the release of leachate to ground water in selected locations.

In 1985, a Remedial Investigation/Feasibility Study (RI/FS) Work Plan was prepared and submitted to the DEC. In January 1986, the field investigation was begun based on an approved Work Plan. In June 1986, the Town Landfills were proposed for inclusion on the National Priorities List. In June 1986 the field efforts included in the approved Work Plan were completed and the Town of Conklin so advised. On October 17, 1986, Congress passed the Superfund Amendments and Reauthorization Act of 1986 (SARA) which modified the requirements of an RI/FS. In November 1986, the Town advised O'Brien & Gere to suspend work, pending completion of the renewal of negotiations on the form of a Consent Order due to the availability of RI/FS funding under the Environmental Quality Review Act of 1986.

On June 12, 1987, a Consent Order was signed by the DEC and the Town which required the preparation of a Preliminary Report. The Preliminary Report was to include all data generated to date as well as any revisions to the Work Plan required by SARA. The preliminary report was reviewed by the Town and State of New York officials, and a revised report is presented herein.

SECTION 2 - SITE FEATURES INVESTIGATION

2.01 Demography

The 1980 U.S. Census reported the total population of the Town of Conklin to be 6,204. Approximately 700 people reside within one mile of the Site. The median age of the Town of Conklin residents was 29.9 years and the median family income of the Town of Conklin residents was $19,661 (BIDA, 1985).

2.02 Land Use

The predominant land uses in the Town of Conklin are agricultural/vacant and forest uses. These two land uses occupy approximately 89% of the land in the Town of Conklin. Single family homes account for the third single largest land area in the Town of Conklin, occupying approximately 8% of the land area in the Town of Conklin. Industrial areas comprise 0.5% of the land use in the Town of Conklin (BIDA, 1985).

The Industrial Park is zoned Industrial Limited (IL), Industrial Development (ID) and one- and two-family residential. The residentially zoned areas occupy the southern one third of the property. The Town of Conklin Comprehensive Plan has targeted the entire property for industrial development (BIDA, 1985).

2.03 Natural Resources

The Site is located within the Appalachian Plateau and the unconsolidated deposits underlying the site consist of glacial till, lacustrine deposits and outwash sand and gravel. The sand and gravel in the vicinity of the Lower Landfill is an unconfined aquifer that supplies drinking water to the homeowner wells along Route 7. The Susquehanna River is located approximately one kilometer (0.5 miles) to the east of the Lower Landfill.

Approximately 16 hectares (40 acres) of state-regulated wetlands and 8 hectares (20 acres) of unregulated wetlands exist adjacent to the Site as illustrated in Figure 2. (BIDA, 1985).

2.04 Climatology

Climatological data for the geographic region have been gathered for the time period of 1972-1986. The average yearly precipitation for the region during this time period was approximately 1 meter (38.88 inches). The average temperature for the area during this time period was 7.89°C (46.2°F), with low and high average monthly temperature data recorded over the time period of -10.22°C (13.6°F) and 22.67°C (72.8°F), respectively.

SECTION 3 - WASTE CHARACTERIZATION

3.01 General

Between 1964 and 1969, the Lower Landfill was used for the disposal of municipal solid waste. Between 1969 and 1975, the Upper Landfill was used for the disposal of municipal solid waste. Given the wide variety of materials found in municipal refuse, it is unlikely that a characterization of the landfill contents would provide sufficient valuable information regarding impacts to the environment. Consequently, the investigation was based on a characterization of various environmental matrices (ie. ground water, surface water, sediment) to determine the environmental impacts posed by the landfills at the site.

The analytical program included samples of the leachate from the Lower and the Upper Landfills, surface water samples from Carlin Creek and the adjacent wetlands, sediment samples from Carlin Creek and the wetlands, and ground water samples from monitoring and homeowner wells. Analytical parameters included site specific indicators and specific parameters such as PCBs, pesticide/herbicides, and metals.

Sample identification was based on a horizontal location number, a depth/strata number, sample type, and the date collected. At a given horizontal location, several samples might be collected to characterize different strata, sediment/fill or ground water. Each sample was then given a discrete laboratory number to trace it through the various analytical protocols.

Locations 101-117 include homeowner and municipal supply wells to the east of the Lower Landfill. Locations 13 through 16 and 23 through 26 represent leachate sampling areas. Leachate samples taken from locations 23 through 26 were composited in equal volumes and submitted for chemical analyses as Location 27. Locations 1 through 12 and 17 through 22 are ground water monitoring well sites. Locations 30 through 35 were sample locations for both surface water and sediment samples. Locations 28 and 29 have been reserved for future sampling, if required. All sampling locations with the exception of Location 19, are shown on Figure 2. Monitoring Well 19 is located approximately 4000 feet south along the roadway and opposite the Susquehanna River (see Figure 5).

3.02 Nature of Waste Materials

The wastes deposited in both the Lower and Upper Landfills are reported to be municipal solid waste as there is no record of disposal of any industrial waste. Sampling of leachate from the Lower Landfill revealed measurable concentrations of iron, manganese, mercury, copper and benzene. Ground water monitoring wells in the vicinity of the Lower Landfill have been sampled, and the analytical results revealed measurable concentrations of iron, manganese, arsenic, mercury and benzene.

Sampling of leachate from the Upper Landfill revealed measurable concentrations of iron, manganese, cadmium, chloride, trichloroethene, tetrachloroethene, 1,1-dichloroethane, 1,2-dichloroethane, ethyl benzene and benzene. Ground water monitoring wells in the vicinity of the Upper Landfill have been sampled, and the analytical results revealed measurable concentrations of iron, manganese, sulfate, arsenic, vinyl chloride, 1,1-dichloroethane, 1,2-dichloroethane, benzene and toluene.

Additional information on the analytical results for ground water, leachate, sediment, and soil borings can be found in Sections 4 and 5.

SECTION 4 - HYDROGEOLOGIC INVESTIGATION

4.01 Soils

4.01.01 Soil Types

The Industrial Park is underlain by soils of the Lordstown-Volusia-Mardin association. The association is composed of the following soil series: Lordstown, Volusia, Mardin, Canaseraga, Chenango and Dalton.

The Lordstown series is composed of well-drained soils that offer high-bearing capacity and good stability over bedrock.

Volusia series soils are moderately well to poorly drained with high-bearing capacity and low compressibility. Volusia series soils also have a seasonally high water table which is typically found atop a slowly permeable fragipan layer.

The Mardin series is moderately well-drained and the subsoils bottom layer has a dense, very channery silt loam fragipan that often creates a perched water table. Mardin series soils have a high-bearing capacity.

Canaseraga series soils are deep, well-drained soils that are prone to seasonal wetness and have varying bearing capacities.

Chenango series soils are deep, well-drained soils and, like the Canaseraga series soils, are considered to be prime agricultural soils.

Dalton series soils contain two contrasting deposits with a dense fragipan that separates the two deposits and creates a seasonally high water table that results in varying bearing capacities (BIDA, 1985).

4.02 Geology

4.02.01 Regional Geology

The Site is located within the Susquehanna section of the glaciated Appalachian Plateau. The regional physiography is characterized by moderately to steeply sloping uplands and broad, flat to gently undulating valley bottoms. The landscape has been sculptured primarily by fluvial processes, which have created numerous drainage systems dissecting the plateau surface. Glacial processes have further modified the region by rounding hill tops, truncating bedrock spurs, steepening valley walls, and partially filling the Susquehanna River valley with unconsolidated deposits.

The bedrock that underlies the site consists predominantly of fine-grained shale and siltstone. These units were consolidated into rock formations from sediments deposited in a shallow sea during late Devonian time (approximately 350 million years ago). Individual shale and siltstone layers dip gently to the southwest at gradients of less than 0.004 m/m (20 feet per mile). Small post depositional horizontal and vertical fractures are present in the bedrock.

4.02.02 Site Geology

The local shale/siltstone bedrock topography in the vicinity of the Site is covered with varying thicknesses of unconsolidated sediments. Most of these sediments were deposited as the result of glacial processes and post glacial recession. These sediments have subsequently been dissected and modified by recent fluvial processes. The glacial sediments in the vicinity of the Lower Landfill have been identified as till, outwash and glacio-lacustrine (lake) deposits.

Till is a dense, unsorted mixture of rock fragments and gravel in a silt, clay, and sand matrix. Outwash deposits are characteristically comprised of well-sorted washed sands and gravels. Glacio-lacustrine or glacial lake deposits are typically fine grained silts, clays and sands deposited in glacial lake beds that formed when meltwater drainage was blocked by the glacial ice mass. Recent alluvial sediments are identified as silts, sands, and gravels deposited by modern fluvial processes. Figure 3 shows the areal distribution of surficial unconsolidated deposits encompassing the Industrial Park.

Descriptive soil boring logs obtained in conjunction with the installation of monitoring wells have been used to characterize the horizontal and vertical extent of subsurface hydrogeologic units. The hydrogeologic cross section, Figure 4, defines the relative thicknesses and lateral continuity of unconsolidated deposits along a northwest-southeast trending traverse. The cross section can be located in Figure 2.

The local subsurface geology in the immediate vicinity of the Lower Landfill is primarily glacial outwash overlying glacial till. Further downgradient, the outwash sand and gravels are underlain by laucustrine silt, fine sand, and clay. These deposits are superimposed on the dense glacial till deposits.

The local subsurface geology in the vicinity of the Upper Landfill is primarily glacial till. The refuse is bordered to the southeast by a lens of low permeability silt. The silt layer extends downgradient from the base of the refuse. Further downgradient, the silt changes to sand and gravel outwash overlying the till.

4.02.03 Subsurface Investigations

Test Borings

In July and August of 1983, eight (8) soil test borings were installed in the vicinity of the Lower Landfill and seven (7) soil test borings were installed in the vicinity of the Upper Landfill. All fifteen (15) of these test borings were converted into ground water monitoring wells 1-15.

A total of ten (10) soil borings were installed within the Industrial Park between October and November, 1984. Four (4) of the ten soil borings were converted into ground water monitoring wells (Wells 17-20), while the remaining were left as soil borings. Figure 2 shows the locations for borings B1 through B3, while borings B4 and B5 are located approximately 1/2 mile south of the landfills and B6 is located approximately 200 feet north of the upper landfill. The boring program was initiated to obtain information concerning the horizontal and vertical extent of overburden materials within the landfills and areas adjacent to the landfills. A geologic log was prepared for each of the borings describing soil types, formation depths, texture, color, density, etc. The soil sampling methods and boring logs are presented as Appendix C. Well 6 was installed using a well point of one meter (3 feet), therefore, no log is present for Well 6.

Magnetometer Survey

A field magnetometer survey was performed to delineate the horizontal boundary of buried metallic fill in the Upper Landfill. A grid system with a 50-foot interval spacing was established from an existing topographic survey. A Geometric^{R} proton magnetometer Model G-816/6826 was used throughout the survey to collect total magnetic field data at each defined grid point station. At each grid point, data were collected pertaining to the grid point location, total magnetic field intensity, and the time the reading was collected. An offsite base station was defined and reoccupied periodically to correct for diurnal (magnetic drift) changes.

To supplement the magnetometer survey, aerial photographs encompassing the Upper Landfill were obtained. To review the historic development of the Industrial Park, photographs from 1973 and 1981 were reviewed. The information derived from these sources was used to estimate the horizontal extent of fill in the Upper Landfill.

The magnetometer survey also detected ferro-magnetic objects within the forested area lying outside of the defined landfill boundaries. Further investigations indicated that the elevated magnetic field readings were the result of surface debris including, wheels, cans, and other miscellaneous metallic debris.

A magnetometer survey has not been conducted on the Lower Landfill.

4.03 Ground Water

4.03.01 General

An unconfined aquifer exists along the eastern portion of the Industrial Park and this aquifer supplies drinking water to the homeowner wells along Route 7. The Town of Conklin Well 3 is located approximately 610 meters (2,000 ft.) northeast of the Lower Landfill and the well is capable of producing 0.85 m^3/min. (224 gal/min.).

Six monitoring wells (Wells 5, 6, 7, 8, 9 and 10) were installed in the vicinity of the Lower Landfill and six monitoring wells (1, 2, 3, 4, 11, 12) were installed in the vicinity of the Upper Landfill from July 1983 through January 1984 during the Phase I Hydrogeologic Investigation. Four additional monitoring wells (Wells 17-20) were installed from October 1984 through December 1984 during the Phase II Hydrogeologic Investigation. Two additional monitoring wells (Wells 21 and 22) were installed during January 1986. The wells were used to establish a ground water profile, provide information on the flow rate and direction of ground water movement and supply sampling points to determine ground water quality. The locations of all wells are shown on Figure 2.

4.03.02 Well Installation and Development

All the wells were installed using hollow stem auger drilling methods. Well installation procedures, well development procedures and well descriptions are given in Appendix D.

4.03.03 Ground Water Flow Conditions

Part of the precipitation falling on the land surface is transported as surface water runoff, some of it returns to the atmosphere as evaportranspiration, and the remainder percolates through the soils until it reaches the water table. Once infiltrating water reaches the water table, it enters the ground water flow system and flows under the influence of gravity down the slope of the water table until it reaches a point of discharge such as a wetland, stream or river. At the Lower Landfill, a portion of the ground water discharges locally into the Wetland BE6 but most of the ground water will flow beneath the local discharge point and discharge into the Susquehanna River. At the Upper Landfill, the ground water may discharge locally into the wetlands or Carlin Creek, but most of the ground water will likely flow beneath these local discharge points and discharge into the Susquehanna River.

The ground water elevation map illustrated on Figure 5 depicts the configuration of the potentiometric surface from the ground water elevation data collected on December 20, 1984. Ground water elevation data are summarized in Table 1. The ground water within the outwash occurs at a depth ranging from five to ten feet below the surface. The ground water gradient slopes in an eastward direction towards the Susquehanna River.

The hydraulic gradient, measured from Figure 5, is steep in the uplands areas, approximately 0.07 m/m, and relatively gentle within the valley in the vicinity of the Lower Landfill, approximately 0.01 m/m.

The water transmitting capacity, or permeability, of the various geologic formations were estimated by conducting in-situ permeability tests on several monitoring wells. The results of the tests conducted on Wells 1, 3-7, 9-12, and 17-20 are included in Appendix D. No permeability tests have been conducted on Wells 2, 8, 13-16, 21 and 22. The permeability test data for Wells 1, and 19, which were installed within the glacial till, indicate that the permeability of the till ranges from 2.3×10^{-7} to 3.8×10^{-7} cm/sec (6.5×10^{-4} to 1.08×10^{-3} ft/day). The permeability test data for Wells 7, 9, and 10 indicate a permeability for the outwash sand and gravel ranging from 1.8×10^{-3} to 4.6×10^{-3} cm/sec (5.1 to 13.0 ft/day).

Permeability tests were also conducted on Wells 5, 6, 17, 18, and 20. However, because these wells were installed within mixed deposits of sand and gravel interbedded with silts and clays, the permeabilities were highly variable, ranging from 9.63×10^{-5} cm/sec to 2.6×10^{-3} cm/sec (0.27 to 7.37 ft/day). A summary of the permeability data is shown in Table 2.

The velocity of ground water at the site can be approximated using Darcy's law and estimates of the hydraulic gradient, aquifer permeability and aquifer porosity. The ground water flow velocity equation is as follows:

$$V = K \frac{(dh/dL)}{a}$$

Where: V = Velocity, in m per sec.

K = permeability, in m/sec.

dh/dL = hydraulic gradient; in m/m

a = porosity

The upland area encompassing the Upper Landfill is underlain by glacial till which has a low permeability, 2.3×10^{-7} cm/sec. (6.5×10^{-4} ft/day) at Well 1, and an estimated porosity of 0.34 which is typical for glacial till (Todd, 1980). Based on this information, and a hydraulic gradient of 0.070, it is estimated that the ground water flow velocity within the glacial till beneath the Upper Landfill is approximately 0.014 m/year (0.048 ft/year).

The lowland area in the vicinity of the Lower Landfill is underlain by outwash sand and gravel that has a relatively high permeability. Wells 7 and 9 that are screened entirely within the outmass have a permeability ranging from 4.6×10^{-3} cm/sec to 1.8×10^{-3} cm/sec (1.22 to 13.0 ft/day) and an estimated porosity of 0.25. Based on these data, and a hydraulic gradient of 0.010 m/m, it is estimated that the ground water velocity of the lowland area ranges from 0.06 to 0.16 m/day (0.20 to 0.52 ft/day).

4.03.04 Ground Water Sampling and Analysis

Ground water quality in the vicinity of the Site was assessed by sampling supply wells and ground water monitoring wells in and around the Lower Landfill and Upper Landfill. Figure 2 presents the location of the wells sampled as part of this study. Locations

1-12, 17-18 and 20-22 are ground water monitoring wells, while locations 101-117 are private homeowner wells. Homeowner wells 101-112 were sampled by the Broome County Industrial Development Agency (BIDA) and were analyzed by O'Brien & Gere. Homeowner wells 113-117 were sampled by the Broome County Health Department and were analyzed by the New York State Department of Health (NYS DOH).

Homeowner supply wells were sampled for purgeable priority pollutants as well as several metals and other parameters. The ground water from the monitoring wells was analyzed for pH, specific conductance, TOC, TDS, purgeable priority pollutants (Table 3), chlorides, filterable iron, arsenic, copper, manganese and mercury. In addition, Wells 15, 18 and 21 were also analyzed for organic priority pollutants by EPA Methods 608 and 625.

4.03.05 Ground Water Quality

Analytical results of ground water from the monitoring wells are presented in Appendix I. A summary of inorganic parameters for ground water quality data in the vicinity of the Lower and Upper Landfills is given in Table 4. Table 5 presents a summary of ground water quality purgeable priority pollutants for the Lower and Upper Landfills. As discussed in the following sections, the analytical results were compared to background water quality, the natural quality of ground water within a glacial till aquifer (Table 6) and Class GA ground water standards (Table 7).

Background Wells

Examination of Figure 5 demonstrates that hydraulically upgradient wells to the Lower Landfill include Well 6 and Well 21. Well 6 was installed as a background well during 1983, while Well 21 was installed during early 1986. Well 6 was used as a background well during the 1983-84 studies; however it was damaged and unavailable for use during the recent investigations.

Examination of the Well 21 data within summary Table 4 suggests that the hydraulically upgradient water quality is characterized by a relatively low pH (6.0) and high iron concentration (2.6 mg/l). Total Organic Carbon (TOC) values changed considerably during the three month interval between the January 21, 1986 sampling and the April 24, 1986 sampling. Supplemental analyses during April resulted in a TOC value of 6 mg/l which is consistent with concentrations observed at Well 3 and Well 4 located further upgradient. The cause of this difference has not been determined. Other parameters determined during 1986 were similar in concentration to typical ground water quality values.

Ground water monitoring well 1 was installed hydraulically upgradient from the Upper Landfill and is representative of the background ground water quality adjacent to the Upper Landfill. Well 1 was analyzed and initially found to contain an iron concentration of 1.8 mg/l; however, the sample was unfiltered and entrained sediments likely resulted in elevated concentrations of iron and manganese. Subsequent samplings of the well showed a decrease in the iron content of the ground water to below detection limits. The most recent analysis indicates that the ground water from Well 1 is typical for the natural quality of ground water within a glacial till aquifer and meets the Class GA ground water standards.

Monitoring Wells

Five monitoring wells located hydraulically downgradient of the Lower Landfill were sampled as part of the 1986 investigation. Table 4 presents a summary of the results which demonstrate considerable variation in water quality within wells located in the vicinity of the Lower Landfill.

Well 5 and Well 8 are immediately downgradient of the fill area within approximately 6.1 meters of each other. Well 8 results demonstrated iron (5.7 mg/l) and manganese (1.59 mg/l) concentrations well above background quality at Well 21. However, these parameters for Well 5 were below background concentration. The difference is likely associated with the difference in screened interval. Well 8 is screened in the outwash sand and gravel which is likely to be the predominant path for leachate migration, whereas Well 5 is screened at the top of till in a silt and fine sand strata. The data demonstrate that other parameters were similar in concentration to indicators for Well 8 (total dissolved solids and TOC at 44 mg/l and 2 mg/l, respectively).

Well 9 and Well 10, located near the Lower Landfill, demonstrate manganese values similar to Well 8, but iron concentrations were non-detectable. Each of these wells is screened in materials geologically similar to Well 8 and at the same elevation. Other parameters were similar to those observed for Well 8 and the background Well 21.

Well 18, located approximately 400 meters (1400 feet) north of the Lower Landfill and lateral to downgradient ground water flow also demonstrated elevated concentrations of iron (0.86 mg/l) and manganese (2.9 mg/l). These results suggest that local variations in ground water concentrations of iron and manganese may be unrelated to landfill operations.

The organics data for ground water are summarized in Table 5. Traces of benzene were detected in Wells 7 and 8. Examination of temporal trends using Well 8 and Well 10 suggests only minor changes in water quality during that period. This is expected given the date of deposition of fill, anticipated velocity of 20 to 60 meters (70 to 190 feet) per year of ground water within the outwash sands and gravels, and the proximity of the wells to the fill.

Five monitoring wells located hydraulically downgradient of the Upper Landfill were sampled as part of the 1986 investigation and the analytical results are summarized in Tables 4 and 5. The discussion which follows addresses two aspects of the ground water data: spatial trends related to well locations and temporal trends at selected locations.

The analyses of Wells 3, 4, and 11 represent the ground water quality beneath and immediately hydraulically downgradient of the Upper Landfill. The analyses conducted during 1986 indicate elevated concentrations of some organic constituents and selected metals downgradient of the fill area. Wells 3 and 4, located within 100 meters (328 feet) east and north of the fill, generally had water quality similar to hydraulically upgradient Well 1.

Well 21 and Well 22 water samples were within a reasonable range of background Well 1 for all parameters except iron and manganese. Well 18 also demonstrated elevated concentrations of iron and manganese. Given the general ground water flow direction, the locations of these three wells, the screened strata and the water quality in Well 3 and Well 4, the elevated iron and manganese concentrations do not appear to be associated with landfill activities.

Temporal trends can be addressed by examining solvent and metal data generated during 1983 and 1986. Well 11 and Well 3 serve as examples of locations where some changes in water quality resulting from landfill activities are evident.

At Well 3 in 1983, benzene was present at the detection limit of 0.001 mg/l. In 1984, no benzene was detected. TOC data indicate a reduction from 59 mg/l to 6 mg/l over the three year period. Manganese concentrations have decreased from a 1983 average of 0.85 mg/l to 0.09 mg/l in 1986.

At Well 11, solvent concentrations in 1983 were generally of the same order of magnitude as the solvent concentrations for 1986. Some solvents, methylene chloride and benzene, were not detected in 1986, while both solvents were present in low microgram/liter concentrations in 1983. Conversely, chloroethane and 1,1-dichloroethane increased to concentrations of 0.063 mg/l and 0.210 mg/l, respectively, from low microgram/liter concentrations.

Supply Wells

Seventeen homeowner wells were sampled during November 1983 to determine supply well water quality. The homes that were sampled are located east of the Lower Landfill along Route 7. The sampling was done by the BIDA, with the analytical work provided by O'Brien & Gere Engineers, Inc. and the New York State Department of Health (NYSDOH). Homeowner well locations are shown in Figure 2 with the analytical results developed by O'Brien & Gere presented in Table 8 and NYSDOH data presented in Exhibit A. Wells 1 to 17 presented in Table 8 are equivalent to Wells 101 to 117 depicted in Figure 2.

Analytical results showed the presence of arsenic, manganese and iron in several of the wells. The level of arsenic in well 109 exceeded the NYSDOH drinking water standard of 0.05 mg/l during November 1983. Each well initially found to contain arsenic was resampled in January 1984. These analyses indicated that wells 102 and 109 still contained measurable arsenic in January 1984, but did not exceed the NYSDOH drinking water standard for arsenic. Iron and manganese concentrations varied considerably with no horizontal pattern discernible. Differences are likely related to depth of well and aquifer being tapped.

SECTION 5 - SURFACE WATER INVESTIGATION

5.01 General

The Final Environmental Impact Statement for development of the Broome Corporate Park prepared by the Broome Industrial Development Agency in June 1985 presented a detailed section describing the surface water hydrology present at the Industrial Park. The Lower Landfill is surrounded by the surface waters described. Excerpts from that document are presented as the following sections: 5.01.01 Streams and Drainage and 5.01.02 Wetlands.

5.01.01 Streams and Drainage

The land area near the Lower Landfill is drained by a dendritic pattern of permanently flowing and intermittent streams. The streams are associated with three small watersheds that ultimately drain into the Susquehanna River. The three small watersheds are: the Carlin Creek watershed, 807 hectares (1,993 acres), the South Tyler watershed, 106 hectares (262 acres), and the North Park watershed, 163 hectares (404 acres).

Carlin Creek, traveling through poorly drained soils, tends to maintain a surface flow. The North Park watershed has similar characteristics, although the South Tyler drainage network tends to lose water through the more permeable Canaseraga soils. In all three watersheds, stream flow is intermittent in nature. Peak run-off rates were calculated for each watershed under existing conditions using the U.S. Soil Conservation Service Method for small watersheds and are as follows: Carlin Creek at 40 m^3/sec (1,415 cubic feet per second (cfs)), South Tyler at 22 m^3/sec (780 cfs), and North Park at 9 m^3/sec (305 cfs).

5.01.02 Wetlands

Approximately 16 hectares (40 acres) of State-regulated wetlands are located west of the Lower Landfill. The wetlands are comprised of 9 hectares (23 acres) of standing ponds and emergent marsh (Wetland BE5) and 7 hectares (17 acres) of wet meadow (Wetland BE5) as illustrated in Figure 2. Another wetland lies just to the east of D & H rail line (Wetland BE6). Although Wetland BE6 is unregulated by the State, it contains approximately 8 hectares (20 acres) of emergent marsh that must realistically be considered a part of the local wetland system.

Wetland BE4, located to the north of the landfill access road and to the west of the D & H rail-line is flooded seasonally by Carlin Creek as well as by surface run-off from upland slopes. The slowly permeable Wayland soils that underlie the wetland keep the area wet throughout much of the year although little, if any, standing water remains for prolonged periods of time. Because of the continuously wet condition in Wetland BE4, a sedge, rush grass-dominated plant community has evolved. As a result, Wetland BE4 is classified as a wet meadow. Wetland BE6 is also classified as wet meadow.

Wetland BE5, located to the south of the landfill access road and to the west of the Conrail D & H railroad is classified as an emergent marsh because of the constant presence of standing water. Considerable acreage in Wetland BE5 remains an average of three feet underwater through the year which creates a pond about 9 hectares (23 acres) in area. Several factors account for this condition. Surface water run-off and precipitation contribute some input, yet it is primarily discharging ground water that is responsible for maintaining standing water in the pond (BIDA, 1985).

Geologic borings taken in the area of Wetland BE5 show that a low-permeability, glacio-lacustrine deposit of silt and clay extends along the 870-foot and 890-foot contour west of the pond. The lacustrine deposit thins considerably toward the 870-foot contour where it intergrades with a much more permeable sand and gravel deposit. Ground water is most likely discharged into the pond along the plane of increasing permeability that begins at approximately the 870-foot contour. A dirt embankment crossing the southern end of Wetland BE5 prevents water from leaving the northern two-thirds of the pond. As a result, little water, if any, leaves the impoundment except through evaporation or transpiration.

Flood Potential

A portion of the Industrial Park is considered to be in a flood-prone area. Figure 6 depicts the flood-prone areas of the Industrial Park.

5.02 Carlin Creek and Wetlands Investigations

5.02.01 Carlin Creek and Wetlands Sampling and Analysis

A total of seven samples were taken from Carlin Creek on February 3, 1986. Three samples were taken from location 30 and two samples were taken from both location 31 and location 32, as shown in Figure 2. An additional sample was taken from each of these locations on April 24, 1986. Three samples were taken from the wetlands between the Upper and Lower landfills on November 14, 1984. These three samples were taken from locations 33, 34 and 35, as shown on Figure 2. The samples were analyzed for pH, specific conductance, dissolved oxygen, total arsenic, cadmium, chromium, copper, iron, lead, nickel, mercury, manganese, zinc and total phenols.

5.02.02 Carlin Creek and Wetlands Quality

Appendix K presents analytical results for the surface water samples.

Carlin Creek (SR-57) is classified as a D class stream subject to D standards according to 6 NYCRR 17 931.4. In Carlin Creek, mercury was the only substance found to be in excess of guidelines or standards set by New York State Ambient Water Quality Standards presented in Table 9. Mercury was found during February 1986 in Carlin Creek at location 31 at a concentration of 0.0031 mg/l. However, mercury was not detected either upstream or downstream of this sample location during the February 1986 sampling. A sample was taken from each of the Carlin Creek locations on November 7, 1986 and submitted for mercury analysis.

Mercury concentrations during November 1986 were less than the detection limit of 0.0005 mg/l for all three samples. Consequently, the one mercury detection appears to be anomalous data and will not be considered representative of site conditions.

5.03 Leachate Investigations

5.03.01 Leachate Sampling and Analysis

Leachate samples from the Lower Landfill were collected from leachate monitoring Wells 13 and 15. Wells 13 and 15 are screened within the leachate of the Lower Landfill. Leachate samples were also taken from four locations near the Lower Landfill (23, 24, 25, 26). Three samples were taken near Wetland BE6 (23, 24, and 25). The remaining sample location (26) was near a wetland area along the south side of the Lower Landfill near leachate monitoring well 15. Following collection of samples 23, 24, 25, and 26, the four samples were composited and submitted for analysis as location 27. Sample locations 23, 24, 25 and 26 are shown in Figure 2.

Leachate samples from the Upper Landfill were collected from the leachate monitoring wells (14 and 16). Well 14 was installed within the saturated refuse of the Upper Landfill and Well 16 is a well point which was driven three feet into a leachate seep. The sample locations are presented on Figure 2.

Leachate samples were analyzed for pH, specific conductance, TOC, TDS, purgeable priority pollutants (Table 3), chlorides, filterable iron, arsenic, copper, manganese, mercury and organic priority pollutants determined using EPA protocols 608 and 625.

5.03.02 Leachate Quality

Appendix L contains analytical results for the Lower Landfill leachate samples. Table 10 summarizes the leachate results for purgeable priority pollutants. The leachate samples from the Upper Landfill contained measurable concentrations of several solvents, including methylene chloride, vinyl chloride, trichloroethene, tetrachloroethene, chloroethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, ethyl benzene, toluene, xylene and benzene. The presence of trace quantities of organic constituents is not unusual for municipal refuse leachate. (Khare et al., 1977).

Analytical results for inorganics in Appendix L indicate the presence of iron, mercury, manganese and copper in the leachate from the Lower Landfill. The results for the Upper Landfill leachate samples indicate the presence of iron, mercury, manganese, sulfate and chloride. These inorganic analyses compare to the range of various constituents generally found in municipal sanitary landfills. (Freeze and Cherry, 1979, Table 11).

5.03.03 Leachate Volume Generation

The Phase I Hydrogeologic Investigation (March, 1984) conducted by O'Brien & Gere estimated that approximately 0.9 million gallons of leachate is generated yearly by precipitation infiltrating the Lower Landfill. The same study concluded that roughly 150,000 gallons per year of leachate is generated by ground water flow through the refuse. Based on these estimates, the leachate samples might be expected to represent 85% of surface runoff and 15% of potentially contaminated upgradient ground water.

Similarly, the Phase I investigations for the Upper Landfill showed that approximately 1.8 million gallons of leachate are generated annually from direct surface infiltration (precipitation), and 1000 gallons per year are contributed from ground water flow.

5.04 Sediment Evaluation

Sediment samples were taken from Carlin Creek and from Wetland BE5 on February 13, 1986. The sample locations are depicted in Figure 2. Additional samples were taken from the wetlands on April 24, 1986. The samples were analyzed for metals, the purgeable organics listed in Table 3 and PCBs. Metal concentrations were reasonably consistent with values within typical background concentration ranges (Lindsay, 1979). All organics analyzed for in the sediments were below the detection limit for each respective constituent. The analytical results from the metals and organics analyses are presented in Appendix M.

PART II

SUPPLEMENTAL RI/FS WORK PLAN

SECTION 6 - REMEDIAL INVESTIGATION

6.01 General

The RI/FS Work Plan was prepared in October 1985. Since that time, additional information has been developed which suggests the need for supplemental studies. In addition, legislation has been passed (SARA) and guidance documents developed which suggest revisions to the RI/FS Work Plan. Part I, RI Studies, includes additional background on the Site. This Section of the Preliminary Report includes a Supplemental Work Plan which addresses the requirements for additional studies due to changes in legislation.

Although the field investigations required by the 1985 Work Plan have been completed, it should be noted that data analysis, the additional studies, the risk assessment, and RI Report preparation remain to be done.

6.02 Objectives

The purpose of this Work Plan is to supplement the existing data compiled at the Conklin Landfill Site in order to complete a Remedial Investigation/Feasibility Study. The Work Plan is designed to accomplish the following goals:

A. Determine the nature of and the areal and vertical distribution of any hazardous wastes disposed of at the landfills.

B. Evaluate the on and off site impacts that any past, present or future release or migration of hazardous wastes may have on public health or the environment.

C. Screen possible response actions in accordance with the National Contingency Plan 40 CFR Section 300.68, and the 1986 Superfund Amendments and Reauthorization Act (SARA), using guidelines provided in the report "Interim Guidance on Superfund Selection of Remedy" (USEPA, 1986)

All investigations, reports, supplements and revisions thereto described in this Work Plan or the corresponding Order shall address both on and off-site contamination caused by the disposal of hazardous wastes at and in the vicinity of the landfills.

6.03 Disposal Site Definition

The landfill areas were developed at different times at locations separated by approximately 2500 feet. The two landfills are illustrated on Figure 2. Additional information on the Site is provided in Section 1.0, Introduction, of this Report.

A new topographic survey of the Site will be prepared to document changes to the Upper and Lower Landfills since the original surveys were completed in 1983. Elevations will be expressed by contour intervals of 2 feet.

To delineate the horizontal boundaries of fill within the Lower Landfill, a series of fourteen (14) trenches will be excavated from the gravel mining area until fill is encountered, and from the outer dimension of the reported fill boundary. These trenches will move from clean soil areas to a point where fill is encountered; they will penetrate the fill area only to the extent necessary to define the outer boundary of fill material. Each trench will be backfilled with the excavated material.

In addition, seven borings will be installed in accordance with Appendix C within the fill area to determine the depth of waste material. The locations and elevations of trenches and borings will be documented on a revised topographic survey of the Lower Landfill. Proposed locations for the borings have been identified on Figure 2. The revisions to the Lower Landfill survey are required due to the excavation of sand and gravel from the area since the original survey was completed during November 1983.

To supplement the field investigation, historic stereographic aerial photographs will be examined to define the horizontal limits of the landfill. The aerial photograph analysis will also be useful for estimating fill thickness, defining pre-existing drainage patterns and identifying past leachate seeps.

6.04 Hydrogeologic Investigation

Review of Existing Data:

Existing hydrogeologic data from previous studies and RI studies to date will be reviewed to characterize the geologic and ground water flow conditions of the area around the landfills. These data in addition to the data generated from the additional hydrogeologic investigations will also be evaluated to assess potential migration patterns and the potential for off-site contamination of ground water and surface water.

Ground Water Monitoring Wells:

During the period of January 1984 to January 1986, Well 6 was destroyed, reportedly by a snow plow. The well is located in an area hydraulically upgradient of the Lower Landfill and downgradient of the Upper Landfill. A site inspection conducted on October 7, 1987 found that Well 3 downgradient from the Upper Landfill was also inoperative. All other wells were determined to be in working order. Replacement wells for Wells 3 and 6 will be installed using hollow stem auger methods in accordance with the well installation procedures specified in Appendix D.

An O'Brien & Gere geologist will supervise the drilling program and prepare a geologic log for each monitoring well which will include a visual description of each soil sample describing texture, composition, color, density, moisture content and any visual signs of contamination. Physical tests, pH and specific conductance, will be conducted on the saturated soils during well installation. The results of these analyses and the visual descriptions of the soils will be used to select the most appropriate well screen setting.

Based on the investigations conducted to date, the hydrogeologic conditions in the vicinity of the Upper Landfill appear suitable for landfilling waste material. On-site consolidation of the waste material from the Lower Landfill into the Upper Landfill appears feasible from a screening of alternatives perspective. To better define subsurface hydrogeologic conditions such as soil texture, depth to ground water, and soil permeability, supplemental borings are proposed adjacent to the existing Upper Landfill.

Five soil borings will be conducted around the perimeter of the Upper Landfill area. Locations are identified as 36, 37, 38, 64, 65, on Figure 2. At each of the borings, continuous split spoon soil samples will be collected in accordance with the procedures presented in Appendix C. When the borings are completed, they will be sealed with a bentonite/cement grout. Samples collected from the borings will be visually classified by the field geologist. Three of the borings will be converted to monitoring wells. Field changes, as necessary, will be made subject to the approval of the DEC representative on site.

Ground Water Elevation Monitoring:

Following installation of the additional wells, a field survey will be conducted to establish the locations and elevations of each of the ground water monitoring wells. Top of well casing and ground elevations will be determined. In addition, water level measurement will be taken at each of the existing and proposed monitoring wells on at least two occasions. Water level measurements will be used to develop a revised ground water elevation map, delineate ground water flow directions, and evaluate the vertical and horizontal components of ground water flow.

Permeability Testing:

Permeability tests for existing wells indicate a wide range in permeabilities. The presence of leachate seeps at the base of the Upper Landfill suggest collection of leachate as a possible remedial alternative. To better define leachate generation rates under present and proposed conditions, and to better characterize subsurface permeability, supplemental permeability tests are proposed.

In order to evaluate the effectiveness of the existing cover material for restricting rainfall infiltration, and to more accurately quantify the amount of leachate generation of the Upper Landfill, infiltration tests on the landfill surface are proposed. The tests will be conducted using a double ring infiltrometer in accordance with ASTM Method D3385.

In situ permeability tests will be conducted for leachate well 14 and underlying till well 2. This information will provide water transmitting capacity for the refuse and underlying till.

Existing permeability test data indicate that the on-site till soils in the vicinity of the Upper Landfill may be suitable as a final cover/cap material. Soil permeability tests using triaxial apparatus with backpressure saturation on samples compacted to 90% maximum modified proctor density will be conducted on these soils at various compaction rates to assess the feasibility of utilizing on-site soils for a final cover material.

Supplemental in-situ permeability tests will also be performed on the proposed two new wells, on the replacement wells 3 and 6, and on existing monitoring wells 2, 8, 13-16, 21 and 22. The additional permeability data will be used to verify the permeabilities of the glacial till and of the silt layer downgradient from the upper landfill. The tests will be performed in accordance with procedures outlined in Appendix E, by removing a volume of water from the well and measuring the recovery rate of the water level in the well.

Ground Water Sampling and Analysis:

The most recent information on ground water quality was generated during January 1986. To determine whether water quality has changed enough to affect any conclusions or recommendations incorporated within the Remedial Investigation Report, a supplemental round of sampling and analyses are recommended.

The monitoring wells will be sampled by using either the pump or bailer procedures outlined in Appendix F. Following sample collection, all ground water samples will be properly preserved and transported to a laboratory approved by the NYSDEC utilizing chain of custody procedures. The procedures presented in Appendix F, Quality Assurance Project Plan (QAPP) will be used.

Monitoring wells numbered 1,3,4,5,6,7,8,9,10,11,12,18,21 and 22 and any new wells installed will be sampled on one occasion. The samples will be analyzed for: filterable arsenic, filterable iron, filterable manganese, specific conductance, pH, and purgeable organics listed in Table 3. Laboratory analyses shall be performed according to Contract Laboratory Protocols (CLP).

The Quality Assurance Project Plan procedures as presented as Appendix F will be used. Purgeable priority pollutants identified in Table 3 will be analyzed.

Leachate:

Leachate collection and treatment is a potential remedial technology. Supplemental testing will be performed on leachate samples from the upper landfill to determine compatibility with the Binghamton/Johnson City wastewater treatment facilities (WWTP), and the costs associated with treatment. Treatability tests on leachate samples collected from leachate wells 14 and 16 are recommended. Procedures for sampling are included as Appendix F.

The compatibility tests for samples of leachate will include analyses for parameters regulated by the sewer use ordinance using procedures outlined in Appendix F. Testing for biological compatibility will include extended dilution oxygen uptake testing, ultimate BOD testing, and Gilson respirometric testing. All tests will use seed organisms from the Binghamton/Johnson City WWTP. Data generated will be used to determine whether direct discharge of leachate would adversely affect WWTP performance and whether treatment of leachate would be effective in the existing WWTP.

Homeowner Wells:

The previous hydrogeologic investigations indicated that the Lower Landfill may be impacting the water quality of residential water supplies. The historical water quality data, as well as the analytical data from the sampling of the residential wells will be reviewed to assess if the water quality of the residential wells is attributed to the lower landfill or background conditions. In addition, geologic logs and well records of the residential wells will be used to evaluate the hydrogeologic relationship between the lower landfill and the residential wells. Private supply wells in the vicinity of the site will be identified and sampled. In addition a sample will be collected from Town of Conklin Municipal Well No. 3. The samples will be analyzed for iron, manganese, arsenic and purgeable organics listed in Table 3.

6.05 Surface Water/Sediment Characterization

The potential for Carlin Creek to recharge the water supply aquifer near the municipal supply well suggests supplemental analyses on this surface water. Carlin Creek will be resampled on three separate occasions for pH, specific conductance, dissolved oxygen, total arsenic, cadmium, chromium, copper, iron, lead, nickel, mercury, manganese, zinc, and total phenols. Analyses will be performed according to Contract Laboratory Protocols.

In addition, three sediment samples will be collected from the wetland east of the lower landfill at the approximate locations of leachate samples 23, 24, and 25 as illustrated on Figure 2. Sediment samples will be analyzed for arsenic, mercury, lead, cadmium, chromium, zinc, copper, PCBs and the purgeable organics listed on Table 3.

6.06 Data Analysis and Risk Assessment

Following completion of the supplemental field investigation, all field data will be compiled to evaluate the potential impact from the landfills on the environment and human health. A two-phased approach, consistent with EPA guidelines for the completion of health assessments under CERCLA, will be utilized in the execution of the assessment. The first phase will be a qualitative element designed to evaluate the potential exposure scenarios. The second phase, will provide a quantitative assessment of the magnitude of exposures and any associated human health and environmental risks for those exposure scenarios that are complete based on the qualitative assessment.

The risk assessment will evaluate factors contributing to, or in some cases reducing the likelihood of a release from the site resulting in harm to human health or the environment. The assessment qualitatively unifies the source, transport route, and receptor components associated with an environmental release and evaluates them on an integral process. If all the elements are feasible, a quantitative determination of the risks and other impacts associated with existing or potential releases of chemical constituents under various exposure scenarios is prepared.

6.07 Remedial Investigation Report

Following the completion of the field investigations all field data will be compiled into a draft report of the Remedial Investigation. The Report shall meet the objectives of the Work Plan and the terms of the NYSDEC Consent Order. It will include detailed descriptions of the following:

- A topographic survey and resultant plot plan including on-site bench marks.
- A description of construction activities at Broome County Corporate Park and development plans for the Corporate Park.

- A summary of all relevant environmental conditions including annual and seasonal climatic conditions.
- Geology of the site including soil types and depths, lithology and thickness of unconsolidated deposits, bedrock depth and type.
- A determination of the areal and vertical extent of wastes including cross sections of waste disposal areas.
- Site plan with locations of all wells, test boring and surface water/sediment sampling points.
- Vertical and horizontal variations in ground water quality.
- Surface water quality of the area.
- Types and concentrations of hazardous constituents detected in the landfills, surface water and ground water.
- An inventory of operating water supply wells hydraulically downgradient of the landfills.
- The location and influence of private and public wells on the movement of ground water.
- The current or potential impacts from the landfills on the environment and downgradient public and private water supplies.
- Supporting data including: test boring logs, well specifications, field investigation procedures, chemical analyses, in-situ permeability test data, and monitoring well water level elevations.
- A list of remedial programs to be evaluated as part of the feasibility study.

- References to all scientific or technical literature used to prepare the Report.
- Names, titles, and disciplines of all professional engaged in Report preparation.

6.08 Project Schedule

The project schedule for completion of the Remedial investigation is dictated to a certain extent by weather conditions in Central New York. It is anticipated that field activities could be initiated within 15 days of authorization to proceed by the State of New York and the Town of Conklin. Approximately four weeks will be required to conduct the trenching/boring for the supplemental activities. An additional eight weeks will be required to complete sampling and analyses. It is anticipated that twelve additional weeks will be required to prepare the Draft Remedial Investigation Report after all analytical results have been received. This schedule could be delayed substantially if field activities are not completed prior to the onset of winter.

SECTION 7 - FEASIBILITY STUDY

7.01 General

Subsequent to the preparation of the RI/FS Work Plan in 1985 legislation was passed and guidance documents developed which suggest revisions to the RI/FS Work Plan. This revised section has been based on guidance provided in the document entitled Interim Guidance on Superfund Selection of Remedy (USEPA, 1986 which is presented as Exhibit B.

The first step of the Feasibility Study is to define the objectives of the remedial actions. This involves the identification of site problems, quantification of hazards, pathways of contamination, and potential receptors based on the data generated in the RI. The appropriate response actions to address the particular site problems will be identified based on public health and environmental concerns, the results of the RI, and applicable or relevant and appropriate Federal or State requirements (ARARs), as required by SARA. Once the response actions are identified, the development and evaluation of alternatives may commence.

7.02 Development of Alternatives (FS Phase I)

Based on the preliminary results of the Remedial Investigation, a number of alternatives for source control or off-site remedial actions or both will be developed. Remedial response objectives and appropriate remedial technologies will be identified. Because the site has been proposed for the National Priorities List, guidance provided in the document entitled "Interim Guidance on Superfund Selection of Remedy" (USEPA, 1986b) will be used. Remedial response objectives will be based on public health and environmental concerns, information gathered during the remedial investigation and the National Contingency Plan (NCP) (40 CFR Part 300). Remedial response objectives are defined as those activities which must be accomplished to reduce any threat to human health and the environment resulting from the presence of hazardous constituents identified during the RI.

Once the remedial response objectives are defined, remedial technologies which address site specific problems and/or pathways are identified. The NCP identifies the following methods or technologies of remedying releases that should be considered:

A. No Action

  1. Monitoring
  2. Fencing
  3. Site Use Limitations

B. On-Site Actions - Control of Releases

  1. Air emissions controls
  2. Surface water controls
     a. Surface seals
     b. Surface water diversions and collection systems
        i. Dikes and berms
        ii. Ditches, diversions, waterways
        iii. Chutes and downpipes
        iv. Levees
        v. Seepage basins and ditches

vi. Sedimentation basins and ditches

vii. Terraces and benches

c. Grading

d. Revegetation

3. Ground water controls

a. Impermeable barriers

i. Slurry walls

ii. Grout curtains

iii. Sheet pilings

b. Permeable treatment beds

c. Ground water pumping

i. Water table adjustment

ii. Plume containment

d. Leachate control

i. Subsurface drains

ii. Drainage ditches

iii. Liners

C. On-site actions - treatment technologies

1. Gaseous emissions treatment

a. Vapor phase adsorption

b. Thermal oxidation

2. Direct waste treatment methods

a. Biological methods

b. Chemical methods

i. Chlorination

ii. Precipitation, flocculation, sedimentation

iii. Neutralization

iv. Equalization

v. Chemical oxidation

c. Physical Methods

i. Air stripping

ii. Carbon adsorption

iii. Ion exchange

iv. Reverse osmosis

v. Permeable bed treatment

vi. Wet air oxidation

vii. Incineration

3. Contaminated soils and sediments

a. Incineration

b. Wet air oxidation

c. Solidification

d. Encapsulation

e. On-site treatment

i. Solution mining

ii. Neutralization/Detoxification

iii. Microbiological degradation

D. Off-site transport for storage

E. Provision of alternate water

1. Individual treatment units

2. Water distribution system

3. New wells in a new location or deeper wells

4. Cisterns

5. Bottled or treated water

6. Upgraded treatment for existing distribution systems

F. Relocation of residents, businesses, and community facilities.

Each of the technologies is screened with respect to the data gathered during the RI based on the following criteria:

1. Performance. This criterion evaluates the effectiveness of the technology in terms of meeting the pertinent remedial response objective. In order for a technology to meet the performance criterion, it is also necessary that it maintain its function over the expected life of the remedial action. Also considered here is the "track record" of a technology to perform its intended function. For those technologies that do not have a record of performance, such as innovative and alternative technologies, their potential performance given the site conditions will be evaluated. Those technologies that are not applicable based on the performance criterion will be eliminated from further consideration.

2. Reliability. The reliability criterion assesses the ability of a technology to perform its intended function. This includes an appraisal of the frequency and complexity of operation and maintenance activities required for the technology to remain effective over its expected life.

3. Implementability. The feasibility of implementing a technology under the given site conditions is evaluated. This criterion considers both the constructability of a technology and the safety practices required to protect workers, adjacent property, and the environment during and after construction.

4. Applicability. All technologies that pass the technology screening must be applicable to the chemical and physiographic conditions at the site. Technologies whose effectiveness are limited by waste and/or site characteristics are eliminated from further consideration.

A technology must meet all four criteria to pass the technology screening.

7.03 Initial Screening of Alternatives (FS Phase II)

The remedial technologies that pass the technology screening are then combined into groups to form remedial alternatives. Each alternative, with the exception of the "No Action" alternative must address all identified response objectives. In order to ensure that a sufficiently broad range of alternatives is evaluated, the NCP states that:

"To the extent that it is possible and appropriate, at least one remedial alternative shall be developed as part of the feasibility study (FS) in each of the following categories:

(i) Alternatives for treatment or disposal at an off-site facility, as appropriate;

(ii) Alternatives that attain applicable or relevant and appropriate Federal public health and environmental requirements;

(iii) As appropriate, alternatives that exceed applicable or relevant and appropriate Federal public health and environmental requirements;

(iv) As appropriate, alternatives that do not attain applicable or relevant and appropriate Federal public health and environmental requirements but will reduce the likelihood of present or future threat from the hazardous substances and that provide significant protection to public health and welfare and the environment. This must include an alternative that closely approaches the level of protection provided by the applicable or relevant and appropriate requirements;

(v) No action alternative."

In addition, the 1986 Superfund Amendments and Reauthorization Act (SARA) requires that remedial alternatives must consider damage to natural resources. SARA also expresses a strong preference for "permanent" technologies such as chemical or thermal destruction. The selected alternative shall be protective of human health and the environment. These factors will be considered in establishing the list of alternatives for further consideration.

The following three broad considerations will be used as a basis for the initial screening: effectiveness, implementability, and cost:

1. Effectiveness. The alternatives will be evaluated relative to their effectiveness in protecting human health and the environment, and permanently reducing the toxicity, mobility, or volume of hazardous constituents. Those alternatives that are not protective of human health and the environment shall not be considered further. Alternatives that result in a permanent reduction in the toxicity, mobility, or volume of hazardous constituents shall be considered more effective than those that do not accomplish these permanent reductions. Any alternatives which would result in an increase in the toxicity, mobility, or volume of hazardous constituents shall

not be considered further. Other issues which could impact the effectiveness of an alternative shall be evaluated as applicable.

2. Implementability. The alternatives will be evaluated with regard to the technical feasibility and availability of the individual technologies associated with the alternatives. Alternatives that may prove to be technically infeasible or unavailable will not be considered further. The technical and institutional ability to monitor, maintain, and replace technologies associated with the alternatives will be evaluated. Those alternatives for which the ability to monitor, maintain, and replace technologies over time are feasible will be considered further, whereas those that are infeasible will not be considered further. The alternatives will also be evaluated relative to their administrative feasibility of implementation. Alternatives which prove to be administratively infeasible will not be considered further.

3. Cost. Preliminary cost estimates will be developed for each of the alternatives. The cost estimates will include capital and long-term operation and maintenance costs. An alternative whose cost far exceeds that of other alternatives which provide similar results will be eliminated from further consideration.

The initial list of alternatives set forth in the RI will be evaluated in this manner. Those alternatives selected for detailed evaluation will be set forth in a technical memorandum prior to the initiation of the detailed evaluation set forth in the next section. In addition, if any of the alternatives require the acquisition of additional data, such as treatability data, these data will be generated at this time. However, it is believed that the RI, as supplemented by the work recommended in Section 6, will result in sufficient data to complete the FS.

The alternatives which will be analyzed in detail will include at least one alternative from each of the five categories presented in Section 7.03. If not included in the five categories, a containment alternative and an alternative with innovative technologies will be analyzed in detail, if they offer the potential for better treatment performance or implementability, fewer adverse impacts than other approaches, or lower costs for similar levels of performance than demonstrated treatment technologies.

7.04 Detailed Analysis of Alternatives (FS Phase III)

Alternative remedies which pass through the initial screening will be evaluated in depth prior to selecting the recommended alternative. The alternative evaluation shall include a detailed description, environmental assessment, and cost analysis as presented below.

A detailed description of each alternative will be prepared which will address the following issues.

1. Description of appropriate treatment and disposal technologies considered at this stage.
2. Special engineering considerations required to implement the alternative, e.g., additional studies needed to proceed with final remedial design. These studies will include such items as leachate treatability and cover material assessment, including Atterberg liquid and plastic limits, grain size, moisture

density relation, and permeability. However, the exact studies cannot be determined until the screening process is completed.

3. Environmental impacts, proposed methods, and costs for mitigating any adverse effects.
4. Operation, maintenance, and monitoring requirements of the remedy.
5. Off-site disposal needs and transportation plans.
6. Temporary storage requirements.
7. Safety requirements for remedial implementation (including both on-site and off-site health and safety considerations).
8. A description of how the alternative could be phased into individual segments. The description should include a discussion of how various segments of the total remedy could be implemented individually or in groups, resulting in a significant improvement to the environment or savings in costs.
9. A review of any off-site disposal facilities to ensure compliance with applicable RCRA requirements.

Alternatives shall be evaluated using technical, environmental, and economic criteria. As in the Initial Screening of Alternatives, the three considerations of effectiveness, implementability, and cost will be used as the basis of the detailed Analysis of Alternatives. However, at this point, each alternative will be evaluated in greater detail as indicated below:

1. <u>Effectiveness.</u> Each alternative will be assessed relative to whether it is adequately protective of human health and the environment, and attains Applicable or Relevant and

Appropriate Federal and State Requirements (ARARs). Additionally, an assessment will be made as to whether each alternative would result in a significant reduction in the toxicity, mobility, or volume of hazardous constituents. Finally, each alternative will be assessed with respect to technical reliability.

2. Implementability. The alternatives will be evaluated with respect to the ability to construct and the short and long-term reliability of the associated technologies. Other considerations that will impact the implementability of the alternatives are the ability to monitor the effectiveness of the alternatives, ability to operate and maintain the alternative, and the availability of equipment and specialists to implement the alternatives.

3. Cost. A detailed cost estimate for each alternative will be developed. The cost estimates will include short-term development and construction costs including operating costs to implement the remedial alternatives, long-term operating and maintenance costs, and five year remedial action reviews. Total costs will be developed as the total present worth of project costs, including appropriate replacement costs.

After each individual alternative is assessed using the above factors, the alternatives will be compared to each other using these factors. The result of the entire exercise will be one alternative which is preferred over all others and recommended for implementation.

In keeping with SARA, the recommended alternative must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The recommended alternative should also attain Federal and State ARARs unless an exemption set forth in the NCP applies. The recommended alternative should represent the best balance of the effectiveness, implementability, and cost considerations.

A report presenting the results of the alternatives evaluation and the recommended remedial alternative will be prepared and submitted to the NYSDEC.

7.05 Conceptual Design

A conceptual design of the recommended remedial alternative shall include the engineering approach, including implementation schedule, special implementation requirements, institutional requirements, phasing and segmenting considerations, preliminary design critèria, preliminary site and facility layouts, budget cost estimate (including operation and maintenance costs), operating and maintenance requirements and duration, and an outline of the safety plan including cost impact on implementation. A description of any additional information, which will be required as the basis for the completion of the final remedial design for the site, will also be included.

7.06 Final Report

The Feasibility Study report will recommend the alternative to be implemented for the Conklin Landfills Remedial Program. The report will contain:

- A summary of all health and environmental hazards and potential hazards attributable to the Conklin Landfills.
- Identification of remedial actions necessary to eliminate existing or potential hazards.
- Identification of alternatives capable of achieving the project objectives.
- For each applicable alternative, an evaluation according to Section 7.05.
- Identification of a recommended alternative, including implementation schedule.

In addition, the Feasibility Study report will specify the names, titles, and disciplines of all professionals engaged in the preparation of the report, and include references to all scientific or technical literature used in preparing the report.

Respectfully Submitted,

O'BRIEN & GERE ENGINEERS, INC.

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Tables

O'BRIEN & GERE

TABLE 1
TOWN OF CONKLIN
GROUND WATER MONITORING WELL DATA

WELL NO.	GRADE ELEVATION	TOP OF STEEL CASING ELEVATION	TOP OF PVC CASING ELEVATION	WELL DEPTH BELOW GRADE	GROUND WATER ELEVATION DATA 8/16/83	11/9/83	12/20/84	1/30/86 -2/3/86	12/1/86
1	944.40	947.41	947.30	60.0	937.34	933.79	943.16	942.73	943.32
2	914.80	916.16	915.93	45.0	891.37	890.56	909.84	896.30	896.30
3	-	-	891.88	20.0	881.21	879.57	885.60	885.54	-
4	890.90	893.58	893.42	20.0	881.85	881.80	886.80	887.42	887.55
5	860.31	860.31	860.24	33.5	853.25	852.17	853.86	855.71	-
6	868.80	868.82	868.59	17.9	861.97	860.57	865.59	866.10	-
7	865.20	868.37	868.27	25.0	853.54	852.02	856.22	859.16	859.16
8	860.20	860.24	860.08	18.0	853.34	851.60	853.89	855.26	-
9	861.30	864.21	864.11	18.0	853.31	851.66	854.66	855.25	856.88
10	863.80	863.76	863.47	18.0	853.69	851.76	855.29	856.71	-
11	896.20	898.97	898.82	30.5	882.31	881.82	890.77	886.69	887.34
12	898.60	901.62	901.51	16.0	-	-	889.17	889.53	889.43
13	865.70	868.62	868.55	15.0	853.94	-	860.07	-	861.78
14	914.80	917.25	917.14	15.0	908.45	-	-	-	912.03
15	873.80	876.62	876.49	18.0	859.76	-	-	-	865.04
16	-	-	-	2.5	-	-	-	-	-
17	948.46	950.89	950.38	30.0	-	-	947.06	-	-
18	861.00	863.37	862.74	15.0	-	-	859.97	860.70	861.54
19	912.39	914.94	914.61	31.5	-	-	908.89	-	-
20	898.77	898.77	898.77	31.5	-	-	885.70	887.46	887.46
21	-	875.06	874.76	20.0	-	-	-	871.84	872.43
22	-	885.41	885.02	22.0	-	-	-	877.99	880.48

ALL ELEVATIONS GIVEN IN FT. ABOVE MEAN SEA LEVEL. WELL DEPTHS BELOW GRADE GIVEN IN FT.
WELLS 1-15 WERE INSTALLED PRIOR TO 8/16/83
WELLS 16-20 WERE INSTALLED PRIOR TO 12/20/84
WELLS 21-22 WERE INSTALLED 1/27/86

TABLE 2

TOWN OF CONKLIN LANDFILLS
IN-SITU PERMEABILITY DATA

WELL #	PERMEABILITY			GEOLOGIC FORMATION
	(cm/sec)	(ft/day)	(gpd/SF)	
LOWER LANDFILL				
5	4.3E-4	1.2	9.1	Mixed sand, silt & clay
6	5.7E-4	1.6	12.3	Mixed sand, gravel & silt
7	4.6E-3	13.0	9.7	Sand & gravel (outwash)
9	1.8E-3	5.1	3.8	Sand & gravel (outwash)
10	2.1E-3	6.0	4.4	Sand, silt & gravel (outwash)
18	6.8E-4	1.9	1.4	Sand, gravel & silt (mixed)
UPPER LANDFILL				
1	2.3E-7	6.5E-4	4.8E-3	Glacial Till
3	2.6E-4	7.4E-1	5.6	Silt (lacustrine)
4	1.3E-2	36.8	265.0	Glacial Till
11	2.7E-5	7.7E-2	5.8	Silt (lacustrine)
12	2.5E-3	7.1	5.3	Mixed sand & silt
17	9.6E-5	2.7E-1	2.1	Gravel, silt & sand (mixed)
19	3.8E-7	1.1E-3	8.4E-3	Till
20	2.6E-3	7.4	54.9	Sand, gravel & silt (mixed)

Table 3

PURGEABLE PRIORITY POLLUTANTS

Chloromethane
Bromomethane
Vinyl Chloride
Chloroethane
Methylene Chloride
1,1-Dichloroethane
1,1-Dichloroethene
t-1,2-Dichloroethene
Chloroform
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon Tetrachloride
Bromodichloromethane
1,2-Dichloropropane
t-1,3-Dichloropropene
Trichloroethene
Benzene
Dibromochloromethane
1,1,2-Trichloroethane
c-1,3-Dichloropropene
2-Chloroethylvinyl Ether
Bromoform
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
Chlorobenzene
Ethyl-benzene
Xylenes

Table 4 (Page 1 of 2)

Town of Conklin - Lower Landfill
Ground Water Quality Analyses
Summary Table

Parameter	Units	Reported Concentration (1) Well Location - 1986						Well Location - 1983	
		21	5	8	9	10	18	8	10
Arsenic	mg/l	ND	ND	0.002	ND	ND	0.001	ND	ND
Chloride	mg/l	12	4	7	4	7	11	10	15
Copper	mg/l	ND	ND	ND	0.01	ND	ND	0.05	ND
Iron	mg/l	2.6	0.05	5.7	ND	ND	0.86	10	0.07
Mercury	mg/l	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	mg/l	1.00	0.26	1.59	1.74	3.10	2.90	4.60	2.80
pH	S.U.	6.0	6.3	6.5	5.8	6.7	5.8	6.2	6.8
Conductivity	umhos/cm	80	75	75	65	85	85	92	103
Total Dissolved Solids	mg/l	64	132	44	44	80	108	90	150
Total Organic Carbon	mg/l	90/6	9	2	1	ND	12	4	3

(1) ND - Not detected at detection limit noted in Appendix C.

Table 4 (Page 2 of 2)

Town of Conklin - Upper Landfill
Ground Water Quality Analyses
Summary Table

Parameter	Units	Reported Concentration (1) Well Location - 1986							Well Location - 1983	
		1	3	4	11	18	21	22	3	11
Arsenic	mg/l	ND	ND	ND	0.002	0.001	ND	0.006	ND	ND
Chloride	mg/l	ND	58	4	47	11	12	27	12	45
Copper	mg/l	ND	ND	ND	ND	ND	ND	ND	ND	0.14
Iron	mg/l	ND	ND	0.05	0.95	0.86	1.50	0.50	ND	2.20
Mercury	mg/l	ND	ND	ND	0.0002	ND	ND		ND	ND
Manganese	mg/l	ND	0.09	0.07	5.80	2.90	1.50	0.03	0.80	7.60
pH	S.U.	6.7	5.8	6.3	6.0	5.8	6.0	6.2	6.7	7.4
Conductivity	umhos/cm	200	280	95	960	85	80	80	206	850
Total Dissolved Solids	mg/l	188	276	72	732	108	64	148	165	550
Total Organic Carbon	mg/l	9	6	1	ND	12	6	6	59	280

(1) ND - Not detected at detection limit noted in Appendix C.

TABLE 5
TOWN OF CONKLIN
VOLATILE ORGANICS SUMMARY TABLE
GROUND WATER DATA
(Units are ug/l)

	Lower Landfill						Upper Landfill							
	WELL 6** 11/9/83	WELL 7 8/5/83	WELL 7* 11/9/83	WELL 8* 8/5/83	WELL 21# 1/31/86	WELL 21# 1/31/86	WELL 1* 8/5/83	WELL 2 8/5/83	WELL 2* 11/9/83	WELL 3* 8/5/83	WELL 11 8/8/83	WELL 11 11/9/83	WELL 11 2/3/86	WELL 12*** 2/3/86
BENZENE	BDL	6	BDL	2	BDL	BDL	BDL	2	BDL	1	BDL	3	BDL	BDL
BROMOMETHANE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	2	BDL	BDL
CHLOROBENZENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CHLOROETHANE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5	18	63	BDL
CHLOROMETHANE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-DICHLOROETHANE	BDL	BDL	BDL	BDL	1	1	BDL	BDL	BDL	BDL	26	150	210	1
1,2-DICHLOROETHANE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	3	3	BDL
1,2-DICHLOROETHENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	BDL
1,2-DICHLOROPROPANE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	40	43	BDL
ETHYLBENZENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	BDL	BDL
METHYLENE CHLORIDE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4	BDL	BDL	2	32	1	BDL
TETRACHLOROETHENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
TOLUENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	2	BDL	BDL	110	40	BDL
1,1,1-TRICHLOROETHANE	1	BDL	1	BDL	BDL	BDL	2	2	BDL	BDL	8	1	9	BDL
TRICHLOROETHENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	2	BDL
VINYL CHLORIDE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	16	1	BDL	BDL
m-XYLENE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4	1	BDL
XYLENE	BDL	BDL	BDL	BDL	BDL	BDL	2	BDL	1	BDL	BDL	11	7	BDL

BDL = Below detection limit

# indicates that one round of analyses was performed at the site

* indicates that all parameters in subsequent volatile organic analyses were below the detection limit of all of the parameters

** indicates that all parameters in preceding and subsequent volatile organic analyses were below the detection limit of all of the parameters

*** indicates that all parameters in preceding volatile organic analyses were below the detection limit of all of the parameters

Table 6

Groundwater Quality Within the Aquifers of the Susquehanna River Basin in New York State (values in mg/l) (from Hollyday, 1969)

*	Glacial Till and Bedrock			Lacustrine Deposits			Outwash Deposits		
	G	M	P	G	M	P	G	M	P
Temperature	48	50	52	50	52	53	47	50	53
Silica	6.7	8.3	9.6	2.0	7.8	15	6.8	7.4	8.8
Iron	.08	.30	.65	.21	1.0	1.8	.03	.06	.15
Manganese	.01	.03	.05		.02		0	.01	.05
Calcium	29	41	51		30		45	50	74
Magnesium	3.8	8.3	9.7		9.0		6.0	12	19
Sodium	4.8	11	64		7.6		6.6	8.9	13
Potassium	.5	1.5	2.3		.5		1.1	1.4	1.6
Bicarbonate	140	170	250		130		150	180	230
Sulfate	3.6	12	27		15		25	31	50
Chloride	4.0	16	58		3.0		7.8	13	22
Fluoride	.1	.1	.2		.1		.05	.1	.2
Nitrate	.09	.18	.53		0		.24	1.0	2.1
Dissolved Solids	160	200	310		140		190	240	330
Calcium and Magnesium	54	90	140		120		150	200	220
Alkalinity	110	150	190		110	130	130	150	170
pH	7.3	7.7	8.1		7.5		7.4	7.6	7.8
Color	0	2	10		1		1	2	5

*Values tabulated are taken from a frequency distribution of reported chemical analysis of well water. Good (G), medium (M) and poor (P) refer to values equaled or exceeded for 75, 50 and 25 percent of available analyses, respectively.

Table 7

NEW YORK STATE WATER QUALITY STANDARDS

Parameter	NYSDOH Drinking Water Standards/Maximum Contaminant Level	NYSDEC Class GA Groundwater Standards/Maximum Allowable Concentration
Arsenic (As)	.05 mg/l	.025 mg/l
Barium (Ba)	1.0 mg/l	1.0 mg/l
Cadmium (Cd)	.01 mg/l	.01 mg/l
Chloride (Cl)	250. mg/l	250. mg/l
Chromium (Cr)	.05 mg/l	.05 mg/l
Copper (Cu)	1.0 mg/l	1.0 mg/l
Cyanide (CN)	- -	.2 mg/l
Fluoride (F)	2.2 mg/l	1.5 mg/l
Foaming Agents		.5 mg/l
Iron (Fe)	.3* mg/l	.3 mg/l
Lead (Pb)	.05 mg/l	.025 mg/l
Manganese (Mn)	.3* mg/l	.3 mg/l
Mercury (Hg)	.002 mg/l	.002 mg/l
Nitrate (N)	10. mg/l	10.0 mg/l
Phenols	- -	.001 mg/l
Selenium (Se)	.01 mg/l	.02 mg/l
Silver (Ag)	.05 mg/l	.05 mg/l
Sulfate (SO_4)	250. mg/l	250. mg/l
Zinc (Zn)	5.0 mg/l	5. mg/l
pH Range	- -	6.5 - 8.5
Chlordane		.1 ug/l
Endrin	.0002 mg/l	not detectable
Heptachlor	- -	not detectable
Lindane	.004 mg/l	not detectable
Methoxychlor	.1 mg/l	35. ug/l
Toxaphene	.005 mg/l	not detectable
2,4-Dichlorophenoxyacetic Acid	.1 mg/l	4.4 ug/l
2,4,5-Trichlorophenoxyproploric Acid	.01 mg/l	.26 ug/l
Vinyl Chloride	- -	5 ug/l
Benzene	- -	not detectable
Chloroform	- -	100 ug/l
Trichloroethylene	- -	10 ug/l

*If iron and manganese are both present, the total concentration of both substances should not exceed 0.5 milligrams per liter.

Table 8

INORGANIC ANALYSES - NONFORMER WELLS *

HOME	DATE	SAMPLE	AL	AS	BA	CD	CR	CU	FE	PB	MN	HG	NI	SE	NA	ZN	CA	MG	HARD	TALK	PH	SPCOND	TDS
1	11/14/83	71229	<.1	<.01	.3	<.01	<.01	<.01	2.1	<.01	1.5	<.5	<.01	<.01	10.	.02	19.	4.3	65.	70.	7.3	158.	130.
2	11/14/83	71230	<.1	.04	.2	<.01	<.01	<.01	<.01	<.01	.06	<.5	<.01	<.01	130.	.01	7.9	1.4	25.	270.	8.8	524.	340.
2	01/19/84	4146		.033																			
3	11/14/83	71231	<.1	<.01	.1	<.01	<.01	.10	<.01	<.01	.14	<.5	<.01	<.01	40.	.02	30.	6.5	100.	40.	6.3	426.	260.
4	11/14/83	71232	<.1	<.01	<.1	<.01	<.01	.01	<.01	<.01	1.1	<.5	<.01	<.01	26.	.03	53.	5.8	160.	174.	8.8	379.	250.
5	11/14/83	71233	<.1	.02	.2	<.01	<.01	<.01	.03	<.01	.45	<.5	<.01	<.01	14.	.01	34.	5.4	110.	122.	8.9	223.	180.
6	11/15/83	71234	<.1	<.01	<.1	<.01	<.01	.12	<.01	<.01	.01	<.5	<.01	<.01	6.2	.03	12.	3.0	42.	16.	5.9	112.	80.
7	11/14/83	71235	<.1	.03	.1	<.01	<.01	<.01	.04	<.01	.54	<.5	<.01	<.01	11.	.02	33.	5.4	105.	114.	7.7	236.	140.
7	01/19/84	4147		.01																			
8	11/14/83	71236	<.1	.01	.4	<.01	<.01	<.01	.01	<.01	.13	<.5	<.01	<.01	23.	.06	27.	5.0	88.	120.	8.0	248.	140.
9	11/14/83	71237	<.1	.11	.1	<.01	<.01	.01	.04	<.01	.42	<.5	<.01	<.01	75.	.03	27.	4.8	87.	224.	7.9	399.	270.
9	01/19/84	4148		.033																			
10	11/14/83	71238	<.1	<.01	.1	<.01	<.01	.33	<.01	<.01	<.01	<.5	<.01	<.01	65.	.03	26.	6.3	91.	44.	6.3	517.	320.
11	11/14/83	71239	<.1	<.01	<.1	<.01	<.01	.01	<.01	<.01	1.0	<.5	<.01	<.01	27.	.01	44.	5.1	130.	162.	7.7	348.	220.
12	11/14/83	71240	<.1	<.01	.1	<.01	<.01	.23	<.01	<.01	<.01	<.5	<.01	<.01	69.	.26	26.	4.7	84.	40.	6.2	539.	320.
13	11/15/83	50315	<.05	.023	.5	<.002	<.01	<.05	.44	<.01	.27	<.4	<.05	<.01	53.	.14			88.	190.	7.6	386.	206.
14	11/15/83	50316	<.05	<.01	<.5	<.002	<.01	<.05	6.6	<.01	1.9	<.4	<.05	<.01	12.	.09			129.	107.	7.0	281.	204.
15	11/15/83	50317	<.05	<.01	<.5	<.002	<.01	<.05	8.4	<.01	.22	<.4	<.05	<.01	5.8	<.05			57.	38.	6.5	142.	87.
16	11/15/83	50318	<.05	<.01	<.5	<.002	<.01	<.05	<.02	<.01	.08	<.4	<.05	<.01	55.	<.05			1.	105.	7.5	256.	162.
17	11/15/83	50319	<.05	<.01	<.5	<.002	<.01	<.1	.06	<.01	.20	<.4	<.05	<.01	4.7	<.05			43.	23.	6.6	118.	71.

* Chemical concentrations are in mg/l except for Hg which is in ug/l.

Table 8 (Cont'd)

INORGANIC ANALYSES - HOMEOWNER WELLS *

HOME	DATE	SAMPLE	SO4	CL	NO3N	CN	PHENOL	TOC	AG
1	11/14/83	71229	14.	6.	<.01	<.05	<.001	6.	<.01
2	11/14/83	71230	<1.	29.	<.01	<.05	<.001	14.	<.01
2	01/19/84	4146							
3	11/14/83	71231	30.	65.	4.7	<.05	<.001	8.	<.01
4	11/14/83	71232	14.	23.	<.01	<.05	<.001	10.	<.01
5	11/14/83	71233	7.	8.	<.01	<.05	<.001	7.	<.01
6	11/15/83	71234	11.	17.	1.13	<.05	<.001	4.	<.01
7	11/14/83	71235	12.	8.	<.01	<.05	<.001	8.	<.01
7	01/19/84	4147							
8	11/14/83	71236	4.	7.	<.01	<.05	<.001	9.	<.01
9	11/14/83	71237*	3.	27.	<.01	<.05	<.001	11.	<.01
9	01/19/84	4148							
10	11/14/83	71238	25.	116.	5.0	<.05	<.001	8.	<.01
11	11/14/83	71239	12.	14.	<.01	<.05	<.001	9.	<.01
12	11/15/83	71240	37.	114.	4.6	<.05	<.001	6.	<.01
13	11/15/83	50315	2.2	14.					<.02
14	11/15/83	50316	20.	13.					<.02
15	11/15/83	50317	15.	11.					<.02
16	11/15/83	50318	20.	5.6					<.02
17	11/15/83	50319	18.	8.5					<.02

*Chemical concentrations are in mg/l except for Hg which is in ug/l.

TABLE 8 (Continued)
ORGANIC ANALYSES OF HOMEOWNER WELLS

WELL NUMBER	1	2	3	4	5	6	7	8	9
OWNER	D. Eckelberger	G. Tamkins	R. Edminster	M. Smith	D. Kernan	J. Villano	O. Desimone	A. Dahteria	R. Johns
DATE	11/9/83	11/9/83	11/9/83	11/9/83	11/9/83	11/9/83	11/9/83	11/9/83	11/9/83
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
a-Trifluorotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1-Chlorocyclohexene-1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Bromofluorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-Propylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Chlorotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Chlorotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
sec-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Cymene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclopropylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,3-Benzofuran	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachloro-1,3-butadiene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
t-1,2-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
t-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	2	< 1	< 1	< 1
Trichloroethene	< 1	< 1	< 1	< 1	< 1	4	< 1	< 1	< 1
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
c-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Chloroethylvinyl ether	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromoform	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

* Chemical concentrations expressed in ug/l (ppb)

TABLE 8 (Continued)
ORGANIC ANALYSES OF HOMEOWNER WELLS

WELL NUMBER	10	11	12	13	14	15	16	17
OWNER	A. Allen	J. Hoover	R. Gleason	D. Hamm	Town Hall	R. Rowse	T. Butchko	S. Lasky
DATE	11/9/83	11/9/83	11/9/83	11/15/84	11/15/84	11/15/84	11/15/84	11/15/84
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
a-Trifluorotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1-Chlorocyclohexene-1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Bromofluorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-Propylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Chlorotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Chlorotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
sec-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Cymene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclopropylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,3-Benzofuran	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachloro-1,3-butadiene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
t-1,2-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	< 1	< 1	< 1	2	2	< 1	< 1	< 1
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
t-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	9
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
c-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Chloroethylvinyl ether	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromoform	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

* Chemical concentrations expressed in ug/l (ppb)

TABLE 9

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS FOR SURFACE WATER

Parameter	Standard (S) or Guidance (G) Value			
	Human (AA)		Aquatic (A,B,C)	
Arsenic (As)	0.05 mg/l	(S)	0.19 mg/l *	(S)
Barium (Ba)	1.0 mg/l	(S)	-	
Cadmium (Cd)	0.01 mg/l	(S)	(1)	(S)
Chloride (Cl)	250.0 mg/l	(S)	-	
Chromium (Cr)	0.05 mg/l	(S)	(2)	(S)
Copper (Cu)	0.2 mg/l	(S)	(3)	(S)
Cyanide (CN)	0.1 mg/l	(S)	0.052 mg/l **	(S)
Fluoride (F)	1.5 mg/l	(S)	(4)	(S)
Iron (Fe)	0.3 mg/l	(S)	0.3 mg/l	(S)
Lead (Pb)	0.05 mg/l	(S)	(5)	(S)
Magnesium (Mg)	35.0 mg/l	(S)	-	
Manganese (Mn)	0.3 mg/l	(S)	-	
Mercury (Hg)	0.002 mg/l	(S)	0.2 ug/l	(G)
Nitrate as N (NO3)	10.0 mg/l	(S)	-	
Phenols (total)	0.001 mg/l	(S)	-	
Selenium (Se)	0.01 mg/l	(S)	0.001 mg/l	(S)
Silver (Ag)	0.05 mg/l	(S)	0.1 ug/l	(S)
Sulfate (SO4)	250.0 mg/l	(S)	-	
Zinc (Zn)	0.3 mg/l	(S)	0.03 mg/l	(S)
Chlordane	0.02 ug/l	(G)	0.002 ug/l	(G)
Endrin	0.2 ug/l	(S)	0.002 ug/l	(S)
Heptachlor	0.009 ug/l	(S)	0.001 ug/l	(S)
Methoxychlor	35 ug/l	(S)	0.03 ug/l	(S)
Toxaphene	0.01 ug/l	(G)	0.005 ug/l	(S)
Vinyl Chloride	0.3 ug/l	(G)	-	
Benzene	1.0 ug/l	(G)	6.0 ug/l	(G)
Chloroform	0.2 ug/l	(S)	-	
Trichloroethylene	3.0 ug/l	(G)	11.0 ug/l	(G)

* dissolved arsenic form

** free cyanide

(1) exp(0.7852 [ln(ppm hardness)] - 3.49)

(2) exp(0.819 [ln(ppm hardness)] + 1.561)

(3) exp(0.8545 [ln(ppm hardness)] - 1.465)

(4) (0.02) exp(0.907 [ln(ppm hardness)] + 7.394)

(5) exp(1.266 [ln(ppm hardness)] - 4.661)

Hardness is the sum of magnesium and calcium concentrations expressed as mg/l CaCO3

TABLE 10
TOWN OF CONKLIN
VOLATILE ORGANICS SUMMARY TABLE
LEACHATE DATA
(Units are ug/l)

	Lower Landfill				Upper Landfill			
	WELL 13** 8/8/83	WELL 13** 8/20/83	WELL 15** 8/8/83	WELL 15** 8/20/83	WELL 14*** 8/8/83	WELL 14*** 8/19/83	WELL 14*** 2/13/86	WELL 16* 8/20/83
BENZENE	2	BDL	BDL	BDL	40	47	33	7
BROMOMETHANE	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CHLOROBENZENE	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CHLOROETHANE	BDL	BDL	BDL	BDL	19	15	BDL	BDL
CHLOROMETHANE	BDL	BDL	BDL	BDL	BDL	2	BDL	BDL
1,1-DICHLOROETHANE	BDL	BDL	BDL	BDL	62	80	BDL	BDL
1,2-DICHLOROETHANE	BDL	BDL	BDL	BDL	6	10	BDL	BDL
1,2-DICHLOROETHENE	BDL	BDL	BDL	BDL	8	10	BDL	BDL
1,2-DICHLOROPROPANE	BDL	BDL	45	20	150	350	BDL	BDL
ETHYLBENZENE	8	5	BDL	BDL	34	59	89	23
METHYLENE CHLORIDE	BDL	2	2	4	1600	2100	150	4
TETRACHLOROETHENE	BDL	BDL	BDL	BDL	5	4	BDL	BDL
TOLUENE	17	13	BDL	1	1100	1200	1200	8
1,1,1-TRICHLOROETHANE	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
TRICHLOROETHENE	BDL	BDL	BDL	BDL	23	23	BDL	BDL
VINYL CHLORIDE	BDL	BDL	BDL	BDL	36	25	BDL	BDL
m-XYLENE	15	4	BDL	BDL	BDL	100	100	22
XYLENE	26	7	BDL	BDL	BDL	160	190	40

BDL = Below detection limit
* indicates that one round of analyses was performed at the site
** indicates that two rounds of analyses were performed at the site
*** indicates that three rounds of analyses were performed at the site

TABLE 11
REPRESENTATIVE RANGES FOR VARIOUS INORGANIC CONSTITUENTS IN LEACHATE FROM SANITARY LANDFILLS

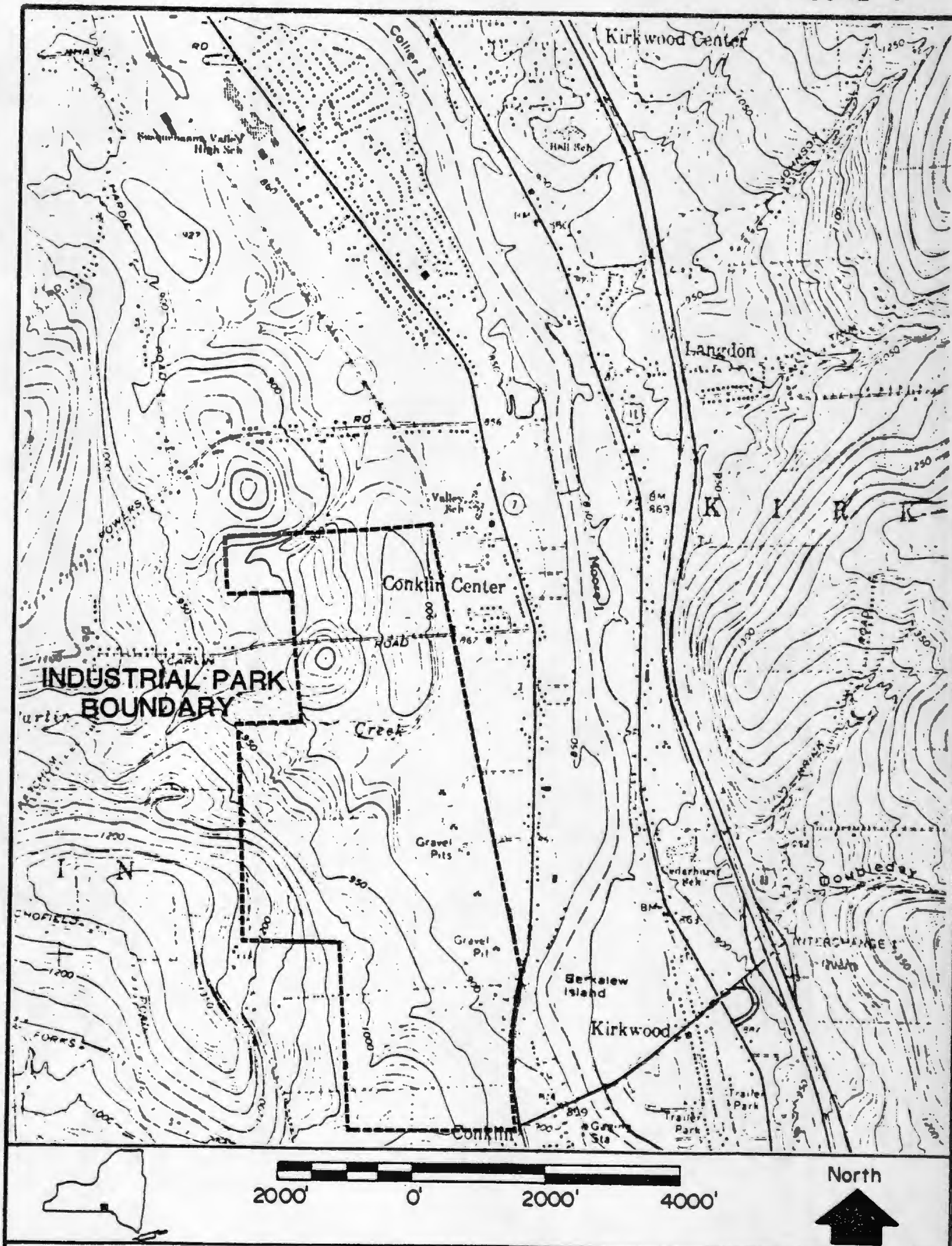
(Sources: Griffin et al., 1976; Leckie et al., 1975)

PARAMETER	RANGE (mg/l)
Alkalinity	500 - 10,000
Ammonium (NH4+)	10 -1,000
Chemical Oxygen Demand (COD)	1,000 - 90,000
Chloride (Cl-)	200 - 1,000
Copper (Cu)	10
Iron - total (Fe)	1 - 1,000
Lead (Pb)	5
Magnesium (Mg+2)	100 - 1,500
Manganese (Mn)	0.01 - 100
Mercury (Hg)	0.2
Nickel (Ni)	0.01 - 1
Nitrate (NO3)-	0.1 - 10
Organic Nitrogen	10 -1,000
pH (s.u.)	4 - 8
Phosphorus (PO4)-3	1- 100
Potassium (K+)	200 - 1,000
Sodium (Na+)	200 - 1,200
Sulfate (SO4)-2	10 -1,000
Total Dissolved Organic Carbon	200 - 30,000
Total Dissolved Solids (TDS)	5,000 - 40,000
Zinc (Zn)	0.1 - 100

Figures

O'BRIEN & GERE

FIGURE 1



BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY	BROOME INDUSTRIAL PARK CONKLIN, N.Y. LOCATION MAP

O'BRIEN & GERE

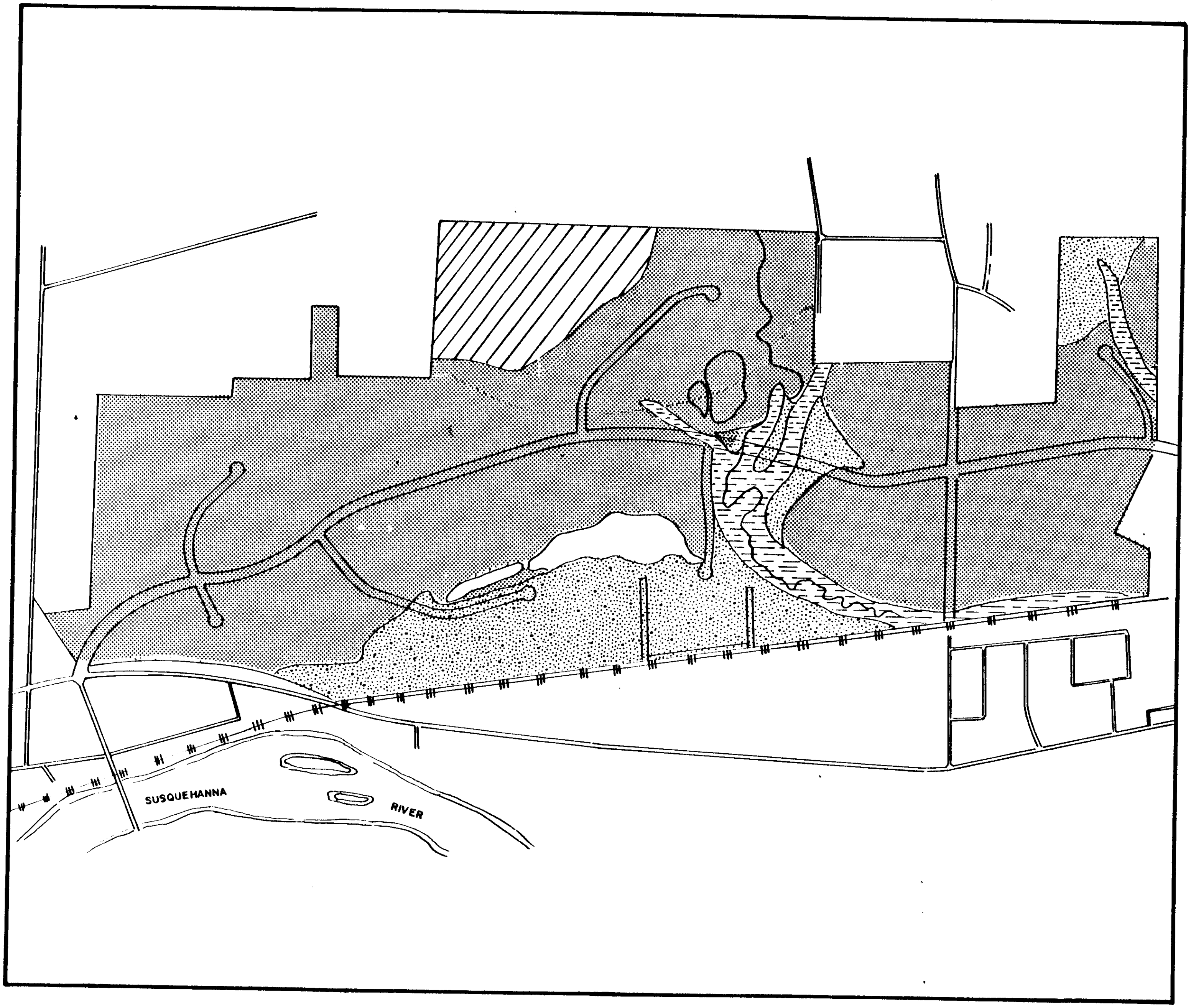


FIGURE 3

SURFICIAL GEOLOGY MAP

LEGEND

- ALLUVIUM – MODERATELY SORTED SILT, SAND AND GRAVEL DEPOSITED BY MODERN STREAMS.
- TILL – UNSORTED MIXTURE OF SILT SAND, CLAY AND ROCK FRAGMENTS DEPOSITED DIRECTLY BY GLACIAL ICE.
- OUTWASH – MODERATELY TO WELL-SORTED SAND SILT DEPOSITED BY MELTWATER STREAM
- COLLUVIUM – THIN (<4FT THICK) OVER BEDROCK.

SCALE IN FEET

400 0 400 800

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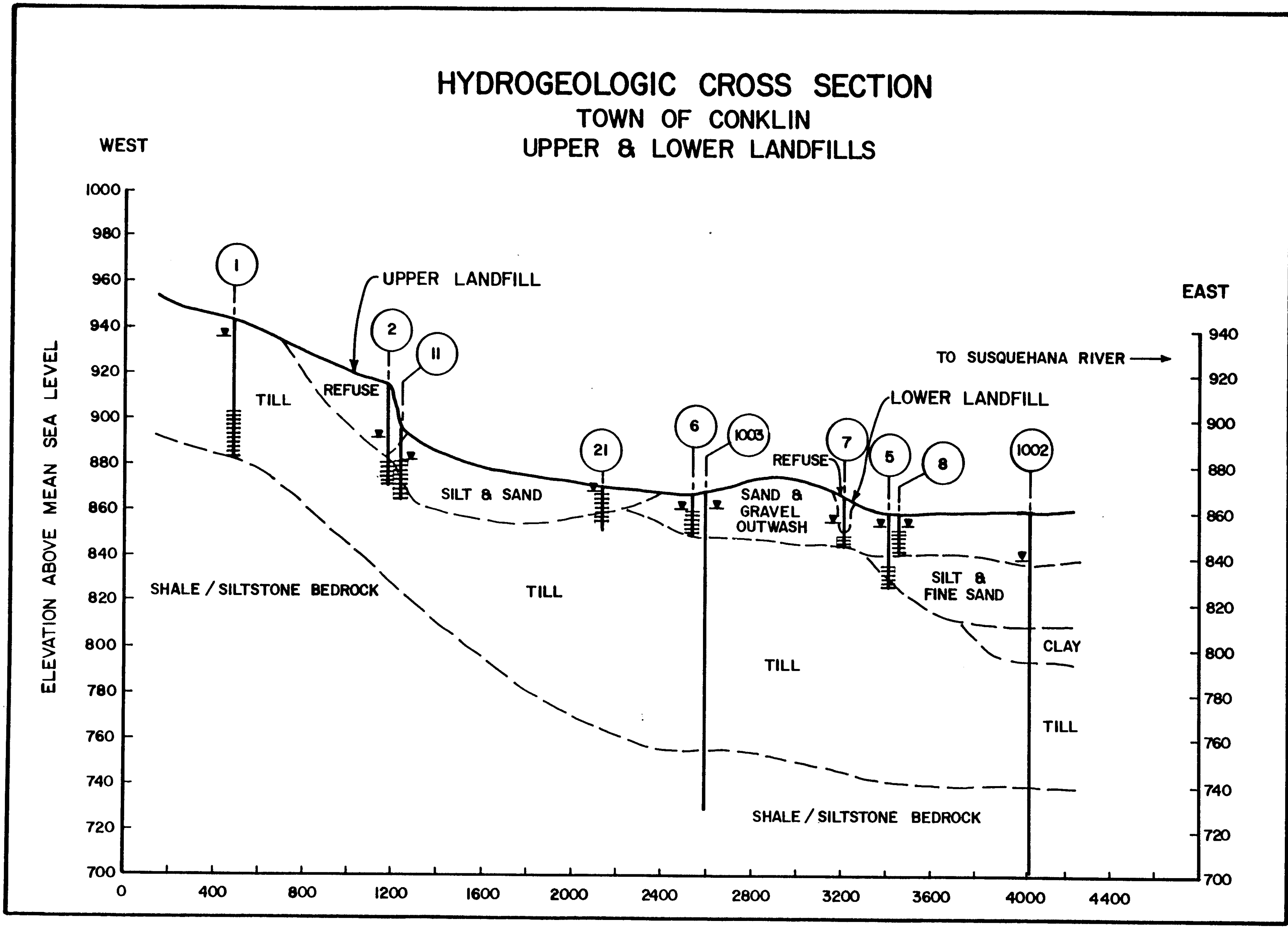

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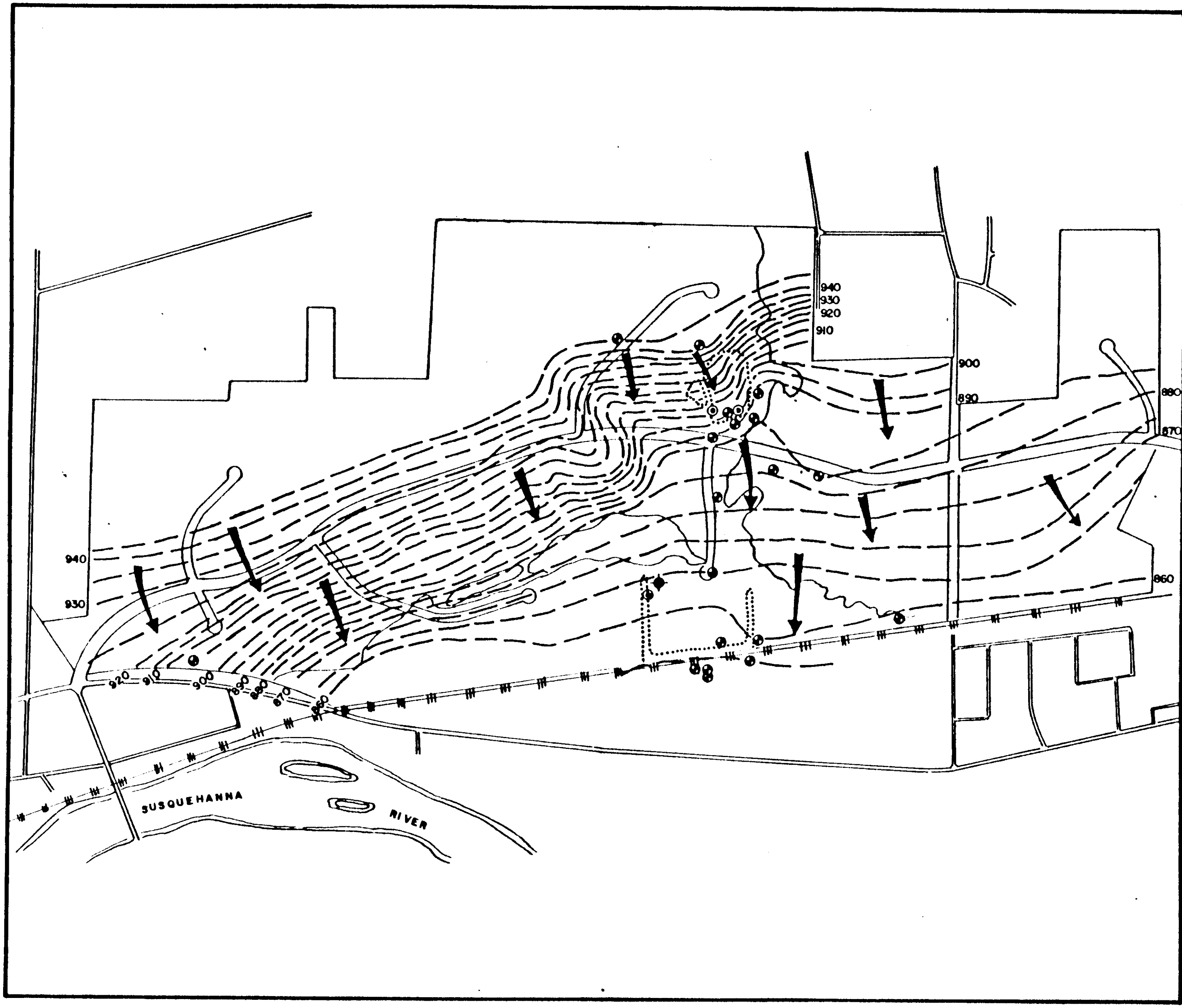
FIGURE 4

FIGURE 5

GROUNDWATER ELEVATION MAP



LEGEND

- GROUNDWATER MONITORING WELL
- LEACHATE / METHANE GAS MONITORING WELL
- WELLS BY OTHERS
- GROUNDWATER EQUIPOTENTIAL LINE (DEC. 20, 1984)
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE LIMITS OF FILL

SCALE IN FEET

400 0 400 800

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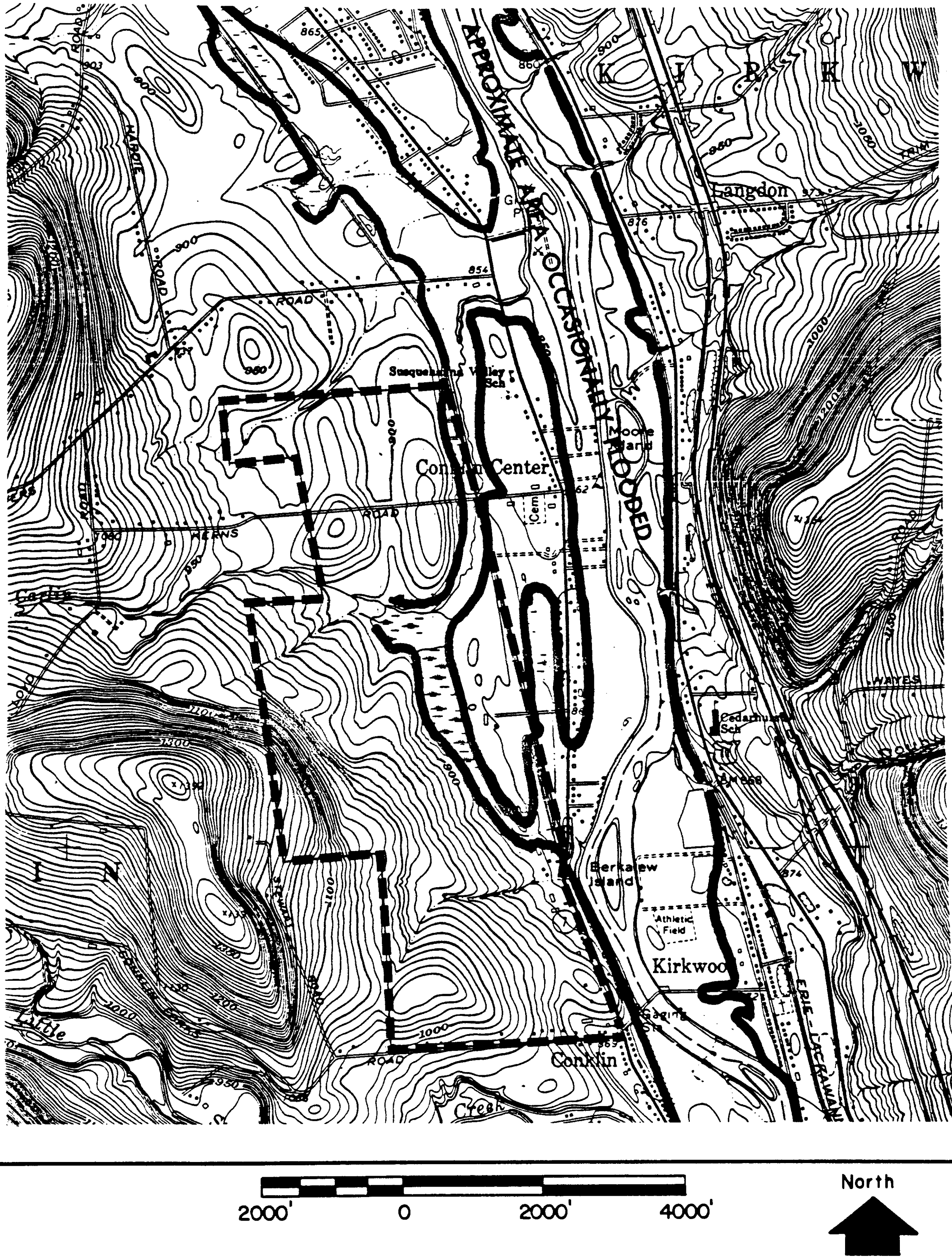
FIGURE 6



BROOME COUNTY INDUSTRIAL DEVELOPMENT AGENCY	BROOME INDUSTRIAL PARK CONKLIN, N.Y. FLOOD ZONE MAP

O'BRIEN & GERE ENGINEERS, INC

Appendices

O'BRIEN & GERE

APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
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Page

HEALTH AND SAFETY PLAN

SECTION 1 - INTRODUCTION

1.01 Health and Safety Plan

This document serves as the Health and Safety Plan for all work activities connected with the remedial investigation and feasibility studies at the Town of Conklin Landfills in Conklin, NY. The primary potential work site hazard arises during exposure to exposed fill material, due to the presence of low level organics and inorganics present in municipal landfills. All activities involving disturbance of or contact with the fill material must be addressed with appropriate protection, as detailed in this Plan.

This Plan is designed to address the minimum health and safety requirements and general procedures to be met by O'Brien & Gere employees and contractors during the RI/FS investigation. In accordance with contract documents, the Health and Safety Officer for any contractor is required to review this plan, complete an independent safety plan and finalize logistical details and considerations prior to commencement of any contractor onsite activities.

This plan provides details on the site, the work stages, associated hazards, the required safety equipment and applicable procedures for each stage of the work in order to clearly define the steps necessary to provide adequate protection for all personnel involved with the on-site work. All personnel are required to adhere to the protocols and procedures in this plan while in the designated project-specific areas.

1.02 Project Work Plan Summary

The field investigation will involve the following activities:

1) installation of ground water monitoring wells

2) excavation of trenches adjacent to the lower landfill areas

3) a sampling program to further define the extent of on-site and off-site contamination in ground water, soil, surface water and sediments, and leachate.

Based on the data from the field investigation, a risk assessment and remedial investigation report will be prepared, followed by a feasibility study of remedial alternatives.

SECTION 2 - SITE DESCRIPTION

2.01 General

The Town of Conklin owns two inactive municipal waste landfills within the area designated as the Broome Corporate Park. In June, 1986 the site of the two landfills was proposed for inclusion on the National Priorities List. Field activities associated with geophysical surveys, the installation of ground water monitoring wells and sampling for soil, sediment, water, ground water, and leachate have been conducted over the period 1983 to 1986. Results from these investigations have indicated the presence of low levels of organic compounds and metals in leachate and ground water samples.

2.02 Designation of Project-Specific Areas

2.02.1 Work Zone

The work zone shall be defined as each landfill, and all immediately surrounding land surface on which personnel and equipment must traverse while working on the site (not including that which they must pass through in order to get to the site). See Figure 1 for work zone delineation. For both administrative and safety reasons, the work zone will be delineated with markers, stakes and flagging tape, or other similar means to designate the area as one of limited access and usage.

2.02.2 Decontamination Area

Decontamination areas will be designated at the trenching and well-drilling sites. Heavy equipment will be steam-cleaned at the site after use, and wash water allowed to drain into the landfill material. Disposable protective equipment (i.e. tyveks, disposable gloves, and outer boots) will be treated as waste material and disposed of properly off site.

2.02.3 Health/Safety/Emergency Facilities

Materials for health, safety and first aid measures will be provided for in the project vehicle. Provisions will include extra protective clothing and equipment, first aid supplies, fire extinguishers, and emergency phone numbers.

SECTION 3 - WORK SITE HAZARDS

3.01 Hazardous Materials Present

Based on information gathered through the Phase I and Phase II Hydrogeological investigations and previous RI studies conducted by O'Brien & Gere, the following chemicals have been determined to be present in the leachate and ground water samples from the landfill:

- metals including iron, maganese, and copper
- 1,1-Dichloroethane
- toluene
- traces of other volatile organics

The potential for exposure to the compounds listed above, present in residual levels, is adequately addressed by the health and safety measures specified in this Health and Safety Plan.

3.02 Physical Hazards Present

The work will involve walking around the area during excavation of test trenches at the edge of the fill area with backhoes, and the use of heavy equipment such as well-drilling rigs. Use of such equipment, and related activities, presents hazards common to general construction situations including falling, being struck by the equipment, head injuries, and noise. These are most directly addressed with the use of the proper personal protective clothing and equipment such as hard hats, steel-toe boots and coveralls, and common sense, which includes compliance with safety protocols and open and effective communication between all personnel on site.

A variety of municipal type wastes have been buried at the site. Excavation of wells, trenches, etc. will require the precautions associated with a level D protective equipment (see Section 4.0), in order to mitigate potential hazards from fill materials. Specifically, the backhoe operator will be instructed to proceed slowly, and an observer must stand by during the entire excavation process. Excavation will stop when the edge of the fill is encountered to avoid excavating unknown fill materials.

SECTION 4 - PROTECTIVE MEASURES

Most operations on-site will require the use of level D protection.

4.01 Contact Protection - Level C

The following protective clothing and equipment are required for all onsite personnel within the contaminated zone during lower landfill boring activities.

- fully hooded tyvek (or similar brand) suit over long-sleeve, long-pant work clothes
- inner gloves (medical gloves)
- rubber or latex outer gloves
- rubber overboots over steel-toe boots
- tape to seal the joints between the suit, and gloves and boots
- hard hats

4.02 Respiratory Protection - Level C

Full face respirators, equipped with high-efficiency dust/mist/particulate, organic vapor combination cartridges are to be worn by all personnel, including equipment operators, during all activities involving movement and/or disturbance of the fill material. A safety station containing a Self Contained Breathing Apparatus (SCBA), First Aid Kit, Drinking Water and other appropriate equipment will be placed as close as possible. A place where employees may break in a clean zone by washing their boots, removing their gloves and respirator for the purpose of receiving water, monitoring vital signs and rest periods will also be established.

No facial hair which could interfere with the proper fit and seal of the respirator is permitted on onsite workers. All personnel must be fit-tested prior to using the respirators for onsite work. Also, all personnel must have medical approval for the use of respiratory protective equipment prior to the using such equipment onsite. Personnel must be safety trained in accordance with 29 CFR 1910.210.

Those workers who require corrective lenses for accurate vision must be fitted with a full face respirator which can have glasses clipped inside the mask. No one is permitted to wear a standard full face respirator over regular eyeglasses. No one is permitted to wear contact lenses while in the work area.

4.03 Eye Protection

Eye protection will be provided for with the full face respirator. For the work site activities which do not require a respirator, all personnel must wear protective eyeglasses with side shields or goggles while onsite.

4.04 Protection - Level D

Barring the detection of unforeseen hazards during the field investigation, all field activities, including sampling, will be conducted using level D protection.

Requirements for level D protection include:

- Full-face/half-face air-purifying respirator equipped with appropriate canisters or cartridge must be available for use; and all potential users trained and medically approved for such use.

- Long sleeve work shirt and long pants (work pants or jeans)
- Leather boots
- Options as required:

  1. Work gloves
  2. Disposable outer boots
  3. Safety glasses or chemical splash goggles
  4. Hard hat
  5. Respirator

SECTION 5 - HEALTH AND SAFETY PROGRAMS AND PROCEDURES

5.01 Onsite Organization

Project Director (Town of Conklin):	Phil Marks Town Supervisor Town of Conklin (607) 775-3456
Project Manager (O'Brien & Gere):	Frank D. Hale Syracuse, NY (315) 451-4700
Health & Safety Officers (O'Brien & Gere:	Swiatoslav W. Kaczmar, Ph.D., C.I.H.
(H&S Officers)	Ruth Wegmann Syracuse, NY (315) 451-4700
New York State Department of Environmental Conservation	Brian Davidson (518) 457-5637

5.02 Training Program

As a proposed federal Superfund site, the Town of Conklin Landfills fall under the jurisdiction of the OSHA standard contained in 29 CFR 1910.120, regarding the health and safety of onsite workers.

All project personnel, including employees of Corning, O'Brien & Gere Engineers, Inc., contractors and subcontractors must demonstrate participation in a 40-hour health and safety training program, which includes use of respiratory protective equipment and protective clothing, decontamination, onsite procedures, and emergency response measures.

Any personnel not meeting these requirements, as well as those detailed elsewhere in this plan, are not permitted entry into the Work Zone.

5.03 Monitoring Programs

Previous investigations have not revealed significant levels of volatile compounds to which site workers may be exposed. Nonetheless, monitoring will be conducted during all site activities with an HNU (PL-101) photoionization organic vapor detector. At readings of 5 ppm (chosen on the basis of a 50 ppm TLV for tetrachloroethylene, a frequently observed contaminant at landfills, and a safety factor of 10) or greater, use of a respirator equipped with an organic vapor cartridge will be required.

Monitoring for heat stress shall be maintained for all personnel dressed in Level C protection. This monitoring is to consist of periodic measurements of oral temperature, body weight, and/or heart rate. The following criteria are to be used:

- if the heart rate exceeds 110 beats per minute at the beginning of a rest period, shorten the next work cycle by one-third.
- if oral temperature exceeds 99.6°F shorten the next work cycle by one-third.
- if oral temperature exceeds 100.6°F, the worker should not be permitted to continue wearing the protective clothing.

- body water loss (based on weight) should not exceed 1.5% total body weight loss in a work day.

5.04 Decontamination Procedures

5.04.1 Equipment

Equipment decontamination will consist of a steam rinse of all pieces of wettable field equipment. All runoff rinse waters will be drained back onto the landfill at the point of use.

5.04.2 Personnel

Decontamination for personnel is to take place in two stages. Initial decontamination (washing and disposal of contaminated garments) is to take place immediately adjacent to the work site.

Station 1: Equipment Drop

Deposit equipment used on-site (tools, containers, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination.

Station 2: Outer Garments, Boots, Gloves - Wash & Rinse

Wash outer boots and outer gloves with detergent water in a small tub or wading pool. Rinse off using copious amounts of water, again using a small tub or wading pool.

Station 3: Outer Boot and Glove Removal

Remove tape, outer boots and outer gloves. Deposit in container with plastic liner.

Station 4: Cartridge of Mask Change

If a worker leaves the work area to change a respirator cartridge or mask, then this is the last step in the decontamination procedure. New outer gloves and boots covers donned and taped, and the worker returns to duty.

Station 5: Outer Garment Removal

Tyveks are removed and deposited in plastic lined disposal containers.

Station 6: Respiratory Removal

Respirator is removed. Avoid touching face with fingers. Deposit respirator on plastic sheet. Respirators are to be cleaned with soap and water by decontamination line personnel.

Station 7: Inner Glove Removal

Remove inner gloves and deposit in lined container.

5.05 Entry and Exit Procedures

In order to control the potential for the spread of the contaminated materials, entry and exit into the work zone must be controlled. Refer to Figure 1 for the entry and exit point location. Entry procedures are as follows:

1. All personnel must dress in required safety clothing specified for each task in Section 4 above.
2. All personnel must notify the H&S Officer of intended operations.
3. The H&S Officer will review team personnel for appropriate personal protective equipment and clothing.
4. Entry time and name must be logged in.
5. Team proceeds through the designated Entry and Exit point.

Exit procedures are as follows:

a. All personnel must exit through the designated Entry and Exit point.

b. All personnel must go through appropriate decontamination procedures, as specified in Section 5.04.2.

c. All personnel must log out and record exit time.

5.06 Offsite Health and Safety Concerns

In addition to providing for the health and safety of all onsite personnel, it is also imperative to consider offsite residents in the immediate area. If trenching creates excessive dust, the area will be wetted to suppress dust. If off-site residents are bothered by excessive noise levels, precautions will be taken to shorten the work periods and alert residents of the work hours.

5.07 Medical Program

All personnel working onsite are required to have passed a general physical exam within 6 months prior to the initiation of onsite activities. A follow-up physical within 6 months following the completion of work activities will also be required. The physicals are to include pulmonary and cardiac function tests, and blood test indicative of liver and kidney function.

SECTION 6 - EMERGENCY MEASURE

6.01 Phone Numbers

Town of Conklin	(607) 775-3456
Police Dept.	*
Fire Dept.	*
Corning Hospital	*
Ambulance	*

* To be provided to field personnel prior to starting field activities.

Hospital Directions

Hospital directions will be obtained and provided to field personnel prior to initiating field activities.

6.03 Responses to Incidents

Response to major incidents and/or emergency situations should follow the basic steps as explained below.

1. Major Exposure

   Notify H&S Officer, Project Director and Project Manager. Decontaminate victim to the greatest extent practicable. Remove the victim from the area, using a stretcher if necessary. Administer preliminary first aid, if trained in such. Victim will be transported to treatment at the direction of the H&S Officer and Project Director.

2. Medical Crisis

   Follow procedures in #1 above.

3. Fire and/or Explosion

   Evacuate area.

Contact Fire Department

Follow procedures in #1 above, as necessary.

4. Accident involving equipment

Follow procedures in #1 above.

6.04 Follow-Up Procedures

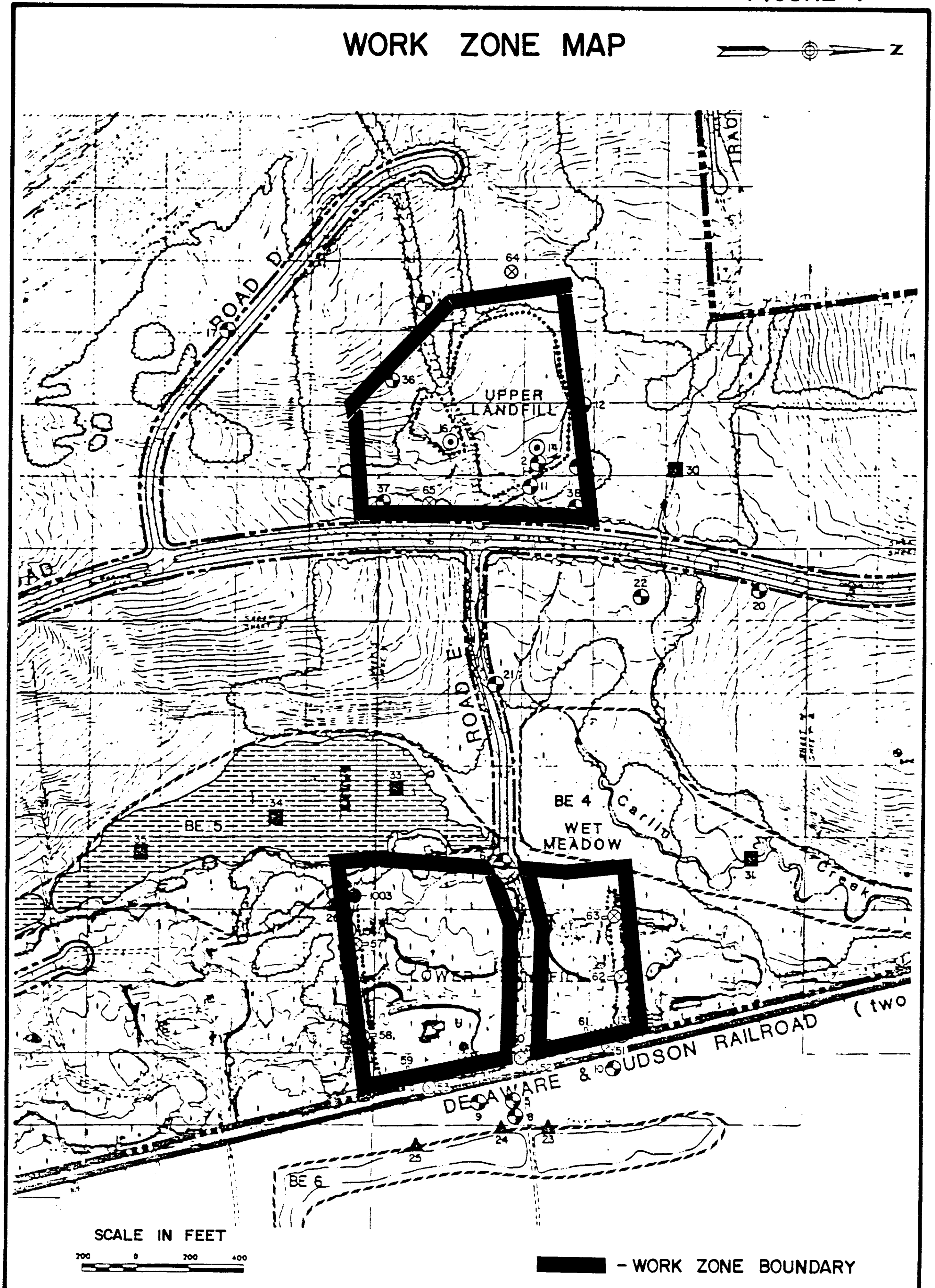
6.04.1 Documentation

Documentation is important in understanding an incident and planning to prevent any similar incidents in the future. A report must be filed with the Project Manager for all incidents of worker illness or injury.

6.04.2 Restore to Order

Work should not be continued following any incident/emergency until all equipment has been restored to readiness, in order to be fully prepared for any future incidents.

FIGURE 1



O'BRIEN & GERE ENGINEERS, INC.

APPENDIX B

MAGNETOMETER SURVEY PROTOCOL

MAGNETOMETER SURVEY PROTOCOL

A grid system will be established by standard surveying techniques to document the location of each grid point and surface elevation. All elevations will be in feet above mean sea level. The grid spacing will be sufficient to detail the site(s) location and boundaries.

A Geometric proton magnetometer, Model G-816/G826 or the equivalent, will be used to conduct the survey. The magnetometer will be operated in accordance with the operating manual.

A base station will be established outside the survey area in an area with no known buried or surface ferrous-metallic objects. Readings at the base station will be repeated every one (1) hour and at the beginning and end of each day. At each point of the grid system, the time, station location and magnetometer readings will be recorded.

APPENDIX C

SOIL SAMPLING METHODS AND BORING LOGS

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GENERAL NOTES

1. The soil logs, notes and other test data shown are the results of interpretations made by representatives of Parratt-Wolff Inc. from personal observations made during the exploration period of samples of subsurface materials recovered during exploration and records of exploration as prepared by the drill operator.

2. Explanation of the classifications and terms:

a. Bedrock - Natural solid mineral matter occurring in great thickness and extent in its natural location. It is classified according to geological type and structure (joints, bedding, etc.) and described as solid, weathered, broken, fragmented or decomposed depending on its condition.

b. Soils - Sediments or other unconsolidated accumulations of particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter.

PENETRATION RESISTANCE

COHESIONLESS SOILS		COHESIVE SOILS	
Blows Per Ft.	Relative Density	Blows Per Ft.	Consistency
0 to 4	Very Loose	0 to 2	Very Soft
4 to 10	Loose	2 to 4	Soft
10 to 30	Medium	4 to 8	Medium
30 to 50	Dense	8 to 15	Stiff
Over 50	Very Dense	15 to 30	Very Stiff
		Over 30	Hard

Size Component Terms

Boulder	Larger than 8 inches
Cobble or Small Stone . .	8 inches to 3 inches
Gravel - coarse	3 inches to 3/4 inch
medium	3/4 inch to 4.76 mm
Sand - coarse	4.76 mm to 2.00 mm (#10 sieve)
medium	2.00 mm to 0.42 mm (#40 sieve)
fine	0.42 mm to 0.074 mm (#200 sieve)
Silt and Clay	Finer than 0.074 mm

Proportion by Weight

Major component is shown with all letters capitalized.

Minor component percentage terms of total sample are:

and . . .	40 to 50 percent
some . . .	20 to 40 percent
little . . .	10 to 20 percent
trace . . .	1 to 10 percent

c. Gradation Terms - The terms coarse, medium and fine are used to describe gradation of Sands and Gravel.

d. The terms used to describe the various soil components and proportions are arrived at by visual estimates of the recovered soil samples. Other terms are used when the recovered samples are not truly representative of the natural materials, such as, soil containing numerous cobbles and boulders which cannot be sampled, thinly stratified soils, organic soils, and fills.

e. Ground Water - The measurement was made during exploration work or immediately after completion, unless otherwise noted. The depth recorded is influenced by exploration methods, the soil type and weather conditions during exploration. Where no water was found it is so indicated. It is anticipated that the ground water will rise during periods of wet weather. In addition, perched ground water above the water levels indicated (or above the bottom of the hole where no ground water is indicated) may be encountered at changes in soil strata or top of rock.

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A BRIEF DESCRIPTION OF THE UNIFIED SOIL SYSTEM

The Unified Classification System is an engineering soil classification that is an outgrowth of the Air-Field classification developed by Casagrande.

The system incorporates the textural characteristics of a soil into the engineering classification. All soils are classified into fifteen groups, each group being designated by two letters. These letters are as follows: G—gravel, S—sand, M—Non plastic or low plasticity fines, C—plastic fines, Pt—peat, humus and swamp soils, O—organic, W—well graded, P—poorly graded, L—low liquid limit, H—high liquid limit.

GW and SW Groups

These groups comprise well graded gravelly and sandy soils which contain less than 5% of non plastic fines passing a #200 sieve. Fines which are present must not noticeably change the strength characteristics of the coarse grain fraction and must not interfere with its free draining characteristics. In areas subject to frost action the material should not contain more than about 3% of soil grains smaller than .02 millimeters in size.

GP and SP Groups

These groups are poorly graded gravels and sands containing less than 5% non plastic fines. They may consist of uniform gravels, uniform sands, or non uniform mixtures of very coarse material and very fine sand with intermediate sizes lacking. Materials of this latter type are sometimes referred to as skip graded, cap graded, or step graded.

GM and SM Groups

In general, these groups include gravels or sands which contain more than 12% of fines having little or no plasticity. The plasticity index and liquid limit of a soil in either of these groups plot below the "A" line on a plasticity chart. Gradation is not important and both low grade and poorly graded materials are included. Some sands and gravels in these groups may have a binder composed of natural cementing agents so proportioned that the mixture shows negligible swelling or shrinkage. Thus, the dry strength is provided by a small amount of soil binder or dry cementation of calcareous materials or iron oxide. A fine fraction of non cemented materials may be composed of silts or rock flour types having little or no plasticity, and the mixture will exhibit no dry strength.

GC and SC Groups

These groups comprise gravelly or sandy soils with more than 12% of fines which exhibit either low or high plasticity. The plasticity index and liquid limit of a soil in either of these groups plot above the "A" line on the plasticity chart. Gradation of these materials is not important. Plasticity of the binder fraction has more influence on the behavior of the soils than does the variation in gradation. A fine fraction is generally composed of clays.

ML and MH Groups

These groups include predominantly silty materials and micaceous or diatomaceous soils. An arbitrary division between the two groups has been established with a liquid limit of 50. Soils in these groups are sandy silts, clayey silts or organic silts with relatively low plasticity. Also included are loessial soils and rock flours. Micaceous and diatomaceous soils generally fall within the MH group, but may extend into the ML group when their liquid limit is less than 50. The same is true for certain types of kaolin clays and some illite clays having relatively low plasticity.

CL and CH Groups

The CL and CH groups embrace clays with low and high liquid limits respectively. They are primarily inorganic clays. Low plasticity clays are classified as CL and are usually lean clays, sandy clays, and silty clays. The medium plasticity and high plasticity clays are classified as CH. These include fat clays, gumbo clays, certain volcanic clays and bentonite.

OL and OH Groups

The soils in these groups are characterized by the presence of organic matter including organic silts and clays. They have a plasticity range that corresponds with the ML and MH groups.

Pt Group

Highly organic soils which are very compressible have undesirable construction characteristics and are classified in one group with the symbol Pt. Peat, humus and swamp soils with a highly organic texture are typical of the group. Particles of leaves, grass, branches of bushes and other fibrous vegetable matter are common components of these soils.

Borderline Classification

Soils in the GW, SW, GP and SP groups are non plastic materials having less than 5% passing the #200 sieve, while GM, SM, GC, and SC soils have more than 12% passing the #200 sieve. When these coarse grain materials contain between 5% and 12% of fines they are classified as borderline, and are designated by the dual symbol such as GW-GM. Similarly coarse grain soils which have less than 5% passing the #200 sieve, but which are not free draining or in which the fine fraction exhibits plasticity are also classed as borderline and are given a dual symbol. Still another type of borderline classification occurs when a liquid limit of a fine grain soil is less than 29 and the plasticity index lies in the range of four to seven. These limits are indicated by the shaded area on the plasticity chart.

Silty and Clayey

In the Unified System, these terms are used to describe soils whose Atterberg limits plot below and above the "A" line on the plasticity chart. The adjectives silty and clayey are used to describe soils whose limits plot close to the "A" line.

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel - sand - silt mixtures.
			GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

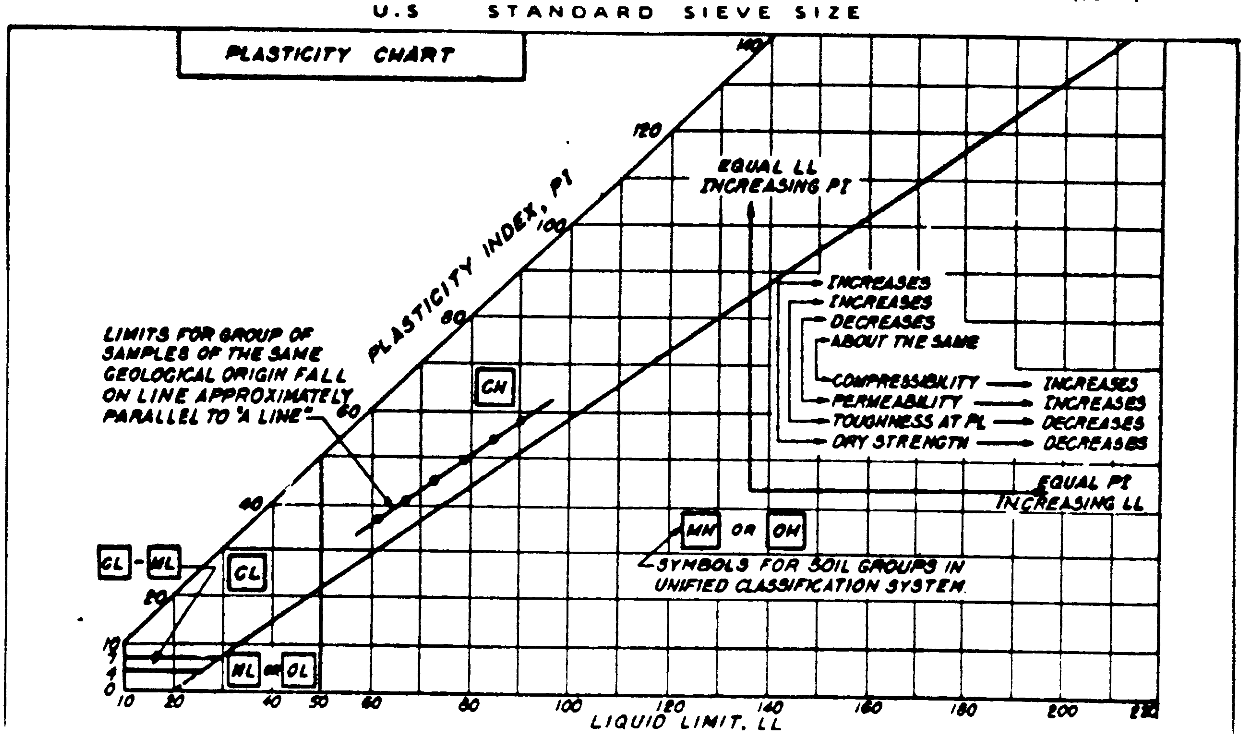
BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

No. 200 · No. 40 · No. 10 · No. 4 · ¾ in. · 3 in. · (12 in.)

U.S STANDARD SIEVE SIZE



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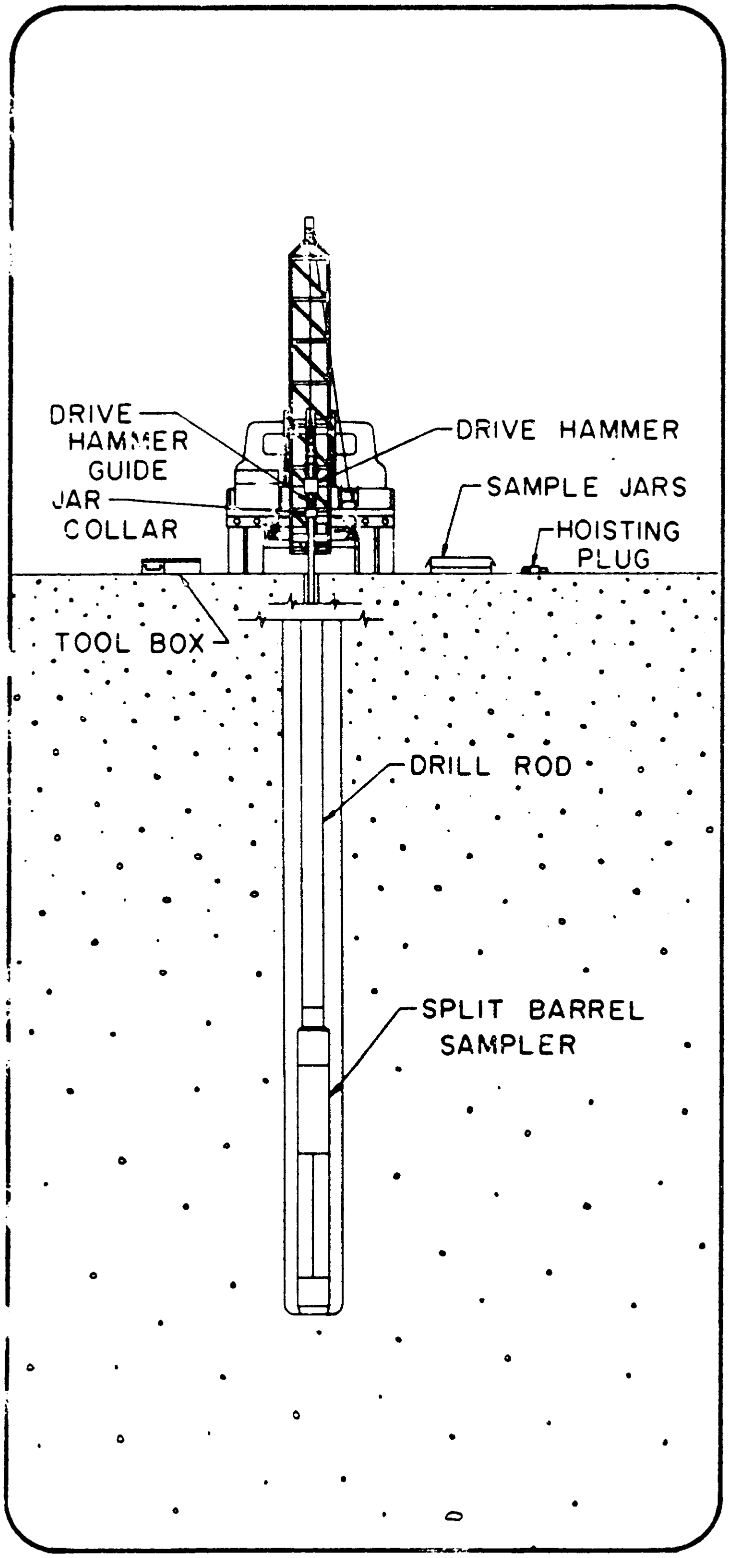

Split barrel sampling

The following excerpts are from "Standard Method for penetration test and split-barrel sampling of soils."[1] (ASTM designation: D-1586-67 AASHO Designation: T-206-70.)

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain respresentative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 Drilling Equipment – Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid "whips" under the blows of the hammer, it is recommended that the drill rod have stiffness equal to or greater than the A-rod. An "A" rod is a hollow drill rod or "steel" having an outside diameter of 1-5/8 in. or 41.2 mm and an inside diameter of 1-1/8 in. or 28.5 mm, through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15m). The hole shall be limited in diameter to between 2-1/4 and 6 in. (57.2 and 152mm).

2.2 Split-Barrel Sampler – The sampler shall be constructed with the dimensions indicated (in Fig. 1.) The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four 1/2-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 Drive Weight Assembly – The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 Accessory Equipment – Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

SOIL SAMPLING METHODS

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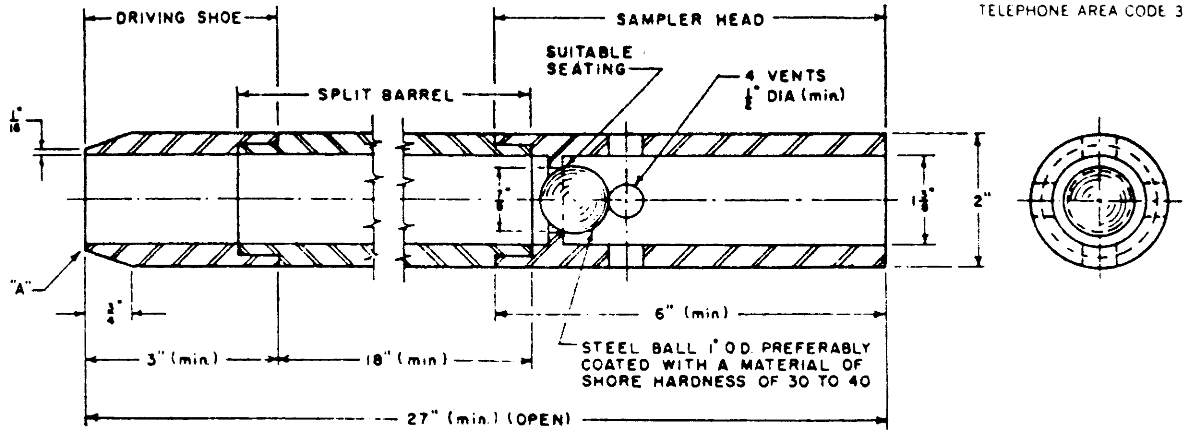


Note 1 — Split barrel may be 1-1/2 in. inside diameter provided it contains a liner of 16-gage wall thickness.

Note 2 — Core retainers in the driving shoe to prevent loss of sample are permitted.

Note 3 — The corners at A may be slightly rounded.

Table of Metric Equivalents.

In.	Mm	Cm	In.	Mm	Cm
1/16 (16 gage)	1.5	. . .	2	. . .	5.08
1/2	12.7	. . .	3	. . .	7.62
3/4	19.0	1.90	6	. . .	15.24
7/8	22.2	2.22	18	. . .	45.72
1-3/8	34.9	3.49	27	68.58	
1-1/2	38.1	3.81			

Fig. 1 — Standard Split Barrel Sampler Assembly

3. Procedure

3.1 Clear out the hole to sampling elevation using equipment that will ensure that the material to be sampled is not disturbed by the operation. In saturated sands and silts withdraw the drill bit slowly to prevent loosening of the soil around the hole. Maintain the water level in the hole at or above ground water level.

3.2 In no case shall a bottom-discharge bit be permitted. (Side-discharge bits are permissible.) The process of jetting through an open-tube sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below sampling elevation. Record any loss of circulation or excess pressure in drilling fluid during advancing of holes.

3.3 With the sampler resting on the bottom of the hole, drive the sampler with blows from the 140-lb (63.5 kg) hammer falling 30 in. (0.76 m) until either 18 in. (0.45 m) have been penetrated or 100 blows have been applied.

3.4 Repeat this operation at intervals not longer than 5 ft (1.5 m) in homogeneous strata and at every change of strata.

3.5 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fractions thereof. The first 6 in. (0.15 m) is considered to be a seating drive. The number of blows required for the second and third 6 in. (0.15 m) of penetration added is termed the penetration resistance, N. If the sampler is driven less than 18 in. (0.45 m), the penetration resistance is that for the last 1 ft (0.30 m) of penetration (if less than 1 ft (0.30 m) is penetrated, the logs shall state the number of blows and the fraction of 1 ft (0.30 m) penetrated).

3.6 Bring the sampler to the surface and open. Describe carefully typical samples of soils recovered as to composition, structure, consistency, color, and condition; then put into jars without ramming. Seal them with wax or hermetically seal to prevent evaporation of the soil moisture. Affix labels to the jar or make notations on the covers (or both) bearing job designation, boring number, sample number, depth penetration record, and length of recovery. Protect samples against extreme temperature changes.

4. Report

4.1 Data obtained in borings shall be recorded in the field and shall include the following:

4.1.1 Name and location of job,
4.1.2 Date of boring — start, finish,
4.1.3 Boring number and coordinate, if available,
4.1.4 Surface elevation, if available,
4.1.5 Sample number and depth,
4.1.6 Method of advancing sampler, penetration and recovery lengths,
4.1.7 Type and size of sampler,
4.1.8 Description of soil,
4.1.9 Thickness of layer,
4.1.10 Depth to water surface; to loss of water; to artesian head; time at which reading was made,
4.1.11 Type and make of machine,
4.1.12 Size of casing, depth of cased hole,
4.1.13 Number of blows per 6 in. (0.15 m)
4.1.14 Names of crewmen, and
4.1.15 Weather, remarks.

[1]Under the standardization procedure of the Society, this method is under the jurisdiction of the ASTM Committee D-18 on Soil and Rock for Engineering Purposes. A list of members may be found in the ASTM Year Book.

Current edition accepted October 20, 1967. Originally issued, 1958. Replaces D-1586-64T.

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 7/27/83 DATE COMPLETED 7/28/83

HOLE NO. B-1-83-494 (Well 1)
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH
WHILE DRILLING 35.0' (See Note)
BEFORE CASING REMOVED 10.5' (12 Hours)
AFTER CASING REMOVED 11.8'
SHEET 1 OF 2
File #2773.002

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-2.0'	1		3/9 10/19	19	Brown dry very stiff SILT, little fine gravel, trace fine to medium sand	
5.0	5.0'-7.0'	2		51/44 16/10	60	Brown dry hard SILT, little fine to coarse sand, trace fine to coarse gravel, trace clay	5.0'
10.0	10.0'-12.0'	3		34/35 22/29	57		
15.0	15.0'-17.0'	4		20/22 24/25	46	Brown moist hard SILT, little clay, little fine to coarse sand, trace fine gravel	15.0'
20.0	20.0'-22.0'	5		12/14 20/25	34		
25.0	25.0'-27.0'	6		9/11 18/50	29	Gray moist very stiff to hard SILT, little clay, little fine to coarse sand, little fine to medium gravel	25.0'
30.0	30.0'-32.0'	7		7/9 15/16	24		
35.0 WL	35.0'-37.0'	8		12/24 22/24	46	Gray wet hard SILT, trace fine to coarse sand	35.0'
40.0							

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York

DATE STARTED 7/27/83 DATE COMPLETED 7/28/83

HOLE NO. B-1-83-494
SURF. EL.
JOB NO. 8396

GROUND WATER DEPTH
WHILE DRILLING 35.0' (See Note)
BEFORE CASING REMOVED 10.5' (12 Hours)
AFTER CASING REMOVED 11.8'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 2 OF 2
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	40.0'- 42.0'	9		9/11 18/18	29	Gray moist very stiff SILT, little clay, little fine to coarse sand, little fine gravel	
45.0	45.0'- 47.0'	10		25/12 14/19	26	Gray moist very stiff SILT, trace fine to coarse sand, trace clay	45.0'
50.0	50.0'- 52.0'	11		9/21 24/25	45	Gray wet to moist hard SILT, little clay, little fine to coarse sand, little fine gravel	50.0'
55.0	55.0'- 57.0'	12		17/23 27/27	50		
60.0	60.0'- 61.6'	13		13/34 100/100- .1'		Gray moist hard silty sandy weathered SHALE	61.0'
						Bottom of Boring	61.6'
65.0							

Notes: Installed observation well to 60.0' on completion of boring. Driller noted wet seams below 40.0'.

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y 13057

PROJECT / LOCATION: Broome County Industrial Park, Conklin, New York

HOLE NO B-2-83-495 (Well 2)

SURF. EL.

DATE STARTED 7/28/83 DATE COMPLETED 7/29/83

JOB NO. 8396

GROUND WATER DEPTH WHILE DRILLING 4.0'

BEFORE CASING REMOVED 16.0'

AFTER CASING REMOVED 5.0'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 2
File #2773.002

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-	1		5/10		Brown moist medium dense fine to coarse SAND, fine to coarse GRAVEL and SILT	
	2.0'			15/12	25		
	2.0'-	2		5/8			
WL ▼	4.0'			8/12	16		
5.0	4.0'-	3		12/12			5.0'
	6.0'			21/13	33	REFUSE	
	6.0'-	4		15/17			
	8.0'			10/13	27		
	8.0'-	5		15/10			
10.0	10.0'			11/12	21		
	10.0'-	6		8/2			
	12.0'			4/4	6		
	12.0'-	7		16/8			
	14.0'			10/5	18		
15.0	14.0'-	8		8/10			
	16.0'			10/20	20		
	16.0'-	9		21/23			
	18.0'			19/30	42		
	18.0'	10		75-.0'			
20.0							
	20.0'-	11		18/12			
	22.0'			10/35	22		
	22.0'-	12		20/50-			
	22.9'			.4'			
25.0	24.0'-	13		24/17			
	26.0'			47/15	64		
	26.0'-	14		4/3			
	28.0'			7/16	10		
	28.0'-	15		13/14			
30.0	30.0'			14/16	28		
	30.0'-	16		12/14			
	32.0'			16/20	30		32.0'
	32.0'-	17		8/9		Gray wet very stiff to hard SILT, some clay, some fine to coarse sand	
	34.0'			10/12	19		
35.0							
	35.0'-	18		12/18			
	37.0'			20/17	38		
40.0							39.0'

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 7/28/83 DATE COMPLETED 7/29/83

HOLE NO. B-2-83-495
SURF. EL.
JOB NO. 8396

GROUND WATER DEPTH
WHILE DRILLING 4.0'
BEFORE CASING REMOVED 16.0'
AFTER CASING REMOVED 5.0'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 2 OF 2
File #2773.002

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	40.0'- 41.5'	19		21/26 32	58	Gray dry hard SILT and SHALE GRAVEL	
45.0							
	45.0'- 45.8'	19		32/50- .3'		Bottom of Boring	45.3'
50.0						Note: Installed observation well to 45.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park

LOCATION Conklin, New York

DATE STARTED 7/29/83 DATE COMPLETED 7/29/83

HOLE NO. B-3-83-496 (Well 3)

SURF. EL.

JOB NO. 8396

GROUND WATER DEPTH WHILE DRILLING Wet

BEFORE CASING REMOVED Wet

AFTER CASING REMOVED Wet

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'- 2.0'	1		2/3 4/6	7	Brown dry moist fine SAND, little silt	1.5'
						Brown dry stiff SILT, little fine sand	5.0'
5.0	5.0'- 7.0'	2		6/10 9/10	19	Brown moist to wet very stiff SILT, little fine sand, little shale gravel, trace clay	10.0'
10.0	10.0'- 12.0'	3		3/5 5/5	10	Gray wet stiff SILT	
15.0	15.0'- 17.0'	4		3/5 4/5	9		
20.0	20.0'- 22.0'	5		4/4 4/4	8		
						Bottom of Boring	22.0'
25.0						Note: Installed observation well to 20.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE N Y 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 7/29/83 DATE COMPLETED 8/1/83

HOLE NO. B-4-83-497 (Well 4)
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH WHILE DRILLING
BEFORE CASING REMOVED 13.6' (72 Hours
AFTER CASING REMOVED 13.6'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-2.0'	1		3/5 8/8	13	Brown dry stiff SILT, little fine to coarse sand, trace fine gravel	
5.0							4.0'
	5.0'-7.0'	2		9/13 1/3	14	Gray-brown wet stiff SILT, some fine to coarse sand, little fine gravel, trace clay	
10.0	10'-11'	3A		2/5			11.0'
	11'-12'	3B		13/15	18	Brown wet medium dense fine to coarse SAND and fine to medium GRAVEL, some silt	
WL							
15.0	15.0'-17.0'	4		9/11 18/20	29		
20.0							20.0'
	20.0'-22.0'	5		4/4 5/8	9	Brown-gray wet stiff SILT	
						Bottom of Boring	22.0'
25.0						Note: Installed observation well to 20.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Broome County Industrial Park

LOCATION: Conklin, New York

DATE STARTED: 8/1/83 DATE COMPLETED: 8/1/83

HOLE NO. B-5-83-498 (Well 5)

SURF. EL.

JOB NO. 8396

GROUND WATER DEPTH
WHILE DRILLING 7.0'

BEFORE CASING REMOVED 8.7'

AFTER CASING REMOVED 7.6'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-2.0'	1		3/3 6/6	9	Brown dry loose fine to coarse GRAVEL, little fine to coarse sand, little silt	
5.0							5.0'
WL	5.0'-7.0'	2		9/29 40/40	69	Brown dry very dense fine to coarse SAND and fine to coarse GRAVEL, little silt	
10.0							10.0'
	10.0'-12.0'	3		40/21 18/25	39	Gray wet dense coarse to fine SAND and fine to coarse GRAVEL, some silt	
15.0	15'-16'	4A		15/12			16.0'
	16'-17'	4B		14/13	26	Brown wet medium dense fine to coarse SAND and fine to coarse GRAVEL, little silt	18.0'
20.0	20.0'-22.0'	5		5/7 8/8	15	Brown wet stiff SILT, trace clay lenses	
25.0							25.0'
	25.0'-27.0'	6		4/5 8/9	13	Brown wet medium dense fine to coarse SAND and fine to medium GRAVEL, little silt	26.5'
30.0						Gray wet stiff SILT	30.5'
	30-30.5'	7A		6/14			
	30.5-32'	7B		18/20	32	Gray wet dense fine to coarse SAND, SILT and fine to medium GRAVEL	
35.0							35.0'
	35.0'-37.0'	8		20/27 63/92	90	Gray moist very dense fine to coarse SAND, some fine to medium gravel, little silt	
40.0							

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 8/1/83 DATE COMPLETED 8/1/83

HOLE NO. B-5-83-498
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH
WHILE DRILLING 7.0'
BEFORE CASING REMOVED 8.7'
AFTER CASING REMOVED 7.6'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 2 OF 2
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	40.0'- 42.0'	9		64/47 46/48	93	Gray moist very dense fine to coarse SAND, some fine to medium gravel, little silt	
45.0						Bottom of Boring	42.0'
						Note: Installed observation well to 33.5' on completion of boring.	

TEST BORING LOG

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Broome County Industrial Park

LOCATION: Conklin, New York

DATE STARTED: 8/2/83 DATE COMPLETED: 8/2/83

HOLE NO. B-6-83-499 (Well 6)

SURF. EL.

JOB NO. 8396

GROUND WATER DEPTH
WHILE DRILLING 7.7'
BEFORE CASING REMOVED 8.4'
AFTER CASING REMOVED 8.2'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-2.0'	1		4/6 6/7	12	Brown dry medium dense fine to medium GRAVEL, little fine to coarse sand, little silt	5.0'
5.0	5.0'-7.0'	2		3/5 7/7	12	Brown moist medium dense fine to coarse SAND, some silt, some fine to medium gravel	9.0'
WL ▼							
10.0	10.0'-12.0'	3		9/25 26/21	51	Gray wet dense to very dense fine to coarsé GRAVEL, some fine to coarse sand little silt	
15.0	15.0'-17.0'	4		20/47 27/49	74		
20.0	20.0'-22.0'	5		27/27 28/27	55		
25.0	25.0'-27.0'	6		36/41 42/37	83	Bottom of Boring	27.0'
30.0						Note: Installed observation well to 17.9' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 8/2/83 DATE COMPLETED 8/2/83

HOLE NO. B-7 (Well 7)
SURF. EL.
JOB NO. 8396

GROUND WATER DEPTH
WHILE DRILLING 13.0'
BEFORE CASING REMOVED 21.4'
AFTER CASING REMOVED 13.4'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'- 2.0'	1		6/13 22/22	35	Brown moist dense fine GRAVEL, little fine to coarse sand, trace silt	
	2.0'- 4.0'	2	No Rec	10/5 5/2	10		4.0'
5.0	4.0'- 6.0'	3		4/6 6/15	12	REFUSE	6.0'
	6.0'- 8.0'	4		15/9 7/16	16	Brown wet medium dense fine GRAVEL, little fine to coarse sand, little silt, little refuse	
10.0	8.0'- 10.0'	5		4/6 8/7	14		
	10.0'- 12.0'	6		56/3 3/6	6		
WL ▼	12.0'- 14.0'	7		7/8 20/21	28		13.0'
15.0	14.0'- 16.0'	8		32/33 32/34	65	Brown wet very dense fine to coarse GRAVEL, little silt, little fine to coarse sand, trace clay	
	16.0'- 18.0'	9		34/42 44/61			
20.0							19.0'
	20.0'- 22.0'	10		21/42 56/69	98	Brown dry very dense fine to coarse SAND, some silt, little fine gravel	
25.0							25.0'
	25.0'- 26.5'	11		31/41 84	125	Brown dry to wet very dense fine to coarse SAND, some silt, little fine gravel	
						Bottom of Boring	26.5'
30.0						Note: Installed observation well to 21.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park

LOCATION Conklin, New York

DATE STARTED 8/2/83 DATE COMPLETED 8/2/83

HOLE NO. B-8-83-501 (Well S

SURF. EL.

JOB NO. 8396

GROUND WATER DEPTH
WHILE DRILLING 7.0'

BEFORE CASING REMOVED 9.4'

AFTER CASING REMOVED 4.6'

SHEET 1 OF 1
File #2773.002

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
						Brown dry fine to coarse GRAVEL, little fine to coarse sand, little silt	
5.0							5.0'
WL						Brown dry fine to coarse SAND, little silt, little fine gravel	
10.0							10.0'
						Brown wet fine GRAVEL, little fine to coarse sand, trace silt	
15.0							
	18.0'-	1		15/10			19.0'
20.0	20.0'			8/9	18	Brown wet very stiff SILT, little clay, trace fine sand	
						Bottom of Boring	20.0'
						Note: Installed observation well to 18.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 8/3/83 DATE COMPLETED 8/3/83

HOLE NO. B-9-83-502 (Well 4)
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH
WHILE DRILLING 9.0'
BEFORE CASING REMOVED 8.0'
AFTER CASING REMOVED 6.3'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'- 2.0'	1		1/3 5/7	8	Brown dry loose fine to coarse GRAVEL, little fine to coarse sand, little silt	3.0'
5.0	5.0'- 7.0'	2		21/34 33/47	67	Brown dry to wet very dense to dense fine to coarse GRAVEL and fine to coarse SAND, little silt	
WL ▼ 10.0	10.0'- 12.0'	3		15/21 19/19	40		
15.0	15.0'- 17.0'	4		31/22 15/12	37		18.0'
20.0	20.0'- 22.0'	5		5/7 9/10	16	Brown wet stiff SILT, trace fine sand	25.0'
25.0	25.0'- 27.0'	6		4/5 5/6	10	Brown wet stiff SILT and fine to coarse SAND, trace fine gravel	26.0'
						Gray wet stiff SILT, trace fine sand	27.0'
						Bottom of Boring	
30.0							

Note: Installed observation well to 18.5' on completion of boring.

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Broome County Industrial Park
LOCATION: Conklin, New York
DATE STARTED: 8/3/83
DATE COMPLETED: 8/3/83

HOLE NO. B-10-83-503 (Well)
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH WHILE DRILLING 8.5'
BEFORE CASING REMOVED 17.3'
AFTER CASING REMOVED 8.8'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-2.0'	1		2/2 3/5	5	Brown dry medium stiff SILT, trace fine to medium sand, trace roots	2.5'
5.0	5.0'-7.0'	2		18/31 36/43	67	Brown dry very dense fine to medium GRAVEL and fine to coarse SAND, little silt	8.5'
WL ▼							
10.0	10-11'	3A		6/6		Brown wet medium dense fine to coarse SAND, little silt	11.0'
	11-12'	3B		10/12	16	Gray wet medium dense to dense fine to coarse SAND and fine to coarse GRAVEL, little silt	18.0'
15.0	15.0'-17.0'	4		20/22 26/21	48		
20.0	20.0'-22.0'	5		7/7 9/7	16	Brown wet very stiff SILT, trace fine sand, trace clay lenses	25.0'
25.0	25.0'-27.0'	6		3/3 5/6	8	Brown wet very stiff SILT, trace fine sand	
						Bottom of Boring	27.0'
30.0						Note: Installed observation well to 18.3' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Broome County Industrial Park
LOCATION: Conklin, New York
DATE STARTED: 8/3/83 DATE COMPLETED: 8/4/83

HOLE NO: B-11-83-504 (Well)
SURF. EL.:
JOB NO.: 8396

GROUND WATER DEPTH
WHILE DRILLING: 13.5'
BEFORE CASING REMOVED: 19.7'
AFTER CASING REMOVED: 9.7'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-2.0'	1		8/9, 10/8	19	Brown dry medium dense fine to coarse SAND, some fine to medium gravel, little silt	2.0'
	2.0'-4.0'	2		9/9, 22/12	31	Brown dry to moist medium dense fine to medium GRAVEL, little fine to coarse sand, little silt, little wood	5.0'
5.0	5.0'-7.0'	3		4/5, 4/5	9	Gray wet stiff SILT, some fine to coarse sand, little clay, trace organic matter	7.8'
	7.0'-9.0'	4		3/2, 4/8	6	Brown wet stiff SILT, some fine to coarse sand, some fine gravel, trace clay	11.8'
10.0	10.0'-12.0'	5		4/5, 6/6	11	Gray wet medium dense fine SAND, some silt	15.0'
WL ▼							
15.0	15.0'-17.0'	6		16/26, 19/19	45	Brown wet dense fine GRAVEL, little silt, little fine to coarse sand, trace clay	20.0'
20.0	20.0'-22.0'	7		6/8, 10/10	18	Gray wet very stiff SILT, trace clay lenses, trace fine sand	25.0'
25.0	25.0'-27.0'	8		3/4, 5/5	9	Gray wet stiff SILT, little clay, trace fine sand	31.5'
30.0	30.0'-32.0'	9		2/6, 8/12	14	Gray wet medium dense fine to coarse SAND, some silt, little fine gravel	37.0'
35.0	35.0'-37.0'	10		9/12, 18/23	30	Bottom of Boring	
40.0						Note: Installed observation well to 30.5' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 8/4/83 DATE COMPLETED 8/4/83

HOLE NO. B-12-83-505 (Well 12)
SURF. EL.
JOB NO. 8396

GROUND WATER DEPTH WHILE DRILLING 16.0'
BEFORE CASING REMOVED 15.8'
AFTER CASING REMOVED 8.3'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'- 2.0'	1		2/4 6/6	10	Brown dry stiff SILT, trace fine to coarse sand, trace fine gravel	
5.0							5.0'
	5.0'- 7.0'	2		10/15 20/21	35	Brown dry hard SILT, fine to coarse GRAVEL and fine to coarse SAND	
							8.5'
10.0						Brown wet medium stiff SILT, some fine to medium sand, trace clay	
	10-11'	3A		2/3			11.0'
	11-12'	3B		8/12	11	Brown wet medium dense fine to coarse SAND, some fine to coarse gravel, some silt	
15.0 WL ▼	15.0'- 17.0'	4		11/15 16/19	31	Brown wet medium dense to dense fine to coarse SAND and fine to coarse GRAVEL, little silt	15.0'
20.0	20.0'- 22.0'	5		14/12 14/16	26		
						Bottom of Boring	22.0'
25.0						Note: Installed observation well to 16.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y 13057

PROJECT Broome County Industrial Park
LOCATION Conklin, New York
DATE STARTED 8/5/83 DATE COMPLETED 8/5/83

HOLE NO B-13-83-506(Well
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH
WHILE DRILLING 12.0'
BEFORE CASING REMOVED 12.2'
AFTER CASING REMOVED 4.5'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'- 2.0'	1		4/10 16/10	26	Brown dry medium dense fine to coarse SAND, little silt, trace fine gravel	2.0'
	2.0'- 4.0'	2		2/2 2/2	4	Brown moist loose fine to coarse SAND, little silt, little refuse	4.0'
5.0	4.0'- 6.0'	3		2/3 2/3	5	Brown moist loose fine to coarse SAND, little silt, little fine gravel, little refuse	
	6.0'- 8.0'	4		3/5 4/4	9		8.0'
10.0	8.0'- 10.0'	5		6/6 6/10	12	Brown wet medium dense fine to coarse SAND, little silt, trace fine gravel, trace refuse	
WL ▼	10.0'- 12.0'	6		26/12 9/9	21		12.0'
	12.0'- 14.0'	7		16/13 20/26	33	Gray wet medium dense to dense fine to coarse SAND, little fine gravel, little silt	
15.0	14.0'- 16.0'	8		18/17 28/27	45		
						Bottom of Boring	16.0'
20.0						Note: Installed observation well to 15.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Broome County Industrial Park
LOCATION: Conklin, New York
DATE STARTED: 8/5/83
DATE COMPLETED: 8/8/83

HOLE NO. B-14-83-507
SURF. EL
JOB NO. 8396

GROUND WATER DEPTH WHILE DRILLING 6.5'
BEFORE CASING REMOVED 6.5'
AFTER CASING REMOVED 4.2'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1
File #2773.002

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
						Augered to 15.0'	
5.0							
WL ▼							
10.0							
15.0							
						Bottom of Boring	15.0'
						Note: Installed observation well to 15.0' on completion of boring.	

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Broome County Industrial Park
LOCATION: Conklin, New York
DATE STARTED: 8/8/83 DATE COMPLETED: 8/8/83

HOLE NO. B-15-83-508 (Well [illegible]
SURF. EL.
JOB NO. 8396
GROUND WATER DEPTH WHILE DRILLING 14.0'
BEFORE CASING REMOVED 14.0'
AFTER CASING REMOVED 14.5'
SHEET 1 OF 1
File #2773.002

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

DRILLER'S FIELD LOG

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-	1		1/1		Brown dry very loose fine to coarse	
	2.0'			1/2	2	SAND, little silt, little fine gravel,	
	2.0'-	2		1/2		trace wood	3.0'
	4.0'			4/6	6	Brown dry medium dense fine to coarse	
5.0	4.0'-	3		6/7		SAND, little fine gravel, trace silt	
	6.0'			4/9	11		
	6.0'-	4		10/6			
	8.0'			5/4	11		8.0'
	8.0'-	5		6/7		Brown moist medium dense fine to coarse	
10.0	10.0'			5/5	12	SAND, little silt, little fine gravel	
	10.0'-	6		6/4			
	12.0'			6/4	10		
	12.0'-	7		7/13			
WL ▼	14.0'			14/11	27		14.0'
15.0	14.0'-	8		28/100-		Gray wet very dense fine GRAVEL, some	
	14.7'			.2'		fine to coarse sand, trace silt	
	16.0'-	9		29/100-			
	16.9'			.4'		Bottom of Boring	18.0'
20.0							

Note: Installed observation well to 18.0' on completion of boring.

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER ________
SHEET 1 OF 1
DATE ________ FILE 2733.004.130

PROJECT LOCATION – Conklin, NY
HOLE NUMBER Well 17

SAMPLER
TYPE: Split Spoon
HAMMER ________
FALL ________

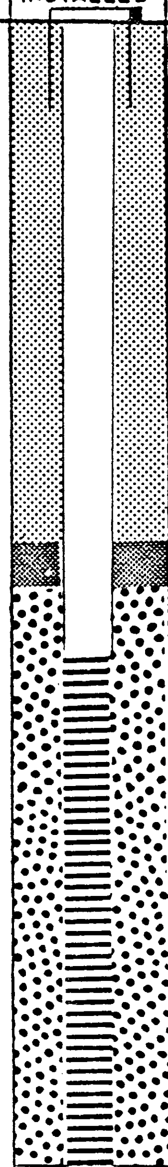
GROUNDWATER READINGS

DATE	DEPTH		
12/20	1.4		

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV. 948.46
DATE STARTED 10/31/84 DATE ENDED 11/1/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	3/5 16	Brown moist SILT and fine to coarse GRAVEL, trace fine SAND				
5'		2		5-6.5	16/15 42					
10'		3		10-11.5	20/28 42	Grey-brown moist fine to coarse GRAVEL and SILT, some fine to coarse SAND				
15'		4		15-16.5	8/9 17	Grey-brown moist SILT, trace CLAY				
20'		5		20-21.5	16/18 25	Grey-brown wet fine to coarse GRAVEL and SILT, some to trace fine to medium SAND				
25'		6		25-26.5	35/38 31					
30'		7		30-31.5	18/28 42	Bottom of Boring 31.5'				



REMARKS:

O'BRIEN & GERE ENGINEERS INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION Conklin, NY

HOLE NUMBER Well 18

SAMPLER
TYPE: Split Spoon
HAMMER
FALL

GROUNDWATER READINGS

DATE	DEPTH		
12/20	1.03		

BORING CO. Parratt Wolff

FOREMAN Mike Hurley

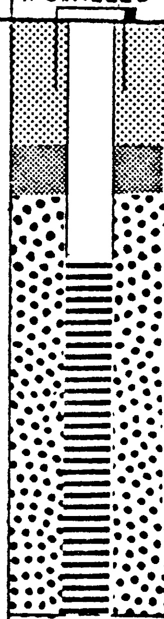
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2

GROUND ELEV. 861.00

DATE STARTED 11/1/84 DATE ENDED 11/1/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	2/3 4	Grey-brown moist SILT and fine SAND				
5'		2		5-6.5	2/1 1	Grey wet fine to coarse SAND and PEAT, trace SILT				
10'		3		10-11.5	8/8 12					
15'		4		15-16.5	10/9 13	Grey-brown wet fine to coarse SAND and fine GRAVEL, trace SILT				
						Bottom of Boring 16.5'				



REMARKS:

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION: Conklin, NY
HOLE NUMBER: Well 19

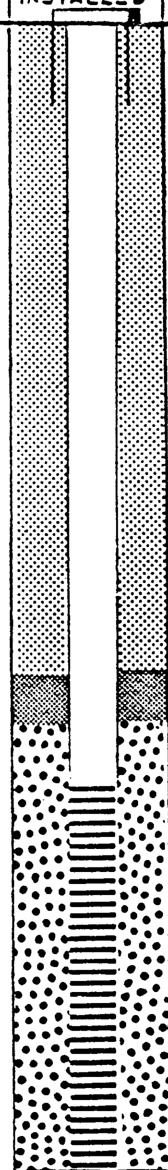
SAMPLER
TYPE: Split Spoon
HAMMER
FALL

GROUNDWATER READINGS		
DATE	DEPTH	
12/20	3.5	

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION
GROUND ELEV. 912.39
DATE STARTED 11/5/84 DATE ENDED 11/5/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	3/3					
					6	Brown moist SILT, some fine to medium SAND				
5'		2		5-6.5	9/12					
					15	Grey and brown moist fine to medium SAND and SILT				
10'		3		10-	14/16					
				11.5	13	Grey moist fine to coarse GRAVEL and SILT, little fine SAND				
15'		4		15-	14/13					
				16.5	13	Grey moist SILT, little fine to medium SAND, trace fine GRAVEL				
20'		5		20-	9/13					
				21.5	50(.3')	Grey wet SILT and fine to coarse GRAVEL, little fine to medium SAND, trace CLAY				
25'		6		25-	50(.4')					
30'		7		30-	60					
				31.5						
						Bottom of Boring 31.5'				



REMARKS:

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION Conklin, NY
HOLE NUMBER Well 20

SAMPLER
TYPE: Split Spoon
HAMMER FALL

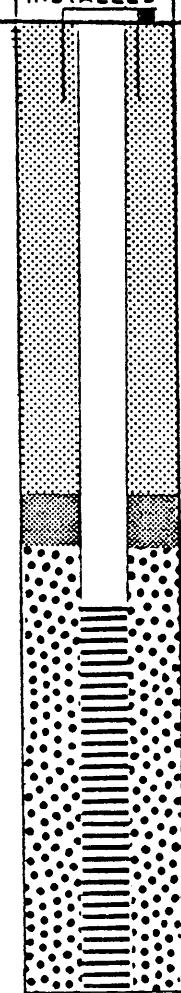
GROUNDWATER READINGS

DATE	DEPTH	
12/20	2.19	

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV. 887.89
DATE STARTED 11/6/84 DATE ENDED 11/6/84

DEPTH	CAS. BL./FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	3/3	Dark brown moist SILT and				
					4	ROOTS, some fine SAND				
						Brown moist fine SAND and SILT				
5'		2		5-6.5	5/10					
					20	Brown moist fine to coarse SAND and GRAVEL, some SILT				
						Grey-brown wet SILT and				
10'		3		10-	10/20	fine to coarse SAND, some				
				11.5	20	fine GRAVEL				
						Brown wet fine to coarse				
15'		4		15-	15/11	SAND and fine to coarse				
				16.5	15	GRAVEL, little SILT				
						Brown moist SILT and CLAY				
						Brown wet fine to coarse SAND and fine to coarse GRAVEL				
20'		5		20-	8/11					
				21.5	19					
						Grey moist SILT, some fine to coarse GRAVEL, trace fine SAND				
25'		6		25-	15/26					
				26.5	67					
						Bottom of Boring 26.5'				



REMARKS:

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NO. W-21

SHEET 1 OF 1

DATE: 1/29/86

FILE NO. 2733.004

PROJECT LOCATION
Broome Co. Industrial Park

CLIENT

SAMPLER
TYPE: split spoon
HAMMER 140 lb
FALL 30"

BORING CO. Parratt Wolff

FOREMAN Mike Elingsworth

OBG GEOLOGIST J.C. Tomik

BORING LOCATION east of upper landfill

GROUND ELEV.

DATE STARTED 1/29/86 DATE ENDED 1/29/86

DEPTH FT.	"N" VALUE	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS /6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
	2	1	2/2	0-2	2/1	0-1 Brown, moist silt,	silt,			
			1/1			little fine gravel and sand	sand,			
						1-2 Brown, wet, silt and	and			
						clay, little gravel	gravel			
5	20	2	2/1.5	5-7	8/12	Brown, wet, silt and clay,	silt			
					8/12	little fine-medium gravel	and			
							clay			
10	17	3	2/2	10-12	9/10	Brown, wet, silt and clay,				
					7/7	little fine-coarse gravel				
							+,11			
15	25	4	2/1.5	15-17	10/12	Brown, wet, fine sand and				
					13/16	silt, some angular coarse				
						gravel (till)				
	53	5	2/1.5	18-20	12/23	Brown, wet, silt and fine				
20					30/32	sand, some coarse gravel,				
						sand lens at 18-18.5'				

REMARKS: 1. 2" PVC well installed: .010" screen set at 3-18'
sand pack 2-18'
bentonite pellets 0-2'
4" protective casing

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NO. W-22

SHEET 1 OF 1

DATE: 1/29/86

FILE NO. 2733.004

PROJECT LOCATION Broome Co. Industrial Park

CLIENT Town of Conkin

SAMPLER TYPE: split spoon

HAMMER 140 lb

FALL 30"

BORING CO. Parratt Wolff

FOREMAN Mike Elingsworth

OBG GEOLOGIST J.C. Tomik

BORING LOCATION northeast of upper landfill

GROUND ELEV.

DATE STARTED 1/29/86 DATE ENDED 1/29/86

DEPTH FT.	"N" VALUE	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
		1	2/.5	0-2	6/7	Brown, moist, silt, some				
	20				13/17	fine-coarse angular gravel				1
5		2	2/1.5	5-7	9/12	Brown, wet fine-coarse gravel, few subangular stones, some silt little fine sand	sand and gravel			1
	21				9/11					
10		3	2/1.5	10-12	10/11	10-11' Brown, wet fine-coarse sand and silt	silt and fine sand			
	26				15/17	11-12' Brown, wet, silt and clay, (varved) little fine sand				
15	13	4	2/1.7	15-17	5/6	Gray-brown, wet, clay and silt	silt and clay			
					7/10					
20		5	2/1.5	20-22	7/7	Gray-brown, wet, clay and silt				
	14				7/7					2

REMARKS:
1. Drilled softer material at 4', ground water at 3'
2. 2" PVC well set with .010" screen at 3'-18'
   sand pack 2'-18'
   bentonite pellets 0-2', 4" protective steel casing

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION: Conklin, NY
HOLE NUMBER: B-1

SAMPLER
TYPE: Split Spoon
HAMMER FALL

GROUNDWATER READINGS

DATE	DEPTH		

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV.
DATE STARTED
DATE ENDED

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	1/2	Black cinders and organic matter				
					4	(construction fill)				
5'		2		5-5.05	50(.05)	Brown, dry, very dense SAND, SILT, GRAVEL				
						Refusal at 5.05'				

REMARKS:

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION Conklin, NY
HOLE NUMBER B-2

SAMPLER
TYPE: Split Spoon
HAMMER
FALL

GROUNDWATER READINGS

DATE	DEPTH		

BORING CO. Parratt-Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV.
DATE STARTED
DATE ENDED

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	1/1	Black cinders and organic matter (construction fill)				
					1					
		2		3.5-3.8'	100(3')	Brown, dry, very dense SAND, SILT, GRAVEL				
5'						Refusal at 3.8'				

REMARKS:

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION Conklin, NY
HOLE NUMBER B-3

SAMPLER
TYPE: Split Spoon
HAMMER
FALL

GROUNDWATER READINGS

DATE	DEPTH		

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV.
DATE STARTED DATE ENDED

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	2/2	Black cinders and organic matter (construction fill)				
					10					
5'		2		4.8-5.2	100(.4)	Brown, dry very dense SAND, SILT, GRAVEL				
						Refusal at 5.2'				

REMARKS:

APPENDIX D

MONITORING WELL INSTALLATION: PROCEDURES, DEVELOPMENT AND DESCRIPTIONS

MONITORING WELL INSTALLATION PROCEDURES

I. Drilling/Sampling Procedures

Test borings shall be completed using the hollow stem auger drilling method, to a depth specified by the supervising geologist/engineer. The inside diameter of the augers shall be 3-3/4" inches. The auger stem is to be turned by a rotary drive head which is mounted on a hydraulic feed mechanism.

Samples of the encountered subsurface materials shall be collected at a minimum of every five (5) feet and/or change in material or at the discretion of the supervising geologist. The sampling method employed shall be ASTM D-1586/Split Barrel Sampling using either a standard 2.5' long 2" outside diameter split spoon sampler with a 140 lb. hammer or a 3" outside diameter sampler with a 300 lb. hammer. Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labelled, stored and retained by O'Brien & Gere for possible testing. Chain of custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Wastewaters.

Note: Samples collected by split spoon will be field screened by methods outlined in the Drilling/Sampling protocol for test boring completion.

A geologist will be on site during the drilling operations to fully describe each soil sample including 1) Soil type, 2) color, 3) percent recovery, 4) moisture content, 5) odor and 6) miscellaneous observations such as organic content. The supervising geologist will be responsible for retaining a representative portion of each sample in a one pint glass jar labelled with 1) site, 2) boring number 3) interval sample/interval preserved, 4) date, 5) time of sample collection, and 6) sampling personnel. This data will be reported in the geologist's field book for later reference.

The Drilling Contractor will be responsible for obtaining accurate and representative samples, informing the supervising geologist of changes in drilling pressure, keeping a separate general log of soils encountered including blow counts (i.e. the number of blows from a soil sampling drive weight (140 pounds) required to drive the split spoon sampler in 6-inch increments) and installing monitoring wells to levels directed by the supervising geologist following specifications further outlined in this protocol.

II. Monitoring Well Completion

Published reports (USEPA, 1983) reveal that the use of PVC monitoring wells is not suitable primarily where the groundwater is acidic or contains high levels of chlorinated organic compounds. Within these conditions organic compounds can be leached from the PVC material into the groundwater and provide interference for priority pollutant analyses of the groundwater. Previous field investigations at the Town of Conklin landfills have determined that the groundwater was neither acidic nor contained significant levels of volatile organic compounds. Furthermore, organic compounds typically leached from PVC were found to be less than detectable within all the groundwater monitoring wells.

provide representative groundwater samples at the Town of Conklin landfills.

All monitoring wells will be constructed of National Sanitation Foundation approved PVC flush joint threaded well screen and riser casing (Schedule 40 or 80) that will extend from the screened interval to approximately 2' above existing grade. A #20 slot screen will be used and compatible sandpack is to be used. Other materials utilized for completion will be washed silica sand, bentonite grout, Portland Cement. A protective steel well casing and cap with locks will be used.

The monitoring well installation method for 2" wells shall be to place the screen and casing assembly into the auger string once the screen interval has been selected. At that time a washed silica sand pack will be placed if required to prevent screen plugging. If a sand pack is not warranted, the auger string will be pulled back to allow the native aquifer material to collapse 2-3" above the top of the screen. Bentonite grout will then be added to the annulus between the casing and the inside auger wall at a minimum thickness of two feet above the sand pack. A cement/bentonite Grout will be added during the extraction of the augers until the entire aquifer thickness has been sufficiently sealed off from horizontal and/or vertical flow above the screened interval. During placement of sand and grout, frequent measurements will be made to check the height of the sand pack and thickness of bentonite-layers by a weighted tape measure.

A vented protective four (4) inch diameter steel casing shall be located over the vented PVC standpipe extending 2-3' above grade secured by a Portland Cement seal. The cement seal shall extend laterally at least one foot (1') in all directions from the protective casing and shall slope gently away to drain water away from the well. A vented steel cap will be fitted on the protective casing and a steel hasp shall be welded on one side of each steel casing so that the cap may be secured with a steel lock.

A typical monitoring well detail is shown in Figure 3. The supervising geologist shall specify the monitoring well design to the Drilling Contractor before installation.

The supervising geologist is responsible for recording the exact well details as relayed by the drilling contractor and actual measurement. Both the supervising geologist and drilling contractor are responsible for tabulating all well materials used such as footage of casing and screen or bags of grout, cement or sand.

A field survey control program will be conducted using standard instrument survey techniques to document well location, ground, inner and outer casing elevations.

III. Well Development

All monitoring wells will be developed or cleared of all fine grained materials and sediments that have settled in or around the well during installation to insure the screen is transmitting representative portions of the groundwater. The development will be by one of three methods, air surging, pumping or bailing groundwater from the well until it yields relatively sediment-free water. The determination of which method to use is dependent upon the size and depth of the well and the volume of groundwater in the well.

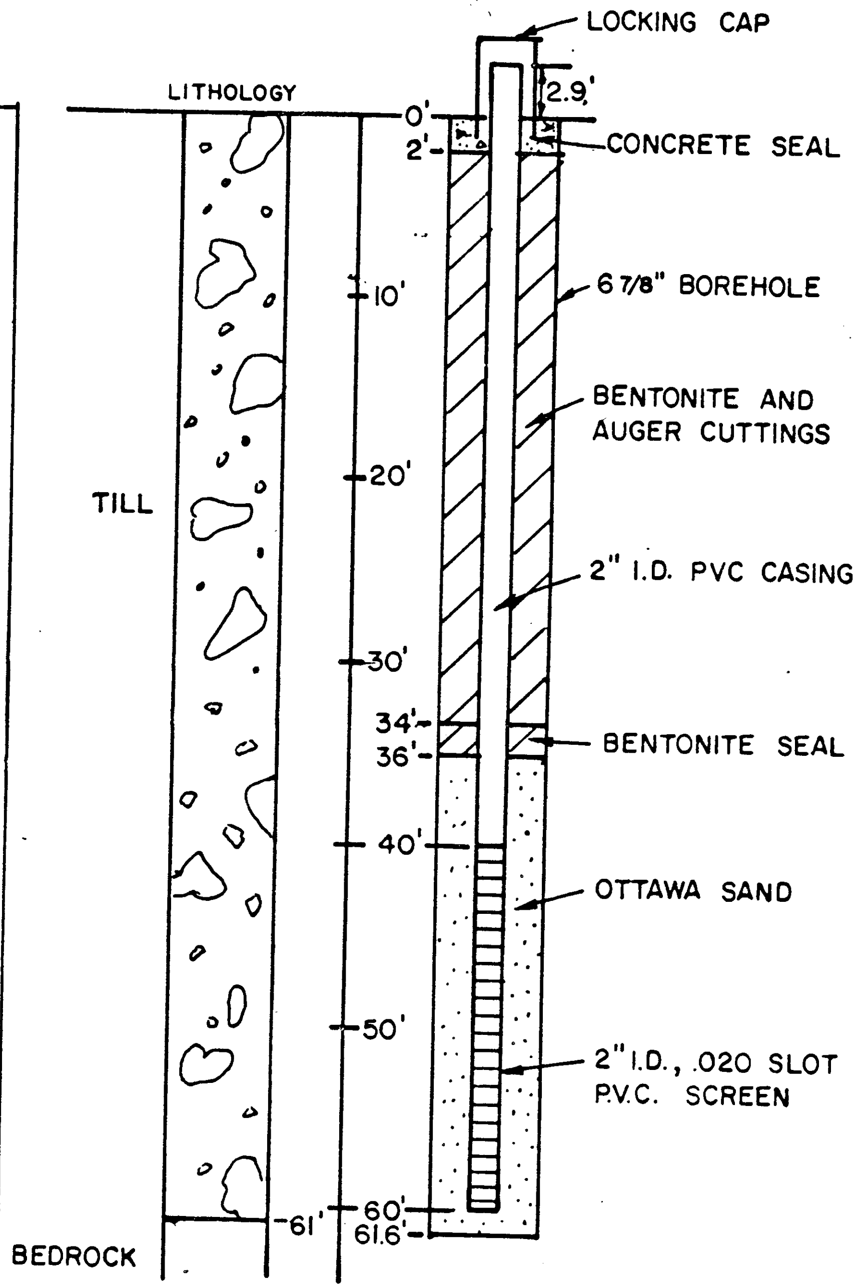
The air surging method of development consists of extending a clean propylene tube down into the screened portion of the well. This tube attached to an air compressor. The compressed air displaces the water and suspends finegrained material from the well. The well is allowed to surge until the groundwater clears.

If either the pumping or bailing method is used a decontaminated pump or bailer will be utilized and subsequently decontaminated after each use. Groundwater will be pumped from the bottom of the well using a keck model stainless steel submersible pump or equivalent. Bailing will utilize a stainless steel bailer and new polypropylene rope on the bailer at each well. Pumping or bailing will cease when the groundwater yields sediment-free water.

All water removed from the wells during development will be pumped into 55 gallon drums and retained on-site until the proper disposal method is established. Interim security will be provided and all drums will be removed from the site within ninety (90) days. The disposal method will be based on the chemical analysis of the groundwater samples from each well.

WELL I
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

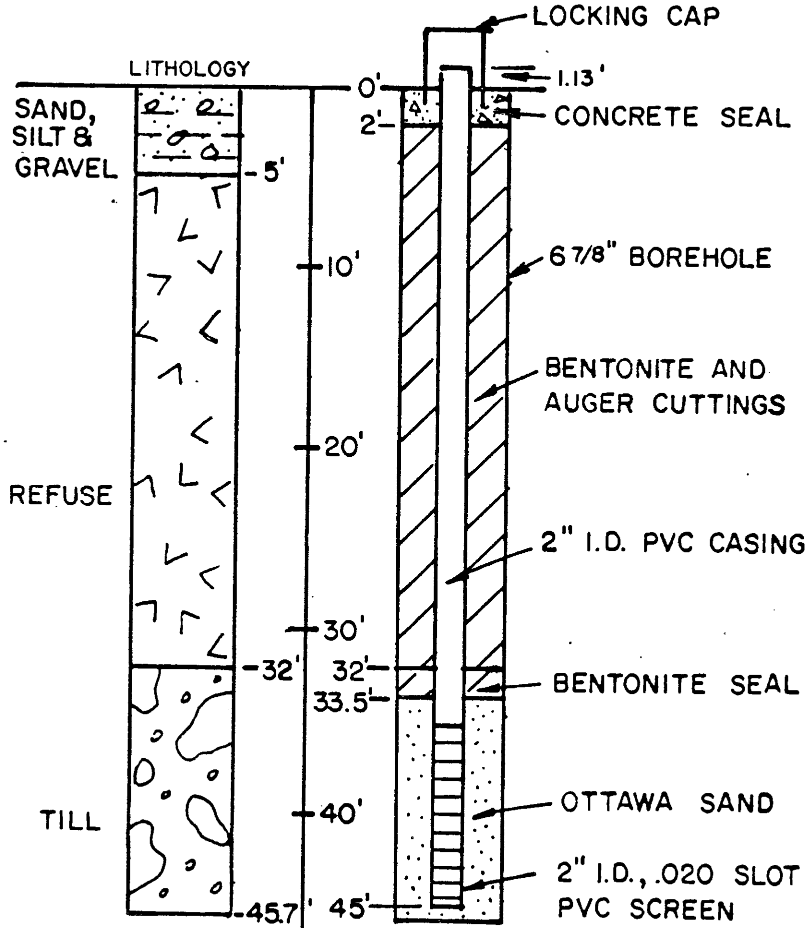
DETH	ELEV.	DESCRIPTION
0-2	944.4-939.4	Silt, brown, moist, little sand and gravel, very stiff
5-7	939.4-937.4	Silt, brown, moist, little sand, trace gravel, trace clay, hard
10-12	934.4-932.4	Same as above
15-17	929.4-927.4	Silt, brown, moist, little clay and sand, trace gravel, hard
20-22	924.4-922.4	Silt, gray, moist, little clay, sand and gravel, very stiff to hard
25-27	919.4-917.4	Same as above
30-32	914.4-912.2	Same as above
35-37	909.4-	Silt, wet, hard, trace sand and clay, hard
40-42	904.4-883.4	Silt, gray, moist to wet little clay, sand and gravel, very stiff
45-47	899.4-897.4	Same as above
50-52	894.4-892.4	Same as above
55-57	889.4-887.4	Same as above
60-61	884.4-882.4	Same as above
61-61.6	883.4-	Silt, stone, gray, dry, hard



O'BRIEN & GERE ENGINEERS, INC.

WELL 2
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-5	914.8 909.8	Sand, gravel & silt, brown moist, medium dense
5-12	909.8- 902.8	Refuse, gray-brown, wet
12-26	902.8- 888.8	Refuse, gray-brown, wet, some sand, silt & gravel medium dense
26-30	888.8- 884.8	Silt & clay gray, wet little sand & gravel medium dense
30-32	884.8- 882.8	Silt, clay, gray, wet some refuse, little sand & gravel medium dense
32-45.7	882.8- 869.1	Silt, clay, gray, wet, some sand & gravel Still to hard
45.7	869.1	Refusal



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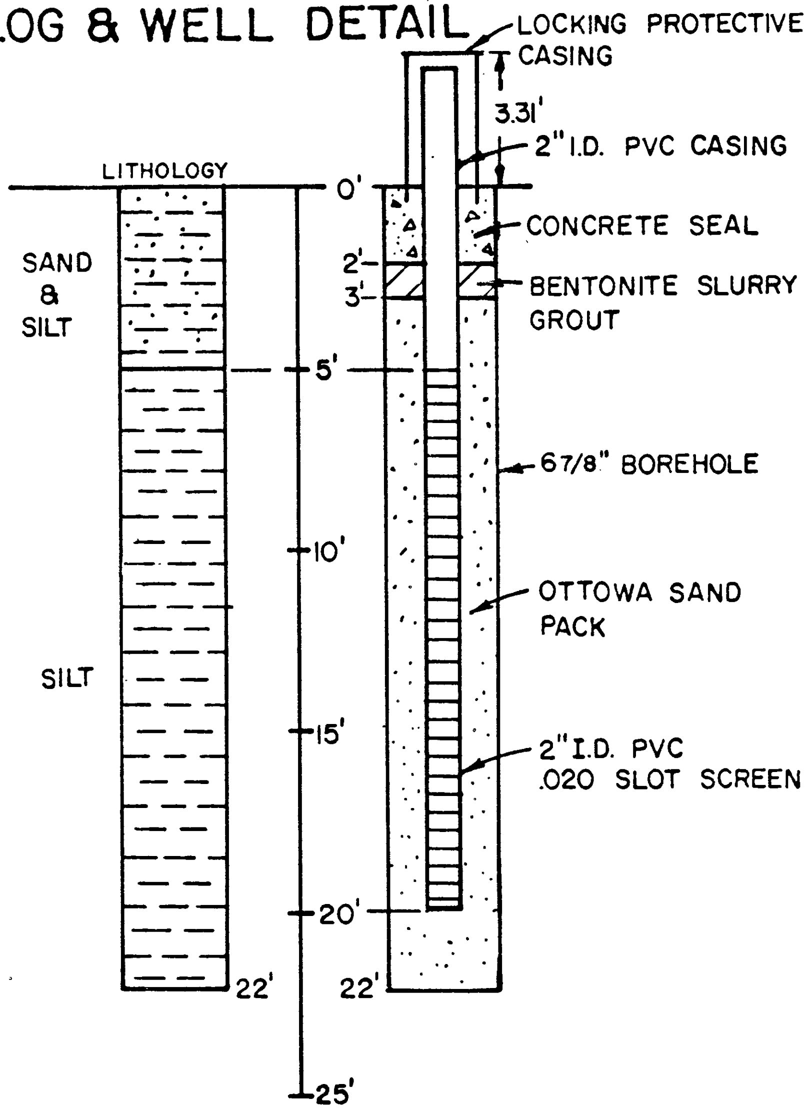
WELL 3
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-1	885.8-883.8	Silt, brown, moist, little fine sand, stiff
5-7	880.8-878.8	Silt, brown, moist, very stiff, some rounded pebbles and angular shale gravel, little, fine sand, trace clay, stiff
10-12	875.8-873.8	Silt, gray, wet, varred, stiff, some clay, very stiff
15-17	870.8-868.8	Silt, gray, wet varred, stiff, little clay, stiff
20-22	865.8-863.8	Silt, grey, wet, varred stiff, little clay, stiff



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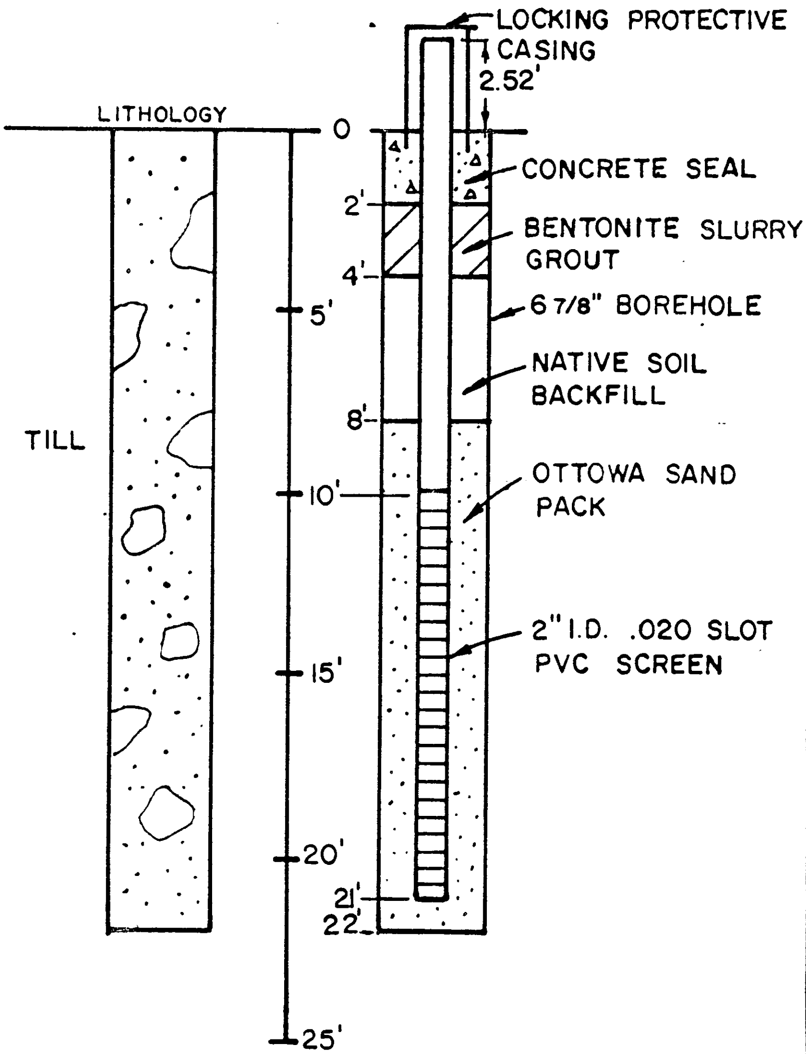
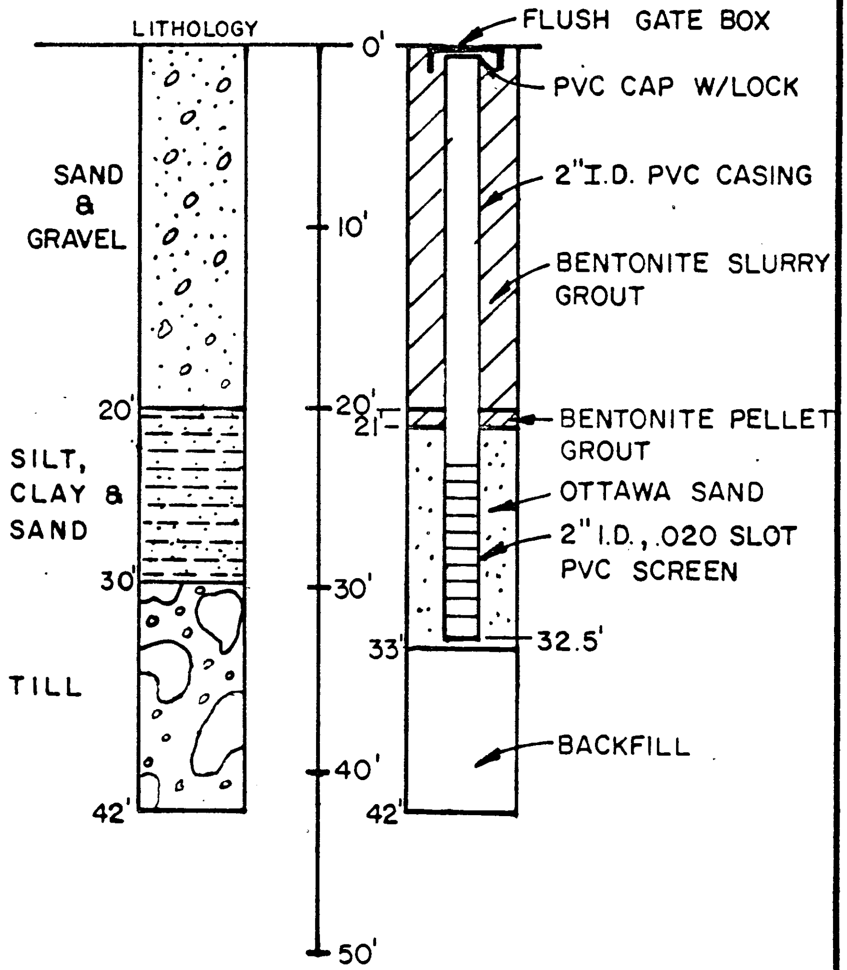
WELL 4
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	890.9-888.9	Silt, brown moist some gravel, trace clay, stiff
5-7	885.9-883.9	Silt, gray, wet, some clay, little gravel, stiff
10-12	880.9-878.9	Silt, brown, moist, some gravel, little sand, medium dense
15-17	875.9-873.9	Silt, brown, wet, some sand and gravel, little clay
20-22	870.9-868.9	Silt, brown-gray, wet, little clay, little gravel, stiff



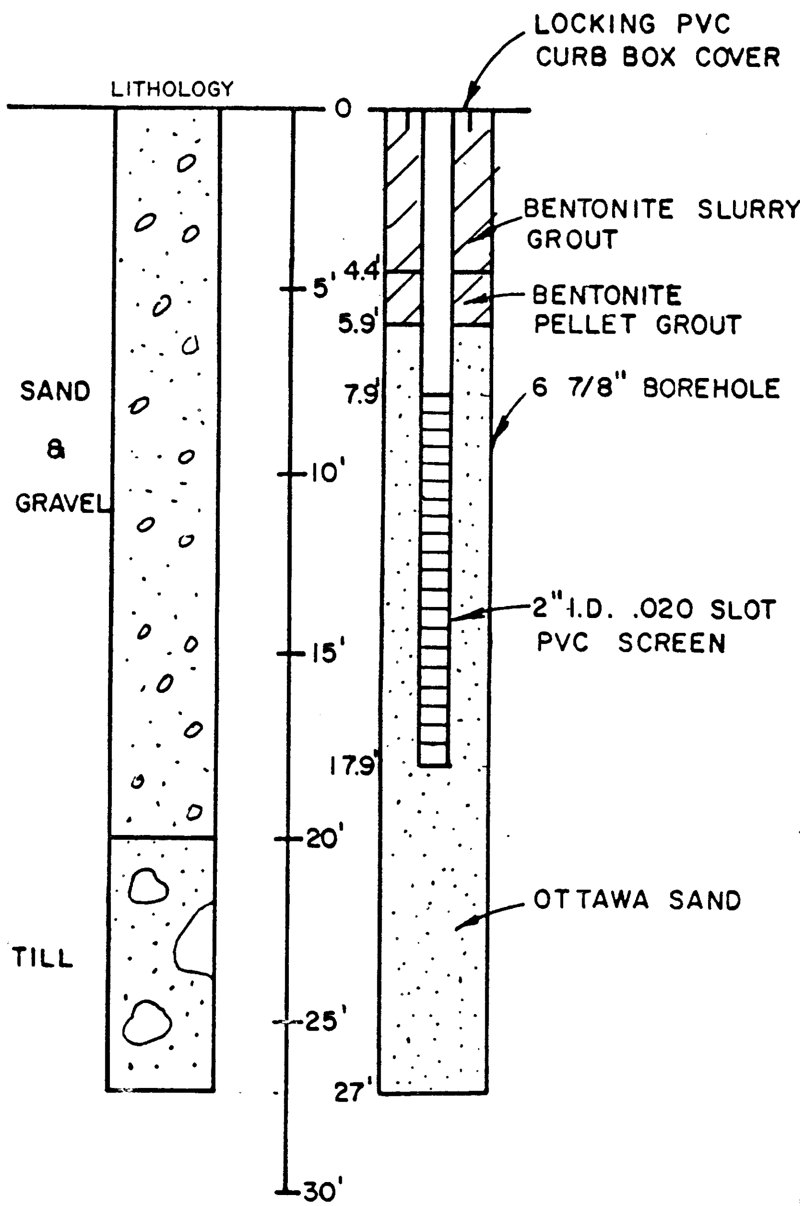
WELL 5
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	860.31-858.31	Gravel, brown, dry, little sand, loose
5-7	855.31-853.31	Sand and gravel, brown, dry, little silt, very dense
10-12	850.31-848.31	Gravel and sand, gray, wet, some silt, dense
15-16	845.31-844.31	Same as above
16-17	844.31-843.31	Sand and gravel, brown, wet, medium dense
20-22	840.31-838.31	Silt, brown, wet, little clay lenses, stiff
25-27	835.31-833.31	Silt, brown, wet, some sand, little gravel, medium dense
30-32	830.31-828.31	Silt, gray, moist, some sand and gravel, stiff
35-37	825.31-823.31	Silt, gray moist, little sand and gravel
40-42		Silt, gray, moist, some sand and gravel



WELL 6
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	868.82-866.82	Sand and gravel, brown, dry, medium dense
5-7	863.82-861.82	Sand, brown moist, some silt, little gravel, medium dense
10-12	858.82-856.82	Gravel and sand, gray, wet, little silt, dense
15-17	853.82-851.82	Same as above
20-22	848.82-846.82	Gravel and gray, wet, some silt very dense
25-27	843.82-851.82	Same as above



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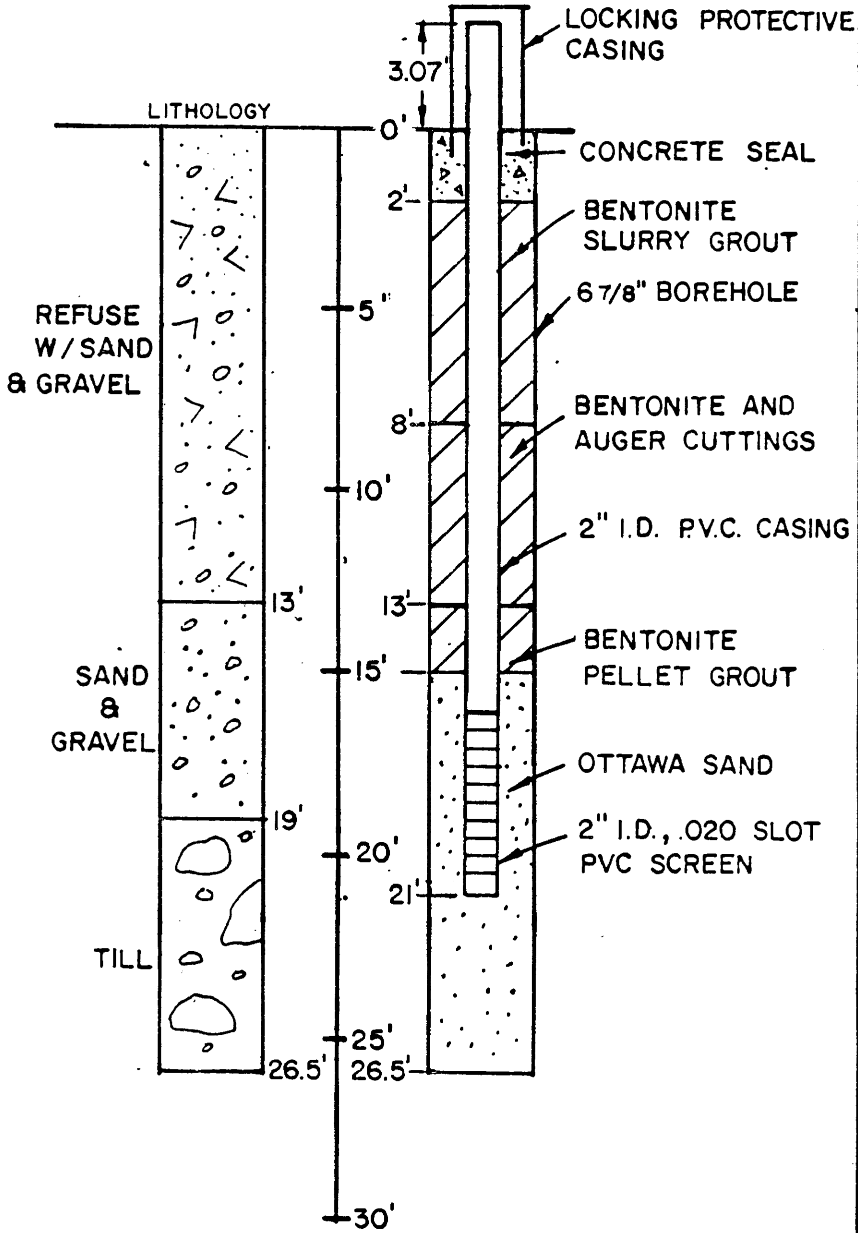
WELL 7
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	865.2- 863.2	Gravel, brown, moist, some sand and silt, dense
4-6	861.2- 859.2	Refuse, black, wet, little sand, silt and gravel
6-8	859.2- 857.2	Gravel, brown, wet, some refuse, little sand and silt, medium dense
8-10	857.2-	Same as above
10-12	855.2- 853.2	Same as above
12-14	853.2- 851.2	Same as above
14-16	851.2- 849.2	Gravel, brown wet, little silt and sand, trace clay, very dense
16-18	849.2- 847.2	Same as above
20-22	845.2- 843.2	Silt and sand, brown, dry, little gravel, very dense
25- 26.5	840.2- 838.2	Silt and sand, brown, dry to wet, little gravel, very dense



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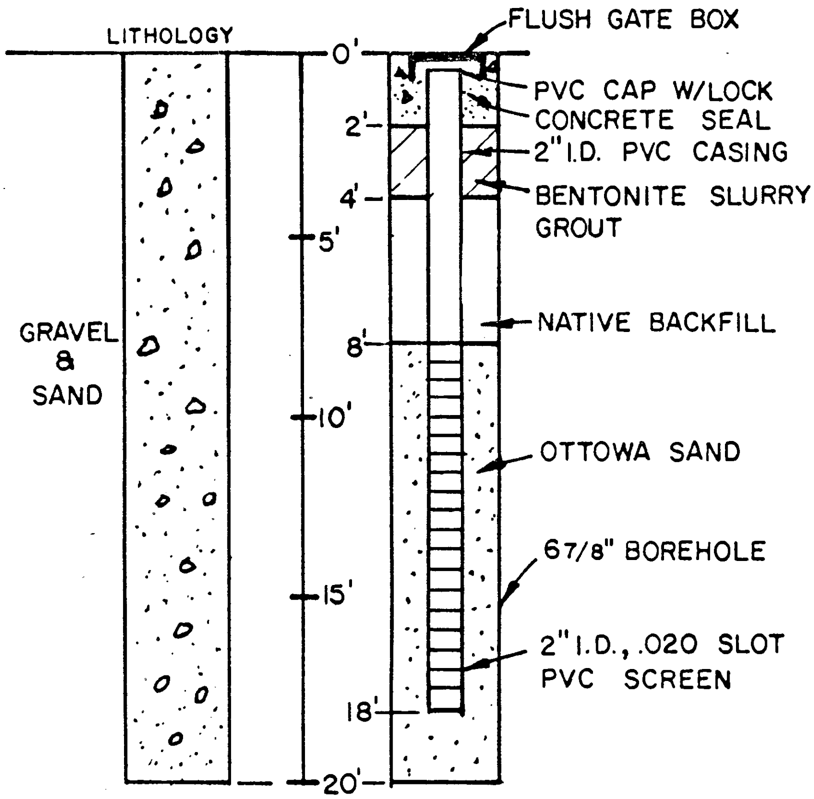
WELL 8
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH.	ELEV.	DESCRIPTION
0-18	860.24 842.24	No Samples - same as Well #5
18-19	842.24 841.24	Gravel, brown, wet, little sand and silt, medium dense
19-20	841.24 840.24	Silt, brown, wet, trace sand & clay, stiff



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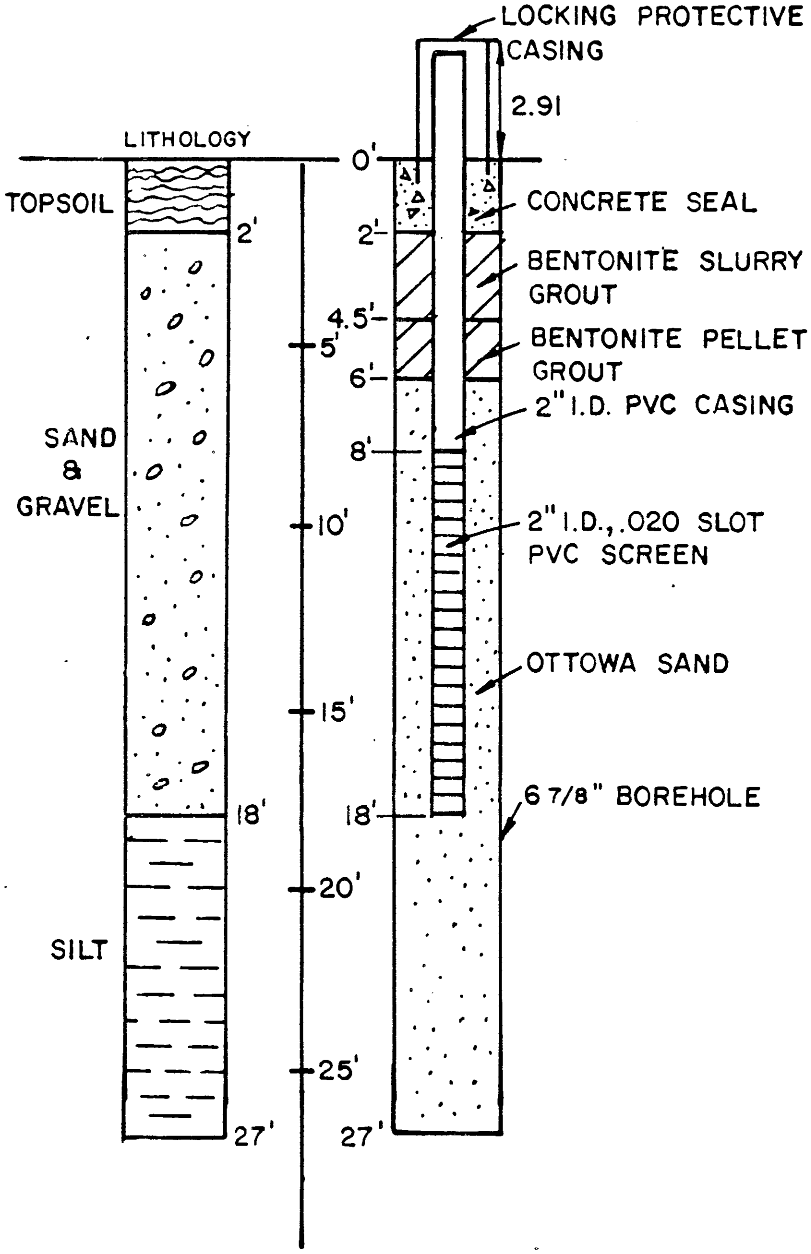
WELL 9
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	861.3-	Gravel, brown dry, some sand, little silt, loose
5-7	856.3-	Gravel & Sand, brown, dry to wet, little silt, very dense
10-12	851.3- 849.3	Coarse sand, brown, wet, some gravel dense
15-17	846.3- 844.3	Same as above
20-22	841.3 839.3	Silt, brown, wet, some sand, little stiff
25-27	836.3- 834.3	Silt, Brown, wet, little sand, trace gravel, stiff



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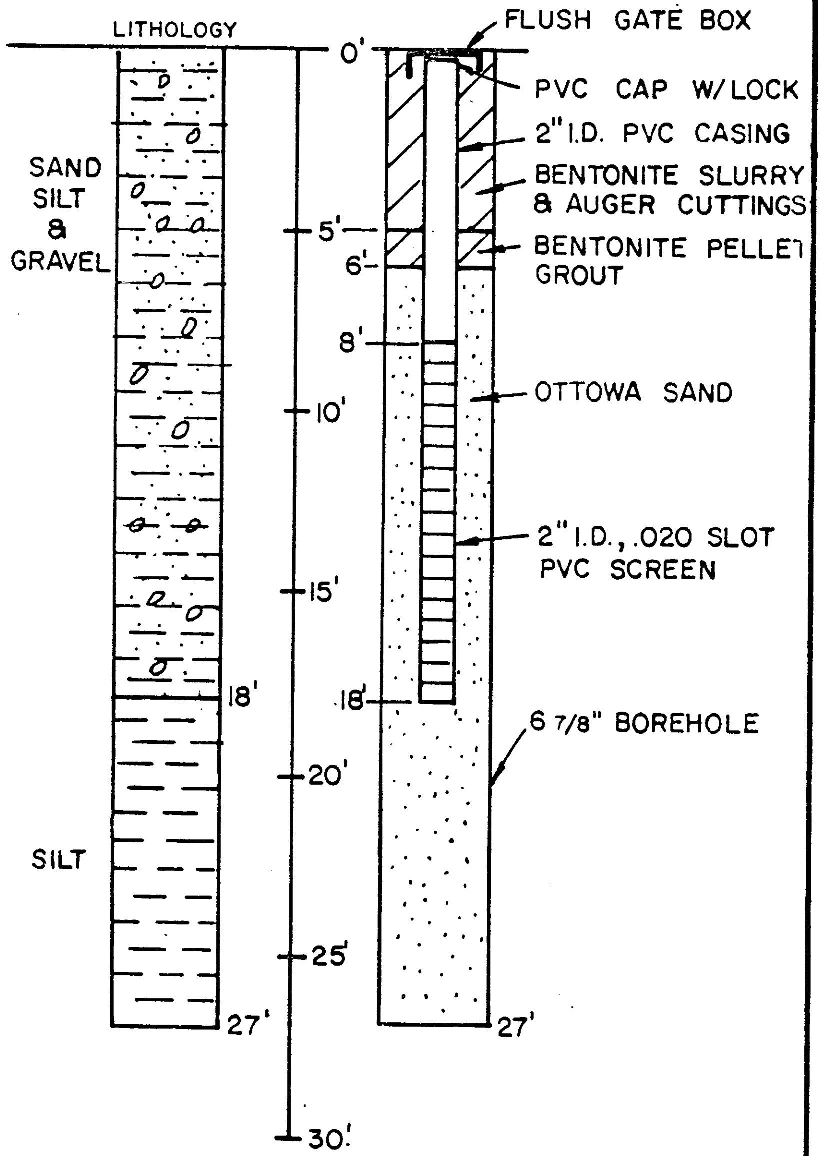
WELL 10
BROOME COUNTY
` INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	863.76-	Silt, brown, dry, little sand and gravel, medium stiff
5-7	858.76- 856.76	Same as above
10-11	853.76- 852.76	Sand, brown, wet, little silt, medium dense
11-12	852.76- 851.76	Sand, brown, wet, some gravel, little silt, medium dense
15-17	848.76- 846.76	Same as above
20-22	843.76- 841.76	Silt, brown, wet, trace fine sand, stiff
25-27	838.76- 846.76	Silt, brown, wet, very stiff



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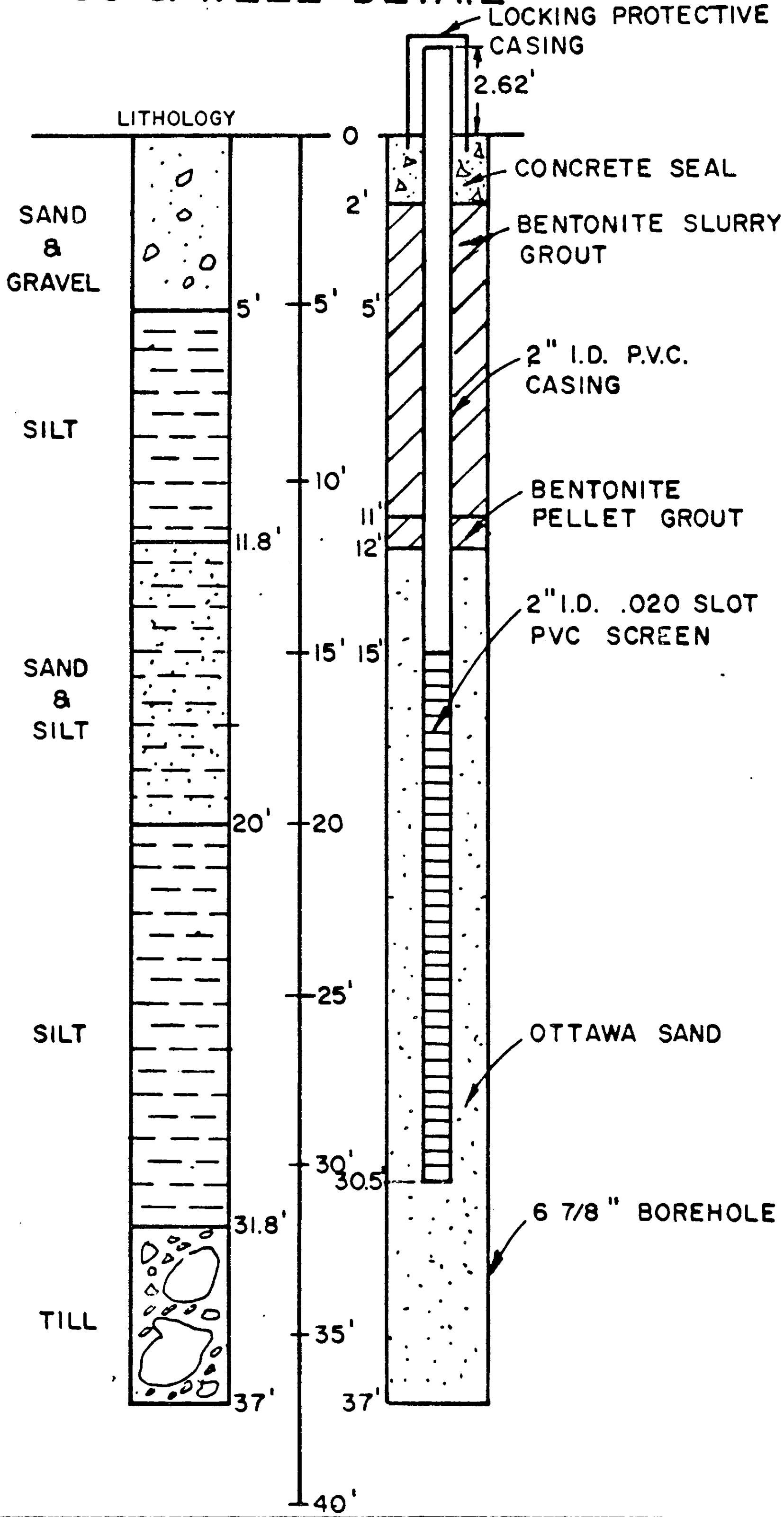
WELL 11
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

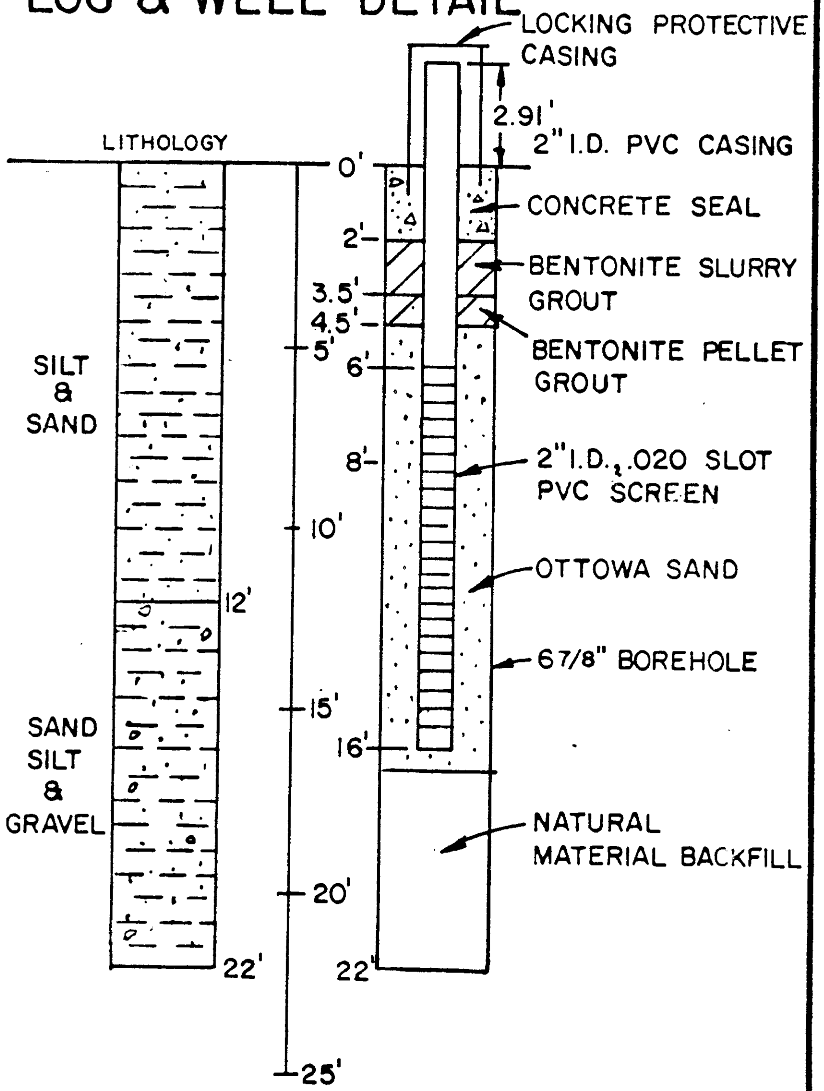
DEPTH	ELEV.	DESCRIPTION
0-2	896.2-894.2	Sand, brown, dry, some gravel, medium dense
2-4	894.2-892.2	Gravel, brown, dry, some sand, little silt, medium dense
5-7	891.2-889.2	Silt, gray, moist, little clay, stiff
7-8	889.2-888.2	Same as above
8-9	888.2-887.2	Silt, brown, moist, some sand, little clay and gravel, stiff
10-12	886.2-884.2	Same as above
15-17	881.2-879.2	Sand, brown, wet, some silt, medium dense
20-22	876.2-874.2	Silt, gray, wet, little clay, trace sand, stiff
25-27	871.2-879.2	Silt, gray, wet, very stiff
30-31.8	866.2-864.4	Same as above
31.8-32	864.4-864.2	Sand, gray, wet, some silt, medium dense
35-37	861.2-859.2	Same as above



WELL 12

BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	898.6-896.6	Silt, brown, dry, trace sand and gravel, stiff
5-7	893.6-891.6	Silt, brown, dry, some sand and gravel, hard
10-11	888.6-887.6	Silt, brown, wet, some sand, trace clay, medium stiff
11-12	887.6-886.6	Sand, brown, wet, some silt and gravel, medium dense
15-17	883.6-881.6	Sand, wet, brown, some gravel, medium dense
20-22	878.6-877.6	Same as above



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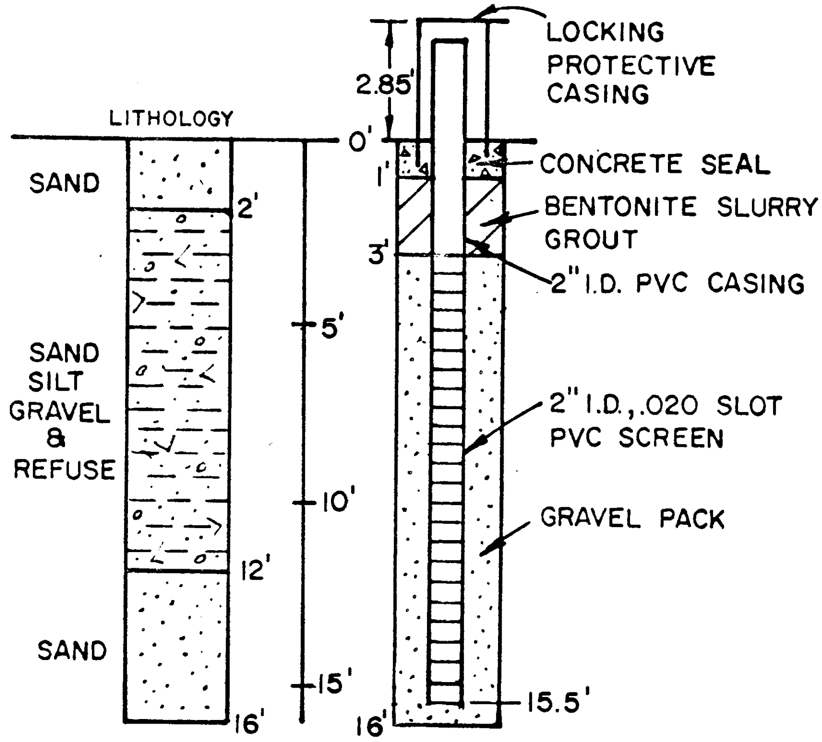
WELL 13
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	865.7-863.7	Sand, brown, dry, little silt, trace gravel, medium dense
2-4	863.7-861.7	Sand, brown moist, trace refuse and silt, loose
4-6	861.7-859.7	Sand, brown, moist, little silt, gravel and refuse, loose
6-8	859.7-857.7	Same as above
8-10	857.7-855.7	Sand, brown gray, wet, little silt, trace gravel and refuse, medium dense
10-12	855.7-853.7	Same as above
12-14	853.7-851.7	Sand, gray, wet, little gravel and silt, medium dense
14-16	851.7-849.7	Same as above



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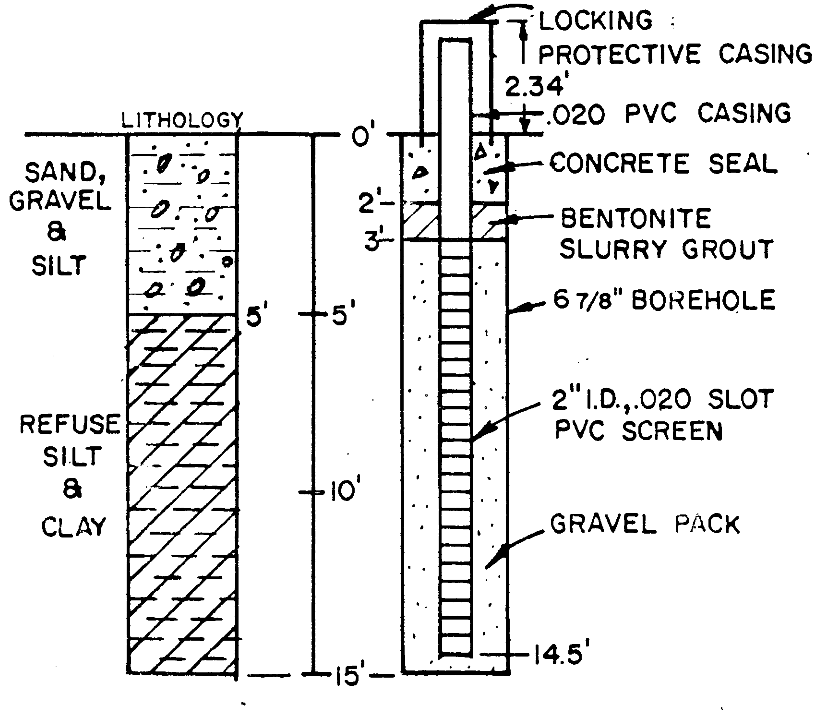
WELL 14
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-5	914.8-912.8	Sand, gravel and silt, brown, moist, medium dense
5-12	909.8-902.8	Refuse, gray-brown, wet
12-15	902.8-899.8	Refuse, gray-brown, wet, some sand, silt and gravel, medium dense



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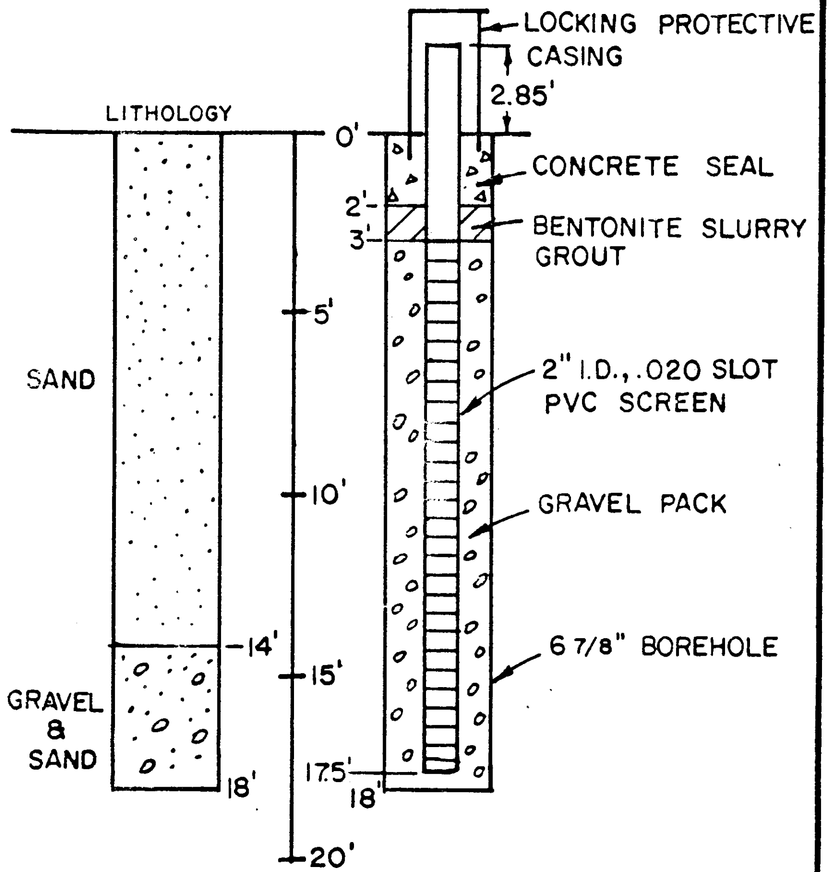
WELL 15
BROOME COUNTY
INDUSTRIAL DEVELOPEMENT AGENCY
LITHOLOGIC LOG & WELL DETAIL

DEPTH	ELEV.	DESCRIPTION
0-2	873.8-871.8	Sand, brown, dry, little silt and gravel loose
2-4	871.8-869.8	Sand, brown, dry, little silt and gravel, medium dense
4-6	869.8-867.8	Same as above
6-8	867.8-865.8	Same as above
8-10	865.8-863.8	Sand, brown, moist, little silt and gravel, medium dense
10-12	863.8-861.8	Same as above
12-14	861.8-859.8	Same as above
14-16	859.8-857.8	Gravel and sand, gray, wet, trace silt, very dense
16-18	857.8-855.8	Same as above



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TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION Conklin, NY
HOLE NUMBER Well 17

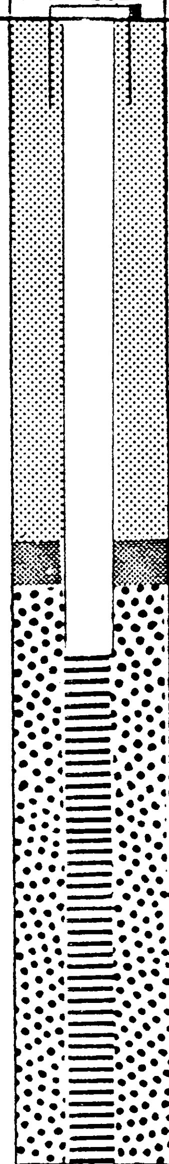
SAMPLER
TYPE: Split Spoon
HAMMER
FALL

GROUNDWATER READINGS

DATE	DEPTH		
12/20	1.4		

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV. 948.46
DATE STARTED 10/31/84 DATE ENDED 11/1/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	3/5	Brown moist SILT and fine to coarse GRAVEL, trace fine SAND				
					16					
5'		2		5-6.5	16/15					
					42					
10'		3		10-11.5	20/28	Grey-brown moist fine to coarse GRAVEL and SILT, some fine to coarse SAND				
					42					
15'		4		15-16.5	8/9	Grey-brown moist SILT, trace CLAY				
					17					
20'		5		20-21.5	16/18	Grey-brown wet fine to coarse GRAVEL and SILT, some to trace fine to medium SAND				
					25					
25'		6		25-26.5	35/38					
					31					
30'		7		30-31.5	18/28					
					42	Bottom of Boring 31.5'				

REMARKS: #20 Slot Screen 31.5 - 17.5
Washed Silica Sandpack 31.5 - 15.5
Bentonite Pellets 15.5 - 14.5
Bentonite Grout/Portland Cement 14.5 - 0

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION Conklin, NY

HOLE NUMBER Well 18

SAMPLER

TYPE: Split Spoon

HAMMER

FALL

GROUNDWATER READINGS

DATE	DEPTH		
12/20	1.03		

BORING CO. Parratt Wolff

FOREMAN Mike Hurley

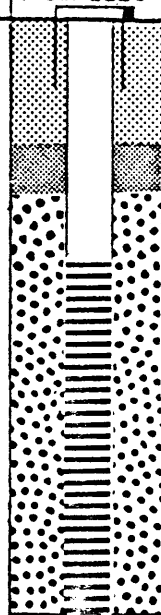
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2

GROUND ELEV. 861.00

DATE STARTED 11/1/84 DATE ENDED 11/1/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	2/3					
					4	Grey-brown moist SILT and fine SAND				
5'		2		5-6.5	2/1					
					1	Grey wet fine to coarse SAND and PEAT, trace SILT				
10'		3		10-	8/8					
				11.5	12					
						Grey-brown wet fine to coarse SAND and fine GRAVEL, trace SILT				
15'		4		15-	10/9					
				16.5	13	Bottom of Boring 16.5'				



REMARKS:

#20 Slot Screen 16.5 - 6.5
Washed Silica Sandpack 16.5 - 5.0
Bentonite Pellets 5.0 - 3.5
Bentonite Grout/Portland Cement 5 - 0

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION	Conklin, NY
HOLE NUMBER	Well 19

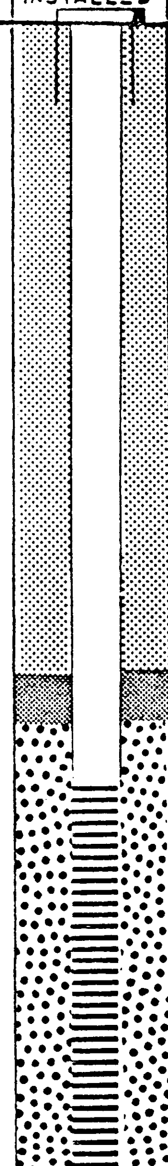
SAMPLER
TYPE: Split Spoon
HAMMER
FALL

GROUNDWATER READINGS

DATE	DEPTH
12/20	3.5

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath
BORING LOCATION
GROUND ELEV. 912.39
DATE STARTED 11/5/84 DATE ENDED 11/5/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	SAMPLE PEN./REC.	SAMPLE DEPTH	SAMPLE BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	3/3					
					6	Brown moist SILT, some fine to medium SAND				
5'		2		5-6.5	9/12					
					15	Grey and brown moist fine to medium SAND and SILT				
10'		3		10-	14/16					
				11.5	13	Grey moist fine to coarse GRAVEL and SILT, little fine SAND				
15'		4		15-	14/13					
				16.5	13	Grey moist SILT, little fine to medium SAND, trace fine GRAVEL				
20'		5		20-	9/13					
				21.5	50(.3')	Grey wet SILT and fine to coarse GRAVEL, little fine to medium SAND, trace CLAY				
25'		6		25-	50(.4')					
30'		7		30-	60					
				31.5						
						Bottom of Boring 31.5'				



REMARKS: #20 Slot Screen 31.5 - 21.0
Washed Silica Sandpack 31.5 - 19.5
Bentonite Pellets 19.5 - 18.0
Bentonite Grout/Portland Cement 18.0 - 0

O'BRIEN & GERE ENGINEERS INC.

TEST BORING LOG

REPORT OF BORING NUMBER
SHEET 1 OF 1
DATE
FILE 2733.004.130

PROJECT LOCATION: Conklin, NY
HOLE NUMBER: Well 20

SAMPLER
TYPE: Split Spoon
HAMMER FALL:

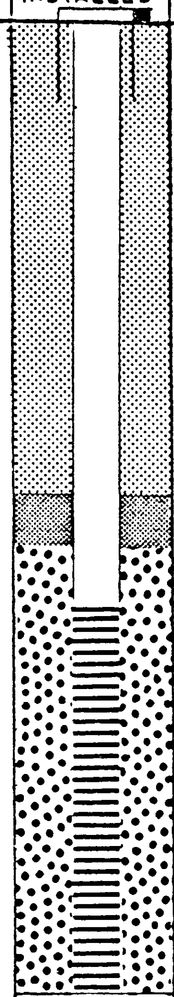
GROUNDWATER READINGS

DATE	DEPTH	
12/20	2.19	

BORING CO. Parratt Wolff
FOREMAN Mike Hurley
OBG ENGINEER D. Ozvath

BORING LOCATION See Figure 2
GROUND ELEV. 887.89
DATE STARTED 11/6/84 DATE ENDED 11/6/84

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	SAMPLE DEPTH	BLOWS / 6"	SAMPLE DESCRIPTION	STRA. CHG. GEN. DESC.	EQUIPMENT INSTALLED	FIELD TESTING	RMKS
0'		1		0-1.5	3/3 4	Dark brown moist SILT and ROOTS, some fine SAND				
						Brown moist fine SAND and SILT				
5'		2		5-6.5	5/10 20					
						Brown moist fine to coarse SAND and GRAVEL, some SILT				
						Grey-brown wet SILT and fine to coarse SAND, some fine GRAVEL				
10'		3		10-11.5	10/20 20					
						Brown wet fine to coarse SAND and fine to coarse GRAVEL, little SILT				
15'		4		15-16.5	15/11 15					
						Brown moist SILT and CLAY				
						Brown wet fine to coarse SAND and fine to coarse GRAVEL				
20'		5		20-21.5	8/11 19					
						Grey moist SILT, some fine to coarse GRAVEL, trace fine SAND				
25'		6		25-26.5	15/26 67					
						Bottom of Boring 26.5'				



REMARKS: #20 Slot Screen 26.5 - 16.0
Washed Silica Sandpack 26.5 - 14.5
Bentonite Pellets 14.5 - 13.0
Bentonite Grout/Portland Cement 13.0 - 0

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Broome Co. Industrial Park

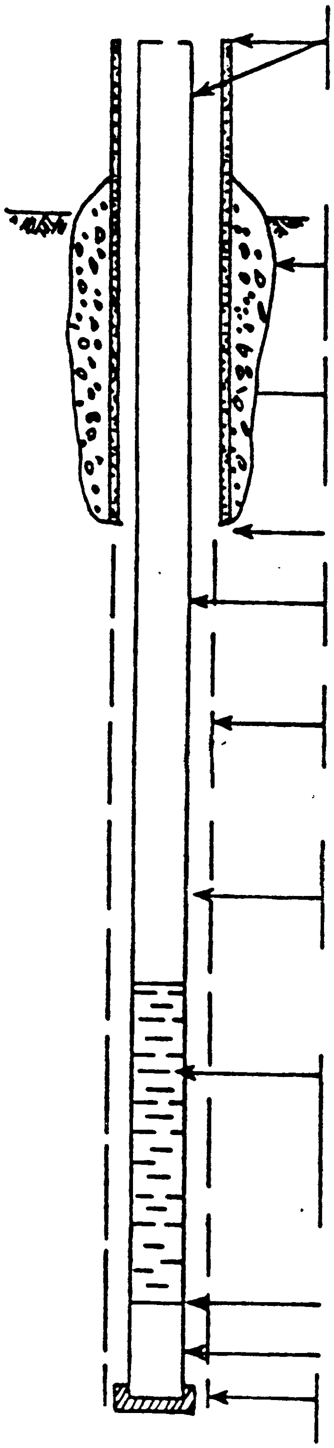
AQUIFER:

WELL NO.: W-21

DATE COMPLETED: 1/29/86

LOCATION: East of Upper Landfill

DRILLED BY: Parrott Wolff



Height of top of surface casing/well casing above ground surface	-- ft.
Depth of surface seal below ground surface	2 ft.
Type of surface seal: Bentonite Pellets	
I.D. of surface casing	
Type of surface casing: Steel	4 in.
Bottom of surface casing below ground	-- ft.
I.D. of well casing	2 in.
Type of well casing: PVC	
Depth of top of gravel pack below ground surface	2 ft.
Type of gravel pack: Ottawa Sand	
Diameter of borehole	6.875 in.
Depth of top of screened section	3 ft.
Type of screened section:	
Type of perforations: slot	
I.D. of screened section	2 in.
Depth of bottom of screened section	18 ft.
Length of blank section	-- ft.
Depth of bottom of plugged blank section	-- ft.
Total depth of hole	20 ft.

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Broome Co. Industrial Park

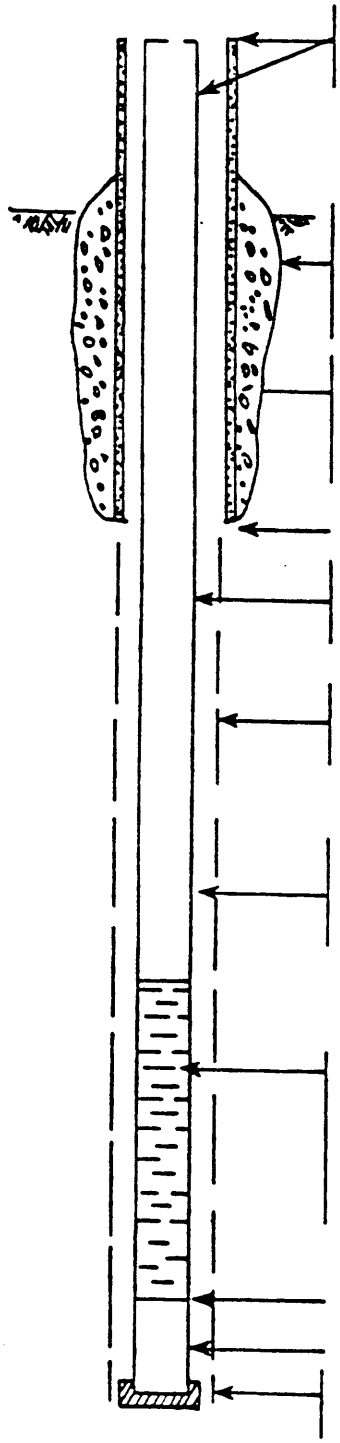
AQUIFER:

WELL NO.: W-22

DATE COMPLETED: 1/29/86

LOCATION: Northeast of Upper Landfill

DRILLED BY: Parrott-Wolff



Height of top of surface casing/well casing above ground surface	-- ft.
Depth of surface seal below ground surface	2 ft.
Type of surface seal: Bentonite Pellets	
I.D. of surface casing	
Type of surface casing: Steel	4 in.
Bottom of surface casing below ground	-- ft.
I.D. of well casing	2 in.
Type of well casing: PVC	
Depth of top of gravel pack below ground surface	2 ft.
Type of gravel pack: Ottawa Sand	
Diameter of borehole	6.875in.
Depth of top of screened section	3 ft.
Type of screened section: #10	
Type of perforations: slot	
I.D. of screened section	2 in.
Depth of bottom of screened section	18 ft.
Length of blank section	-- ft.
Depth of bottom of plugged blank section	-- ft.
Total depth of hole	22 ft.

APPENDIX E

IN-SITU PERMEABILITY TEST PROCEDURE AND FIELD LOGS

IN SITU PERMEABILITY TEST PROTOCOL

An in-situ permeability test will be performed on selected monitoring wells. The test will be conducted by evacuating or adding a sufficient volume of water from a well to create a potential hydraulic difference between the well and the surrounding aquifer.

Water levels will be measured and recorded at specific time intervals for four (4) hours or until the water level returns to the initial static water level. These measurements will monitor the rate of recovery which is a function of the hydraulic conductivity of the aquifer material.

All water level measurements will be recorded to the nearest hundredth of a foot. The water level probe will be cleaned with a nanograde acetone swabbing and distilled water rinse between each monitoring well.

Values for the hydraulic conductivity will be calculated using a digital computer program by Weyer and Horwood-Brown that uses Hvorselv's formulae.

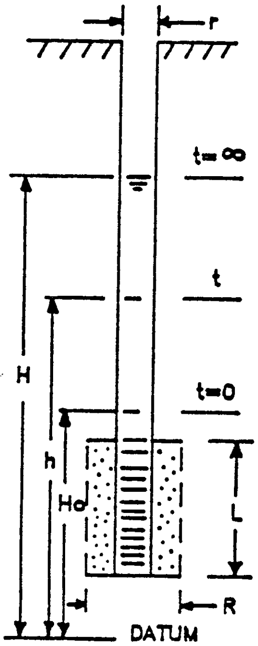
Any water removed from the wells during the in-situ permeability tests will be placed into 55 gallon drums and retained on-site until the proper disposal method is established. The disposal method will be based on the chemical analyses of the grounwater samples from each well.

O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 1
DATE 12/13/84

LOCATION See Plan
ELEVATION 947.41' (TOC)

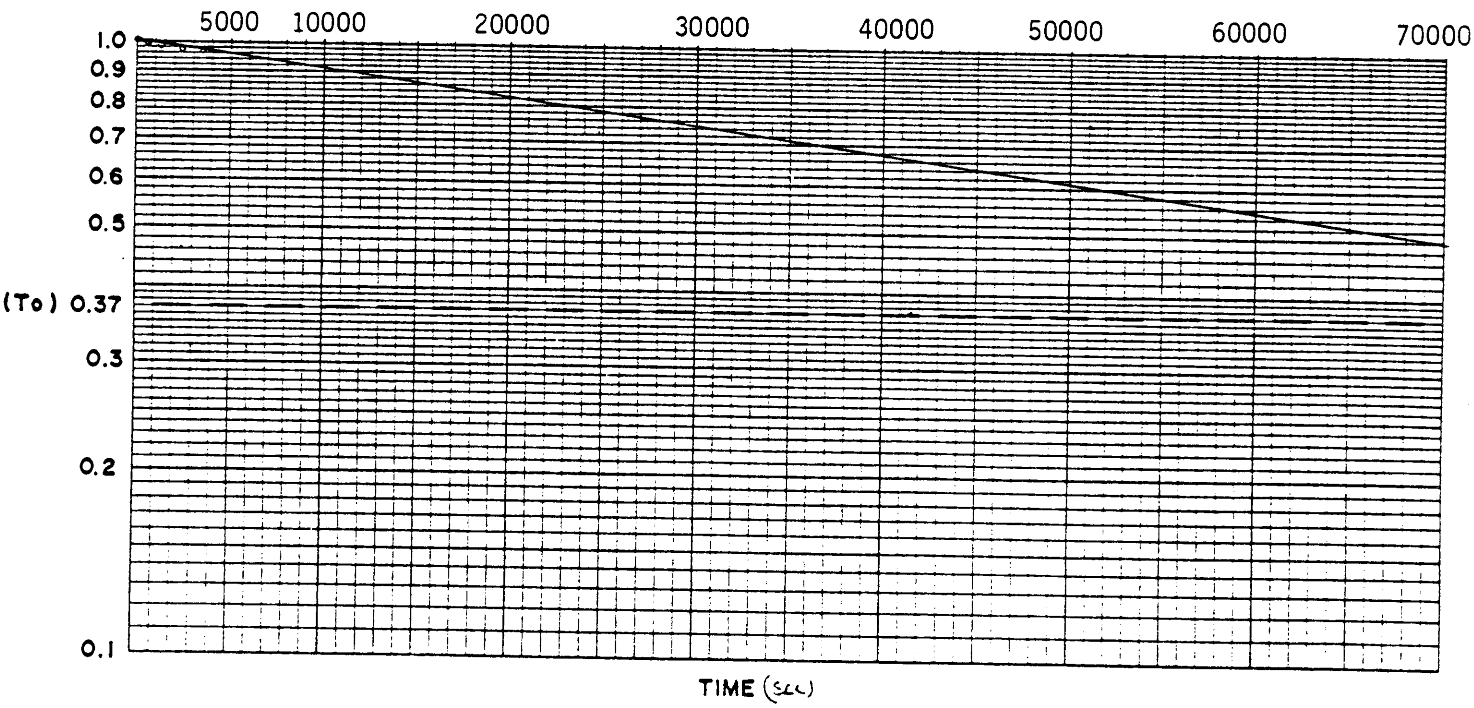


STATIC HEAD (H) 1,550 cm
PIPE RADIUS (r) ~~2.54~~ cm
SCREEN RADIUS (R) 7.62 cm
SCREEN LENGTH (L) 609 cm
INITIAL HEAD (Ho) 415 cm
HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o} = \frac{6.45\ (609/7.62)}{2(609)101{,}000}$$

$K = 2.29 \times 10^{-7}$ cm/sec. $= 7.5 \times 10^{-9}$ ft/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
1	1413	60	415	1
5	1403	300	425	.99
10	1397	600	431	.985
16	1395	960	433	.984
20	1393	1200	435	.982
30	1390	1800	438	.980
40	1387	2400	441	.976
50	1385	3000	443	.974
60	1382	3600	446	.972

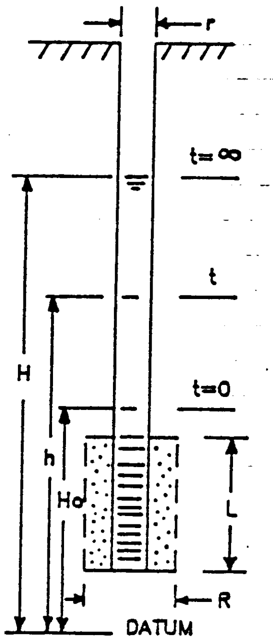


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BCIDA
WELL NUMBER 3
DATE 11/7/86

LOCATION Conklin Landfill
ELEVATION 889.20' (TOC)



STATIC HEAD (H) 8.25'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 15'

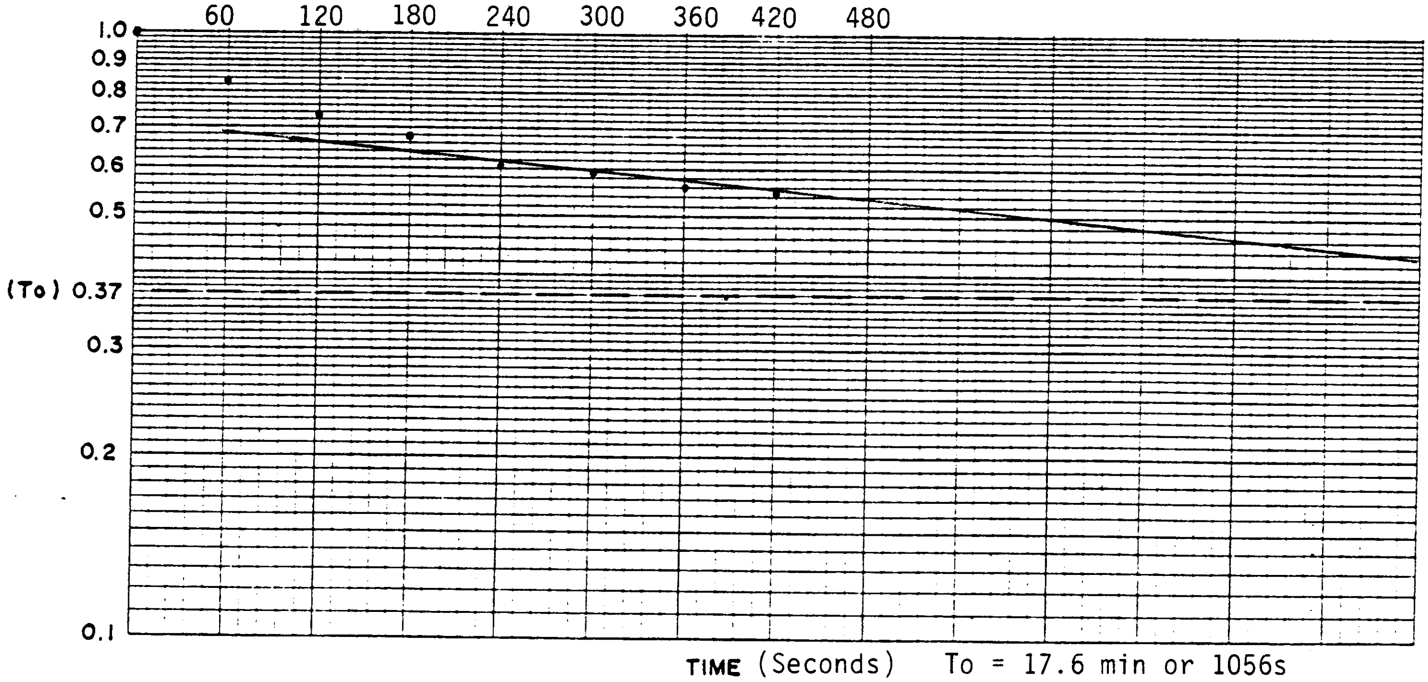
INITIAL HEAD (Ho) 16.31'

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LTo} = \frac{(.083)^2 \ln(1/.286)}{(2)(1)(1056)}$$

$K = 8.6 \times 10^{-6}$ ft/sec $= 2.6 \times 10^{-4}$ cm/sec

TIME	WATER DEPTH	t	h	H-h / H-Ho
	16.31	0	8.06	1.0
	15.38	30	7.13	.88
	14.93	60	6.68	.83
	14.48	90	6.23	.77
	14.14	120	5.89	.73
	13.90	150	5.65	.70
	13.71	180	5.46	.68
	13.46	210	5.21	.65
	13.17	270	4.92	.61
	13.00	330	4.75	.59
	12.79	390	4.54	.56
	12.72	450	4.47	.55
	12.26	750	4.01	.50
	11.89	870	3.64	.45



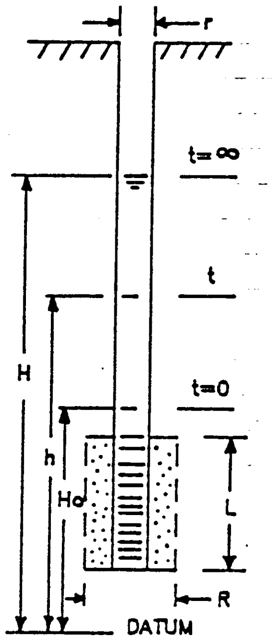
TIME (Seconds) To = 17.6 min or 1056s

O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BCIDA
WELL NUMBER 4
DATE 11/7/86

LOCATION Conklin Landfill
ELEVATION 893.58' (TOC)



STATIC HEAD (H) 6.78'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 10'

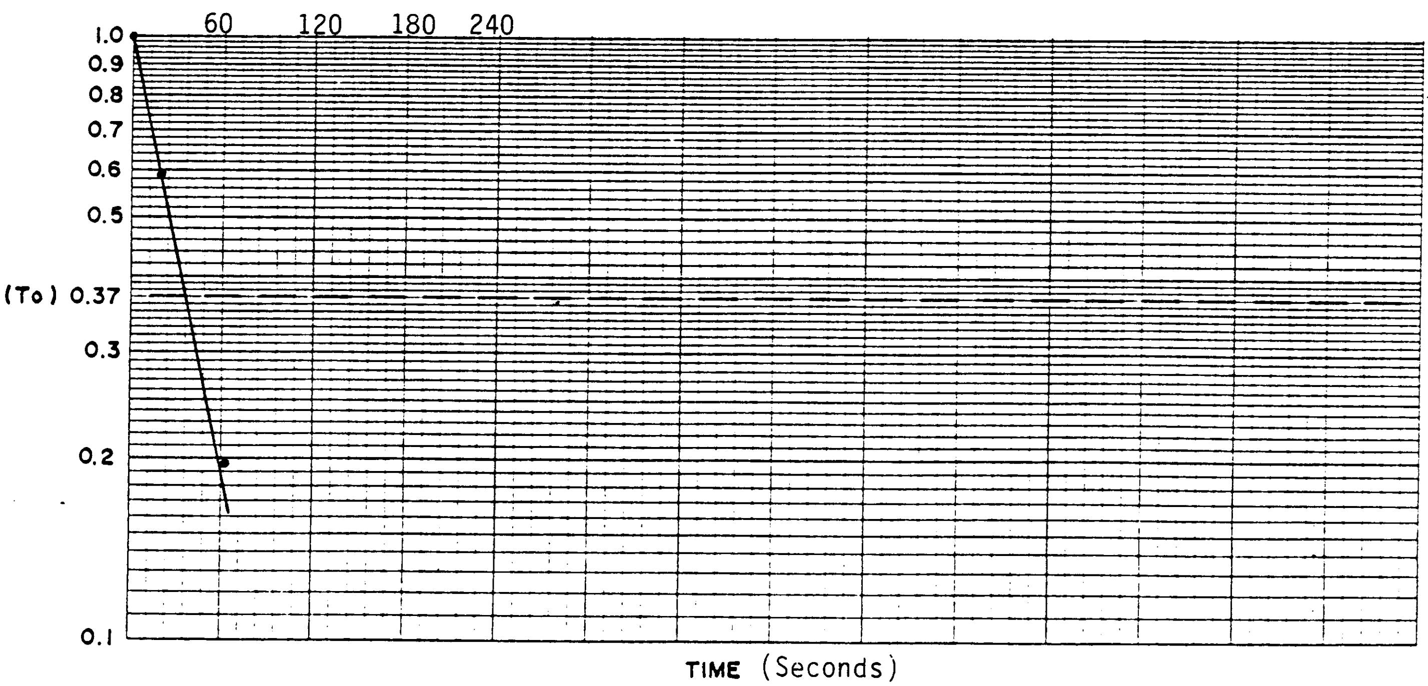
INITIAL HEAD (Ho) 7.69'

HYDRAULIC CONDUCTIVITY :

$$K=\frac{r^2\ln(L/R)}{2LT_o}=\frac{(.083)^2\ln(10/.286)}{2\ (10)\ (36)}$$

K= 4.1×10^{-4} ft/sec = 1.3×10^{-2} cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
	7.69	0	.91	1.0
	7.32	20	.54	.59
	7.13	35	.35	.38
	7.02	50	.24	.26
	6.95	65	.17	.19
	6.91	80	.13	.14
	6.85	100	.07	.08
	6.84	120	.06	.07
	6.80	150	.02	.02
	6.78	180	.00	.00
	6.78	180	.00	.00

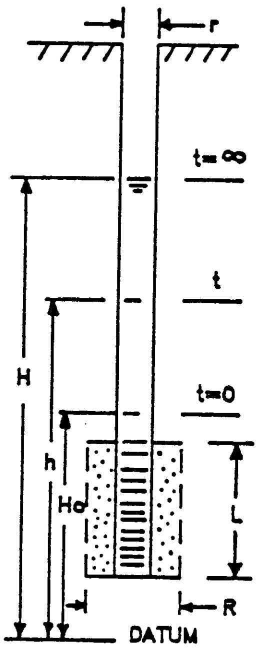


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 5
DATE 12/13/84

LOCATION See Plan
ELEVATION 860.31' (TOC)



STATIC HEAD (H) 855.11'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 10'

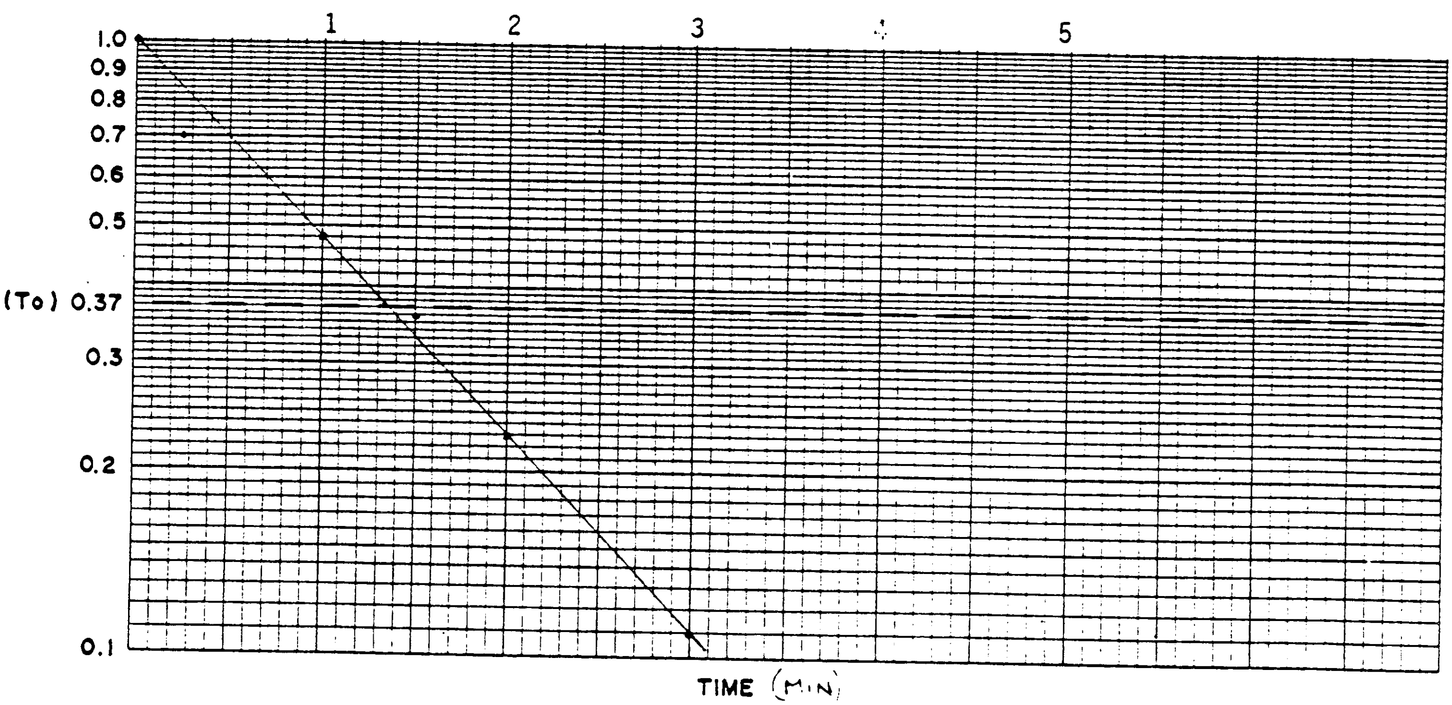
INITIAL HEAD (Ho) 842.31'

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o} = \frac{(.083)^2 \cdot \ln(10/.286)}{2(10)\ (87.6)}$$

K= 1.4 x 10^{-5} ft/sec = 4.3 x 10^{-4} cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
		0	842.31	1
		.25	846.31	.69
		.5	847.16	.62
		1	849.31	.47
		1.5	850.46	.36
		2	852.06	.23
		3	853.64	.11
		5	854.51	.05



O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

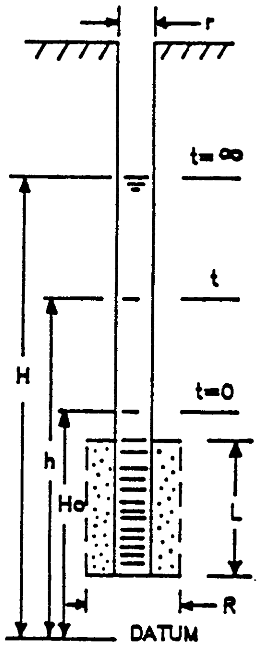
PROJECT BROOME CO. IDA

WELL NUMBER Well 6

DATE 12/13/84

LOCATION See Plan

ELEVATION TOC Elevation 886.82'



STATIC HEAD (H) 865.43'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 10'

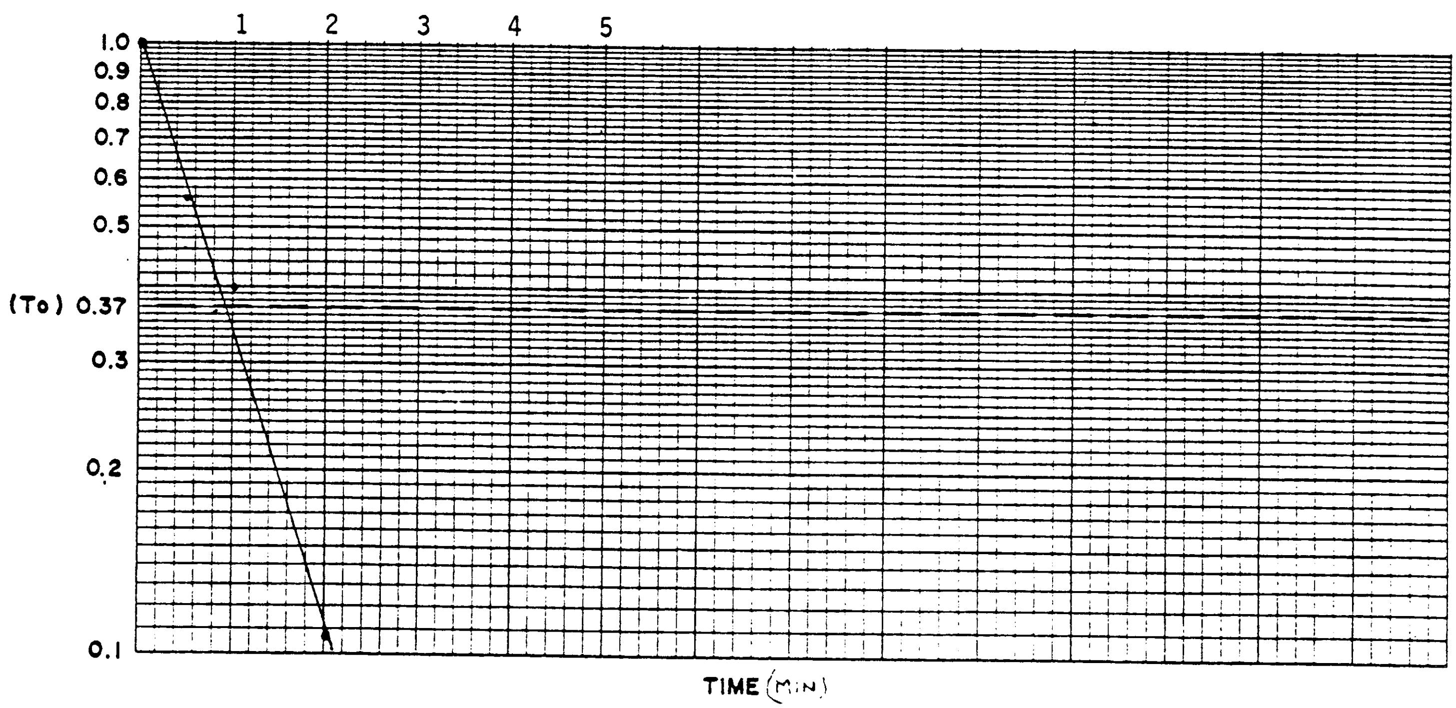
INITIAL HEAD (Ho) 859.8'

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o} = \frac{(.083)^2 \ln(10/.286)}{2(10)(66)}$$

K= 1.86 x 10^{-5} ft/sec = 5.7 s 10^{-4} cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-H_o}$
0	9.00	0	859.8	1
.5	6.55	.5	862.25	.56
1	5.64	1	863.16	.40
2	4.00	2	864.8	.11
4	3.75	4	865.05	.07
5	3.37	5	865.43	0

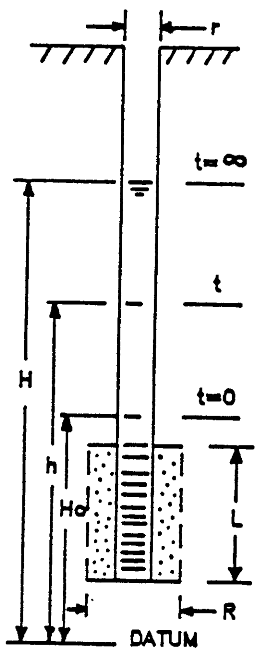


O'BRIEN & GERE

IN–SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 7
DATE 12/20/84

LOCATION See Plan
ELEVATION (TOC) 868.37'



STATIC HEAD (H) 856.22'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 5'

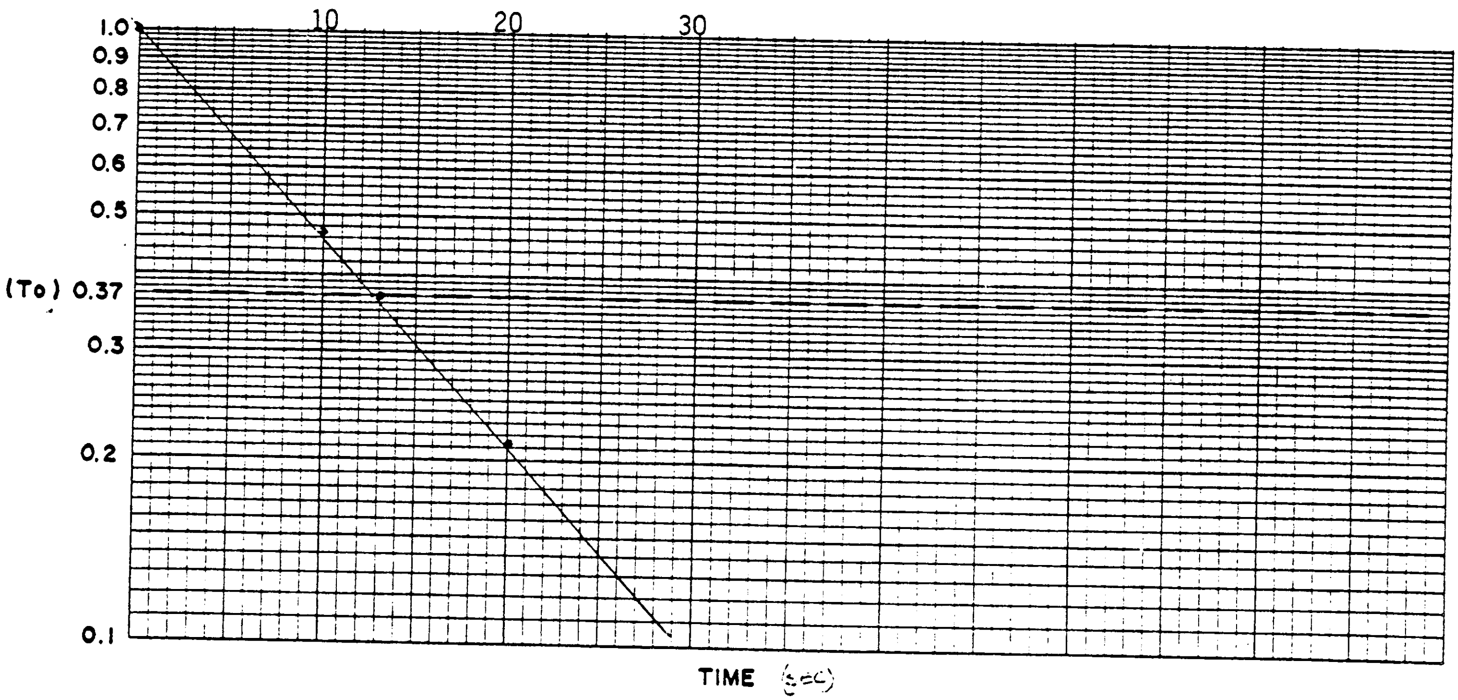
INITIAL HEAD (Ho) 846.37'

HYDRAULIC CONDUCTIVITY :

$$K=\frac{r^2\ln(L/R)}{2LTo}=\frac{(.083)^2\ln(5/.286)}{2(5)(13)}$$

K= 1.5 x 10^{-4} ft/sec = 4.6 x 10^{-3} cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
		0	846.37	1
		10	851.57	.47
		20	854.15	.21
		30	856.22	0

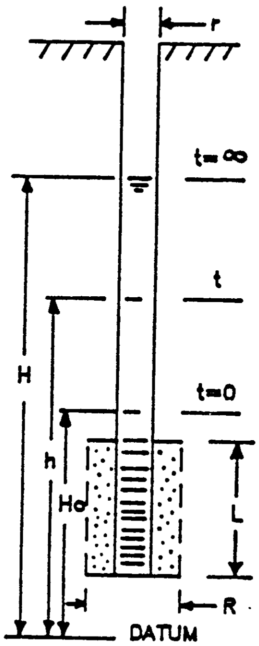


OBRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 9
DATE 12/20/84

LOCATION Lower Landfill
ELEVATION (TOC) 864.21'



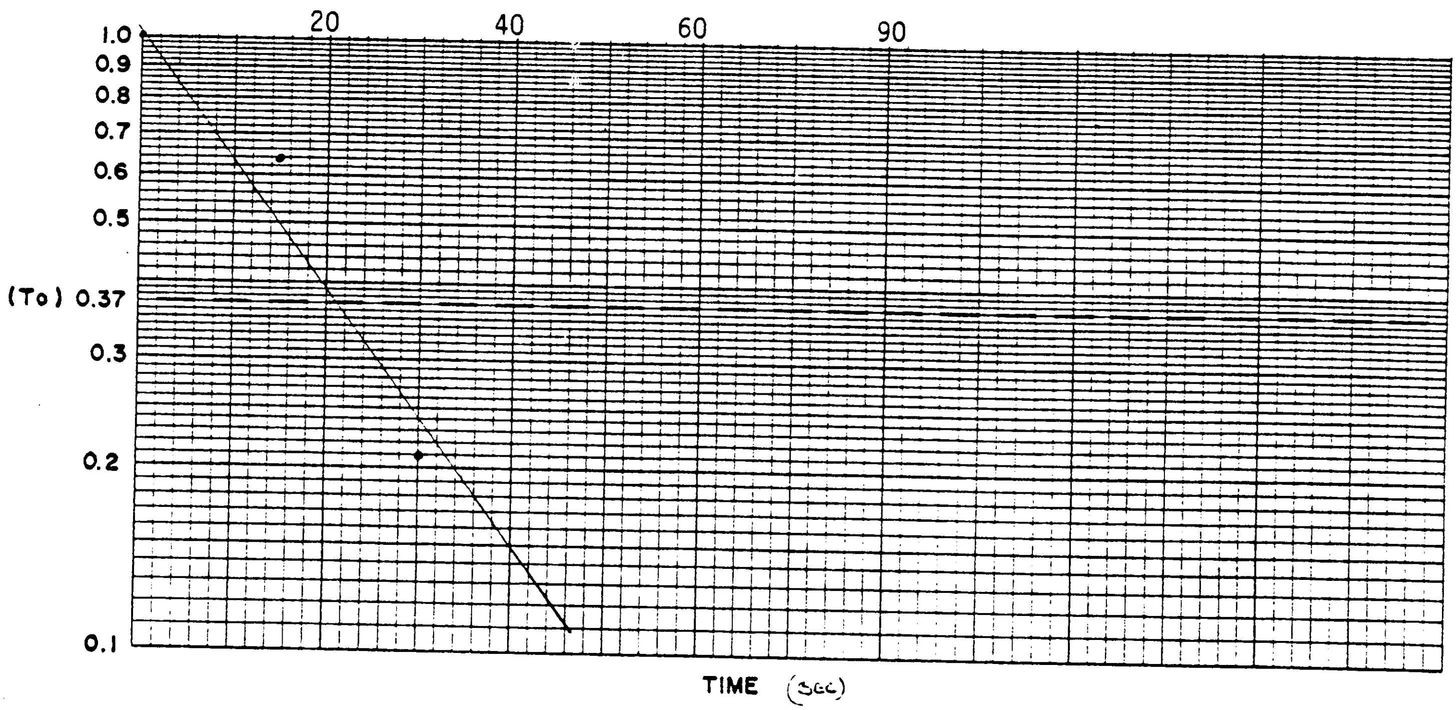
STATIC HEAD (H) 854.66'
PIPE RADIUS (r) .083'
SCREEN RADIUS (R) .286'
SCREEN LENGTH (L) 10'
INITIAL HEAD (Ho) 844.21'

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o} = \frac{(.083)^2 \ln(10/.286)}{(2)(10)(21)}$$

$K = 5.83 \times 10^{-5}$ ft/sec $= 1.8 \times 10^{-3}$ cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
		0	844.21	1
		15	848.01	.64
		30	852.71	.21
		60	853.96	.07
		90	854.66	0



O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

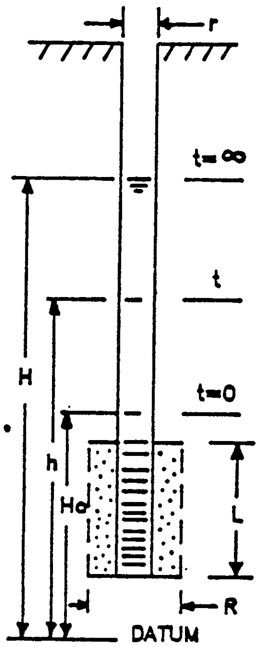
PROJECT BROOME CO. IDA

WELL NUMBER Well 10

DATE 12/20/84

LOCATION Lower Landfill

ELEVATION (TOC) 863.76'



STATIC HEAD (H) 855.29'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 10'

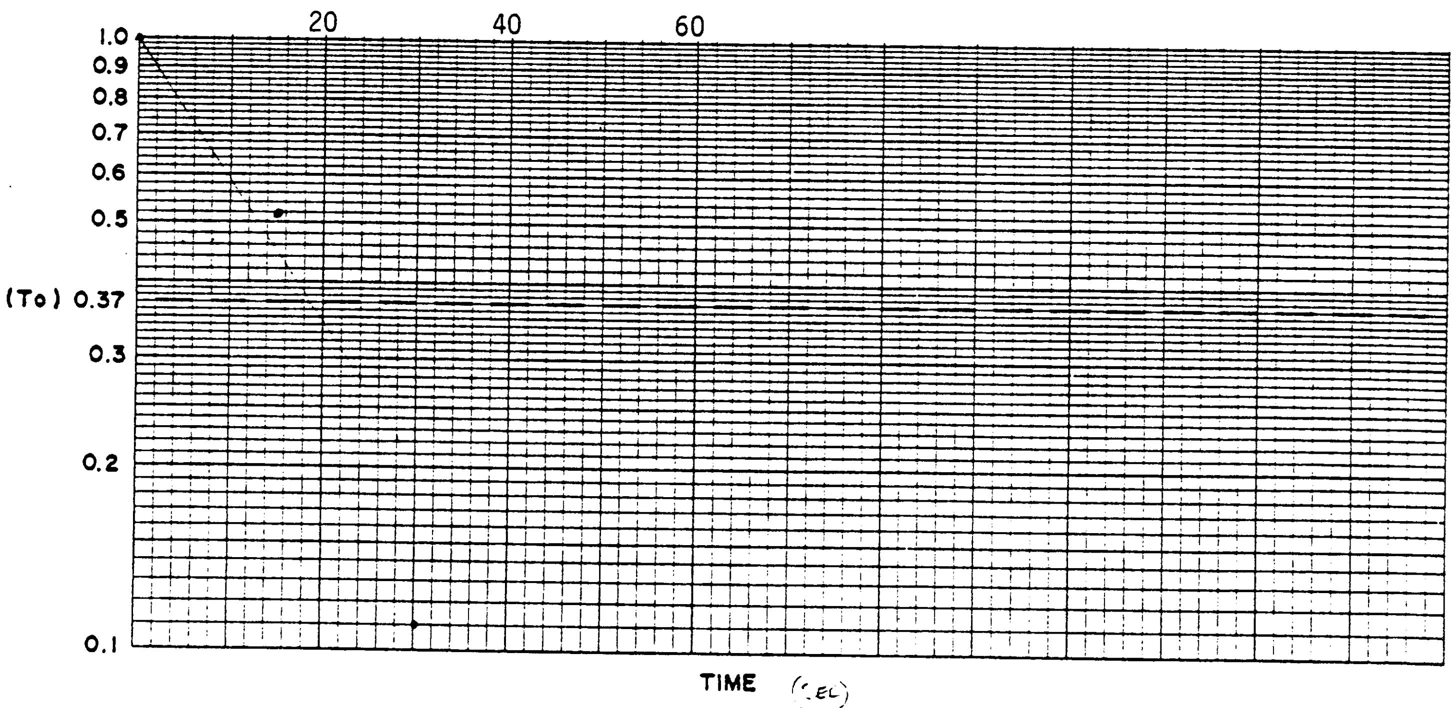
INITIAL HEAD (Ho) 847.76'

HYDRAULIC CONDUCTIVITY :

$K = \frac{r^2 \ln(L/R)}{2LT_o}$ $\frac{(.083)^2 \ln(10/.286)}{2(10)(18)}$

K= 6.8 x 10^{-5} ft/sec 2.1 x 10^{-3} cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
		0	847.26	1
		15	851.37	.52
		30	854.39	.12
		45	855.26	.003
		60	855.26	.003

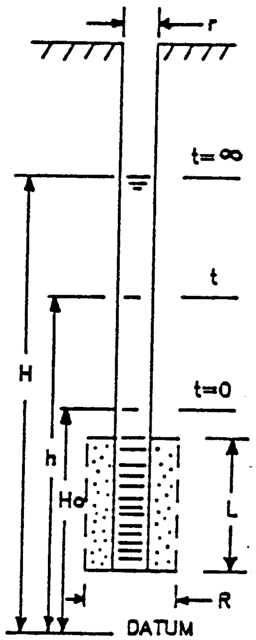


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BCIDA
WELL NUMBER 11
DATE 11/7/86

LOCATION Conklin Landfill
ELEVATION 898.97' (TOC)



STATIC HEAD (H) 12.60'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 15'

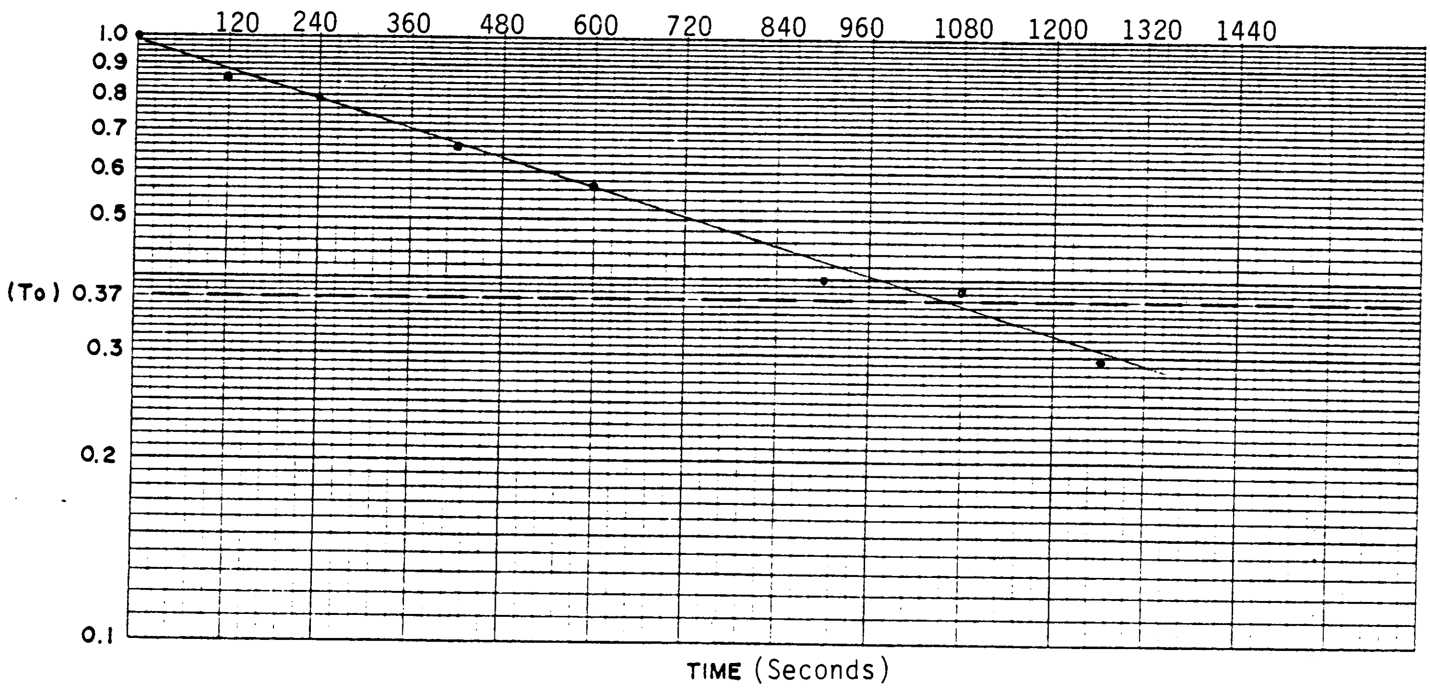
INITIAL HEAD (Ho) 20.18'

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LTo} = \frac{(.083)^2 \ln(15/.286)}{(2)\ (15)\ (1056)}$$

K= 9.0×10^{-7} ft/sec 2.74×10^{-5} cm/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
	20.18	0	7.58	1.0
	19.12	2	6.52	.86
	18.60	4	6.0	.79
	17.69	7	5.0	.66
	16.98	10	4.38	.58
	15.61	15	3.01	.40
	15.24	18	2.64	.39
	14.77	21	2.17	.29
	12.65	82	0.05	.007



OBRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

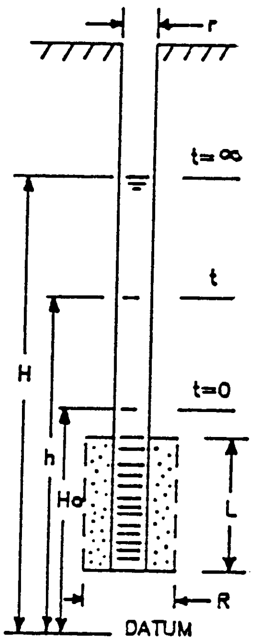
PROJECT BCIDA

WELL NUMBER 12

DATE 11/7/86

LOCATION Conklin Landfill

ELEVATION 901.62' (TOC)



STATIC HEAD (H) 13.00'

PIPE RADIUS (r) .083'

SCREEN RADIUS (R) .286'

SCREEN LENGTH (L) 10'

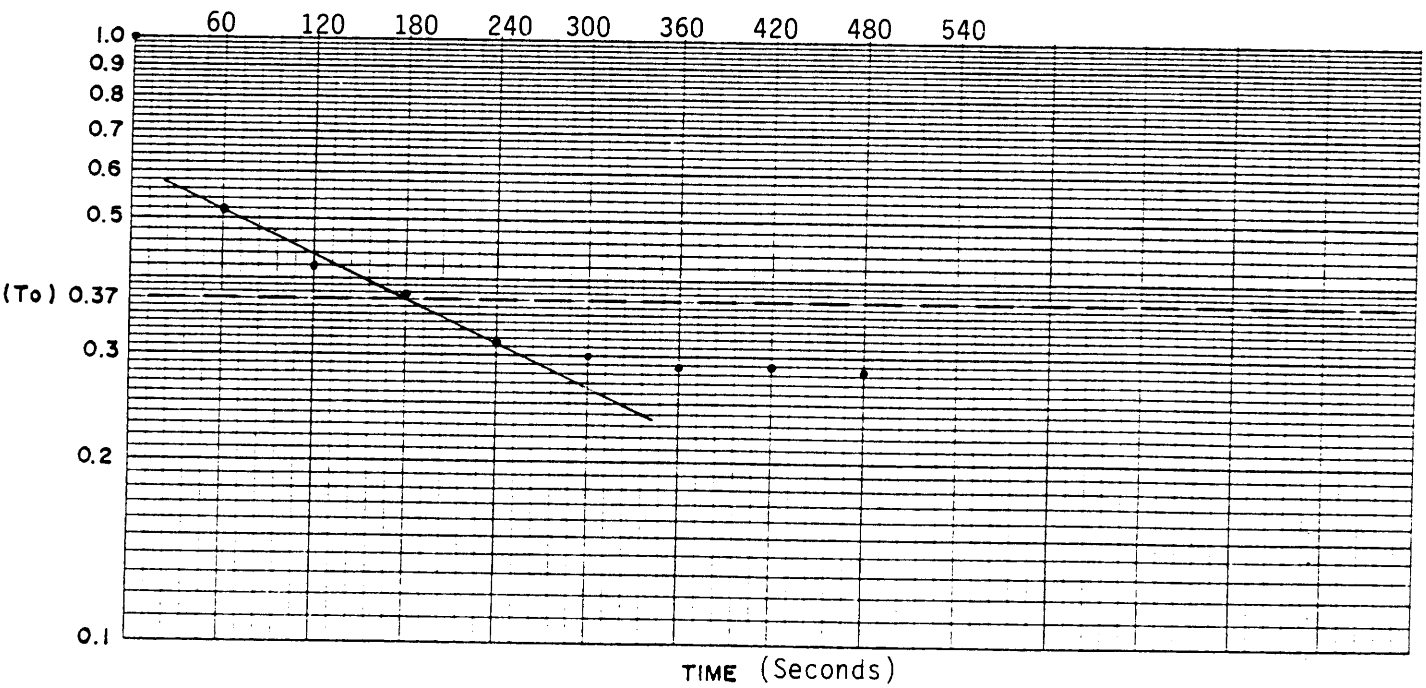
INITIAL HEAD (Ho) 14.85'

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LTo} = \frac{(.083)^2 (10/.286)}{2\ (10)\ (180)}$$

$K = 8.19 \times 10^{-5}$ ft/sec $= 2.5 \times 10^{-3}$ cm/sec

TIME	WATER DEPTH	t	h	H-h / H-Ho
	14.85	0	1.85	1.0
	14.20	30	1.20	.65
	13.96	60	.96	.52
	13.87	90	.87	.47
	13.78	120	.78	.42
	13.75	150	.75	.48
	13.70	180	.70	.38
	13.61	210	.61	.33
	13.61	240	.61	.33
	13.58	300	.58	.31
	13.52	360	.52	.28
	13.51	420	.51	.28
	13.50	480	.50	.27



O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

Confined Condition

PROJECT BROOME CO. IDA

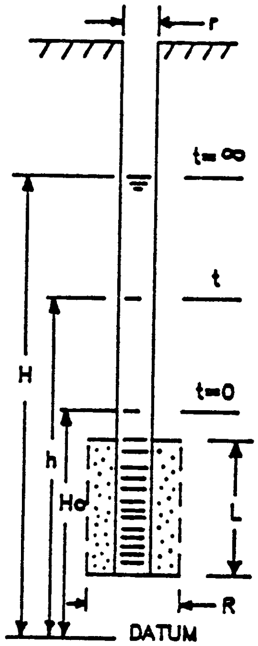
WELL NUMBER Well 17

DATE 12/20/84

LOCATION See Plan

ELEVATION (TOC) 950.89'

(GRD) 948.46'



STATIC HEAD (H) 871'

PIPE RADIUS (r) 2.54'

SCREEN RADIUS (R) 7.62'

SCREEN LENGTH (L) 457'

INITIAL HEAD (Ho) 485'

HYDRAULIC CONDUCTIVITY :

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-Ho}$
0	429	0	485	1
15	378	15	536	.87
30	337	30	577	.76
60	305	60	609	.68
120	256	120	658	.55
240	193	240	721	.39
600	132	600	782	.23
1200	77	1200	837	.09
1800	43	1800	871	0

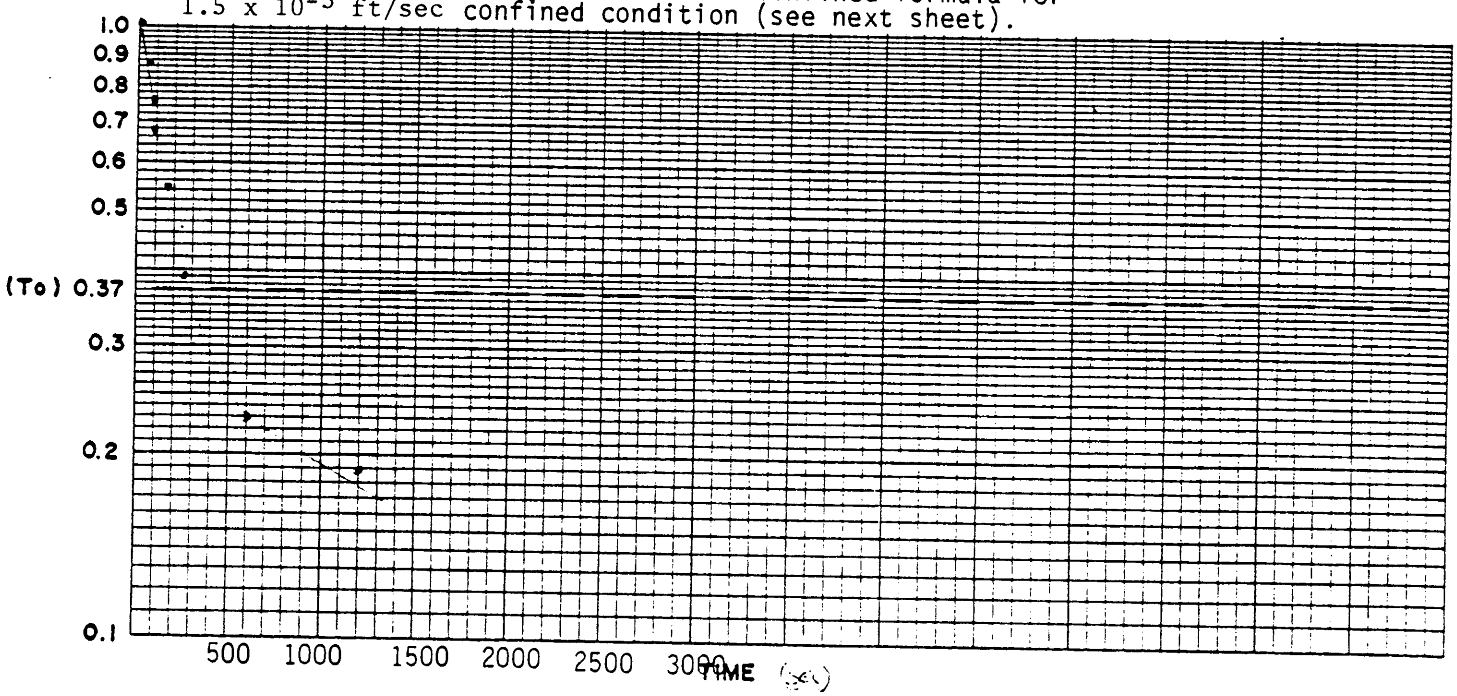
$$K = \frac{r^2 \ln(L/R)}{2LT_o} \quad \frac{6.45\ln(457/7.62)}{2(457)(300)}$$

K= 9.63×10^{-5} cm/sec → 8.08×10^{-4} to 9.63×10^{-5} Range of K

Mean K = 4.52×10^{-4}

1.5×10^{-5} ft/sec

Using Hvorslev's unconfined formula for confined condition (see next sheet).

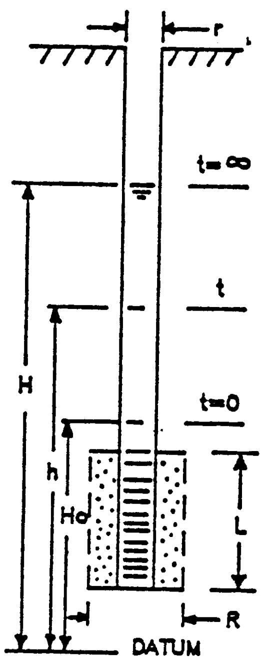


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 18
DATE 12/20/84

LOCATION See Plan
ELEVATION (TOC) 863.37'
(GRD) 861'



STATIC HEAD (H) 426 cm

PIPE RADIUS (r) 2.54 cm

SCREEN RADIUS (R) 7.62 cm

SCREEN LENGTH (L) 305 cm

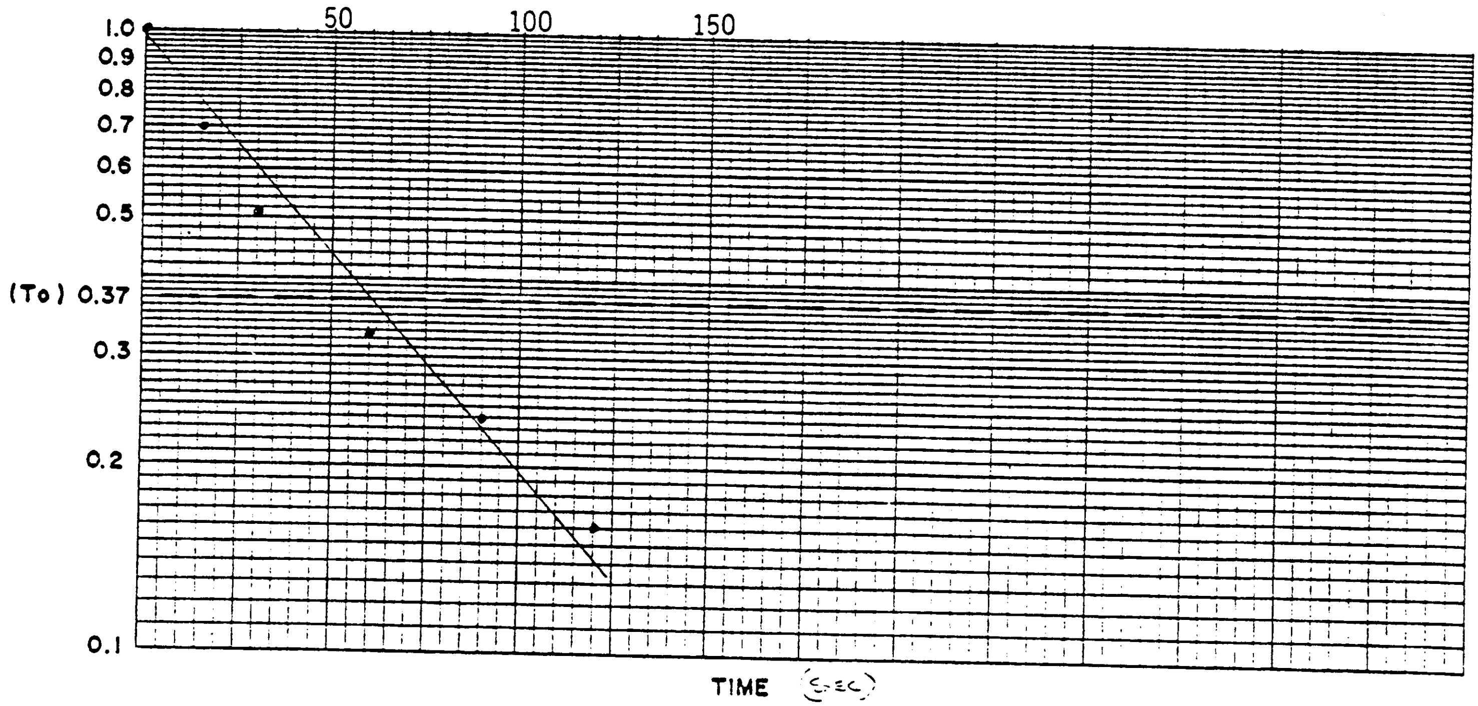
INITIAL HEAD (Ho) 225 cm

HYDRAULIC CONDUCTIVITY :

$$K=\frac{r^2\ln(L/R)}{2LT_o}=\frac{6.45\ \ln 305/7.62}{(2)(305)57}$$

K= 6.84×10^{-4} cm/sec. = 2.2×10^{-5} ft/sec

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-H_o}$
0	232	0	225	1
15	172	15	285	.70
30	133	30	324	.51
60	97	60	360	.33
90	79	90	378	.24
120	44	120	413	.06

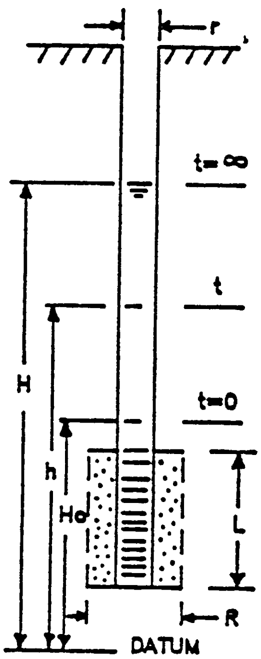


O'BRIEN & GERE

IN–SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 19
DATE 12/20/84

LOCATION See Plan
ELEVATION (TOC) 914.94'
(GRD) 912.39'



STATIC HEAD (H) 853 cm

PIPE RADIUS (r) 2.54 cm

SCREEN RADIUS (R) 7.62 cm

SCREEN LENGTH (L) 305 cm

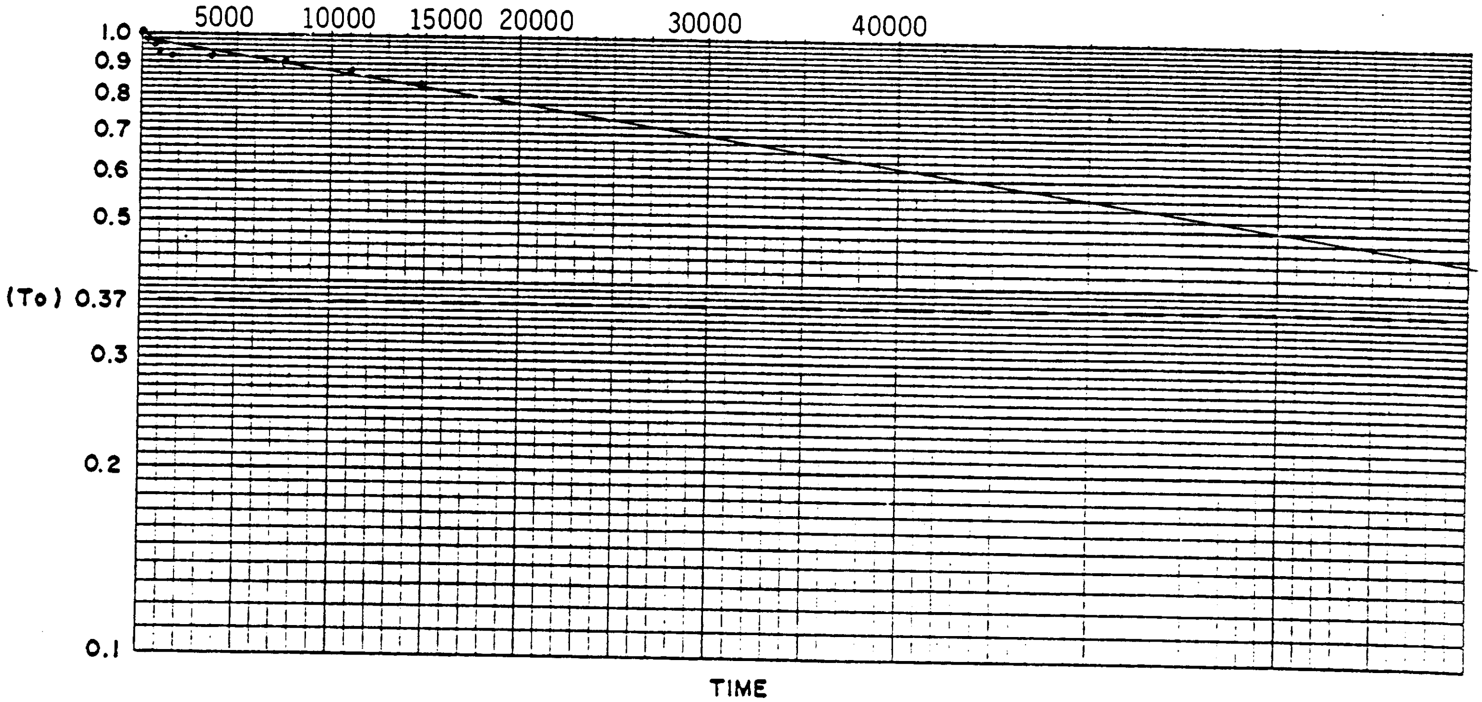
INITIAL HEAD (Ho) 229 cm

TIME	WATER DEPTH		h	$\frac{H-h}{H-Ho}$
0	731	0	229	1
1	731	60	229	1
2	716	120	244	.98
5	710	300	250	.97
10	708	600	252	.96
20	707	1200	253	.96
60	695	3600	265	.94
120	675	7200	285	.91
180	657	10800	303	.88
240	638	14400	322	.85

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o} = \frac{6.45 \ln(305/7.62)}{2(305)102{,}500}$$

K= 3.80×10^{-7} cm/sec. = 1.3×10^{-8} ft/sec.

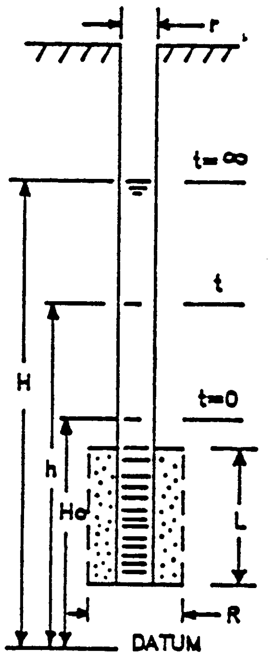


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT BROOME CO. IDA
WELL NUMBER Well 20
DATE 12/20/84

LOCATION See Plan
ELEVATION (TOC) 890.05'
(GRD) 887.89'



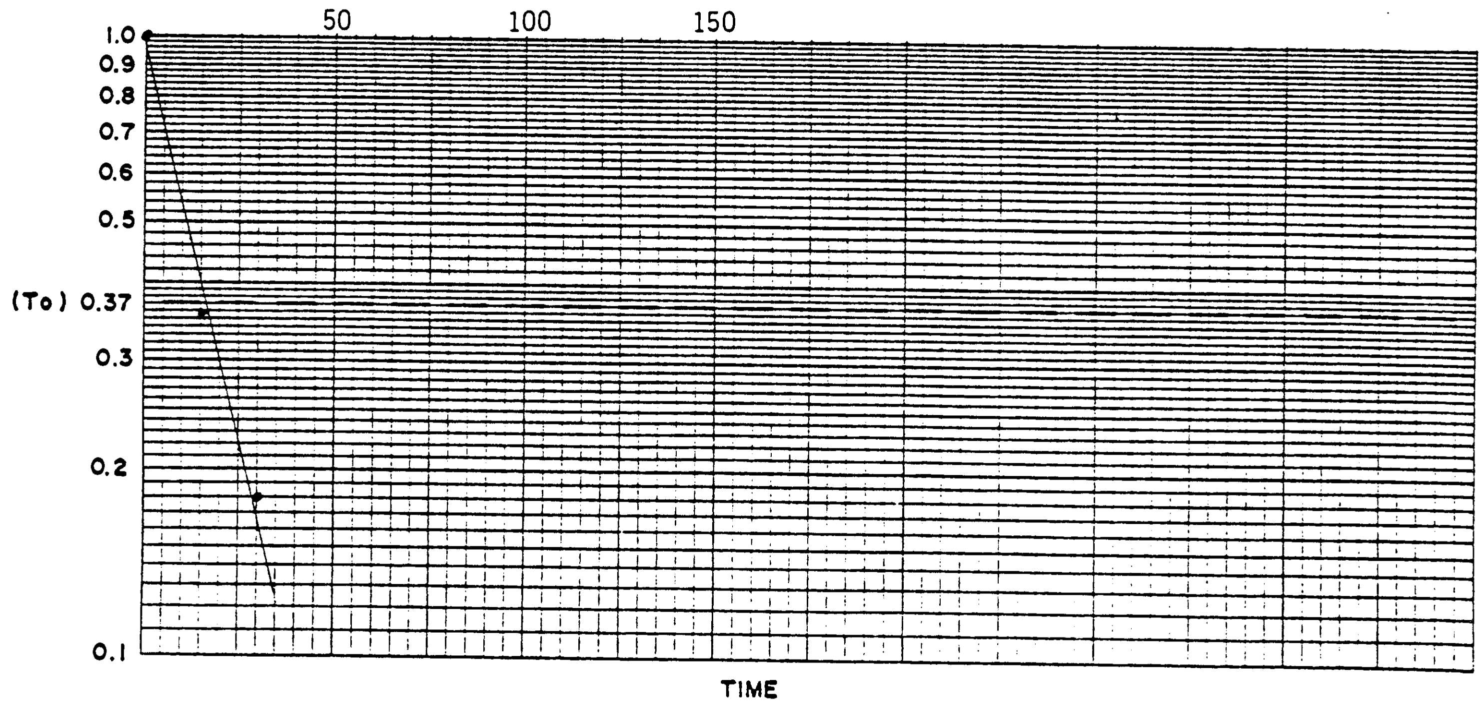
STATIC HEAD (H) 558 cm
PIPE RADIUS (r) 2.54 cm
SCREEN RADIUS (R) 7.62 cm
SCREEN LENGTH (L) 305 cm
INITIAL HEAD (Ho) 271 cm

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o} = \frac{6.45 \ln(305/762)}{(2)(305)15}$$

$K = 2.60 \times 10^{-3}$ cm/sec $= 8.5 \times 10^{-5}$ ft/sec.

TIME	WATER DEPTH	t	h	$\frac{H-h}{H-H_o}$
0	353	0	271	1
15	170	15	454	.36
30	117	30	507	.18
45	91	45	533	.09
60	85	60	539	.07
120	79	120	545	.04



APPENDIX F

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN
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QUALITY ASSURANCE PROJECT PLAN

SECTION 1 - INTRODUCTION

1.01 General Background

The Town of Conklin owns two inactive municipal waste landfills within the area designated as the Broome Corporate Park. In June, 1986 the site of the two landfills was proposed for inclusion on the National Priorities List. Field activities associated with geophysical surveys, the installation of ground water monitoring wells and sampling for soil, sediment, water, ground water, and leachate have been conducted over the period 1983 to 1986. Results from these investigations have indicated the presence of low levels of organic compounds and metals in leachate and ground water samples.

1.02 Quality Assurance Project Plan Objectives

This document is a site-specific quality assurance project plan (QAPP). The plan is consistent with United States Environmental Protection Agency (USEPA) and NYSDEC guidance documents (QAMS-005/80) on the preparation of quality assurance project plans and will be submitted to NYSDEC for review. The plan addresses the following points:

1. Quality Assurance (QA) objectives for measurement data, including precision, accuracy, completeness, representativeness, and comparability
2. sampling procedures
3. sample custody
4. calibration procedures, references, and frequency

5. internal Quality Control (QC) checks and frequency
6. QA performance audits, system audits, and frequency
7. QA reports to management
8. preventative maintenance procedures and schedule
9. specific procedures to be used to routinely assess data precision, representativeness, comparability, accuracy, and completeness
10. corrective action

Representativeness refers to the use of EPA-recommended procedures for the collection and preservation of data as specified in EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, and the Federal Register, 26 October 1984. Comparability refers to the use of consistent procedures, reporting units, standardized methods of field analysis, and standardized data format with document control. Completeness refers to the process of obtaining all required data as outlined in the Site Operations Plan.

This QAPP presents the organization, objectives, functional activities, and specific QA and QC activities associated with the field investigation of the site. The objectives of the QAPP are to provide sufficiently thorough and concise descriptions of the measures to be applied during the investigation that the data generated thereby will be of a known and acceptable level of precision and accuracy. This document, therefore, provides a description of the project, identifies the project responsibilities, and sets forth specific procedures to be used during sampling, analysis, and other field activities. Complete details of data sampling protocols are provided in the October 1985 Work Plan.

1.03 Project Organization

Table (1) lists the primary contacts for the project. Project technical personnel and quality assurance personnel are indicated in the project organization chart (Table 2).

1.04 Project Coordinator/Manager

The project manager, will have primary responsibility for overseeing all facets of the project on a day-to-day basis. Specifically, his duties will include:

- project scheduling
- budget control
- subcontractor performance review
- review of interim reports
- responsible for project coordination and communication
- project deliverables
- responsible for establishing a project specific record keeping system
- project close-out

1.05 Project Quality Assurance Manager

The Project Quality Assurance (QA) Manager is responsible for the monitoring and supervision of the QA/QC program. The Project QA/QC Manager reports directly to the Project Manager and his responsibilities include:

- Insure field personnel are both familiar with and adhering to proper sampling procedures, field measurements sample identification and chain-of-custody procedures.

- Contact the laboratory to insure that samples received by them have been properly identified and packaged.
- Monitor and audit the performance of the QA procedures.
- Conduct field and office audits.
- Maintain a record of performance and system audits and inform the Project Manager of any problems encountered in the analytical procedures.
- The Project QA/QC Manager in conjunction with the Project and Laboratory Managers will formulate recommendations on corrective action procedure to correct any deficiency in the analytical protocol, data, or sampling.

1.06 Assistant Project Managers

The management team for this project will draw upon the technical expertise and experience of a number of different individuals. The project team will consist of multidisciplined personnel with expertise in hydrogeology, geophysical surveys, chemical characterization, soil science, wet chemistry and toxicology. The firm's toxicologist will be responsible for the development of both the Safety Plan and the Risk Assessment.

1.07 Manager of Analytical Services

The Laboratory Manager is responsible for the overall administration of the analytical operations at OBG Laboratories. The section group leaders handle the day to day operations and scheduling and report to the manager.

The Laboratory Quality Assurance Manager is responsible for the implementation, monitoring and supervision of the QA/QC program. He or she assures that the program is conducted in strict adherence to procedures and requirements outlined for this program. The QA/QC Manager reports to the Laboratory Manager and interacts daily with other group leaders and laboratory staff. His/her duties include:

- Insuring laboratory custody procedures are followed,
- Monitoring daily precision and accuracy records,
- Maintaining copies of all procedures routinely used,
- Implementing correction measures if results are unacceptable,
- Rescheduling analysis based upon unacceptable accuracy or precision data.

The Laboratory QA Manager will conduct an initial data validation and assessment on analytical results. A final data validation and assessment will be conducted by the Project Quality Assurance Manager, for review and approval by the Project Manager.

SECTION 2 - QUALITY ASSURANCE OBJECTIVES

2.01 Quality Assurance

The general quality assurance objective for analytical and field data is to obtain environmental monitoring data of known and acceptable quality. For this project, the specific objectives for measurement data include precision, accuracy, and compatibility, and are contained in the New York State Contract Laboratory Protocol (NYS CLP), which states that the purpose of the QA/QC program "is the definition of procedures for the evaluation and documentation of sampling and analytical methodologies and the reduction and reporting of data. The objective is to provide a uniform basis for sample collection and handling, instrument and methods maintenance, performance evaluation, and analytical data gathering and reporting." This QAPP for sampling, analysis and data handling is consistent with the requirements set forth by all New York State and USEPA requirements.

2.02 Field QC Objectives and Procedures

Field investigations, such as magnetometer surveys, are activities that do not require sample collection, but nonetheless involve measurements for which quality assurance concerns are appropriate. The primary QA objective of activities such as these is to obtain reproducible measurements to a degree of accuracy consistent with the intended use of the measurements and to document measurement procedures.

The objective of field sampling procedures is to obtain samples that represent the environmental matrix being investigated. Approved sampling techniques and proper selection of sampling equipment will be used as described in Appendices C and D of the July 1987 Work Plan. The primary reference for the sampling and analytical procedures applied in this program is the NYS CLP.

2.03 Accuracy, Sensitivity and Precision of Analysis

Samples collected during the investigation will be analyzed for purgeable priority pollutants and selected parameters from the New York State Hazardous Substances List (NYS HSL) using methods outlined in the NYS CLP. The CLP Target Compounds List (TCL) for this investigation, method detection limits, and audit, frequency and control limits for the analysis of the compounds are compiled in Table 3.

SECTION 3 - SAMPLING PLAN

3.01 Objective

The objective of this sampling plan is to document the sampling locations, procedures, and practices that will be used in the field investigation of the site. Information will be obtained as to the amount and the vertical and horizontal extent of CLP TCL compound contamination of the site.

The sampling plan describes the following protocols and documentation:

- Number of locations to be sampled
- Sampling procedures to be used at the site
- Tests to be completed at each sampling location
- Sampling equipment required at the site
- Sample containers required at the site
- Preservation methods to be used at the site for various types of samples
- Reagents, etc. required at the site for sample preservation
- Shipping containers required at the site
- Chain-of-custody procedures to be used at the site
- Shipping methods and destinations, marking instructions, special labels, etc.

Some of the sampling procedures were provided in appendices E - G of the October 1985 Work Plan previously submitted to the NYSDEC; therefore, details present in the Work Plan will only be summarized in this QAPP.

3.02 Sample Types

Three matrices will be sampled and analyzed as part of the Field Investigation:

1. Waters (ground water and surface water),
2. Sediments, soil borings, and
3. Leachate.

3.02.1 Matrix Spikes (MS) and Matrix Spike Duplicates (MSD)

Matrix spike and matrix spike duplicates will be performed as listed in Table 4. These samples are essentially duplicate samples to which are added matrix spiking solutions, as described in the NYS CLP. Percent recovery indicates extraction efficiency or matrix interferences.

3.02.2 Surrogate Blanks

Surrogate blanks are prepared by the laboratory per group of 20 or less samples, or as 5% of sample shipment. Blanks will consist either of diatomaceous earth or pure solvent. These blanks will be spiked with a surrogate to determine a percent recovery for comparison purposes.

3.02.3 Excavation Trenches

To delineate the horizontal boundaries of fill within the lower landfill, a series of fourteen (14) trenches will be excavated from the gravel mining area until fill is encountered, and from the outer dimension of the reported fill boundary. These trenches will move from clean soil areas to a point where fill is encountered; they will penetrate the fill area only to the extent necessary to define the outer boundary of fill material. Each trench will be backfilled with the excavated material.

3.03 General Sampling Locations and Numbers

3.03.1 Sample Locations

The sampling locations are specified in Part II, Supplemental RI/FS Plan in this report. A log book listing the various samples to be collected will be prepared for use on-site. The log book will also contain the type of sample and analytical matrix for each of the samples to be collected. Pre-printed peel- off labels will be included in the log book for tagging the various containers to be used for sample collection. The sample team leader will be responsible for recording the exact sampling location in the field sampling notebook. The location will be described in the log book with a sketch that includes distances from numbered field reconnaissance stakes and other landmarks. Detailed descriptions of the excavation trenches will be recorded by the sample team leader. The descriptions may also include photographs.

3.03.2 Sample Numbering System

A sample numbering system will be used to identify each sample taken during the field investigation sampling program. This numbering system will provide a tracking procedure to allow retrieval of information regarding a particular sample and to assure that each sample is uniquely numbered. A listing of the sample identification numbers will be maintained by the sample team leader.

3.04 Sampling Procedures

3.04.1 Soil Borings and Ground Water Studies

Existing ground water wells may not sufficiently define subsurface hydrogeological conditions at the Upper Landfill. For this reason, five soil borings will be conducted around the perimeter of the Upper Landfill area. At each boring, continuous split spoon samples will be collected in accordance with the procedures in Appendix C. The completed borings will be sealed with a bentonite/cement grout. Samples collected from the borings will be visually classified by the field geologist. Three of the borings will be converted to monitoring wells. In addition, Wells 3 and 6 which were found to be inoperative during recent site visits will be replaced. The procedures for the installation of ground water wells are detailed in Appendix D. All wells will be installed by Parratt-Wolff, a Syracuse-based Drilling Company, or another O'Brien & Gere approved company. Samples will be collected from each of the three new wells, replacement wells 3 and 6, and from existing wells 1, 4, 5, 7, 8, 9, 10, 11, 12, 18, 21, and 22, for a total of 17 samples. The sampling protocol for ground water monitoring is detailed in Appendix I. All ground water samples will be analyzed for filterable metals including arsenic, iron, and manganese, specific conductance, pH, and purgeable priority pollutants listed in Table 3. The analytical methods and QA/QC requirements detailed in Table 3 will be followed.

3.04.2 Leachate Sampling

Supplemental testing will be performed on leachate samples from the Upper Landfill, to determine compatibility with the Binghamton/Johnson City WWTP. Treatability tests will be conducted on samples from leachate wells 14 and 16. The sampling protocol to be used in collecting the samples are detailed in Appendix I.

3.04.3 Surface Water and Sediment Sampling

Carlin Creek will be resampled on three separate occasions for pH, specific conductance, dissolved oxygen, total arsenic, cadmium, copper, iron, lead, nickel, mercury, manganese, zinc, and total phenols. Three sediment samples will be collected at the locations proposed in the supplemental work plan. The sediments will be analyzed for arsenic, cadmium, chromium, copper, lead, mercury, zinc, PCB and purgeable priority pollutants. Analyses will be performed according to the CLP as listed in Table 3.

3.05 Decontamination Procedures

3.05.1 General

Decontamination of personal gear (boots, gloves, and waders), sample jars and sampling equipment will be as follows:

1. Personal gear or sample containers will be washed in a bucket or tub filled between 50 and 75 percent with a trisodium phosphate (TSP) solution (2 lbs of TSP per 10 gallons of clean water). The entire exterior surface of the article undergoing decontamination will be brushed.

2. Personal gear or sample containers will be rinsed in a bucket or tub filled between 50 and 75 percent with clean water. The entire exterior surface of the article undergoing decontamination will be completely brushed.
3. All wash and rinse water will be disposed of on site.

3.05.2 Sampling Equipment

1. Sampling equipment will be brush washed in a bucket or tub filled between 50 and 75 percent with a TSP solution (2 lbs of TSP per 10 gallons of clean water). The entire exterior surface of the article undergoing decontamination will be completely brushed. Interior wetted surfaces will be washed as required. Drilling equipment, augers and split spoon samplers will be decontaminated by a soap solution wash and a steam cleaning using clean water.
2. Contaminated sampling equipment will be rinsed in a bucket or tub filled between 50 and 75 percent with Hexane. The entire exterior surface of the article undergoing decontamination will be completely brushed. Interior wetted surfaces will be rinsed as required.
3. Following step 2 above, all sampling equipment will be rinsed in a bucket or tub filled between 50 and 75 percent with clean water. The entire exterior surface of the article undergoing decontamination will be completely brushed. Interior wetted surfaces will be rinsed as required.

4. All wash and rinse water will be disposed of on site. Protective clothing will be contained for proper disposal.
5. Rinse solvents will be contained for proper removal.

3.06 Control of Contaminated Sampling Materials

Disposable sampling and safety equipment and excess samples may be generated during sampling operations. These materials will be contained and disposed of off site. Bailed well water and contaminated drilling spoils will be disposed of on site.

3.07 Documentation

3.07.1 Site Location Procedure

Following sampling location identification, a wood stake (approximately 2" X 2" X 24") will be driven into the ground, allowing approximately 8 to 10 inches of the stake to remain visible above ground. The top portion of the stake will be painted orange and labeled for identification. The label will contain sample number and sample type. The location of each stake will be recorded. Sample locations will eventually be surveyed and tied into the site grid system.

3.07.2 Photographs

Photographs may be taken, in addition to field notes, to illustrate sampling locations. Photographs will show the surrounding area and reference objects which help to locate sampling sites. The picture number and roll number (if more than one roll of film is used) will be logged in the field notebook to identify which sampling site is depicted in the photograph. The film roll number will be identified by taking a photograph of an informational sign on the first frame of the roll. This sign would have the job and film roll number written on it to identify the pictures contained on the roll.

3.07.3 Field Notebooks

Field notebooks will provide the means of recording data on collecting activities performed at a site. As such, entries will be described in as much detail as possible so that anyone going to the site could reconstruct a particular situation without reliance on memory.

Field notebooks will be bound. Notebooks will be assigned to field personnel, but will be stored in the document control center when not in use. Each notebook will be identified by the project-specific document number.

The cover of each notebook will contain:

Person or Organization to whom the book is assigned.

Book Number

Project Name

Start Date

End Date

Entries into the notebook will contain a variety of information. At the beginning of each entry, the date, start time, weather, all field personnel present, level of personal protection being used onsite, and the signature of the person making the entry will be entered. The names of visitors to the site, all field sampling team personnel and the purpose of their visit will be recorded in the field notebook.

All measurements made and samples collected will be recorded. All entries will be made in ink with no erasures allowed. If an incorrect entry is made, it will be crossed out with a single strike mark. Wherever a sample is collected or a measurement is made, a detailed description of the location of the station, which includes compass and distance measurements, shall be recorded. The film roll number and number of photographs taken of the station will also be noted. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the procedures documented in this plan. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. In addition, the cooler number into which the sample is placed in the field will be recorded. Sample numbers will be assigned prior to going onsite. Significant field notebook entries (samples collected, significant observations) will be countersigned by another member of the project team.

3.08 Sample Control

Serialized sample tags will be used to label each sample for analysis. Chain-of-custody records will be completed for all samples according to EPA requirements and procedures set forth in NEIC Policies and Procedures EPA-330-19-78-001R (Revised 1986). Custody seals will be placed on all shipping coolers containing samples.

3.08.1 Sample Containers and Sample Preservation

A variety of factors affect the choice of containers and cap material. These include resistance to breakage, size, weight, interference with constituents, cost and availability. There are also various procedures for cleaning and preparing bottles depending upon the analyses to be performed on the sample.

Required sample containers, filling instructions and preservation procedures are listed below. The collected samples will be kept out of direct sunlight and, after decontamination and labeling, will be placed in coolers for shipment to the analytical laboratory.

Thirty two ounce, wide-mouth glass sample containers with teflon liners and sulfuric acid preservative will be used for phenols sampling. Metals aliquots will be sampled in 16-ounce plastic containers; preserved with nitric acid. Filtered metals samples will be filtered on-site, prior to preservation. Volatiles samples will be collected in duplicate in 40 ml glass vials with teflon caps. All sampling containers will be supplied by OBG Laboratories. Samples will be packed and labelled according to DOT regulations and personally delivered by O'Brien & Gere personnel on the day collected to the analytical laboratory so that the samples can be cool stored until analyses are completed. See Appendix G for additional details or sample preservations and shipment.

3.08.2 Chain of Custody Procedures

Chain of custody procedures are instituted and followed throughout the study. Additional detail is provided in Appendix H.

The chain of custody procedures include field custody, laboratory custody, and evidence files. Samples are physical evidence and should be handled according to procedural safeguards. The project coordinator must be prepared to produce documentation that traces the samples from the field to the laboratory and through the analysis. The National Enforcement Investigation Center (NEIC) of the U.S. EPA defines custody of evidence in the following ways:

- In actual physical possession
- In view after being in physical possession
- In a locked respiratory
- In a secure, restrict area

Chain of custody records begin in the field when sample collection has been completed. See Figure 4, "Chain of Custody Form" for a typical arrangement of the form samplers will use to complete their field logs. On that form, they note meteorological data, equipment employed during collection, evacuation techniques and any calculations, physical characteristics of sample, date, time of day and location, and any abnormalities during sampling.

The sampler completes the custody form, packages the samples including the custody form, and seals the package with evidence tape. Shipment may be made by commercial vendors, and their policy is to document the transfer to the package within their organization. Therefore, when the sample arrives at the laboratory, the sample custodian signs the vendors air bill or bill of lading. The samples may also be delivered personally to the laboratory. The sample custodian's duties and responsibilities upon sample receipt are:

- Document receipt of samples.
- Inspect sample shipping containers for presence or absence of custody seals, locks, evidence tape, container integrity.
- Record condition of shipping and sample containers in logs.
- Sign appropriate forms or documents.
- Verify and record agreement or disagreement of information on sample documents. If there is discrepancy, record the problem and notify the project officer.
- Label sample with laboratory sample number.
- Place samples in storage, including secure storage, if appropriate.

The hand-to-hand custody of samples in the laboratory is maintained through preparation and analysis. The analyst is required to log samples into and from secure storage as the analysis proceeds. Samples are returned to secure storage at the close of business. Log sheets incorporate options for multiple entries, because several people handle the samples throughout the analytical scheme.

The laboratory records may also be used as evidence in enforcement proceedings, therefore care must be exercised to properly complete, date and sign items needed to generate data. Copies of the following items are stored:

- Documentation of the preparation and analysis of samples, including copies of the analyst's notebooks.
- Bench sheets, graphs, computer printouts, chromatographic outputs, mass spectral outputs.
- Copies of all QA/QC data.
- Instrument logs showing date, time and analyst.
- Analytical tracking forms which record date, time, and analyst for each step of sample preparation and analysis.

Upon completion of analysis, the project officer or his assignee should commence assimilating all the field and laboratory notes. It is they who generate the evidence file for the project. The package is arranged in chronological order for ease of review. When all the information is gathered, the package is inventoried, numbered and stored for future reference.

The sample custodian logs in the samples on a log-in form (Figure 5) and notes the appropriate information, including sample identification and condition of the samples. Any inconsistencies in paperwork or comments on the condition of the samples are duely noted on the form and filed with the case. To further document the custody of each sample, the analyst will complete Figures 6, 7 and 8, Sample Preparation and Extraction Log, Surrogate Standard Work Sheet and GC Logbook, respectively. In all cases the chemist or technician signs and dates the appropriate forms when handling the samples.

During the analysis, these forms will be maintained in a secure file. Following the completion of a group of samples all appropriate forms and data sheets will be gathered and stored in the files. If necessary, the files will be purged of all the appropriate records and transmitted to the QA/QC Manager.

SECTION 4 - CALIBRATION PROCEDURES

4.01 Equipment Calibration

Complete calibration procedures and frequency of calibration for laboratory equipment are detailed in the NYS CLP. Generally, a GC/MS should be initially calibrated at a minimum of five concern trations to determine the linearity of response utilizing NYS HSL compound standards. This calibration curve should encompass the concentrations of extracted samples that will be injected into the GC. For GC/MS analysis, typical linear ranges are 0-400 ng for base neutrals, 0-1000 ng for phenols and 0-1000 ng for volatiles. Once the system has been calibrated, the calibration must be verified each twelve hour time period for each GC/MS system. For the analysis of metals by furnace atomic absorption, the instrument must be calibrated daily and each time the instrument is set up. Further details are given in the NYS CLP.

All field equipment used during this project will be calibrated and operated in accordance with the manufacturer's instructions. Any field equipment used during this project that is not covered by the investigator's standard operating procedures will have a specific calibration and operation instruction sheet prepared for it.

4.02 Standards

Standards may be generally grouped into two classifications: primary and secondary. Primary standards include USP drugs, NBS and ASTM materials, and certain designated EPA reference materials. All other standards are to be considered secondary.

No testing of primary standards is necessary. Primary standards should not be used if there is any physical indication of contamination or decomposition (i.e. partially discolored, etc.). Secondary standards should be examined when first received, either by comparison to an existing primary standard or by comparing known physical properties to literature values. The less stable standards will be rechecked at appropriate intervals, usually six months to one year.

4.03 Records

A records book will be kept for each standard and will include:

1. Name and date received
2. Source
3. Code or lot number
4. Purity
5. Testing data including all raw work and calculations
6. Special storage requirements
7. Storage location

These records will be checked periodically as part of the Laboratory Controls Review.

4.04 Equipment

A. General

1. Each major piece of analytical laboratory instrumentation used on this project is documented and on file with the analytical laboratory.
2. A form is prepared for each new purchase and old forms will be discarded when the instrument is replaced.

B. Testing

1. Each form details both preventative maintenance activities and the required QA testing and monitoring.

2. In the event the instrument does not perform within the limits specified on the monitoring form, the Laboratory Manager will be notified and a decision made as to what action to take.

3. If repair is deemed necessary, an "out of order" sign will be placed in the instrument until repairs are effected.

4.05 Calibration Records

A bound notebook will be kept with each instrument, requiring calibration, to record all activities associated with a maintained, QA monitoring and repairs program. Additionally, these records will be checked during periodic equipment review.

SECTION 5 - ANALYTICAL PROCEDURES

5.01 Laboratory Analytical Procedures

The analysis and methods detection limits for analytical parameters are given in Table 3. When analyzing samples by the above standardized methods, the accuracy or precision of the data generated by the laboratory is determined through analysis of replicates, spiked samples, synthetic reference standard samples, and/or field or laboratory blanks along with each set of samples. Any interference are identified and documented.

In general, the methods accuracy is determined by spiking the sample matrix with the analyte at a minimum of three concentration levels. The range of the spiking levels is selected to bracket the concentration of interest. Percent recoveries of the spikes are calculated and are compared with synthetic standards. The methods precision is determined by analyzing a minimum of three replicates at each spiking level. The precision is evaluated by calculating the standard deviation.

The data generated is, whenever possible, input to the laboratory base data management system. Analyst's work sheets are filed for one year as a temporary record. When approved and signed, data reports and pertinent information are reported to the client.

5.02 Field Procedures

Field analyses of ground water will consist of pH, dissolved oxygen, and specific conductance. Samples collected for dissolved metals analyses will be filtered in the field.

SECTION 6 - DATA REDUCTION, VALIDATION, AND REPORTING

6.01 General

OBG Laboratories will be performing analysis on all collected samples. Data reduction and validation will be incorporated into the in-house effort for all parameters.

6.02 Data Reduction and Reporting

The following data handling procedures are employed at OBG Laboratories:

6.02.1 Data Production

A Hewlett-Packard Model 5880 gas chromatograph (GC) equipped with either an Electron Capture detector or a Flame Ionization detector is used for the positive identification and quantification of the CLP TCL compounds in sample extracts. Output from the determination is a chromatogram recorded on thermal printer paper. A Perkin-Elmer Model 3030B atomic absorption (AA) spectrophotometer is used for the quantification of CLP TCL metals. Analysis of phenols is in performed by the 4 AAP method outlined in the EPA Manual for chemical analysis of waters and wastewaters.

6.02.2 Data Reduction

Output from the GC is processed for presentation in two formats:

1. A real-time chromatogram

2. A post-run integration report containing the following:

   a. Retention time

   b. Response factor

   c. Concentration

Reduction of data from the analyses of the metals and fluoride will be minimal and will consist primarily of tabulating the results and performing basic descriptive statistics on the data.

6.02.3 Data Transcription

The post integration report contains the following:

1. Listing of all compounds.
2. Relative retention times.
3. Relative response factor to their internal standards.
4. Concentration of compounds, surrogate and internals.

Quality Control/Quality Assurance data such as resolution and calibration standards and are also processed and stored in the above manner.

6.02.4 Data Verification

The processed transcribed information and the hard copied raw data are then evaluated by the Group Leader to verify the validity of the data and determine whether reinjection or additional cleanup steps are required. The results of the evaluation are recorded in a notebook and inputted into the Sample Status File.

6.02.5 Distribution

Following final review of the GC Group Leader and Manager of Analytical Services, the results of the analytical determination are shipped to the Contractor. The format used for presentation of data are presented in the IFB forms. Additional data such as copies of raw data and chromatograms are provided upon request.

6.02.6 In-House Storage

Results of all analytical determinations are stored in the Honeywell DPS8 computer. Raw data tapes are logged into the computer on a separate file and listed by tape number and its contents. The data tapes are stored indefinitely. Should a request be made for a particular raw data tape, the tape is copied and the copy is kept in the archive while the original is sent to the Contractor. All notebooks are also archived and stored in the O'Brien & Gere Central File.

6.02.7 Reporting

Once a sample has been tagged and input into the laboratory data management system, we have the ability to determine its exact status. With the available maintenance programs and tracking forms, the group leaders can trace the progress of one sample or an entire group of samples. Therefore, a client is able to receive partial data before the entire program is complete.

For a program that covers the course of several months, it is imperative that interim reports be submitted. It is anticipated that turnaround for a batch of samples will be 28 days from sample arrival. The data results and evaluation will be incorporated into the final report.

Of course there may be certain instances where faster turn-around would be dictated and we shall make every attempt to meet those needs. Our past experience on similar programs have proven our capability to supply information in a timely manner.

6.03 Data Validation

Prior to submittal of the data to the Project Manager for his review, data will be validated by the individual laboratory group leaders and the Project QA/QC Manager.

The Laboratory Quality Assurance Manager identified in Figure 2 will perform validation of the data. The data validation will include a review of the sample holding times, instrument calibration, method blanks, spike recoveries and surrodate recovery, adherence to accuracy and precision criteria, unusually high or low parameter values, and possible transmittal errors. The Project QA/QC Manager will review the Laboratory QA/QC report and documentation and compare the performance to the requirements of the protocols and program objectives.

SECTION 7 - INTERNAL QUALITY CONTROL CHECKS

7.01 Quality Assurance/Quality Control Objectives

The quality control objectives for the project are listed in Table 4. The requirements listing identifies the frequency and control limits for acceptability. Upon completion of analysis the results of quality control data will be reviewed to verify compliance with the criteria listed. The goal is to achieve compliance with the criteria, 88% completeness on this matrix spike and matrix spike duplicate. When results are reported to the project team, quality control data will be included in the package for everyones review. This will include the analysis of EPA standard reference materials where available to verify initial calibration of non CLP analysis. The criteria for acceptance will be ±10% of known values. Matrix spikes will monitor the methodology and recoveries will be compared to Exhibit E of the WA-85-177 CLP protocols. Matrix spike duplicates will be incorporated to be an indicator of the precision of sample results. The relative percent difference calculations will be compared to Exhibit E of the CLP protocol.

7.02 Field Sampling Quality Control

Field sampling crews will always be under the direct supervision of a crew chief. Bound log books and appropriate data sheets will be used to document the collection of samples so that any individual sample can be traced back to its point of origin; sampler and sampling equipment.

7.03 Field Analytical Procedures Quality Control

Field measurements of pH, temperature and specific conductance will be taken on ground water samples only. The pH meter will be checked against two known standard pH buffers (7 and 10) before and after each day's use.

Conductivity reading will be made with a portable specific conductivity meter. The meter will be calibrated against a 0.010 normal potassium chloride solution (KCl) at least once per day. Dissolved oxygen readings will be made with a portable D.O. meter. The meter will be calibrated with a 0.025 normal sodium thiosulfate solution at least once per day.

7.04 Preventive Maintenance

Preventive maintenance procedures will be carried out on all field equipment in accordance with the procedures outlined by the manufacturer's equipment manuals. Any field equipment used during this project that is not covered by the standard operating procedures will have a specific maintenance instruction sheet prepared for it.

SECTION 8 - AUDIT PROCEDURES

The O'Brien & Gere Project Manager and the DEC Project Manager (Table 2) will monitor the performance of the QA audit listed in this plan. O'Brien & Gere will conduct an initial audit of all analytical data, with the final audit performed by O'Brien & Gere and NYSDEC Quality Assurance Officer (QAO).

O'Brien & Gere has designated a Project QA/QC Manager as indicated in Table 2. A performance audit consisting of analysis of appropriate blanks, fortified samples and standard solutions will be performed. O'Brien & Gere's Project QA/QC Manager will maintain a record of such audits and will inform the DEC of significant deviations from established control limits. These audits will test not only the total system's response, but inherently all major measurement methods.

O'Brien & Gere's Project QA/QC Manager will report to the Project Manager (Table 2) and the DEC the result of assessment of: the accuracy, precision and completeness of the data, results of the performance and system audits, and any problems encountered in the analytical procedures. The Project QA/QC Manager, in conjunction with the Laboratory QA/QC Manager, the analyst, analyst's supervisor, and Project Manager will formulate recommendations to correct any deficiency in the analytical protocol or data. These corrective measures will be in accord with ongoing good laboratory practices and the overall Quality Assurance Program.

SECTION 9 - DATA ASSESSMENT PROCEDURES

The O'Brien & Gere Laboratories QA/QC Manager will be responsible for data assessment. His assessment will be based upon instrument tuning criteria, surrogate recoveries, matrix spikes and matrix spike duplicates. Procedures for data assessment will be consistent with those used by USEPA CRL.

The Laboratory QA/QC Manager, with individual laboratory group leaders, will identify any data that should be rated as "unacceptable" or "preliminary", and take corrective actions, if deemed necessary.

SECTION 10 - CORRECTIVE ACTION PROCEDURES

Corrective action procedures that might be implemented from audit results or upon detection of data unacceptability are developed on a case-by-case basis.

The actions may include:

- Reanalyzing samples if holding time requirements have not been exceeded.
- Altering field or handling procedures.
- Resampling.
- Using a different batch of sample containers.
- Recommending an audit of laboratory procedures.
- Accepting data with knowledged level of uncertainty.
- Discard data.

The O'Brien & Gere Project Manager will discuss corrective actions with the Regional Resource Contaminants Assessment Coordinator prior to initiating them.

SECTION 11 - QUALITY ASSURANCE REPORTS TO MANAGEMENT

The final Field Investigation report will contain separate QA sections that summarize data quality information collected during the project. Specifically, the reports will include:

1. Project QA/QC Manager report to DEC on accuracy, precision, completeness of data and results of performance and system audit.
2. Report to DEC on results of data assessments.

TABLE 1

PRIMARY CONTACTS

Name and Responsibility	Organization and Address	Phone Number
Phil Marks Project Director	Town of Conklin	(607) 775-3456
Brian Davidson	NYS Department of Environmental Conservation	(518) 457-5637
Frank D. Hale Project Manager	O'Brien & Gere Engineers, Inc. 1304 Buckley Road Syracuse, NY 13221	(315) 451-4700
Swiatoslav W. Kaczmar, Ph.D., CIH Health & Safety Officer	O'Brien & Gere Engineers, Inc. 1304 Buckley Road Syracuse, NY 13221	(315) 451-4700

TABLE 2

TOWN OF CONKLIN LANDFILLS
CONKLIN, NEW YORK

PROJECT ORGANIZATION

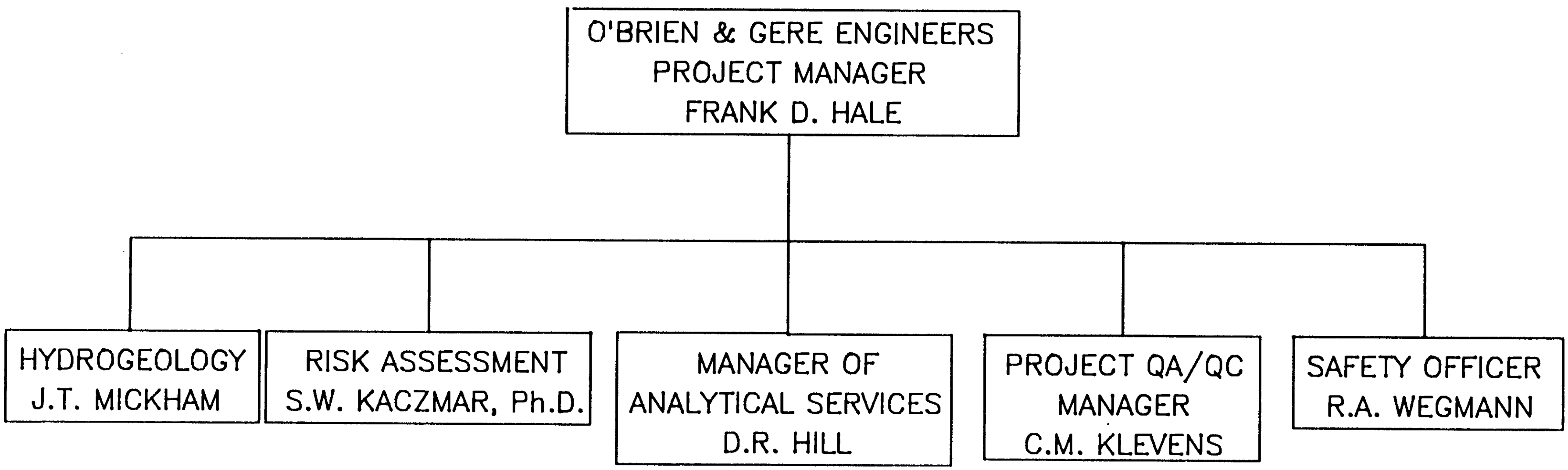


Table 3 , Page 1

ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS

CLP TCL VOLATILES - MATRIX: WATER/WELLS

CHEMICAL COMPOUND	METHOD	QUANTITATION LIMIT +	AUDIT	FREQUENCY	CONTROL LIMITS
	(CLP)	ppb			
chloromethane	IFB WA 87-K*	10	SEE BELOW	SEE BELOW	SEE BELOW
bromomethane	IFB WA 87-K*	10	"	"	"
vinyl chloride	IFB WA 87-K*	10	"	"	"
chloroethane	IFB WA 87-K*	10	"	"	"
methylene chloride	IFB WA 87-K*	5	"	"	"
acetone	IFB WA 87-K*	10	"	"	"
carbon disulfide	IFB WA 87-K*	5	"	"	"
1,1-dichloroethene	IFB WA 87-K*	5	"	"	"
1,1-dichloroethane	IFB WA 87-K*	5	"	"	"
1,2-dichloroethene	IFB WA 87-K*	5	"	"	"
chloroform	IFB WA 87-K*	5	"	"	"
1,2-dichloroethane	IFB WA 87-K*	5	"	"	"
2-butanone	IFB WA 87-K*	10	"	"	"
1,1,1-trichloroethane	IFB WA 87-K*	5	"	"	"
carbon tetrachloride	IFB WA 87-K*	5	"	"	"
vinyl acetate	IFB WA 87-K*	10	"	"	"
bromodichloromethane	IFB WA 87-K*	5	"	"	"
1,2-dichloropropane	IFB WA 87-K*	5	"	"	"
c-1,3-dichloropropene	IFB WA 87-K*	5	"	"	"
trichloroethene	IFB WA 87-K*	5	"	"	"
dibromochloromethane	IFB WA 87-K*	5	"	"	"
1,1,2-trichloroethane	IFB WA 87-K*	5	"	"	"
benzene	IFB WA 87-K*	5	"	"	"
t-1,3-dichloropropene	IFB WA 87-K*	5	"	"	"
bromoform	IFB WA 87-K*	5	"	"	"
4-methyl-2-pentanone	IFB WA 87-K*	10	"	"	"
2-hexanone	IFB WA 87-K*	10	"	"	"
tetrachloroethene	IFB WA 87-K*	5	"	"	"
toluene	IFB WA 87-K*	5	"	"	"
1,1,2,2-tetrachloroethane	IFB WA 87-K*	5	"	"	"
chlorobenzene	IFB WA 87-K*	5	"	"	"
ethyl benzene	IFB WA 87-K*	5	"	"	"
styrene	IFB WA 87-K*	5	"	"	"
xylenes (total)	IFB WA 87-K*	5	"	"	"

+ Specific quantitation limits are highly matrix dependent. The quantitation limits listed here are provided for guidance and may not always be achievable.

* U.S.EPA Contract Laboratory Program Statement of Work For Organics Analysis Multi-media Multi-concentration. 10/86. Revised: 1/87, 2/87, 7/87. IFB-WA87-K236, IFB WA87-K237, IFB WA87-K238.

Table 3 , Page 2
ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS
CLP TCL VOLATILES - MATRIX: WATER/WELLS

AUDIT	FREQUENCY	CONTROL LIMITS
Reagent Blank	1 per case or 5% of sample shipment.	Less than 5x CRDL for solvents, less than CRDL for all others
Surrogate Spike	All samples and blank (including MS/MSD).	Recovery limits within those of Table 4.2, Exhibit E WA 87-K*.
MS/MSD	1 per case or 1 in 20 of similar concentration/matrix.	Recovery limits within those of Table 5.2, Exhibit E WA 87-K*.
Calibration Continuing	Each 12 hours	Minimum RF 0.300; must be less than 30% difference for any check compound.
Method/Field Blank	1 in 20-provided by sampling crew	Same as reagent blank
Replicate	1 in 20-provided by smplng crew	±20% RPE waters
MS Tuning	One per day.	BFB key ions and abundance criteria must be met for all 9 ions.
Calibration Verification	Once	Five concentrations - linear range volatiles 20 - 200 mg/L.

Table 3 , Page 3

ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS

CLP TCL VOLATILES - MATRIX: SOIL/SEDIMENT

CHEMICAL COMPOUND	METHOD (CLP)	QUANTITATION LIMIT + ppb	AUDIT	FREQUENCY	CONTROL LIMITS
chloromethane	IFB WA 87-K*	10	SEE BELOW	SEE BELOW	SEE BELOW
bromomethane	IFB WA 87-K*	10	"	"	"
vinyl chloride	IFB WA 87-K*	10	"	"	"
chloroethane	IFB WA 87-K*	10	"	"	"
methylene chloride	IFB WA 87-K*	5	"	"	"
acetone	IFB WA 87-K*	10	"	"	"
carbon disulfide	IFB WA 87-K*	5	"	"	"
1,1-dichloroethene	IFB WA 87-K*	5	"	"	"
1,1-dichloroethane	IFB WA 87-K*	5	"	"	"
1,2-dichloroethene	IFB WA 87-K*	5	"	"	"
chloroform	IFB WA 87-K*	5	"	"	"
1,2-dichloroethane	IFB WA 87-K*	5	"	"	"
2-butanone	IFB WA 87-K*	10	"	"	"
1,1,1-trichloroethane	IFB WA 87-K*	5	"	"	"
carbon tetrachloride	IFB WA 87-K*	5	"	"	"
vinyl acetate	IFB WA 87-K*	10	"	"	"
bromodichloromethane	IFB WA 87-K*	5	"	"	"
1,2-dichloropropane	IFB WA 87-K*	5	"	"	"
c-1,3-dichloropropene	IFB WA 87-K*	5	"	"	"
trichloroethene	IFB WA 87-K*	5	"	"	"
dibromochloromethane	IFB WA 87-K*	5	"	"	"
1,1,2-trichloroethane	IFB WA 87-K*	5	"	"	"
benzene	IFB WA 87-K*	5	"	"	"
t-1,3-dichloropropene	IFB WA 87-K*	5	"	"	"
bromoform	IFB WA 87-K*	5	"	"	"
4-methyl-2-pentanone	IFB WA 87-K*	10	"	"	"
2-hexanone	IFB WA 87-K*	10	"	"	"
tetrachloroethene	IFB WA 87-K*	5	"	"	"
toluene	IFB WA 87-K*	5	"	"	"
1,1,2,2-tetrachloroethane	IFB WA 87-K*	5	"	"	"
chlorobenzene	IFB WA 87-K*	5	"	"	"
ethyl benzene	IFB WA 87-K*	5	"	"	"
styrene	IFB WA 87-K*	5	"	"	"
xylenes (total)	IFB WA 87-K*	5	"	"	"

+ Specific quantitation limits are highly matrix dependent. The quantitation limits listed here are provided for guidance and may not always be achievable.

Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Volatile TCL Compounds are 125 times the individual Low Soil/Sediment CRQL. Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

* U.S.EPA Contract Laboratory Program Statement of Work For Organics Analysis Multi-media Multi-concentration. 10/86. Revised: 1/87, 2/87, 7/87. IFB-WA87-K236, IFB WA87-K237, IFB WA87-K238.

Table 3 , Page 4
ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS
CLP TCL VOLATILES - MATRIX: SOIL/SEDIMENT

AUDIT	FREQUENCY	CONTROL LIMITS
Reagent Blank	1 per case or 5% of sample shipment.	Less than 5x CRDL for solvents, less than CRDL for all others
Surrogate Spike	All samples and blank (including MS/MSD).	Recovery limits within those of Table 4.2, Exhibit E WA 87-K*.
MS/MSD	1 per case or 1 in 20 of similar concentration/matrix.	Recovery limits within those of Table 5.2, Exhibit E WA 87-K*.
Calibration Continuing	Each 12 hours	Minimum RF 0.300; must be less than 30% difference for any check compound.
Method/Field Blank	1 in 20-provided by sampling crew	Same as reagent blank
Replicate	1 in 20-provided by smplng crew	±50% PRE soils
MS Tuning	One per day.	BFB key ions and abundance criteria must be met for all 9 ions.
Calibration Verification	Once	Five concentrations - linear range volatiles 20 - 200 mg/L.

Table 3 , Page 5

ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS

CLP TCL PESTICIDES/PCBs+ - MATRIX: SOIL/SEDIMENT

	(CLP)	ppb**			
α-BHC	WA 87-K*	8.0	SEE BELOW	SEE BELOW	SEE BELOW
β-BHC	WA 87-K*	8.0	"	"	"
δ-BHC	WA 87-K*	8.0	"	"	"
γ-BHC (lindane)	WA 87-K*	8.0	"	"	"
heptachlor	WA 87-K*	8.0	"	"	"
aldrin	WA 87-K*	8.0	"	"	"
heptachlor epoxide	WA 87-K*	8.0	"	"	"
endosulfan I	WA 87-K*	8.0	"	"	"
dieldrin	WA 87-K*	16.0	"	"	"
4,4'-DDE	WA 87-K*	16.0	"	"	"
endrin	WA 87-K*	16.0	"	"	"
endosulfan II	WA 87-K*	16.0	"	"	"
4,4'-DDD	WA 87-K*	16.0	"	"	"
endosulfan sulfate	WA 87-K*	16.0	"	"	"
4,4'-DDT	WA 87-K*	16.0	"	"	"
methoxychlor	WA 87-K*	80.0	"	"	"
endrin ketone	WA 87-K*	16.0	"	"	"
α-chlordane	WA 87-K*	80.0	"	"	"
γ-chlordane	WA 87-K*	80.0	"	"	"
toxaphene	WA 87-K*	160.0	"	"	"
Aroclor 1016	WA 87-K*	80.0	"	"	"
Aroclor 1221	WA 87-K*	80.0	"	"	"
Aroclor 1232	WA 87-K*	80.0	"	"	"
Aroclor 1242	WA 87-K*	80.0	"	"	"
Aroclor 1248	WA 87-K*	80.0	"	"	"
Aroclor 1254	WA 87-K*	160.0	"	"	"
Aroclor 1260	WA 87-K*	160.0	"	"	"

+ Specific quantitation limits are highly matrix dependent. The quantitation limits listed here are provided for guidance and may not always be achievable.

* U.S.EPA Contract Laboratory Program Statement of Work For Organics Analysis Multi-media Multi-concentration. 10/86. Revised: 1/87, 2/87, 7/87. IFB-WA-87K236, IFB WA-87K237, IFB WA-87K238.

**Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Pesticide/PCB TCL compounds are 15 times the individual Low Soil/Sediment CRQL.
Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

AUDIT	FREQUENCY	CONTROL LIMITS
Retention Time Windows	Once per 24 hours	4,4'-DDT must have retention time greater than or equal to 12 minutes on packed column, less than 2% shift on packed and .3% for capillary column.
Evaluation Mixtures A,B, & C	Once per 72 hours.	% RSD for aldrin, endrin, and heptachlor epoxide must be less than or equal to 10%.
Column Breakthrough	Once per 72 hours.	Must not exceed 20% - if greater remedial action is required.
Standard Mix	Once per 72 hours then intermittently throughout analysis	Calculated factors must not exceed 15% difference for the quantitation run nor 20% difference for confirmation run during 12-hr period. Deviation greater than or equal to 15% requires reanalysis.
Confirmation Analysis	Once per 72 hours.	Separation should be greater than or equal to 25% resolution between peaks.
Reagent Blank	1 per case or 5% of sample shipment.	Less than 5x CRDL for solvents, less than CRDL for all others.

<u>Table 3 , Page 6</u>
ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS
<u>CLP TCL PESTICIDES/PCBs+</u> - MATRIX: SOIL/SEDIMENT

Surrogate Spike	All samples and blank (including MS/MSD).	Recovery limits within those of Table 4.2, Exhibit E WA 87-J001 (10/86).
MS/MSD	1 per case or 1 in 20 of similar concentration/matrix.	Must fall within limits of Table 5.2, Exhibit E WA 87-J001 (10/86).

Table 3 , Page 7
ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS
CLP TCL METALS - MATRIX: SOIL/SEDIMENT

CHEMICAL COMPOUND	METHOD	QUANTITATION LIMIT +	AUDIT	FREQUENCY	CONTROL LIMITS
		ppm			
aluminum	WA87-K*	40	SEE BELOW	SEE BELOW	SEE BELOW
antimony	WA87-K*	12	"	"	"
arsenic	WA87-K*	2	"	"	"
barium	WA87-K*	40	"	"	"
beryllium	WA87-K*	1	"	"	"
cadmium	WA87-K*	1	"	"	"
calcium	WA87-K*	1000	"	"	"
chromium	WA87-K*	2	"	"	"
cobalt	WA87-K*	10	"	"	"
copper	WA87-K*	5	"	"	"
iron	WA87-K*	20	"	"	"
lead	WA87-K*	1	"	"	"
magnesium	WA87-K*	1000	"	"	"
manganese	WA87-K*	3	"	"	"
mercury	WA87-K*	0.04	"	"	"
nickel	WA87-K*	8	"	"	"
potassium	WA87-K*	1000	"	"	"
selenium	WA87-K*	1	"	"	"
silver	WA87-K*	2	"	"	"
sodium	WA87-K*	1000	"	"	"
thallium	WA87-K*	2	"	"	"
vanadium	WA87-K*	.10	"	"	"
zinc	WA87-K*	4	"	"	"
cyanide	WA87-K*	2	"	"	"

* U.S.EPA Contract Laboratory Program Statement of Work For Inorganics Analysis Multi-media Multi-concentration. SOW NO. 787. IFB-WA87-K025, IFB WA87-K026, IFB WA87-K027.

**Subject to the Restrictions specified in the first page of Part G, Section IV of Exhibit D (Alternate Methods - Catastrophic Failure) any analytical method specified in SOW Exhibit D may be utilized as long as the documented instrument or method detection limits meet the Contract Required Detection Limit (CRDL) requirements. Higher detection limits may only be used in the following circumstances:

If the sample concentration exceeds 5 times the detection limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the Contract Required Detection Limit. This is illustrated in the example below:

For lead:
Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample concentration = 220
Contract Required Detection Limit (CRDL) = 5

The value of 220 may be reported even though instrument detection limit is greater than CRDL. The instrument or method detection limit must be documented as described in Exhibit E.

The CRDL are the instrument detection limits obtained in pure water that must be met using the procedure in Exhibit E. The detection limits for samples may be considerably higher depending on the sample matrix.

ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS

CLP TCL METALS - MATRIX: SOIL/SEDIMENT

AUDIT	FREQUENCY	CONTROL LIMITS
Calibration Verification	Calibrated daily and each time instrument is set up; verify at at a frequency of 10% or every 2 hr, whichever is greater.	Within ±10% of true value for all except tin and mercury (±20% of true value).
Calibration Blank	During calibration at a frequency of 10% during run and at end of run.	No more than CRDL.
Preparation Blank	1 per batch of samples digested or 1 in 20 whichever is greater	No more than CRDL.
Spiked Sample Analysis	1 per group of similar concentration and matrix, 1 per case of samples, or 1 in 20, whichever is greater.	Within ±50% recovery
Duplicate Sample Analysis	Same as spiked sample analysis.	±50% RPD for values 5X CRDL or more ±CRDL for samples less than 5X CRDL
Lab Control Sample (soils)	once a month for each of the procedures (applied) to solid sample analysis.	Within recovery of ±35%.

Dissolved Metals: Those constituents (metals) which will pass through a 0.45μ membrane filter.

Field Filtration Protocol:
An aliquot of sample will be passed through a 0.45μ membrane filter by one of the following methods:
1) Plastic syringe equipped with a filter holder (Swinnex Filter Holder).
2) Hand vacuum pump and a 500 ml side arm, glass filtration flask.
3) Bench top (electric) filtration system.

•Standards and samples will be matrix-matched to the concentration of the mineral acid.

•Calibration curves, continuing calibration and corrective measures records will be documented.

•One medium range internal synthetic standard will be analyzed to verify calibration and will be within ±10% of true value

•Furnace work will require duplicate analysis of each sample to verify recovery of spiked material. If recoveries are within ±10%, methods of addition will not be required. If outside this criterion, methods of standard addition will be required.

Table 3-?, Page 9
ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS
CLP TCL METALS - MATRIX: WATER/WELLS

CHEMICAL COMPOUND	METHOD	QUANTITATION LIMIT +	AUDIT	FREQUENCY	CONTROL LIMITS
		ppb			
aluminum	WA87-K*	200	SEE BELOW	SEE BELOW	SEE BELOW
antimony	WA87-K*	60	"	"	"
arsenic	WA87-K*	10	"	"	"
barium	WA87-K*	200	"	"	"
beryllium	WA87-K*	5	"	"	"
cadmium	WA87-K*	5	"	"	"
calcium	WA87-K*	5000	"	"	"
chromium	WA87-K*	10	"	"	"
cobalt	WA87-K*	50	"	"	"
copper	WA87-K*	25	"	"	"
iron	WA87-K*	100	"	"	"
lead	WA87-K*	5	"	"	"
magnesium	WA87-K*	5000	"	"	"
manganese	WA87-K*	15	"	"	"
mercury	WA87-K*	0.2	"	"	"
nickel	WA87-K*	40	"	"	"
potassium	WA87-K*	5000	"	"	"
selenium	WA87-K*	5	"	"	"
silver	WA87-K*	10	"	"	"
sodium	WA87-K*	5000	"	"	"
thallium	WA87-K*	10	"	"	"
vanadium	WA87-K*	50	"	"	"
zinc	WA87-K*	20	"	"	"
cyanide	WA87-K*	10	"	"	"

* U.S.EPA Contract Laboratory Program Statement of Work For Inorganics Analysis Multi-media Multi-concentration. SOW NO. 787. IFB-WA87-K025, IFB WA87-K026, IFB WA87-K027.

\+ Subject to the Restrictions specified in the first page of Part G, Section IV of Exhibit D (Alternate Methods - Catastrophic Failure) any analytical method specified in SOW Exhibit D may be utilized as long as the documented instrument or method detection limits meet the Contract Required Detection Limit (CRDL) requirements. Higher detection limits may only be used in the following circumstances:

If the sample concentration exceeds 5 times the detection limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the Contract Required Detection Limit. This is illustrated in the example below: -

For lead:
Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample concentration = 220
Contract Required Detection Limit (CRDL) = 5

The value of 220 may be reported even though instrument detection limit is greater than CRDL. The instrument or method detection limit must be documented as described in Exhibit E.

The CRDL are the instrument detection limits obtained in pure water that must be met using the procedure in Exhibit E. The detection limits for samples may be considerably higher depending on the sample matrix.

Table 3 , Page 10

ANALYTICAL METHODS AND DATA QUALITY REQUIREMENTS

CLP TCL METALS - MATRIX: WATER/WELLS

AUDIT	FREQUENCY	CONTROL LIMITS
Calibration Verification	Calibrated daily and each time instrument is set up; verify at at a frequency of 10% or every 2 hr, whichever is greater.	Within ±10% of true value for all except tin and mercury (±20% of true value).
Calibration Blank	During calibration at a frequency of 10% during run and at end of run.	No more than CRDL.
Preparation Blank	1 per batch of samples digested or 1 in 20 whichever is greater	No more than CRDL.
Spiked Sample Analysis	1 per group of similar concentration and matrix, 1 per case of samples, or 1 in 20, whichever is greater.	Within ±25% recovery
Duplicate Sample Analysis	Same as spiked sample analysis.	±20% RPD for values 5X CRDL or more ±CRDL for samples less than 5X CRDL
Lab Control Sample (aqueous)	1 for each procedure for each case of samples received; 1 in 20 or 1 per batch digested, whichever is greater.	Within 80-120% recovery

Dissolved Metals: Those constituents (metals) which will pass through a 0.45μ membrane filter.

Field Filtration Protocol:
An aliquot of sample will be passed through a 0.45μ membrane filter by one of the following methods:
1) Plastic syringe equipped with a filter holder (Swinnex Filter Holder).
2) Hand vacuum pump and a 500 ml side arm, glass filtration flask.
3) Bench top (electric) filtration system.

•Standards and samples will be matrix-matched to the concentration of the mineral acid.

•Calibration curves, continuing calibration and corrective measures records will be documented.

•One medium range internal synthetic standard will be analyzed to verify calibration and will be within ±10% of true value

•Furnace work will require duplicate analysis of each sample to verify recovery of spiked material. If recoveries are within ±10%, methods of addition will not be required. If outside this criterion, methods of standard addition will be required.

•For chromium analysis, a nitrous oxide flame will be used.

APPENDIX G

SAMPLE PRESERVATION AND SHIPMENT

SAMPLE PRESERVATION

To maintain the integrity of the groundwater samples, appropriate selection of containers, pretreatment of containers if necessary and the holding times form the integral part of the sample preservation program. The recommenced choice of preservatives, type of sample container, and holding time for various constituents are shown in Table 1 which is taken from the USEPA recommended methods for chemical analysis. The recommended sample volumes are given in Table II.

TABLE 1

REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES

Parameter	Container[1]	Preservative[2,12]	Maximum Holding Time[3]
Physical Properties			
Color	P,G	Cool, 4°C	24 hours
Specific Conductance	P,G	Cool, 4°C	24 hours
Hardness	P,G	Cool, 4°C HNO_3 to pH 2	6 months
Odor	G only	Cool, 4°C	24 hours
pH	P,G	Det. on site	6 hours
Bacterial Tests			
Coliform, fecal and total	P,G	Cool, 4°C 0.008% $Na_2S_2O_3$[6]	6 hours
Fecal streptococci 0.008%, $Na_2S_2O_3$[6]	P,G	Cool, 4°C	6 hours

(Table I - Continued)

Parameter	Container[1]	Preservative[2,12]	Maximum Holding Time[3]
Inorganic Tests			
Acidity	P,G	Cool, 4°C	14 days
Alkalinity	P,G	Cool, 4°C	14 days
Ammonia	P,G	Cool, 4°C H_2SO_4 to pH 2	28 days
Biochemical oxygen demand	P,G	Cool, 4°C	48 hours
Biochemical oxygen demand, carbonaceous	P,G	Cool, 4°C	48 hours
Bromide	P,G	None required	28 days
Chemical oxygen demand	P,G	Cool, 4°C H_2SO_4 to pH 2	28 days
Chloride	P,G	None required	28 days
Chlorine, total residual	P,G	None required	Analyze Immediately
Color	P,G	Cool, 4°C	48 hours
Cyanide, total and amenable to chlorination	P,G	Cool, 4°C NaOH to pH 12 0.6g ascorbic acid[6]	14 days[9]
Fluoride	P	None required	28 days
Hardness	P,G	HNO_3 to pH 2	6 months
Kjeldahl and organic Nitrogen	P,G	Cool, 4°C H_2SO_4 to pH 2	28 days
Metals[4]			
Chromium VI	P,G	Cool, 4°C	24 hours
Mercury	P,G	HNO_3 to pH 2	28 days
Metals, except above	P,G	HNO_3 to pH 2	6 months

(Table I - Continued)

Parameter	Container[1]	Preservative[2,12]	Maximum Holding Time[3]
Nitrate	P,G	Cool, 4°C	48 hours
Nitrate-nitrite	P,G	Cool, 4°C H_2SO_4 to pH 2	28 days
Oil and grease	G	Cool, 4°C H_2SO_4 to pH 2	28 days
Organic carbon	P,G	Cool, 4°C HCl or H_2SO_4 to pH	28 days
Orthophosphate	P,G	Filter immediately Cool, 4°C	48 hours
Oxygen, Dissolved Probe	G bottle and top and top	None required store in dark	Analyze ImmediatelyWinkler
Phenols	G only	Cool, 4°C H_2SO_4 to pH 2	28 days
Phosphorus (elemental)	G	Cool, 4°C	48 hours
Phosphorus, total	P,G	Cool, 4°C H_2SO_4 to pH 2	28 days
Residue, total	P,G	Cool, 4°C	7 days
Residue, Filterable	P,G	Cool, 4°C	7 days
Residue Non-filterable (TSS)	P,G	Cool, 4°C	7 days
Residue, settleable	P,G	Cool, 4°C	48 hours
Residue, volatile	P,G	Cool, 4°C	7 days
Silica	P	Cool, 4°C	28 days
Specific conductance	P,G	Cool, 4°C	28 days
Sulfate	P,G	Cool, 4°C	28 days
Sulfide	P,G	Cool, 4°C, add zinc acetate plus sodium hydroxide to pH 9	7 days

(Table I - Continued)

Parameter	Container[1]	Preservative[2,12]	Maximum Holding Time[3]
Sulfite	P,G	Cool, 4°C	Analyze Immediately
Surfactants	P,G	Cool, 4°C	48 hours
Temperature	P,G	Non required	Analyze Immediately
Turbidity	P,G	Cool, 4°C	48 hours
Organic Tests			
Purgeable halocarbons	G, Teflon-lined septum	Cool, 4°C 0.008% $Na_2S_2O_3$[6]	14 days
Purgeable aromatics	G, Teflon-lined septum	Cool, 4°C 0.008% $Na_2S_2O_3$[6] HCL to pH 2[10]	14 days
Acrolein and acrylonitrile	G, Teflon-lined septum	Cool, 4°C 0.008% $Na_2S_2O_3$[6] Adjust pH to 4-5[11]	14 days
Phenols	G, Teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[6]	7 days until extraction, 40 days after extraction
Benzidines	G, Teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[6]	7 days until extraction, 40 days after extraction
Phthalate esters	G, Teflon-lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
Nitrosamines	G, Teflon-lined cap	Cool, 4°C store in dark 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction
PCB's	G, Teflon-lined cap	Cool, 4°C[8] pH 5-9	7 days until extraction, 40 days after extraction

(Table I - Continued)

Parameter	Container[1]	Preservative[2,12]	Maximum Holding Time[3]
Nitroaromatics and isophorone	G, Teflon-lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
Polynuclear aromatic hydrocarbons	G, Teflon-lined cap	Cool, 4°C store in dark 0.008% $Na_2S_2O_3$[6]	7 days until extraction 40 days after extraction
Haloethers	G, Teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[6]	7 days until extraction, 40 days after extraction
Chlorinated hydrocarbons	G, Teflon-lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
TCDD	G, Teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[6]	7 days until extraction, 40 days after extraction
Pesticides Tests			
Pesticides	G, Teflon-lined cap	Cool, 4°C pH 5-9[8]	7 days until extraction, 40 days after extraction
Radiological Tests			
Alpha, beta and radium	P,G	HNO_3 to pH 2	6 months

NOTES

1. Polyethylene (P) or Glass (G).
2. Sample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of samples under study are stable for the longer time. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.
4. Samples should be filtered immediately on-site before adding preservative for dissolved metals.
5. Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.
6. Should only be used in the presence of residual chlorine.
7. For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.

8. The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted with 72 hours of collection. For the analysis of aldrin, add 0.008% $Na_2S_2O_3$.

9. Maximum holding time is 24 hours when sulfide is present.

10. Sample receiving no pH adjustment must be analyzed within seven days of sampling.

11. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

12. When any sample is to be shipped by common carrier or set through the United States Mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of Table I, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCL) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

TABLE II

RECOMMENDATIONS FOR SAMPLING VOLUME OF SAMPLES ACCORDING TO MEASUREMENT

Measurement	Volume	Container
Metals	1 pt	plastic bottle/cap
Phenols	1 qt	glass bottle/teflon lined cap only
Pesticides	1 qt	glass bottle/teflon lined cap
Herbicides	1 qt	glass bottle/teflon lined cap
Inorganics	1 qt	plastic bottle/cap
Cyanide	1 pt	plastic bottle/cap
Nutrients	1 pt	plastic bottle/cap
Demand	1 pt	plastic bottle/cap
VHO	40 ml	duplicate glass bottle/teflon septum cap
THMS	40 ml	duplicate glass bottle/teflon septum cap
Extractable (base/neutrals/acid) organics	1 qt	glass bottle/teflon lined cap
Solids	1 qt	plastic bottle/cap
Oil & Grease	1/2 gal	glass bottle/teflon lined cap only

APPENDIX H

CHAIN OF CUSTODY PROCEDURES

CHAIN-OF-CUSTODY PROCEDURES

Because any sample is physical evidence of a current situation in the environment, possession must be traceable from the time the samples are collected until they are submitted to the laboratory for analysis. To maintain and document sample possession, the following chain-of-custody procedures are to be followed.

Field Custody Procedures

1. Collect only that number which provides a good representation of the media being sampled. To the extent possible, the quantity and types of samples and sample locations are determined prior to the actual field work. As few people as possible should handle samples.
2. Appropriate field sheets must be completed at the time of sample collection. In addition, a bound field notebook must be maintained by the survey leader to provide a daily record of significant events. All entries must be signed and dated. All members of the survey party must use this notebook. Keep the notebook as a permanent record.
3. The field sampler is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly.
4. The Project Coordinator determines whether proper custody procedures were followed during the field work and decides if additional samples are required.

Transfer of Custody and Shipment

1. Samples are accompanied by a Chain-of-Custody Record (Attached). When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the analyst in a mobile laboratory or at the laboratory.

2. Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis, with a separate custody record accompanying each shipment (for example, one for each field laboratory, one for samples driven to the laboratory). Shipping containers will be padlocked or sealed for shipment to the laboratory. The method of shipment, courier name(s) and other pertinent information are entered in the bottom of the form.

3. All shipments will be accompanied by the Chain-of-Custody Record identifying its contents. The original record will accompany the shipment, and a copy will be retained by the Project Coordinator.

4. If sent by mail, the package will be registered with return receipt requested. Freight bills, Post Office receipts, and Bills of Lading will be retained as part of the permanent documentation.

5. Upon receipt in laboratory, custody will be transferred by the signature of a staff member recording date and time.

This document becomes a permanent record and is filed with the data report form. The lab staff will then assign each sample a unique number for data storage and retrieval purposes.

CHAIN OF CUSTODY RECORD

SURVEY	SAMPLERS: (Signature)

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE: Water — Comp.	SAMPLE TYPE: Water — Grab.	SAMPLE TYPE: Air	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

APPENDIX I

GROUND WATER SAMPLING PROCEDURES

GROUNDWATER SAMPLING PROCEDURES

Materials

1. Disposable Latex Gloves
2. Plastic Sheeting (10 ft. by 10 ft. minimum)
3. Bailers (top filling) - 1½ inch stainless steel
4. Polypropylene Rope
5. Distilled Water
6. Acetone Solvent
7. Clean Disposable Towels
8. "Soiltest" Water Level Indicator or 100 Ft. Steel Tape
9. "Jabsco" Impeller Pump
10. Tygon Tubing (3/8-inch)
11. Insulated Transport Containers
12. Graduated Pail
13. Conductivity Meter
14. pH Meter
15. Safety Glasses or Goggles
16. Appropriate Sampling Containers
17. Vacuum Flasks (1,000 ml and 250 ml) and Associated Fittings

General

The following procedures must be adhered to during all well developing and sampling operations. Hard hats and safety glasses or goggles must be worn at all times during well development or sampling to prevent splashing of potentially contaminated water into the eyes. Sampling of wells must be discontinued during precipitation periods.

Procedures

Use of the following procedures for the sampling of groundwater observation wells is dependent upon the depth of the water level in the well to be sampled. To obtain representative groundwater samples from wells where water levels are at a depth greater than 25 feet, the bailing procedure should be used. To obtain representative groundwater samples from wells where water levels are at a depth less than 25 feet, the bailing procedure or the pumping procedure can be used. Each of these procedures is explained in detail below.

A. Sampling Procedures (BAILER)

1. Identify the well and record the location on the Groundwater Sampling Field Log. (Attached)
2. Cut a slit in one side of the plastic sheet and slip it over and around the well, creating a clean surface onto which the sampling equipment can be positioned. This clean working area should be a minimum of 10 feet by 10 feet. Do not kick, transfer, drop, or in any way let soils or other materials fall onto this sheet unless it comes from inside the well. Do not place meters, tools, equipment, etc. on the sheet unless they have been cleaned first with a clean rag.
3. Put on a new pair of disposable gloves.
4. Clean the well cap with a clean towel and remove the well cap and plug, placing both on the plastic sheet.
5. Clean the first ten feet of the steel 100 foot tape or electric water level indicator with an acetone soaked towel, rinse with

distilled water and measure the depth to the water table. Record this information on the Groundwater Sampling Field Log.

6. Compute the volume of water in the well using the formulae and information provided on the Groundwater Sampling Field Log. Record this volume on the Groundwater Field Log.

7. Attach enough polypropylene rope to a bailer to reach the bottom of the well and lower the bailer slowly into the well, making certain to submerge it only far enough to fill it completely.

8. Pull the bailer out of the well, keeping the polypropylene rope on the plastic sheet. Empty the groundwater from the bailer into a new glass quart container and observe its appearance. Return the glass quart to its proper transport container. Note: This sample will not undergo laboratory analysis, and is collected to observe the physical appearance of the groundwater only.

9. Record the physical appearance of the groundwater on the Groundwater Sampling Field Log.

10. Lower the bailer to the bottom of the well and agitate the bailer up and down to resuspend any material settled in the well.

11. Initiate bailing the well from the well bottom making certain to keep the polypropylene rope on the plastic sheet.. All groundwater should be dumped from the bailer into a graduated pail to measure the quantity of water removed from the well.

12. Continue bailing the well from the bottom until three times the volume of groundwater in the well has been removed, or until the well is bailed dry. If the well is bailed dry, allow sufficient time (several hours to overnight) for the well to recover before proceeding with Step 13. Record this information on the Groundwater Sampling Field Log.

13. Remove the sampling bottles from their transport containers and prepare the bottles for receiving samples. Inspect all labels to insure proper sample identification. Sample bottles should be kept cool with their caps on until they are ready to receive samples. Arrange the sampling containers to allow for convenient filling. Always fill the containers for Total Organic Halogens first.

14. Initiate sampling by lowering the bailer slowly into the well, making certain to submerge it only far enough to fill it completely. Minimize agitation of the water in the well. Fill each sample container following the instructions in the Sample Preservation Procedures. Return each sample bottle to its proper transport container.

15. Record the physical appearance of the groundwater observed during sampling on the Groundwater Sampling Field Log.

16. After the last sample has been collected, record the date and time, empty one bailer of water from the surface of the water in the well into the 250 ml flask, measure and record the pH, specific conductivity and temperature of the groundwater following the procedures outlined in the equipment operation

manuals. Record this information on the Groundwater Sampling Field Log. The 250 ml flask must then be rinsed with acetone and distilled water prior to reuse.

17. Replace the well plug and lock the well protection assembly before leaving the well location.
18. Place the polypropylene rope, gloves, towels and plastic sheeting into a plastic bag for disposal.
19. Begin Chain of Custody procedures.

B. Sampling Procedures (PUMP)

1. Identify the well and record the location on the Groundwater Sampling Field Log.
2. Cut a slit in one side of the plastic sheet and slip it over and around the well, creating a clean surface onto which the sampling equipment can be positioned. This clean working area should be a minimum of 10 feet by 10 feet. Do not kick, transfer, drop, or in any way let soils or other materials fall onto this sheet unless it comes from inside the well. Do not place meters, tools, equipment, etc. on the sheet unless they have been cleaned first with a clean rag.
3. Put on a new pair of disposable gloves.
4. Clean the well cap with a clean towel and remove the well cap and plug, placing both on the plastic sheet.
5. Clean the first ten feet of the steel 100 foot tape or electric water level indicator with an acetone soaked towel, rinse with

distilled water and measure the depth to the water table. Record this information on the Groundwater Sampling Field Log.

6. Compute the volume of water in the well using the formulae and information provided on the Groundwater Sampling Field Log. Record this volume on the Field Log.

7. Install a measured length of 3/8-inch ASTM 304 stainless steel tubing into the well such that it is two feet from the bottom of the well. The stainless steel tubing is to be thoroughly cleaned with acetone and distilled water before installation. Once installed, the tubing is left in the well permanently.

8. The top of the stainless steel tubing is connected to a 250 ml flask by pushing it through a silicone stopper (see attached Figure 1) and connected to a 120 V "Jabsco" impeller pump with a piece of 3/8-inch tygon tubing. Another piece of tygon tubing is connected to the pump discharge and runs into a 1000 ml vacuum flask, as shown in attached figure.

9. Use the manually operated vacuum pump to draw water up through the tubing, into the 250 ml flask and through the pump which primes the Jabsco pump. Start the pump, remove the 1000 ml vacuum flask, and pump into a graduated pail until three times the well volume of water in the well is removed, or until the well is pumped dry. If the well is pumped dry, allow sufficient time for the well to recover before proceeding with step 11.

10. Record the physical appearance of the groundwater in the Groundwater Sampling Field Log.

11. Remove the sampling bottles from their transport containers and prepare the bottles for receiving samples. Inspect all labels to insure proper sample identification. Sample bottles should be kept cool with their caps on until they are ready to receive samples. Arrange the sampling bottles to allow for convenient filling. Always fill the bottles for Total Organic Halogens first.

12. Continue pumping the well and remove the silicone stopper from the 250 ml flask while the pump is still running to avoid any runback from the pump. Fill the appropriate sample container following the instructions on the Sample Preservation Procedures. Return each sample bottle to its proper transport container.

13. Record the physical appearance of the groundwater observed during sampling on the Groundwater Sampling Field Log.

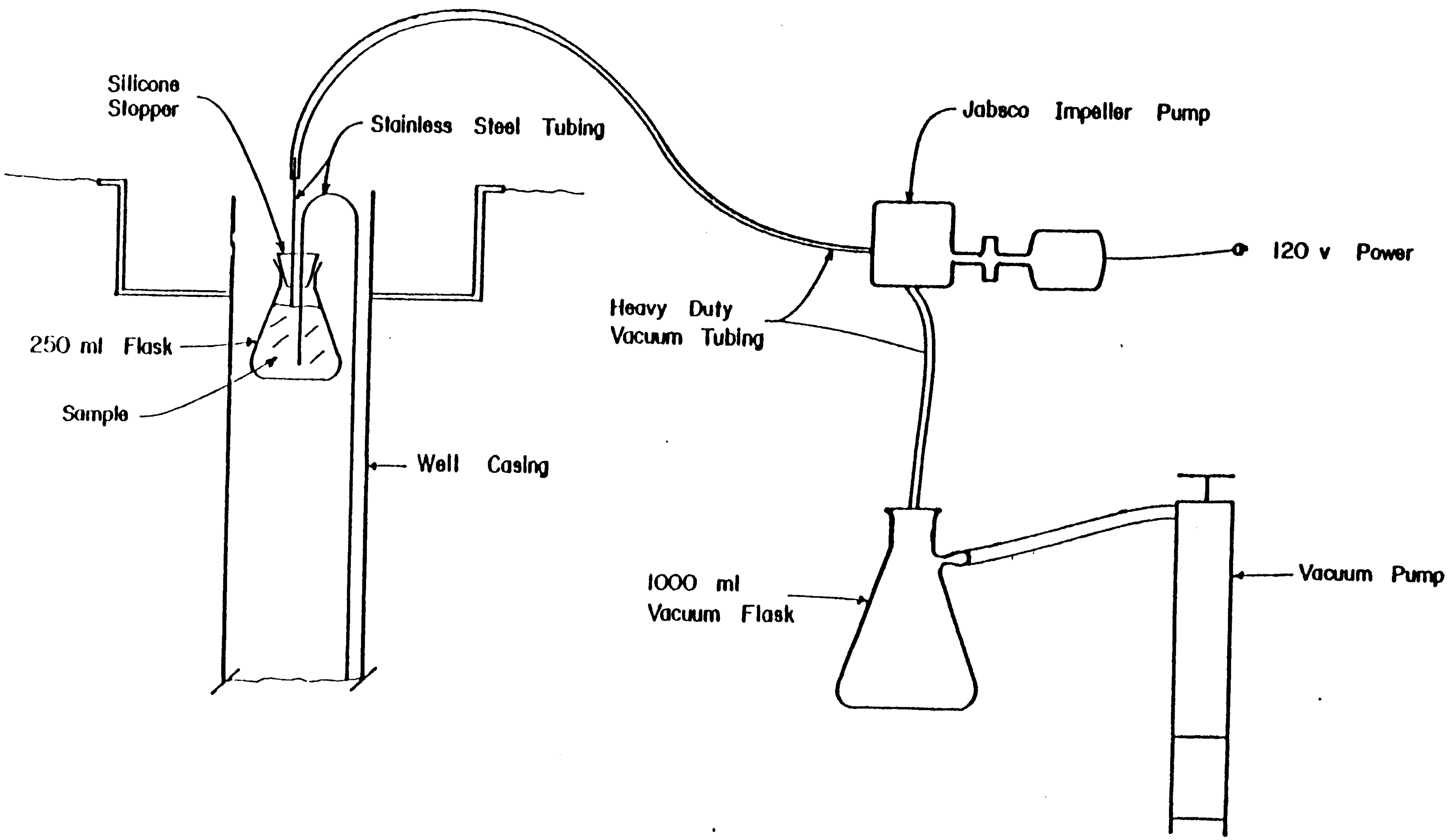
14. After the last sample has been collected, record the date and time and pump water from the well into the 250 ml flask, filling it approximately halfway. Measure and record the pH and conductivity of the groundwater following the procedures outlined in the equipment operation manuals. Record this information on the Groundwater Sampling Field Log. The 250 ml flask must then be rinsed with acetone and distilled water prior to reuse.

15. Replace the well plug and lock the well protection assembly before leaving the well location.

16. Place the gloves, towels, and plastic sheeting into a plastic bag for disposal.

17. Begin Chain-of-Custody procedures.

WELL PUMPING - SAMPLING SYSTEM



GROUNDWATER SAMPLING FIELD LOG

Sample Location ______________________ Well No. __________

Sampled By ______________________ Date __________ Time __________

Weather ______________________ Sampled with Bailer ____ Pump ____

A. Water Table

Well depth (from top of standpipe) ______ Well elevation (top of standpipe) ______

Depth to water table (from top of standpipe ______ Water table elevation ______

Length of water column (LWC) ________ (feet)

Volume of water in well - 2" diameter wells = 0.163 x (LWC) = __________ gallons
- 4" diameter wells = 0.653 x (LWC) = __________ gallons
- 6" diameter wells = 1.469 x (LWC) = __________ gallons

B. Physical Appearance At Start

Color __________ Odor __________ Turbidity __________

Was an oil film or layer apparent? __________

C. Preparation of Well for Sampling

Amount of water removed before sampling __________ gallons

Did well go dry? __________

D. Physical Appearance During Sampling

Color __________ Odor __________ Turbidity __________

Was an oil film or layer apparent? __________

E. Well Sampling

Analysis	Bottle No.	Special Sampling Instructions
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

F. Conductivity __________ pH __________

APPENDIX J

GROUND WATER ANALYTICAL RESULTS

CHEMICAL PARAMETERS FOR GROUNDWATER DATA (Page 1 of 2)

ABBREV.	PARAMETER NAME	UNITS	
A-BHC	Alpha-BHC	ug/l	
A-ENDO	Endosulfan I	ug/l	
AG	Silver	mg/l	
ALDRIN	Aldrin	ug/l	
AS	Arsenic	mg/l	
AS F	Arsenic (filtered)	mg/l	
B-BHC	beta-BHC	ug/l	
B-ENDO	Endosulfan II	ug/l	
BA F	Barium (filtered)	mg/l	
BENZ	Benzene	ug/l	
BRCL2CH	Bromodichloromethane	ug/l	
BRCLC3H6	2-bromo-1-chloropropane	ug/l	IS
BRCLCH2	Bromochloromethane	ug/l	IS
C2H5CL	Chloroethane	ug/l	
CA F	Calcium (filtered)	mg/l	
CCL4	Carbon Tetrachloride	ug/l	
CD	Cadmium	mg/l	
CD F	Cadmium (filtered)	mg/l	
CH2CHCL	Vinyl Chloride	ug/l	
CH2CL2	Methylene Chloride	ug/l	
CH3BR	Bromomethane	ug/l	
CH3CL	Chloromethane	ug/l	
CHBR3	Bromoform	ug/l	
CHCL3	Chloroform	ug/l	
CHLRDNE	Chlordane	ug/l	
CL	Chloride	ug/l	
CL3C2112	1,1,2-Trichloroethane	ug/l	
CL3C2H	Trichloroethene	ug/l	
CL3CCH3	1,1,1-Trichloroethane	ug/l	
CL4C2	Tetrachloroethene	ug/l	
CL4C2H2	1,1,2,2-Tetrachloroethane	ug/l	
CLBR2CH	Dibromochloromethane	ug/l	
CLETHER	2-Chloroethylvinyl Ether	ug/l	
CHLOROBZ	Chlorobenzene	ug/l	
CN	Cyanide	mg/l	
COD-M	Chemical Oxygen Demand	mg/l	
CR	Chromium	mg/l	
CR-HEX F	Hexavalent Chromium (filtered)	mg/l	
CU	Copper	mg/l	
CU F	Copper (filtered)	mg/l	
DATE	Date Analysis Completed		
D-BHC	delta-BHC	ug/l	
DBC	Decachlorobiphenyl	ug/l	IS
DCETAN11	1,1-Dichloroethane	ug/l	
DCETAN12	1,2-Dichloroethane	ug/l	
DCLEN11	1,1-Dichloroethene	ug/l	
DCLEN12	t-1,2-Dichloroethene	ug/l	
DCPAN12	1,2-Dichloropropane	ug/l	

IS = laboratory internal standard

CHEMICAL PARAMETERS FOR GROUNDWATER DATA (Page 2 of 2)

DCPENC13	c-1,3-Dichloropropene	ug/l	
DCPENT13	t-1,3-Dichloropropane	ug/l	
DIELDRN	Dieldrin	ug/l	
ENDRIN	Endrin	ug/l	
ENDRIN-A	Endrin Aldehyde	ug/l	
ENDRIN-K	Endrin Ketone	ug/l	
ENDSULF	Endosulfan Sulfate	ug/l	
ETHBENZ	Ethylbenzene	ug/l	
F3C7	Trifluorotoluene	ug/l	IS
FE	Iron	mg/l	
FE F	Iron (filtered)	mg/l	
FREON113	Freon 113	ug/l	
HARD F	Hardness (filtered)	mg/l	
HEPEPOX	Heptachlor Epoxide	ug/l	
HEPTA	Heptachlor	ug/l	
HG	Mercury	ug/l	
HG F	Mercury(filtered)	ug/l	
LINDANE	gamma-BHC	ug/l	
M-XYLENE	Meta-Xylene	ug/l	
MEK	Methly Ethyl Ketone	ug/l	
MG F	Magnesium (filtered)	mg/l	
MIBK	Methyl Isobutyl Ketone	ug/l	
MN	Manganese	mg/l	
MN F	Manganese (filtered)	mg/l	
NA	Sodium	mg/l	
NA F	Sodium (filtered)	mg/l	
NI F	Nickel (filtered)	mg/l	
NO2N	Nitrite as N	mg/l	
NO2NO3	Nitrite + Nitrate as N	mg/l	
NO3N	Nitrate as N	mg/l	
PB	Lead	mg/l	
PB F	Lead (filtered)	mg/l	
PCB	PCB's (total)	ug/l	
PH	pH	SU	
PP-DDD	4,4'-DDD	ug/l	
PP-DDE	4,4'-DDE	ug/l	
PP-DDT	4,4'-DDT	ug/l	
SE F	Selenium (filtered)	mg/l	
SO4	Sulfate	mg/l	
SPCOND	Specific Conductance	umhos/cm	
TALK	Total Alkalinity	mg/l	
TC	Total Carbon	mg/l	
TDS	Total Dissolved Solids	mg/l	
TIC	Total Inorganic Carbon	mg/l	
TOC	Total Organic Carbon	mg/l	
TOLUENE	Toluene	ug/l	
TXPHENE	Toxaphene	ug/l	
XYLENES	Xylenes	ug/l	
ZN F	Zinc (filtered)	mg/l	

IS = laboratory internal standard

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	A-BHC	A-ENDO	AG F	AL	AL F	ALDRIN	AS	AS F	B-BHC	B-ENDO	BA F	BENZ	BRCL2CH	BRCLC3H6
1	0	08/ 8/83	62897												<1.	<1.	
1	0	11/ 8/83	71241												<1.	<1.	
1	0	11/ 9/83	4901												<1.	<1.	
1	1	08/ 5/83	4385				<.1			<.01					<1.	<1.	
1	1	11/ 9/83	4890				<.1			<.01					<1.	<1.	
1	1	01/31/86	90426								<.001				<1.	<1.	100.
1	2	08/ 5/83	4386				<.1			<.01					2.	<1.	
1	2	11/ 9/83	4891				<.1			.06					<1.	<1.	
1	2	01/19/84	4137							.01							
1	3	08/ 5/83	4387			<.01	<.1			<.01					1.	<1.	
1	3	11/ 9/83	4892				<.1			.02					<1.	<1.	
1	3	01/19/84	4138							<.01							
1	3	01/31/86	90427								<.001				<1.	<1.	85.
1	4	08/ 5/83	4388				<.1			<.01					<1.	<1.	
1	4	11/ 9/83	4893				<.1			<.01					<1.	<1.	
1	4	01/19/84	4139							<.01							
1	4	02/ 3/86	90428								<.001				<1.	<1.	106.
1	5	08/ 5/83	4389				<.1			.02					<1.	<1.	
1	5	11/ 9/83	4894				<.1			.01					<1.	<1.	
1	5	01/19/84	4140							<.01							
1	5	01/30/86	90429	<.05	<.05				<.05		<.001	<.05	<.1		<1.	<1.	97.
1	6	08/ 8/83	62892				<.1	3.1		<.01	<.01				<1.	<1.	
1	6	11/ 9/83	4895				<.1			.08					<1.	<1.	
1	6	01/19/84	4141							.01							
1	7	08/ 5/83	4390				<.1	<.1		<.01	<.01				6.	<1.	
1	7	11/ 9/83	4896				<.1			.07					<1.	<1.	
1	7	01/19/84	4142							.01							
1	8	08/ 5/83	4391				<.1	<.1		<.01	<.01				2.	<1.	
1	8	11/ 9/83	4897				<.1			.08					<1.	<1.	
1	8	01/19/84	4143							.01							
1	8	01/30/86	90430								.002				<1.	<1.	100.
1	9	08/ 5/83	4392				<.1	<.1		<.01	<.01				<1.	<1.	
1	9	11/ 9/83	4898				<.1			<.01					<1.	<1.	
1	9	01/30/86	90431								<.001				<1.	<1.	107.

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	BRCLCH2	C2H5CL	CA F	CCL4	CD	CD F	CH2CHCL	CH2CL2	CH3BR	CH3CL	CHBR3	CHCL3	CHLRDNE	CL
1	0	08/ 8/83	62897		<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		
1	0	11/ 8/83	71241		<1.		<1.			<1.	2.	<1.	<1.	<10.	<1.		
1	0	11/ 9/83	4901		<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		
1	1	08/ 5/83	4385		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		12.
1	1	11/ 9/83	4890		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		2.
1	1	01/31/86	90426	89.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		<1.
1	2	08/ 5/83	4386		<1.		<1.	<.01		<1.	4.	<1.	<1.	<10.	<1.		18.
1	2	11/ 9/83	4891		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		8.
1	2	01/19/84	4137														
1	3	08/ 5/83	4387		<1.		<1.	.015		<1.	<1.	<1.	<1.	<10.	<1.		23.
1	3	11/ 9/83	4892		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		1.
1	3	01/19/84	4138														
1	3	01/31/86	90427	75.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		58.
1	4	08/ 5/83	4388		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		15.
1	4	11/ 9/83	4893		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		1.
1	4	01/19/84	4139														
1	4	02/ 3/86	90428	91.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		4.
1	5	08/ 5/83	4389		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		23.
1	5	11/ 9/83	4894		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		4.
1	5	01/19/84	4140														
1	5	01/30/86	90429	87.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.	<.5	4.
1	6	08/ 8/83	62892		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		27.
1	6	11/ 9/83	4895		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		4.
1	6	01/19/84	4141														
1	7	08/ 5/83	4390		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		13.
1	7	11/ 9/83	4896		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		4.
1	7	01/19/84	4142														
1	8	08/ 5/83	4391		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		16.
1	8	11/ 9/83	4897		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		3.
1	8	01/19/84	4143														
1	8	01/30/86	90430	100.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		7.
1	9	08/ 5/83	4392		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		21.
1	9	11/ 9/83	4898		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		3.
1	9	01/30/86	90431	102.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		4.

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	CL3C2112	CL3C2H	CL3CCH3	CL4C2	CL4C2H2	CLBR2CH	CLETHER	CLOROBZ	CN	COD-M	CR F	CR-HEX F	CU
1	0	08/ 8/83	62897	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	0	11/ 8/83	71241	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	0	11/ 9/83	4901	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	1	08/ 5/83	4385	<1.	<1.	2.	<1.	<1.	<1.	<10.	<1.	<.05	28.			.01
1	1	11/ 9/83	4890	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	1	01/31/86	90426	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	2	08/ 5/83	4386	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	.07				.01
1	2	11/ 9/83	4891	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				.03
1	2	01/19/84	4137													
1	3	08/ 5/83	4387	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.02
1	3	11/ 9/83	4892	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	3	01/19/84	4138													
1	3	01/31/86	90427	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	4	08/ 5/83	4388	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05	<1.	<.01		<.01
1	4	11/ 9/83	4893	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	4	01/19/84	4139													
1	4	02/ 3/86	90428	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	5	08/ 5/83	4389	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05		<.01		.12
1	5	11/ 9/83	4894	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	5	01/19/84	4140													
1	5	01/30/86	90429	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	6	08/ 8/83	62892	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05	26.	<.01		.01
1	6	11/ 9/83	4895	<1.	<1.	1.	<1.	<1.	<1.	<10.	<1.	<.5				.01
1	6	01/19/84	4141													
1	7	08/ 5/83	4390	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05		<.01		.05
1	7	11/ 9/83	4896	<1.	<1.	1.	<1.	<1.	<1.	<10.	<1.	<.5				.01
1	7	01/19/84	4142													
1	8	08/ 5/83	4391	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05	7.	<.01		.05
1	8	11/ 9/83	4897	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	8	01/19/84	4143													
1	8	01/30/86	90430	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	9	08/ 5/83	4392	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05		<.01		.18
1	9	11/ 9/83	4898	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	9	01/30/86	90431	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	CU F	D-BHC	DATE	DBC	DCETAN11	DCETAN12	DCLEN11	DCLEN12	DCPAN12	DCPENC13	DCPENT13	DIELDRN
1	0	08/ 8/83	62897					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	0	11/ 8/83	71241					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	0	11/ 9/83	4901					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	1	08/ 5/83	4385					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	1	11/ 9/83	4890					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	1	01/31/86	90426	<.01		22086.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	2	08/ 5/83	4386					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	2	11/ 9/83	4891					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	2	01/19/84	4137												
1	3	08/ 5/83	4387					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	3	11/ 9/83	4892					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	3	01/19/84	4138												
1	3	01/31/86	90427	<.01		22086.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	4	08/ 5/83	4388	<.01				<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	4	11/ 9/83	4893					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	4	01/19/84	4139												
1	4	02/ 3/86	90428	<.01		22186.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	5	08/ 5/83	4389					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	5	11/ 9/83	4894					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	5	01/19/84	4140												
1	5	01/30/86	90429	<.01	<.05	22186.	130.	<1.	<1.	<1.	<1.	<1.	<1.	<1.	<.1
1	6	08/ 8/83	62892	.01				<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	6	11/ 9/83	4895					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	6	01/19/84	4141												
1	7	08/ 5/83	4390					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	7	11/ 9/83	4896					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	7	01/19/84	4142												
1	8	08/ 5/83	4391					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	8	11/ 9/83	4897					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	8	01/19/84	4143												
1	8	01/30/86	90430	<.01		22186.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	9	08/ 5/83	4392					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	9	11/ 9/83	4898					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	9	01/30/86	90431	.01		22186.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	ENDRIN	ENDRIN-A	ENDRIN-K	ENDSULF	ETHBENZ	F3C7	FE	FE F	FREON113	HARD F	HEPEPOX	HEPTA	HG
1	0	08/ 8/83	62897					<1.				<1.				
1	0	11/ 8/83	71241					<1.				<1.				
1	0	11/ 9/83	4901					<1.				<1.				
1	1	08/ 5/83	4385					<1.		1.8		<1.				<.5
1	1	11/ 9/83	4890					<1.		<.01		<1.				<.5
1	1	01/31/86	90426					<1.	103.		<.01	<1.				
1	2	08/ 5/83	4386					<1.		<.01		<1.				<.5
1	2	11/ 9/83	4891					<1.		.38		<1.				4.6
1	2	01/19/84	4137													
1	3	08/ 5/83	4387					<1.		<.01		<1.				<.5
1	3	11/ 9/83	4892					<1.		<.01		<1.				<.5
1	3	01/19/84	4138													
1	3	01/31/86	90427					<1.	96.		<.01	<1.				
1	4	08/ 5/83	4388					<1.		.05		<1.				<.5
1	4	11/ 9/83	4893					<1.		.01		<1.				6.7
1	4	01/19/84	4139													
1	4	02/ 3/86	90428					<1.	104.		.05	<1.				
1	5	08/ 5/83	4389					<1.		<.01		<1.				<.5
1	5	11/ 9/83	4894					<1.		.02		<1.				3.9
1	5	01/19/84	4140													
1	5	01/30/86	90429	<.1	<.1	<.1	<.1	<1.	97.		.05	<1.		<.05	<.05	
1	6	08/ 8/83	62892					<1.		2.4		<1.				<.5
1	6	11/ 9/83	4895					<1.		38.		<1.				2.2
1	6	01/19/84	4141													
1	7	08/ 5/83	4390					<1.		<.01		<1.				<.5
1	7	11/ 9/83	4896					<1.		7.8		<1.				<.5
1	7	01/19/84	4142													
1	8	08/ 5/83	4391					<1.		<.01		<1.				<.5
1	8	11/ 9/83	4897					<1.		10.		<1.				<.5
1	8	01/19/84	4143													
1	8	01/30/86	90430					<1.	94.		5.7	<1.				
1	9	08/ 5/83	4392					<1.		<.01		<1.				<.5
1	9	11/ 9/83	4898					<1.		.03		<1.				<.5
1	9	01/30/86	90431					<1.	98.		<.01	<1.				

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	HG F	LINDANE	M-XYLENE	MEK	MG F	MIBK	MN	MN F	MTHXYCR	NA	NA F	NI F	NO2N	NO2NO3	NO3N	PB
1	0	08/ 8/83	62897			<1.													
1	0	11/ 8/83	71241			<1.													
1	0	11/ 9/83	4901			<1.													
1	1	08/ 5/83	4385			<1.				.18			18.			<.01	<.01	<.01	<.01
1	1	11/ 9/83	4890			<1.				.02			14.			<.01	<.01	<.01	<.01
1	1	01/31/86	90426	<.1		<1.					<.01								
1	2	08/ 5/83	4386			<1.				.31			10.			<.01	<.01	<.01	<.01
1	2	11/ 9/83	4891			<1.				1.9			43.			.02	.02	<.01	<.01
1	2	01/19/84	4137																
1	3	08/ 5/83	4387			<1.				.40			7.0			.01	.01	<.01	<.01
1	3	11/ 9/83	4892			<1.				1.3			6.2			.03	.07	.03	<.01
1	3	01/19/84	4138																
1	3	01/31/86	90427	<.1		<1.					.09								
1	4	08/ 5/83	4388			<1.				.33			11.			.03	.17	.15	<.01
1	4	11/ 9/83	4893			<1.				<.01			5.6			.02	.07	.05	<.01
1	4	01/19/84	4139																
1	4	02/ 3/86	90428	<.1		<1.					.07								
1	5	08/ 5/83	4389			<1.				1.4			13.			.05	.19	.14	<.01
1	5	11/ 9/83	4894			<1.				1.9			6.7			.05	.05	<.01	<.01
1	5	01/19/84	4140																
1	5	01/30/86	90429	<.1	<.05	<1.					.26	<.5							
1	6	08/ 8/83	62892			<1.				2.8			11.			.02	.02	<.01	<.01
1	6	11/ 9/83	4895			<1.				4.1			4.5			.01	.03	.02	<.01
1	6	01/19/84	4141																
1	7	08/ 5/83	4390			<1.				4.1			5.0			.01	.03	.02	<.01
1	7	11/ 9/83	4896			<1.				4.3			3.8			<.01	.03	.02	<.01
1	7	01/19/84	4142																
1	8	08/ 5/83	4391	<.1		<1.				4.4			5.0			.01	.09	.08	<.01
1	8	11/ 9/83	4897			<1.				4.8			3.6			<.01	.03	.02	<.01
1	8	01/19/84	4143																
1	8	01/30/86	90430	<.1		<1.					1.59								
1	9	08/ 5/83	4392	<.1		<1.				1.7			9.0			.04	.09	.05	<.01
1	9	11/ 9/83	4898			<1.				2.0			3.7			.01	.02	.01	<.01
1	9	01/30/86	90431	<.1		<1.					1.74								

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	PB F	PCB	PH	PP-DDD	PP-DDE	PP-DDT	SE F	SO4	SPCOND	TALK	TC	TDS
1	0	08/ 8/83	62897												
1	0	11/ 8/83	71241												
1	0	11/ 9/83	4901												
1	1	08/ 5/83	4385			7.8					9.	330.			210.
1	1	11/ 9/83	4890			8.3					8.	319.	132.	50.	190.
1	1	01/31/86	90426			6.7						200.		50.	188.
1	2	08/ 5/83	4386	<.01		7.5					65.	310.			240.
1	2	11/ 9/83	4891			7.6					<1.	420.	174.	540.	300.
1	2	01/19/84	4137												
1	3	08/ 5/83	4387			6.7					27.	200.			180.
1	3	11/ 9/83	4892			7.8					3.	212.	61.	90.	150.
1	3	01/19/84	4138												
1	3	01/31/86	90427			5.8						280.		30.	276.
1	4	08/ 5/83	4388	<.01		7.0					81.	160.			170.
1	4	11/ 9/83	4893			8.2					12.	160.	42.	20.	90.
1	4	01/19/84	4139												
1	4	02/ 3/86	90428			6.3						95.		20.	72.
1	5	08/ 5/83	4389	<.01		7.1					31.	190.			200.
1	5	11/ 9/83	4894			8.3					11.	161.	<1.	32.	110.
1	5	01/19/84	4140												
1	5	01/30/86	90429		<.1	6.3	<.1	<.1	<.1			75.		30.	132.
1	6	08/ 8/83	62892	<.01		5.9					34.	140.			220.
1	6	11/ 9/83	4895			6.6					5.	115.	19.	32.	100.
1	6	01/19/84	4141												
1	7	08/ 5/83	4390	<.01		6.2					71.	90.			90.
1	7	11/ 9/83	4896			7.1					11.	94.4	19.	12.	110.
1	7	01/19/84	4142												
1	8	08/ 5/83	4391			6.2					35.	90.			100.
1	8	11/ 9/83	4897			7.1					12.	84.3	14.	10.	80.
1	8	01/19/84	4143												
1	8	01/30/86	90430			6.5						75.		12.	44.
1	9	08/ 5/83	4392	<.01		6.2					100.	90.			120.
1	9	11/ 9/83	4898			7.0					16.	100.	16.	10.	100.
1	9	01/30/86	90431			5.8						65.		12.	44.

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	TIC	TOC	TOLUENE	TXPHENE	XYLENES	ZN F
1	0	08/ 8/83	62897			<1.		<1.	
1	0	11/ 8/83	71241			<1.		<1.	
1	0	11/ 9/83	4901			<1.		<1.	
1	1	08/ 5/83	4385			<1.		2.	
1	1	11/ 9/83	4890	42.	8.	<1.		<1.	
1	1	01/31/86	90426	41.	9.	<1.		<1.	
1	2	08/ 5/83	4386			1.		<1.	
1	2	11/ 9/83	4891	150.	390.	2.		1.	
1	2	01/19/84	4137						
1	3	08/ 5/83	4387			<1.		<1.	
1	3	11/ 9/83	4892	31.	59.	<1.		<1.	
1	3	01/19/84	4138						
1	3	01/31/86	90427	24.	6.	<1.		<1.	
1	4	08/ 5/83	4388			<1.		<1.	
1	4	11/ 9/83	4893	19.	1.	<1.		<1.	
1	4	01/19/84	4139						
1	4	02/ 3/86	90428	19.	1.	<1.		<1.	
1	5	08/ 5/83	4389			<1.		<1.	
1	5	11/ 9/83	4894	18.	14.	<1.		<1.	
1	5	01/19/84	4140						
1	5	01/30/86	90429	21.	9.	<1.	<1.0	<1.	
1	6	08/ 8/83	62892			<1.		<1.	
1	6	11/ 9/83	4895	13.	19.	<1.		<1.	
1	6	01/19/84	4141						
1	7	08/ 5/83	4390			<1.		<1.	
1	7	11/ 9/83	4896	3.	4.	<1.		<1.	
1	7	01/19/84	4142						
1	8	08/ 5/83	4391			<1.		<1.	
1	8	11/ 9/83	4897	6.	4.	<1.		<1.	
1	8	01/19/84	4143						
1	8	01/30/86	90430	10.	2.	<1.		<1.	
1	9	08/ 5/83	4392			<1.		<1.	
1	9	11/ 9/83	4898	8.	2.	<1.		<1.	
1	9	01/30/86	90431	11.	1.	<1.		<1.	

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	A-BHC	A-ENDO	AG F	AL	AL F	ALDRIN	AS	AS F	B-BHC	B-ENDO	BA F	BENZ	BRCL2CH	BRCLC3H6
1	10	08/ 5/83	4393				<.1	<.1		<.01	<.01				<1.	<1.	
1	10	11/ 9/83	4899				<.1			<.01					<1.	<1.	
1	10	01/19/84	4144							<.01							
1	10	01/30/86	90432								<.001				<1.	<1.	109.
1	11	08/ 8/83	62893				<.1			<.01	<.01				<1.	<1.	
1	11	11/ 9/83	4900				<.1			.06					3.	<1.	
1	11	01/19/84	4145							<.01							
1	11	02/ 3/86	90433								.002				<1.	<1.	107.
1	12	02/ 3/86	90434								<.001				<1.	<1.	117.
1	17	11/14/84	6745			<.01		<.5			<.01			<.1			
1	18	11/14/84	6746			<.01		<.5			<.01			<.1			
1	18	01/31/86	90435								.001				<1.	<1.	102.
1	19	11/14/84	6747			<.01		<.5			<.01			<.1			
1	20	11/14/84	6748			<.01		<.5			<.01			<.1			
1	21	01/31/86	90436	<.05	<.05				<.05		.002	<.05	<.1		<1.	<1.	102.
1	21	01/31/86	90437								<.001				<1.	<1.	111.
1	21	04/24/86	23928								<.001				<1.	<1.	106.
1	22	02/ 3/86	90438								<.001				<1.	<1.	117.
1	22	02/ 3/86	90439								.001				<1.	<1.	110.
1	22	04/24/86	23929								.006				<1.	<1.	103.
1	101	11/14/83	71229				<.1			<.01					<1.	<1.	
1	102	11/14/83	71230				<.1			.04					<1.	<1.	
1	102	01/19/84	4146							.033							
1	103	11/14/83	71231				<.1			<.01					<1.	<1.	
1	104	11/14/83	71232				<.1			<.01					<1.	<1.	
1	105	11/14/83	71233				<.1			.02					<1.	<1.	

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	BRCLCH2	C2H5CL	CA F	CCL4	CD	CD F	CH2CHCL	CH2CL2	CH3BR	CH3CL	CHBR3	CHCL3	CHLRDNE	CL
1	10	08/ 5/83	4393		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		26.
1	10	11/ 9/83	4899		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		4.
1	10	01/19/84	4144														
1	10	01/30/86	90432	104.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		7.
1	11	08/ 8/83	62893		5.		<1.	<.01		16.	2.	<1.	<1.	<10.	<1.		47.
1	11	11/ 9/83	4900		18.		<1.	<.01		1.	32.	2.	<1.	<10.	<1.		43.
1	11	01/19/84	4145														
1	11	02/ 3/86	90433	107.	63.		<1.			<1.	1.	<1.	<1.	<10.	<1.		47.
1	12	02/ 3/86	90434	109.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		9.
1	17	11/14/84	6745			33.			<.01								3.
1	18	11/14/84	6746			25.			<.01								19.
1	18	01/31/86	90435	91.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		11.
1	19	11/14/84	6747			57.			<.01								1.
1	20	11/14/84	6748			34.			<.01								2.
1	21	01/31/86	90436	94.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.	<.5	9.
1	21	01/31/86	90437	99.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		9.
1	21	04/24/86	23928	114.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		12.
1	22	02/ 3/86	90438	102.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		13.
1	22	02/ 3/86	90439	102.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		22.
1	22	04/24/86	23929	100.	<1.		<1.			<1.	<1.	<1.	<1.	<10.	<1.		27.
1	101	11/14/83	71229		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		6.
1	102	11/14/83	71230		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		29.
1	102	01/19/84	4146														
1	103	11/14/83	71231		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		65.
1	104	11/14/83	71232		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		23.
1	105	11/14/83	71233		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		8.

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	CL3C2112	CL3C2H	CL3CCH3	CL4C2	CL4C2H2	CLBR2CH	CLETHER	CLOROBZ	CN	COD-M	CR F	CR-HEX F	CU
1	10	08/ 5/83	4393	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05		<.01		.34
1	10	11/ 9/83	4899	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.5				<.01
1	10	01/19/84	4144													
1	10	01/30/86	90432	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	11	08/ 8/83	62893	<1.	<1.	8.	<1.	<1.	<1.	<10.	<1.	<.05		<.01		.26
1	11	11/ 9/83	4900	<1.	1.	1.	<1.	<1.	<1.	<10.	<1.	<.5				.02
1	11	01/19/84	4145													
1	11	02/ 3/86	90433	<1.	2.	9.	<1.	<1.	<1.	<10.	<1.					
1	12	02/ 3/86	90434	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	17	11/14/84	6745									<.05	183.	<.05	<.05	
1	18	11/14/84	6746									<.05	416.	<.05	<.05	
1	18	01/31/86	90435	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	19	11/14/84	6747									<.05	15.	<.05	<.05	
1	20	11/14/84	6748									<.05	50.	<.05	<.05	
1	21	01/31/86	90436	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	21	01/31/86	90437	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	21	04/24/86	23928	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	22	02/ 3/86	90438	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	22	02/ 3/86	90439	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	22	04/24/86	23929	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.					
1	101	11/14/83	71229	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				<.01
1	102	11/14/83	71230	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				<.01
1	102	01/19/84	4146													
1	103	11/14/83	71231	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.10
1	104	11/14/83	71232	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.01
1	105	11/14/83	71233	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				<.01

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	CU F	D-BHC	DATE	DBC	DCETAN11	DCETAN12	DCLEN11	DCLEN12	DCPAN12	DCPENC13	DCPENT13	DIELDRN
1	10	08/ 5/83	4393					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	10	11/ 9/83	4899					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	10	01/19/84	4144												
1	10	01/30/86	90432	<.01		22186.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	11	08/ 8/83	62893					26.	<1.	<1.	<1.	<1.	<1.	<1.	
1	11	11/ 9/83	4900					150.	3.	<1.	<1.	40.	<1.	<1.	
1	11	01/19/84	4145												
1	11	02/ 3/86	90433	.01		22186.		210.	3.	<1.	1.	43.	<1.	<1.	
1	12	02/ 3/86	90434	.01		22186.		1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	17	11/14/84	6745	<.01											
1	18	11/14/84	6746	<.01											
1	18	01/31/86	90435	.01		22486.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	19	11/14/84	6747	<.01											
1	20	11/14/84	6748	<.01											
1	21	01/31/86	90436	.01	<.05	22486.	124.	1.	<1.	<1.	<1.	<1.	<1.	<1.	<.1
1	21	01/31/86	90437	.01		22486.		1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	21	04/24/86	23928	<.01		50586.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	22	02/ 3/86	90438	.01		22486.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	22	02/ 3/86	90439	.01		22486.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	22	04/24/86	23929	<.01		50586.		<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	101	11/14/83	71229					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	102	11/14/83	71230					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	102	01/19/84	4146												
1	103	11/14/83	71231					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	104	11/14/83	71232					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	105	11/14/83	71233					<1.	<1.	<1.	<1.	<1.	<1.	<1.	

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	ENDRIN	ENDRIN-A	ENDRIN-K	ENDSULF	ETHBENZ	F3C7	FE	FE F	FREON113	HARD F	HEPEPOX	HEPTA	HG
1	10	08/ 5/83	4393					<1.		<.01		<1.				<.5
1	10	11/ 9/83	4899					<1.		.07		<1.				<.5
1	10	01/19/84	4144													
1	10	01/30/86	90432					<1.	93.		<.01	<1.				
1	11	08/ 8/83	62893					<1.		<.01		<1.				.6
1	11	11/ 9/83	4900					1.		2.2		<1.				<.5
1	11	01/19/84	4145													
1	11	02/ 3/86	90433					<1.	92.		.95	<1.				
1	12	02/ 3/86	90434					<1.	97.		.12	<1.				
1	17	11/14/84	6745								.02		120.			
1	18	11/14/84	6746								2.7		83.			
1	18	01/31/86	90435					<1.	106.		.86	<1.				
1	19	11/14/84	6747								<.01		190.			
1	20	11/14/84	6748								.03		100.			
1	21	01/31/86	90436	<.1	<.1	<.1	<.1	<1.	102.		1.08	<1.		<.05	<.05	
1	21	01/31/86	90437					<1.	104.		1.10	<1.				
1	21	04/24/86	23928					<1.	99.		.61	<1.				
1	22	02/ 3/86	90438					<1.	104.		.12	<1.				
1	22	02/ 3/86	90439					<1.	105.		.45	<1.				
1	22	04/24/86	23929					<1.	100.		.10	<1.				
1	101	11/14/83	71229					<1.		2.1		<1.				<.5
1	102	11/14/83	71230					<1.		<.01		<1.				<.5
1	102	01/19/84	4146													
1	103	11/14/83	71231					<1.		<.01		<1.				<.5
1	104	11/14/83	71232					<1.		<.01		<1.				<.5
1	105	11/14/83	71233					<1.		.03		<1.				<.5

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	HG F	LINDANE	M-XYLENE	MEK	MG F	MIBK	MN	MN F	MTHXYCR	NA	NA F	NI F	NO2N	NO2NO3	NO3N	PB
1	10	08/ 5/83	4393	2.8		<1.				3.3			11.			.05	.13	.08	<.01
1	10	11/ 9/83	4899			<1.				2.3			4.4			.01	.01	<.01	<.01
1	10	01/19/84	4144																
1	10	01/30/86	90432	<.1		<1.					3.14								
1	11	08/ 8/83	62893			<1.				4.4			21.			.02	.02	<.01	<.01
1	11	11/ 9/83	4900			4.				11.			22.			.02	.02	<.01	<.01
1	11	01/19/84	4145																
1	11	02/ 3/86	90433	.2		1.	<10.		210.		5.78								
1	12	02/ 3/86	90434	<.1		<1.					1.28								
1	17	11/14/84	6745	<.5				9.0			1.4			10.	<.03	.03	.03	<.01	
1	13	11/14/84	6746	<.5				5.0			4.1			6.7	.07	.04	.4	.4	
1	18	01/31/86	90435	<.1		<1.					2.94								
1	19	11/14/84	6747	<.5				12.			.46			14.	.09	.02	.02	<.01	
1	20	11/14/84	6748	<.5				4.7			.43			1.8	.09	.10	.17	.07	
1	21	01/31/86	90436	<.1	<.05	<1.					1.75	<.5							
1	21	01/31/86	90437	.3		<1.					1.61								
1	21	04/24/86	23928	<.1		<1.					1.01								
1	22	02/ 3/86	90438	<.1		<1.					.04								
1	22	02/ 3/86	90439	<.1		<1.					.05								
1	22	04/24/86	23929	<.1		<1.					.03								
1	101	11/14/83	71229			<1.				1.5			10.			<.01	<.01	<.01	<.01
1	102	11/14/83	71230			<1.				.06			130.			<.01	<.01	<.01	<.01
1	102	01/19/84	4146																
1	103	11/14/83	71231			<1.				.14			40.			<.01	4.7	4.7	<.01
1	104	11/14/83	71232			<1.				1.1			26.			<.01	<.01	<.01	<.01
1	105	11/14/83	71233			<1.				.45			14.			<.01	<.01	<.01	<.01

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	PB F	PCB	PH	PP-DDD	PP-DDE	PP-DDT	SE F	SO4	SPCOND	TALK	TC	TDS
1	10	08/ 5/83	4393	<.01		6.8					23.	100.			170.
1	10	11/ 9/83	4899			7.5					37.	106.	19.	12.	120.
1	10	01/19/84	4144												
1	10	01/30/86	90432			6.7						85.		10.	80.
1	11	08/ 8/83	62893			7.1					72.	750.			360.
1	11	11/ 9/83	4900			7.7					1.	995.	350.	400.	740.
1	11	01/19/84	4145												
1	11	02/ 3/86	90433			6.0						960.		144.	732.
1	12	02/ 3/86	90434			5.9						95.		30.	132.
1	17	11/14/84	6745	<.01		6.7				<.01	22.	250.		64.	200.
1	18	11/14/84	6746	<.01		6.2				<.01	380.	170.		160.	260.
1	18	01/31/86	90435			5.8						85.		22.	108.
1	19	11/14/84	6747	<.01		6.1				<.01	32.	330.		50.	210.
1	20	11/14/84	6748	<.01		6.7				<.01	49.	170.		28.	190.
1	21	01/31/86	90436		<.1	5.7	<.1	<.1	<.1			90.		112.	156.
1	21	01/31/86	90437			5.7						90.		104.	152.
1	21	04/24/86	23928			6.0						80.		22.	64.
1	22	02/ 3/86	90438			6.1						60.		24.	184.
1	22	02/ 3/86	90439			6.1						60.		18.	208.
1	22	04/24/86	23929			6.2						80.		8.	148.
1	101	11/14/83	71229			7.3					14.	158.	70.	24.	130.
1	102	11/14/83	71230			8.8					<1.	524.	270.	74.	340.
1	102	01/19/84	4146												
1	103	11/14/83	71231			6.3					30.	426.	46.	34.	260.
1	104	11/14/83	71232			8.8					14.	379.	174.	50.	250.
1	105	11/14/83	71233			8.9					7.	223.	122.	36.	180.

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	TIC	TOC	TOLUENE	TXPHENE	XYLENES	ZN F
1	10	08/ 5/83	4393			<1.		<1.	
1	10	11/ 9/83	4899	9.	3.	<1.		<1.	
1	10	01/19/84	4144						
1	10	01/30/86	90432	10.	<1.	<1.		<1.	
1	11	08/ 8/83	62893			<1.		<1.	
1	11	11/ 9/83	4900	120.	280.	110.		11.	
1	11	01/19/84	4145						
1	11	02/ 3/86	90433	140.	<10.	40.		7.	
1	12	02/ 3/86	90434	20.	10.	<1.		<1.	
1	17	11/14/84	6745	29.	35.				<.01
1	18	11/14/84	6746	21.	139.				.02
1	18	01/31/86	90435	10.	12.	<1.		<1.	
1	19	11/14/84	6747	40.	10.				<.01
1	20	11/14/84	6748	15.	13.				<.01
1	21	01/31/86	90436	17.	95.	<1.	<1.0	<1.	
1	21	01/31/86	90437	17.	87.	<1.		<1.	
1	21	04/24/86	23928	16.	6.	<1.		<1.	
1	22	02/ 3/86	90438	5.	19.	<1.		<1.	
1	22	02/ 3/86	90439	5.	13.	<1.		<1.	
1	22	04/24/86	23929	2.	6.	<1.		<1.	
1	101	11/14/83	71229	18.	6.	<1.		<1.	
1	102	11/14/83	71230	60.	14.	<1.		<1.	
1	102	01/19/84	4146						
1	103	11/14/83	71231	26.	8.	<1.		<1.	
1	104	11/14/83	71232	40.	10.	<1.		<1.	
1	105	11/14/83	71233	29.	7.	<1.		<1.	

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	A-BHC	A-ENDO	AG F	AL	AL F	ALDRIN	AS	AS F	B-BHC	B-ENDO	BA F	BENZ	BRCL2CH	BRCLC3H6
1	106	11/15/83	71234				<.1			<.01					<1.	<1.	
1	107	11/14/83	71235				<.1			.03					<1.	<1.	
1	107	01/19/84	4147							.01							
1	108	11/14/83	71236				<.1			.01					<1.	<1.	
1	109	11/14/83	71237				<.1			.11					<1.	<1.	
1	109	01/19/84	4148							.033							
1	110	11/14/83	71238				<.1			<.01					<1.	<1.	
1	111	11/14/83	71239				<.1			<.01					<1.	<1.	
1	112	11/15/83	71240				<.1			<.01					<1.	<1.	
1	113	11/15/83	50315				<.05			.023							
1	114	11/15/83	50316				<.05			<.01							
1	115	11/15/83	50317				<.05			<.01							
1	116	11/15/83	50318				<.05			<.01							
1	117	11/15/83	50319				<.05			<.01							

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	BRCLCH2	C2H5CL	CA F	CCL4	CD	CD F	CH2CHCL	CH2CL2	CH3BR	CH3CL	CHBR3	CHCL3	CHLRDNE	CL
1	106	11/15/83	0														
1	106	11/15/83	71234		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		17.
1	107	11/14/83	71235		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		8.
1	107	01/19/84	4147														
1	108	11/14/83	71236		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		7.
1	109	11/14/83	71237		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		27.
1	109	01/19/84	4148														
1	110	11/14/83	71238		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		116.
1	111	11/14/83	71239		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		14.
1	112	11/15/83	71240		<1.		<1.	<.01		<1.	<1.	<1.	<1.	<10.	<1.		114.
1	113	11/15/83	50315					<.002									14.
1	114	11/15/83	50316					<.002									13.
1	115	11/15/83	50317					<.002									11.
1	116	11/15/83	50318					<.002									5.6
1	117	11/15/83	50319					<.002									8.5

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	CL3C2112	CL3C2H	CL3CCH3	CL4C2	CL4C2H2	CLBR2CH	CLETHER	CLOROBZ	CN	COD-M	CR F	CR-HEX F	CU
1	106	11/15/83	0													
1	106	11/15/83	71234	<1.	2.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.12
1	107	11/14/83	71235	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				<.01
1	107	01/19/84	4147													
1	108	11/14/83	71236	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				<.01
1	109	11/14/83	71237	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.01
1	109	01/19/84	4148													
1	110	11/14/83	71238	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.33
1	111	11/14/83	71239	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.01
1	112	11/15/83	71240	<1.	<1.	<1.	<1.	<1.	<1.	<10.	<1.	<.05				.23
1	113	11/15/83	50315													<.05
1	114	11/15/83	50316													<.05
1	115	11/15/83	50317													<.05
1	116	11/15/83	50318													<.05
1	117	11/15/83	50319													<.1

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	CU F	D-BHC	DATE	DBC	DCETAN11	DCETAN12	DCLEN11	DCLEN12	DCPAN12	DCPENC13	DCPENT13	DIELDRN
1	106	11/15/83	0												
1	106	11/15/83	71234					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	107	11/14/83	71235					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	107	01/19/84	4147												
1	108	11/14/83	71236					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	109	11/14/83	71237					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	109	01/19/84	4148												
1	110	11/14/83	71238					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	111	11/14/83	71239					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	112	11/15/83	71240					<1.	<1.	<1.	<1.	<1.	<1.	<1.	
1	113	11/15/83	50315												
1	114	11/15/83	50316												
1	115	11/15/83	50317												
1	116	11/15/83	50318												
1	117	11/15/83	50319												

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	ENDRIN	ENDRIN-A	ENDRIN-K	ENDSULF	ETHBENZ	F3C7	FE	FE F	FREON113	HARD F	HEPEPOX	HEPTA	HG
1	106	11/15/83	0													
1	106	11/15/83	71234					<1.		<.01		<1.				<.5
1	107	11/14/83	71235					<1.		.04		<1.				<.5
1	107	01/19/84	4147													
1	108	11/14/83	71236					<1.		.01		<1.				<.5
1	109	11/14/83	71237					<1.		.04		<1.				<.5
1	109	01/19/84	4148													
1	110	11/14/83	71238					<1.		<.01		<1.				<.5
1	111	11/14/83	71239					<1.		<.01		<1.				<.5
1	112	11/15/83	71240					<1.		<.01		<1.				<.5
1	113	11/15/83	50315							.44						<.4
1	114	11/15/83	50316							6.6						<.4
1	115	11/15/83	50317							8.4						<.4
1	116	11/15/83	50318							<.02						<.4
1	117	11/15/83	50319							.66						<.4

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	HG F	LINDANE	M-XYLENE	MEK	MG F	MIBK	MN	MN F	MTHXYCR	NA	NA F	NI F	NO2N	NO2NO3	NO3N	PB
1	106	11/15/83	0																
1	106	11/15/83	71234			<1.				.01			6.2			<.01	1.14	1.13	<.01
1	107	11/14/83	71235			<1.				.54			11.			<.01	<.01	<.01	<.01
1	107	01/19/84	4147																
1	108	11/14/83	71236			<1.				.13			23.			<.01	<.01	<.01	<.01
1	109	11/14/83	71237			<1.				.42			75.			<.01	<.01	<.01	<.01
1	109	01/19/84	4148																
1	110	11/14/83	71238			<1.				<.01			65.			<.01	5.0	5.0	<.01
1	111	11/14/83	71239			<1.				1.0			27.			<.01	<.01	<.01	<.01
1	112	11/15/83	71240			<1.				<.01			69.			<.01	4.6	4.6	<.01
1	113	11/15/83	50315							.27			53.						<.01
1	114	11/15/83	50316							1.9			12.						<.01
1	115	11/15/83	50317							.22			5.8						<.01
1	116	11/15/83	50318							.08			55.						<.01
1	117	11/15/83	50319							.20			4.7						<.01

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	PB F	PCB	PH	PP-DDD	PP-DDE	PP-DDT	SE F	SO4	SPCOND	TALK	TC	TDS
1	106	11/15/83	0												
1	106	11/15/83	71234			5.9					11.	112.	16.	16.	80.
1	107	11/14/83	71235			7.7					12.	236.	114.	34.	140.
1	107	01/19/84	4147												
1	108	11/14/83	71236			8.0					4.	248.	120.	36.	140.
1	109	11/14/83	71237			7.9					3.	399.	224.	62.	270.
1	109	01/19/84	4148												
1	110	11/14/83	71238			6.3					25.	517.	44.	28.	320.
1	111	11/14/83	71239			7.7					12.	348.	162.	46.	220.
1	112	11/15/83	71240			6.2					37.	539.	40.	20.	320.
1	113	11/15/83	50315			7.6					2.2	386.	190.		206.
1	114	11/15/83	50316			7.0					20.	281.	107.		204.
1	115	11/15/83	50317			6.5					15.	142.	38.		87.
1	116	11/15/83	50318			7.5					20.	256.	105.		162.
1	117	11/15/83	50319			6.6					18.	118.	23.		71.

TOWN OF CONKLIN LANDFILL DATA
TYPE 1: GROUND WATER SAMPLES

TYPE		DATE	SAMPLE	TIC	TOC	TOLUENE	TXPHENE	XYLENES	ZN F
1	106	11/15/83	0						
1	106	11/15/83	71234	12.	4.	<1.		<1.	
1	107	11/14/83	71235	26.	8.	<1.		<1.	
1	107	01/19/84	4147						
1	108	11/14/83	71236	27.	9.	<1.		<1.	
1	109	11/14/83	71237	51.	11.	<1.		<1.	
1	109	01/19/84	4148						
1	110	11/14/83	71238	20.	8.	<1.		<1.	
1	111	11/14/83	71239	37.	9.	<1.		<1.	
1	112	11/15/83	71240	14.	6.	<1.		<1.	
1	113	11/15/83	50315						
1	114	11/15/83	50316						
1	115	11/15/83	50317						
1	116	11/15/83	50318						
1	117	11/15/83	50319						

APPENDIX K

SURFACE WATER ANALYTICAL RESULTS

CHEMICAL PARAMETERS FOR SURFACE WATER DATA (Page 1 of 2)

ABBREV.	NAME	UNITS	
AG F	Silver (filtered)	mg/l	
AL F	Aluminum (filtered)	ug/l	
AS	Arsenic	mg/l	
AS F	Arsenic (filtered)	mg/l	
BA F	Barium (filtered)	mg/l	
BENZ	Benzene	ug/l	
BOD5	Biological Oxygen Demand	mg/l	
BRCL2CH	Bromodichloromethane	ug/l	
BRCLC3H6	2-bromo-1-chloropropane	ug/l	IS
BRCLCH2	Bromochloromethane	ug/l	IS
C2H5CL	Chloroethane	ug/l	
CA F	Calcium (filtered)	mg/l	
CCL4	Carbon Tetrachloride	ug/l	
CD	Cadmium	mg/l	
CD F	Cadmium (filtered)	mg/l	
CH2CHCL	Vinyl Chloride	ug/l	
CH2CL2	Methylene Chloride	ug/l	
CH3BR	Bromomethane	ug/l	
CH3CL	Chloromethane	ug/l	
CHBR3	Bromoform	ug/l	
CHCL3	Chloroform	ug/l	
CL	Chloride	ug/l	
CL3C2112	1,1,2-Trichloroethane	ug/l	
CL3C2H	Trichloroethene	ug/l	
CL3CCH3	1,1,1-Trichloroethane	ug/l	
CL4C2	Tetrachloroethene	ug/l	
CL4C2H2	1,1,2,2-Tetrachloroethane	ug/l	
CLBR2CH	Dibromochloromethane	ug/l	
CLETHER	2-Chloroethylvinyl Ether	ug/l	
CHLOROBZ	Chlorobenzene	ug/l	
CN	Cyanide	mg/l	
COD-M	Chemical Oxygen Demand	mg/l	
CR	Chromium	mg/l	
CR F	Chromium (filtered)	mg/l	
CR-HEX F	Hexavalent Chromium (filtered)	mg/l	
CU	Copper	mg/l	
DATE	Date Analysis Completed		
DCETAN11	1,1-Dichloroethane	ug/l	
DCETAN12	1,2-Dichloroethane	ug/l	
DCLEN11	1,1-Dichloroethene	ug/l	
DCLEN12	t-1,2-Dichloroethene	ug/l	
DCPAN12	1,2-Dichloropropane	ug/l	
DCPENC13	c-1,3-Dichloropropene	ug/l	
DCPENT13	t-1,3-Dichloropropane	ug/l	
ETHBENZ	Ethylbenzene	ug/l	
F3C7	Trifluorotoluene	ug/l	IS
FE F	Iron (filtered)	mg/l	
FREON113	Freon 113	ug/l	

IS = Laboratory Internal Standard

CHEMICAL PARAMETERS FOR SURFACE WATER DATA (Page 2 of 2)

HARD F	Hardness (filtered)	mg/l
HG	Mercury	ug/l
HG F	Mercury(filtered)	ug/l
M-XYLENE	Meta-Xylene	ug/l
MG F	Magnesium (filtered)	mg/l
MN	Manganese	mg/l
NA F	Sodium (filtered)	mg/l
NI F	Nickel (filtered)	mg/l
NO2N	Nitrite as N	mg/l
NO2NO3	Nitrite + Nitrate as N	mg/l
NO3N	Nitrate as N	mg/l
PB	Lead	mg/l
PB F	Lead (filtered)	mg/l
PH	pH	SU
SE F	Selenium (filtered)	mg/l
SO4	Sulfate	mg/l
SPCOND	Specific Conductance	umhos/cm
TC	Total Carbon	mg/l
TDS	Total Dissolved Solids	mg/l
TIC	Total Inorganic Carbon	mg/l
TOC	Total Organic Carbon	mg/l
TOLUENE	Toluene	ug/l
TURB	Turbidity	TU
XYLENES	Xylenes	ug/l
ZN	Zinc	mg/l
ZN F	Zinc (filtered)	mg/l

IS = Laboratory Internal Standard

TOWN OF CONKLIN LANDFILL DATA
TYPE 3: SURFACE WATER SAMPLES

TYPE		DATE	SAMPLE	AG F	AL F	AS	AS F	BA F	BENZ	BOD5	BRCL2CH	BRCLC3H6	BRCLCH2	C2H5CL	CA F	CCL4	CD	CD F
3	30	02/ 3/86	90440			.002			<1.		<1.	102.	89.	<1.		<1.	<.01	
3	30	02/ 3/86	90441			.001											<.01	
3	30	04/24/86	23992			<.001			<10.		<10.	92.	94.	<10.		<10.	<.01	
3	30	11/ 7/86	131360															
3	31	02/ 3/86	90442			.002			<1.		<1.	94.	81.	<1.		<1.	<.01	
3	31	02/ 3/86	90443			.003											<.01	
3	31	04/24/86	23993			<.001			<10.		<10.	79.	81.	<10.		<10.	<.01	
3	31	11/ 7/86	131361															
3	32	02/ 3/86	90444			<.001			<1.		<1.	96.	95.	<1.		<1.	<.01	
3	32	02/ 3/86	90472			.003											<.01	
3	32	04/24/86	23994			.002			<10.		<10.	92.	92.	<10.		<10.	<.01	
3	32	11/ 7/86	131362															
3	33	11/14/84	6749	<.01	<.5		<.01	<.1		<1.					8.8			<.01
3	34	11/14/84	6750	<.01	<.5		<.01	<.1		<1.					9.3			<.01
3	35	11/14/84	6751	<.01	<.5		<.01	<.1		<1.					11.			<.01

TOWN OF CONKLIN LANDFILL DATA
TYPE 3: SURFACE WATER SAMPLES

TYPE		DATE	SAMPLE	CH2CHCL	CH2CL2	CH3BR	CH3CL	CHBR3	CHCL3	CL	CL3C2112	CL3C2H	CL3CCH3	CL4C2	CL4C2H2	CLBR2CH
3	30	02/ 3/86	0													
3	30	02/ 3/86	90440	<1.	<1.	<1.	<1.	<10.	<1.		<1.	<1.	<1.	<1.	<1.	<1.
3	30	02/ 3/86	90441													
3	30	04/24/86	23992	<10.	<50.	<10.	<10.	<100.	<10.		<10.	<10.	<10.	<10.	<10.	<10.
3	30	11/ 7/86	131360													
3	31	02/ 3/86	90442	<1.	<1.	<1.	<1.	<10.	<1.		<1.	<1.	<1.	<1.	<1.	<1.
3	31	02/ 3/86	90443													
3	31	04/24/86	23993	<10.	<50.	<10.	<10.	<100.	<10.		<10.	<10.	<10.	<10.	<10.	<10.
3	31	11/ 7/86	131361													
3	32	02/ 3/86	90444	<1.	<1.	<1.	<1.	<10.	<1.		<1.	<1.	<1.	<1.	<1.	<1.
3	32	02/ 3/86	90472													
3	32	04/24/86	23994	<10.	<50.	<10.	<10.	<100.	<10.		<10.	<10.	<10.	<10.	<10.	<10.
3	32	11/ 7/86	131362													
3	33	11/14/84	6749							1.						
3	34	11/14/84	6750							1.						
3	35	11/14/84	6751							1.						

TOWN OF CONKLIN LANDFILL DATA
TYPE 3: SURFACE WATER SAMPLES

TYPE		DATE	SAMPLE	CLETHER	CLOROBZ	CN	COD-M	CR	CR F	CR-HEX F	CU	CU F	DATE	DCETAN11	DCETAN12	DCLEN11
3	30	02/ 3/86	0													
3	30	02/ 3/86	90440	<10.	<1.			<.01			.02		22086.	<1.	<1.	<1.
3	30	02/ 3/86	90441					<.01			.01					
3	30	04/24/86	23992	<100.	<10.			<.01			<.01		50886.	<10.	<10.	<10.
3	30	11/ 7/86	131360													
3	31	02/ 3/86	90442	<10.	<1.			<.01			.01		22086.	<1.	<1.	<1.
3	31	02/ 3/86	90443					<.01			.01					
3	31	04/24/86	23993	<100.	<10.			<.01			<.01		50886.	<10.	<10.	<10.
3	31	11/ 7/86	131361													
3	32	02/ 3/86	90444	<10.	<1.			<.01			.01		22086.	<1.	<1.	<1.
3	32	02/ 3/86	90472					<.01			.01					
3	32	04/24/86	23994	<100.	<10.			<.01			<.01		50886.	<10.	<10.	<10.
3	32	11/ 7/86	131362													
3	33	11/14/84	6749			<.05	74.		<.05	<.05		<.01				
3	34	11/14/84	6750			<.05	166.		<.05	<.05		<.01				
3	35	11/14/84	6751			<.05	111.		<.05	<.05		<.01				

TOWN OF CONKLIN LANDFILL DATA
TYPE 3: SURFACE WATER SAMPLES

TYPE		DATE	SAMPLE	DCLEN12	DCPAN12	DCPENC13	DCPENT13	ETHBENZ	F3C7	FE F	FREON113	HARD F	HG	HG F	M-XYLENE
3	30	02/ 3/86	0												
3	30	02/ 3/86	90440	<1.	<1.	<1.	<1.	<1.	105.		<1.		<.1		<1.
3	30	02/ 3/86	90441										<.1		
3	30	04/24/86	23992	<10.	<10.	<10.	<10.	<10.	97.		<10.		.2		<10.
3	30	11/ 7/86	131360										<.5		
3	31	02/ 3/86	90442	<1.	<1.	<1.	<1.	<1.	102.		<1.		<.1		<1.
3	31	02/ 3/86	90443										<.1		
3	31	04/24/86	23993	<10.	<10.	<10.	<10.	<10.	74.		<10.		3.1		<10.
3	31	11/ 7/86	131361										<.5		
3	32	02/ 3/86	90444	<1.	<1.	<1.	<1.	<1.	102.		<1.		<.1		<1.
3	32	02/ 3/86	90472										<.1		
3	32	04/24/86	23994	<10.	<10.	<10.	<10.	<10.	95.		<10.		<.1		<10.
3	32	11/ 7/86	131362										<.5		
3	33	11/14/84	6749							.05		29.		<.5	
3	34	11/14/84	6750							.04		30.		<.5	
3	35	11/14/84	6751							.05		37.		<.5	

TOWN OF CONKLIN LANDFILL DATA
TYPE 3: SURFACE WATER SAMPLES

TYPE		DATE	SAMPLE	MG F	MN F	NA F	NI F	NO2N	NO2NO3	NO3N	PB	PB F	PH	PHENOL	SE F	SO4	SPCOND	TC	TDS
3	30	02/ 3/86	0																
3	30	02/ 3/86	90440								<.01		7.5	<.001			88.3	8.	100.
3	30	02/ 3/86	90441								<.01		7.1	<.001			83.9	4.	88.
3	30	04/24/86	23992								<.01		6.6	<.001			70.	8.	52.
3	30	11/ 7/86	131360																
3	31	02/ 3/86	90442								<.01		6.8	<.001			76.9	8.	136.
3	31	02/ 3/86	90443								<.01		6.7	<.001			80.1	6.	68.
3	31	04/24/86	23993								<.01		.1	<.001			70.	10.	64.
3	31	11/ 7/86	131361																
3	32	02/ 3/86	90444								<.01		6.7	<.001			78.1	8.	88.
3	32	02/ 3/86	90472								<.01		6.8	<.001			77.4	6.	92.
3	32	04/24/86	23994								<.01		6.9	<.001			65.	10.	52.
3	32	11/ 7/86	131362																
3	33	11/14/84	6749	1.8	.13	.7	.09	<.01	.01	<.01		<.01	5.8		<.01	32.	46.	34.	80.
3	34	11/14/84	6750	1.7	.19	1.1	.07	.01	.03	.02		<.01	6.3		<.01	25.	46.	56.	140.
3	35	11/14/84	6751	2.3	.21	1.1	.07	.01	.02	.01		<.01	6.4		<.01	34.	45.	36.	130.

TOWN OF CONKLIN LANDFILL DATA
TYPE 3: SURFACE WATER SAMPLES

TYPE		DATE	SAMPLE	TIC	TOC	TOLUENE	TURB	XYLENES	ZN	ZN F
3	30	02/ 3/86	0							
3	30	02/ 3/86	90440	5.	3.	<1.		<1.	<.01	
3	30	02/ 3/86	90441	4.	<1.				<.01	
3	30	04/24/86	23992	5.	3.	<10.		<10.	<.01	
3	30	11/ 7/86	131360							
3	31	02/ 3/86	90442	5.	3.	<1.		<1.	<.01	
3	31	02/ 3/86	90443	4.	2.				<.01	
3	31	04/24/86	23993	5.	5.	<10.		<10.	<.01	
3	31	11/ 7/86	131361							
3	32	02/ 3/86	90444	5.	3.	<1.		<1.	<.01	
3	32	02/ 3/86	90472	5.	1.				<.01	
3	32	04/24/86	23994	5.	5.	<10.		<10.	<.01	
3	32	11/ 7/86	131362							
3	33	11/14/84	6749	1.	33.		15.			<.01
3	34	11/14/84	6750	1.	55.		120.			.02
3	35	11/14/84	6751	1.	35.		15.			.02

APPENDIX L

LEACHATE ANALYTICAL RESULTS

CHEMICAL PARAMETERS FOR LEACHATE DATA (Page 1 of 2)

ABBREV.	PARAMETER NAME	UNITS	
A-BHC	alpha-BHC	ug/l	
A-ENDO	Endosulfan I	ug/l	
AG	Silver	mg/l	
ALDRIN	Aldrin	ug/l	
AS	Arsenic	mg/l	
AS F	Arsenic (filtered)	mg/l	
B-BHC	beta-BHC	ug/l	
B-ENDO	Endosulfan ii	ug/l	
BA F	Barium (filtered)	mg/l	
BENZ	Benzene	ug/l	
BRCL2CH	Bromodichloromethane	ug/l	
BRCLC3H6	2-bromo-1-chloropropane	ug/l	IS
BRCLCH2	Bromochloromethane	ug/l	IS
C2H5CL	Chloroethane	ug/l	
CA F	Calcium (filtered)	mg/l	
CCL4	Carbon Tetrachloride	ug/l	
CD	Cadmium	mg/l	
CD F	Cadmium (filtered)	mg/l	
CH2CHCL	Vinyl Chloride	ug/l	
CH2CL2	Methylene Chloride	ug/l	
CH3BR	Bromomethane	ug/l	
CH3CL	Chloromethane	ug/l	
CHBR3	Bromoform	ug/l	
CHCL3	Chloroform	ug/l	
CHLRDNE	Chlordane	ug/l	
CL	Chloride	ug/l	
CL3C2112	1,1,2-Trichloroethane	ug/l	
CL3C2H	Trichloroethene	ug/l	
CL3CCH3	1,1,1-Trichloroethane	ug/l	
CL4C2	Tetrachloroethene	ug/l	
CL4C2H2	1,1,2,2-Tetrachloroethane	ug/l	
CLBR2CH	Dibromochloromethane	ug/l	
CLETHER	2-Chloroethylvinyl Ether	ug/l	
CHLOROBZ	Chlorobenzene	ug/l	
CN	Cyanide	mg/l	
COD-M	Chemical Oxygen Demand	mg/l	
CR	Chromium	mg/l	
CR-HEX F	Hexavalent Chromium (filtered)	mg/l	
CU	Copper	mg/l	
CU F	Copper (filtered)	mg/l	
DATE	Date Analysis Completed		
D-BHC	delta-BHC	ug/l	
DBC	Decachlorobiphenyl	ug/l	IS
DCETAN11	1,1-Dichloroethane	ug/l	
DCETAN12	1,2-Dichloroethane	ug/l	
DCLEN11	1,1-Dichloroethene	ug/l	
DCLEN12	t-1,2-Dichloroethene	ug/l	
DCPAN12	1,2-Dichloropropane	ug/l	

IS = Laboratory Internal Standard

CHEMICAL PARAMETERS FOR LEACHATE DATA

DCPENC13	c-1,3-Dichloropropene	ug/l	
DCPENT13	t-1,3-Dichloropropane	ug/l	
DIELDRN	Dieldrin	ug/l	
ENDRIN	Endrin	ug/l	
ENDRIN-A	Endrin Aldehyde	ug/l	
ENDRIN-K	Endrin Ketone	ug/l	
ENDSULF	Endosulfan Sulfate	ug/l	
ETHBENZ	Ethylbenzene	ug/l	
F3C7	Trifluorotoluene	ug/l	IS
FE	Iron	mg/l	
FE F	Iron (filtered)	mg/l	
FREON113	Freon 113	ug/l	
HARD F	Hardness (filtered)	mg/l	
HEPEPOX	Heptachlor Epoxide	ug/l	
HEPTA	Heptachlor	ug/l	
HG	Mercury	ug/l	
HG F	Mercury(filtered)	ug/l	
LINDANE	gamma-BHC	ug/l	
M-XYLENE	Meta-Xylene	ug/l	
MEK	Methly Ethyl Ketone	ug/l	
MG F	Magnesium (filtered)	mg/l	
MIBK	Methyl Isobutyl Ketone	ug/l	
MN	Manganese	mg/l	
MN F	Manganese (filtered)	mg/l	
NA	Sodium	mg/l	
NA F	Sodium (filtered)	mg/l	
NI F	Nickel (filtered)	mg/l	
NO2N	Nitrite as N	mg/l	
NO2NO3	Nitrite + Nitrate as N	mg/l	
NO3N .	Nitrate as N	mg/l	
PB	Lead	mg/l	
PB F	Lead (filtered)	mg/l	
PCB	PCB's (total)	ug/l	
PH	pH	SU	
PP-DDD	4,4'-DDD	ug/l	
PP-DDE	4,4'-DDE	ug/l	
PP-DDT	4,4'-DDT	ug/l	
SE F	Selenium (filtered)	mg/l	
SO4	Sulfate	mg/l	
SPCOND	Specific Conductance	umhos/cm	
TALK	Total Alkalinity	mg/l	
TC	Total Carbon	mg/l	
TDS	Total Dissolved Solids	mg/l	
TIC	Total Inorganic Carbon	mg/l	
TOC	Total Organic Carbon	mg/l	
TOLUENE	Toluene	ug/l	
TXPHENE	Toxaphene	ug/l	
XYLENES	Xylenes	ug/l	
ZN F	Zinc (filtered)	mg/l	

IS = Laboratory Internal Standard

TOWN OF CONKLIN LANDFILL DATA
TYPE 4: LEACHATE SAMPLES

TYPE		DATE	SAMPLE	A-BHC	A-ENDO	ACETONE	ALDRIN	AS	B-BHC	B-ENDO	BENZ	BRCL2CH	BRCLC3H6	BRCLCH2	C2H5CL	CCL4
4	13	08/ 8/83	62894					<.01			2.	<1.			<1.	<1.
4	13	08/20/83	63217					<.01			<1.	<1.			<1.	<1.
4	14	08/ 8/83	62895					<.01			40.	<1.			19.	<1.
4	14	08/19/83	63218					<.01			47.	<1.			15.	<1.
4	14	02/13/86	90477	<.05	<.05	1500.	<.05	.005	<.05	<.1	33.	<10.	94.	97.	<10.	<10.
4	15	08/ 8/83	62896					<.01			<1.	<1.			<1.	<1.
4	15	08/20/83	63220								<1.	<1.			<1.	<1.
4	16	08/20/83	63219					<.01			7.	<1.			<1.	<1.
4	27	02/13/86	90484	<.05	<.05		<.05	.006	<.05	<.1	<1.	<1.	101.	90.	<1.	<1.

TOWN OF CONKLIN LANDFILL DATA
TYPE 4: LEACHATE SAMPLES

TYPE		DATE	SAMPLE	CH2CHCL	CH2CL2	CH3BR	CH3CL	CHBR3	CHCL3	CHLRDNE	CL	CL3C2112	CL3C2H	CL3CCH3	CL4C2
4	13	08/ 8/83	0												
4	13	08/ 8/83	62894	<1.	<1.	<1.	<1.	<10.	<1.		27.	<1.	<1.	2.	<1.
4	13	08/20/83	63217	<1.	2.	<1.	<1.	<100.	<1.		90.	<1.	<1.	<1.	<1.
4	14	08/ 8/83	62895	36.	1600.	<1.	<1.	<10.	<1.		840.	<1.	23.	<1.	5.
4	14	08/19/83	63218	25.	2100.	<1.	2.	<100.	<1.		860.	<1.	23.	<1.	4.
4	14	02/13/86	90477	<10.	150.	<10.	<10.	<100.	<10.	<.5	195.	<10.	<10.	<10.	<10.
4	15	08/ 8/83	62896	<1.	2.	<1.	<1.	<10.	<1.		47.	<1.	<1.	<1.	<1.
4	15	08/20/83	63220	<1.	4.	<1.	<1.	<100.	<1.			<1.	<1.	<1.	<1.
4	16	08/20/83	63219	<1.	4.	<1.	<1.	<100.	<1.		760.	<1.	<1.	<1.	1.
4	27	02/13/86	90484	<1.	<1.	<1.	<1.	<10.	<1.	<.5	11.	<1.	<1.	<1.	<1.

TOWN OF CONKLIN LANDFILL DATA
TYPE 4: LEACHATE SAMPLES

TYPE		DATE	SAMPLE	CL4C2H2	CLBR2CH	CLETHER	CLOROBZ	CU	D-BHC	DATE	DBC	DCETAN11	DCETAN12	DCLEN11	DCLEN12
4	13	08/ 8/83	0												
4	13	08/ 8/83	62894	<1.	<1.	<10.	2.	2.4				<1.	<1.	<1.	<1.
4	13	08/20/83	63217	<1.	<1.	<100.	<1.	2.5				<1.	<1.	<1.	<1.
4	14	08/ 8/83	62895	<1.	<1.	<10.	<1.	.20				62.	6.	<1.	8.
4	14	08/19/83	63218	<1.	<1.	<100.	<1.	.2				80.	10.	<1.	10.
4	14	02/13/86	90477	<10.	<10.	<100.	<10.	.01	<.05	22786.	40.	<10.	<10.	<10.	<10.
4	15	08/ 8/83	62896	<1.	<1.	<10.	<1.	.78				<1.	<1.	<1.	<1.
4	15	08/20/83	63220	<1.	<1.	<100.	<1.					<1.	<1.	<1.	<1.
4	16	08/20/83	63219	<1.	<1.	<100.	<1.	.3				<1.	<1.	<1.	<1.
4	27	02/13/86	90484	<1.	<1.	<10.	<1.	20.	<.05	22786.	75.	<1.	<1.	<1.	<1.

TOWN OF CONKLIN LANDFILL DATA
TYPE 4: LEACHATE SAMPLES

TYPE		DATE	SAMPLE	DCPAN12	DCPENC13	DCPENT13	DIELDRN	ENDRIN	ENDRIN-A	ENDRIN-K	ENDSULF	ETHBENZ	F3C7	FE
4	13	08/ 8/83	0											
4	13	08/ 8/83	62894	<1.	<1.	<1.						8.		3.6
4	13	08/20/83	63217	<1.	<1.	<1.						5.		.84
4	14	08/ 8/83	62895	150.	<1.	<1.						34.		190.
4	14	08/19/83	63218	350.	<1.	<1.						59.		640.
4	14	02/13/86	90477	<10.	<10.	<10.	<.1	<.1	<.1	<.1	<.1	89.	100.	6200.
4	15	08/ 8/83	62896	45.	<1.	<1.						<1.		<.01
4	15	08/20/83	63220	20.	<1.	<1.						<1.		.03
4	16	08/20/83	63219	<1.	<1.	<1.						23.		4.3
4	27	02/13/86	90484	<1.	<1.	<1.	<.1	<.1	<.1	<.1	<.1	<1.	103.	77.

TOWN OF CONKLIN LANDFILL DATA
TYPE 4: LEACHATE SAMPLES

TYPE		DATE	SAMPLE	FREON113	HEPEPOX	HEPTA	HG	LINDANE	M-XYLENE	MEK	MIBK	MN	MTHXYCR	PCB	PH	PP-DDD	PP-DDE
4	13	08/ 8/83	0														
4	13	08/ 8/83	62894	<1.			<.5		15.			16.			6.8		
4	13	08/20/83	63217	<1.			25.		4.			15.			6.6		
4	14	08/ 8/83	62895	<1.					<1.			110.			6.0		
4	14	08/19/83	63218	<1.			5.		100.			120.			5.9		
4	14	02/13/86	90477	<10.	<.05	<.05	<.1	<.05	100.	4200.	310.	16.2	<.5	<.1	6.7	<.1	<.1
4	15	08/ 8/83	62896	<1.			<.5		<1.			7.2			6.8		
4	15	08/20/83	63220	<1.					<1.			15.					
4	16	08/20/83	63219	<1.			2.		22.			.80			7.7		
4	27	02/13/86	90484	<1.	<.05	<.05	.8	<.05	<1.			2.47	<.5	<.1	6.9	<.1	<.1

TOWN OF CONKLIN LANDFILL DATA
TYPE 4: LEACHATE SAMPLES

TYPE		DATE	SAMPLE	PP-DDT	SPCOND	TC	TDS	TIC	TOC	TOLUENE	TXPHENE	XYLENES
4	13	08/ 8/83	0									
4	13	08/ 8/83	62894		430.		310.			17.		26.
4	13	08/20/83	63217		272.		230.			13.		7.
4	14	08/ 8/83	62895		10342.		13750.			1100.		<1.
4	14	08/19/83	63218		11458.		15900.			1200.		160.
4	14	02/13/86	90477	<.1	3300.	1960.	4700.	200.	1760.	1200.	<1.0	190.
4	15	08/ 8/83	62896		330.		280.			<1.		<1.
4	15	08/20/83	63220							1.		<1.
4	16	08/20/83	63219		4586.		2660.			8.		40.
4	27	02/13/86	90484	<.1	61.6	120.	96.	3.	117.	<1.	<1.0	<1.

APPENDIX M

SEDIMENT ANALYTICAL RESULTS

CHEMICAL PARAMETERS FOR SEDIMENT DATA

ABBREV.	PARAMETER NAME	UNITS	
AS	Arsenic	mg/l	
BENZ	Benzene	ug/l	
BRCL2CH	Bromodichloromethane	ug/l	
BRCLC3H6	2-bromo-1-chloropropane	ug/l	IS
BRCLCH2	Bromochloromethane	ug/l	IS
C2H5CL	Chloroethane	ug/l	
CCL4	Carbon Tetrachloride	ug/l	
CD	Cadmium	mg/l	
CH2CHCL	Vinyl Chloride	ug/l	
CH2CL2	Methylene Chloride	ug/l	
CH3BR	Bromomethane	ug/l	
CH3CL	Chloromethane	ug/l	
CHBR3	Bromoform	ug/l	
CHCL3	Chloroform	ug/l	
CL3C2112	1,1,2-Trichloroethane	ug/l	
CL3C2H	Trichloroethene	ug/l	
CL3CCH3	1,1,1-Trichloroethane	ug/l	
CL4C2	Tetrachloroethene	ug/l	
CL4C2H2	1,1,2,2-Tetrachloroethane	ug/l	
CLBR2CH	Dibromochloromethane	ug/l	
CLETHER	2-Chloroethylvinyl Ether	ug/l	
CHLOROBZ	Chlorobenzene	ug/l	
CR	Chromium	mg/l	
CU	Copper	mg/l	
DATE	Date Analysis Completed		
DCETAN11	1,1-Dichloroethane	ug/l	
DCETAN12	1,2-Dichloroethane	ug/l	
DCLEN11	1,1-Dichloroethene	ug/l	
DCLEN12	t-1,2-Dichloroethene	ug/l	
DCPAN12	1,2-Dichloropropane	ug/l	
DCPENC13	c-1,3-Dichloropropene	ug/l	
DCPENT13	t-1,3-Dichloropropane	ug/l	
ETHBENZ	Ethylbenzene	ug/l	
F3C7	Trifluorotoluene	ug/l	IS
FE	Iron	mg/l	
FREON113	Freon 113	ug/l	
HG	Mercury	ug/l	
M-XYLENE	Meta-Xylene	ug/l	
PB	Lead	mg/l	
PCB	PCB's (total)	ug/l	
TOLUENE	Toluene	ug/l	
XYLENES	Xylenes	ug/l	
ZN	Zinc	mg/l	

IS = Laboratory Internal Standard

TOWN OF CONKLIN LANDFILL DATA
TYPE 2: SEDIMENT SAMPLES

TYPE		DATE	SAMPLE	AS	BENZ	BRCL2CH	BRCLC3H6	BRCLCH2	C2H5CL	CCL4	CD	CH2CHCL	CH2CL2	CH3BR	CH3CL	CHBR3	CHCL3
2	30	02/13/86	90480	1.29							2.						
2	31	02/13/86	90479	1.46							2.						
2	32	02/13/86	90478	1.29							2.						
2	33	02/13/86	90481	1.0							2.						
2	33	04/24/86	23995		<10.	<10.	69.	70.	<10.	<10.		<10.	<50.	<10.	<10.	<100.	<10.
2	34	02/13/86	90482	.5							2.						
2	34	04/24/86	23996		<10.	<10.	92.	90.	<10.	<10.		<10.	<50.	<10.	<10.	<100.	<10.
2	35	02/13/86	90483	.7							2.						
2	35	04/24/86	23997		<10.	<10.	76.	72.	<10.	<10.		<10.	<50.	<10.	<10.	<100.	<10.

TOWN OF CONKLIN LANDFILL DATA
TYPE 2: SEDIMENT SAMPLES

TYPE		DATE	SAMPLE	CL3C2112	CL3C2H	CL3CCH3	CL4C2	CL4C2H2	CLBR2CH	CLETHER	CLOROBZ	CR	CU	DATE	DBC	DCETAN11
2	30	02/13/86	0													
2	30	02/13/86	90480									10.	30.		58.	
2	31	02/13/86	90479									6.	25.		58.	
2	32	02/13/86	90478									8.	27.		57.	
2	33	02/13/86	90481									6.	21.		65.	
2	33	04/24/86	23995	<10.	<10.	<10.	<10.	<10.	<10.	<100.	<10.			50886.		<10.
2	34	02/13/86	90482									5.	18.		63.	
2	34	04/24/86	23996	<10.	<10.	<10.	<10.	<10.	<10.	<100.	<10.			50886.		<10.
2	35	02/13/86	90483									4.	18.		60.	
2	35	04/24/86	23997	<10.	<10.	<10.	<10.	<10.	<10.	<100.	<10.			50886.		<10.

TOWN OF CONKLIN LANDFILL DATA
TYPE 2: SEDIMENT SAMPLES

TYPE		DATE	SAMPLE	DCETAN12	DCLEN11	DCLEN12	DCPAN12	DCPENC13	DCPENT13	ETHBENZ	F3C7	FREON113	HG
2	30	02/13/86	0										
2	30	02/13/86	90480										<10.
2	31	02/13/86	90479										110.
2	32	02/13/86	90478										60.
2	33	02/13/86	90481										30.
2	33	04/24/86	23995	<10.	<10.	<10.	<10.	<10.	<10.	<10.	74.	<10.	
2	34	02/13/86	90482										40.
2	34	04/24/86	23996	<10.	<10.	<10.	<10.	<10.	<10.	<10.	100.	<10.	
2	35	02/13/86	90483										130.
2	35	04/24/86	23997	<10.	<10.	<10.	<10.	<10.	<10.	<10.	69.	<10.	

TOWN OF CONKLIN LANDFILL DATA
TYPE 2: SEDIMENT SAMPLES

TYPE		DATE	SAMPLE	M-XYLENE	PB	PCB	TOLUENE	XYLENES	ZN
2	30	02/13/86	0						
2	30	02/13/86	90480		16.	<500.			610.
2	31	02/13/86	90479		15.	<500.			510.
2	32	02/13/86	90478		15.	<500.			510.
2	33	02/13/86	90481		18.	<500.			460.
2	33	04/24/86	23995	<10.			<10.	<10.	
2	34	02/13/86	90482		11.	<500.			170.
2	34	04/24/86	23996	<10.			<10.	<10.	
2	35	02/13/86	90483		12.	<500.			210.
2	35	04/24/86	23997	<10.			<10.	<10.	

Exhibits

O'BRIEN & GERE

EXHIBIT A

NEW YORK STATE DEPARTMENT OF HEALTH

HOMEOWNER WELL DATA

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

AUG - 9 1984

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health
Roland M. Austin, P.E., Director, Environmental Health Services

August 2, 1984

Mr. C. Miller
Box 350, Conklin Road
Conklin, NY 13748

Dear Mr. Miller:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Departments.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was negative and, therefore, is slightly corrosive.

Chemical parameters measured included arsenic, sodium, sulfates and chlorides. The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l. All of these parameters were below NYSDOH Standards in your groundwater.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. Of the 8 metals tested for three were detected. Of these three metals, one, iron exceeded its NYS Department of Health standard which is 0.3 mg/l. The value of 0.3 mg/l is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, it is undesireable because it stains laundry and plumbing fixtures.

Iron is a natural constituent of the area soils and it is not unusual to find it at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor quality but within drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Svatyla
Assistant Public Health Engineer

MMS:et
enclosure

cc: Dr. Kathleen A. Gaffney
Robert Denz, P.E.
Phil Murphy
Jack Guinan
Town Clerk, Conklin, NY

0772

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 — RESULTS OF EXAMINATION — FINAL REPORT

SAMPLE ID: 841000720 SAMPLE RECEIVED:84/05/03/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #7 MILLER RESIDENCE
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 84/05/01 12:15 DATE PRINTED:84/07/18

	PARAMETER	RESULT
21CADMIUM	CADMIUM	< 2. MCG/L
21CHROMIUM	CHROMIUM	< 10. MCG/L
21LEAD	LEAD	< 10. MCG/L
01BARIUM	BARIUM	< 0.5 MG/L
01IRON	IRON	0.35 MG/L ←
01MANGAN	MANGANESE	0.16 MG/L
01MERCURY	MERCURY	< 0.2 MCG/L
01SODIUM	SODIUM ✓	25. MG/L
01ZINC	ZINC	0.19 MG/L
01PH	PH ✓	7.9
01ALKALIN	ALKALINITY TO PH 4.5 ✓	126. MG/L
01HARDNESS	HARDNESS, TOTAL AS CACO3 ✓	81. MG/L
01ODOR	ODOR, COLD ✓	NONE
01CHLORIDE	CHLORIDE ✓	4.6 MG/L
21ARSENIC	ARSENIC ✓	< 10. MCG/L
01SULFATE	SULFATE AS SO4 ✓	12. MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C ✓	152. MG/L

**** END OF REPORT ****

Langlier Index = -0.06

RECEIVED
JUL 23 1984
BROOME CO.
HEALTH DEPARTMENT

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON, N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 41552 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:05 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:MILLER RESIDENCE #7
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 12:15 DATE PRINTED:84/05/14

	PARAMETER	RESULT
T62009	CHLOROMETHANE	< 1. MCG/L
T61809	BROMOMETHANE	< 1. MCG/L
T41009	VINYL CHLORIDE	< 1. MCG/L
T70209	DICHLORODIFLUORMETHANE	< 1. MCG/L
T61909	CHLOROETHANE	< 1. MCG/L
T61709	TRICHLOROFLUOROMETHANE	< 1. MCG/L
T23809	DICHLOROMETHANE	< 1. MCG/L
T50909	1,1-DICHLOROETHENE	< 1. MCG/L
T51909	1,1-DICHLOROETHANE	< 1. MCG/L
T61209	TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
T39009	CHLOROFORM	< 1. MCG/L
T50809	1,2-DICHLOROETHANE	< 1. MCG/L
T23609	1,1,1-TRICHLOROETHANE	< 1. MCG/L
T35609	CARBON TETRACHLORIDE	< 1. MCG/L
T38909	BROMODICHLOROMETHANE	< 1. MCG/L
T61309	1,2-DICHLOROPROPANE	< 1. MCG/L
T61509	TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
T41109	TRICHLOROETHYLENE	< 1. MCG/L
T44909	DIBROMOCHLOROMETHANE	< 1. MCG/L
T61409	CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
T51709	1,1,2-TRICHLOROETHANE	< 1. MCG/L
T61109	2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
T42109	BROMOFORM	< 1. MCG/L
T51809	1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
T41209	TETRACHLOROETHENE	< 1. MCG/L
T40909	CHLOROBENZENE	< 1. MCG/L
T49709	1,3-DICHLOROBENZENE	< 1. MCG/L
T44109	1,2-DICHLOROBENZENE	< 1. MCG/L
T44209	1,4-DICHLOROBENZENE	< 1. MCG/L
T34409	BENZENE	< 1. MCG/L
T39209	TOLUENE	< 1. MCG/L
T51009	ETHYLBENZENE	< 1. MCG/L
T85209	1-CHLOROCYCLOHEXENE-1	< 1. MCG/L

**** CONTINUED ON NEXT PAGE ****

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION — FINAL REPORT

SAMPLE ID: 41552 SAMPLE RECEIVED:84/05/02/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN,NY
TIME OF SAMPLING: 84/05/01 12:15 DATE PRINTED:84/05/14

	PARAMETER	RESULT
I70409	PARA-XYLENE	< 1. MCG/L
I70309	META-XYLENE	< 1. MCG/L
I51409	ORTHO-XYLENE	< 1. MCG/L
I85309	CUMENE	< 1. MCG/L
I85409	STYRENE	< 1. MCG/L
I85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
I51109	N-PROPYLBENZENE	< 1. MCG/L
I85609	TERT-BUTYLBENZENE	< 1. MCG/L
I85709	O/P-CHLOROTOLUENE	< 1. MCG/L
I51209	BROMOBENZENE	< 1. MCG/L
I50509	META-CHLOROTOLUENE	< 1. MCG/L
I85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
I85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
I86009	P-CYMENE	< 1. MCG/L
I86109	CYCLOPROPYLBENZENE	< 1. MCG/L
I86209	SEC-BUTYLBENZENE	< 1. MCG/L
I86309	N-BUTYLBENZENE	< 1. MCG/L
I86409	2,3-BENZOFURAN	< 1. MCG/L
I52509	HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
I44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
I65609	NAPHTHALENE	< 5. MCG/L
I43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

RECEIVED
MAY 21 1984
BROOME COUNTY
HEALTH DEPARTMENT

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health
Environmental Health Services

August 2, 1984

Mrs D. Hamm
P.O. Box #53
Conklin, NY 13748

Dear Mrs Hamm:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Departments.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was positive and, therefore, has a tendency toward scaling.

Chemical parameters measured included arsenic, sodium, sulfates, and chlorides. The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are: arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. of the 8 metals tested for three were detected. All three metals detected were found at levels below NYS Department of Health Standards for drinking water.

Overall, the quality of your drinking water as determined using these parameters is of poor quality but within drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Swiatyla
Assistant Public Health Engineer

MMS:et
cc: Dr. Kathleen A. Gaffney
Robert Denz,P.E.
Phil Murphy
Jack Guinan
~~Town Clerk, Conklin,~~ NY

enclosure

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 841000715 SAMPLE RECEIVED:84/05/03/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #2 HAMM RESIDENCE
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 84/05/01 11:20 DATE PRINTED:84/07/18

	PARAMETER	RESULT
21CADMIUM	CADMIUM	< 2. MCG/L
21CHROMIUM	CHROMIUM	< 10. MCG/L
21LEAD	LEAD	< 10. MCG/L
01BARIUM	BARIUM	< 0.5 MG/L
01IRON	IRON	0.24 MG/L
01MANGAN	MANGANESE	0.29 MG/L
01MERCURY	MERCURY	< 0.2 MCG/L
01SODIUM	SODIUM	53. MG/L
01ZINC	ZINC	0.05 MG/L
01PH	PH	7.9
01ALKALIN	ALKALINITY TO PH 4.5	197. MG/L
01HARDNESS	HARDNESS, TOTAL AS CACO3	92. MG/L
01ODOR	ODOR, COLD	1 MUSTY
01CHLORIDE	CHLORIDE	15. MG/L
01NITRATE	NITROGEN, NITRATE + NITRITE	< 0.05 MG/L
21ARSENIC	ARSENIC	30. MCG/L
01SULFATE	SULFATE AS SO4	2.8 MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	235. MG/L

**** END OF REPORT ****

Langlier Index = 0.16

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 41547 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:06 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:HAMM RESIDENCE #2
REPORTING LAB: 13A:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: V002:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 11:20 DATE PRINTED:84/05/14

	PARAMETER	RESULT
I62009	CHLOROMETHANE	< 1. MCG/L
I61809	BROMOMETHANE	< 1. MCG/L
I41009	VINYL CHLORIDE	< 1. MCG/L
I70209	DICHLORODIFLUORMETHANE	< 1. MCG/L
I61909	CHLOROETHANE	< 1. MCG/L
I61709	TRICHLOROFLUOROMETHANE	< 1. MCG/L
I23809	DICHLOROMETHANE	< 1. MCG/L
I50909	1,1-DICHLOROETHENE	< 1. MCG/L
I51909	1,1-DICHLOROETHANE	< 1. MCG/L
I51209	TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
I39009	CHLOROFORM	< 1. MCG/L
I50809	1,2-DICHLOROETHANE	< 1. MCG/L
I23609	1,1,1-TRICHLOROETHANE	< 1. MCG/L
I35609	CARBON TETRACHLORIDE	< 1. MCG/L
I38909	BROMODICHLOROMETHANE	< 1. MCG/L
I61309	1,2-DICHLOROPROPANE	< 1. MCG/L
I61509	TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
I41109	TRICHLOROETHYLENE	< 1. MCG/L
I44909	DIBROMOCHLOROMETHANE	< 1. MCG/L
I61409	CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
I51709	1,1,2-TRICHLOROETHANE	< 1. MCG/L
I61109	2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
I42109	BROMOFORM	< 1. MCG/L
I51809	1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
I41209	TETRACHLOROETHENE	< 1. MCG/L
I40909	CHLOROBENZENE	< 1. MCG/L
I49709	1,3-DICHLOROBENZENE	< 1. MCG/L
I44109	1,2-DICHLOROBENZENE	< 1. MCG/L
I44209	1,4-DICHLOROBENZENE	< 1. MCG/L
I34409	BENZENE	< 1. MCG/L
I39209	TOLUENE	< 1. MCG/L
I51009	ETHYLBENZENE	< 1. MCG/L
I85209	1-CHLOROCYCLOHEXENE-1	< 1. MCG/L

**** CONTINUED ON NEXT PAGE ****

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

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MAY 21 1984
BROOME COUNTY
HEALTH DEPARTMENT

SUBMITTED BY:SVIATYLA

11

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION — FINAL REPORT

SAMPLE ID: 41547 SAMPLE RECEIVED:84/05/02/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN,NY
TIME OF SAMPLING: 84/05/01 11:20 DATE PRINTED:84/05/14

	PARAMETER	RESULT
T70409	PARA-XYLENE	< 1. MCG/L
T70309	META-XYLENE	< 1. MCG/L
T51409	ORTHO-XYLENE	< 1. MCG/L
T85309	CUMENE	< 1. MCG/L
T85409	STYRENE	< 1. MCG/L
T85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
T51109	N-PROPYLBENZENE	< 1. MCG/L
T85609	TERT-BUTYLBENZENE	< 1. MCG/L
T85709	O/P-CHLOROTOLUENE	< 1. MCG/L
T51209	BROMOBENZENE	< 1. MCG/L
T50509	META-CHLOROTOLUENE	< 1. MCG/L
T85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
T85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
T86009	P-CYMENE	< 1. MCG/L
T86109	CYCLOPROPYLBENZENE	< 1. MCG/L
T86209	SEC-BUTYLBENZENE	< 1. MCG/L
T86309	N-BUTYLBENZENE	< 1. MCG/L
T86409	2,3-BENZOFURAN	< 1. MCG/L
T52509	HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
T44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
T65509	NAPHTHALENE	< 5. MCG/L
T43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

RECEIVED

MAY 21 1984

BROOME COUNTY
HEALTH DEPARTMENT

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health

August 7, 1984

Mr. J. Ferry
P.O. Box 174
WestView Station
Binghamton, NY 13905

Dear Mr. Ferry:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Departments.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was negative and, therefore, is highly corrosive.

Corrosion is defined as the chemical action on materials exerted by outside factors which results in the eating away or destruction of the material. Corrosive water is characteristic of the groundwater found along the Susquehanna River and, in fact, is a common problem throughout Broome County. Public Health concerns relating to corrosive water deals with the level of dissolved metals put into solution. These metals may originate from the pipes found in the water distribution system and become soluble by the corrosive action of the water. The NYS Health Department Part 5 regulations set -2.0 as the value for the Langlier index to initiate metals monitoring in a public water supply. Results during this sampling showed that manganese was found to be above Part 5 standards.

Chemical parameters measured included arsenic, sodium, sulfates and chlorides. The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l. All of these parameters were below NYSDOH Standards in your groundwater.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. Of the 8 metals tested for one was detected. Only manganese exceeded its NYS Department of Health standard which is 0.3 mg/l. The value of 0.3 mg/l is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, it isundesireable because it stains laundry and plumbing fixtures. Manganese is a natural constituent of the area soils and it is not unusual to find it at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor qualityand exceeds drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Sviatyla
Assistant Public Health Engineer

MMS:et
enclosure

cc: Dr. Kathleen A. Gaffney
Robert Denz,P.E.
Phil Murphy
Jack Guinan
~~Town Clerk, Conklin, NY~~

0771

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 841000719 SAMPLE RECEIVED:84/05/03/11
PROGRAM: 170:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #6 FERRY RESIDENCE
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 84/05/01 12:05 DATE PRINTED:84/07/18

	PARAMETER	RESULT
21CADMIUM	CADMIUM	< 2. MCG/L
21CHROMIUM	CHROMIUM	< 10. MCG/L
21LEAD	LEAD	< 10. MCG/L
01BARIUM	BARIUM	< 0.5 MG/L
01IRON	IRON	< 0.05 MG/L
01MANGAN	MANGANESE	0.43 MG/L
01MERCURY	MERCURY	< 0.2 MCG/L
01SODIUM	SODIUM	25. MG/L
01ZINC	ZINC	< 0.05 MG/L
01PH	PH	5.7
01ALKALIN	ALKALINITY TO PH 4.5	7. MG/L
01HARDNESS	HARDNESS, TOTAL AS CACO3	49. MG/L
01ODOR	ODOR, COLD	1 MUSTY
01CHLORIDE	CHLORIDE	29. MG/L
21ARSENIC	ARSENIC	< 10. MCG/L
01SULFATE	SULFATE AS SO4	29. MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	178. MG/L

**** END OF REPORT ****

Langlier Index = -3.74
corrosive

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 41551 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:05 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:FERRY RESIDENCE #6
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 12:05 DATE PRINTED:84/05/14

PARAMETER	RESULT
T62009 CHLOROMETHANE	< 1. MCG/L
T61809 BROMOMETHANE	< 1. MCG/L
T41009 VINYL CHLORIDE	< 1. MCG/L
T70209 DICHLORODIFLUORMETHANE	< 1. MCG/L
T61909 CHLOROETHANE	< 1. MCG/L
T61709 TRICHLOROFLUOROMETHANE	< 1. MCG/L
T23809 DICHLOROMETHANE	< 1. MCG/L
T50909 1,1-DICHLOROETHENE	< 1. MCG/L
T51909 1,1-DICHLOROETHANE	< 1. MCG/L
T51209 TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
T39009 CHLOROFORM	< 1. MCG/L
T50809 1,2-DICHLOROETHANE	< 1. MCG/L
T23609 1,1,1-TRICHLOROETHANE	< 1. MCG/L
T35609 CARBON TETRACHLORIDE	< 1. MCG/L
T38909 BROMODICHLOROMETHANE	< 1. MCG/L
T51309 1,2-DICHLOROPROPANE	< 1. MCG/L
T61509 TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
T41109 TRICHLOROETHYLENE	< 1. MCG/L
T44909 DIBROMOCHLOROMETHANE	< 1. MCG/L
T61409 CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
T51709 1,1,2-TRICHLOROETHANE	< 1. MCG/L
T61109 2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
T42109 BROMOFORM	< 1. MCG/L
T51809 1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
T41209 TETRACHLOROETHENE	< 1. MCG/L
T40909 CHLOROBENZENE	< 1. MCG/L
T49709 1,3-DICHLOROBENZENE	< 1. MCG/L
T44109 1,2-DICHLOROBENZENE	< 1. MCG/L
T44209 1,4-DICHLOROBENZENE	< 1. MCG/L
T34409 BENZENE	< 1. MCG/L
T39209 TOLUENE	< 1. MCG/L
T51009 ETHYLBENZENE	< 1. MCG/L
T65209 1-CHLOROCYCLOHEXENE-1	< 1. MCG/L

**** CONTINUED ON NEXT PAGE ****

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
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HEALTH DEPARTMENT

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 41551 SAMPLE RECEIVED:84/05/02/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN,NY
TIME OF SAMPLING: 84/05/01 12:05 DATE PRINTED:84/05/14

PARAMETER		RESULT
I70409	PARA-XYLENE	< 1. MCG/L
I70309	META-XYLENE	< 1. MCG/L
I51409	ORTHO-XYLENE	< 1. MCG/L
I85309	CUMENE	< 1. MCG/L
I85409	STYRENE	< 1. MCG/L
I85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
I51109	N-PROPYLBENZENE	< 1. MCG/L
I85609	TERT-BUTYLBENZENE	< 1. MCG/L
I85709	O/P-CHLOROTOLUENE	< 1. MCG/L
I51209	BROMOBENZENE	< 1. MCG/L
I50509	META-CHLOROTOLUENE	< 1. MCG/L
I85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
I85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
I86009	P-CYMENE	< 1. MCG/L
I86109	CYCLOPROPYLBENZENE	< 1. MCG/L
I86209	SEC-BUTYLBENZENE	< 1. MCG/L
I86309	N-BUTYLBENZENE	< 1. MCG/L
I86409	2,3-BENZOFURAN	< 1. MCG/L
I52509	HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
I44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
I65609	NAPHTHALENE	< 5. MCG/L
I43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health

August 7, 1984

Mr. R. Rowse
1258 Conklin Road
Conklin, NY 13748

Dear Mr. Rowse:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Departments.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was negative and, therefore, very corrosive.

Corrosion is defined as the chemical action on materials exerted by outside factors which results in the eating away or destruction of the material. Corrosive water is characteristic of the groundwater found along the Susquehanna River and, in fact, is a common problem throughout Broome County. Public Health concerns relating to corrosive water deals with the level of dissolved metals put into solution. These metals may originate from the pipes found in the water distribution system and become soluble by the corrosive action of the water. The NYS Health Department Part 5 regulations set -2.0 as the value for the Langlier index to initiate metals monitoring in a public water supply. Results during this sampling showed that iron was found to be above Part 5 standards.

Chemical parameters measured included arsenic, sodium, sulfates and chlorides. The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l. All of these parameters were below NYSDOH Standards in your groundwater.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. Of the 8 metals tested for two were detected. Of these two metals, one, iron exceeded its NYS Department of Health standard which is 0.3 mg/l. The value of 0.3 mg/l is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, it is undesireable because it stains laundry and plumbing fixtures. Iron is a natural constituent of the area soils and it is not unusual to find it at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor qualityand exceeds drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Sviatyla
Assistant Public Health Engineer

MMS:et
enclosure

cc: Dr. Kathleen A. Gaffney
Robert Denz,P.E.
Phil Murphy
Jack Guinan
[redacted] NY

0767

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 841000717 SAMPLE RECEIVED:84/05/03/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #4 ROWSE RESIDENCE
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 100:WATER FROM DUG WELL
TIME OF SAMPLING: 84/05/01 11:40 DATE PRINTED:84/07/18

	PARAMETER	RESULT
21CADMIUM	CADMIUM	< 2. MCG/L
21CHROMIUM	CHROMIUM	< 10. MCG/L
21LEAD	LEAD	< 10. MCG/L
01BARIUM	BARIUM	< 0.5 MG/L
01IRON	IRON	7.2 MG/L ←
01MANGAN	MANGANESE	0.21 MG/L
01MERCURY	MERCURY	< 0.2 MCG/L
01SODIUM	SODIUM	5.2 MG/L
01ZINC	ZINC	< 0.05 MG/L
01PH	PH	6.5
01ALKALIN	ALKALINITY TO PH 4.5	41. MG/L
01HARDNESS	HARDNESS, TOTAL AS CACO3	56. MG/L
01ODOR	ODOR, COLD	4 MUSTY
01CHLORIDE	CHLORIDE	11. MG/L
01NITRATE	NITROGEN, NITRATE + NITRITE	< 0.05 MG/L
21ARSENIC	ARSENIC	< 10. MCG/L
01SULFATE	SULFATE AS SO4	15. MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	93. MG/L

**** END OF REPORT ****

Langlier Index = -2.08
Corrosive

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

GE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 41549 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:05 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:ROUNSE RESIDENCE #4
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 11:40 DATE PRINTED:84/05/14

PARAMETER	RESULT
T62009 CHLOROMETHANE	< 1. MCG/L
T51809 BROMOMETHANE	< 1. MCG/L
T41009 VINYL CHLORIDE	< 1. MCG/L
T70209 DICHLORODIFLUORMETHANE	< 1. MCG/L
T61909 CHLOROETHANE	< 1. MCG/L
T61709 TRICHLOROFLUOROMETHANE	< 1. MCG/L
T23809 DICHLOROMETHANE	< 1. MCG/L
T50909 1,1-DICHLOROETHENE	< 1. MCG/L
T51909 1,1-DICHLOROETHANE	< 1. MCG/L
T61209 TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
T39009 CHLOROFORM	< 1. MCG/L
T50809 1,2-DICHLOROETHANE	< 1. MCG/L
T23609 1,1,1-TRICHLOROETHANE	< 1. MCG/L
T35509 CARBON TETRACHLORIDE	< 1. MCG/L
T33909 BROMODICHLOROMETHANE	< 1. MCG/L
T51309 1,2-DICHLOROPROPANE	< 1. MCG/L
T61509 TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
T41109 TRICHLOROETHYLENE	< 1. MCG/L
T44909 DIBROMOCHLOROMETHANE	< 1. MCG/L
T61409 CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
T51709 1,1,2-TRICHLOROETHANE	< 1. MCG/L
T61109 2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
T42109 BROMOFORM	< 1. MCG/L
T51809 1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
T41209 TETRACHLOROETHENE	< 1. MCG/L
T10909 CHLOROBENZENE	< 1. MCG/L
T49709 1,3-DICHLOROBENZENE	< 1. MCG/L
T44109 1,2-DICHLOROBENZENE	< 1. MCG/L
T44209 1,4-DICHLOROBENZENE	< 1. MCG/L
T34409 BENZENE	< 1. MCG/L
T39209 TOLUENE	< 1. MCG/L
T51009 ETHYLBENZENE	< 1. MCG/L
T35209 1-CHLOROCYCLOHEXENE-1	< 1. MCG/L
	< 1. MCG/L

**** CONTINUED ON NEXT PAGE ****

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

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BROOME COUNTY
HEALTH DEPARTMENT

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 41549 SAMPLE RECEIVED:84/05/02/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN,NY
TIME OF SAMPLING: 84/05/01 11:40 DATE PRINTED:84/05/14

PARAMETER		RESULT
T70409	PARA-XYLENE	< 1. MCG/L
T70309	META-XYLENE	< 1. MCG/L
T51409	ORTHO-XYLENE	< 1. MCG/L
T85309	CUMENE	< 1. MCG/L
T85409	STYRENE	< 1. MCG/L
T85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
T51109	N-PROPYLBENZENE	< 1. MCG/L
T85609	TERT-BUTYLBENZENE	< 1. MCG/L
T85709	O/P-CHLOROTOLUENE	< 1. MCG/L
T51209	BROMOBENZENE	< 1. MCG/L
T50509	META-CHLOROTOLUENE	< 1. MCG/L
T85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
T85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
T85009	P-CYMENE	< 1. MCG/L
T85109	CYCLOPROPYLBENZENE	< 1. MCG/L
T86209	SEC-BUTYLBENZENE	< 1. MCG/L
T86309	N-BUTYLBENZENE	< 1. MCG/L
T86409	2,3-BENZOFURAN	< 1. MCG/L
T52509	HEXACHLOROBUTADIENE (C-46)	< 1. MCG/L
T44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
T55609	NAPHTHALENE	< 5. MCG/L
T43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

RECEIVED
MAY 21 1984
BROOME COUNTY
HEALTH DEPARTMENT

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health

August 7, 1984

Mr. S. Ryall
1256 Conklin Road
Conklin, NY 13748

Dear Mr. Ryall:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Departments.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was negative and, therefore, highly corrosive.

Corrosion is defined as the chemical action on materials exerted by outside factors which results in the eating away or destruction of the material. Corrosive water is characteristic of the groundwater found along the Susquehanna River and, in fact, is a common problem throughout Broome County. Public Health concerns relating to corrosive water deals with the level of dissolved metals put into solution. These metals may originate from the pipes found in the water distribution system and become soluble by the corrosive action of the water. The NYS Health Department Part 5 regulations set -2.0 as the value for the Langlier index to initiate metals monitoring in a public water supply. Results during this sampling showed that both iron and manganese were found to be above Part 5 standards.

Chemical parameters measured included arsenic, sodium, sulfates and chlorides. The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l. All of these parameters were below NYSDOH Standards in your groundwater.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. Of the 8 metals tested for two were detected. Of these two metals, both iron and manganese exceeded the NYS Department of Health standard which is 0.3 mg/l. The value of 0.3 mg/l is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, they are undesireable because they stain laundry and plumbing fixtures. Iron and Manganese are natural constituents of the area soils and it is not unusual to find them at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor quality and exceeds drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Sviatyla
Assistant Public Health Engineer

MMS:et
enclosure

cc: Dr. Kathleen A. Gaffney
Robert Denz,P.E.
Phil Murphy
Jack Guinan
~~Town Clerk, Conklin~~,NY

0769

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 | RESULTS OF EXAMINATION | FINAL REPORT

SAMPLE ID: 841000718 SAMPLE RECEIVED:84/05/03/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #5 RYALL RESIDENCE
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 100:WATER FROM DUG WELL
TIME OF SAMPLING: 84/05/01 11:55 DATE PRINTED:84/07/18

	PARAMETER	RESULT	
21CADMIUM	CADMIUM	< 2. MCG/L	
21CHROMIUM	CHROMIUM	< 10. MCG/L	
21LEAD	LEAD	< 10. MCG/L	
01BARIUM	BARIUM	< 0.5 MG/L	
01IRON	IRON	1.5 MG/L ←	
01MANGAN	MANGANESE	4.8 MG/L ←	
01MERCURY	MERCURY	< 0.02 MCG/L	
01SODIUM	SODIUM	9.0 MG/L	
01ZINC	ZINC	< 0.05 MG/L	
01PH	PH	6.4	
01ALKALIN	ALKALINITY TO PH 4.5	25. MG/L	
01HARDNESS	HARDNESS, TOTAL AS CACO3	3. MG/L	SR
01ODOR	ODOR, COLD	1 MUSTY	
01CHLORIDE	CHLORIDE	11. MG/L	
01NITRATE	NITROGEN, NITRATE + NITRITE	0.17 MG/L	
21ARSENIC	ARSENIC	< 10. MCG/L	
01SULFATE	SULFATE AS SO4	21. MG/L	
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	94. MG/L	

**** END OF REPORT ****

Langlier Index = -3.66
Corrosive -

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BROOME COUNTY
HEALTH DEPARTMENT

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON, N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 41550 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:06 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:RYALL RESIDENCE #5
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 11:55 DATE PRINTED:84/05/14

	PARAMETER	RESULT
I62009	CHLOROMETHANE	< 1. MCG/L
I61809	BROMOMETHANE	< 1. MCG/L
I41009	VINYL CHLORIDE	< 1. MCG/L
I70209	DICHLORODIFLUORMETHANE	< 1. MCG/L
I61909	CHLOROETHANE	< 1. MCG/L
I61709	TRICHLOROFLUOROMETHANE	< 1. MCG/L
I23809	DICHLOROMETHANE	< 1. MCG/L
I50909	1,1-DICHLOROETHENE	< 1. MCG/L
I51909	1,1-DICHLOROETHANE	< 1. MCG/L
I61209	TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
I39009	CHLOROFORM	< 1. MCG/L
I50809	1,2-DICHLOROETHANE	< 1. MCG/L
I23609	1,1,1-TRICHLOROETHANE	< 1. MCG/L
I36609	CARBON TETRACHLORIDE	< 1. MCG/L
I38909	BROMODICHLOROMETHANE	< 1. MCG/L
I51309	1,2-DICHLOROPROPANE	< 1. MCG/L
I61509	TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
I41109	TRICHLOROETHYLENE	< 1. MCG/L
I44909	DIBROMOCHLOROMETHANE	< 1. MCG/L
I61409	CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
I51709	1,1,2-TRICHLOROETHANE	< 1. MCG/L
I61109	2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
I42109	BROMOFORM	< 1. MCG/L
I51809	1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
I41209	TETRACHLOROETHENE	< 1. MCG/L
I40909	CHLOROBENZENE	< 1. MCG/L
I49709	1,3-DICHLOROBENZENE	< 1. MCG/L
I44109	1,2-DICHLOROBENZENE	< 1. MCG/L
I44209	1,4-DICHLOROBENZENE	< 1. MCG/L
I34409	BENZENE	< 1. MCG/L
I39209	TOLUENE	< 1. MCG/L
I51009	ETHYLBENZENE	< 1. MCG/L
I95209	1-CHLOROCYCLOHEXENE-1	< 1. MCG/L

**** CONTINUED ON NEXT PAGE ****

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
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NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 41550 SAMPLE RECEIVED:84/05/02/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN,NY
TIME OF SAMPLING: 84/05/01 11:55 DATE PRINTED:84/05/14

PARAMETER	RESULT
T70409 PARA-XYLENE	< 1. MCG/L
T70309 META-XYLENE	< 1. MCG/L
T51409 ORTHO-XYLENE	< 1. MCG/L
T85309 CUMENE	< 1. MCG/L
T85409 STYRENE	< 1. MCG/L
T85509 P-BROMOFLUOROBENZENE	< 1. MCG/L
T51109 N-PROPYLBENZENE	< 1. MCG/L
T85609 TERT-BUTYLBENZENE	< 1. MCG/L
T85709 O/P-CHLOROTOLUENE	< 1. MCG/L
T51209 BROMOBENZENE	< 1. MCG/L
T50509 META-CHLOROTOLUENE	< 1. MCG/L
T85809 1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
T85909 1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
T86009 P-CYMENE	< 1. MCG/L
T86109 CYCLOPROPYLBENZENE	< 1. MCG/L
T86209 SEC-BUTYLBENZENE	< 1. MCG/L
T86309 N-BUTYLBENZENE	< 1. MCG/L
T86409 2,3-BENZOFURAN	< 1. MCG/L
T52509 HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
T43009 1,2,4-TRICHLOROBENZENE	< 5. MCG/L
T63609 NAPHTHALENE	< 5. MCG/L
T43909 1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

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HEALTH DEPARTMENT

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

AUG - 9 1984

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health
Roland M. Austin, P.E., Director, Environmental Health Services

August 2, 1984

Town Clerk
Town of Conklin
1271 Conklin Road
Conklin, NY 13748

Dear Ms Osterhout:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Departments.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was negative and, therefore, is slightly corrosive.

Chemical parameters measured included arsenic, sodium, sulfates and chlorides. The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l. All of these parameters were below NYSDOH Standards in your groundwater.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. Of the 8 metals tested for three were detected. Of these three metals, two, iron and manganese exceeded the New York State Dept of Health standard which is 0.3 mg/l. The value of 0.3 mg/l is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, they are undesireable because they stain laundry and plumbing fixtures. Iron and manganese are natural constituents of the area soils and it is not unusual to find them at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor quality but within drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. Th would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Sviatyla
Assistant Public Health Engineer

MMS:et
enclosure

cc: Dr. Kathleen A. Gaffney
Robert Denz,P.E.
Phil Murphy
Jack Guinan

0761 NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 841000714 SAMPLE RECEIVED:84/05/03/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #1 TOWN OF CONKLIN
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 84/05/01 11:10 DATE PRINTED:84/07/18

	PARAMETER	RESULT
21CADMIUM	CADMIUM	< 2. MCG/L
21CHROMIUM	CHROMIUM	< 10. MCG/L
21LEAD	LEAD	< 10. MCG/L
01BARIUM	BARIUM	< 0.5 MG/L
01IRON	IRON	4.4 MG/L ←
01MANGAN	MANGANESE	1.8 MG/L ←
01MERCURY	MERCURY	< 0.2 MCG/L
01SODIUM	SODIUM	13. MG/L
01ZINC	ZINC	0.13 MG/L
01PH	PH	7.2
01ALKALIN	ALKALINITY TO PH 4.5	106. MG/L
01HARDNESS	HARDNESS, TOTAL AS CACO3	130. MG/L
01ODOR	ODOR, COLD	3 MUSTY
21ARSENIC	ARSENIC	< 10. MCG/L
01SULFATE	SULFATE AS SO4	20. MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	191. MG/L
01CHLORIDE	CHLORIDE	17. MG/L
01NITRATE	NITROGEN, NITRATE + NITRITE	< 0.05 MG/L

**** END OF REPORT ****

Langlier Index = -0.65

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

AUG - 9 1984

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health

August 7, 1984

Mr. J. Villano
1262 Conklin Road
Conklin, NY 13748

Dear Mr. Villano:

Enclosed are the inorganic results from the sampling of your well on May 1, 1984 by the Broome County and New York State Health Department.

A number of inorganic physical, chemical and metal parameters were tested for in order to determine the potable quality of your groundwater.

Physical parameters measured included pH, hardness, alkalinity, odor and total dissolved solids. Using these parameters, the Langlier index was calculated. The Langlier index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier index was negative and, therefore, is highly corrosive.

Corrosion is defined as the chemical action on materials exerted by outside factors which results in the eating away or destruction of the material. Corrosive water is characteristic of the groundwater found along the Susquehanna River and in fact is a common problem throughout Broome County. Public Health concerns relating to corrosive water deals with the level of dissolved metals put into solution. These metals may originate from the pipes found in the water distribution system and become soluble by the corrosive action of the water. The NYS Health Department Part 5 regulations set -2.0 as the value for the Langlier index to initiate metals monitoring in a public water supply. Results during this sampling showed that all metals were found at levels below Part 5 standards.

Chemical parameters measured included arsenic, sodium, sulfates, and chlorides, The NYS Department of Health has established standards for three of these parameters in drinking water, found in the NYS Sanitary Code, Part 5. These standards are arsenic = 50 ug/l, chlorides = 250 mg/l, and sulfates = 250 mg/l. All of these parameters were below NYSDOH Standards in your ground-water.

The remaining parameters measured included the metals. NYSDOH standards have also been established for the metals. Of the 8 metals tested for all were undetected.

Overall,the quality of your drinking water as determined using these parameters is of poor quality but within drinking water standards. Due to this fact, we strongly recommend that, as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions regarding these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely yours,

Melonie M. Sviatyla

Melonie M. Sviatyla
Assistant Public Health Engineer

MMS:et
enclosure

cc: Dr. Kathleen A. Gaffney
Robert Denz,P.E.
Phil Murphy
Jack Guinan
Town Clerk - Conklin, NY

NEW YORK STATE DEPARTMENT OF HEALTH
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AUG - 9 [illegible]

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 84100071o SAMPLE RECEIVED:84/05/03/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN NY
DESCRIPTION:COLD WATER TAP #3 VILLANO RESIDENCE
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 100:WATER FROM DUG WELL
TIME OF SAMPLING: 84/05/01 11:30 DATE PRINTED:84/07/18

	PARAMETER	RESULT	
21CADMIUM	CADMIUM	< 2.	MCG/L
21CHROMIUM	CHROMIUM	< 10.	MCG/L
21LEAD	LEAD	< 10.	MCG/L
01BARIUM	BARIUM	< 0.5	MG/L
01IRON	IRON	< 0.05	MG/L
01MANGAN	MANGANESE	< 0.02	MG/L
01MERCURY	MERCURY	< 0.2	MCG/L
01SODIUM	SODIUM	8.7	MG/L
01ZINC	ZINC	< 0.05	MG/L
01PH	PH	6.7	
01ALKALIN	ALKALINITY TO PH 4.5	10.	MG/L
01HARDNESS	HARDNESS, TOTAL AS CACO3	48.	MG/L
01ODOR	ODOR, COLD	1 MUSTY	
01CHLORIDE	CHLORIDE	22.	MG/L
01NITRATE	NITROGEN, NITRATE + NITRITE	2.0	MG/L
21ARSENIC	ARSENIC	< 10.	MCG/L
01SULFATE	SULFATE AS SO4	20.	MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	110.	MG/L

**** END OF REPORT ****

Langlier Index = -2.58
corrosive

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 41548 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 105:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:05 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:VILLANO RESIDENCE #3
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 11:30 DATE PRINTED:84/05/14

PARAMETER	RESULT
T62009 CHLOROMETHANE	< 1. MCG/L
T51809 BROMOMETHANE	< 1. MCG/L
T41009 VINYL CHLORIDE	< 1. MCG/L
T70209 DICHLORODIFLUORMETHANE	< 1. MCG/L
T61909 CHLOROETHANE	< 1. MCG/L
T61709 TRICHLOROFLUOROMETHANE	< 1. MCG/L
T23809 DICHLOROMETHANE	< 1. MCG/L
T50909 1,1-DICHLOROETHENE	< 1. MCG/L
T51909 1,1-DICHLOROETHANE	< 1. MCG/L
T61209 TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
T39009 CHLOROFORM	< 1. MCG/L
T50809 1,2-DICHLOROETHANE	< 1. MCG/L
T23609 1,1,1-TRICHLOROETHANE	< 1. MCG/L
T36609 CARBON TETRACHLORIDE	< 1. MCG/L
T38909 BROMODICHLOROMETHANE	< 1. MCG/L
T61309 1,2-DICHLOROPROPANE	< 1. MCG/L
T51509 TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
T41109 TRICHLOROETHYLENE	2. MCG/L
T44909 DIBROMOCHLOROMETHANE	< 1. MCG/L
T51409 CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
T51709 1,1,2-TRICHLOROETHANE	< 1. MCG/L
T61109 2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
T42109 BROMOFORM	< 1. MCG/L
T51809 1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
T41209 TETRACHLOROETHENE	< 1. MCG/L
T40909 CHLOROBENZENE	< 1. MCG/L
T49709 1,3-DICHLOROBENZENE	< 1. MCG/L
T44109 1,2-DICHLOROBENZENE	< 1. MCG/L
T44209 1,4-DICHLOROBENZENE	< 1. MCG/L
T34409 BENZENE	< 1. MCG/L
T39209 TOLUENE	< 1. MCG/L
T51009 ETHYLBENZENE	< 1. MCG/L
T65209 1-CHLOROCYCLOHEXENE-1	< 1. MCG/L

**** CONTINUED ON NEXT PAGE ****

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DIRECTOR OF ENVIRONMENTAL SANITATION
BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON, N.Y. 13901

SUBMITTED BY:SVIATYLA

MAY 21 1984

BROOME COUNTY
HEALTH DEPARTMENT

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 41548 SAMPLE RECEIVED:84/05/02/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN, NY
TIME OF SAMPLING: 84/05/01 11:30 DATE PRINTED:84/05/14

	PARAMETER	RESULT
I70409	PARA-XYLENE	< 1. MCG/L
I70309	META-XYLENE	< 1. MCG/L
I51409	ORTHO-XYLENE	< 1. MCG/L
I85309	CUMENE	< 1. MCG/L
I85409	STYRENE	< 1. MCG/L
I85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
I51109	N-PROPYLBENZENE	< 1. MCG/L
I85609	TERT-BUTYLBENZENE	< 1. MCG/L
I85709	O/P-CHLOROTOLUENE	< 1. MCG/L
I51209	BROMOBENZENE	< 1. MCG/L
I50509	META-CHLOROTOLUENE	< 1. MCG/L
I85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
I85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
I85009	P-CYMENE	< 1. MCG/L
I86109	CYCLOPROPYLBENZENE	< 1. MCG/L
I86209	SEC-BUTYLBENZENE	< 1. MCG/L
I86309	N-BUTYLBENZENE	< 1. MCG/L
I86409	2,3-BENZOFURAN	< 1. MCG/L
I52509	HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
I44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
I55509	NAPHTHALENE	< 5. MCG/L
I43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

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BROOME COUNTY
HEALTH DEPARTMENT

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health
Roland M. Austin, P.E., Director, Environmental Health Services

March 15, 1984
~~January 30, 1984~~

Mrs. Saundra Lasky
1275 Conklin Road
Conklin, New York 13748

Dear Mrs. Lasky:

Enclosed are the organic and inorganic results from the sampling of your groundwater on November 15, 1983 by the Broome County Health Department.

Organic results for the volatiles detected three organics, toluene, trichloroethene and chloroform in your groundwater. The NYS Department of Health guidelines for toluene and trichloroethene in drinking water is 50 ug/l; both of these organics were found at a level below guidelines. These organic chemicals, however, are not naturally occurring. They are common constituents of solvents, blockcleaners and degreasing agents. Their presence in your water indicates an onsite/nearby source of pollution which is affecting the quality of your shallow well. The chloroform result is listed as suspect because it may be a result of laboratory contamination and not actually present in the sample.

A number of physical and chemical parameters were also analyzed for, in the water sample.

Physical parameters measured included pH, alkalinity, conductivity, hardness and total dissolved solids (TDS). Using these parameters, the Langlier Index was calculated.

The Langlier Index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier Index was positive and therefore, has a tendency toward scaling.

continued -

Chemical parameters measured included sulfates and chlorides. The NYS Department of Health has established standards for both of these parameters in drinking water, found in the State Sanitary Code, Part 5. These standards are: Chlorides = 250 mg/l and sulfates = 250 mg/l. Both of these parameters were below standards in your drinking water.

The remaining parameters measured included the metals. NYSDOH standards are also set for the metals. Of the fifteen metals tested for, only four were detected. Copper has a NYSDOH standard of 1.0 mg/l, manganese a standard of 0.3 mg/l and sodium a monitoring standard of 20 mg/l. All of these metals were found at levels below standards in your groundwater.

Iron was found at a level of 0.66 mg/l, a level exceeding the standard of 0.3 mg/l. The value 0.3 is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, it is undesireable, because it stains laundry and plumbing fixtures. Iron is a common constituent of the area soils and it is not unusual to find it at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor quality but within drinking water standards. Due to this fact, we strongly recommend that as a resident of the Town of Conklin you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to Town water and receive water of a much better quality for drinking.

If you have any questions on these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely,

Kathleen A. Gaffney, M.D., M.P.H.
Commissioner of Health

KAG;sc
cc: Bob Denz
Jack Guinan
David Machlica
Phil Murphy
[redacted]

Enc.

0700

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 34958 SAMPLE RECEIVED:83/11/17/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:06 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: Z DIRECTION:
LOCATION: CONKLIN → SAKWORA LASKY
DESCRIPTION:JOHN LASH RES 1275 CONKLIN RD KITCHEN RD
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 83/11/15 11:10 DATE PRINTED:83/12/13

	PARAMETER	RESULT	
T62009	CHLOROMETHANE	< 1. MCG/L	
T61809	BROMOMETHANE	< 1. MCG/L	
T41009	VINYL CHLORIDE	< 1. MCG/L	
T70209	DICHLORODIFLUORMETHANE	< 1. MCG/L	
T61909	CHLOROETHANE	< 1. MCG/L	
T61709	TRICHLOROFLUOROMETHANE	< 1. MCG/L	
T23809	DICHLOROMETHANE	< 1. MCG/L	
T50909	1,1-DICHLOROETHENE	< 1. MCG/L	
T51909	1,1-DICHLOROETHANE	< 1. MCG/L	
T61209	TRANS-1,2-DICHLOROETHENE	< 1. MCG/L	SUSPECT
T39009	CHLOROFORM	1. MCG/L	SU
T50809	1,2-DICHLOROETHANE	< 1. MCG/L	
T23609	1,1,1-TRICHLOROETHANE	< 1. MCG/L	
T36609	CARBON TETRACHLORIDE	< 1. MCG/L	
T38909	BROMODICHLOROMETHANE	< 1. MCG/L	
T61309	1,2-DICHLOROPROPANE	< 1. MCG/L	
T61509	TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L	
T41109	TRICHLOROETHYLENE	9. MCG/L	
T44909	DIBROMOCHLOROMETHANE	< 1. MCG/L	
T61409	CIS-1,3-DICHLOROPROPENE	< 1. MCG/L	
T51709	1,1,2-TRICHLOROETHANE	< 1. MCG/L	
T61109	2-CHLOROETHYLVINYL ETHER	< 1. MCG/L	
T42109	BROMOFORM	< 1. MCG/L	
T51809	1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L	
T41209	TETRACHLOROETHENE	< 1. MCG/L	
T40909	CHLOROBENZENE	< 1. MCG/L	
T49709	1,3-DICHLOROBENZENE	< 1. MCG/L	
T44109	1,2-DICHLOROBENZENE	< 1. MCG/L	
T44209	1,4-DICHLOROBENZENE	< 1. MCG/L	
T34409	BENZENE	< 1. MCG/L	
T39209	TOLUENE	10. MCG/L	
T51009	ETHYLBENZENE	< 1. MCG/L	
T85209	1-CHLOROCYCLOHEXENE-1	< 1. MCG/L	

**** CONTINUED ON NEXT PAGE ****

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REGIONAL DIRECTOR OF pH ENGINEERING
NEW YORK STATE DEPARTMENT OF HEALTH
351 SOUTH WARREN ST.
SYRACUSE,N.Y. 13202

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 34958 SAMPLE RECEIVED:83/11/17/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN
TIME OF SAMPLING: 83/11/15 11:10 DATE PRINTED:83/12/13

	PARAMETER	RESULT
T70409	PARA-XYLENE	< 1. MCG/L
T70309	META-XYLENE	< 1. MCG/L
T51409	ORTHO-XYLENE	< 1. MCG/L
T85309	CUMENE	< 1. MCG/L
T85409	STYRENE	< 1. MCG/L
T85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
T51109	N-PROPYLBENZENE	< 1. MCG/L
T85609	TERT-BUTYLBENZENE	< 1. MCG/L
T85709	O/P-CHLOROTOLUENE	< 1. MCG/L
T51209	BROMOBENZENE	< 1. MCG/L
T50509	META-CHLOROTOLUENE	< 1. MCG/L
T85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
T85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
T86009	P-CYMENE	< 1. MCG/L
T86109	CYCLOPROPYLBENZENE	< 1. MCG/L
T86209	SEC-BUTYLBENZENE	< 1. MCG/L
T86309	N-BUTYLBENZENE	< 1. MCG/L
T86409	2,3-BENZOFURAN	< 1. MCG/L
T52509	HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
T44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
T65609	NAPHTHALENE	< 5. MCG/L
T43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

0695 ,

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 | RESULTS OF EXAMINATION | FINAL REPORT

SAMPLE ID: 831002823 SAMPLE RECEIVED:83/11/17/11
PROGRAM: 125:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN:00 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: LONGITUDE: . Z DIRECTION:
LOCATION: ~~JOHN LASH~~ LASKY RESIDENCE 1275 CONKLIN RD.
DESCRIPTION:KITCHEN TAP SAMPLE #1
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-001:SAFE DRINKING WATER ACT - METALS ONLY
SAMPLE TYPE: 011:FINISHED WATER, UNCHLORINATED - SURVEILLANCE
TIME OF SAMPLING: 83/11/15 11:10 DATE PRINTED:84/01/10

	PARAMETER	RESULT
21LEAD	LEAD	< 10. MCG/L
01BARIUM	BARIUM	< 0.5 MG/L
01SILVER	SILVER	< 0.02 MG/L
01MERCURY	MERCURY	< 0.4 MCG/L
21ARSENIC	ARSENIC	< 10. MCG/L
21CADMIUM	CADMIUM	< 2. MCG/L
21CHROMIUM	CHROMIUM	< 10. MCG/L
21SELENIUM	SELENIUM	< 10. MCG/L
21ALUMINUM	ALUMINUM	< 50. MCG/L
01COPPER	COPPER	0.10 MG/L
01IRON	IRON	0.65 MG/L *
01MANGAN	MANGANESE	0.20 MG/L
01SODIUM	SODIUM	4.7 MG/L
01NICKEL	NICKEL	< 0.05 MG/L
01ZINC	ZINC	< 0.05 MG/L
01PH	PH	6.5
01ALKALIN	ALKALINITY TO PH 4.5	23. MG/L
01CONDUCT	CONDUCTIVITY	118. MMHO/CM
01CHLORIDE	CHLORIDE	8.5 MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	71. MG/L
01SULFATE	SULFATE AS SO4	16. MG/L
01CYANIDE	CYANIDES, HYDROLYZABLE	SD
01HARDNESS	HARDNESS, TOTAL AS CACO3	43. MG/L

**** END OF REPORT ****

Langlier Index = 2.33

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BROOME COUNTY HEALTH DEPT.
20 WALL ST.
BINGHAMTON, N.Y. 13901

SUBMITTED BY:SVIATYLA

Broome County
HEALTH DEPARTMENT
One Wall Street / Binghamton, New York 13901 / (607) 772-2887

Carl S. Young, County Executive
Kathleen A. Gaffney, M.D., Commissioner of Health
Roland M. Austin, P.E., Director, Environmental Health Services

March 15, 1984
~~January 30, 1984~~

Graydon Tamkins — Conklin Town Hall
Water Superintendent
1282 Conklin Road
Conklin, NY 13748

Dear Mr. Tamkins:

Enclosed are the organic and inorganic results from the sampling of the Town's groundwater on November 15, 1983 by the Broome County Health Department.

Organic results for the volatiles showed all organics were below the detection levels of 1 ug/l (ppb) or 5 ug/l (ppb) for all organics except chloroform. The chloroform result is listed as suspect because it may be a result of laboratory contamination and not actually present in the sample.

A number of physical and chemical parameters were also analyzed for, in the water sample.

Physical parameters measured included pH, alkalinity, conductivity, hardness and total dissolved solids (TDS). Using these parameters, the Langlier Index was calculated.

The Langlier Index makes it possible to predict whether a given water will deposit or dissolve calcium carbonate. A positive value for the index signifies that the water is oversaturated and will produce scaling on pipe surfaces. A negative value indicates that the water will tend not to form a scale and thus be corrosive. Your Langlier Index was negative and therefore, is slightly corrosive.

Chemical parameters measured included sulfates and chlorides. The NYS Department of Health has established standards for both of these parameters in drinking water, found in the State Sanitary Code, Part 5. These standards are: Chlorides = 250 mg/l and sulfates = 250 mg/l. Both of these parameters were below standards in your drinking water.

continued -

The remaining parameters measured included the metals. NYSDOH standards are also set for the metals. Of the fifteen metals tested for, only four were detected. Iron and manganese have a NYSDOH standard of 0.3 mg/l, zinc has a standard of 5 mg/l and sodium a monitoring standard of 20 mg/l. Both sodium and zinc were found at levels below standards in your groundwater.

Iron was found at a level of 6.6 mg/l and manganese at 1.9 mg/l, levels exceeding the NYSDOH standards. The value 0.3 mg/l is a secondary standard and is based on taste and aesthetic considerations. Aesthetically, it is undersireable because it stains laundry and discolors plumbing fixtures. Both are a common constituent of the area soils and it is not unusual to find them at elevated levels in groundwater.

Overall, the quality of your drinking water as determined using these parameters is of poor quality but within drinking water standards. Due to this face, we strongly recommend that as a resident of the Town of Conklin, you petition the Town Board into extending the public water line down Conklin Road. This would then allow you to connect to town water and receive water of a much better quality for drinking.

If you have any questions on these results, please feel free to contact the Environmental Health Division of the Broome County Health Department.

Sincerely,

Kathleen A. Gaffney, M.D., M.P.H.
Commissioner of Health

KAG/sc
cc: Bob Denz
Jack Guinan
David Machlica
Phil Murphy
[redacted]

Enc.

05

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 34955 SAMPLE RECEIVED:83/11/17/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:06 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN
DESCRIPTION:TOWN OF CONKLIN HALL 127 CONKLIN RD INSIDE TAP
REPORTING LAB: -TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 83/11/15 11:55 DATE PRINTED:83/12/12

	PARAMETER	RESULT	
T62009	CHLOROMETHANE	< 1. MCG/L	
T61809	BROMOMETHANE	< 1. MCG/L	
T41009	VINYL CHLORIDE	< 1. MCG/L	
T70209	DICHLORODIFLUORMETHANE	< 1. MCG/L	
T61909	CHLOROETHANE	< 1. MCG/L	
T61709	TRICHLOROFLUOROMETHANE	< 1. MCG/L	
T23809	DICHLOROMETHANE	< 1. MCG/L	
T50909	1,1-DICHLOROETHENE	< 1. MCG/L	
T51909	1,1-DICHLOROETHANE	< 1. MCG/L	
T61209	TRANS-1,2-DICHLOROETHENE	< 1. MCG/L	SUSPECT
T39009	CHLOROFORM	2. MCG/L	SU
T50809	1,2-DICHLOROETHANE	< 1. MCG/L	
T23609	1,1,1-TRICHLOROETHANE	< 1. MCG/L	
T36609	CARBON TETRACHLORIDE	< 1. MCG/L	
T39909	BROMODICHLOROMETHANE	< 1. MCG/L	
T61309	1,2-DICHLOROPROPANE	< 1. MCG/L	
T61509	TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L	
T41109	TRICHLOROETHYLENE	< 1. MCG/L	
T44909	DIBROMOCHLOROMETHANE	< 1. MCG/L	
T61409	CIS-1,3-DICHLOROPROPENE	< 1. MCG/L	
T51709	1,1,2-TRICHLOROETHANE	< 1. MCG/L	
T61109	2-CHLOROETHYLVINYL ETHER	< 1. MCG/L	
T42109	BROMOFORM	< 1. MCG/L	
T51809	1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L	
T41209	TETRACHLOROETHENE	< 1. MCG/L	
T40909	CHLOROBENZENE	< 1. MCG/L	
T49709	1,3-DICHLOROBENZENE	< 1. MCG/L	
T44109	1,2-DICHLOROBENZENE	< 1. MCG/L	
T44209	1,4-DICHLOROBENZENE	< 1. MCG/L	
T34409	BENZENE	< 1. MCG/L	
T39209	TOLUENE	< 1. MCG/L	
T51009	ETHYLBENZENE	< 1. MCG/L	
T85209	1-CHLOROCYCLOHEXENE-1	< 1. MCG/L	

**** CONTINUED ON NEXT PAGE ****

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SYRACUSE,N.Y. 13202

SUBMITTED BY:S VIATYLA

.0701

NEW YORK STATE DEPARTMENT OF HEALTH
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PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 831002825 SAMPLE RECEIVED:83/11/17/11
PROGRAM: 126:HOUSEHOLD WATER SUPPLIES
SOURCE ID: DRAINAGE BASIN:06 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: TOWN OF CONKLIN HALL
DESCRIPTION:INSIDE TAP SAMPLE #4
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - ALBANY
TEST PATTERN: 10-001:SAFE DRINKING WATER ACT - METALS ONLY
SAMPLE TYPE: 120:WATER FROM DRILLED WELL
TIME OF SAMPLING: 83/11/15 11:55 DATE PRINTED:84/01/10

	PARAMETER	RESULT	
21LEAD	LEAD	< 10.	MCG/L
01BARIUM	BARIUM	< 0.5	MG/L
01SILVER	SILVER	< 0.02	MG/L
01MERCURY	MERCURY	< 0.4	MCG/L
21ARSENIC	ARSENIC	< 10.	MCG/L
21CADMIUM	CADMIUM	< 2.	MCG/L
21CHROMIUM	CHROMIUM	< 10.	MCG/L
21SELENIUM	SELENIUM	< 10.	MCG/L
21ALUMINUM	ALUMINUM	< 50.	MCG/L
01COPPER	COPPER	< 0.05	MG/L
01IRON	IRON	6.6	MG/L *
01MANGAN	MANGANESE	1.9	MG/L *
01NICKEL	NICKEL	< 0.05	MG/L
01SODIUM	SODIUM	12.	MG/L
01ZINC	ZINC	0.09	MG/L
01PH	PH	7.0	
01ALKALIN	ALKALINITY TO PH 4.5	107.	MG/L
01CONDUCT	CONDUCTIVITY	281.	MMHO/CM
01CHLORIDE	CHLORIDE	13.	MG/L
01SOLIDDIS	SOLIDS, TOTAL DISSOLVED, 180 C	204.	MG/L
01SULFATE	SULFATE AS SO4	20.	MG/L
01CYANIDE	CYANIDES, HYDROLYZABLE		SD
01HARDNESS	HARDNESS, TOTAL AS CACO3	129.	MG/L

**** END OF REPORT ****

Langlier Index = -0.86

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BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 34955 SAMPLE RECEIVED:83/11/17/11
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LOCATION: CONKLIN
TIME OF SAMPLING: 83/11/15 11:55 DATE PRINTED:83/12/12

	PARAMETER	RESULT
I70409	PARA-XYLENE	< 1. MCG/L
I70309	META-XYLENE	< 1. MCG/L
I51409	ORTHO-XYLENE	< 1. MCG/L
I85309	CUMENE	< 1. MCG/L
I85409	STYRENE	< 1. MCG/L
I85509	P-BROMOFLUOROBENZENE	< 1. MCG/L
I51109	N-PROPYLBENZENE	< 1. MCG/L
I85609	TERT-BUTYLBENZENE	< 1. MCG/L
I85709	O/P-CHLOROTOLUENE	< 1. MCG/L
I51209	BROMOBENZENE	< 1. MCG/L
I50509	META-CHLOROTOLUENE	< 1. MCG/L
I85809	1,3,5-TRIMETHYLBENZENE	< 1. MCG/L
I85909	1,2,4-TRIMETHYLBENZENE	< 1. MCG/L
I86009	P-CYMENE	< 1. MCG/L
I86109	CYCLOPROPYLBENZENE	< 1. MCG/L
I86209	SEC-BUTYLBENZENE	< 1. MCG/L
I86309	N-BUTYLBENZENE	< 1. MCG/L
I86409	2,3-BENZOFURAN	< 1. MCG/L
I52509	HEXACHLOROBUTADIENE (C-46)	< 5. MCG/L
I44009	1,2,4-TRICHLOROBENZENE	< 5. MCG/L
I65609	NAPHTHALENE	< 5. MCG/L
I43909	1,2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

PAGE 1 RESULTS OF EXAMINATION FINAL REPORT

SAMPLE ID: 41546 SAMPLE RECEIVED:84/05/02/11
PROGRAM: 106:BUREAU OF TOXIC SUBSTANCES ASSESSMENT
SOURCE ID: DRAINAGE BASIN:06 GAZETTEER CODE:0354
POLITICAL SUBDIVISION:CONKLIN COUNTY:BROOME
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: CONKLIN,NY
DESCRIPTION:TOWN OF CONKLIN HALL #1
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: VOL2:EPA METHOD 503.1 & F.R.METHOD 601
SAMPLE TYPE: 012:FINISHED WATER, UNCHLORINATED - MONITORING
TIME OF SAMPLING: 84/05/01 11:10 DATE PRINTED:84/05/14

	PARAMETER	RESULT
T62009	CHLOROMETHANE	< 1. MCG/L
T61609	BROMOMETHANE	< 1. MCG/L
T41009	VINYL CHLORIDE	< 1. MCG/L
T70209	DICHLORODIFLUOROMETHANE	< 1. MCG/L
T61909	CHLOROETHANE	< 1. MCG/L
T61709	TRICHLOROFLUOROMETHANE	< 1. MCG/L
T23809	DICHLOROMETHANE	< 1. MCG/L
T50909	1,1-DICHLOROETHENE	< 1. MCG/L
T51909	1,1-DICHLOROETHANE	< 1. MCG/L
T61209	TRANS-1,2-DICHLOROETHENE	< 1. MCG/L
T39009	CHLOROFORM	< 1. MCG/L
T50809	1,2-DICHLOROETHANE	< 1. MCG/L
T23609	1,1,1-TRICHLOROETHANE	< 1. MCG/L
T36509	CARBON TETRACHLORIDE	< 1. MCG/L
T38909	BROMODICHLOROMETHANE	< 1. MCG/L
T61309	1,2-DICHLOROPROPANE	< 1. MCG/L
T61509	TRANS-1,3-DICHLOROPROPENE	< 1. MCG/L
T41109	TRICHLOROETHYLENE	< 1. MCG/L
T44909	DIBROMOCHLOROMETHANE	< 1. MCG/L
T61109	CIS-1,3-DICHLOROPROPENE	< 1. MCG/L
T51709	1,1,2-TRICHLOROETHANE	< 1. MCG/L
T61109	2-CHLOROETHYLVINYL ETHER	< 1. MCG/L
T42109	BROMOFORM	< 1. MCG/L
T51309	1,1,2,2-TETRACHLOROETHANE	< 1. MCG/L
T41209	TETRACHLOROETHENE	< 1. MCG/L
T40909	CHLOROBENZENE	< 1. MCG/L
T49709	1,3-DICHLOROBENZENE	< 1. MCG/L
T44109	1,2-DICHLOROBENZENE	< 1. MCG/L
T44209	1,4-DICHLOROBENZENE	< 1. MCG/L
T34409	BENZENE	< 1. MCG/L
T39209	TOLUENE	< 1. MCG/L
T51009	ETHYLBENZENE	< 1. MCG/L
T85209	1-CHLOROCYCLOHEXENE-1	< 1. MCG/L

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BROOME COUNTY HEALTH DEPT.
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BINGHAMTON,N.Y. 13901

SUBMITTED BY:SVIATYLA

NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

RESULTS OF EXAMINATION FINAL REPORT

41545 SAMPLE RECEIVED:84/05/02/11

DIVISION:CONKLIN COUNTY:BROOME

CONKLIN, NY

..ING: 84/05/01 11:10 DATE PRINTED:84/05/14

PARAMETER	RESULT
PARA-XYLENE	< 1. MCG/L
META-XYLENE	< 1. MCG/L
ORTHO-XYLENE	< 1. MCG/L
CUMENE	< 1. MCG/L
STYRENE	< 1. MCG/L
..BROMOFLUOROBENZENE	< 1. MCG/L
..PROPYLBENZENE	< 1. MCG/L
TERT-BUTYLBENZENE	< 1. MCG/L
..P-CHLOROTOLUENE	< 1. MCG/L
..BROMOBENZENE	< 1. MCG/L
META-CHLOROTOLUENE	< 1. MCG/L
..3,5-TRIMETHYLBENZENE	< 1. MCG/L
..2,4-TRIMETHYLBENZENE	< 1. MCG/L
P-CYMENE	< 1. MCG/L
CYCLOPROPYLBENZENE	< 1. MCG/L
..C-BUTYLBENZENE	< 1. MCG/L
..BUTYLBENZENE	< 1. MCG/L
2,3-BENZOFURAN	< 1. MCG/L
..XACHLOROBUTADIENE (C-46)	< 5. MCG/L
..2,4-TRICHLOROBENZENE	< 5. MCG/L
NAPHTHALENE	< 5. MCG/L
..2,3-TRICHLOROBENZENE	< 5. MCG/L

**** END OF REPORT ****

RECEIVED

MAY 21 1984

BROOME COUNTY
HEALTH DEPARTMENT

EXHIBIT B

ENVIRONMENTAL PROTECTION AGENCY

INTERIM GUIDANCE ON SUPERFUND SELECTION OF REMEDY

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

EPA

DIRECTIVE NUMBER: 9355.0-19

TITLE: Interim Guidance on Superfund Selection of Remedy

APPROVAL DATE: December 24, 1986

EFFECTIVE DATE: December 24, 1986

ORIGINATING OFFICE:

☒ FINAL

☐ DRAFT

STATUS:

REFERENCE (other documents):

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VE DIRECTIVE DIRECTIVE D

United States Environmental Protection Agency
Washington, DC 20460

EPA OSWER Directive Initiation Request

1. Directive Number: 9355.0-19

2. Originator Information

Name of Contact Person	Mail Code	Office	Telephone Number
Betsy Shaw	WH-548E	OERR, HSCD	(202) 382-3304

3. Title

Interim Guidance on Superfund Selection of Remedy

4. Summary of Directive *(include brief statement of purpose)*

Provides interim guidance regarding implementation of SARA cleanup standards provisions. Highlighting new requirements and emphasis in the RI/FS and ROD process.

5. Keywords: Superfund, CERCLA, Reauthorization Implementation, Remedial, SARA

6a. Does this Directive Supersede Previous Directive(s)? ☐ Yes ☒ No What directive *(number, title)*

b. Does It Supplement Previous Directive(s)? ☐ Yes ☒ No What Directive *(number, title)*

7. Draft Level

☒ A — Signed by AA/DAA ☐ B — Signed by Office Director ☐ C — For Review & Comment ☐ In Development

This Request Meets OSWER Directives System Format

8. Signature of Lead Office Directives Coordinator	Date
Terry Ouverson	12/30/86

9. Name and Title of Approving Official	Date
J. Winston Porter, AA/OSWER	12/24/86

OSWER OSWER OSWER
DIRECTIVE DIRECTIVE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 24 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

9355.0-19

MEMORANDUM

SUBJECT: Interim Guidance on Superfund Selection of Remedy

FROM: J. Winston Porter
Assistant Administrator

TO: Regional Administrators, Regions I - X
Regional Counsel, Regions I - X
Director, Waste Management Division
Regions I, IV, V, VII, and VIII
Director, Emergency and Remedial Response Division
Region II
Director, Hazardous Waste Management Division
Regions III and VI
Director, Toxics and Waste Management Division
Region IX
Director, Hazardous Waste Division
Region X
Environmental Services Division Directors
Regions I, VI, and VII

Introduction

Section 121 of the Superfund Amendments and Reauthorization Act (SARA) addresses the cleanup standards for Superfund remedial actions. While the new statute retains the basic components of the existing Remedial Investigation/Feasibility Study (RI/FS) and Record of Decision (ROD) process, the §121 provisions add some new requirements and special emphasis to certain issues. This guidance is intended to aid Regions in selecting remedial actions pending the Agency's upcoming revision of the National Contingency Plan (NCP).

This guidance memorandum builds on the transition guidance issued October 24, 1986 ("Implementation Strategy for Reauthorized Superfund: Short Term Priorities for Action," OSWER Directive 9200.3-02) and elaborates on the guidance related to implementation of selection of remedy requirements outlined at the Superfund Implementation Meeting of November 19 - 20, 1986.

This is one of several interim guidances we plan to issue on some of the more difficult cleanup standards issues. The Selection of Remedy Workgroup, which has been meeting since July and includes representatives from Regions and States in addition to a wide variety of Headquarters offices, is currently engaged in drafting language for the NCP regulation and preamble. A number of issues related to applicable or relevant and appropriate Federal and State requirements, cost-effectiveness, and challenges associated with an increased use of treatment will be addressed.

In addition to this and subsequent interim guidances, we will attempt to meet short-term Regional implementation needs by making Headquarters staff available, upon your request, to assist your staffs as they modify their RI/FS workplans for ongoing projects in January and February, 1987. In preparation for these project review sessions, Regions in conjunction with State-lead Agencies, should begin to examine ongoing projects and draft a list of potential changes that will be required to satisfy §121 of SARA. Regional staff should use this guidance and the transition guidance as the basis for proposed workplan revisions.

As soon as possible, Regions should notify potentially responsible parties (PRPs) conducting RI/FSs of the new SARA provisions and discuss with them any necessary modifications of their workplans.

We will continue to delegate remedy selection authority to Regions. In support of this effort over the longer term we will be revising the RI/FS Guidance and ROD Guidance and holding related workshops in the Spring of 1987. Also, Headquarters will be available to assist Regions with final FS revisions and ROD preparation throughout the fiscal year.

Overview of the Process

Under SARA, the remedial process retains its major analytical components: a remedial investigation (RI) in which data about site and waste characteristics, their hazards, and routes of exposure are collected and analyzed, and in which data about treatability of wastes and performance of treatment processes is assembled as necessary; and a feasibility study (FS) in which a number of potential remedial alternatives are developed and screened, and the most promising subset of alternatives is evaluated against a range of factors and compared against one another. This process culminates in the selection of a remedy.

Figure 1 suggests that the RI may need to be conducted in at least two phases, while the FS will retain the three phases described in the current NCP. The RI/FS has been evolving into a more interactive process: as the FS progresses, more sophisticated data are required to assess the feasibility of an alternative. In addition to a literature survey, more site data and/or bench- or pilot-scale testing of a treatment technology may be needed. Likewise, the RI has become a phased process wherein the data quality objectives (DQOs) are tailored to the need for additional site, waste, and treatment performance information.

While the basic framework remains intact, SARA does add some new features and emphasis. The most significant emphasis is on risk reduction through destruction or detoxification of hazardous waste by employing treatment technologies which reduce toxicity, mobility or volume rather than protection achieved through prevention of exposure. SARA calls for the Agency to prefer remedies that use treatment to permanently and significantly reduce the toxicity, mobility, or volume of wastes over remedies that do not use such treatment. In addition, SARA requires that the Agency select a remedy that utilizes permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable.

It should be noted that volume reduction should be considered distinctly from reducing toxicity and/or mobility; some treatment processes will increase the volume of contaminated material while effectively reducing toxicity or mobility, whereas other processes may reduce volume and consequently increase the concentration of constituents which increases the toxicity and/or mobility of the contaminants.

Another significant change is the codification of the CERCLA Compliance Policy. First published as an appendix to the preamble of the current National Contingency Plan (50 FR 47946, Wednesday, November 20, 1985), this policy required that Superfund remedial actions attain the applicable or relevant and appropriate requirements (ARARs) of other Federal environmental statutes. Furthermore, Section 300.68 of the NCP specifically refers to ARARs in regard to the development of alternatives. SARA incorporates this requirement into statutory law while adding the provision that remedial actions also attain State requirements more stringent than Federal requirements if they are also applicable or relevant and appropriate.

Also integral to the remedy selection process is SARA's incorporation, with some modifications, of the Superfund program's existing State involvement and community relations processes. The new statute basically formalizes practices the Agency has pursued and highlights the importance of early, constant, and responsive relations with both the States and communities affected by Superfund sites.

A discussion of how SARA affects each particular phase of the remedy selection process follows.

Scoping of the RI/FS

In this phase, a workplan for the RI and the FS is prepared to undertake the studies. Existing data about the site from previous investigations, including Preliminary Assessment and Site Investigation data collected for the National Priorities Listing, are assembled and evaluated. Initial project boundaries are identified, and a preliminary decision made on whether the entire site will be evaluated and remedied as a single unit or subdivided into two or more operable units.

Most significant in this phase is the preliminary identification of applicable or relevant and appropriate requirements that alternatives will need to attain. At this early stage in the process, Regions and States should begin identifying potential health-based requirements related to determining initial action levels, requirements which restrict activities that can be undertaken at different locations, (such as floodplains, wetlands, and historic sites), and on whether the requirements might be met at the completion of each operable unit or the total site remedy. Also, States should begin to identify and notify Regions of State requirements that may be potentially applicable or relevant and appropriate to the site.

Initial data quality objectives (DQOs) should also be established to ensure that environmental, health effects and treatability data will be of adequate quality and appropriate for their intended uses.

Site Characterization (RI Phase I)

This phase focuses on defining the nature and extent of contamination through field sampling and laboratory analysis to determine initial cleanup goals and to characterize waste types, mixtures, volume, the media in which they occur, concentration ranges and profiles, and interface zones between media. An analysis is conducted to characterize and assess risks, routes of exposure, fate and transport of contaminants, and likely human and environmental receptors. DQOs should be evaluated to identify data use, type, quality, and quantity. DQOs should be refined to ensure that forseeable needs for environmental, health effects, and treatability data will be met. At the completion of this stage, Regions should supply the Agency for Toxic Substances and Disease Registry with the data and analytical results.

Development of Alternatives (FS Phase I)

This stage may begin concurrently with or slightly behind the RI and consists of three major steps: identifying potential treatment technologies and their associated containment or disposal requirements; prescreening of technologies for suitability as part of alternatives, and assembling technology and/or disposal combinations into alternatives.

Treatment alternatives should be developed ranging from an alternative that, to the degree possible, would eliminate the need for long-term management (including monitoring) at the site to alternatives involving treatment that would reduce toxicity, mobility, or volume as their principal element. Although alternatives may involve different technologies (which will most often address toxicity and mobility) for different types of waste, they will vary mainly in the degree to which they rely on long-term management of treatment residuals or low-concentrated wastes.

In addition to the range of treatment alternatives, a containment option involving little or no treatment and a no action alternative should also be developed.

Initial Screening (FS Phase II)

The purpose of the screening step is to reduce the number of alternatives for further analysis while preserving a range of options. Consultation between the Agency and the State is very important at this stage. This screening is accomplished by considering the alternatives against effectiveness, implementability and cost factors. Cost is an important factor when comparing alternatives which provide similar results (i.e., cost may be used to discriminate among treatment alternatives, but not between treatment and nontreatment alternatives).

In some situations the above factors could occasionally result in elimination of alternatives which involve treatment of the source as the principal element (e.g., large, complex sites such as municipal landfills). Typically, ground water actions will be necessary at such sites to achieve adequate protection. The ROD must explain the rationale for eliminating source treatment options at this point in the process.

Innovative technologies should be carried through the screen if there is reasonable belief that they offer potential for better treatment performance or implementability, few or lesser adverse impacts than other available approaches, or lower costs than demonstrated technologies.

Post Screening Field Investigation (RI Phase II)

This phase of the RI should focus on collecting data sufficient to make a well-substantiated remedy selection decision. After a literature survey is conducted to identify existing treatment data, treatability tests at the bench- and sometimes pilot-scale may be necessary to test a particular technology on actual site waste. Additional field data may be collected as needed to further assess alternatives.

Detailed Analysis (FS Phase III)

The alternatives passing through the initial screen should be analyzed in further detail against a range of factors and compared against one another.

The effectiveness of the alternatives should be assessed, taking into account whether or not an alternative adequately protects human health and the environment and attains Federal and State ARARs, whether or not it significantly and permanently reduces the toxicity, mobility, or volume of hazardous constituents, and whether or not it is technically reliable.

Alternatives should be evaluated against implementability factors, including the technical feasibility and availability of the technologies each alternative would employ, the technical and institutional ability to monitor, maintain, and replace technologies over time; and the administrative feasibility of implementing the alternative.

Finally, the costs of construction and the long-term costs of operating and maintaining the alternatives should be analyzed using present-worth analysis.

Both the short- and long-term effects of each of these factors must be assessed. In considering these items, Regions will address all of the long-term effectiveness factors cited in SARA §121(b)(1). After each alternative has been analyzed against these factors, the remedial options should be compared for their relative strengths and weaknesses.

Upon completion of the RI and draft FS, EPA and the State should formulate a recommended alternative or approach to present to the community when the FS goes out for public comment. At this point, the RI/FS is transmitted to ATSDR for their use in preparing a health assessment.

Selection of Remedy

The remedial action for a site should be selected among those alternatives about which the following four findings can be made:

- Remedies must be protective of human health and the environment. This means that the remedy meets or exceeds ARARs or health-based levels established through a risk assessment when ARARs do not exist.

- Remedies should attain Federal and State public health and environmental requirements that have been identified for a specific site. In general, the remedy selection process presumes that alternatives will be formulated and refined to ensure that they attain all of the appropriate ARARs. However, SARA does provide waivers which permit selection of remedies which do not attain all ARARs under six different types of circumstances: fund-balancing, technical impracticability, interim remedy, greater risk to health and the environment, equivalent standard of performance, and inconsistent application of State standards. If a remedy is protective, cost-effective, and adequately satisfies the statutory preferences, inability to attain a particular ARAR will not necessarily prevent selection of that alternative if it was viewed as the all around best remedial alternative.

- Remedies must be cost-effective. In general, this finding requires ensuring that the results of a particular alternative cannot be achieved by less costly methods. This implies that for any specific site there may be more than one cost-effective remedy, with each remedy varying in its environmental and public health results.

- Remedies must utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination is interrelated to the cost-effectiveness finding and includes consideration of technological feasibility and availability.

The selected remedy should represent the best balance across all the effectiveness, implementability, and cost factors examined in the detailed analysis. In making this selection, the decision-maker must consider the statutory preference for treatment which permanently and significantly reduces the toxicity, mobility or volume of the waste.

The program permits the staging of remedial action implementation through multiple operable units. Decisionmakers may choose to implement a limited measure to stabilize a site when a suitable technology for that site is not currently available but clearly on the horizon or capacity for the desired technology is currently unavailable. Initial cleanup actions should not impede implementation of subsequent phases.

Writing the ROD

The Record of Decision (declaration statement and supporting documentation) is the centerpiece of the administrative record against which the Agency's decisionmaking may be judged by the courts. In addition to containing an accurate and complete summary of the site, the threat it poses, and the selected remedy, the ROD must describe the relative strengths and weaknesses of each alternative considered and offer a clear justification for the final decision that is made. For Fund-financed actions, the ROD should include a formal written concurrence from the State.

Specific statements and explanations that should appear in the ROD include the following:

- A statement and justification that the selected remedy is protective and cost-effective, attains ARARs and utilizes permanent solutions and treatment technologies to the maximum extent practicable, where all statutory requirements and preferences are fully satisfied.
- An explanation as to why an alternative that would have reduced the toxicity, mobility, or volume of waste was not selected if the selected remedy does not satisfy the preference for permanent solutions.
- A statement that indicates whether a remedy which does not satisfy the statutory preferences for treatment is intended as the final remedy for that site (at a minimum this remedy would have to be protective and cost-effective) or whether the action is an operable unit that will be followed by subsequent actions to achieve a final remedy which satisfies the preferences. The timeframe for completing the total remedy should be specified.
- A description of those Federal and State requirements which were found to be applicable or relevant and appropriate to the site and will be met. In addition, where ARARs do not exist, a description of the health-based level that will be met.
- A statement of which ARARs will not be met and the waiver that will be invoked to justify the nonattainment.
- In those occasional situations where no treatment alternative was carried through the screen to the detailed analysis (for sites such as municipal landfills) a special explanation should be included in the ROD.

Decisionmakers have some flexibility as to how specific the ROD is regarding the use of treatment technologies. At a minimum, the ROD should state what technology will be applied to what type and amount of waste and the performance goal that process is expected to reach. For instance, the ROD may state that thermal destruction is the selected remedy. However, the effectiveness, implementability, and cost analyses must be based on a specific process within that technology category, such as rotary kiln, to ground the analysis in hard data. When the remedial action is bid, any process in that technology category stated in the ROD would be eligible provided they could match the performance goals of the process analyzed in detail.

Applicability to Ongoing Projects

Superfund reauthorization affects a wide variety of projects in many different stages of development. The cleanup standards provisions in §121 will affect ongoing projects in a particularly unique way. For projects closest to ROD signature, Regional managers and project managers should focus on whether an adequate range of treatment alternatives was considered for feasibility, and whether Federal and particularly State ARARs have been thoroughly considered and will be met, unless a waiver is to be invoked. If there is a sound basis for selecting and rejecting alternatives under the new statutory requirements and preferences, Regions should proceed to ROD signature and may postpone treatability studies (that would otherwise be conducted in the RI/FS) until remedial design.

On the other hand, projects in their early stages should be modified to be consistent with the process outlined in this guidance. In particular, Regions should assess the need for treatability testing and initiate immediately studies necessary to ensure availability of needed data in the detailed analysis phase.

Ground Water Operable Units

With the exception of specific statements in §121(d)(2)(A)(ii) and §121(d)(2)(B)(i) and (ii), the cleanup standards provisions apply most directly to source control measures. The existing approach toward ground water remediation outlined in the "Draft Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites (September 29, 1986)" remains largely intact with some modifications necessary to conform to SARA requirements related to ARARs. Specific guidance on ARARs, including MCLGs and WQC, will be provided in the near future.

The remedial approach outlined in the Draft Guidance derives directly from EPA's Ground Water Protection Strategy, which states that ground waters should be protected differentially based on characteristics of vulnerability, use and value. Superfund's Draft Guidance calls for the development of a limited number of ground water remedial alternatives within a performance range, defined in terms of different remediation levels (the level of ground water contaminant reduction achieved), and different rates of restoration (the time required to achieve remediation levels).

Factors that influence a decision regarding the appropriate rate of restoration are:

- Feasibility of providing an alternative water supply;
- Current use of ground water;
- Potential need for ground water;
- Effectiveness and reliability of institutional controls;
- Ability to monitor and control the movement of contaminants in ground water;
- Other risks borne by the affected population; and
- Population sensitivities.

Additionally, limiting the extent of contamination, the impact of contamination on environmental receptors, the technical practicability and the cost of alternatives should also be analyzed and factored into the decision-making process.

Should you have any questions concerning this guidance, please contact Bill Hanson (FTS 382-2345) in the Hazardous Site Control Division or John Cross (FTS 475-6770) in the CERCLA Enforcement Division.

Figure 1

Proposed Remedy Selection Process Under Reauthorization