164677

GROUNDWATER INVESTIGATION REPORT
CAMDEN MUNICIPAL WELLS
CITY OF CAMDEN AND PENNSAUKEN TOWNSHIP, NEW JERSEY

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CAMDEN, CAMDEN COUNTY, NJ

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GROUNDWATER INVESTIGATION REPORT

1.0 INTRODUCTION

On 2 February 2000, the United States Environmental Protection Agency (EPA) tasked Roy F. Weston, Inc. (WESTON) with conducting a groundwater investigation at the Camden Municipal Wells Site (site) in Camden, Camden County, NJ. The purpose of this investigation was to determine the constituents present in groundwater at the site and to identify potential sources of contamination.

1.1 Background

1.1.1 Site Location

The site is located in the City of Camden (Camden) and Pennsauken Township, New Jersey (Figure 1-1). Camden currently has 16 operable wells in three wellfields (Morris, Delair, and Parkside). The Morris wellfield consists of 12 operable wells in Pennsauken Township (Figure 1-2). The Morris wellfield is bounded to the west by the Delaware River, to the south by the Betsy Ross Bridge, to the east by the Penn Central Railroad tracks and to the north by Pennsauken Creek. The Parkside wellfield consists of two operable wells and one inoperable well in Camden, NJ (Figure 1-3). The Delair wellfield consists of one operable well located in Pennsauken Township, NJ (Figure 1-2).

1.1.2 Public Water Supply and Distribution System

The Camden public water supply and distribution system currently consists of three wellfields, two treatment plants, and one distribution system. Water from the Morris and Delair wellfields is pumped to the Morris and Delair treatment plant at 8900 Zimmerman Ave. Pennsauken, NJ. Water from the Parkside wellfield is pumped to the Parkside Treatment Plant (PTP) at Park and Vesper Boulevards in Camden, NJ. Water from both treatment plants is pumped into a distribution system that supplies drinking water to approximately 54,000 Camden residents via water mains (Reference 1).

1.1.3 Site History

Prior to the 1930s, Camden owned and operated approximately 100 shallow wells in and around the existing Morris wellfield. Historical information on these wells is limited, but they were eventually replaced by the current, deeper municipal wells (Reference 2). Between 1930 and 1970 potable water was supplied by various wells in the Morris, Delair, Puchack, and Parkside wellfields. Some wells have been taken off-line, refurbished or redrilled. Table 1-1 summarizes the available specifications, and drilling dates for wells associated with the Morris, Delair, and Parkside wellfields. Numerous sampling events have been conducted at the Morris, Delair, and

Parkside wellfields since the early 1970's. Results from these sampling events are summarized below.

In December 1972, samples collected from Parkside wells 13 and 17 contained 4 parts per million (ppm) of chromium (Reference 3).

In April and May 1978, samples collected from Parkside wells 13, 17 and 18 contained elevated levels of trichloroethylene (TCE) [16 – 297 (parts per billion (ppb)] (Reference 4).

In December 1979, samples collected from Parkside wells 13, 17, and 18 contained elevated levels of TCE, tetrachloroethylene (PCE), and 1,2 dichloroethane. Samples collected from the PTP effluent also contained elevated levels of these compounds (Reference 5).

In 1980, samples were collected monthly (except March) from Parkside wells 13, 16, 17, and 18 as well as the PTP effluent. All samples collected from these wells and the effluent contained elevated levels of TCE, PCE, and 1,2 dichloroethane (Reference 6). In January 1980, samples collected from Parkside wells 13, 17, and 18 contained 5 ppb of chromium (Reference 3). A sample collected in January 1980, from Morris well 11 contained 5 ppb of chromium (Reference 3).

In February 1981 samples collected from Morris wells 12 and 13 contained 5 ppb of chromium (Reference 3).

In April 1985, samples collected from the PTP effluent contained elevated levels of TCE (26.7 ppb) and PCE (6.45 ppb) (Reference 7).

On 21 November 1985, samples collected by NJDEP from the PTP contained TCE (18.3 ppb), PCE (7.5 ppb), 1,2-dichloroethylene (3.8 ppb), and 1,2-dichloroethane (6.5 ppb). NJDEP ordered Camden to identify the source of these contaminants in the PTP and either treat the raw water or use alternative sources. NJDEP also required Camden to conduct monthly monitoring of the PTP (Reference 8).

On 6 March 1986, samples collected by NJDEP from the the PTP contained TCE (22 ppb), PCE (5.2 ppb), trans-1,2-dichloroethylene (4.5ppb), 1,1-dichloroethylene (2 ppb), 1,2-dichloroethane (8.9 ppb), 1,1-dichloroethane (3 ppb), and benzene (2.1 ppb) (Reference 9).

On 26 March 1986, samples collected by Camden from the PTP contained TCE (14 ppb), PCE (12 ppb), 1,2 dichloroethane (8 ppb), and 1,2-trans-dichloroethylene (3 ppb) (Reference 10). In April 1986, samples collected from the PTP effluent contained TCE (50 ppb), 1,2-dichloroethane (5 ppb), and 1,1-dichloroethane (1 ppb) (Reference 11).

In May 1986, samples collected by Camden from the PTP effluent contained TCE (14 ppb) and PCE (8 ppb). (Reference 12). In July 1986, samples collected by Camden from the PTP effluent contained TCE (25 ppb) (Reference 13). In August 1986, samples collected from the PTP effluent contained TCE (9.8 ppb), PCE (5.7 ppb), and 1,2-dichloroethane (4.3 ppb) (Reference 13).

In September 1988, samples collected by Camden from Parkside well 17 contained TCE (17 ppb), 1,2-dichloroethane (6.7 ppb), trans-1,2-dichloroethylene (5.9 ppb), methylene chloride (2.5 ppb), bromoform (23 ppb), chlorobenzene (52 ppb), and toluene (23 ppb). Samples collected from Parkside well 18 contained TCE (19 ppb), 1,2-dichloroethane (5.9 ppb), trans-1,2-dichloroethylene (4.8 ppb), bromoform (6.2 ppb), and toluene 34 ppb). Samples collected from Parkside well 13 contained TCE (130 ppb), 1,2-dichloroethane (8.3 ppb), trans-1,2-dichloroethylene (26 ppb), benzene (14 ppb), bromoform (7.8 ppb), toluene (230 ppb), and chloroform (2.8 ppb). Samples collected from Morris wells 6, 7, 8, 10, 11, and 12 did not contain any volatile organic compounds (VOCs). A sample collected from Morris well 13 contained 1,4-dichlorobenzene (3.3 ppb). A sample collected from Morris well 3 contained PCE (5.9 ppb), 1,4-dichlorobenzene (4.8 ppb), and 1,3-dichlorobenzene (11 ppb). A Sample collected from Delair well 2 did not contain any VOCs. A sample collected from Delair well 3 contained methylene chloride (2.4 ppb). A sample collected from Puchack well 13 contained TCE (3.1 ppb), trans-1,2-dichloroethylene (3.1 ppb), methylene chloride (2.4 ppb), and bromoform (1.8 ppb) (Reference 14).

In 1994, several samples were collected throughout the year from the point of entry into the PTP that contained TCE (18-49 ppb) (Reference 15). In February and May 1995, samples collected from the point of entry into the PTP contained TCE (31-35 ppb) (Reference 15)

In June 2000, the Morris wellfield consisted of 12 operable wells: Morris 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, and 15. Morris 1 was being redrilled and Morris 9 was collapsed. The Delair wellfield consisted of Delair well 1. Delair wells 2 and 3 were removed. The Parkdside wellfield consisted of two functioning wells (17 and 18) and one out of service well (13). Camden was in the process of constructing two new wells (Morris 14 and 15).

1.1.4 Regulatory History

On 18 August 1971, the New Jersey Department of Environmental Protection (NJDEP) issued an Administrative Order (AO) to the City of Camden. The AO required the city to make extensive improvements in the operation and maintenance of its potable water supply and distribution system. The order also required the city to seal abandoned wells, provide treatment and disinfection where necessary, maintain operating records, and provide additional elevated storage capacity (Reference 17).

On 25 March, 2 April, and 14 May 1980, NJDEP conducted three inspections of the Camden water supply and distribution system that revealed several wells were pumping raw untreated groundwater directly to the distribution system. Various wells were found to produce water that exceeded maximum contaminant levels (MCLs) defined in the New Jersey Safe Drinking Water Act Regulations, for chromium, iron, manganese, color and corrosivity. NJDEP also determined that Camden required additional storage capacity and prime sources of water supply (Reference 17).

In July 1981, Camden responded to the AO with a written proposal for short and long-term improvements to the water supply and distribution system to insure an adequate and safe water supply to the city. These reports served as a basis for extensive discussions between the city and NJDEP, following which the AO was revised (Reference 17).

In September 1983, the revised AO required Camden to disconnect five wells from the water supply system, make them functional for groundwater monitoring, and protect them from unauthorized access and vandalism. Camden was also ordered to submit a comprehensive operation and maintenance manual for all treatment facilities, pumping stations, and distribution mains within the system. The AO also required Camden to provide additional elevated storage capacity or a combination of storage capacity and auxiliary power to operate pumping equipment at the storage facility. NJDEP also ordered Camden to correct several system leaks using a two phase approach on an eight year schedule (Reference 17).

In October 1983, NJDEP conducted an inspection of the Morris-Delair treatment plant. This inspection revealed that pH was being monitored on a daily basis, however, the self-monitoring program was inadequate. In addition, storage capacity requirements were not fulfilled (Reference 16).

In January 1989, NJDEP issued an AO and Civil Administrative Penalty Assessment to Camden for failing to conduct proper laboratory quality control practices (Reference 19).

In April 1995, NJDEP issued an Administrative Consent order that required Camden to provide treatment at the PTP for all VOCs that exceeded MCLs. The order also required Camden to install flow meters in the Morris-Delair and Puchack, and PTPs (Reference 18).

1.2 Objectives

The objectives of this groundwater investigation are:

- To determine the concentrations of contaminants in the groundwater supplying the Morris, Delair, and Parkside wellfields.
- To identify potential sources for detected contaminants.

Analytical results will be compared to MCLs to determine which contaminants present in groundwater exist at levels that could effect human health. Historical records and documents will be used with an Environmental Data Resources (EDR) report to identify potential sources.

1.3 Sample Collection

On 13 and 14 June 2000, WESTON collected raw (untreated) potable water samples from the Morris, Delair, and Parkside wellfields. All samples were collected by WESTON and shipped over night to Mitkem Corporation in Warwick, RI and analyzed for Target Compound List (TCL) (VOCs), semivolatile compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs). Samples were also shipped over night to Sentinel Inc. in Huntsville, AL and analyzed for Target Analyte List (TAL) inorganics. Analyses for TCL organics and TAL inorganics were performed under the EPA Contract Laboratory Program (CLP). Samples were also delivered to Chemtech in Edison, NJ (a non-CLP laboratory) for hexavalent chromium analysis. Sampling activities were conducted in accordance with the EPA-approved Quality Assurance Project Plan (QAPP) for the Camden Municipal Wells site, dated June 8, 2000.

2.0 REGIONAL HYDROGEOLOGY

2.1 Regional Geology

The subject properties are located in the Atlantic Coastal Plain physiographic province. The sediments of Camden County are unconsolidated sands, silts, and clays of Quaternary, Tertiary, and Cretaceous age. The bedrock underlying the Coastal Plain sediments in Camden County is crystalline rock of pre-Cretaceous age. Over 600 million years ago (mya) (Precambrian) a large amount of sediment, including sands, silts, clays, and carbonates, was deposited throughout the present Camden County location. These materials were subsequently buried, then metamorphosed, and uplifted during the Paleozoic Era. A portion of this sediment now comprises the metamorphic rocks of the Wissahickon Formation. A period of substantial erosion proceeded in the Camden County area until approximately 150 mya. During the Cretaceous period sands, clays, and silts were deposited in a delta environment providing the necessary sedimentary material for the Potomac Group and the Raritan and Magothy Formations. Troughs created from the late Cretaceous weathering events were subsequently filled by the sands and gravels of this (deltaic) depositional environment (Reference 21).

Overlying the crystalline rock of the Wissahickon Formation is the fluvial-marginal marine sediments of the Potomac Group and the Raritan and Magothy Formations (approximately 70 to 100 mya). These are the sediments that form a major part of the surrounding Coastal Plain as it extends from Massachusetts to Florida. The Potomac Group and the Raritan and Magothy Formations are characterized by their wedge shape that thickens toward the southeast (or downdip). These late Mesozoic sediments are commonly overlain by permeable Pleistocene deposits in the outcropping locations throughout the subject properties (Reference 21).

The Pensauken Formation (Pleistocene Epoch) crops out in occasional patches along the Delaware River in northcentral Camden County. The formation consists of medium to coarse grained quartzose sand, gravel, and clay. The Pensauken Formation ranges in thickness from several feet to 30 feet in Camden County. Another Pleistocene aged formation is the Cape May Formation. This formation occurs along the Delaware River and its tributaries. Outcrops of the Cape May formation are relatively flat and are easily infiltrated by runoff. Although this formation ranges in thickness from several feet to 40 feet, it is hydraulically connected to the Potomac Group and the Raritan and Magothy Formations (Reference 21).

The most recent deposits of sediment in the subject area are alluvial materials (mixtures of clay, silt, organic material, sand, and gravel) inside the tidal flats and low-lying stream channels. The majority of the alluvium is fine silt and clay with low overall permeability. This low permeability of the Holocene material helps to prevent the waters of the Delaware River from entering the water-bearing zones of the unconfined aquifer system (Reference 21).

2.2 Regional Hydrology

The Potomac Group and the Raritan and Magothy Formations are the most productive ground water sources in Camden County. The sands, gravels, silts, and clays deposited in the late-Cretaceous fluvial-deltaic environment act as the major permeable (storage) and confining layers to the aquifer system. The system is composed of three hydraulically connected aquifers, with the two lower units consisting of the sands of the Raritan Formation and Potomac Group and the upper unit representing the Magothy Formation. The younger, overlying Pleistocene sediments (of the Pensauken and Cape May Formations) are hydraulically connected to all three of the previously mentioned units. All of Camden's municipal wells draw water from the lower aquifer (Reference 21).

The movement of ground water in the Potomac-Raritan-Magothy aquifer system (prior to heavy pumpage) is linked to the topography of the region. Recharge occurred at the topographic highs, and the discharge along the Delaware River and other regional low lying areas. The Morris well Field, included in this investigation, was the first public-water obtained from the regional aquifer system. Heavy pumpage throughout Camden City and the surrounding suburbs (starting 1898) caused a (regionally) sharp decline in the potentiometric heads of the three aquifers. The City of Camden pumps between 12 and 24 million gallons per day (mgd) of water depending on the season. The Morris and Delair Wellfields of Pennsauken can yield approximately 15 mgd. The Parkside wells have a maximum capacity of around 3 mgd (Reference 21).

As water usage increased throughout Camden County, the Potomac-Raritan-Magothy aquifer system was affected by the large volumes consumed. The high pumping commonly causes a reversal in the flow of ground water around the Delaware River, allowing river water to enter into the aquifer system. In Pennsauken, the municipality with the largest withdrawals, the water table is drawn down by leakage to the confined part of the aquifer system to below sea level within a mile of the Delaware River. Recharge in this altered aquifer system occurs through leaching of local precipitation (or waterways), an expanded cone of depression, and permeation through the confining silts and clays of overlying strata. Results from aquifer tests at the Camden division of the New Jersey Water Company revealed transmissivity ranges from 3,200 to 3,700 ft^2/day and storage coefficient ranges from $3.3 * 10^{-5}$ to $1.5 * 10^{-3}$. The average yield for 106 wells in Camden County is 1,085 gallons per minute (gpm) (Reference 21).

2.3 Surface Water

Both the Morris and Delair wellfields are located on the eastern bank of the Delaware River, less than one mile from the Camden-Burlington County line. The Delaware River is supplied by a 7,850 square mile drainage area, and has a historical peak flow rate ranging between 5.47 and 8.90 ft^3/sec near Philadelphia. The Pennsauken Creek empties into the river, and represents the natural boundary between the two counties. Peak flow rates for the north branch of Pennsauken Creek have historically ranged between 4.17 and 7.44 ft^3/sec, and between 3.81 and 6.09 ft^3/sec for the south branch of the creek. The Parkside Wellfield is located on the southern bank of the Cooper River. The Cooper River (peak flow 5.37 - 7.85 ft^3/sec, historically) drains into the Back

Cooper River. The Cooper River (peak flow 5.37 - 7.85 ft^3/sec, historically) drains into the Back Channel of the Delaware River. The Parkside wells are located approximately 2 miles southeast of the Back Channel. The Delaware River and The Cooper River are both tidally influenced bodies of water. During drought periods, salt water has been reported as far north as the city of Camden (Reference 21).

2.4 Water Quality

Water from the Potomac Group and the Raritan and Magothy Formations meets New Jersey standards for potable water, except for iron content. In addition, the ground water is suitable for most industrial and agricultural uses. The quality of water in the aquifer system varies from well to well depending on the depth of the well, the nature of the overlying sedimentary material, and the distance from the Delaware River. Local ground water contamination caused by iron has required iron removal treatment for most users. A large difference exists between the chloride concentrations in the upper aquifer in comparison to the lower (4.0 mg/l and 300 mg/l, respectively). The large range in chloride concentrations may be attributed to an interface existing between the saltwater to the southeast and fresh water to the northwest. Groundwater from the middle or lower aquifer has had a decrease in quality through time, with chloride and sulfate concentrations increasing. A major reason for the decline in the water quality of the shallow and deeper aquifers in the Camden City area may be from contamination caused by disposal ponds, waste-injection wells, and improperly sealed abandoned wells (Reference 21).

3.0 SAMPLING DESIGN AND INVESTIGATION

3.1 Sampling Procedures

Groundwater samples were collected from 14 operable municipal wells (Parkside 13 is operable, but not in service). Groundwater samples were collected from the Parkside wells 13, 17, and 18, Delair well 1 and Morris wells 2, 3, 4, 6, 7, 8, 10, 11, 12, and 13. Morris well 9 was not sampled because it collapsed and Morris wells 14 and 15 were not sampled because access was not granted. Morris 1 was not sampled because it was being developed at the time of sampling. A complete field sampling summary can be seen in Table 3-1. Well specifications for all sampled wells can be found in Table 1-1.

Pressurized sampling ports were available and utilized for the collection of all samples. Water was allowed to flow for ten minutes from the sampling ports prior to sample collection. The field parameters (e.g., temperature, specific conductance, pH, dissolved oxygen, turbidity, and salinity) were measured immediately before sample collection using a Horiba U-10 Water Quality Meter. Table 3-2 contains the water quality data for purge water from each well.

A matrix spike/matrix spike duplicate (MS/MSD) sample was collected from Morris Well 10. Duplicate sampling was performed at Morris Well location #8 (yielding sample GW-M15). One trip blank was included with the organic samples shipped after the sampling activities. A rinsate blank was not collected because disposable sampling equipment was used during this sampling event. The sample bottles met all the guidelines specified in OSWER Directive 9240.0-05A, Specifications and Guidance for Contaminant Free Sample Containers (July 1989). A complete field sampling summary can be seen in Table 3-1.

Groundwater sampling was conducted in accordance with the guidelines outlined in the WESTON Potable Water Sampling Standard Operating Practice (Appendix A). Samples were packaged and shipped according to the EPA User's Guide to the Contract Laboratory Program (January 1991). Chain of custody forms, sample labels, custody seals, and other sample documents were completed as specified in the above referenced manual. All entries were made in permanent ink.

All samples collected for TAL inorganic analysis were preserved with nitric acid and all samples collected for VOC analysis were preserved with hydrochloric acid. After collection, the sample containers were labeled, sealed in polyethylene bags, and placed in coolers filled with ice. Coolers were packed with sufficient amounts of ice and noncombustible, adsorbent cushioning material. Sample documentation was sealed in a plastic bag and affixed to the underside of each cooler. After sealing the cooler, custody seals were affixed so that any sign of tampering would be easily visible. All samples were either hand-delivered or shipped to the appropriate laboratory within 24 hours of collection. Information regarding the shipment of samples, including the airbill number, sample quantity, and the sample types, were reported to the EPA Sample Management Office.

3.2 Deviations to Work Plan

Morris Wells 1 and 14 were not sampled as proposed in the QAPP. Camden Water, LLC is currently installing Morris wells 14 and 15. In addition, Morris Well #1 is currently being developed and is expected to be operational in the near future.

4.0 SAMPLING RESULTS

4.1 VOC Results

TCE was detected in samples from Morris 2 (7 ppb), Morris 6 (27 ppb), Morris 7 (15 ppb), Morris 11 (5 ppb), Parkside 13 (330 ppb), Parkside 17 (21 ppb), and Parkside 18 (170). All of these reported values exceed the MCL (5 ppb) for TCE. Concentrations of TCE for each of the Morris wells are shown on Figure 4-1. Concentrations of TCE for the Parkside wells are shown on Figure 4-2. PCE was detected in samples collected from Morris 2 (6 ppb), Parkside 13 (10 ppb), Parkside 17 (19 ppb), and Parkside 18 (13 ppb). All of these reported concentrations exceed the MCL (5 ppb) for PCE. 1,1-dichloroethene (8 ppb) and vinyl chloride (2 ppb) were detected in the sample collected from Parkside 13. The concentration of 1,1-dichloroethene exceeds the MCL (7 ppb) and the concentration of vinyl chloride is equal to the MCL (5 ppb). 1,2-dichloroethane was detected in the samples collected from Parkside 13 (26 ppb), Parkside 17 (7 ppb), and Parkside 18 (7 ppb). All of these reported concentrations exceed the MCL (5 ppb) for 1,2-dichloroethane. All VOC results and detection limits can be found in Table 4-1.

4.2 SVOC Results

There were no semivolatile organic compounds (SVOCs) detected in any groundwater samples collected during this sampling event. Results and detection limits for SVOC analysis can be found in Table 4-2.

4.3 Pesticide and PCB Results

There were no pesticides or PCBs detected in any groundwater samples during this sampling event. Results and detection limits for Pesticide and PCB analyses can be found in Table 4-3.

4.4 Inorganic Results

All groundwater samples were analyzed for hexavalent chromium using the EPA Method 7196, referenced in the Test Methods for Evaluating Solid Wastes, SW846 3rd edition. On 14 June 2000, groundwater samples from fourteen well locations were analyzed utilizing the above method. The detection limit for Hexavalent Chromium utilizing Method 7196 was 10 micrograms/liter (ug/l). Hexavalent chromium was detected in groundwater samples from wells Morris 8 (22 ug/l) and Morris 10 (26 ug/l). These detected concentrations are significantly below the MCL of 100 ug/l for total chromium. Hexavalent chromium was not detected in any other wells. All hexavalent chromium results are shown on Figure 4-1 and can be found in Table 4-4.

5.0 POTENTIAL SOURCES OF CONTAMINATION

The stressed conditions of the groundwater flow, caused by excessive withdrawals in Camden have altered the recharge of the underlying aquifers. Camden is consistently supplied groundwater by the long-distance, long-travel-time path from Mercer and Middlesex Counties, and the medium-distance path from down-gradient locations. However, the Delaware River now serves as a recharge location, representing a short-distance, short-travel-time pathway for groundwater. Much of the water entering this system, through the above pathways, enters as precipitation. The runoff flowing through (or from) industrial and commercial areas will typically contain contaminants at concentrations capable of affecting the overall quality of groundwater in an area. Another less probable method for contaminants to enter the aquifer system would be from the river. Although illegal dumping of hazardous materials into the Delaware River has been controlled since the 1970s, the presence of contaminants in surface water is possible.

5.1 Potential Sources of Historical VOC Contamination

A review of historical records indicates that numerous facilities within one mile of the Morris wellfield could be responsible for VOCs detected in Morris wells 2, 6, 7, and 11. These potential sources, their addresses and processes are summarized in Table 5-1.

5.2 Potential Sources of Historical Hexavalent Chromium

The Puchack Wellfield, located approximately 0.5 mile east of Morris-Delair Wellfields, has documented contamination from a variety of compounds since the early 1970s. Wells have been abandoned for several years (1970, 1978, 1980, and 1983) due to the presence of hexavalent chromium. The earliest (1970) contamination was caused by the construction of the Betsy Ross Bridge. Subsequent investigations performed for Camden and the NJDEP Enforcement Element have identified several potential sources of chromium contamination. SGL Modern Hard Chrome Service is a plating company that discharged nearly 10,000 gallons/day of chrome plating waste into on-site septic systems (from the late 1960s to the early 1980s). Swope Oil and Chemical Company is a chemical reclamation company that dumped chrome and mercury waste into an unlined lagoon in the late 1960s. The Pennsauken landfill has had chromium detected at monitoring wells throughout the landfill. Due to the number of contaminant sources, history of contamination, and the complex hydrology of the underlying aquifers, it has become increasingly difficult to accurately determine the responsible parties (of hexavalent chromium groundwater contamination). Several potential sources for hexavalent chromium have been identified during years of investigation of the Puchack wellfield. These potential sources are summarized in Table 5-2.

5.3 Environmental Resources Data Report

In February 2000, WESTON obtained an Environmental Resources Data Report (EDR) for the Morris/Delair and Parkside wellfields. Over 100 potential sources were identified in this report using several federal and state databases including but not limited to:

- EPA CERCLIS
- EPA CERCLIS No Further Remedial Action Planned
- EPA Emergency Response Notification System
- Resource Conservation Recovery Act (RCRA) (Large and Small Quantity Generators)
- NJDEP Hazardous Waste Sites
- NJDEP Underground Storage Tank (UST) Program
- NJDEP Leaking UST (LUST) Program
- NJDEP Spills

EDR reports for the Morris and Parkside wellfields were reviewed to identify sites that could be responsible for contamination. Any sites that were currently on CERCLIS or appeared to be exempt due to the CERCLA petroleum exclusion were eliminated from consideration. Table 5-3 summarizes those sites in the vicinity of the Morris wellfield that could be responsible for VOC or hexavalent chromium contamination of the Morris wellfield. Table 5-4 summarizes those sites in the vicinity of the Parkside wellfield that could be responsible for VOC contamination in the Parkside wellfield. Sites currently on CERCLIS and those that appeared to fall under the CERCLA petroleum exclusion were eliminated from consideration and thus were not included in these tables (5-3 and 5-4).

6.0 CONCLUSIONS AND RECOMMENDATIONS

The June 2000 analytical results indicate that levels of VOCs (TCE and PCE) as well as hexavalent chromium in the groundwater of the Morris and Parkside wellfields may be harmful to human health. A review of all historical data and EDR reports suggests that several sources of VOCs may be present in the vicinity of the Morris and Parkside wellfields. Several sources may also be responsible for hexavalent chromium present in the Morris wellfield. The sites listed in Tables 5-1, 5-2, 5-3 and 5-4 should be screened for inclusion in CERCLIS. Any sites placed on CERCLIS can be addressed individually. CERCLA screening activities should include:

- Conducting site file searches at state and local agencies (i.e. NJDEP)
- Conducting on or off site reconnaissances at each site
- Recording the location of each site using a global positioning system (GPS) unit
- Complete CERCLA screening forms in order to determine which sites should be included in CERCLIS.

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Table 1-1
Camden Municipal Wells
Well Specifications

Well ID	Status	Depth (feet)	Permitted Capacity (gpm)	June 1996 Production (gpm)	Original Yield (gpm)	Year Drilled	Depth to Screen (feet bgs)
Delair 1	Operating	138	1680	1100	1980	10/31/30	103-138
Morris 10	Operating	115	1400	1230	1529	10/29/60	75-115
Morris 11	Operating	144	2030	815	2030	8/1/79	102-144
Morris 12	Operating	117.6	2030	887	2030	1/7/81	86-95
Morris 13	Operating	130	2060	800	2060	6/4/80	90-130 mult.
Morris 2	Operating	115	1000	No pump	1000	1/1/32	93-123
Morris 3	Operating	107	1800	800	1000	7/53	73-107
Morris 4	Operating	130	1600	1200	1585	1/1/60	95-130
Morris 6	Operating	133	1700	325	1944	7/11/32	98-133
Morris 7	Operating	120	1680	1056	1630	1/1/32	85-120
Morris 8	Operating	124	1670	603	1000	1/1/53	89-124
Parkside 13	Off-line	230	1200	690	1000	1953	185-225
Parkside 17	Operating	270	1500	0	1000	1954	230-265
Parkside 18	Operating	290	1200	1062	1250	1976	258-288

Notes:
gpm = gallons per minute.
bgs = below ground surface.
mult.= multiple screening intervals.

Table 3-1
Camden Municipal Wells Site
Field Sampling Summary

Analytical Parameters	Matrix	Container Size	Preservative	Holding Time[1]	Subtotal Samples	Trip Blanks	Duplicate Samples	MS/MSD Samples	Total Field Samples
TAL Metals	Aqueous	1 x 1-L polyethylene bottle	Cool to 4° C, HNO3 to pH<2	6 months to analyze Hg - 30 days	14	NA	1	1	15
Chromium VI	Aqueous	1 x 1 -L polyethylene bottle	Cool to 4° C	24 hours	14	NA	1	1	15
TCL VOCs	Aqueous	2 x 40 - ml glass vials w/ teflon septum caps	Cool to 4° C, HCL to pH<2	7 days, unpreserved 14 days, preserved	14	1	1	1	16
TCL BNA/Pesticides/ PCBs	Aqueous	4 x 1 - L amber glass bottles	Cool to 4° C	7 days to extract 40 days to analyze	14	NA	1	1	15

[1] - Holding time from date of sampling.
NA - Not Applicable.
MS/MSD = matrix spike/matrix spike duplicate.

Table 3-2
Camden Municipal Wells Site
Well Purge Data
13, 14 June 2000

Well Number	Wellfield	pH	Conductivity (ms/cm)	Turbidity ntu	Dissolved Oxygen (mg/L)	Temp (°C)	Salinity (ppt)
10	Morris	5.25	.347	423	10.53	17.2	.01
8	Morris	6.0	.335	3	10.87	15.8	.01
7	Morris	6.2	.263	2	10.45	15.7	.01
6	Morris	6.31	.265	-5	10.53	15.3	.01
11	Morris	6.29	.256	22	10.42	15.5	0
13	Morris	6.71	.218	-4	10.13	15.7	0
12	Morris	6.74	.212	100	9.79	16.9	0
3	Morris	6.59	.42	-5	10.54	15.3	.01
2	Morris	6.57	.385	-5	10.59	15.4	.01
4	Morris	6.6	.297	129	10.06	16.2	.01
1	Delair	6.8	.215	-4	10.86	16.6	0
13	Parkside	6.5	.593	0	11.69	16	.02
18	Parkside	6.3	.449	-5	11.01	17.2	.01
17	Parkside	6.55	.453	-1	10.73	16.4	.01

Notes:
mg/L = milligrams per liter.
C = celsius.
ppt = parts per thousand.
ms/cm = millisemons per centimeter.
ntu = nephalometric turbidity unit.

Table 4-1
Camden Municipal Wells Site
Summary of Volatile Organic Results

Sample Number :	B01QK		B01QN		B01QW		B01QX		B01QY		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 2		Morris 3		Morris 4		Morris 6		Morris 7			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	11:35		11:25		12:00		10:15		10:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Dichlorodifluoromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Chloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Vinyl Chloride	10	U	10	U	10	U	10	U	10	U	NA	2
Bromomethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Chloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Trichlorofluoromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	7	7
1,1,2-Trichloro-1,2,2-trifluoroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Acetone	13	U	17	U	10	U	17	U	11	U	NA	NA
Carbon Disulfide	10	U	10	U	10	U	10	U	10	U	NA	NA
Methyl Acetate	10	U	10	U	10	U	10	U	10	U	NA	NA
Methylene Chloride	10	U	10	U	10	U	10	U	10	U	NA	NA
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	100	100
Methyl tert-Butyl Ether	28		1	J	10	U	3	J	10	U	NA	NA
1,1-Dichloroethane	10	U	10	U	10	U	1	J	10	U	NA	NA
cis-1,2-Dichloroethene	10	U	10	U	10	U	4	J	2	J	70	70
2-Butanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Chloroform	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	200	200
Cyclohexane	10	U	10	U	10	U	10	U	10	U	NA	NA
Carbon Tetrachloride	10	U	10	U	10	U	10	U	10	U	NA	5
Benzene	10	U	10	U	10	U	10	U	10	U	NA	5
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	NA	5
Trichloroethene	**7**	J	10	U	10	U	**27**		**15**		NA	5
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	NA	5
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Toluene	10	U	10	U	10	U	10	U	10	U	1000	1000
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	3	5
Tetrachloroethene	**6**	J	10	U	10	U	3	J	1	J	NA	5
2-Hexanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Chlorobenzene	6	J	5	J	10	U	2	J	1	J	100	100
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	700	700
Xylenes (total)	10	U	10	U	10	U	10	U	10	U	10000	10000
Styrene	10	U	10	U	10	U	10	U	10	U	100	100
Bromoform	10	U	10	U	10	U	10	U	10	U	NA	NA
Isopropylbenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	75	75
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	600	600
1,2-Dibromo-3-chloropropane	**10**	R	**10**	R	**10**	R	**10**	R	**10**	R	NA	0.2
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	70	70

Notes:

U = Not detected above the method detection limit.

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

R = Unusable result. Analyte may or may not be present in sample. Supporting data necessary to confirm result.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1 = Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 4-1
Camden Municipal Wells Site
Summary of Volatile Organic Results

ple Number :	B01QZ		B01TJ		B01TK		B01TN		B01TP		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 8		Delair 1		Parkside 13		Parkside 17		Parkside 18			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		13:50		14:35		15:25		15:00			
Dilution Factor :	1.0		1.0		2.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Dichlorodifluoromethane	10	UJ	10	UJ	20	UJ	10	UJ	10	UJ	NA	NA
Chloromethane	10	U	10	U	20	U	10	U	10	U	NA	NA
Vinyl Chloride	10	UJ	10	UJ	**2**	J	10	UJ	1	J	NA	2
Bromomethane	10	U	10	U	20	U	10	U	10	U	NA	NA
Chloroethane	10	UJ	10	UJ	20	UJ	10	UJ	10	UJ	NA	NA
Trichlorofluoromethane	10	U	10	U	20	U	10	U	10	U	NA	NA
1,1-Dichloroethene	10	U	10	U	**8**	J	1	J	5	J	7	7
1,1,2-Trichloro-1,2,2-trifluoroethane	10	U	10	U	20	U	10	U	10	U	NA	NA
Acetone	13	U	15	U	20	U	10	U	13	U	NA	NA
Carbon Disulfide	10	U	10	U	20	U	10	U	10	U	NA	NA
Methyl Acetate	10	U	10	U	20	U	10	U	10	U	NA	NA
Methylene Chloride	10	U	10	U	20	U	10	U	10	U	NA	NA
trans-1,2-Dichloroethene	10	U	10	U	20	U	10	U	10	U	100	100
Methyl tert-Butyl Ether	10	U	10	U	20	U	6	J	2	J	NA	NA
1,1-Dichloroethane	10	U	10	U	9	J	2	J	5	J	NA	NA
cis-1,2-Dichloroethene	10	U	10	U	21		5	J	12		70	70
2-Butanone	10	U	10	U	20	U	10	U	10	U	NA	NA
Chloroform	10	U	10	U	2	J	10	U	10	U	NA	NA
1,1,1-Trichloroethane	10	U	10	U	20	U	10	U	10	U	200	200
Cyclohexane	10	U	10	U	20	U	10	U	10	U	NA	NA
Carbon Tetrachloride	10	U	10	U	20	U	10	U	10	U	NA	5
Benzene	10	U	10	U	20	U	10	U	10	U	NA	5
1,2-Dichloroethane	10	U	10	U	**26**		**7**	J	**7**	J	NA	5
loroethene	10	U	10	U	**330**		**21**		**170**		NA	5
ethylcyclohexane	10	U	10	U	20	U	10	U	10	U	NA	NA
1,2-Dichloropropane	10	U	10	U	20	U	10	U	10	U	NA	5
Bromodichloromethane	10	U	10	U	20	U	10	U	10	U	NA	NA
cis-1,3-Dichloropropene	10	U	10	U	20	U	10	U	10	U	NA	NA
4-Methyl-2-pentanone	10	U	10	U	20	U	10	U	10	U	NA	NA
Toluene	10	U	10	U	20	U	10	U	10	U	1000	1000
trans-1,3-Dichloropropene	10	U	10	U	20	U	10	U	10	U	NA	NA
1,1,2-Trichloroethane	10	U	10	U	20	U	10	U	10	U	3	5
Tetrachloroethene	1	J	10	U	**10**	J	**19**		**13**		NA	5
2-Hexanone	10	UJ	10	UJ	20	UJ	10	UJ	10	UJ	NA	NA
Dibromochloromethane	10	U	10	U	20	U	10	U	10	U	NA	NA
1,2-Dibromoethane	10	U	10	U	20	U	10	U	10	U	NA	NA
Chlorobenzene	10	U	10	U	6	J	10	U	10	U	100	100
Ethylbenzene	10	U	10	U	20	U	10	U	10	U	700	700
Xylenes (total)	10	U	10	U	20	U	10	U	10	U	10000	10000
Styrene	10	U	10	U	20	U	10	U	10	U	100	100
Bromoform	10	U	10	U	20	U	10	U	10	U	NA	NA
Isopropylbenzene	10	U	10	U	20	U	10	U	10	U	NA	NA
1,1,2,2-Tetrachloroethane	10	U	10	U	20	U	10	U	10	U	NA	NA
1,3-Dichlorobenzene	10	U	10	U	20	U	10	U	10	U	NA	NA
1,4-Dichlorobenzene	10	U	10	U	20	U	10	U	10	U	75	75
1,2-Dichlorobenzene	10	U	10	U	20	U	10	U	10	U	600	600
1,2-Dibromo-3-chloropropane	**10**	R	**10**	R	**20**	R	**10**	R	**10**	R	NA	0.2
1,2,4-Trichlorobenzene	10	U	10	U	20	U	10	U	10	U	70	70

Notes:

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

R = Unusable result. Analyte may or may not be present in sample. Supporting data necessary to confirm result.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

[1] Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

[2] Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not available.

Table 4-1
Camden Municipal Wells Site
Summary of Volatile Organic Results

ple Number :	B01T0		B01T1		B01T3		B01T4		B01T2		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
pling Location :	Morris 15		Morris 10		Morris 12		Morris 13		Morris 11			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		09:00		11:00		10:55		10:35			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Dichlorodifluoromethane	10	UJ	10	U	10	U	10	U	10	U	NA	NA
Chloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Vinyl Chloride	10	UJ	10	U	10	U	10	U	10	U	NA	2
Bromomethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Chloroethane	10	UJ	10	U	10	U	10	U	10	U	NA	NA
Trichlorofluoromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	7	7
1,1,2-Trichloro-1,2,2-trifluoroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Acetone	10	U	12	U	12	U	17	U	19	U	NA	NA
Carbon Disulfide	10	U	10	U	10	U	10	U	10	U	NA	NA
Methyl Acetate	10	U	10	U	10	U	10	U	10	U	NA	NA
Methylene Chloride	10	U	10	U	10	U	10	U	10	U	NA	NA
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	100	100
Methyl tert-Butyl Ether	10	U	10	U	10	U	10	U	1	J	NA	NA
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	70	70
2-Butanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Chloroform	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	200	200
Cyclohexane	10	U	10	U	10	U	10	U	10	U	NA	NA
Carbon Tetrachloride	10	U	10	U	10	U	10	U	10	U	NA	5
Benzene	10	U	10	U	10	U	10	U	10	U	NA	5
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	NA	5
Trichloroethene	2	J	10	U	10	U	10	U	5	J	NA	5
ylcyclohexane	10	U	10	U	10	U	10	U	10	U	NA	NA
Dichloropropane	10	U	10	U	10	U	10	U	10	U	NA	5
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Toluene	10	U	10	U	10	U	10	U	10	U	1000	1000
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	3	5
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	NA	5
2-Hexanone	10	UJ	10	U	10	U	10	U	10	U	NA	NA
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	100	100
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	700	700
Xylenes (total)	10	U	10	U	10	U	10	U	10	U	10000	10000
Styrene	10	U	10	U	10	U	10	U	10	U	100	100
Bromoform	10	U	10	U	10	U	10	U	10	U	NA	NA
Isopropylbenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	75	75
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	600	600
1,2-Dibromo-3-chloropropane	**10**	R	**10**	R	10	R	10	R	**10**	R	NA	0.2
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	70	70

Notes:

U = Not detected above the method detection limit.

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

R = Unusable result. Analyte may or may not be present in sample. Supporting data necessary to confirm result.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 4-1
Camden Municipal Wells Site
Summary of Volatile Organic Results

ple Number :	B01T7		B01T1MS		B01T1MSD		VHBLK1B		VBLK1B		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
pling Location :	Trip Blank		Matrix Spike		Matrix Spike D.		Lab QC		Lab QC			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000							
Time Sampled :	15:50		09:00		09:00							
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Dichlorodifluoromethane	10	U	10	UJ	10	U	10	UJ	10	UJ	NA	NA
Chloromethane	10	U	10	U	10	U	10	UJ	10	UJ	NA	NA
Vinyl Chloride	10	U	10	UJ	10	U	10	UJ	10	UJ	NA	2
Bromomethane	10	U	10	U	10	U	10	UJ	10	UJ	NA	NA
Chloroethane	10	U	10	UJ	10	U	10	UJ	10	UJ	NA	NA
Trichlorofluoromethane	10	U	10	U	10	U	10	UJ	10	UJ	NA	NA
1,1-Dichloroethene	10	U	**59**		**63**		10	U	10	U	7	7
1,1,2-Trichloro-1,2,2-trifluoroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Acetone	7	J	13	U	12	U	10	U	10	U	NA	NA
Carbon Disulfide	10	U	10	U	10	U	10	U	10	U	NA	NA
Methyl Acetate	10	U	10	U	3	J	10	U	10	U	NA	NA
Methylene Chloride	10	U	10	U	10	U	10	U	10	U	NA	NA
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	100	100
Methyl tert-Butyl Ether	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	70	70
2-Butanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Chloroform	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	200	200
Cyclohexane	10	U	10	U	10	U	10	U	10	U	NA	NA
Carbon Tetrachloride	10	U	10	U	10	U	10	U	10	U	NA	5
Benzene	10	U	**48**		**51**		1	J	10	U	NA	5
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	NA	5
Trichloroethene	10	U	**50**		**52**		10	U	10	U	NA	5
ylcyclohexane	10	U	10	U	10	U	10	U	10	U	NA	NA
Dichloropropane	10	U	10	U	10	U	10	U	10	U	NA	5
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	NA	NA
Toluene	10	U	52		48		10	U	10	U	1000	1000
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	3	5
Tetrachloroethene	10	U	2	J	10	U	10	U	10	U	NA	5
2-Hexanone	10	U	10	UJ	10	U	10	U	10	U	NA	NA
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Chlorobenzene	10	U	51		46		10	U	10	U	100	100
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	700	700
Xylenes (total)	10	U	10	U	10	U	10	U	10	U	10000	10000
Styrene	10	U	10	U	10	U	10	U	10	U	100	100
Bromoform	10	U	10	U	10	U	10	U	10	U	NA	NA
Isopropylbenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	75	75
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	600	600
1,2-Dibromo-3-chloropropane	10	R	**10**	R	**10**	R	10	U	10	U	NA	0.2
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	70	70

Notes:

U = Not detected above the method detection limit.

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

R = Unusable result. Analyte may or may not be present in sample. Supporting data necessary to confirm result.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

[1] Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

[2] Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

Table 4-2
Camden Municipal Wells Site
Summary of Semivolatile Organic Results

Sample Number :	B01QK		B01QN		B01QW		B01QX		B01QY		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 2		Morris 3		Morris 4		Morris 6		Morris 7			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	11:35		11:25		12:00		10:15		10:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Benzaldehyde	10	U	10	U	10	U	10	U	10	U	NA	NA
Phenol	10	U	10	U	10	U	10	U	10	U	NA	NA
bis-(2-Chloroethyl) ether	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,2'-oxybis(1-Chloropropane)	10	U	10	U	10	U	10	U	10	U	NA	NA
Acetophenone	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
Isophorone	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
Naphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	NA	NA
Caprolactam	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	50	50
2,4,6-Trichlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4,5-Trichlorophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
1,1'-Biphenyl	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
Dimethylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	NA	NA
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	NA	NA
3-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
Acenaphthene	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dinitrophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
4-Nitrophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

Not Available.

Table 4-2
Camden Municipal Wells Site
Summary of Semivolatile Organic Results

Sample Number :	B01QK		B01QN		B01QW		B01QX		B01QY		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 2		Morris 3		Morris 4		Morris 6		Morris 7			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	11:35		11:25		12:00		10:15		10:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Diethylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Fluorene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chlorophenyl-phenyl ether	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
4,6-Dinitro-2-methylphenol	25	U	25	U	25	U	25	U	25	U	NA	NA
N-Nitrosodiphenylamine	10	U	1	J	10	U	10	U	10	U	NA	NA
4-Bromophenyl-phenylether	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	NA	1
Atrazine	10	U	10	U	10	U	10	U	10	U	3	3
Pentachlorophenol	25	U	25	U	25	U	25	U	25	U	NA	1
Phenanthrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Carbazole	10	U	10	U	10	U	10	U	10	U	NA	NA
Di-n-butylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Pyrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Butylbenzylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(a)anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Chrysene	10	U	10	U	10	U	10	U	10	U	NA	NA
bis(2-Ethylhexyl)phthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Di-n-octylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	NA	0.2
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not available.

Table 4-2
Camden Municipal Wells Site
Summary of Semivolatile Organic Results

Sample Number :	B01QZ		B01TJ		B01TK		B01TN		B01TP		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 8		Delair 1		Parkside 13		Parkside 17		Parkside 18			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		13:50		14:35		15:25		15:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Benzaldehyde	10	U	10	U	10	U	10	U	10	U	NA	NA
Phenol	10	U	10	U	10	U	10	U	10	U	NA	NA
bis-(2-Chloroethyl) ether	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,2'-oxybis(1-Chloropropane)	10	U	10	U	10	U	10	U	10	U	NA	NA
Acetophenone	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
Isophorone	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
Naphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	NA	NA
Caprolactam	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	50	50
2,4,6-Trichlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4,5-Trichlorophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
1,1'-Biphenyl	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
Dimethylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	NA	NA
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	NA	NA
3-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
Acenaphthene	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dinitrophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
4-Nitrophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

Not Available.

Table 4-2
Camden Municipal Wells Site
Summary of Semivolatile Organic Results

Sample Number :	B01QZ		B01TJ		B01TK		B01TN		B01TP		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 8		Delair 1		Parkside 13		Parkside 17		Parkside 18			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		13:50		14:35		15:25		15:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Diethylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Fluorene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chlorophenyl-phenyl ether	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
4,6-Dinitro-2-methylphenol	25	U	25	U	25	U	25	U	25	U	NA	NA
N-Nitrosodiphenylamine	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Bromophenyl-phenylether	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	NA	1
Atrazine	10	U	10	U	10	U	10	U	10	U	3	3
Pentachlorophenol	25	U	25	U	25	U	25	U	25	U	NA	1
Phenanthrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Carbazole	10	U	10	U	10	U	10	U	10	U	NA	NA
Di-n-butylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Pyrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Butylbenzylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(a)anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Chrysene	10	U	10	U	10	U	10	U	10	U	NA	NA
bis(2-Ethylhexyl)phthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Di-n-octylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	NA	0.2
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 4-2
Camden Municipal Wells Site
Summary of Semivolatile Organic Results

Sample Number :	B01T0		B01T1		B01T2		B01T3		B01T4		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 15		Morris 10		Morris 11		Morris 12		Morris 13			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		09:00		10:35		11:00		10:55			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Benzaldehyde	10	U	10	U	10	U	10	U	10	U	NA	NA
Phenol	10	U	10	U	10	U	10	U	10	U	NA	NA
bis-(2-Chloroethyl) ether	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,2'-oxybis(1-Chloropropane)	10	U	10	U	10	U	10	U	10	U	NA	NA
Acetophenone	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	NA	NA
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	NA	NA
Isophorone	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
Naphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	NA	NA
Caprolactam	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	50	50
2,4,6-Trichlorophenol	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4,5-Trichlorophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
1,1'-Biphenyl	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	NA	NA
2-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
Dimethylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	NA	NA
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	NA	NA
3-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
Acenaphthene	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dinitrophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
4-Nitrophenol	25	U	25	U	25	U	25	U	25	U	NA	NA
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	NA	NA
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

Not Available.

Table 4-2
Camden Municipal Wells Site
Summary of Semivolatile Organic Results

Sample Number :	B01T0		B01T1		B01T2		B01T3		B01T4		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 15		Morris 10		Morris 11		Morris 12		Morris 13			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		09:00		10:35		11:00		10:55			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Semivolatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Diethylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Fluorene	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Chlorophenyl-phenyl ether	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Nitroaniline	25	U	25	U	25	U	25	U	25	U	NA	NA
4,6-Dinitro-2-methylphenol	25	U	25	U	25	U	25	U	25	U	NA	NA
N-Nitrosodiphenylamine	10	U	10	U	10	U	10	U	10	U	NA	NA
4-Bromophenyl-phenylether	10	U	10	U	10	U	10	U	10	U	NA	NA
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	NA	1
Atrazine	10	U	10	U	10	U	10	U	10	U	3	3
Pentachlorophenol	25	U	25	U	25	U	25	U	25	U	NA	1
Phenanthrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Carbazole	10	U	10	U	10	U	10	U	10	U	NA	NA
Di-n-butylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Pyrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Butylbenzylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(a)anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Chrysene	10	U	10	U	10	U	10	U	10	U	NA	NA
bis(2-Ethylhexyl)phthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Di-n-octylphthalate	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	NA	0.2
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	NA	NA
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	NA	NA
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 4-3
Camden Municipal Wells Site
Summary of Pesticide and PCB Results

Sample Number :	B01QK		B01QN		B01QW		B01QX		B01QY		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 2		Morris 3		Morris 4		Morris 6		Morris 7			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	11:35		11:25		12:00		10:15		10:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
alpha-BHC	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	NA	NA
beta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
delta-BHC	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	NA	NA
gamma-BHC (Lindane)	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.2	0.2
Heptachlor	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	0.4
Aldrin	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Heptachlor epoxide	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	0.2
Endosulfan I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Dieldrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	2	2
Endosulfan II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endosulfan sulfate	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDT	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Methoxychlor	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	40	40
Endrin ketone	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endrin aldehyde	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
alpha-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
gamma-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Toxaphene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	NA	3
Aroclor-1016	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1221	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	NA	NA
Aroclor-1232	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1242	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1248	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1254	1.0	U	1.0	U	1.6		1.0	U	1.0	U	NA	NA
Aroclor-1260	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 4-3
Camden Municipal Wells Site
Summary of Pesticide and PCB Results

Sample Number :	B01QZ		B01TJ		B01TK		B01TN		B01TP		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 8		Delair 1		Parkside 13		Parkside 17		Parkside 18			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		13:50		14:35		15:25		15:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
alpha-BHC	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	NA	NA
beta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
delta-BHC	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	NA	NA
gamma-BHC (Lindane)	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.2	0.2
Heptachlor	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	0.4
Aldrin	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Heptachlor epoxide	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	0.2
Endosulfan I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Dieldrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	2	2
Endosulfan II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endosulfan sulfate	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDT	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Methoxychlor	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	40	40
Endrin ketone	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endrin aldehyde	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
alpha-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
gamma-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Toxaphene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	NA	3
Aroclor-1016	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1221	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	NA	NA
Aroclor-1232	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1242	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1248	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1254	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1260	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 4-3
Camden Municipal Wells Site
Summary of Pesticide and PCB Results

Sample Number :	B01T0		B01T1		B01T2		B01T3		B01T4		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 15		Morris 10		Morris 11		Morris 12		Morris 13			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:30		09:00		10:35		11:00		10:55			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Pesticide/PCB Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
alpha-BHC	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	NA	NA
beta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
delta-BHC	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	NA	NA
gamma-BHC (Lindane)	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.050	UJ	0.2	0.2
Heptachlor	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	0.4
Aldrin	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Heptachlor epoxide	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	0.2
Endosulfan I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Dieldrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	2	2
Endosulfan II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endosulfan sulfate	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
4,4'-DDT	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Methoxychlor	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	40	40
Endrin ketone	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
Endrin aldehyde	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	NA	NA
alpha-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
gamma-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	NA	NA
Toxaphene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	NA	3
Aroclor-1016	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1221	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	NA	NA
Aroclor-1232	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1242	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1248	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1254	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA
Aroclor-1260	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	NA	NA

Notes:

U = Not detected above the method detection limit.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Availble.

T[illegible]4-4
Camden Municipal Wells Site
Summary of Inorganic Results

Sample Number :	MB02FT		MB02FW		MB02FX		MB02FY		MB02PB		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Delair 1		Parkside 13		Parkside 17		Parkside 18		Morris 15			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	13:50		14:35		15:25		15:00		09:30			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Analyte	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Aluminum	27.1	U	27.1	U	81.4	B	94.5	B	46.5	B	NA	NA
Antimony	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	6	6
Arsenic	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U	NA	50
Barium	47.1	B	62.8	B	60.2	B	51.1	B	54.8	B	2000	2000
Beryllium	0.10	U	0.10	U	0.20	B	0.10	B	0.10	U	4	4
Cadmium	0.30	U	0.30	U	0.40	B	0.30	U	0.30	U	5	5
Calcium	15000		48300		32800		33500		21900		NA	NA
Chromium	0.50	U	0.50	U	0.60	B	6.8	B	0.50	U	100	100
Hexavalent Chromium	10	U	10	U	10	U	10	U	10	U	NA	NA
Cobalt	58.2		8.8	B	15.1	B	8.4	B	33.4	B	NA	NA
Copper	2.1	B	4.9	B	18.8	B	13.9	B	5.6	B	1300	NA
Iron	4140		3120		838		446		5520		NA	NA
Lead	2.3	BJ	2.3	BJ	2.2	BJ	1.8	U	9.8	J	NA	NA
Magnesium	5020		18600		14300		12900		12300		NA	NA
Manganese	1180		922		204		251		1590		NA	NA
Mercury	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	2	2
Nickel	3.4	B	6.0	B	18.8	B	8.5	B	4.1	B	NA	NA
Potassium	2310	B	6960		7070		6670		6050		NA	NA
Selenium	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	50	50
Silver	0.70	U	0.70	U	0.70	U	0.70	U	0.70	U	NA	NA
Sodium	13900		46800		34300		36200		13900		NA	NA
Thallium	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	0.5	2
Vanadium	0.70	B	2.1	B	0.70	U	2.0	B	0.70	U	NA	NA
Zinc	8.3	B	12.0	B	31.9		22.7		19.0	B	NA	NA
Cyanide	N/A		N/A		N/A		N/A		N/A		NA	NA

Notes:

U = Not detected above the method detection limit.

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

B = Not detected substantially above the level reported in laboratory or field blanks.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

T[illegible]4-4
Camden Mu[illegible]pal Wells Site
Summary of Inorganic Results

Sample Number :	MB02PC		MB02P8		MB02P9		MB02PF		MB02PG		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 10		Morris 7		Morris 8		Morris 11		Morris 12			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	09:00		10:00		09:30		10:35		11:00			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Analyte	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Aluminum	33.5	B	27.1	U	43.5	B	40.6	B	27.1	U	NA	NA
Antimony	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	6	6
Arsenic	1.9	U	2.0	B	1.9	U	1.9	U	1.9	U	NA	50
Barium	58.8	B	54.6	B	54.7	B	63.0	B	23.3	B	2000	2000
Beryllium	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	4	4
Cadmium	0.30	U	0.30	B	0.30	U	0.30	U	0.30	U	5	5
Calcium	14700		16900		21800		17000		15000		NA	NA
Chromium	7.4	B	0.50	B	0.60	B	1.0	B	0.50	U	100	100
Hexavalent Chromium	26		10	U	22	J	10	U	10	U	NA	NA
Cobalt	19.8	B	42.8	B	34.2	B	103		13.8	B	NA	NA
Copper	2.1	B	12.6	B	6.0	B	3.8	B	3.8	B	1300	NA
Iron	21800		8980		5410		7440		3050		NA	NA
Lead	1.8	U	10.8	J	1.8	UJ	13.4		1.8	U	NA	NA
Magnesium	8760		7150		12300		6250		5210		NA	NA
Manganese	2390		1350		1600		2480		678		NA	NA
Mercury	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	2	2
Nickel	5.5	B	4.3	B	4.4	B	7.6	B	0.90	U	NA	NA
Potassium	3810	B	3260	B	6070		2650	B	2100	B	NA	NA
Selenium	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	50	50
Silver	0.70	U	0.70	U	0.70	U	0.70	U	0.70	U	NA	NA
Sodium	12000		13900		13900		13900		14100		NA	NA
Thallium	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	0.5	2
Vanadium	0.70	U	0.70	U	0.70	U	0.70	U	5.8	B	NA	NA
Zinc	7.6	B	29.4		12.8	B	28.0		8.0	B	NA	NA
Cyanide	N/A		N/A		N/A		N/A		N/A		NA	NA

Notes:

U = Not detected above the method detection limit.

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

B = Not detected substantially above the level reported in laboratory or field blanks.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

T[illegible]4-4
Camden Mu[illegible]pal Wells Site
Summary of Inorganic Results

Sample Number :	MB02PH		MB02P4		MB02P5		MB02P6		MB02P7		Maximum Contaminant Level[1]	Maximum Contaminant Level[2]
Sampling Location :	Morris 13		Morris 2		Morris 3		Morris 4		Morris 6			
Units :	ug/L		ug/L		ug/L		ug/L		ug/L			
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000			
Time Sampled :	10:55		11:35		11:25		12:00		10:15			
Dilution Factor :	1.0		1.0		1.0		1.0		1.0			
Analyte	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Aluminum	27.1	U	27.1	U	27.1	U	27.1	U	46.9	B	NA	NA
Antimony	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	6	6
Arsenic	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U	NA	50
Barium	17.8	B	83.8	B	202		61.0	B	71.8	B	2000	2000
Beryllium	0.10	U	0.10	U	0.10	U	0.10	U	0.10	B	4	4
Cadmium	0.60	B	0.30	U	0.30	U	0.30	U	0.30	U	5	5
Calcium	15800		21300		23000		14500		16700		NA	NA
Chromium	0.50	U	0.50	B	0.50	U	0.50	U	0.50	U	100	100
Hexavalent Chromium	10	U	10	U	10	U	10	U	10	U	NA	NA
Cobalt	16.4	B	18.3	B	43.7	B	7.4	B	132		NA	NA
Copper	44.4		7.0	B	0.90	U	2.0	B	34.4		1300	NA
Iron	3720		15300		33600		36200		440		NA	NA
Lead	26.2		1.8	U	1.8	U	1.8	U	2.5	BJ	NA	NA
Magnesium	5400		12900		11900		5860		7960		NA	NA
Manganese	368		2930		2180		1520		2800		NA	NA
Mercury	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	2	2
Nickel	2.0	B	3.9	B	4.4	B	0.90	U	18.9	B	NA	NA
Potassium	2220	B	8310		8460		2120	B	3860	B	NA	NA
Selenium	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	50	50
Silver	0.70	U	0.70	U	0.70	U	0.70	U	0.70	U	NA	NA
Sodium	14700		14400		11600		11900		17200		NA	NA
Thallium	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	0.5	2
Vanadium	4.0	B	0.70	U	0.70	U	0.70	U	0.70	U	NA	NA
Zinc	28.6		16.0	B	9.2	B	10.6	B	26.6		NA	NA
Cyanide	N/A		N/A		N/A		N/A		N/A		NA	NA

Notes:

U = Not detected above the method detection limit.

J = Analyte present. Reported value is estimated; concentration is outside the range of accurate quantitation.

B = Not detected substantially above the level reported in laboratory or field blanks.

Bolded value indicates an exceedence of the Maximum Contaminant Level[2].

1= Maximum Contaminant Level Goal. Maximum level of a contaminant in drinking water at which no known adverse health effects would occur.

2 = Maximum Contaminant Level. The maximum permissable level of a contaminant in drinking water which is delivered to any user of a public water system.

NA = Not Available.

Table 5-1
Summary of Potential Sources for Historical VOC Contamination in the Morris Wellfield

Facility	Address	Process/Contamination
Magnetic Metals	21st and Hayes	Stored Chemical Drums (TCE).
Conrail Pavonia Railroad	---	Monitoring Wells contained TCE and other VOCs.
Dehawk Transmission	2795 River Road	Discharged transmission fluid and degreasers into storm drains (drains empty into Cooper River).
Flowen Oil-Delaware Valley Corporation	18th and Carmen Avenue	Treated and stored hazardous waste. Facility had several spills.
Concord Chemical	17th and Federal	USTs used for chemical storage.
Classic Chemical	17th and Admiral Wilson Boulevard	Site of numerous chemical spills. Stores various solvents on site.

Notes:

All information contained in this table was taken from Reference 20.
No address was provided for Conrail Pavonia Railroad.

Table 5-2
Summary of Potential Sources for Historical Hexavalent Chromium Contamination in the Morris Wellfield

Facility	Address	Process/Contamination
Penler Anodizing Co.	Pennsauken, NJ	Electroplating
SGL Modern Hard Chrome	**Camden, NJ**	**Electroplating**
Alpha Tool and Machine Co.	Pennsauken, NJ	Discharged various wastes (including chromate)
Pennsauken Landfill	Pennsauken, NJ	Municipal, vegetative, and non-chemical industrial waste.
Aluminum Shapes	**Pennsuaken, NJ**	**Aluminum smelting**
United Steel and Wire	Pennsauken, NJ	Electroplating
Advance Process Supply	Pennsauken, NJ	Manufactured and stored inks and dyes. Discharged chromate.
Devoe Marine Coatings	**Pennsauken, NJ**	**Manufactured corrosion resistant paints. Discharged chromate.**
Grow Group Inc.		Parent Corporation of Devoe Marine Coatings
Swope Oil and Chemical Company		**Solvent Re-processing. Discharged chromate.**
Chapman Industrial Finishers		Various chemical-based products and wastes.
Denton Plastic Products		Various chemical-based products and wastes.
Desoto Inc.		**Various chemical-based products and wastes.**
E.I. Dupont Inc.	Wilmington, DE	Various chemical-based products and wastes.
Hobart Corporation		Various chemical-based products and wastes.
McCloskey Varnishing Co.		Various chemical-based products and wastes.
Minnesota Mining and Manufacturing (3-M)		Various chemical-based products and wastes.
NL Inc.		Various chemical-based products and wastes.
Philadelphia Newspapers Inc.	Philadelphia, PA	Various chemical-based products and wastes.
Rohm and Haas Co.		Various chemical-based products and wastes.
Triangle Publications		Various chemical-based products and wastes.
U.S. Steel Corp.		Various chemical-based products and wastes.

Notes:

Sites that appear in bold text are currently listed in CERCLIS.
All information contained in this table was taken from Reference 22.
Addresses were not reported for all sites.

Table 5-3
Summary of Potential Sources of Contamination for the Morris Wellfield

EDR Map Number	Site Name	Process/Contaminants
9	Keystone Automotive Plating	
16	Bridge Machine Co.	
17	Palmyra Board of Education	
20	Commercial Property/Garages	
23	Rear of 724 Parry Avenue	Paint, tar, cleaning fluids
25	FC Kerbeck and Sons	
27	Richardson Paint Company Inc.	
28	Theodore Mozer Inc.	
30	Sherman Industries	
33	Industrial Area 701 W. 5th St. Palmyra, NJ	Transformer, PCB
35	Jet Set Marine	
39	Callahan Chemical Company	Generator, Transporter
40	Foster Automotive	
40	Roto Cylinders/ Armotek Industries	
41	Avanti Marine	Drums Spill
41	Palmyra Borough Sanitary Landfill	
41	Palmyra Boat Yard	
43	Philadelphia Sign Company	
49	Camden County Division of Solid Waste	
49	Pennsauken Sanitary Landfill	
49	Pollution Control Financing Agency	
51	GOD Trucking	
51	Bobby Dee's Trucking	Spill
54	HGP Tempering Systems	
54	Concours Auto Body	
54	PPG Industries	
54	Fineline Circuits	
55	Highway Rental Company	
59	Dependable Distributors	
60	Vevoe Coatings Company	Solvents, Organics
62	Universal Furniture Rentals	
64	Montgomery Ward	
65	MPC Industries	Contaminated Soil
66	Tri-State Transport Inc.	
68	Eastern Electric	

Notes:
Shaded rows indicate potential sources of volatile organic compounds or hexavalent chromium.
EDR = Environmental Data Resources.
Map numbers correspond to those in the figure included in Attachment A (EDR Report).

Table 5-3
Summary of Potential Sources of Contamination for the Morris Wellfield

69	Cetylite Industries Inc.	
70	Federal Armored Express	
73	Pennsauken Township RRF	
73	Esther Williams Swimming Pools	Solvents, Paints
75	Century Inks	
75	Keystone Adjustable Cap Inc.	
77	CVI Inc.	
78	Secura Seal Corp.	
80	Flexitalic	
81	Interstate Welding	
81	Duall Maintenance Company	
81	Aqua Gulf Corporation	
82	Conway Central Express	
83	R.K. Metals	
84	Area of 8406 Eden Lane	
85	Nor-Am Chemical Company	
87	Celotex Corporation	Volatile Organic Compounds
88	Rollins Leasing Corporation	
90	Lorlis Corporation	
90	Area of 925 Union Avenue	
93	Northbrook Metals	
94	Borden Corporation	
94	Amerada Hess	Buried Drums
95	Old Dominion Freight Line	
95	Falcon Express	
96	Packing Coordinators	
96	Crescent Lighting Corporation	
98	Penler Anodized Corporation	
99	Cynwyd Investments	
100	House of Gold	
102	Barry Callebaut USA Inc.	
102	Pennsauken Landfill	
102	Barry Callebaut USA Inc.	
103	Cocoa Barry US Inc.	
104	Natico	
104	Amerada Hess	
106	1435 Melrose Highway	Abandoned, Leaking Drums
109	GMS Inc.	

Notes:
Shaded rows indicate potential sources of volatile organic compounds or hexavalent chromium.
EDR = Environmental Data Resources.
Map numbers correspond to those in the figure included in Attachment A (EDR Report).

Table 5-3
Summary of Potential Sources of Contamination for the Morris Wellfield

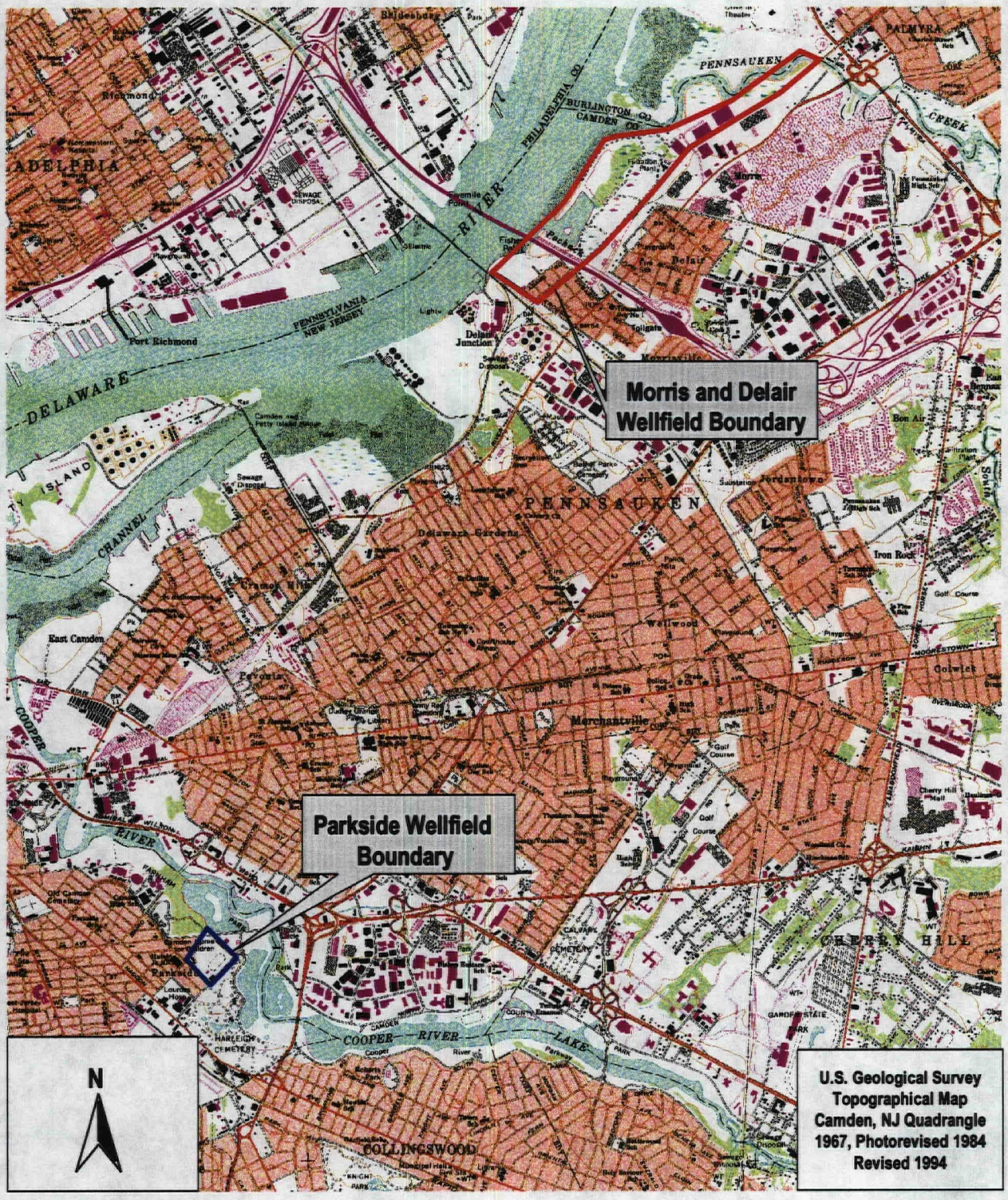
111	Krimstock Brothers	
112	RIS Paper	
113	New England Motor Freight	
114	Mediq	
115	Standard Brand Foods	
118	Rapid Lift Service	
119	American Bank Stationary	
119	JJ Maloney	
119	Lyons and Son	
119	Pacific Wood Products	
119	Standard Warehouse	
119	Cook Composites and Pigments	Volatile Organic Compounds
119	CJ Osbourn Company	
119	Factory Corner of Sherman Ave./River Road	
120	Rhone-Poulenc Inc.	
124	Cetylite Industries Inc.	
126	Advance Process Supply Co.	Volatile Organic Compounds, Solvents
129	Encapsulation Services	
135	Overnight Transportation Co.	
135	Murphy Plywood	
135	400 Cove Road	
136	Star Enterprise	
138	Abandoned Garage	
139	Fell Brothers	
140	Lynch Industries	
143	Phoenix Resin	
143	Empac	
143	Residence at 428 Springfield Ave.	

Notes:
Shaded rows indicate potential sources of volatile organic compounds or hexavalent chromium.
EDR = Environmental Data Resources.
Map numbers correspond to those in the figure included in Attachment A (EDR Report).

Table 5-4
Summary of Potential Sources of Contamination for the Parkside Wellfield

EDR Map Number	Site Name	Process/Contaminants
10	Our Lady of Lord's Medical Center	
14	Harry Pape and Sons	
24	McGuire Gardens Community Center	
25	Crestwood Motors	
26	Metro Cab Service Center	
28	The Garage	
29	Aroma Mills	
30	Woodlynne Boro Hall	
31	Whistle Clean	
33	135 Browning East Road	
34	Penn Jersey Rubber and Waste Company	
36	Classic Chemical	
37	Merit Oil Corporation	
38	271 Atlantic Avenue	

Notes:
EDR = Environmental Data Resources.
Map numbers correspond to those presented in the figures included in Attachment B.



WESTON MANAGERS DESIGNERS/CONSULTANTS FEDERAL PROGRAMS DIVISION

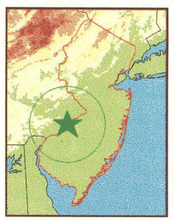
Camden Municipal Wells Site
Figure 1-1
Site Location Map

2000 0 2000 Feet

Morris-DeLair

- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Study Area Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- 100-Yr Flood Zones
- Wetlands

N



Camden, NJ

0 1/4 1/2

Scale in Miles

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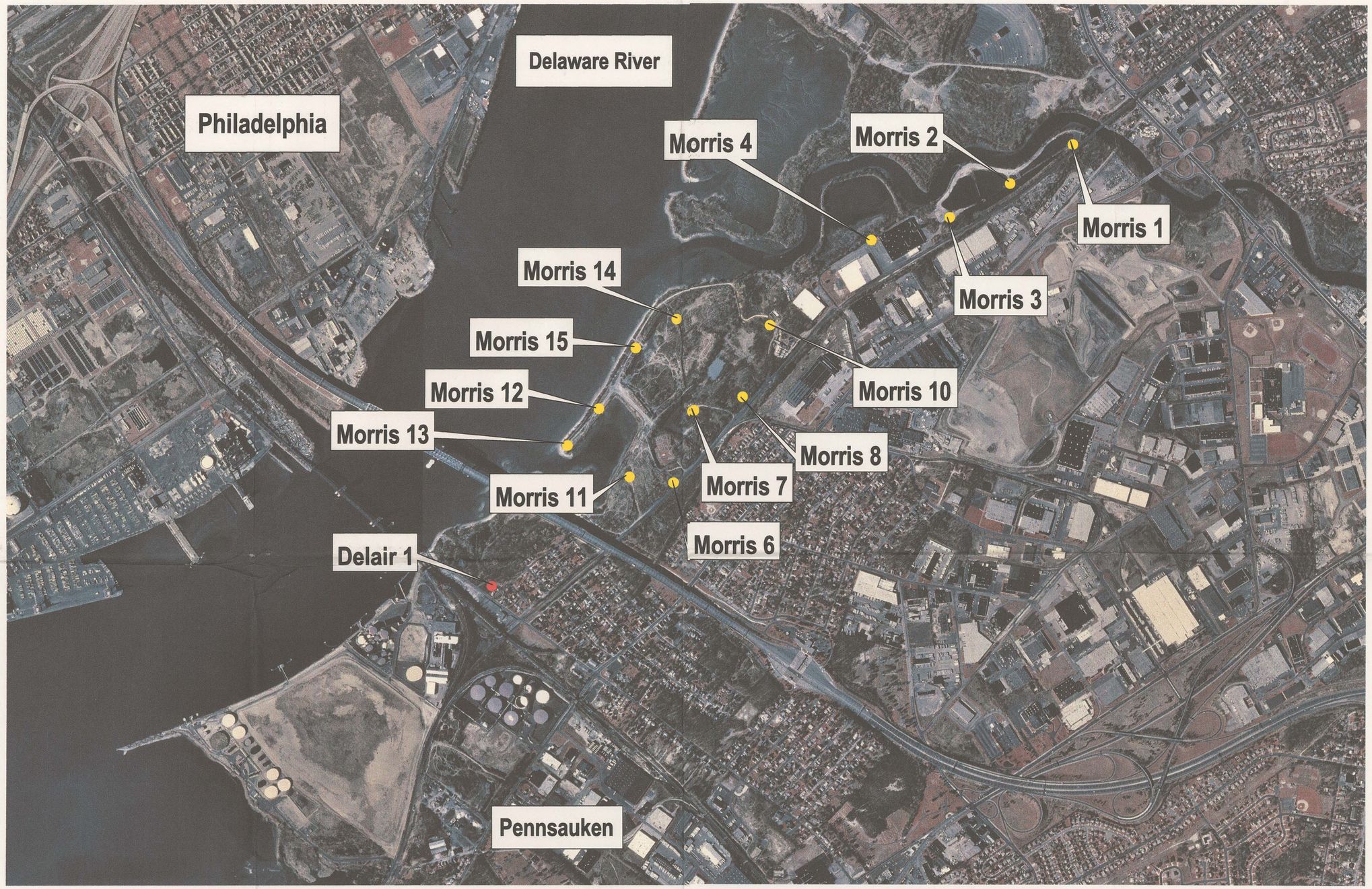
1-800-352-0050

465843.1p - 25 Feb 00



WESTON FEDERAL PROGRAMS DIVISION (MANAGERS DESIGNERS/CONSULTANTS)	Delair Well Morris Wells	Camden Municipal Wells Site Camden, Camden Co., NJ	N W E S	U.S. Geological Survey Digital Orthophoto Camden Quadrangle Photographed April, 1992
Contract No.: 68-W7-0026 Work Assignment No.: 052-SISI-02ZZ	Task Monitor: Cathy Moyik Task Leader: Richard Flack	Figure 1-2 Morris and Delair Well Location Map	1000 0 1000 Feet	All well locations were recorded on June 14, 2000 with a Trimble Global Positioning System unit

WESTON FEDERAL PROGRAMS DIVISION
MANAGERS DESIGNERS/CONSULTANTS

Contract No.: 68-W7-0026
Work Assignment No.: 052-SISI-02ZZ

● Parkside Wells

Task Monitor: Cathy Moyik
Task Leader: Richard Flack

Camden Municipal Wells Site
Camden, Camden Co., NJ

Figure 1-3
Parkside Well Location Map

N W E S

500 0 500 Feet

U.S. Geological Survey Digital Orthophoto
Camden Quadrangle
Photographed April, 1992

All well locations were recorded on June 14, 2000
with a Trimble Global Positioning System unit

LEGEND

Hexavalent Chromium (ppb)

- 22
- 26

Trichloroethylene (TCE) (ppb)

- 5
- 7
- 10
- 15
- 27

Camden Municipal Wells Site
Camden, Camden Co., NJ
Figure 4-1

TCE and Hexavalent Chromium Results for the Morris Wellfield

N
W E
S

1000 0 1000 Feet

U.S. Geological Survey
Digital Orthophoto
Camden Quadrangle
Photographed April, 1992

WESTON
MANAGERS DESIGNERS/CONSULTANTS
FEDERAL PROGRAMS DIVISION

LEGEND

Trichloroethene (TCE) (ppb)

- 21
- 170
- 330

Camden Municipal Wells Site
Camden, Camden Co., NJ
Figure 4-2
TCE Results
for the Parkside Wellfield

N
W E
S

500 0 500 Feet

U.S. Geological Survey
Digital Orthophoto
Camden Quadrangle
Photographed April, 1992

WESTON
MANAGERS DESIGNERS/CONSULTANTS
FEDERAL PROGRAMS DIVISION

POTABLE WATER SAMPLING

THE APPROVAL SIGNATURES ARE KEPT ON FILE
WITH WESTON'S POLICIES AND PRACTICES GROUP
OF THE QUALITY ASSURANCE/FINANCE DIVISION

REVISION NUMBER: 00

Initiated by:	D.L. Jones
	R.B. Biggs
Legal Review:	D.B. Bauer
Approved by:	P.J. Marks
Authorized by:	A.M. Henry

Important Notice:

This document has been prepared as a default procedure to assist Roy F. Weston, Inc. (WESTON) personnel with the performance of specific task and procedures when other guidance documents or regulatory procedures are not applicable or are non-existent. It is the sole responsibility of WESTON personnel performing procedures in this operating practice to determine if other guidance documents or regulatory procedures exist and are to be followed instead of or in conjunction with this operating practice. Other guidance or regulatory documents can include, but are not limited to Federal, State, and Local codes, policies, client or WESTON proposals, work plans, field sampling plans, quality assurance project plans, and any other applicable document. This document is not to be utilized by WESTON personnel as a substitute for thorough understanding of the subject matter or as a substitute for applicable training.

1.0 PURPOSE

Roy F. Weston, Inc. (WESTON) has adopted New Jersey Department of Environmental Protection and Energy (NJDEPE) standard for potable water sampling and domestic well sampling (see attachment).

2.0 INTERPRETATION

If there are questions regarding the interpretation or the applicability of items in this operating practice, the Project Manager or Technical Manager should be consulted. In the absence of either of those, contact your Section Manager.

3.0 REFERENCES

New Jersey Department of Environmental Protection and Energy (NJDEPE) Field Sampling Procedures Manual, May 1992, pages 181-186.

h. Sampling Domestic Wells

(See also, J. "POTABLE WATER SAMPLING" - 2. "INDIVIDUAL WATER SUPPLY SYSTEMS")

An important step in sampling a domestic well is to obtain as much information as possible from the homeowner. This should include: depth of the well, well yield, formation in which the well is completed, screen depth and length, well construction material, diameter of casing and when and by whom the well was installed. This information should be verified if possible by obtaining drilling logs, etc. With this information, determine the number of gallons to be evacuated (see section 5. "Sampling Procedures" b. "Field Measurements").

When collecting a sample from an operating domestic well, it is essential to evacuate the plumbing and water storage tank. Running the water for a minimum of fifteen minutes before collection is a good rule of thumb, however, longer is desirable. Listen for the pump or the electric circuit to the pump to come on, indicating that the plumbing is being evacuated. Inquire as to whether any treatment units are installed on the system. Softening, iron removal, turbidity removal, disinfection, pH adjustment are often used; these may give misleading analyses depending on the parameters of interest. Home carbon filters for the removal of organics are also increasingly popular. Basement and outside faucets may by-pass such treated water (note: sample cold water faucet).

A brief inspection of the system should be performed to locate the well, pump, storage tanks and any treatment systems. Samples should be taken as close to the pumping well as possible and prior to any storage tanks or treatment systems. If a sample must be taken following a treatment unit, the type, size and purpose of the unit should be noted on samples sheets and in the field logbook.

Home faucets, particularly kitchen faucets, usually have a screen installed on the discharge. The screen must be removed prior to sampling for bacteria, or for volatile organics, since the screen tends to aerate the water and some organics may be lost. Also, when sampling for bacteria, do not take a sample from a swivel faucet since the joint may harbor a significant bacterial population.

Note: Homeowners' plumbing systems should not be tampered with in any way, except for removal of the faucet screen with permission of the homeowner.

For long term monitoring projects which utilize domestic wells, a specific tap or faucet should be designated as the target sample access point for accurate reproducibility of future samples.

i. Sampling Industrial Wells

When sampling industrial wells, it is desirable to sample as close to the well source as possible. Samples should be taken directly from the well head whenever possible. This will eliminate treatment interferences, possible changes in quality within the lines, mixing of water from other wells, etc.

Large capacity wells which are "on-line" during the visit can be sampled immediately. Wells which are "off-line", must be pumped to waste prior to sampling. Fifteen minutes or more is suggested. Access to municipal well systems well houses, etc. requires the assistance of a water department employee. Prior notification is essential.

I. SAMPLING OF MUNICIPAL AND INDUSTRIAL WASTEWATERS

Sampling of municipal and industrial wastewaters is performed for a number of reasons: to determine compliance with Federal, State or local standards, to verify reported self-monitoring data, to assist in determining discharger or user fees based upon wastewater strength, to verify the sampling technique and monitoring points of regulated parties, and to aid in determining the sources of prohibited or unwanted wastes. The most difficult type of sampling to perform is the collection of background information for future use; sometimes the correct information will be obtained, sometimes it will be missed. The collection of background information is critical. Information that may be gathered includes flow, totalizer readings, pH, TSS, treatment plant configuration and operating status.

When sampling wastewaters, one must take into consideration that good sample results are dependent on a number of factors, including sample representativeness, proper sampling technique and proper preservation. A location for sample collection should be chosen where uniform wastewater quality and thorough mixing exist. Wastewater influent samples should be collected at a point prior to any recycle, supernatant or return lines; wastewater effluent samples should be collected after the final treatment process. Take into consideration that the representativeness of samples may depend on timing; for example, influent samples collected at a municipal treatment plant with a substantial collection system may represent discharges into the system that occurred hours ago. In addition, be cognizant that many sampling locations present safety hazards, ranging from confined spaces, heights, unsteady equipment or surroundings, to airborn pollutants, biological hazards that may include infectious disease agents, ticks, poison ivy and snakes to chemical hazards such as corrosive liquids, heavy metals and potentially explosive atmospheres.

Samples may be collected as grabs or composites, depending on the purpose of the sampling, regulatory requirements or site conditions. Grab samples are single samples collected at neither a set time or flow. It may be advantageous to collect grab samples if wastewater flow is not continuous, if the wastewater's character varies or is not consistent, or if there is a need or desire to determine if a composite sample of the wastewater would obscure extreme conditions of the waste. In addition, some parameters, specifically dissolved oxygen or other dissolved gases, total and fecal coliform and other bacteria, pH, temperature, oil and grease and petroleum hydrocarbons, purgeable organics, and available and residual chlorine sulfite may only be collected as grab samples.

Composite samples may be collected in six different manners depending on sample volumes collected and at what frequency sample collection occurs. Composite samples may be collected as follows: constant sample volume/consistent time intervals, constant sample volume/time interval between samples is proportional to wastewater flow, constant time intervals/sample volume is proportional to the wastewater flow rate at the time of sample collection, constant time interval/sample volume is proportional to total wastewater flow since the last sample was collected; continuous sample collection or pumping rate, and continuous sample rate is proportional to wastewater flow. If flow rates at the time of sample collection are within (+/-) fifteen percent of the average flow, sample compositing based on constant sample volumes and constant time intervals is generally representative, however, the method is not considered to be the most representative for highly variable flow or concentration conditions. During sample compositing, a minimum of eight individual samples should be collected, if at all possible, and each individual aliquot should be a minimum of 100 milliliters. During six hour composites, a faciltiy should collect an aliquot at least once each half hour.

Composite sampling may be conducted manually or by the use of an automatic sampler. The most common automatic samplers use either a vacuum pump or a peristaltic pump to draw the sample into the unit. A unit with a vacuum pump may be able to draw the sample at a higher velocity and from a cross-section of the wastestream, however it may also bias the solids concentration in the collected sample if the unit in use operates by filling a reservoir and then wasting excess sample material before draining the remainder to the sample container. A unit with a peristaltic pump discharges a measured sample volume into the sample container, so less solids separation and associated sample bias should occur. However, peristaltic pump units generally sample from only one point in the wastestream. Automatic samplers operating with a suction lift and without a detachable gathering system are practically limited to operation at heads at or under 25 feet due to internal friction losses and atmospheric pressure. Automatic samplers should be capable of rapidly purging the intake system prior to and immediately after collection of an aliquot. The transport lines for the units should also be at least 0.64 centimeters (0.25 inches) in diameter to prevent clogging. It should be recognized that the transport lines may build up growths which may periodically slough off and contaminate sample material if left uncleaned or unnoticed. Samplers should have an intake velocity of between two and five feet (0.6 to 1.5 meters) per second. Units with an intake velocity under two feet per second may leave solids behind in the tubing, while those with intake velocities over this range may draw in large pieces of suspended material; either case may yield erratic analytical results. One reference consulted recommended determining the suspended solids concentrations obtained from an automatic sampler and comparing it with a mean of a minimum of six simultaneously collected manual grab samples. The obtained ratio (automatic:grab) for a municipal treatment plant influent should be 1.6 to 2.0 and for a municipal treatment plant effluent should be 0.9 to 1.3. Samples should be kept near 4° C during compositing; if the sampler does not have an integrated refrigeration unit or ice compartment, it may be placed on ice in an ice chest that has been laid on its end. Standard Methods for the Examination of Water and Wastewater recommends the addition of chemical preservatives at the start of composite sample collection, so that all sample portions are preserved as soon as they are collected.

Units to be used for collecting samples to be analyzed for trace organics must be free of Tygon tubing, which may be a source of phthalate ester contamination, and of other sources of contamination such as plastic or rubber compounds. The collection of a field blank must include the automatic sampling equipment.

When sampling wastewater, any equipment coming in contact with the sample material must be clean (see Chapter 2). It is preferable to collect samples directly into the containers in which they will be submitted for analysis, if at all possible. If a bucket or sampling device is to be used for collecting samples that will be analyzed for metals, do not use a metal device. Some parameters, such as oil and grease, petroleum hydrocarbons, volatile organics, and base neutral/acid extractable organics should not be collected except in the final sample container, if at all possible. Any device or bottle coming into contact with the sample material should be rinsed with the liquid two or three times, unless the bottle is pre-preserved, contains a dechlorinating agent, has been rinsed with acid, acetone, or hexane, or unless the sample is to be analyzed for oil and grease, petroleum hydrocarbons or for microbiological parameters. Sampling devices should face upstream, and samples should be collected centrally (at a 0.4 to 0.6 depth from the bottom of the wastestream and in the center of the channel). Collecting samples at this depth avoids skimming the surface of the wastestream, where the concentration of lighter-than-water materials will be highest, and lowers the possibility of sampling bed

loads in situations where solids separation is a concern.

When sampling from a valve or a faucet, flush the sampling line first, taking into consideration the line diameter, length of pipe to be flushed and velocity of flow. When sampling wastestreams that are under pressure, regulate the flow rate in the sampling line to not less than 500 milliliters per minute after first flushing the line at a rate high enough to remove sediment and gas pockets. If it is believed that dissolved gases will be released from solution due to the drop in pressure, a notation should be made. If samples are to be collected from a wastestream that is at an elevated temperature, they must be collected through a cooling coil.

The importance of the use of proper containers and proper sampling and preservation techniques cannot be overly stressed. A material with a pH of 6.5 standard units, or less, and a low buffer capacity may experience a significant pH change if shaken. In addition, samples stored in plastic containers may experience a change in pH due to the permeability of the container walls to gases like carbon dioxide. With a change in the carbon dioxide, pH, and alkalinity balance, calcium carbonate may precipitate out and the concentrations of total hardness and calcium may drop. A change in the concentrations of carbon dioxide and dissolved oxygen and in pH and temperature may change the concentrations of inorganic parameters such as manganese, iron, alkalinity and hardness. If air contact will change the concentration or characteristics of a constituent, it is recommended that the sample bottle be completely filled and secured from air contact. If the sample will require mixing, if the sample will be completely consumed during analysis (such as oil and grease and petroleum hydrocarbons), or if microbiological parameters are to be analyzed, the bottle will not be able to be completely filled. If a preservative has already been added to the bottle, do not overfill the container. Containers should be completely filled for the following analyses: purgeable organics, hydrogen sulfide, free and residual chlorine, pH, hardness, ammonia, dissolved oxygen and oxygen demands, sulfite, acidity, alkalinity, ferrous iron, and for most organics. For samples requiring shipment, allow a one to ten percent airspace for thermal expansion except VO, BOS and DO. This airspace will most likely not compensate for accidental sample freezing, however.

Microbiological activity may be responsible for changes in the nitrate/nitrite/ammonia concentrations of a wastewater, may reduce phenol concentration, may cause the reduction of sulfate to sulfide, reduce biochemical oxygen demand, and reduce residual chlorine to chloride. Due to oxidation, sulfite, sulfide, iodide, cyanide and ferrous iron concentrations may decrease. Hexavalent chromium may be reduced to chromic ion. Color, odor and turbidity may change in quality. Silica, sodium and boron may be leached out of glass containers. Some cations may be lost by adsorption onto, or in ion exchange with, the glass walls of sample containers.

Individuals who are required to chose dilutions for biochemical oxygen demand or coliform bacteria analyses, may find the following tables to be helpful:

Suggested Biochemical Oxygen Demand Dilutions

Sample Type	Dilutions
Raw Sewage	1-2-5%
Secondary Effluent	5-10-25% or 2-5-10%
Tertiary Effluent	5-10-25%

Suggested Coliform Dilutions

Sample Type	Dilutions
Raw Sewage	10^{-4}, 10^{-5}, 10^{-6}
Disinfected Effluent	1, 10^{-1}, 10^{-2}

Dilutions	MPN Range	
10, 1, 10^{-1}	2.0	1,600
1, 10^{-1}, 10^{-2}	20	16,000
10^{-1}, 10^{-2}, 10^{-3}	200	160,000
10^{-2}, 10^{-3} 10^{-4}	2,000	1,600,000
10^{-3}, 10^{-4}, 10^{-5}	20,000	16,000,000
10^{-4}, 10^{-5}, 10^{-6}	200,000	160,000,000

J. POTABLE WATER SAMPLING

1. PUBLIC COMMUNITY WATER SYSTEM: DEFINITION

A system for provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serve at least 25 individuals at least 60 days out of the year.

a. Source (Raw water) Sample

i. Ground Water

Samples from a well supply should be collected as close to the well head as possible (before any treatment) preferably from a designated raw water sample tap. The sampler is cautioned to remember that well pumps and casings can contribute to sample contamination. If a well pump has not run for an extended period of time prior to sampling, the water collected may not be representative of actual water quality. The sample may be collected immediately (after flushing the sample tap) if the well has been running continuously. If the pump has turned off or is running intermittently, run the pump for a minimum of 30 minutes.

ii. Surface Water

Samples collected from a surface water supply are to be collected before the water receives any treatment and should be representative of the water entering the intake structure. The actual sampling location might be after the low lift pumps or at the intake structure. This sample is NOT to be collected along the banks of a river, lake, or reservoir.

b. Plant Delivered (Finished Water) Sample

This sample is to be collected at a location following all water treatment and is to be representative of the finished product leaving the treatment facility. Only proper spigots are to be used and they must be flushed prior to sampling.

c. Point of Entry Sample

This sample is to be collected at a point of entry into the water distribution system representative of a particular source after the application of any treatment.

In many cases this may be a plant delivered sample (if no other sample tap is available) or a meter pit sample tap where water bulk purchased from another water supply enters a distribution system.

d. System Sample

A system sample is a sample collected from the water distribution system. A FIRST DRAW sample is water that immediately comes out when a tap is first opened. This type of sample is useful when evaluating whether plumbing materials are contributing lead or other contaminants to the water supply. A FLUSHED SAMPLE is collected after the piping has been evacuated and should be representative of the water flowing in the public water main.

When collecting a FLUSHED sample, allow the spigot to run long enough to obtain a representative sample. A good rule-of-thumb is to allow the water to flow until the water in the service line (the pipe that carries tap water from the public water main to a home or building) has been replaced at least twice. A convenient flow for sampling is usually about a half-gallon per minute. (to estimate flow, use a gallon jug and watch it fill. For a flow of a half-gallon per minute, the jug should be half full in one minute or completely full in two minutes). Since 50 feet of 3/4 inch service line pipe contains over one gallon (3.8 liters), 4 or 5 minutes of running time would be necessary to replace the water in the line twice.

Samples should not normally be collected from fire hydrants, drinking fountains, or from spigots that contain aerators or screens. If aerators or screens are present, they should be removed with care. Do not sample from taps that are surrounded by excessive foliage (leaves, flowers) or taps that are dirty, corroded, or are leaking. Never collect a sample from a hose or any other attachment to a faucet. Be sure that the sample container does not touch the faucet.

2. Individual Water Supply Systems (Public Non-Community/Non-Public/Domestic Wells)

An important step when sampling these types of supplies is to conduct an initial survey to get a general overview of the water system and its operation, and how the configuration of the system relates to the type of sample (raw water, finished/treated water, or an intermediate sampling point) that you want to collect. Some important considerations are:

- Well driller and date drilled
- Construction of well and casing depth
- Well and pump location
- Well depth and pump capacity (if available)
- Storage tank capacity
- Treatment or conditioning units (if any)
- Plumbing arrangement
- Possible sample collection points
- Distance of well to any septic systems or underground storage tanks

Prior to sampling an individual water supply system it [illegible] essential to evacuate all standing water from the [illegible], storage tank, and plumbing (unless a first draw [illegible]ple is desired - See "System Sample"). A good rule-of-thumb is to flush for 15 minutes prior to sampling. Listen for the pump to turn on. This is a good indicator that the tank and plumbing are being evacuated. Opening additional faucets, flushing toilets, etc., will use more water and shorten the waiting time.

Should a raw water sample be desired, sample as close to the well head as possible and prior to the storage tank or any treatment system. Sometimes basement or outside faucets may be the best sampling point for this type of sample.

If the kitchen faucet is used, the aerator should be removed (for more information see H 5.h. Sampling Domestic Wells).

Measurement of the thickness of the floating layer may accomplished by using a water indicator paste/gel .th a weighted steel tape to determine the depth to the top of the floating layer and to the water surface. The difference between these two readings is the thickness of the floating layer. Measurement of the thickness of the floating layer may also be accomplished by using an interface probe or clear Teflon bailer, if the product thickness is less than the length of the bailer. Electric water level sounders will not work properly for these determinations.

Prior to the purging of ground water from the well, a sample of the floating layer may be obtained using a bailer which fills from the bottom. Care should be taken to lower the bailer just through the floating layer but not significantly down into the underlying ground water. Samples should be analyzed to determine the chemical composition of the LNAPL and its physical properties (e.g., specific gravity, water solubility, equilibrium vapor pressure of the liquid and Henry's Law Constant, etc.). After following typical evacuation procedures discussed previously in this section, a sample of formation water may be obtained from the well.

. Sampling for Dense, Non-Aqueous Phase Liquids (DNAPLs)

DNAPLs include chlorinated solvents and other chemicals which have specific gravities greater than water. They are likely to be present in aquifers as a separate phase because of low solubility in water. DNAPL chemicals tend to migrate downward through the unsaturated zone and the saturated zone due to their high density. If the volume of DNAPL chemical introduced into the subsurface is larger than the retention capacity of the vadose and saturated zones, a portion of the DNAPL will spread out as a layer of free liquid on the bottom of the aquifer or on lower permeability beds within the aquifer.

Measurement of the thickness of DNAPLs (and LNAPLs) must be performed prior to purging (evacuating) the well. Measurement of the DNAPL may be accomplished by using a water indicator paste/gel with a weighted steel tape (if no LNAPL is present) to determine the depth of the top of the DNAPL and the bottom of the well. The difference between these two measurements is the thickness of the DNAPL in the well. An interface probe may also be used to measure DNAPL in the well. An interface probe may also be used to measure DNAPL thickness.

Prior to purging a monitor well, a sample of the DNAPL may be obtained using a dual check valve bailer or a bladder pump. If both LNAPLs and DNAPLs are present in a well it may be necessary to purge the well of one casing volume of water prior to sampling the DNAPL provided that efforts are made not to disturb the DNAPL in the bottom of the well. This can be accomplished by setting the pump intake of the submersible or suction-lift pump several feet above the DNAPL.

Samples should be analyzed to determine the chemical composition of the DNAPL and its physical properties (e.g., specific gravity, water solubility, equilibrium vapor pressure of the liquid and Henry's Law Constant, etc.). After the well is purged, a sample of the ground water may be obtained for laboratory analysis.

h. Sampling Domestic Wells

(See also, J. "POTABLE WATER SAMPLING" - 2. "INDIVIDUAL WATER SUPPLY SYSTEMS")

An important step in sampling a domestic well is to obtain as much information as possible from the homeowner. This should include: depth of the well, well yield, formation in which the well is completed, screen depth and length, well construction material, diameter of casing and when and by whom the well was installed. This information should be verified if possible by obtaining drilling logs, etc. With this information, determine the number of gallons to be evacuated (see section 5. "Sampling Procedures" b. "Field Measurements").

When collecting a sample from an operating domestic well, it is essential to evacuate the plumbing and water storage tank. Running the water for a minimum of fifteen minutes before collection is a good rule of thumb, however, longer is desirable. Listen for the pump or the electric circuit to the pump to come on, indicating that the plumbing is being evacuated. Inquire as to whether any treatment units are installed on the system. Softening, iron removal, turbidity removal, disinfection, pH adjustment are often used; these may give misleading analyses depending on the parameters of interest. Home carbon filters for the removal of organics are also increasingly popular. Basement and outside faucets may by-pass such treated water (note: sample cold water faucet).

Prior to sampling an individual water supply system it is essential to evacuate all standing water from the pump, storage tank, and plumbing (unless a first draw sample is desired - See "System Sample"). A good rule-of-thumb is to flush for 15 minutes prior to sampling. Listen for the pump to turn on. This is a good indicator that the tank and plumbing are being evacuated. Opening additional faucets, flushing toilets, etc., will use more water and shorten the waiting time.

Should a raw water sample be desired, sample as close to the well head as possible and prior to the storage tank or any treatment system. Sometimes basement or outside faucets may be the best sampling point for this type of sample.

If the kitchen faucet is used, the aerator should be removed (for more information see H 5.h. Sampling Domestic Wells).

K. BIOLOGICAL

1. PHYTOPLANKTON SAMPLING

a. Sample Site Location

Locate sampling stations as near as possible to those selected for chemical and bacteriological sampling to ensure maximum correlation of findings. These locations will depend upon the physical nature of the water body. In streams or rivers, stations should be established both upstream and downstream of a pollution source or major tributary. Stations should also be set up on either side of the river so as to account for unequal lateral mixing. Slow moving sections of streams generally contain more phytoplankton than slower moving segments. If there are any lakes, reservoirs, or backwater areas (i.e., potential phytoplanton sources) upstream of sampling stations, notes on their nature and location should be included in the sampling log.

Sampling stations in lakes, reservoirs, estuaries and the ocean should be located along grid networks or transect lines, aligned so as to provide the most representative sampling. Points of interest should include intake and discharge areas, constrictions within the water body, and major bays and tributaries off of the main basin. In tidal areas, the effects of tidal oscillation should also be taken into account when determining sampling frequency. When locating stations for a "red tide" survey in estuarine or coastal waters, note where and when the blooms tend to occur.

b. Sampling Depth

Rivers, streams, shallow bays and coastal waters are usually well mixed so that only subsurface sampling is necessary. In lakes, reservoirs, as well as deeper coastal waters, plankton composition and density may vary with depth; thus sampling should be done at several depths determined by the depth of the thermocline, the euphotic zone if applicable, and overall the depth at the station. In shallow areas (1-2 meters) subsurface samples (to a depth of 1M) are usually sufficient. In deeper lakes and reservoirs, samples should be taken at intervals of 5M or less to the thermocline. In estuarine and coastal waters 2-10M deep, subsuface, mid-depth and near bottom samples are recommended. Offshore, in marine waters, samples should be collected at intervals of 5M or less to the bottom of the thermocline, and near the bottom where depletion of oxygen by decaying blooms is critical; larger sample volumes of at least one liter are needed because these waters are typically low in productivity.

c. Sampling Procedure

Sample size, preservation and storage is dependent upon certain variables. Refer to Appendix 2-1 for details.

If analysis is limited to species composition clear polyethylene or glass bottles may be used. If chlorophyll analyses is requested, amber bottles are recommended. Clear or translucent glass or plastic bottles may be used provided they are covered with aluminum foil so as to shield out light.

Freshwater samples for species composition analysis should be preserved with a solution of neutralized formalin (5 ml neutralized buffer with formalin/100 ml of sample); estuarine and marine samples are to be preserved with Lugol's solution (60 g KI + 40 g iodine crystals in 1,000 ml distilled water) at a rate of one (1) drop Lugol's solution to 100 ml of sample adding more periodically to maintain the color of weak tea. In special studies glutaraldehyde may be used (6 drops/25 ml of sample). All preserved samples should be stored in the dark immediately so as to prevent the degradation of the phytoplankton, or the preservative if Lugol's solution is used.

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MANAGERS DESIGNERS/CONSULTANTS

REMOVAL SUPPORT TEAM
EPA CONTRACT 68-W-00-113

RST-02-F-00123

TRANSMITTAL MEMO

To:	Cathy Moyik, OSC ERRD/PSB, U.S. EPA Region II
From:	Smita Sumbaly, Inorganic Data Reviewer RST Region II
Subject:	Camden Municipal Wells Site Data Validation Assessment
Date:	November 21, 2000

The purpose of this memo is to transmit the following information:

- Data validation results for the following parameters:

  Chromium Hexavalent 15 samples

- Matrices and Number of Samples

  Surface Water 15 samples

- Sampling dates: June 13, 2000

The final data assessment narrative and original analytical data package are attached.

cc:	START PM:	Richard Flack
	START SITE FILE TDD #:	02-00-02-0020
	ANALYTICAL TDD #:	02-00-06--0014
	PCS#	6788

U.S. ENVIRONMENTAL PROTECTION AGENCY

MEMORANDUM

DATE: November 21, 2000

TO: Cathy Moyik, OSC
USEPA Region II

FROM: Smita Sumbaly
RST Data Review Team

SUBJECT: QA/QC Compliance Review Summary

As requested quality control and performance measures for the data packages noted have been examined and compared to EPA standards for compliance. Measures for the following general areas were evaluated as applicable:

Data Completeness	Blanks
Spectra Matching Quality	DFTPP and BFB Tuning
Surrogate Spikes	Chromatography
Matrix Spikes/Duplicates	Holding Times
Calibration	Compound ID (HSL, TIC)

Any statistical measures used to support the following conclusions are attached so that the review may be reviewed by others.

Summary of Results

	I CR VI	II	III	IV
Acceptable as Submitted	X			
Acceptable with Comments				
Unacceptable, Action Pending				
Unacceptable				

Data Reviewed by: Smita Sumbaly Date: 11/21/00

Approved By: _____ Date: _____

Area Code/Phone No.: (732) 225-6116

NARRATIVE

CASE No. 6788

SITE NAME: Camden Municipal Wells Site

River Road, Camden New Jersey.

Laboratory Name: Chemtech Consulting Group, 205 Campus Plaza, Edison, NJ.

INTRODUCTION:

The laboratory's portion of this Case consisted of fifteen water samples collected on June 13, 2000.

The laboratory reported No problem(s) with the receipt of these samples.

The laboratory reported No problems with the analyses of Chromium Hexavalent parameters.

The evaluator has commented on the criteria specified under each fraction heading. All criteria have been assessed, but no discussion is given where the evaluator has determined that criteria were adequately performed or require no comment. Details relevant to these comments are given on the following forms.

Appropriate Form I's and Chain of Custody have been copied from the original data package and appended to the data assessment narrative for reference.

IV. Inorganic:- Chromium Hexavalent

- Y Data Summary/Tabulated Results
- Y Check Standard
- Y Blanks
- Y Spike Sample Recovery
- Y Duplicates
- Y Detection Limits
- Y Holding Times
- Y Chain of Custody
- Y Raw Data
- Y Quantitation, Conversions, Dilutions, etc.

Comments:

1. Refer to Data Assessment Narrative.

Title: Evaluation of Inorganic Data for the Contract laboratory Program Appendix A.2: Data Assessment Narrative

Date: Jan. 1992
Number: HW-2
Revision: 11

Case #:RFP # 6788 **Site: Camden Municipal Wells Site**

SDG#: L8836 **Lab: Chemtech Consulting Group.** **Matrix: Soil: NA Water: 15**

Contractor: WESTON-RST **Reviewer: Smita Sumbaly**

A.2.1 Validation Flags- The following flags have been applied in red by the data validator and must be considered by the data user.

J- This flag indicates the result qualified as estimated.

Red- Line- A red-line drawn through a sample result indicates an unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

Fully Usable Data- The results that do not carry "J" or "red-line" are fully usable.

Contractual Qualifiers- The legend of contractual qualifiers applied by the laboratory on Form I's is found on page B-20 of SOW ILM01.0.

A.2.2 The data assessment is given below and on the attached sheets.

On 13 June 2000, USEPA Region II sampling personnel collected fifteen (15) groundwater samples from the Camden Municipal Wells Site,River Road, Camden, New Jersey. Within 24 hours of collection the samples for hexavalent chromium were hand delivered to Chemtech Consulting Group, 205 Campus Plaza, Raritan Center, Edison, NJ. The laboratory verified that samples were received intact, properly preserved and in sealed shipping containers.

The Hexavalent Chromium analyses was analyzed according to EPA SW-846 method no. 7196A.

A.2.2 (continuation)

Client identification (ID) and laboratory ID numbers are as follows:

Client ID No.	Laboratory ID No.	Matrix	Analysis	Sampling date
6532-GW-M10	25047	Water	Chromium Hexavalent	06/13/00
6532-GW-M8	25050	Water	Chromium Hexavalent	06/13/00
6532-GW-M15	25051	Water	Chromium Hexavalent	06/13/00
6532-GW-M7	25052	Water	Chromium Hexavalent	06/13/00
6532-GW-M6	25053	Water	Chromium Hexavalent	06/13/00
6532-GW-M13	25054	Water	Chromium Hexavalent	06/13/00
6532-GW-M12	25055	Water	Chromium Hexavalent	06/13/00
6532-GW-M11	25056	Water	Chromium Hexavalent	06/13/00
6532-GW-M3	25057	Water	Chromium Hexavalent	06/13/00
6532-GW-M4	25058	Water	Chromium Hexavalent	06/13/00
6532-GW-P13	25059	Water	Chromium Hexavalent	06/13/00
6532-GW-P18	25060	Water	Chromium Hexavalent	06/13/00
6532-GW-P17	25061	Water	Chromium Hexavalent	06/13/00
6532-GW-D1	25062	Water	Chromium Hexavalent	06/13/00
6532-GW-M2	25063	Water	Chromium Hexavalent	06/13/00

[1]) Water sample 6532-GW-M15 is a field duplicate sample of 6532-GW-M8.

The results presented in the data package are acceptable with the exception noted in the following data assessment narrative.

CASE DESCRIPTION: RFP # 6788 consists of 15 groundwater samples from the Camden Municipal Wells Site.

Holding times: All water samples were analyzed within 24 hours of sample collection; holding times were not exceeded.

CALIBRATION: The correlation coefficient (r^2) of standard concentration versus absorbance readings is greater than (>) 0.995 for linear calibration curves generated in the data package.

RAW DATA: The laboratory provided the supporting raw data for this package. This data package contains summary of analytical results, blank results, standard check recovery, spike sample recovery and lab duplicate results.

CHECK STANDARD: Std. Check was run at beginning of analytical run, and all recoveries are within the acceptable range of 90 to 110%.

DUPLICATE ANALYSIS: Data met laboratory duplicate analysis QC criteria (≤ 20% RPD)

MATRIX SPIKE RECOVERY: Matrix Spike recoveries are within the acceptable range of 85-115%.

A.2.2 (continuation)

FIELD DUPLICATE ANALYSIS:-

The following analytes were either qualified as estimated ("J") or rejected ("redlined") in the associated field duplicate samples because the Relative Percent Difference (RPD) or Difference (Diff) between the samples and corresponding field duplicate samples were outside the specified QC criteria:

ANALYTE	RPD/DIFFERENCE	QUALIFIER	ASSOCIATED SAMPLES
Chromium VI	DIFF > CRDL	"J"	6532-GW-M15 & 6532-GW-M8

A.2.3 Contract Problem/Non-Compliance:

Sample #_6532-GW-M2 was not listed in chain of custody, but a data reviewer corrected the chain of custody.

MMB/ESAT Reviewer: _____ Signature _____ Date:

Contractor Reviewer: Signature Date: 11/21/00

Verified by: _____ Signature _____ Date:

OTHER ANALYTES WORK TABLE

Project: Camden Municipal Wells Site

Sampling Date: June 13, 2000

(Unless otherwise indicated)
SAMPLE #/CONCENTRATION (MG/L)

Analytical Parameter Dilution Factor	Method Limit MG/L	Aqueous 6532-GW-M10 25047 1.0	Aqueous 6532-GW-M8 25050 1.0	Aqueous 6532-GW-M15 25051 1.0	Aqueous 6532-GW-M7 25052 1.0	Aqueous 6532-GW-M6 25053 1.0
Chromium Hexavalent (mg/l)	0.01	0.026	0.022 J	< 0.01 J	< 0.01	< 0.01

Analytical Parameter Dilution Factor	Method Limit MG/L	Aqueous 6532-GW-M13 25054 1.0	Aqueous 6532-GW-M12 25055 1.0	Aqueous 6532-GW-M11 25056 1.0	Aqueous 6532-GW-M3 25057 1.0	Aqueous 6532-GW-M4 25058 1.0
Chromium Hexavalent (mg/l)	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Analytical Parameter Dilution Factor	Method Limit MG/L	Aqueous 6532-GW-P13 25059 1.0	Aqueous 6532-GW-P18 25060 1.0	Aqueous 6532-GW-P17 25061 1.0	Aqueous 6532-GW-D1 25062 1.0	Aqueous 6532-GW-M2 25063 1.0
Chromium Hexavalent (mg/l)	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

BRL - Below Reporting Limit
NWR - Not Within Range
J - estimated value
R - rejected compound

CHEMTECH

CASE NARRATIVE

Roy F. Weston, INC
Project Name: Camden Municipal Wells
Chemtech Project # L8836LP

A. Number of Samples and Date of Receipt
15 Aqueous Samples Plus A MS/MSD were delivered to the laboratory intact on 06/13/00.

B. Parameters
Test requested was Chromium Hexavalent. This Case Narrative reviews results for Chromium Hexavalent.

C. Analytical Techniques
The analysis of Chromium Hexavalent is based on Method 7196A.

D. QA/ QC Samples
A Method Blank, Spike and Duplicate sample were analyzed along with the samples.

Blank analysis did not indicate the presence of contamination. Spike Sample recoveries were within QC limits. Duplicate recoveries and RPDs met QC requirements. Calibrations met requirements. Holding Times were met.

I certify that the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature.

Signature Mildred V. Reyes Name: Mildred V. Reyes

Date: 7/6/00 Title: QA/QC

CHEMTECH

LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25047
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M10
TIME SAMPLED- 0900 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	0.026	mg/l

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NYSDOH Certification No. 11376
NJDEP Certification No. 12013

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25050
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M8
TIME SAMPLED- 0930 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	0.022	mg/l J

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25051
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M15
TIME SAMPLED- 0930 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l J

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25052
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M7
TIME SAMPLED- 1000 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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REPORT OF ANALYSES

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101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25053
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M6
TIME SAMPLED- 1015 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25054
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M13
TIME SAMPLED- 1055 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
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101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25055
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M12
TIME SAMPLED- 1100 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25056
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M11
TIME SAMPLED- 1035 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25057
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M3
TIME SAMPLED- 1125 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
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101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25058
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M4
TIME SAMPLED- 1200 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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REPORT OF ANALYSES

ROY F. WESTON
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EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25059
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-P13
TIME SAMPLED- 1435 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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REPORT OF ANALYSES

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101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25060
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-P18
TIME SAMPLED- 1500 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25061
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-P17
TIME SAMPLED- 1525 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

LABORATORY DIRECTOR _____

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25062
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-D1
TIME SAMPLED- 1350 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

LABORATORY DIRECTOR _____

020

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LABORATORY REPORT

REPORT OF ANALYSES

ROY F. WESTON
RARITAN PLAZA, SUITE 2B
101 FIELDCREST AVE.
EDISON, NJ 08837-

DATE: 06/15/00

PROJECT # L8836 NJ

SAMPLE NUMBER- 25063
DATE SAMPLED- 06/13/00
DATE RECEIVED- 06/13/00
DELIVERED BY- CLIENT

SAMPLE ID- 6532-GW-M2
TIME SAMPLED- 1135 SAMPLER- CLIENT
TIME RECEIVED- 1828
RECEIVED BY- SP SAMPLE MATRIX- WW

Page 1 of 1

ANALYSIS	METHOD	ANALYSIS DATE	TIME	BY	RESULT	UNITS
CHROMIUM HEXAVALENT	7196A	06/14/00		ST	< 0.01	mg/l

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NYSDOH Certification No. 11376
NJDEP Certification No. 12013

Roy F. Weston, Inc.
Raritan Plaza III, Suite 2B
Edison, New Jersey 08837
Phone: (732) 417-5800 Fax: (732) 417-5801

CHAIN OF CUSTODY / ANALYSIS REQUEST

L8836NJ

Name (for report and invoice): Rich Flack	Samplers Name (Printed): William DeSena	Site/Project Identification: Camden Municipal Wells
Company: Roy F. Weston, Inc.	P.O. #	State (Location of site): NJ: ☒ NY: ☐ Other:
		Regulatory Program: Superfund
Address: Raritan Plaza III, Suite 2B, 101 Fieldcrest Avenue	Analysis Turnaround Time: Standard ☐	
City: Edison State: NJ Zip: 08837	Rush Charges Authorized For: 2 Week ☐ 1 Week ☐ Other ☒ 24 hrs.	
Phone: (732) 417-5800 Fax: (732) 417-5800		

ANALYSIS REQUESTED (ENTER "X" BELOW TO INDICATE REQUEST)

LAB USE ONLY: Project No: Job No:

Sample Identification	Date	Time	Matrix	No. of Cont.	Chromium VI	Sample Numbers
6532-GW-M10	6/13/00	9:00	GA	1	X	
6532-GW-M8		9:30			X	
6532-GW-M15		9:30			X	
6532-GW-M7		10:00			X	
6532-GW-M6		10:15			X	
6532-GW-M13		10:55			X	
6532-GW-M12		11:00			X	
6532-GW-M11		10:35			X	
6532-GW-M3		11:25			X	
6532-GW-M4		12:00			X	

Preservation Used: 1 = ICE, 2 = HCl, 3 = H_2SO_4, 4 = HNO_3, 5 = NaOH, 6 = Other _____, 7 = Other _____

Soil:
Water: 1

Special Instructions: TEMP BLANK INCLUDED

Water Metals Filtered (Yes/No)? _____

Relinquished by	Company	Date / Time	Received by	Company
1) [signature]	Weston	6/13/00 18:28	1) [signature]	CHEMTECH
2)			2)	
3)			3)	
4)		06/13/00 18:28	4) Sunny Patel	CHEMTECH

030 - 002

Roy F. Weston, Inc.
Raritan Plaza III, Suite 2B
Edison, New Jersey 08837
Phone: (732) 417-5800 Fax: (732) 417-5801

CHAIN OF CUSTODY / ANALYSIS REQUEST

L8836 NJ

Name (for report and invoice): Rich Flack	Samplers Name (Printed): William DeSena	Site/Project Identification: Camden Municipal Wells
Company: Roy F. Weston, Inc.	P.O. #	State (Location of site): NJ [X] NY: [ ] Other:
		Regulatory Program: Superfund
Address: Raritan Plaza III, Suite 2B, 101 Fieldcrest Ave.	Analysis Turnaround Time: Standard [ ]	ANALYSIS REQUESTED (ENTER "X" BELOW TO INDICATE REQUEST)
City: Edison State: NJ Zip: 08837	Rush Charges Authorized For: 2 Week [ ] 1 Week [ ] Other [X] 24 hrs.	
Phone: (732) 417-5800 Fax: (732) 417-5801		

Sample Identification	Date	Time	Matrix	No. of Cont.	Chromium VI										
6532-GW-P13	6-13-00	14:35	A	1	X										
6532-GW-P18	↓	15:00	↓	↓	X										
6532-GW-P17		15:25			X										
6532-GW-D1	↓	13:50	↓	↓	X										
(MS) 6532-GW-M2															
Preservation Used: 1 = ICE, 2 = HCl, 3 = H_2SO_4, 4 = HNO_3, 5 = NaOH — Soil:															
6 = Other _____, 7 = Other _____ — Water:					/										

Special Instructions

Water Metals Filtered (Yes/No)?

Relinquished by	Company	Date / Time	Received by	Company
1) [signature]	Roy F. Weston, Inc.	6/13/00 18:28	1) [signature]	ChemTech
Relinquished by 2)	Company	Date / Time	Received by 2)	Company
Relinquished by 3)	Company	Date / Time	Received by 3)	Company
Relinquished by 4)	Company	Date / Time 6/13/00 18:28	Received by Sunny Patel	Company CHEMTECH.

031

003

REFERENCE NO. 1

(1)

1.1 BACKGROUND INFORMATION

The purpose of this Section is to provide the Operator with an overview and general understanding of the City's System(s).

1.1.1 City of Camden

The City of Camden, New Jersey is located in the southwest region of New Jersey, directly across the Delaware River from Philadelphia, Pennsylvania. The 1990 Census population of the City is approximately 87,500. The City provides water service to approximately 54,000 residents as well as commercial, institutional and industrial customers within the portion of the City which comprises the City's water service area which is defined in Section 1.3 and Figure 1-1 of this Schedule 1.

Water is pumped to the City's three treatment plants (Morris-Delair, Parkside and Puchack Run) by 26 existing groundwater wells. All of the City's wells are screened in the Potomac-Raritan-Magothy formation. The Morris-Delair treatment plant is the City's largest treatment facility with a 1960 design capacity of 18 million gallons per day (MGD). The Parkside treatment plant is currently out-of-service and is undergoing substantial renovation. Once completed, the Parkside Water Treatment Plant will have a hydraulic design capacity of three MGD. The well field serving the Puchack Run treatment plant is contaminated with chromium and is currently operated under the direction of New Jersey Department of Environmental Protection (NJDEP) for containment of the chromium plume. The water produced by the Puchack Run treatment plant is currently discharged directly to Puchack Run. The City operates two storage tanks, (five and two million gallons) located within the City limits. A third storage facility, a 0.5 million gallon standpipe located at Whitman Park is not currently operated.

The City provides wastewater collection service to the residential, commercial, institutional and industrial customers located within the City and to approximately 249 customers in Pennsauken Township.

1.2 WATER SYSTEM

The City owns and operates a water supply and distribution system providing for the residential, commercial, industrial and fire protection needs of the residents. Water service is provided for all portions of the City except the area north of the Cooper River. The water service area comprises about six square miles and is shown in Figure 1-1 herein. The Water System serves an estimated 54,000 residents out of a City population of approximately 87,500 (1990 Census), plus industrial, institutional and commercial water users. A total of approximately 13,000 customers use the Water System. In addition, 1,255 fire hydrants serve as the primary source of water supply for fire protection in the Water System's service area.

Att. 8, p. 3/8

Ref. 11, p. 8

Adjacent water service districts include:

- New Jersey American Water Company
- Merchantville-Pennsauken Water Commission
- Collingswood Water Department
- Gloucester City Water Department

The City of Camden Department of Utilities staff is responsible for maintaining all parts of the Water System asset, including groundwater supply wells, treatment plants, and the distribution and storage system.

The balance of this section is a summary of the City's Well Fields, treatment plants, distribution and storage systems.

1.2.1 Well Field Description

The City has permits for 26 water supply wells, 24 of these water supply wells are existing. Two wells, Morris Well Nos. 14 and 15 are proposed. Of the 24 existing wells, the City operates 17 wells on a normal basis. Six other permitted wells are currently out of service due to poor water quality or low well production. Two permitted wells are maintained for emergency use only and one permitted well is out of service due to a lack of service piping. The City's wells are primarily located in four well fields: Morris, Delair, Puchack, and Parkside. Two additional wells, Well No. 7 and Well No. 11 are located at Jefferson and 9th Streets and Bulson and 9th streets in the City, respectively. The location of each well at the Morris, Delair, and Puchack Well Fields is shown in Figure 1-2, and the locations of the Parkside and two City wells are shown in Figure 1-3.

1.2.1.1 Morris-Delair Well Field

The Morris Well Field is located adjacent to the Delaware River and is approximately 95 acres. The Morris Well Field is commonly identified as either the Morris North or the Morris South Well Field. This designation is not based on geographic location, but rather on the electric services and water main to which the wells are connected. The Morris North Well Field contains six permitted wells (Well Nos. 1, 2, 3, 4, 12 and 13). Of these six wells, only Well No. 2 is not operational due to lack of service piping, low production and lack of wellhouse.

The Morris South Well Field contains six existing and two proposed permitted wells. The existing wells are Nos. 6, 7, 8, 9, 10, 11 and proposed wells 14 and 15. With the exception of Well Nos. 6 and 9 which are out of service due to a low rate of production, all existing wells in the Morris South Well Field are operational.

The Delair Well Field is located just south of the Betsy Ross Bridge and occupies approximately 15 acres. The Delair Well Field contains three permitted wells. The permitted wells are Well Nos. 1, 2 and 3. All three wells are operational. Therefore, of the 17 permitted wells located in the Morris and Delair Well Fields, 12 wells (five

Att. B, p. 4/8 Ref. 11, p. 9

wells at Morris North, four wells at Morris South and three wells at Delair) are currently operated on a daily basis.

Operational Concerns

The Morris and Delair Well Fields are collectively referred to as the Morris-Delair Well Field. Operational and maintenance issues that currently exist in the Morris-Delair Well Field include but are not limited to:

- Security Needs - These well fields are accessible by trespassers and are used by dirt bikes. Vandalism risks must be dealt with.

- Raw Water Pipelines - The raw water transmission line extending to Morris Well No. 2 is absent, and in general, existing transmission pipelines are subject to tuberculation and leakage.

- Well Rehabilitation - Due to the age and physical condition of some of the wells, a rehabilitation program must be addressed. Production rates for many of the wells has decreased and efforts to increase well production have had limited success.

- Flooding and Wetlands Issues - Due to the proximity of the Morris-Delair Well Field to the Delaware River, wellheads of two wells in Delair Well Field and one well in the Morris North Well Fields subject to high water levels. Raising of the wellheads of those wells that are in danger of or experiencing flooding will be necessary. In addition, a significant portion of the City's Morris-Delair Well Field is within or adjacent to wetlands. The City's two proposed wells are within or adjacent to wetlands which must be addressed appropriately.

1.2.1.2 Puchack Well Field

The Puchack Well Field is located southeast of the Morris and Delair Well Fields, approximately 2,000 feet southeast of the Delaware River. Groundwater from the Puchack Well Field is reported to be contaminated with hexavalent chromium. The Puchack Well Field contains six permitted wells. The permitted wells are Nos. 1, 2, 3, 5, 6 and 7. Of the six permitted wells, only Well No. 1 is operational. The pumps and motors from three of the four non-operational wells have been removed. Well No. 1 is operated at the direction of NJDEP to contain the chromium plume and as of late 1997, is currently discharged directly to Puchack Run and bypasses the treatment plant.

Upon completion of a new Puchack Run Treatment Plant, contingent upon State funding, the wells are to be rehabilitated and new or re-built pumps are to be installed.

Att. B, p. 5/8

Ref. 11, p. 10

1.2.1.3 Parkside Well Field

The Parkside Well Field is located within the City limits approximately four miles to the southwest of the Puchack Well Field. The Parkside Well Field contains three permitted wells (Well Nos. 13, 17 and 18).

Operational Issues
Due to volatile organic compound contamination, only Well Nos. 17 and 18 will be operated on a normal basis. Well No. 13 has not been in service for several years and in addition, a segment of the raw water piping leading to the Parkside treatment plant has been removed. Parkside Wells Nos. 17 and 18 are currently operational.

1.2.1.4 Other City Wells

In addition to the Parkside wells, the City operates two other wells within the City limits. Well No. 7 is dedicated to supplying process water to the Camden County Resource Recovery Facility (approximately 0.8 MGD) and Well No. 11 is used for emergency water supply. Well No. 11 is disinfected at the well head at discharged directly to the distribution system. Use of Well No. 11 is minimized in conformance with the City's corrosion control strategy due to the corrosive nature of this supply. It is the City's practice to operate City Well No. 11 only if sufficient system pressures can not be maintained using the Morris-Delair, Puchack and Parkside Well Fields operable wells.

1.2.2 Water Production

A summary of the permitted capacity, 1996 pumping capacity and original yield for each permitted well is provided in Table 1-1. The water production data for each well presented in Table 1-1 is not based on information from meters, but rather on flow tests and the number of hours of operation for each well.

1.2.3 Water Allocation Permit

The City operates its Water System under Water Allocation Permit No. 5302 (expires December 31, 1998). In accordance with the Water Allocation Permit, the total permitted diversion from the sources identified in Table 1-1 shall not exceed 664 million gallons per month at a rate of 30,000 gpm and shall not exceed 6,928 million gallons per year. The total diversion from City Well Nos. 7 and 11, Parkside Well Nos. 13, 17 and 18 and Puchack Well Nos. 1, 2, 3, 5, 6 and 7 shall not exceed 2,117.343 million gallons per year. The base allocation, if withdrawn at a constant daily rate, represents an average withdrawal rate of approximately 5.8 MGD for the combined total withdrawal from the Puchack Run and Parkside Well Fields and City Wells. The planned Puchack Run Plant may operate partially or fully under a separate permit.

Att. B, p. 6/8 Ref. 11, p. 11

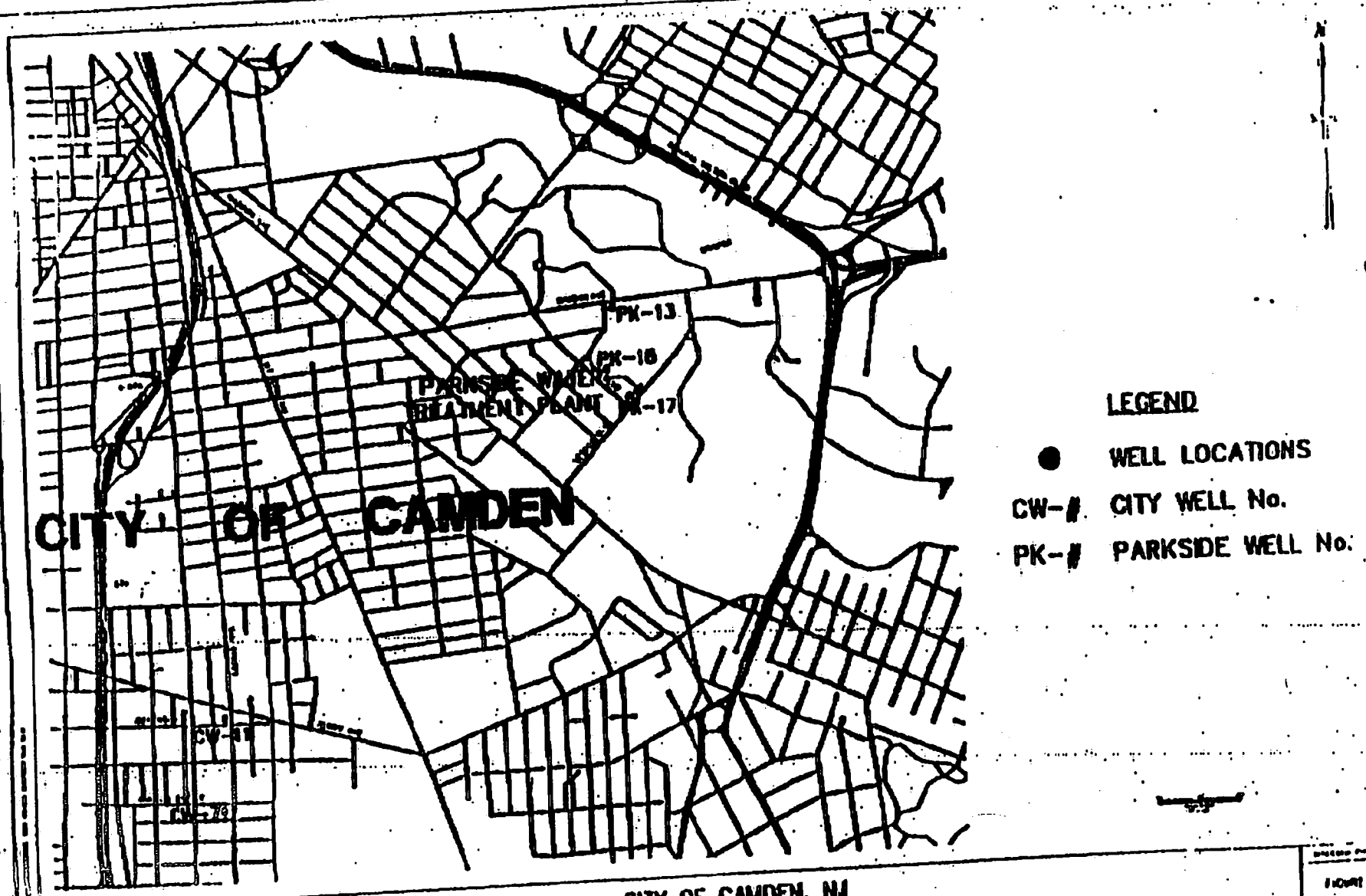
Table 1-1

Groundwater Withdrawal Wells

Permit No.	Well No.	Year Drilled	Depth (feet)	June 1996 Production (gpm) (1)	Permitted Pump Capacity (gpm) (2)	Original Yield (gpm) (3)
Morris Wellfield						
5100050	1	1961	107	750	1600	1000
3151984	2	1941	115	no pump	1000*	1000
3100945	3	1953	107	800	1800	1000
3104252	4	1960	130	1200	1600	1585
5100051	6	1932	133	325	1700	1944
5100052	7	1960	120	1056	1680	1630
3100944	8	1953	124	603	1670	1000
5100076	9	1932	143	700	1670	1900
3104251	10	1960	115	1230	1400	1529
3115745	11	1979	144	815	2030	2030
3116814	12	1981	117.6	887	2030	2030
3116813	13	1980	130	800	2060	2060
Proposed	14				2060**	
Proposed	15				2060**	
Delair Wellfield						
5100053	1	1930	138	1100	1680	1980
5100054	2	1930	141	550	1830	1330
5100055	3	1930	135	650	1830	1850
Pacha Wellfield						
5100056	1	1924	140	1080	1500	1320
5100057	2	1924	169	996	1000	1440
5100058	3	1924	175	1280	1280	1184
5100059	5	1924	186	1120	1324	1119
3105450	6	1970	220	1831	2260	1800
3108526A	7	1975	180	1284	1681	1287
City Wells						
5100060	7	1966	163	1023	1500	1023
5100061	11	1942	159	791	1010	1005
3100904	13	1953	230	690	1200	1000
3101250	17	1954	270	0	1500	1000
3109574	18	1976	290	1062	1200	1250

Notes:
* - Anticipated Pump Capacity
** - Proposed
(1) - As reported by City personnel 7/1/96.
(2) - As reported in NJDEP Water Allocation Diversion Permit No. 5302 effective 10/2/97
(3) - As reported in NJDEP Staff Reports (dated 6/91) regarding Application No. 5302, updated by City personnel 7/1/96 and original construction details.

Att. B, p. 8/8 Ref. 11, p. 13



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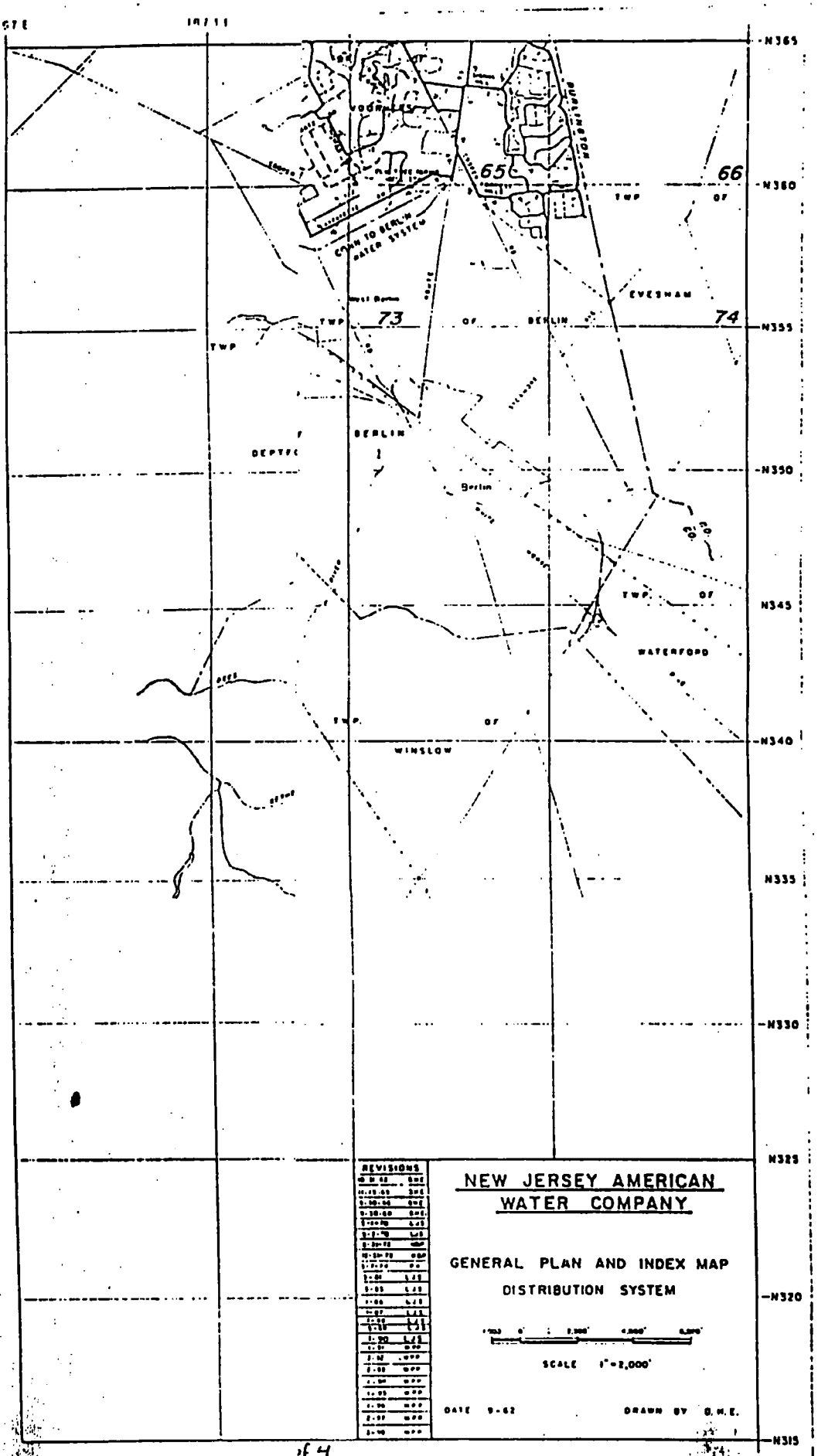


of 4

SHEET 2 OF 2

REFERENCE NO. 2

(2)

CAMDEN MUNICIPAL WELLS
THE CITY OF CAMDEN AND PENNSAUKEN TOWNSHIP,
CAMDEN COUNTY, NEW JERSEY
EPA ID # NJD980769087

GENERAL INFORMATION AND SITE HISTORY

The City of Camden Municipal Wells provide some 50,000 residents with over 2.34 billion gallons of water per year (1988 figures). City owned wells are located in Pennsauken Township and within the City of Camden. The wells occupy 22 separate Block and Lots in Pennsauken Township (attachment A) and Block 1279, Lots 1 and 5 in Camden City. The City of Camden has owned the land the wells are located on since at least the 1930s. Prior to the 1930s, Camden owned and operated approximately 100 shallow wells in and around the Morris Wellfield in Pennsauken Township. Past information on these wells is limited, but they were eventually replaced by the current, deeper municipal wells. Because the aquifer from which Camden obtains its raw water contains numerous organic and inorganic pollutants, the City has closed wells, drilled new wells and provided treatment to water. Other municipal wells in the same aquifer near Camden's wells have also shown contamination problems in the past. In 1984, Merchantville-Pennsauken's National Highway Well # 1 was closed due to high levels of mercury and volatile organic compounds (VOCs). With the addition of air strippers, Well #1 has resumed pumping potable water.

SITE OPERATIONS OF CONCERN

Currently the City has 19 operable wells in four wellfields. City-owned Wellfields in the neighboring Township of Pennsauken include Morris, Delair and Puchack with nine, three and three working wells, respectively (Table 1). Water withdrawal within the City boundaries includes three wells at the Parkside Wellfield and City Well #7 on 9th and Florence if needed. All remaining 17 City wells (Table 2) have been abandoned, sealed or are used for groundwater monitoring purposes only. The closing of the City wells is the result of water quality problems that have plagued the city for many years. Not all of the City's operable wells are constantly pumped at a standard rate. Many factors, including water demand, pumping capacities and contaminants in water, influence pumping rates of individual wells. The City pumps approximately 24 million gallons per day (mgd) in the peak months of production (July, August and September) and approximately 12 mgd in the winter months.

The Morris Wellfield is located in Pennsauken Township, Camden County and is bounded to the west by the Delaware River, to the south by the Betsy Ross Bridge, to the east by Penn Central Railroad tracks and to the north by Pennsauken Creek. With its nine operable wells, it is the City of Camden's most productive wellfield. There are four Morris Wells not in operation. Well # 1 is abandoned and currently under water, Well # 2 is out of service and has been sealed since 1979, Well # 5 is out of service and has been sealed since 1973 and Well # 9 was abandoned in 1977 due to its low capacity. Excluding wells not being pumped, the Morris Wellfield is designed to produce approximately 23 mgd but actually produces about 18 mgd. Recent sampling of the Morris Wellfield raw water by the NJDEP Division of Water Resources (DWR), Bureau of Southern Enforcement has shown all wells with contaminants below Maximum Contaminant Levels (MCL)

for drinking water. Well # 7 was the only well showing VOC levels approaching, but not exceeding, MCL.

In general, the Morris Wellfield has had a history of high levels of iron and manganese and low levels of VOCs including trichloroethylene (TCE), tetrachloroethylene (PCE) and 1,2-dichloroethane. In addition, the presence of phenols has been recorded in some wells. Morris Wells # 2 and # 5 have been abandoned because of this. Carbon chloroform extraction (CCE) tests have indicated the presence of some organics but in levels lower than NJDEP standards for drinking water.

The presence of iron and manganese has been the most troublesome and costly to the public and industry in the city. Several wells were abandoned because of the high iron and manganese content. Iron and manganese content in well water is known to increase as a result of surface water recharge, whether it is salt or fresh water. Therefore, recharge waters from the Delaware River are probably taking iron and manganese into solution from the Potomac-Raritan-Magothy sand minerals thus increasing their concentrations. Also, it is believed that much of the iron and manganese comes from disposals on the land surface leaching down into the groundwaters.

The Delair Wellfield, also located in Pennsauken Township, Camden County, is several hundred feet south of the Betsy Ross Bridge and is bordered by the Delaware River to the west. The wellfield consists of three operable wells with a total capacity of 5340 gallons per minute (gpm).

The quality of water from the Delair Wells is slightly better than that from of all other wellfields. Contaminants of concern include iron and manganese and small amounts of VOCs.

Because of the close proximity to each other and the fact that the two wellfields share the same water treatment facility (Morris-Delair Water Treatment Plant) much of the literature examined refers to the two as the Morris-Delair Wellfield. Together, the Morris-Delair Wellfields produce approximately two-thirds of the city's potable water.

The Morris-Delair Water Treatment Plant, located at 8900 Zimmermon Avenue, was constructed in 1960 and is the major water supply and treatment facility for the city. It treats water from the Morris Wellfield, the Delair Wellfield and during periods of low pumping, the Puchack Wellfield. Unit processes at the plant include aeration, pre-chlorination, pH adjustment (lime), clarification (flocculation), flash mixing, sedimentation, phosphate filtration and post-chlorination. Generally, the iron and the manganese contained in the Morris-Delair Wells can be removed by the treatment processes used at the Morris-Delair Plant.

A recent daily report (November 26, 1989) indicated Morris Wells # 6, 10, 11, 12 and 13 and Delair Wells # 2 and 3 pump a total of approximately 23 mgd. According to Frank Al-Greene, supervisor and program analyst for the City of Camden's Wells, the meters that record pumping capacities are faulty and give incorrect readings. He is currently working on a system to correct the discrepancies between the inaccurate meter readings and the actual flow readings. Figures of 9 to 12 mgd are more realistic for the Morris-Delair Wellfield. He computes the average "over-reporting" of water to be around 40% above actual readings.

The Puchack Wellfield and treatment plant are located in Pennsauken Township, a highly urbanized area of Camden County. The site is bordered on the northeast by the Betsy Ross Bridge and Puchack Creek and on the southwest by the Pennsylvania Reading Seashore Lines. The Delaware River lies approximately 1 mile to the northwest and private homes border the Wellfield. This wellfield supplies approximately 15% of the city's total potable water.

The Puchack Wellfield is contaminated by a variety of compounds including hexavalent chromium, mercury and VOCs. Chromium contamination has been Puchacks biggest problem and was first detected in the early 1970s at Well # 6 (southernmost well). The well was removed from service in 1975, a significant loss because it was one of the city's most productive wells (3.15 mgd). Soon after, chromium began appearing in Wells # 2, 3, 5 and 7 Well # 4 was sealed in 1970 because of the construction of the Betsy Ross Bridge. Wells # 5, 6 and 7 were abandoned due to hexavalent chromium in 1978, 1980 and 1983, respectively. As of 1978, mercury contamination has also been detected at the Puchack Wellfield.

The Puchack Water Treatment Facility was constructed in 1959 and treats water for the removal of iron and carbon dioxide. Unit processes include aeration and chlorination. Currently, water from Puchack Wells # 1, 2 and 3 is pumped to the Morris-Delair Treatment Plant where it is blended and treated with water from the three operable Delair Wells and the nine operable Morris Wells. The Puchack Run Water Treatment Plant is available for use but at the present time it is more feasible for the City of Camden to pump and treat Puchack's water with that of Morris-Delair's. The NJDEP, DWR, Bureau of Safe Drinking Water allows Camden to blend water from Puchack Wells # 1, 2 and 3 as long as the finished water is below MCL.

The localized cone of depression around the Puchack Wellfield is significant enough to capture soluble contaminants introduced at the groundwater table. A 1986 report by Camp Dresser and McKee Inc. (CDM) entitled "Summary of Conclusions and Recommendations of Chromium Contamination Analysis at Puchack Wellfield" (attachment H) suggests several originating sources of the chromium.

A Directive and Notice to Insurers was drafted by the NJDEP, DWR, Bureau of Southern Enforcement in September 1989 (attachment L) for parties involved in the Puchack Wellfield contamination. It lists 24 potentially responsible parties (PRPs) and a brief description of each facility's operations. The PRPs included Swope Oil and Chemical Company (a Superfund site), SGL Modern Hard Chrome Service, Pennsauken Solid Waste Management Authority and other small electroplaters, metal finishers and chemical companies in the area. In addition to the 24 listed PRPs, all companies who previously disposed of waste at the Swope Oil site are being included as PRPs.

The City of Camden also owns and operates three wells within the city limits at the Parkside Wellfield. Located just south of the Cooper River, the wells (# 13, 17 and 18) are designed to produce 3900 gpm.

Raw water from the Parkside Wells contains high levels of carbon dioxide, moderately high levels of iron and manganese and various levels of VOCs including TCE, tetrachloroethylene, carbon tetrachloride and 1,2-dichloroethane. The water from the three wells is pumped to the Parkside Water Treatment Plant, located on Vesper and Park Boulevards where it undergoes aeration, pH adjustment (lime) and chlorination filtration. The Parkside Plant was constructed in 1958 as a carbon dioxide and iron removal facility. The maximum capacity of the wells and well pumps is estimated to be 4.0 mgd but the actual pumping is approximately 3.6 mgd.

NJDEP, DWR, BSDW sampling of the treatment plant's finished water on November 21, 1985 found unacceptable levels of VOCs in the drinking water(Attachment AA 32). The NJDEP requires monthly monitoring of the Parkside Plant for VOCs.

The removal efficiency of the plant's aerator with respect to VOCs was investigated in September 1981 by Malcolm Pirnie, Inc. (attachment N). During operations at the time of the study, removal of TCE, PCE, carbon tetrachloride and carbon dioxide from raw water was 50%. By reducing the loading rate and cutting off air recirculation, the removal efficiency could be increased upwards of 80 to 90%.

Recent daily logs (November 24, 1989) of the Parkside Water Treatment Plant (attachment G) indicated only Wells # 17 and 18 pump a total of 1500 gpm. The treatment plant is currently in operation and supplies approximately 18% of the total potable water to the city.

The City of Camden owns 18 wells within the city boundaries (excluding the Parkside Wells) most of which have been abandoned or sealed. Currently, Wells # 7 and 11 are used only in emergency situations. Seven of the wells are being used for groundwater monitoring, seven wells have been sealed and Well # 9 was removed. A list of city wells, locations, etc. is given in Table 2.

Three Water Treatment Plants (Plants # 4, 5 and 6) that had previously treated water drawn from the city's wells have since closed. Plant # 4 treated raw water containing moderate to high levels of various VOCs and was eventually closed because of high levels of hexavalent chromium. Plant # 5 had high iron and manganese levels and the treatment processes at the plant were unable to reduce those contaminants to acceptable levels. Also of concern were high levels of TCE which greatly exceeded the state guidelines. Plant # 6, fed by Wells # 7 and 11, has had high levels of mercury and VOCs.

Records of chemical analysis of the city wells have been sparse. Some wells do not have reported chemical analysis for more than ten years, others even longer.

The water system in Camden has the following interconnections with adjacent systems:

NAME OF SYSTEM	SIZE OF INTERCONNECTION
Gloucester City	1 to 6 inch line
New Jersey Water Company	2 to 12 inch line and via Five fire hydrants
Collingswood Borough	2 to 6 inch lines
Merchantville-Pennsauken	Via two fire hydrants

The Camden Department of Utilities water system has a total of 331 meters in the water system. The connections that are not metered are residential customers, most of those being hardship cases. The commercial establishments are 100% metered. The system has approximately 150 miles of water mains throughout the city. Water from the Morris-Delair and Puchack Wellfields is pumped 5 miles through parallel 30-inch and 36-inch transmission mains back into the city service area. The City of Camden, Department of Utilities applied for a loan in September 1989 to replace all 3-and 4-inch water mains with 8-inch water mains. The system upgrade will benefit all current and future consumers as the municipal system is in need of repair and updating.

There are currently three finished water storage tanks in Camden. They are the North Camden Tank located on Delaware and Elm Streets with a capacity of 5 million gallons (mg), elevated storage tank on Locust and Kaighn Avenues with a 2 mg capacity and Whitman Park Standpipe on Rose and Whitman Avenues with a 0.57 mg capacity. The Whitman Park Standpipe is currently not being used.

GROUNDWATER ROUTE

The City of Camden's Wells and Wellfields all draw water from the Potomac-Raritan-Magothy (PRM) Aquifer. This aquifer is the largest water bearing stratum in the area and in fact, the most heavily used aquifer in New Jersey. The PRM formations are of early to late Cretaceous Age and overlie crystalline bedrock which is approximately 200 feet deep.

The PRM outcrops on both sides of the Delaware River in one of the most urbanized and industrial corridors of the northeast. The outcrop area of the PRM is 21 square miles in Camden County, 48 square miles in Burlington County and 32 square miles in Gloucester County. The width of the outcrop ranges from 2 to 3 miles and forms a wedge-shaped body that thickens in a down dip direction. The thickness of the PRM ranges from about 200 feet to over 1,000 feet in Winslow Township.

The PRM Aquifer System consists of aquifers composed of sand and gravel and confining units of silt and clay. Three major aquifers have been defined within the aquifer system the upper, middle and lower aquifers. The hydrogeology of this system is extremely complex with several clay layers exhibiting discontinuities throughout the upper and middle PRM system. All of Camden's municipal wells draw water from the lower aquifer.

Groundwater in the lower aquifer system flows from the northeast to the southwest. Originally, the natural groundwater flow was northerly, towards the Delaware River, but increased pumpage in the PRM Aquifer System has reversed the groundwater direction toward the pumping centers and the Delaware River is now a recharge boundary.

The major sources of recharge are induced infiltration of river water (40 to 50%), leaching from overlying aquifers (30%) and rainfall on the outcrop areas (15 to 25%). The remaining 5 to 10% comes from lateral groundwater inflow and aquifer storage.

The amount of Delaware River water induced into the PRM has increased over the years as the regional cone of depression has widened and deepened. The USGS estimates that induced infiltration of Delaware River water began in the late 1950s. Today, the cone of depression has widened and deepened causing the gradient from river to aquifer to become steeper.

Many of the city wells that have been abandoned due to contamination are currently being used as monitoring wells. Seven City Wells and two wells in the Puchack Wellfield are used solely for groundwater monitoring. All of the wells are set in the lower aquifer.

Along with Camdens Municipal Wells, there are other water companies and industries having wells within a 5 mile radius of the Morris Wellfield. The New Jersey-American Water Company owns 21 wells ranging in depth from 130 to 453 feet within 5 miles, the Merchantville-Pennsauken Water Commission owns 14 wells ranging in depth from 140 to 290 feet and the Riverton-Palmyra Water Company owns eight wells with depths between 76 and 325 feet. Other municipalities with wells in the area include Maple Shade Township with five wells and Moorestown Township with four wells.

Our Lady of Lourdes Hospital owns a 277-foot well about 4 miles south of the Morris-Delair Wells. Because of high levels of VOCs, the hospital is not currently using the well and is connected to the public water lines of Camden.

There are two industrial wells within a 1 mile radius and 15 wells within a 4 mile radius of the site .

The Merchantville-Pennsauken Water Commission (serving 50,000 residents), the New Jersey-American Water Company (serving 36,500 residents) and the Maple Shade Township Municipal Water System (serving 20,500 residents) also supply water to residents within 4 miles of the site. Well logs indicate several domestic supply wells in the area but Leo Holland of the Merchantville-Pennsauken Water Commission and the NJDEP, DWR, Bureau of Southern Enforcement (BSE) have no knowledge of any private domestic wells currently being used.

Camden City has VOCs, especially TCE, in their groundwater. The Puchack Wellfield also has chromium contamination. The City of Camden and NJDEP, DWR, BSDW discovered the contamination around 1978. The city itself has numerous operating and abandoned industrial facilities which probably contributed to the groundwater contamination. The contamination may have also occurred as a result of direct discharge to the ground and/or seepage of sewage containing industrial waste from the sewer system.

The City's sewer system is an old brick lined system that is plagued by frequent main ruptures and leaks.

Monitoring at each production well is required twice a year by the NJDEP, DWR, BSDW (A-280 Monitoring). The individual wells are monitored once during peak production in August and once during the winter in February. The finished water from the Puchack and Parkside Treatment Plants is monitored for VOCs quarterly and Morris-Delair's finished water is monitored for VOCs monthly.

The Morris-Delair Water Treatment Plant has a NJPDES Permit (# NJ0031984) to discharge effluent to Pennsauken Creek, the nearest surface water in the area and also to discharge to groundwater via infiltration/percolation lagoons and overland flow. The sludge from the clarifiers is stored in an unlined sludge drying lagoon and occasionally removed and dumped on the ground next to the lagoon. The sludge consists mainly of iron which is removed by the clarifiers. The iron in the sludge is not considered a problem and does not contribute to any additional groundwater contamination according to the NJDEP, DWR, BSE.

The city has water withdrawal permits for the derivation of water from Morris Wells #11, 12 and 13 and for Parkside Well #18 (Attachment U) issued by NJDEP.

The City of Camden was issued an Administrative Order (AO) by the NJDEP on August 18, 1971 because of the many substandard conditions which existed within the water system at that time. The Order required the City to make extensive improvements in the operation and maintenance of the system, to seal abandoned wells, to provide treatment and disinfection where lacking, to maintain operating records and to provide additional elevated storage capacity. The City complied with most of the requirements, however, some of the deficiencies which were addressed in the Order remained uncorrected several years later. On March 25, April 2 and May 14, 1980, the NJDEP, DWR, BSE conducted inspections of Camden's potable water system. Besides the aforementioned deficiencies, additional problems were noted including the pumping of raw, untreated groundwater directly into the city's distribution system and exceeding levels set forth in the New Jersey Safe Drinking Water Act Regulations for one or more of the following parameters: chromium, iron, manganese, color and corrosivity.

Since July 1981, the NJDEP, DWR has endeavored to enter with the City into an Administrative Consent Order (ACO) but the City has repeatedly stated its preference to correct the deficiencies on its own schedule and declined to enter into the ACO. On September 14, 1983, the City of Camden was issued an Administrative Order by NJDEP, DWR, BSE. The Order summoned the City to correct the deficiencies established in the permit.

The deficiencies included sealing four wells, modifying five different wells for groundwater monitoring purposes, and providing additional above ground finished water storage.

The Morris-Delair Water Treatment Facility has had a number of Compliance Evaluation Inspections by the NJDEP, DWR with "unacceptable" ratings. The dates of inspection and deficiencies are as follows:

September 26, 1985. The treatment facility's discharge was not being sampled quarterly as per the NJPDES permit.

April 28, 1987. The facility did not meet required limitations on suspended solids or pH as stated in the permit for discharge.

January 6, 1988. The facility did not meet required limitations on suspended solids or pH for effluent.

October 6, 1988. The plant's flow meter was giving inaccurate readings, holding times on aqueous samples were not adhered to and the second quarter Discharge Monitoring Report for 1988 was not submitted on time.

April 4, 1989. Wells in the system lacked totalizing flow meters and protective covers. Also, there were defective valves and undersized water mains within the system.

On January 30, 1989, the City of Camden was issued an Administrative Order and Notice of Civil Administrative Penalty Assessment by the NJDEP, Division of Environmental Quality, (Attachment X). Findings of the Order and Notice stated that the state certified lab (NJ certification # 04127) at the Morris-Delair Water Treatment Plant failed to observe certain testing and quality control procedures, thereby violating provisions of the Safe Drinking Water Act (SWDA) and related legislation. The lab undertook corrective actions in response to the violations listed.

SURFACE WATER ROUTE

The Delaware River lies several hundred feet to the west (River Mile 106) of the Morris-Delair Wellfields and about 2500 feet west of the Puchack Wellfield. Puchack Creek parallels the Betsy Ross Bridge which bisects the Morris-Delair Wellfields. Pennsauken Creek borders the Morris Wellfield to the north.

The amount of Delaware River water induced into the PRM has increased over the years as has the regional cone of depression. In general, the quality of water from the Delaware River is of equal or better quality than that which is being pumped from wells by the City of Camden. In fact, upon recharging, it serves as a means of diluting the chemicals present in high concentrations in the shallow groundwaters which seep down into deeper aquifers in Philadelphia and Camden.

Due to the close proximity to the Delaware River, wells are at risk from high chloride concentrations. Saltwater intrusion of wells in Camden is enhanced by overpumping and drought conditions.

Pennsauken Creek, classified as FW-2 Non-Trout waters, receives the surface water discharge which consists of untreated filter backwash from the production of potable water from the Morris-Delair Treatment Plant. The effluent limitations for suspended solids are based upon regional USEPA guidelines for filter backwash discharges and the limitations for pH, oil and grease are requirements of the Delaware River Basin Commission (DRBC). Monitoring for iron is required due to the nature of activity. The monitoring reports for effluent discharge must be reported quarterly to NJDEP, DWR. The City of Camden has a NJPDES permit (# NJ0031984) for surface water discharge. The NJPDES permit was issued on December 7, 1983 and expired on January 14, 1989. The City of Camden has intentions of renewing the permit but as of yet has not.

There is a potential for surface water contamination via discharge of contaminated groundwater into the Delaware River.

AIR ROUTE
There are no records of air sampling and no potential for air contamination due to the types of operations at the facilities.

SOIL
No soil sampling has been documented. Sludge from clarifiers is stored in an unlined sludge drying lagoon and is occasionally removed and dumped on the ground next to the lagoon. The sludge consists mainly of iron from the groundwater clarifying process.

DIRECT CONTACT
There are no reports of direct contact and there is no potential due to the types of operations.

FIRE AND EXPLOSION
There have been no reported incidents of fire or explosion at Camden's Wells and no potential due to the type of operations and materials used. Delair Well # 1 was struck by lightning in 1983 resulting in a burned out motor.

ADDITIONAL CONSIDERATIONS
There has been no damage to flora, fauna, off-site property or contamination to the food chain and no potential due to practices at Camden's Municipal Wells.

SUMMARY OF SAMPLING DATA

1. Sampling dates: Representative samples from 1969 to 1989.

Sampled by: NJDEP, DWR, Bureau of Safe Drinking Water, Trenton, New Jersey

NJDEP, DWR, Bureau of Ground Water Pollution Assessment, Trenton, New Jersey

City of Camden, Department of Utilities
Morris-Delair Water Treatment Plant
Pennsauken, New Jersey

Note: Sampling data from a 1984 U.S. Geological Survey report entitled "Water Quality Data for the PRM Aquifer System in Southwestern New Jersey, 1923-83" was also used in this report.

Samples: Numerous groundwater samples used for drinking water.

Laboratories: New Jersey State Department of Health (DOH)
Public Health and Environmental Lab
Trenton, New Jersey Lab # 11148

Campbell Soup Company, Central Environmental Laboratory
Campbell Place, Camden, New Jersey
Lab # 04013

Technological Resources, Inc. (TRI) Camden, New Jersey

City of Camden, Morris-Delair Water Treatment Plant, Pennsauken, New Jersey
Lab # 04127

Rossnagel and Associates, Inc. (R & A)
Medford, New Jersey

Rutgers-State University, Department of Environmental Science, Cook College,
New Brunswick, New Jersey
Lab # 12150

Chemical Samples and Analytical Services Company (CSAS)
Thorofare, New Jersey

Northeastern Analytical Corporation (NAC)
Medford, New Jersey
Lab # 03117

Bureau of Environmental Laboratories (BEL)
Scotch Rd., Trenton, New Jersey

Parameters:	Volatile organic compounds and metals
Sample description:	All samples were obtained from the City potable wells prior to treatment
Contaminants detected:	Contaminants detected are summarized in the following tables.

QA/QC: QA/QC data included spike, chain of custody, duplicates and surrogate was provided by NJDEP.

File location: NJDEP, DWR, Bureau of Southern Enforcement
20 E. Clementon Rd., Suite 301 S,
Gibbsboro, New Jersey

NJDEP, DWR, Bureau of Safe Drinking Water
401 E. State St., Trenton, New Jersey

PRIORITY DESIGNATION

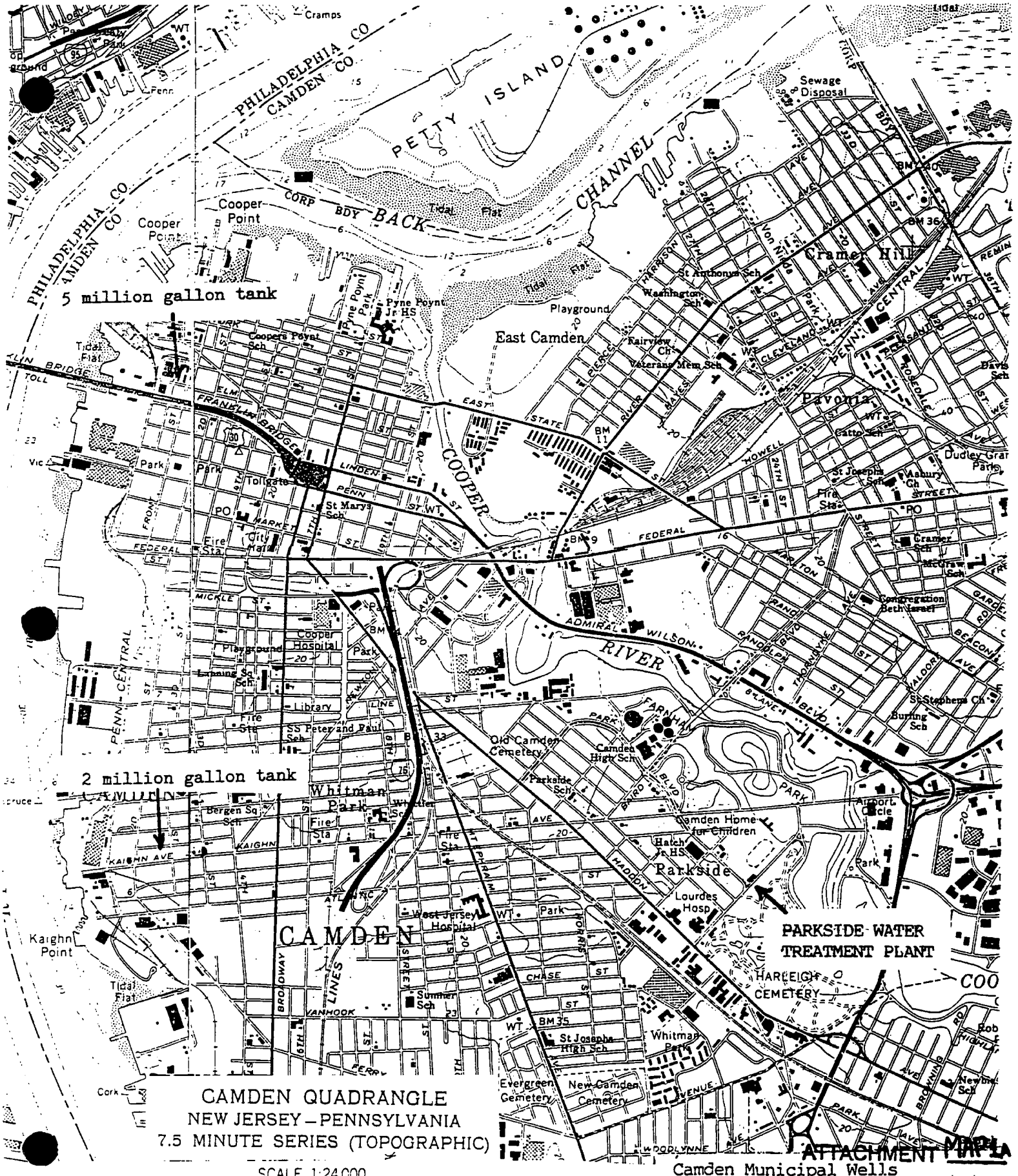
Camdens municipal wells are given a high priority due to documented groundwater contamination and the possibility of the groundwater discharging into the Delaware River.

RECOMMENDATIONS/CONCLUSIONS

The Camden area has a history of groundwater contamination. Camden's Municipal Wells all draw water from the lower PRM Aquifer which is influenced by regional pumping centers. The NJDEP, DWR, Bureau of Southern Enforcement, is currently idenifying responsible parties and conducting sampling of the Morris-Delair Wellfields. The NJDEP, DWR, Bureau of Safe Drinking Water is also sampling the Morris-Delair Wellfield and oversees all of Camden's potable wells for any contamination problems in finished drinking water that may occur. All hydrologic information is being compiled by the NJDEP, DWR, Bureau of Groundwater Pollution Assessment. Due to the extensive sampling previously conducted, sampling by the NJDEP, Division of Hazardous Waste Management, Bureau of Planning and Assessment is not warranted at this time.

Submitted by:

Dan Maltese
HSMS IV
NJDEP, BPA
December 27, 1989



ATTACHMENT

Camden Municipal Wells
Located in the City of Camden
Pennsauken Township, Camden C
New Jersey.
Lat: 39 59 28 Lon: 75 03

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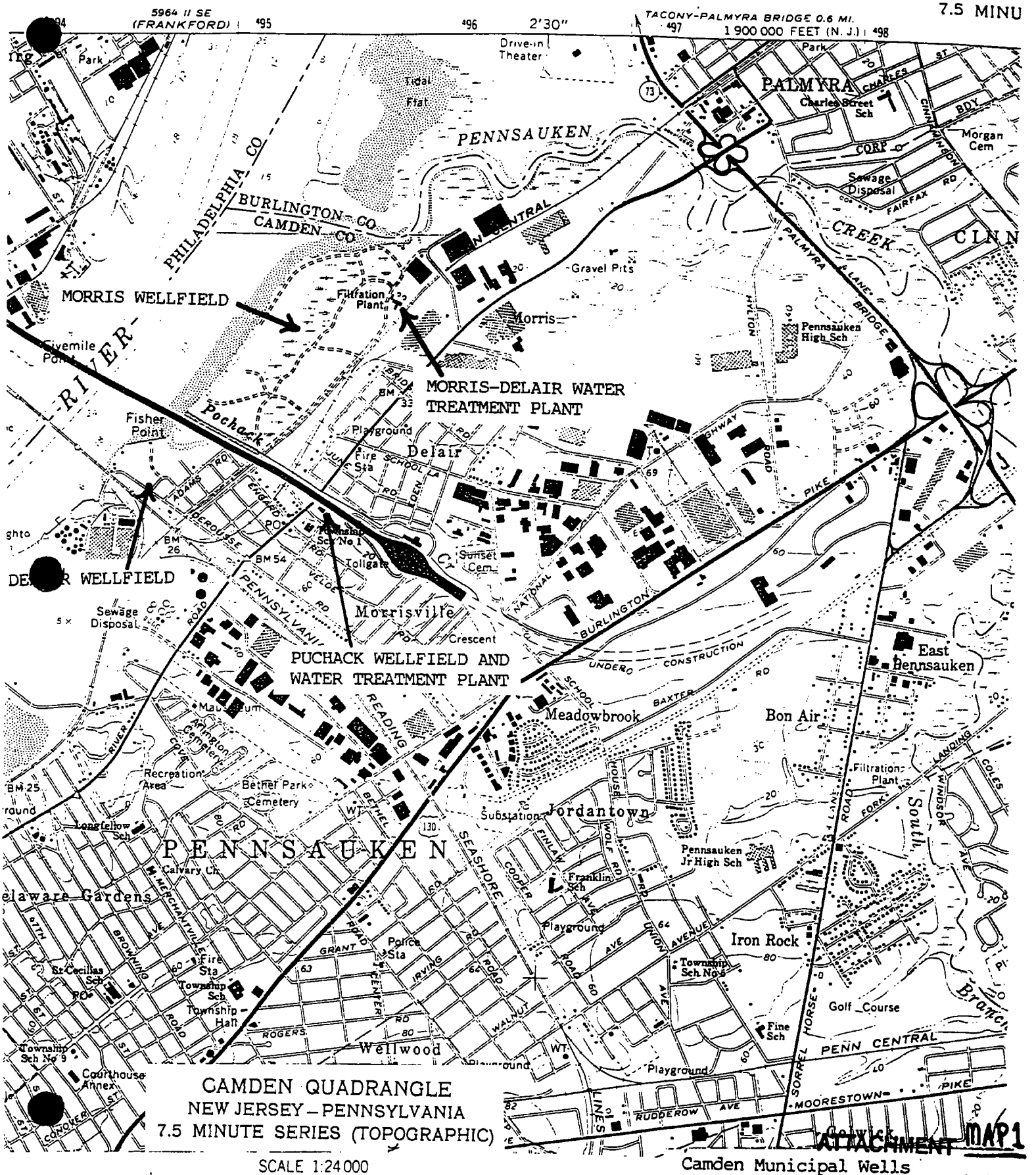

ATTACHMENT MAP 1

Camden Municipal Wells
Located in the City of Camden an
Pennsauken Township, Camden Co.,
New Jersey.

REFERENCE NO. 3

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

File 6 - Community
Camden City W. D.
correspondence

TO File - Camden City Water Department

FROM Philip Royer, Potable Water DATE January 28, 1982

SUBJECT Chromium Sampling

Michael Vena, Licensed Operator and Director of Public Works for the City of Camden, telephoned on January 28, 1982 to report the following hexavalent chromium analysis results for water samples collected on January 22, 1982 by City personnel:

Location	Result (ppm)
Puchack Run Treatment Plant effluent	< 0.05
Morris-Delair Treatment Plant effluent	ND
Warehouse (11th & Wright Ave.)	< 0.05
Fire hydrant (Point & Erie Sts.)	ND

NOTE:

(1) "ND" implies not detectable.
(2) The minimum detection limit is unknown.
(3) A colorimetric analysis method (unapproved) was utilized.
(4) Laboratory personnel reported that, during the analysis, some color showed in the Puchack Plant and the Warehouse samples, but was less apparent in the Warehouse sample.
(5) Puchack Run Wells No. 1, No. 2 and No. 3 were in operation during the sampling; Wells No. 5 and No. 7 were not.

PR/sr

ATTACHMENT

Summary of Chromium Sampling Results for the City of Camden Water System

Date Sampled	Location Sampled	Result (ppm)
1/4/82	Puchack Run Plt. effluent	0.185 (hex)
	Puchack Well No. 1	0.005 (hex)
	Puchack Well No. 2	0.005 (hex)
	Puchack Well No. 3	0.014 (hex)
	Puchack Well No. 5	0.472 (hex)
	Puchack Well No. 7	out of service
	Camden W.D. warehouse @ 11th & Wright Ave.	0.128
2/4/81	Morris Well No. 12	0.005
	Morris Well No. 13	0.005
12/23/80	Parkside Well No. 13	0.005
	Parkside Well No. 17	0.005
	Parkside Well No. 18	0.005
	City Well No. 4	1.648
	City Well No. 5	0.016
	City Well No. 11	0.005
7/29/80	City Well No. 16	0.005
7/25/80	City Well No. 16	0.005
6/26/80	City Well No. 4	2.230
5/14/80	City Well No. 4	1.1412
1/21/80	Parkside Well No. 18	0.005
1/21/80	Morris Well No. 11	0.005
9/20/78	City Well No. 10	ND
7/7/77	City Well No. 4	NEG
6/9/77	City Well No. 4	NEG
	Parkside Well No. 17	NEG
	City Well No. 5 (finished)	NEG
9/16/76	1439 Crestmond Ave.*	NEG
	Arco-Atlantic & Haddon Ave.*	NEG
	1477 Princess Ave.*	NEG
3/22/76	Exxon-Whitman & Haddon Ave.	NEG
7/10/75	Puchack Well No. 7	NEG
1/27/75	2915 Congress Rd.	NEG
1/24/74	917 Atlantic Ave.	0
2/7/73	City Well No. 6	NEG
	City Well No. 1	NEG

ATTACHMENT

12/26/72	426 Mt. Ephraim Ave.	0.140
	City Well No. 4	0.180
	Parkside Well No. 17	0.004
	Parkside Well No. 13	0.004
	City Well No.5	0.018
	City Well No. 1	0.204
12/11/72	1426 Mt. Ephraim Ave.	0.150
5/17/72	1264 Atlantic Ave.	0

NOTE:
* Near Parkside Plant
"(hex)" implies hexavalent chromium

ATTACHMENT

REFERENCE NO. 4

Mr Khan

(4)

Jeff Zelikson, Acting Director
Division of Water Resources
John Wilford, Assistant Director
Division of Water Resources

July 14, 1978

Update on Organic Sampling Investigations of the City of Camden Water Dept

Our recent sampling investigations conducted on 4/20, 4/24, 5/4 and 5/26/78 for the City of Camden ground water sources and distribution system for volatile organics have indicated average levels of trichloroethylene in ppb as follows:

POINTS OF COLLECTION	RAW WATER		1st CONSUMER'S TAP	
	State Lab.	Rutgers Lab.	State Lab.	Rutgers Lab.
Well #5	91.6	66.5	32.5	36.2
Well #11	15	36.2	20	1.2
Well #13	16.5	23.8	5	14.0
Well #16	297	144	80	54.5
Well #17	31.7	29.3	5	14.0
Well #18	27.0	11.8	5	14.0
Puchack Station	7.5	2.4	--	--
Morris Station	5.0	1.0	--	--

The above results indicate comparatively-high levels of trichloroethylene in the raw water from Wells #5 and #16 and at the taps of first consumers of water from these wells, though the latter were considerably lower than the levels in the raw water, presumably as a result of dilution in the mains with water from other wells. All of these results, however, are well below the initial determinations by Rutgers' laboratory showing 1900 ppb and 198 ppb trichloroethylene in Wells #16 and #18 respectively.

There are no established standards that we are aware of for volatile organics, so do not know what should be considered as the safe upper limit, though the proposed M.C.L. of 100 ppb for trihalomethanes in the recent EPA proposed Regulations could, perhaps, be used as a guide.

Camden is not well-endowed with prime source capacity, so the loss of Well #5 and #16 would significantly impair their ability to meet their normal water demands. Because of the mixture of the water from these wells with other waters and the high summer demands that are presently occurring, we are hesitant to order their removal from service at this time. If the present levels of trichloroethylene continue on the basis of additional samples to be collected, we should consider the removal of at least well #16 from service, or permit its use only for meeting peak or emergency demands.

In a letter dated June 23, 1978, Camden has been asked to monitor wells #5, #16, #17 and #18 for selected organics once a week. They are also being monitored twice monthly by the Bureau of Potable Water. These samples will provide information on the tread, to determine whether the presence of

trichloroethylene is constant, occasional, or increasing or declining. There is a growing suspicion that trichloroethylene may be ubiquitous in many of the groundwaters of the State which, if correct, would make it impossible to undertake wholesale removal of affected wells from service. Accordingly, a number of selected water supplies throughout the State are being sampled for 8 significant volatile organics, and we are awaiting receipt of these results for comparison with those obtained from Camden before we make a definite decision.

John Wilford, P.E.
Assistant Director
Division of Water Resources

ATTACHMENT

REFERENCE NO. 5

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58658 P. 1

DATE SAMPLE REC'D: 12/26 & 12/27/79

DATA CALLED IN:

ANALYST: PW

REF. NO.: 1030 to 1034 & 1053 to 1057

Sample Identification / Analytical Results

		Well #5 (City) 12-27	Warehouse Wright Ave. 12-27	Parkside Area 1470 Haddon Ave. 12-27
Chloroform	ug/l	.41	4.17	1.26
Bromodichloromethane	ug/l	ND	ND	ND
Chlorodibromomethane	"	ND	ND	.21
Bromoform	"	ND	ND	ND
1,2 dichloroethane	ug/l	2.62	.46	5.08
trichloroethylene	"	15.8	15.4	16.1
tetrachloroethylene	"	1.01	.92	6.93
Unknowns (as chloroform) (Retention time min.)	ug/l	(11.07) .43 (11.75) 2.21	(11.76) .67 (16.34) .80	(11.07) .42 (11.75) 1.53 (14.28) .14

Attachment A

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58658 P. 2

DATE SAMPLE REC'D: 12/26 & 12/27/79

DATA CALLED IN:

ANALYST: PW

REF. NO.: 1030 to 1034 & 1053 to 1057

Sample Identification / Analytical Results	Whitman Park Bruno's 12-27	North Camden Point & Erie 12-27	Well #13 City Raw Wate 12-26
Chloroform ug/l	ND	.91	4.27
Bromodichloromethane ug/l	ND	.35	ND
Chlorodibromomethane "	9.03	ND	ND
Bromoform "	ND	ND	ND
1,2 dichloroehtane ug/l	1.67	.42	14.2
trichloroethylene "	31.8	5.62	28.5
tetrachloroethylene "	7.32	.22	3.88
Unknowns (as Chloroform) (Retention time min.) ug/l	(11.06) .15 (11.71) 13.67 (12.31) .21 (12.50) .21	(11.78) .24 (12.54) 2.67 (16.34) 1.09	(9.57) 6.85 (11.00) 2.77 (11.72) 4.88 (14.23)1.24

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58658 P. 3

DATE SAMPLE REC'D: 12/26 & 12/27/79

DATA CALLED IN:

ANALYST: PW

REF. NO.: 1030 to 1034 & 105
Analytical Results to 105

Sample Identification

		Well #17 City Raw Water 12-26	Well #18 City Raw Water 12-26	Fairview 2977 Yorkshire 12-26
Chloroform	ug/l	1.76	7.20	1.02
Bromodichloromethane	ug/l	ND	ND	ND
Chlorodibromomehtane	"	ND	ND	0.20
Bromoform	"	ND	ND	ND
1,2 dichloroethane	ug/l	2.89	3.29	3.88
trichloroethylene	"	51.9	8.33	14.1
tetrachloroethylene	"	18.3	21.30	3.20
Unknowns (as chloroform) (Retention time min) -	ug/l	(11.81) .43 (17.92) .34	(11.78) .68 (17.93) .24	(9.63) .06 (11.05) .40 (11.73) 1.64

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58658 P.4

DATE SAMPLE REC'D: 12/26 & 12/27/79

DATA CALLED IN:

ANALYST: PW

REF. NO.: 1030 to 1030 & 105

Sample Identification

Analytical Results to 105

		Parkside Treatment Plant - Effluent 12-26
Chloroform	ug/l	.87
Bromodichloromethane	ug/l	ND
Chlorodibromomethane	"	0.21
Bromoform	"	ND
1,2 dichloroethane	ug/l	4.46
trichloroethylene	"	16.0
tetrachloroethylene	"	6.47
Unknowns (as chloroform) (Retention time min) - ug/l		(11.08) .37 (11.76) 1.46 (14.30) .11

ATTACHMENT

REFERENCE NO. 6

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58670 P. 1

DATE SAMPLE REC'D: 1/31/80

DATA CALLED IN:

ANALYST: pw

REF. NO.: 1253 to 1262

Sample Identification — Analytical Results

	Well #5 1-31-80	Warehouse 1-31-80	Bruno's 1-31-80	2997 Yorksh Sq. 1-
Chloroform ug/l	ND	<1 (.94)	<1 (.25)	1.17
Bromodichloromethane "	ND	ND	ND	ND
Dibromochloromethane "	ND	ND	12.3	1.99
Bromoform "	ND	ND	ND	ND
1,2 dichloroethane ug/l	3.73	1.12	1.97	4.64
Trichloroethylene "	54.8	11.0	40.6	21.7
Tetrachloroethylene "	1.33	<1 (.13)	9.13	8.03
Carbon tetrachloride "				
Unknowns (as CHCl3) ug/l				
Retention Time (min)				
9.70 to 9.9	<1 (.18)			
11.09 to 11.28	<1 (.77)		<1 (.14)	<1 (.35
11.77 to 12.00	4.31	<1 (.47)	17.8	3.53
16.38 to 16.44		<1 (.39)		

ATTACHMENT C

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden — TRI ORDER #: 58670 P. 2

DATE SAMPLE REC'D: 1/31/80 — DATA CALLED IN:

ANALYST: — REF. NO.: 1253 to 1262

Sample Identification	Parkside Trtmnt. Plant 1-31-80	Well #13 1-31-80	Well #17 1-31-80
Analytical Results			
Chloroform ug/l	1.20	4.80	<1 (.28)
Bromodichloromethane "	ND	ND	ND
Dibromochloromethane "	<1 (.26)	ND	<1 (.45)
Bromoform "	ND	ND	ND
1,2 dichloroethane ug/l	5.90	18.7	2.39
Trichloroethylene "	20.0	39.5	61.7
Tetrachloroethylene "	9.71	5.55	27.8
Carbon tetrachloride "	<1 (.20)	2.57	<1 (.15)
Unknowns (as CHCl3) ug/l			
Retention Time (min)			
9.70 to 9.9	<1 (.19)	3.75	
11.09 to 11.28	<1 (.53)	4.26	
11.77 to 12.00	1.82	7.48	<1 (.68)
16.38 to 16.44			

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58670 P. 3

DATE SAMPLE REC'D: 1/31/80

DATA CALLED IN:

ANALYST: pw

REP. NO.: 1253 to 1262

Sample Identification — Analytical Results

	Well #18 1-31-80	Parkside Area 147C Haddon Ave. 1-31-80	North Camden 1-31-80
Chloroform ug/l	<1 (.56)	<1 (.92)	<1 (.91)
Bromodichloromethane "	ND	ND	ND
Dibromochloromethane "	ND	ND	ND
Bromoform "	ND	ND	ND
1,2 dichloroethane ug/l	1.35	4.29	<1 (.72)
Trichloroethylene "	8.60	14.5	3.98
Tetrachloroethylene "	21.8	6.19	
Carbon tetrachloride "			
Unknowns (as CHCl3) ug/l			
Retention Time (min)			
9.70 to 9.9		<1 (.10)	
11.09 to 11.28		<1 (.10)	
11.77 to 12.00	<1 (.95)	1.42	<1 (.13)
16.38 to 16.44			<1 (.76)

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

TRI ORDER #: 58676 P.1

CLIENT: City of Camden

DATA CALLED IN:

DATE SAMPLE REC'D: 2/29/80

REF. NO.: 1412 to 1419

ANALYST: M.E.F.

Analytical Results

Sample Identification

	Well #17 2-29	Parkside Trtmnt Plant Effluent 2-29	Haddon Ave. 1470 2-29
Chloroform ug/l	<1 (.43)	ND	
Bromodichloromethane "	ND	<1 (.74)	ND
Dibromochloromethane "	<1 (.04)	2.94	<1 (.55)
Bromoform "	ND	1.79	<1 (.25)
1,2 dichloroethane ug/l	1.53	<1 (.95)	<1 (.49)
Trichloroethylene "	15.22	11.26	13.81
Tetrachloroethylene "	4.44	8.29	8.93
Carbon Tetrachloride "	ND	ND	ND

Unknowns as Chloroform ug/l

Retention Time (min)		
11.58	<1 (.21)	-
11.77	<1 (.26)	-
12.89	-	1.00

ATTACHMENT C

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58676 P.2

DATE SAMPLE REC'D: 2/29/80

DATA CALLED IN:

ANALYST: N.E.F.

REF. NO.: 1412 to 1419

Sample Identification

Analytical Results

	Well #5 (city) 2-29	Bruno's 2-29	2997 Yorkshire Square (city) 2-29	Point & Erie (city) 2-29
Chloroform ug/l	5.97	30.18	13.43	< 1 (.81)
Bromodichloromethane "	ND	ND	ND	ND
Dibromochloromethane "	ND	13.05	3.60	ND
Bromoform "	ND	ND	ND	ND
1,2 dichloroethane ug/l	3.09	< 1 (.34)	1.11	ND
Trichloroethylene "	39.44	26.99	23.12	4.17
Tetrachloroethylene "	< 1 (.99)	6.67	2.03	ND
Carbon Tetrachloride "	ND	ND	ND	ND

Unknowns as Chloroform ug/l

Retention Time (min)				
11.58	-			
11.77	-			
12.89	-			
16.46		-	-	< 1 (.46)

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58676 P.3

DATE SAMPLE REC'D: 2/29/80

DATA CALLED IN:

ANALYST: M.E.J.

REF. NO.: 1412 to 1419

Sample Identification

Analytical Results

	Warehouse 2-29	Well #18 2-29
Chloroform ug/l	< 1 (.56)	< 1 (.44)
Bromodichloromethane "	ND	ND
Dibromochloromethane "	ND	ND
Bromoform "	ND	ND
1,2 dichloroethane ug/l	< 1 (.25)	< 1 (.94)
Trichloroethylene "	13.14	24.75
Tetrachloroethylene "	ND	15.46
Carbon Tetrachloride "	ND	ND
Unknowns as Chloroform ug/l		
Retention Time (min)		
16.46	< 1 (.36)	-
11.84	-	.63
17.30	-	2.90

ATTACHMENT C

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

TRI ORDER #: 58688 P. 1

CLIENT: City of Camden

DATA CALLED IN:

DATE SAMPLE REC'D: 4/03/80

REF. NO.: 1602 to 1613

ANALYST: M.E.F.

Analytical Results

Sample Identification

	Well #17 4-03	Well #18 4-03	Parkside Trtmnt Plant Effluent 4-03	1470 Haddon Avenue 4-03
Chloroform ug/l	ND	1.71	ND	ND
Bromodichloromethane "	ND	ND	< 1 (.03)	ND
Chlorodibromomethane "	ND	ND	2.23	< 1 (.24)
Bromoform "	ND	ND	4.00	< 1 (.34)
1,2 dichloroethane "	2.26	1.40	< 1 (.37)	< 1 (.20)
Trichloroethylene "	48.30	12.60	10.45	9.48
Tetrachloroethylene "	79.17	16.63	4.68	5.10
Carbon tetrachloride "	ND	ND	ND	ND

Unknowns (as Chloroform)

Retention Time (min)	ug/l			
24.96		-	-	< 1 (.03)

ATTACHMENT C

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58688 P. 2

DATE SAMPLE REC'D: 4/03/80

DATA CALLED IN:

ANALYST: R.E.J.

REF. NO.; 1602 to 1613

Sample Identification — Analytical Results

	Well #5 4-03	Bruno's 4-03	2937 Yorkshire Square 4-03	Point & Erie 4-03
Chloroform ug/l	5.23	21.17	< 1 (.21)	< 1 (.40)
Bromodichloromethane "	ND	ND	ND	ND
Chlorodibromomethane "	ND	9.00	ND	ND
Bromoform "	ND	ND	ND	ND
1,2 dichloroethane "	2.47	< 1 (.42)	< 1 (.1)	< 1 (.33)
Trichloroethylene "	44.68	27.88	3.2	4.26
Tetrachloroethylene "	2.50	4.75	ND	ND
Carbon tetrachloride "	ND	ND	< 1 (.3)	ND

Unknowns as Chloroform ug/l

Retention Time (min)				
11.15	< 1 (.40)			
12.62			-	-
16.46			-	< 1 (.36)

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58688 P. 3

DATE SAMPLE REC'D: 4/03/80

DATA CALLED IN:

ANALYST: M.G.F.

REF. NO.: 1602 to 1613

Sample Identification — Analytical Results

	Warehouse 4-03	Well #4 4-03	MD Effluent 4-03	Pucheck Efflu 4-03
Chloroform ug/l	< 1 (.09)	ND	1.20	ND
Bromodichloromethane "	ND	ND	ND	ND
Chlorodibromomethane "	ND	19.96	ND	ND
Bromoform "	ND	ND	ND	ND
1,2 dichloroethane "	< 1 (.28)	21.04	< 1 (.41)	< 1 (.33)
Trichloroethylene "	8.35	31.41	< 1 (.22)	16.20
Tetrachloroethylene "	ND	6.70	ND	< 1 (.21)
Carbon tetrachloride "	ND	ND	ND	ND
Unknowns as Chloroform "				
Retention Time (min)				
12.62	< 1 (.04)			
16.46	-			
16.50		-	-	< 1 (.08)
16.60		-	-	< 1 (.05)

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58697

DATE SAMPLE REC'D: 5/02/80

DATA CALLED IN:

ANALYST: [illegible]

REF. NO.: 1725 to 1734

Sample Identification

Analytical Results

Sampling date: 5/02/80

	Well #4	Well #5	Well #17	Well #18
Chloroform ug/l	ND	ND	< 1(.47)	< 1(.65)
Bromodichloromethane "	ND	ND	ND	ND
Chlorodibromomethane "	14.95	ND	ND	ND
Bromoform "	ND	ND	ND	ND
1,2 Dichloroethane "	< 1 (.53)	2.79	2.30	2.01
Trichloroethylene "	31.88	36.79	37.05	11.92
Tetrachloroethylene "	5.86	1.25	19.57	16.33
Carbon Tetrachloride "	ND	ND	ND	ND
Unknowns as Chloroform ug/l				
Retention Time (min)				
10.95	-	< 1(.44)	-	-
11.54 - 11.66	28.27	4.37	.54	1.36

ATTACHMENT

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TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden — TRI ORDER #: 58697 - 2 of 3

DATE SAMPLE REC'D: 5/02/80 — DATA CALLED IN:

ANALYST: [illegible] — REF. NO.: 1725 to 1734

Sample Identification — Analytical Results

Sampling date: 5/02/80

	2997 Yorkshire Square	1470 Haddon Ave.	Bruno's	Parkside Treatment Plant Effluent
Chloroform ug/l	ND	ND	ND	< 1 (.60)
Bromodichloromethane "	ND	ND	ND	ND
Chlorodibromomethane "	ND	< 1(.45)	10.37	ND
Bromoform "	ND	ND	ND	ND
1,2 Dichloroethane "	< 1(.48)	< 1(.88)	< 1(.57)	< 1 (.73)
Trichloroethylene "	1.40	6.98	28.55	6.62
Tetrachloroethylene "	ND	4.75	6.35	ND
Carbon Tetrachloride "	ND	ND	ND	ND
Unknowns as Chloroform ug/l				
Retention Time (min)				
11.54 - 11.66	< 1(.42)	-	22.46	< 1(.32)

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TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58697-3 of 3

DATE SAMPLE REC'D: 5/02/80

DATA CALLED IN:

ANALYST: [illegible]

REF. NO.: 1725 to 1734

Sample Identification

Analytical Results

Sampling date: 5/02/80

	Warehouse	Point & Erie
Chloroform ug/l	ND	< 1(.96)
Bromodichloromethane "	< 1(.21)	ND
Chlorodibromethane "	1.30	ND
Bromoform "	3.70	ND
1,2 Dichloroethane "	< 1(.75)	< 1(.14)
Trichloroethylene "	9.13	1.72
Tetrachloroethylene "	4.80	ND
Carbon Tetrachloride "	ND	ND
Unknowns as Chloroform ug/l		
Retention Time(min)		
11.54 - 11.66	< 1(.17)	-
16.31	-	< 1(.25)

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TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

Ref. No. 1869-1878
Sampling Date 6/3/80

ANALYTICAL DATA REPORT - PAGE 1

CLIENT: City of Camden

TRI ORDER #: 58706

DATE SAMPLE REC'D: 6/3/80

DATA CALLED IN:

ANALYST: JD, NF

Sample Identification	Analytical Results			
	Fairview	Warehouse	Haddon Avenue	Bruno's
Chloroform, ug/l	ND	<1 (.71)	<1 (.33)	20.46
Bromodichloromethane, ug/l	ND	ND	<1 (.26)	ND
Chlorodibromomethane, ug/l	ND	ND	<1 (.97)	19.90
Bromoform, ug/l	ND	ND	<1 (.90)	ND
1,2-Dichloroethane, ug/l	<1 (.59)	<1 (.86)	1.60	<1 (.78
Trichloroethylene, ug/l	1.57	7.31	11.34	27.21
Tetrachloroethylene, ug/l	ND	<1 (.52)	6.66	6.57
Carbontetrachloride, ug/l	2.07	ND	ND	ND
Unknown as Chloroform, ug/l				
Retention time (min.)				
11.50-11.60	<1 (.88)	<1 (.26)	<1 (.45)	-
16.20	-	<1 (.25)	-	-

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(609) 964-5603

ANALYTICAL DATA REPORT - PAGE 2

CLIENT: City of Camden TRI ORDER #: 58706

DATE SAMPLE REC'D: 6/3/80 DATA CALLED IN:

Sample Identification	Analytical Results			
	Point & Erie	Parkside Trmt. Plant Effluent	Well #4	Well #
Chloroform, ug/l	<1 (.69)	<1 (.59)	25.81	3.53
Bromodichloromethane, ug/l	ND	ND	ND	ND
Chlorodibromomethane, ug/l	ND	<1 (.94)	21.42	ND
Bromoform, ug/l	ND	1.24	ND	<1 (.11
1,2-Dichloroethane, ug/l	<1 (.49)	<1 (.79)	.68	2.39
Trichloroethylene, ug/l	2.46	1.16	28.09	28.03
Tetrachloroethylene, ug/l	ND	1.28	6.56	1.14
Carbontetrachloride, ug/l	ND	ND	ND	ND
Unknowns as Chloroform, ug/l				
Retention time (min.)				
10.89	-	-	-	<1 (.38
11.5	<1 (.27)	<1 (.17)	-	-
16.12	<1 (.49)	-	-	-

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A Subsidiary of Campbell Soup Company
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(609) 964-5603

ANALYTICAL DATA REPORT - PAGE 3

CLIENT: City of Camden

TRI ORDER #: 58706

DATE SAMPLE REC'D: 6/3/80

DATA CALLED IN:

Sample Identification	Analytical Results	
	Well #17	Well #18
Chloroform, ug/l	< 1 (.91)	< 1 (.73)
Bromodichloromethane, ug/l	ND	ND
Chlorodibromomethane, ug/l	< 1 (.51)	< 1 (.30)
Bromoform, ug/l	ND	ND
1,2-Dichloroethane, ug/l	1.72	2.33
Trichloroethylene, ug/l	10.80	15.02
Tetrachloroethylene, ug/l	8.09	18.81
Carbontetrachloride, ug/l	ND	ND
Unknowns as Chloroform, ug/l		
Retention time (min.)		
11.6		1.84

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TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

TRI ORDER #: 58713

CLIENT: City of Camden

DATA CALLED IN:

DATE SAMPLE REC'D: 7/2/80

Sample Identification	Analytical Results			
	Well #5	Well #13	Well #17	Well #18
Chloroform, ug/l	<1 (.49)	2.84	ND	<1 (.69)
Bromodichloromethane, ug/l	ND	ND	ND	ND
Chlorodibromomethane, ug/l	ND	ND	<1 (.32)	<1 (.86)
Bromoform, ug/l	ND	ND	ND	ND
1,2-Dichloroethane, ug/l	3.41	17.98	2.33	3.00
Trichloroethylene, ug/l	39.19	28.81	27.68	11.22
Tetrachloroethylene, ug/l	1.88	1.81	11.42	16.13
Carbon Tetrachloride, ug/l	ND	2.52	ND	ND
Unknowns as Chloroform, "				
Retention Time (minutes)				
10.65 - 10.75	<1 (.75)	3.30	-	<1 (.43)
11.48 - 11.65	4.54	8.44	<1 (.30)	2.27

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

TRI ORDER #: 58713

CLIENT: City of Camden

DATE SAMPLE REC'D: 7/2/80

DATA CALLED IN:

Sample Identification	Analytical Results			
	Parkside Trmt Plant Effluent	1470 Haddon Avenue	Pucheck Effluent	2997 Yorkshire Square
Chloroform, ug/l	1.13	<1 (.98)	<1 (.20)	<1 (.43)
Bromodichloromethane, "	ND	ND	ND	ND
Chlorodibromomethane, "	<1 (.38)	<1 (.44)	ND	ND
Bromoform, ug/l	ND	ND	ND	ND
1,2-Dichloroethane, ug/l	7.56	7.55	<1 (.95)	<1 (.52)
Trichloroethylene, ug/l	16.46	14.72	11.92	<1 (.30)
Tetrachloroethylene, "	5.66	7.06	1.09	ND
Carbon Tetrachloride, "	ND	1.73	ND	ND
Unknowns as Chloroform, "				
Retention Time (minutes)				
10.7	<1 (.86)	1.38	<1 (.29)	-
11.4	2.69	3.12	1.13	-
16.17	-	-	<1 (.35)	-

ATTACHMENT

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ANALYTICAL DATA REPORT

TRI ORDER #: 58713

CLIENT: City of Camden

DATE SAMPLE REC'D: 7/2/80

DATA CALLED IN:

Sample Identification	Analytical Results			
	Point & Erie	Bruno's	Morris Delair	Warehouse
Chloroform, ug/l	<1 (.41)	<1 (.06)	1.6	<1 (.38)
Bromodichloromethane, ug/l	ND	ND	ND	ND
Chlorodibromomethane, "	ND	14.42	ND	ND
Bromoform, ug/l	ND	ND	ND	ND
1,2-Dichloroethane, ug/l	<1 (.42)	2.08	<1 (.15)	<1 (.51)
Trichloroethylene, "	2.25	21.57	<1 (.8)	8.27
Tetrachloroethylene, "	ND	5.84	ND	<1 (.67)
Carbon Tetrachloride, "	ND	ND	ND	ND
Unknowns as Chloroform, ug/l				
Retention Time (minutes)				
10.8	-	<1 (.23)	-	-
11.5	-	20.00	-	<1 (.28)
16.22	<1 (.30)	-	-	<1 (.43)

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ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58721

DATE SAMPLE REC'D: 8-11-80

DATA CALLED IN:

REFERENCE: 4016 to 4025-0811/0825

Sample Identification		(4016) Well#5	(4017) Well#13	(4018) Well#17	(4019) Well#18	(4020) Bruno's	(4021) Haddon Ave.	(4022) Parkside Eff.
		8-11-80	8-11-80	8-11-80	8-11-80	8-11-80	8-11-80	8-11-80
Analytical Results								
hloroform	ug/l	ND*	5.09	ND	<1(.65)	<1(.20)	1.14	1.28
romodichloromethane	"	ND	ND	ND	ND	ND	ND	ND
rodibromomethane	"	ND	ND	<1(.23)	<1(.17)	12.3	ND	<1(.18)
romoform	"	ND	ND	ND	ND	ND	ND	ND
,2 dichloroethane	"	2.63	20.7	2.53	2.81	2.65	6.61	7.42
richloroethylene	"	25.9	29.6	34.2	11.1	25.7	17.2	13.9
etrachloroethylene	"	<1(.78)	2.40	18.0	16.8	5.73	5.94	5.40
arbon Tetrachloride	"		3.52					
nknowns (as Chloroform)	"	<1(.31)	2.69	<1(.44)	1.27	20.3	<1(.60)	<1(.55)
etention time min.)		(10.89)	(9.51)	(11.63)	(11.60)	(11.62)	(10.85)	(1090)
		3.21	4.99	<1(.65)			1.75	1.77
		(11.57)	(10.85)	(18.82)			(11.58)	(11.58)
			7.63					
			(11.57)					

not detectable

JPW

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58728

DATE SAMPLE REC'D: 9/3/80

REFERENCE: 4136-4145

DATA CALLED IN:

SAMPLE IDENTIFICATION (all results expressed in ug/l)	Well#5 9-3	Well#3 9-3	Well#17 9-3	Well#18 9-3	Bruno's 9-3
	ANALYTICAL RESULTS				
Chloroform	ND*	2.74	<1(.36)	1.02	2.90
Bromodichloromethane	ND	<1(.82)	ND	ND	ND
Chlorodibromomethane	ND	ND	ND	<1(.67)	26.39
Bromoform	ND	ND	ND	ND	ND
1,2 dichloroethane	2.12	7.47	<1(.89)	1.91	2.53
Trichloroethylene	1.52	8.76	23.84	8.69	23.86
Tetrachloroethylene	ND	ND	11.93	17.00	5.86
Carbon Tetrachloride	ND	1.35	ND	ND	ND
Unknowns (as Chloroform)					
Retention time min.					
1) 10.19		2.44			
2) 11.21-11.26		1.04			17.91

*ND: Not Detectable

ATTACHMENT ____

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden (con't)

TRI ORDER #:

DATE SAMPLE REC'D:

DATA CALLED IN:

Sample Identification	Analytical Results				
	Well#5 10-3	Well#13 10-3	Well#17 10-3	Well#18 10-3	Bruno's 10-3
Chloroform	2.94	3.58	<1(.70)	<1(.31)	<1(.21)
Bromodichloromethane	ND	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	1.10	<1(.[illegible])	19.05
Bromoform	ND	ND	ND	ND	ND
1,2-Dichbroethane	2.28	15.54	1.85	2.04	2.57
Trichloroethylene	34.02	30.97	40.46	9.07	23.02
Tetrachloroethylene	1.48	4.07	19.00	18.19	5.80
Carbon Tetrachloride	ND	2.69	ND	ND	ND
Unknowns as Chloroform Retention Time:					
8.15-8.19	--	--	--	--	--
10.35-10.45	1(.65)	3.27	--	--	<1(.28)
11.07-11.20	--	4.71	--	1.17	14.76
15.75-15.76	--	--	--	--	--

ATTACHMENT ___

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58735

DATE SAMPLE REC'D: 10/3/80

DATA CALLED IN:

REFERENCE: 4317 to 4326-1003

Sample Identification	Analytical Results				
	Warehouse	Point Erie	Parkside Effluent	Haddon Ave.	Yorkshire Square
All results expressed in ug/l					
date:	10-3	10-3	10-3	10-3	10-3
Chloroform	<1(.37)	<1(.47)	<1(.81)	<1(.84)	1(.20)
Bromodichloromethane	ND	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	1.29	<1(.76)	7.35
Bromoform	ND	ND	ND	ND	ND
1,2-Dichbroethane	<1(.61)	<1(.29)	5.17	4.94	1.67
Trichloroethylene	8.63	3.34	12.07	11.84	16.42
Tetrachloroethylene	ND	ND	5.15	5.65	2.96
Carbon Tetrachloride	ND	ND	<1(.36)	<1(.33)	ND
Unknowns as Chloroform					
Retention Time:					
8.15-8.19	1.04	<1(.88)	--	--	--
10.35-10.45	--	--	<1(.53)	<1(.57)	--
11.07-11.20	<1(.41)	--	1.25	1.18	7.11
15.75-15.76	--	<1(.74)	--	--	.13

71 of

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TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
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(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58743

DATE SAMPLE REC'D: 11/5/80

DATA CALLED IN:

REF: 4490-4499

Sample Identification	1470 Haddon Avenue	Parkside Treatment Plant-Eff.	Point & Erie	Warehouse	2997 Yorkshi Square
	Analytical Results				
All results expressed in ug/l					
Chloroform	1.04	<1(.87)	<1(.61)	<1(.29)	1.82
Bromodichloromethane	ND	ND	ND	ND	ND
Chlorodibromomethane	<1(.75)	1.37	ND	ND	1.43
Bromoform	ND	ND	ND	ND	ND
1,2-Dichloroethane	4.89	5.45	<1(.51)	<1(.59)	<1(.80)
Trichloroethylene	10.90	12.92	4.62	10.31	3.27
Tetrarchloroethylene	7.77	5.70	ND	<1(.69)	<1(.85)
Carbon Tetrachloride	<1(.35)	<1(.40)	ND	ND	1.00
Unknowns as Chloroform					
Retention Time (min)					
10.33 - 10.50	<1(.6)	<1(.64)	--	--	<1(.24)
11.09 - 11.19	1.19	1.54	<1(.32)	<1(.56)	--
15.76	--	--	1.2	<1(.83)	--

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58743

DATE SAMPLE REC'D: 11/5/80

DATA CALLED IN:

REF: 4490-4499

Sample Identification	Analytical Results				
All results expressed in ug/l	Well #5	Well #13	Well #17	Well #18	Bruno's
Chloroform	3.61	3.56	<1 (.25)	<1 (.21)	<1 (.23)
Bromodichloromethane	ND*	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	1.22	<1 (.72)	20.39
Bromoform	ND	ND	ND	ND	ND
1,2 - Dichloroethane	2.42	16.01	2.50	2.12	1.92
Trichloroethylene	44.07	32.76	42.20	9.12	26.79
Tetrachlorethylene	1.99	4.92	19.74	22.70	6.33
Carbon Tetrachloride	ND	2.85	<1(.32)	ND	<1(.27)
Unknowns as Chloroform Retention time (min)					
10.33 - 10.50	<1(.81)	3.54	--	--	--
11.09 - 11.19	--	5.36	<1(.85)	1.14	21.22

*ND: Not Detectable

Nancy Fox

ATTACHMENT

TRI
TECHNOLOGICAL RESOURCES, INC.
A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden

TRI ORDER #: 58749

DATE SAMPLE REC'D: December 2, 1980

DATA CALLED IN:

Ref: 4582-4590

Sample Identification — Analytical Results

ll resulted expressed in ug/l	Well #5	Well #13	Well #17	Haddon Ave.
loroform	3.78	3.02	<1(.27)	<1(.78)
mobdichloromethane	ND	ND	ND	ND
lorodibromomethane	ND	ND	<1(.71)	<1(.36)
oform	ND	ND	ND	ND
,2-Dichloroethane	2.56	11.10	2.56	4.16
ichloroethylene	48.56	29.87	44.49	12.31
rachloroethylene	1.73	3.69	17.45	5.11
rbontetrachloride	ND	2.70	<1(.33)	<1(.32)
knowns as chloroform				
tention Time (Min.)				
9.07 - 9.11	<1(.24)	2.55	--	--
10.48 - 10.60	<1(.89)	3.11	--	<1(.66)
11.26 - 11.35	--	5.11	<1(.97)	1.17

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A Subsidiary of Campbell Soup Company
P.O. Box 391, Camden, N.J. 08101
(609) 964-5603

ANALYTICAL DATA REPORT

CLIENT: City of Camden - Cont'd. TRI ORDER #: 58749

DATE SAMPLE REC'D: DATA CALLED IN:

Sample Identification	Point & Erie	Bruno's	Parkside Effluent	Yorkshire Square	Warehouse
Analytical Results					
ll results expressed . ug/l					
loroform	<1(.36)	<1(.85)	1.13	<1(.79)	<1(.63)
romodichloromethane	ND	ND	ND	ND	ND
odibromomethane	ND	6.11	<1(.38)	ND	ND
omoform	ND	ND	ND	ND	ND
2-Dichloroethane	<1(.78)	3.80	6.98	<1(.63)	<1(.57)
ichloroethylene	4.27	20.64	17.05	2.35	9.78
trachloroethylene	<1(.36)	4.70	3.83	<1(.51)	<1(.70)
rbontetrachloride	ND	<1(.25)	<1(.48)	<1(.95)	ND
knowns as chloroform Retention Time (Min.)					
10.48 - 10.60	--	<1(.44)	<1(.84)	<1(.29)	--
11.26 - 11.35	--	10.16	1.79	--	--
15.95	1.18	--	--	--	<1(.87)

ATTACHMENT

REFERENCE NO. 7

99-00-292

CAMPBELL SOUP COMPANY
CENTRAL ENVIRONMENTAL LABORATORY

POTABLE WATER

cc: Mr. M. Vena

APR 12 1985
DIRECTOR OF UTILITIES OFFICE

Plant: City of Camden

Date: April 11, 1985

Reference: 2504-11;4/3-9/85

Page # Pg.4-11ES5;lm

Trihalomethane Analysis

	2504 Well #1 4/3/85	2505 Well #2 4/3/85	2506 Well #3 4/3/85	2507 Well #13 4/3/85
Chloroform (ug/l)	ND*	6.9	23.55	30.3
Bromodichloromethane (ug/l)	ND	ND	ND	ND
Chlorodibromomethane (ug/l)	ND	ND	ND	ND
Bromoform (ug/l)	ND	ND	ND	ND
Total Trihalomethanes	ND	6.9	23.55	30.3
Dichloroethane (ug/L)	-	0.95	-	-
Trichloroethane (ug/L)	-	<1	11.83	1.08
Carbon Tetrachloride (ug/L)	-	-	-	0.60
Trichloroethylene (ug/L)	0.122	8.9	~110	~136
Tetrachloroethylene (ug/L)	0.819	9.7	~21.7	~16.3
Unknown Peaks (Retention time, peak height in cm)		(9.55,0.2) (13.47,1) (19.52,0.2)	(9.24,1) (12.16,2.5) (15.8,1)	(12.31,12.5) (13.34,5.5) (15.59,10.5)

* ND = Not Detectable

Edward L. Schwarz
Environmental Chemist

ATTACHMENT BB1

99-00-292

CAMPBELL SOUP COMPANY
CENTRAL ENVIRONMENTAL LABORATORY

POTABLE WATER

cc:

Plant: City of Camden

Date: 4/11/85

Reference: 2504-11

Page # _____

Trihalomethane Analysis

	2508 Well #17 4/3/85	2509 Well #18 4/3/85	2510 Puchack Effluent 4/3/85	2511 Parkside Effluent 4/3/85
Chloroform (ug/l)	12.91	2.38	3.56	3.06
Bromodichloromethane (ug/l)	ND	ND	ND	ND
Chlorodibromomethane (ug/l)	ND	ND	ND	ND
Bromoform (ug/l)	ND	ND	ND	ND
Total Trihalomethanes	12.91	2.38	3.56	3.06
Dichloroethane (ug/L)	16.35	7.33	0.849	8.0
Trichloroethane (ug/L)	2.10	< 1	0.881	--
Carbon Tetrachloride (ug/L)	1.57	--	--	--
Trichloroethylene (ug/L)	~81.7	~19.9	~20.1	~26.7
Tetrachloroethylene (ug/L)	~11.26	~15.7	2.81	6.45
Unknown Peaks (Retention time, peak height in cm)	(12.27,3) (13.50,2)	(12.27,0.5) (13.54,0.5)	(13.51,0.5)	(12.34,0.5) (13.44,0.5) (15.16,2)

ND = Not Detectable

Edward I. Johnson
Environmental Chemist

ATTACHMENT BB2

REFERENCE NO. 8

(17)

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

January 7, 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Camden City Water Department
City Hall
Room 419A
Camden NJ 08101

ATTENTION: Fredrick H. Martin, Jr.
Licensed Water Plant Operator

Dear Mr. Martin:

Summarized below are the results of our analysis of samples collected by this office on November 21, 1985, and analyzed for volatile organics by the State Department of Health laboratory. Our sampling was done in response to an A-280 sampling done by you on June 28, 1985.

CONTAMINANT	CONCENTRATION, PPB		
Location	Vesper & Park Blvd. (Parkside TP)	River Road (Puchack TP)	8900 Zimmermon Ave. (Morris-Delair TP)
1,2 Dichloroethane	6.5		2K
1,2 Dichloroethene	3.8	2.6	2K
Tetrachloroethene	7.5		2K
Trichloroethene	18.3	8.6	2K

Location	2430 Broadway (Stellar Tech)	8th & Van Hook St. (Camden Co Reg Health Ctr)	2977 Yorkship Sq. (Lenny Agency)	N.J. Avenue (AD Malandra Hall)
Bromoform	2.2			

1,2, Dichloroethane	2.2			
Trichloroethene	5.9	3.5	4.2	6.2

Although there are no current standards for these contaminants in water, legislation commonly referred to as A-280 will establish maximum permissible levels in the coming year. It is expected that levels for most of them will be considerably less than 100 ppb. In anticipation of more stringent standards to be adopted, we are currently reviewing these specific contaminants with concern and we are, therefore, using a stricter judgemental approach to determine the acceptability of the supply whenever they are present. Our approach is based on potential adverse health effects which may result from lifetime exposure to water containing such contamination. The higher the levels the greater the health risk to susceptible individuals and the greater the need to seek water of better quality. The goal over the long term is to reduce exposure to the lowest levels that are achievable so as to minimize the overall risk.

Therefore, you are warned that the levels of contaminants as shown through the DEP sampling of the Parkside Treatment Plant <u>are not acceptable</u> in drinking water and it is our position that the source(s) of supply contributing to this contamination should not be used for public potable purposes if more <u>acceptable</u> water is available. Treatment, development of alternative prime source(s), use of existing and/or construction of new interconnections with other supplies is required to minimize long term continued consumer exposure. Such alternatives must be provided as soon as possible and no later than <u>within one year</u> of the date of this letter. This action should be taken for the well(s) found to be the source of the pollution.

It is required that you acknowledge your intentions concerning these wells and provide written confirmation of these intentions within one month of the date of this letter.

Since flow conditions and water quality may vary with time, and since laboratory error is possible, it is required that you conduct <u>monthly</u> monitoring of the Parkside Treatment Plant when this plant is used. This monthly monitoring report is to be forwarded with a letter of transmittal to the Bureau of Safe Drinking Water. All analysis must be done in laboratories certified for A-280 volatile organics. If this source is not used, this should be stated in the monthly letter.

You are also warned that the levels of contaminants as shown through the DEP sampling of the Puchack Treatment Plant are not <u>desirable</u> in drinking water and it is our position that the source(s) of supply contributing to this contamination should normally not be used for public potable purposes if more acceptable water is available. Eventual treatment, development of alternate prime source(s), use of existing and/or construction of new interconnections

with other supplies of better quality should be considered to minimize long term continued consumer exposure.

Since flow conditions and water quality may vary with time, and since laboratory error is possible, it is required that you conduct monthly monitoring of the Puchack Treatment Plant whenever that source is used. At least three such monitoring reports must be submitted. This monthly monitoring report is to be forwarded with a letter of transmittal to the Bureau of Safe Drinking Water. All analysis must be done in laboratories certified for A-280 volatile organics. If this source is not used, this should be stated in the monthly letter.

If you have any questions in this matter, please contact me at (609)292-5550. By copy of this letter, other offices are being alerted to this problem.

Very truly yours,

Steven Nieswand

Steven Nieswand, Chief
Bureau of Safe Drinking Water

Attachment
cc: Mayor and Council, City of Camden
Camden Co. Health Department w/att.
William Whipple, Asst. Dir., Water Supply & Watershed Mgt.
John Preczewski, Bureau of Water Supply
George McCann, Asst. Dir., Enforcement
Haig Kasabach, NJ Geological Survey
Eric Evenson, Superfund Coordinator
Dr. Marwan Sadat, Division of Waste Management
Dr. Thomas Burke, Office of Science and Research w/att.
Dr. Kenneth Rosenman, NJ Dept. of Health w/att.
Ernest Hardin, Water Allocation
Paul Schorr, Special Water Treatment
Dr. Dhun Patel, DWR, Risk Assessment w/att.

ATTACHMENT AA34

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

December 31, 1985

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Camden City Water Department
City Hall, Room 419A
Camden, New Jersey 08101

ATTENTION: Fredrick H. Martin, Jr.
Licensed Water Plant Operator

Dear Mr. Martin:

Summarized below are the results of our analysis of samples collected by this office on November 21, 1985 and analyzed for volatile organics by the State Department of Health Laboratory. Our sampling was done in response to an A-280 sampling done by you on June 28, 1985.

CONTAMINANT	CONCENTRATION, PPB		
Location:	Vesper & Park Blvd. (Parkside T. P.)	River Road (Puchack T. P.)	8900 Zimmerman Ave. (Morris-Delair T. P.)
1,2 Dichloroethane	6.5		2K
1,2 Dichloroethene	3.8	2.6	2K
Tetrachloroethene	7.5		2K
Trichloroethene	18.3	8.6	2K

Location:	2430 Broadway (Stellar Tech.)	8th & Van Hook St. (Camden Co. Regional Health Ctr.)	2977 Yorkship Sq. (Lenny Agency)	New Jersey Ave. (A.D. Malandra Hall)
Bromoform	2.2			
1,2 Dichloroethane	2.2			
Trichloroethene	5.9	3.5	4.2	6.2

Although there are no current standards for these contaminants in water, legislation commonly referred to as A-280 will establish maximum permissible levels in the coming year. It is [illegible] for most of them will be considerably less [illegible] standards to be adopted. We are [illegible]

ATTACHMENT

whenever they are present. Our approach is based on potential adverse health effects which may result from lifetime exposure to water containing such contamination. The higher the levels the greater the health risk to susceptible individuals and the greater the need to seek water of better quality. The goal over the long term is to reduce exposure to the lowest levels that are achievable so as to minimize the overall risk.

Therefore, you are warned that the levels of contaminants as shown through the DEP Sampling of the Parkside Treatment Plant are not acceptable in drinking water and it is our position that the source(s) of supply contributing to this contamination should not be used for public potable purposes if more acceptable water is available. Treatment, development of alternative prime source(s), use of existing and/or construction of new interconnections with other supplies is required to minimize long term continued consumer exposure. Such alternatives must be provided as soon as possible and no later than within one year of the date of this letter. This action should be taken for the well(s) found to be the source of the pollution.

It is required that you acknowledge your intentions concerning these wells and provide written confirmation of these intentions within 1 month of the date of this letter.

Since flow conditions and water quality may vary with time, and since laboratory error is possible, it is required that you conduct monthly monitoring of the Parkside Treatment Plant. This monthly monitoring report is to be forwarded with a letter of transmittal to the Bureau of Potable Water. All analysis must be done in laboratories certified for A-280 volatile organics. If this source is not used, this should be stated in the monthly letter.

You are also warned that the levels of contaminants as shown are not desirable in drinking water and it is our position that the source(s) of supply contributing to this contamination should normally not be used for public potable purposes if more acceptable water is available. Eventual treatment, development of alternate prime source(s), use of existing and/or construction of new interconnections with other supplies of better quality should be considered to minimize long term continued consumer exposure.

Since flow conditions and water quality may vary with time, and since laboratory error is possible, it is required that you conduct monthly monitoring of the Parkside Treatment Plant whenever that source is used. At least three such monitoring reports must be submitted. This monthly monitoring report is to be forwarded with a letter of transmittal to the Bureau of Safe Drinking Water. All analysis must be done in laboratories certified for A-280 volatile organics. If this source is not used, this should be stated in the monthly letter.

ATTACHMENT

If you have any questions in this matter, please contact me at (609) 292-5550. By copy of this letter, other offices are being alerted to this problem.

Very truly ~~yours,~~

Steven Nieswand, Chief
Bureau of Safe Drinking Water

RB/lec
cc: Camden County Governing Body
Camden County Health Department
William Whipple, Water Supply & Watershed Management
John Preczewski, Bureau of Water Supply
George McCann, Enforcement
Haig Kasabach, NJ Geological Survey
Eric Evenson, Superfund Coordinator
Dr. Marwan Sadat, Division of Waste Management
Dr. Thomas Burke, Office of Science & Research
Dr. Kenneth Rosenman, NJ Department of Health
Ernest Hardin, Water Allocation
Paul Schorr, Special Water Treatment
Dr. Dhun Patel, DWR Risk Assessment

ATTACHMENT

DWR-018 (PW 2)
4/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES – BUREAU OF POTABLE WATER

2

WATER ANALYSES REPORT

DM

Supply: CAMDEN CITY WATER DEPT — County: CAMDEN
Municipality: Camden — Date Collected: 11-21-85
Collected by: John Berchtold — Memo #: 85-362 — Project # W-

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
40507	Vesper & Park Blvds Parkside Treatment Pt. treated fog	11:45	59°F	0.2	0.5	X	X
40508	River Rd Puchack Treatment Plant treated fog	12:10	59°F	0.2	0.5	X	X
40509	8900 Zimmerman Ave Morris-Delair Treatment Plant treated fog	12:30	59°F	1.75	1.75	X	X

PHYSICAL - CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER				SAMPLE NUMBER	40507	40508	40509
Nitrate (as N) (10)				Arsenic (0.05)			
Color (10)				Barium (1.0)			
Odor (III)				Cadmium (0.010)			
Turbidity (5)				Chromium (0.05)			
Total Dis. Solids (500)				Fluoride (2.0)			
pH				Lead (0.05)			
Alkalinity (as $CaCO_3$)				Mercury (0.002)			
Chloride (250)				Selenium (0.01)			
ABS/LAS (0.5)				Silver (0.05)			
Hardness(as$CaCO_3$)(250)				Iron (0.3)			
Sulfate (250)				Manganese (0.05)			
Cyanide				Sodium (50)			
Pesticide I, II, III				Copper (1.0)			
Endrin (0.0002)				Zinc (5.0)			
Lindane (0.004)				VO Scan (ppb)	/	/	/ 2K
Methoxychlor (0.1)		1,2 dichloroethane			6.5 II		
Toxaphene (0.005)		1,2 dichloroethene			3.8 I	2.6 I	
2,4-D (0.1)		Teteachloroethene			7.5 II		
(0.01)		Trichloroethene			18.3	8.6	

RECEIVED
DEC 23 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

REPORT SUBMITTED
DEC 16 1985
NJDOH Environmental Chemistry Laboratory

Remarks: 210/2MP blank #16030 accompanied by Lew Schneider of WD
A280 Periodic 1/85 PRIORITY

DOCUMENT

DIVISION OF WATER RESOURCES

WATER ANALYSES REPORT

DM

Supply: CAMDEN CITY WATER DEPT.

County: CAMDEN

Municipality: Camden

Date Collected: 11-21-85

Collected by: John Bendtsen

Memo #: 85-362

Project # W-:

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
40503	2430 Broadway Stella Technology Kitchen sink	10:35	61°F	0	0.1	X	X
40504	8th & Van Hook St Camden Regional Health Ct. lab sink	10:50	61°F	0.1	0.2	X	X
40505	2977 Yorkship Sq. Lenny Agency bathroom sink	11:10	61°F	0	trace	X	X
40506	New Jersey Ave A.D. Malandra Hall kitchen sink	11:25	63°F	0	trace	X	X

PHYSICAL - CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER	40503			SAMPLE NUMBER	40504	40505	40506
Nitrate (as N) (10)				Arsenic (0.05)			
Color (10)				Barium (1.0)			
[illegible] (III)				Cadmium (0.010)			
Turbidity (5)				Chromium (0.05)			
Total Dis. Solids (500)				Fluoride (2.0)			
pH				Lead (0.05)			
Alkalinity (as $CaCO_3$)				Mercury (0.002)			
Chloride (250)				Selenium (0.01)			
ABS/LAS (0.5)				Silver (0.05)			
Hardness(as $CaCO_3$)(250)				Iron (0.3)			
Sulfate (250)				Manganese (0.05)			
Cyanide				Sodium (50)			
Pesticide I, II, III				Copper (1.0)			
Endrin (0.0002)				Zinc (5.0)			
Lindane (0.004)				VO Scan (ppb)	✓	✓	✓
Methoxychlor (0.1)	2.2		Bromoform				
Toxaphene (0.005)	2.2		1,2dichloroethane				
2,4-D (0.1)	5.9		Trichloroethene		3.5	4.2	6.2
Silvex (0.01)							
VO Scan ppb ✓							

RECEIVED
DEC 23 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

REPORT SUBMITTED
DEC 16 1985
N.J. Environmental Chemistry Laboratory

Remarks: 210/2MP blank# 16030 accompanied by Lew Schneider of W.D
A 282 Periodic 1/85 PRIORITY

COPIES: White - Bureau of Potable Water; Blue - Water Purveyor; Green - Health Authority; Canary - Chemistry Lab; Pink - Bacteriological Lab; Gold - Extra

ATTACHMENT 2
PAGE 1 OF 2

DWR-01P (PW 2)

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES – BUREAU OF POTABLE WATER

12

WATER ANALYSES REPORT

Supply: Camden City Water Dept — County: Camden

Municipality: Camden — Date Collected: 4-11-85

Collected by: John Berchtold — Memo #: 85 99 — Project # W-

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
35641	8th & Van Hook St, Camden Co. Dept Health Regional Health Center, men's room sink	10:05	–	–	–	–	–
35642	Park & Vesper Blvd, Parkside Water Treatment Plant, treated tap	10:35	–	0.1	0.8	–	–

PHYSICAL – CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER				SAMPLE NUMBER		35641	35642
Nitrate (as N) (10)				Arsenic (0.05)			
Color (10)				Barium (1.0)			
Odor (III)				Cadmium (0.010)			
Turbidity (5)				Chromium (0.05)			
Total Dis. Solids (500)				Fluoride (2.0)			
pH				Lead (0.05)			
Alkalinity (as $CaCO_3$)				Mercury (0.002)			
Chloride (250)				Selenium (0.01)			
ABS/LAS (0.5)				Silver (0.05)			
Hardness (as $CaCO_3$) (250)				Iron (0.03)			
Sulfate (250)				Manganese (0.05)			
Cyanide				Sodium (50)			
Pesticide I, II, III				Copper (1.0)			
Endrin (0.0002)				Zinc (5.0)			
Lindane (0.004)				VO Scan (ppb)		2K	2K
Methoxychlor (0.1)						1	1
Toxaphene (0.005)							
2,4-D (0.1)							
Silvex (0.01)							

RECEIVED
JUN 24 1985
N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

number of unidentified peaks

REPORT SUBMITTED
JUN 13 1985

Remarks: 210/2MP — Blank # 16398

NJDOH Environmental Chemistry Laboratory

ATTACHMENT

(PW 2)

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES – BUREAU OF POTABLE WATER

2

WATER ANALYSES REPORT

DM

Supply: CAMDEN CITY WATER DEPT.
County: CAMDEN
Municipality: Camden
Date Collected: 11-21-85
Collected by: John Berdtold
Memo #: 85-362
Project # W-

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
40503	2430 Broadway Stellar Technology Kitchen sink	10:35	61°F	0	0.1		
40504	8th & Van Hook St Camden Co Regional Health Ct. lab sink	10:50	67°F	0.1	0.2		
40505	2977 Yorkship Sq. Lenny Agency bathroom sink	11:10	61°F	0	trace		
40506	New Jersey Ave A.D. Malandra Hall Kitchen sink	11:25	63°F	0	trace		

PHYSICAL - CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER	40503			SAMPLE NUMBER	40504	40505	40506
Nitrate (as N) (10)				Arsenic (0.05)			
[illegible] (10)				Barium (1.0)			
Odor (III)				Cadmium (0.010)			
Turbidity (5)				Chromium (0.05)			
Total Dis. Solids (500)				Fluoride (2.0)			
pH				Lead (0.05)			
Alkalinity (as $CaCO_3$)				Mercury (0.002)			
Chloride (250)				Selenium (0.01)			
ABS/LAS (0.5)				Silver (0.05)			
Hardness(as $CaCO_3$)(250)				Iron (0.3)			
Sulfate (250)				Manganese (0.05)			
Cyanide				Sodium (50)			
Pesticide I, II, III				Copper (1.0)			
Endrin (0.0002)				Zinc (5.0)			
Lindane (0.004)				VO Scan (ppb)			
Methoxychlor (0.1)	2.2		Bromoform				
Toxaphene (0.005)	2.2 II		1,2dichloroethane				
2,4-D (0.1)	5.9 I		Trichloroethene		3.5	4.2	6.2
[illegible] (0.01)							

REPORT SUBMITTED
DEC 16 1985
NJDOH Environmental Chemistry Laboratory

RECEIVED
DEC 23 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

ATTACHMENT

Remarks: 210/2MP blank# 16030 accompanied by Lew Schneider of W.D
A280 Periodic 1/85 PRIORITY

COPIES: White - Bureau of Potable Water Green - Health Authority Pink - Bacteriological Lab

-018 (PW 2)

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES – BUREAU OF POTABLE WATER

WATER ANALYSES REPORT

DM

Supply: CAMDEN CITY WATER DEPT
County: CAMDEN
Municipality: Camden
Date Collected: 11-21-85
Collected by: John Berchtold
Memo #: 85-362
Project # W-:

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
40507	Vesper & Park Blvds Parkside Treatment Pt. treated tap	11:45	59°F	0.2	0.5	X	X
40508	River Rd Puchack Treatment Plant treated tap	12:10	59°F	0.2	0.5	X	X
40509	8900 Zimmerman Ave Morris-Delair Treatment Plant treated tap	12:30	59°F	1.75	1.75	X	X

PHYSICAL-CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER					SAMPLE NUMBER	40507	40508	40509
Nitrate (as N)	(10)				Arsenic	(0.05)		
Color	(10)				Barium	(1.0)		
Odor	(III)				Cadmium	(0.010)		
Turbidity	(5)				Chromium	(0.05)		
Total Dis. Solids	(500)				Fluoride	(2.0)		
pH					Lead	(0.05)		
Alkalinity (as $CaCO_3$)					Mercury	(0.002)		
Chloride	(250)				Selenium	(0.01)		
ABS/LAS	(0.5)				Silver	(0.05)		
Hardness(as $CaCO_3$)	(250)				Iron	(0.3)		
Sulfate	(250)				Manganese	(0.05)		
Cyanide					Sodium	(50)		
Pesticide I, II, III					Copper	(1.0)		
Endrin	(0.0002)				Zinc	(5.0)		
Lindane	(0.004)				VO Scan (ppb)	✓	✓	✓ 2K
Methoxychlor	(0.1)		1,2 dichloroethane			6.5 II		
Toxaphene	(0.005)		1,2 dichloroethene			3.8 I	2.6 I	
2,4-D	(0.1)		Teteachloroethene			7.5 II		
Silvex	(0.01)		Trichloroethene			18.3	8.6	

RECEIVED
DEC 23 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

REPORT SUBMITTED
DEC 16 1985
NJDOH Environmental Chemistry Laboratory

ATTACHMENT

Remarks: 210/2MP blank #16030 accompanied by Lew Schneider of WD
A280 Periodic 1/85 PRIORITY

DWR-16 (Rev 2)
6/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES – BUREAU OF POTABLE WATER

7

WATER ANALYSES REPORT

DM

Supply: CAMDEN CITY WATER DEPT.
County: CAMDEN
Municipality: Camden
Date Collected: 11-21-85
Collected by: John Berdetti
Memo #: 85-362
Project # W-

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
40503	2430 Broadway Stellar Technology Kitchen sin	10:35	61°F	0	0.1		
40504	8th & Van Hook St Camden Co Regional Health Ct. lab sink	10:50	67°F	0.1	0.2		
40505	2977 Yorkship Sq. Lenny Agency bathroom sink	11:10	61°F	0	trace		
40506	New Jersey Ave A.D. Malandra Hall Kitchen sink	11:25	63°F	0	trace		

PHYSICAL - CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER	40503			SAMPLE NUMBER	40504	40505	40506
Nitrate (as N) (10)				Arsenic (0.05)			
Color (10)				Barium (1.0)			
Odor (III)				Cadmium (0.010)			
Turbidity (5)				Chromium (0.05)			
Total Dis. Solids (500)				Fluoride (2.0)			
pH				Lead (0.05)			
Alkalinity (as $CaCO_3$)				Mercury (0.002)			
Chloride (250)				Selenium (0.01)			
ABS/LAS (0.5)				Silver (0.05)			
Hardness (as $CaCO_3$) (250)				Iron (0.3)			
Sulfate (250)				Manganese (0.05)			
Cyanide				Sodium (50)			
Pesticide I, II, III				Copper (1.0)			
Endrin (0.0002)				Zinc (5.0)			
Lindane (0.004)				VO Scan (ppb)			
Methoxychlor (0.1)	2.2		Bromoform				
Toxaphene (0.005)	2.2		1,2dichloroethane				
2,4-D (0.1)	5.9		Trichloroethene		3.5	4.2	6.2
Silvex (0.01)							
VO Scan ppb							

REPORT SUBMITTED
DEC 16 1985
NJDEP Environmental Chemistry Laboratory

RECEIVED
DEC 23 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

Remarks: 210/2MP blank# 16030 accompanied by Lew Schneider of W.D
A280 Periodic 1/85 PRIORITY AA

ATTACHMENT

(17)

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

January 7, 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Camden City Water Department
City Hall
Room 419A
Camden NJ 08101

ATTENTION: Fredrick H. Martin, Jr.
Licensed Water Plant Operator

Dear Mr. Martin:

Summarized below are the results of our analysis of samples collected by this office on November 21, 1985, and analyzed for volatile organics by the State Department of Health laboratory. Our sampling was done in response to an A-280 sampling done by you on June 28, 1985.

CONTAMINANT	CONCENTRATION, PPB		
Location	Vesper & Park Blvd. (Parkside TP)	River Road (Puchack TP)	8900 Zimmermon Ave. (Morris-Delair TP)
1,2 Dichloroethane	6.5		2K
1,2 Dichloroethene	3.8	2.6	2K
Tetrachloroethene	7.5		2K
Trichloroethene	18.3	8.6	2K

Location	2430 Broadway (Stellar Tech)	8th & Van Hook St. (Camden Co Reg Health Ctr)	2977 Yorkship Sq. (Lenny Agency)	N.J. Avenue (AD Malandra Hall)
Bromoform	2.2			

ATTACHMENT

1,2, Dichloroethane	2.2			6.2
Trichloroethene	5.9	3.5	4.2	

Although there are no current standards for these contaminants in water, legislation commonly referred to as A-280 will establish maximum permissible levels in the coming year. It is expected that levels for most of them will be considerably less than 100 ppb. In anticipation of more stringent standards to be adopted, we are currently reviewing these specific contaminants with concern and we are, therefore, using a stricter judgemental approach to determine the acceptability of the supply whenever they are present. Our approach is based on potential adverse health effects which may result from lifetime exposure to water containing such contamination. The higher the levels the greater the health risk to susceptible individuals and the greater the need to seek water of better quality. The goal over the long term is to reduce exposure to the lowest levels that are achievable so as to minimize the overall risk.

Therefore, you are warned that the levels of contaminants as shown through the DEP sampling of the Parkside Treatment Plant <u>are not acceptable</u> in drinking water and it is our position that the source(s) of supply contributing to this contamination should not be used for public potable purposes if more <u>acceptable</u> water is available. Treatment, development of alternative prime source(s), use of existing and/or construction of new interconnections with other supplies is required to minimize long term continued consumer exposure. Such alternatives must be provided as soon as possible and no later than <u>within one year</u> of the date of this letter. This action should be taken for the well(s) found to be the source of the pollution.

It is required that you acknowledge your intentions concerning these wells and provide written confirmation of these intentions within one month of the date of this letter.

Since flow conditions and water quality may vary with time, and since laboratory error is possible, it is required that you conduct <u>monthly</u> monitoring of the Parkside Treatment Plant when this plant is used. This monthly monitoring report is to be forwarded with a letter of transmittal to the Bureau of Safe Drinking Water. All analysis must be done in laboratories certified for A-280 volatile organics. If this source is not used, this should be stated in the monthly letter.

You are also warned that the levels of contaminants as shown through the DEP sampling of the Puchack Treatment Plant are not <u>desirable</u> in drinking water and it is our position that the source(s) of supply contributing to this contamination should normally not be used for public potable purposes if more acceptable water is available. Eventual treatment, development of alternate prime source(s), use of existing and/or construction of new interconnections

ATTACHMENT

with other supplies of better quality should be considered to minimize long term continued consumer exposure.

Since flow conditions and water quality may vary with time, and since laboratory error is possible, it is required that you conduct monthly monitoring of the Puchack Treatment Plant whenever that source is used. At least three such monitoring reports must be submitted. This monthly monitoring report is to be forwarded with a letter of transmittal to the Bureau of Safe Drinking Water. All analysis must be done in laboratories certified for A-280 volatile organics. If this source is not used, this should be stated in the monthly letter.

If you have any questions in this matter, please contact me at (609)292-5550. By copy of this letter, other offices are being alerted to this problem.

Very truly yours,

Steven Nieswand

Steven Nieswand, Chief
Bureau of Safe Drinking Water

Attachment
cc: Mayor and Council, City of Camden
Camden Co. Health Department w/att.
William Whipple, Asst. Dir., Water Supply & Watershed Mgt.
John Preczewski, Bureau of Water Supply
George McCann, Asst. Dir., Enforcement
Haig Kasabach, NJ Geological Survey
Eric Evenson, Superfund Coordinator
Dr. Marwan Sadat, Division of Waste Management
Dr. Thomas Burke, Office of Science and Research w/att.
Dr. Kenneth Rosenman, NJ Dept. of Health w/att.
Ernest Hardin, Water Allocation
Paul Schorr, Special Water Treatment
Dr. Dhun Patel, DWR, Risk Assessment w/att.

ATTACHMENT 1

REFERENCE NO. 9

[redacted] Files

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

MAY 27 1986

Camden City Water Department
City Hall
Room 419A
Camden, New Jersey 08101

ATTENTION: Fredrick H. Martin, Jr.
Licensed Water Plant Operator

Dear Mr. Martin:

Summarized below are the results of our analysis of samples collected by this office on March 6, 1986, and analyzed for volatile organics by the State Department of Health laboratory. Our sampling was done in response to an A-280 sampling done by you on December 31, 1985.

CONTAMINANT	CONCENTRATION, PPB/LEVEL	
	River Road (PUCHACK T.P.)	Vesper & Park Blvd. (PARKSIDE T.P.)
Benzene	-	2.1(II)
1,1-Dichloroethane	-	3.0
1,2-Dichloroethane	-	8.9(III)
1,1-Dichloroethylene	-	2.0(I)
trans-1,2-Dichloroethylene	3.37(I)	4.5(I)
Tetrachloroethylene	-	5.2(II)
Trichloroethylene	4.54(II)	22 (II)

Reference is also made to our letter of January 7, 1986, concerning the status of the "Puchack Run" and the "Parkside" water treatment plants. This latest sampling confirms that the "Puchack Run" water treatment plant and the "Parkside" water treatment plant continue to deliver water of undesirable (Level II) and unacceptable (Level III) quality respectively.

ATTACHMENT ____

If you have any questions on this matter, please do not hesitate to contact us at (609)292-5550.

Very truly yours,

Nasir Butt
Principal Environmental Engineer
Bureau of Safe Drinking Water

cc: Camden County Health Dept. w/attachment

ATTACHMENT ____

DWR-018 (PW 2)
4/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES – BUREAU OF POTABLE WATER

TPE 197
198
199
200

WATER ANALYSES REPORT

DM

Supply: CAMDEN WATER DEPT

County: CAMDEN

Municipality: Camden

Date Collected: 3-6-86

Collected by: JL Benditti

Memo #: 86-54

Project # W-

BACTERIOLOGICAL: Coliform organisms are reported in colonies per 100 ml. Chlorine residuals are reported in ppm

SAMPLE NUMBER	POINT OF COLLECTION	TIME	WATER TEMP.	Chlorine Residual FREE	Chlorine Residual TOTAL	Coliform Organisms FECAL	Coliform Organisms TOTAL
41591	Morris & Delair Water T.P. Griffith & Morgan Lane treated tap	9:45	58°F	0.1	2.5	X	X
41592	Pischack Run Water T.P. River Road & Delair Ave. treated tap	10:00	58°F	0.5	0.5		
41593	Parkside Water T.P. Vesper & Park Blvd. treated tap	10:25	58°F	0.8	1.0		
41594	2430 Broadway Stelkir Technology kitchen sink	10:50	55°F	0.1	0.2		

PHYSICAL - CHEMICAL: Determinations are in ppm except color, odor, turbidity, pH, VO, and Pesticide. (N.J. Standards)

SAMPLE NUMBER	41591			
Nitrate (as N) (10)				
Color (10)				
Odor (III)				
Turbidity (5)				
Total Dis. Solids (500)				
pH				
Alkalinity (as $CaCO_3$)				
Chloride (250)				
ABS/LAS (0.5)				
Hardness as $CaCO_3$ (250)				
Sulfate (250)				
Cyanide				
Pesticide I, II, III				
Endrin (0.0002)				
Lindane (0.004)				
Methoxychlor (0.1)				
Toxaphene (0.005)				
VO	See attached			

SAMPLE NUMBER	41592	41593	41594
Arsenic (0.05)			
Barium (1.0)			
Cadmium (0.010)			
Chromium (0.05)			
Fluoride (2.0)			
Lead (0.05)			
Mercury (0.002)			
Selenium (0.01)			
Silver (0.05)			
Iron (0.3)			
Manganese (0.05)			
Sodium (50)			
Copper (1.0)			
Zinc (5.0)	See attached		
VO Screening			

RECEIVED
APR 29 1986
N.J. State Dept. of Environmental Protection
Bureau of Potable Water

DATA SUBMITTED
ACC 22 1986
NJDOH Environmental Health Laboratory

210/2MP blank # 16085

A 280 for retest

New Jersey Department of Health
Division of Public Health and Environmental Laboratories

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANIC (GC/MS)

SAMPLE NUMBER	ANALYTICAL METHOD	DATE AND TIME OF SAMPLE EXTRACTION
#41591	#624	DATE: TIME:

GC/MS IDENTIFICATION NUMBER	DATE AND TIME OF ANALYSIS
M00101	DATE: 3/12/86 TIME: 20:57

SAMPLE RESULTS

TARGET COMPOUND	ION	SCAN No.	AREA	$\overline{RF}$	CONC. IN PPB	MDL
Benzene					—	2 PPB
Bromodichloromethane					—	
Bromoform					—	
Bromomethane					—	
Carbon tetrachloride					—	
Chlorobenzene					—	
Chloroethane					—	
2-Chloroethylvinyl ether					—	
Chloroform					—	
Chloromethane					—	
Dibromochloromethane					—	
1,2-Dichlorobenzene					—	
1,3-Dichlorobenzene					—	
1,4-Dichlorobenzene					—	
1,1-Dichloroethane					—	
1,2-Dichloroethane					—	
1,1-Dichloroethene					—	
trans-1,2-Dichloroethene					—	
1,2-Dichloropropane					—	
cis-1,3-Dichloropropene					—	
trans-1,3-Dichloropropene					—	
Ethylbenzene					—	
[illegible]					—	

REPORT SUBMITTED

ADD 42 [illegible]

NJDOH ENVIRONMENTAL [illegible]

ATTACHMENT

New Jersey Department of Health
Division of Public Health and Environmental Laboratories

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANIC (GC/MS)

SAMPLE NUMBER	ANALYTICAL METHOD	DATE AND TIME OF SAMPLE EXTRACTION
#41592	#624	DATE: TIME:

GC/MS IDENTIFICATION NUMBER	DATE AND TIME OF ANALYSIS
M00101	DATE: 3/12/86 TIME: 21:47

SAMPLE RESULTS

TARGET COMPOUND	ION	SCAN No.	AREA	$\overline{RF}$	CONC. IN PPB	MDL
Benzene					—	2 PPB
Bromodichloromethane					—	
Bromoform					—	
Bromomethane					—	
Carbon tetrachloride					—	
Chlorobenzene					—	
Chloroethane					—	
2-Chloroethylvinyl ether					—	
Chloroform					—	
Chloromethane					—	
Dibromochloromethane					—	
1,2-Dichlorobenzene					—	
1,3-Dichlorobenzene					—	
1,4-Dichlorobenzene					—	
1,1-Dichloroethane					—	
1,2-Dichloroethane					—	
1,1-Dichloroethene					—	
trans-1,2-Dichloroethene					2.37 (I)	
1,2-Dichloropropane					—	
cis-1,3-Dichloropropene					—	
trans-1,3-Dichloropropene						
Ethylbenzene						
Methylene Chloride						
Toluene						

APR 22 1986
NJDOH ENVIRONMENTAL CHEMISTRY

ATTACHMENT ____

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANICS(GC/MS)

SAMPLE NUMBER
41592

SAMPLE RESULTS

TARGET COMPOUND	Ion	SCAN No.	AREA	RF	CONC IN PPB	MDL
1,1,2,2-Tetrachloroethane					—	2 PPB
Tetrachloroethene					—	
Toluene					—	
1,1,1-Trichloroethane					—	
1,1,2-Trichloroethane					—	
Trichloroethene					4.54 (I)	
Trichlorofluoromethane					—	
Vinyl chloride					—	

SURROGATE RECOVERIES

SURROGATE COMPOUND	CONC. ADDED TO SAMPLE (ppb)	PERCENT RECOVERY	Q.C. LIMITS (RI 3σ) LOWER	UPPER
1,2-Dichloroethane d-4	30.0	93.0	70	130
Toluene d-8	31.0	109.6	70	130
4-Bromofluorobenzene	29.4	104.9	70	130

[illegible]

ATTACHMENT

New Jersey Department of Health
Division of Public Health and Environmental Laboratories

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANIC (GC/MS)

SAMPLE NUMBER	ANALYTICAL METHOD	DATE AND TIME OF SAMPLE EXTRACTION
#41593	#624	DATE: ~~TIME:~~

GC/MS IDENTIFICATION NUMBER	DATE AND TIME OF ANALYSIS
M00101	DATE: 3/13/86 TIME: 18:02

SAMPLE RESULTS

TARGET COMPOUND	ION	SCAN No.	AREA	RF	CONC. IN PPB	MDL
Benzene					2.1 (III)	2 ppb
Bromodichloromethane					—	
Bromoform					—	
Bromomethane					—	
Carbon tetrachloride					—	
Chlorobenzene					—	
Chloroethane					—	
2-Chloroethylvinyl ether					—	
Chloroform					—	
Chloromethane					—	
Dibromochloromethane					—	
1,2-Dichlorobenzene					—	
1,3-Dichlorobenzene					—	
1,4-Dichlorobenzene					—	
1,1-Dichloroethane					3.0	
1,2-Dichloroethane					8.9 (III)	
1,1-Dichloroethene					2.0 (I)	
trans-1,2-Dichloroethene					4.5 (I)	
1,2-Dichloropropane					—	
cis-1,3-Dichloropropene					—	
trans-1,3-Dichloropropene					—	
Ethylbenzene					—	
Methylene chloride						
Tetrachloroethene						

RECEIVED
APR 22 1986
NJDOH ENVIRONMENTAL

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANICS(GC/MS)

SAMPLE NUMBER
#41593

SAMPLE RESULTS

TARGET COMPOUND	Ion	SCAN No.	AREA	RF	CONC. IN PPB	MDL
1,1,2,2-Tetrachloroethane					—	2ppb
Tetrachloroethene					5.2 (II)	
Toluene					—	
1,1,1-Trichloroethane					—	
1,1,2-Trichloroethane					—	
Trichloroethene					22 (II)	
Trichlorofluoromethane					—	
Vinyl chloride					—	

SURROGATE RECOVERIES

SURROGATE COMPOUND	CONC. ADDED TO SAMPLE (ppb)	PERCENT RECOVERY	Q.C. LIMITS (RIBs) LOWER	UPPER
1,2 Dichloroethane d-4	30.2	94.7	70	130
Toluene d-8	31.2	106.1	70	130
4-Bromofluorobenzene	29.4	101.6	70	130

ANALYST - PRINT
M.A. KACSMAR
SUPERVISOR - PRINT
S.R. FUNK

SIGNATURE
M.A. Kacsmar
APR 22 1986
S R Funk

REPORT SUBMITTED
4-16-86
4-16-86

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANICS(GC/MS)

SAMPLE NUMBER
415.94

SAMPLE RESULTS

TARGET COMPOUND	Ion	SCAN No.	AREA	RF	CONC. IN PPB	MDL
1,1,2,2-Tetrachloroethane					—	2ppb
Tetrachloroethene					2.1 (II)	
Toluene					—	
1,1,1-Trichloroethane					—	
1,1,2-Trichloroethane					—	
Trichloroethene					7.4 (II)	
Trichlorofluoromethane					—	
Vinyl chloride					—	

SURROGATE RECOVERIES

SURROGATE COMPOUND	CONC. ADDED TO SAMPLE (ppb)	PERCENT RECOVERY	Q.C. LIMITS (R ± 3.) LOWER	UPPER
1,2 Dichloroethane d-4	30.2	95.8	70	13[illegible]
Toluene d-8	31.2	110.4	70	13[illegible]
4-Bromofluorobenzene	29.4	106.2	70	130

ANALYST - TEST
M.A. Nacsmate
SUPERVISOR
S.R. Funk
SUPERVISOR
DATE

MANAGER
M.A. Kaufman
DATE
S.R. Funk
CHIEF

REPORT SUBMITTED
4-16-86
APR 29 1986
4-16-86
PAGE

ATTACHMENT

New Jersey Department of Health
Division of Public Health and Environmental Laboratories

SAMPLE RESULTS AND SURROGATE RECOVERIES
VOLATILE ORGANIC (GC/MS)

SAMPLE NUMBER	ANALYTICAL METHOD	DATE AND TIME OF SAMPLE EXTRACTION
#41594	#624	DATE: — TIME:

GC/MS IDENTIFICATION NUMBER	DATE AND TIME OF ANALYSIS
M00101	DATE: 3/13/86 TIME: 18:53

SAMPLE RESULTS

TARGET COMPOUND	Ion	SCAN No	AREA	RF	CONC. IN PPB	MDL
Benzene					—	2ppb
Bromodichloromethane					—	
Bromoform					—	
Bromomethane					—	
Carbon tetrachloride					—	
Chlorobenzene					—	
Chloroethane					—	
2-Chloroethylvinyl ether					—	
Chloroform					—	
Chloromethane					—	
Dibromochloromethane					—	
1,2-Dichlorobenzene					—	
1,3-Dichlorobenzene					—	
1,4-Dichlorobenzene					—	
1,1-Dichloroethane					—	
1,2-Dichloroethane					3.9 (I)	
1,1-Dichloroethene					—	
trans-1,2-Dichloroethene					2.5 (I)	
1,2-Dichloropropane					—	
[illegible]-1,3-Dichloropropene						
trans-1,3-Dichloropropene						
[illegible]						
[illegible]						
[illegible]						

REPORT [illegible]

ADD [illegible]

[illegible]

ATTACHMENT

REFERENCE NO. 10

ENTERED

MAY 27 1986

NJ DEP Bureau of Potable Water

10

CITY OF CAMDEN
DEPARTMENT OF UTILITIES
City Hall - Room 419A
Sixth and Market Streets
Camden, New Jersey 08101
609-757-7680

FREDERICK HUGH MARTIN, JR.
DIRECTOR

MELVIN R. PRIMAS, JR.
MAYOR

May 5, 1986

Bureau of Safe Drinking Water
Division of Water Resources
NJDEP
CN 029
Trenton, NJ 08625

Gentlemen,

Here are the lab results for the March volatile organic scans for the Parkside and Puchack plants. These are submitted as per your letter of January 7.

Note that where a "K" appears in the "remarks" column, the substance listed was not detected.

This table summarizes the results of the March 26 sampling:

Concentration (PPB) of Listed Substances,
Sample of 3-26-86

	Parkside	Puchack	Level III
1,2 Dichloroethane -	8.0	ND	7<C<70
Tetrachloroethylene	12.0	1.0	6.6<C<66
Trichloroethylene	14.0	6.0	30<C<309
1,2-trans-Dichloroethylene	3.0	2.0	148<C<270

The original lab report is available at Rossnagel & Associates. If you have any questions concerning these results, contact them or me.

Sincerely,

Frank Al-Greene
Administrative Analyst

RECEIVED
MAY 09 1986
N.J. State Dept. of Health
BUREAU OF POTABLE WATER

506 Broad Street
Kannapolis, N. C. 28081
(704) 932-3193

ROSSNAGEL & ASSOCIATES
Engineering & Testing Consultants
234 RT. 70
MEDFORD, N. J. 08055
(609) 654-1441

R.C.R.A. - RESOURCE CONSERVATION & RECOVERY ACT

E.C.R.A. - ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT

AIR - WATER - ENERGY - INDUSTRIAL HYGIENE - NOISE - WASTE

- STACK & EXHAUST TESTING
- DESIGN OF AIR/WATER/NOISE POLLUTION CONTROL SYSTEMS
- BACTERIA / MOLD / FUNGUS / SPORES
- SPECIFICATIONS / DRAWINGS
- WATER / WASTEWATER / SLUDGE
- CHEMICAL ANALYSES
- GAS CHROMATOGRAPHY, I.R. & A.A.
- ENVIRONMENTAL IMPACT STUDIES

TEST REPORT # 24,093

April 30, 1986

Lab Report # 20,960

City of Camden
Department of Utilities
City Hall, Room 419A
Sixth & Market Streets
Camden, NJ 08101

Attention: Mr. Frank Al-Greene

The results are listed on the following pages of the analyses performed on the water samples from the Parkside and Puchack Plants obtained by ROSSNAGEL & ASSOCIATES on March 26, 1986.

If you have any questions, please do not hesitate to contact us.

John M. Rissel
Lab Manager
ROSSNAGEL & ASSOCIATES

JMR/mb
cc: WBR

Notes: 1) All procedures used may be found in "Standard Methods for the Examination of Water and Wastewater," 14th Edition.

2) The liability of ROSSNAGEL & ASSOCIATES and its divisions, with respect to the services charged for herein, shall in no event exceed the amount of the invoice.

RECEIVED
MAY 09 1986
State Dept. of Environmental Protection
DIV. OF POTABLE WATER

Form #RA-898

ATTACHMENT

WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

SE[illegible]E OR PRINT WITH BALLPOINT PEN

LITY NAME Parkside Plant - City of Camden N.J. SW ID NO.

NAME Rossnagel + Assoc.

NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
NJ		86 03 26	03117	

E SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 03 86 (MO. YR.) TO 03 86 (MO. YR.)

ND: K

SUBMIT WITH SIGNED T-VWX-014

Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
	X										Acrylonitrile	UG/L	34215	50	K
	X										Benzene	UG/L	34030	1	K
	X										Bromoform	UG/L	32104	1	K
	X										Carbon Tetrachloride	UG/L	32102	1	K
	X										Chlorobenzene	UG/L	34301	1	K
	X										Chlorodibromoethane	UG/L	34306	1	K
	X										Chloroform	UG/L	32106	1	K
	X										1, 1 - Dichloroethane	UG/L	34496	1	K
											1, 2 - Dichloroethane	UG/L	34531	8.0	
	X										1, 1 - Dichloroethylene	UG/L	34501	1	K
	X										1, 2 - Dichloropropane	UG/L	34541	1	K
	X										Ethylbenzene	UG/L	34371	1	K
	X										Methylene Chloride	UG/L	34423	1	K
	X										1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1	K
	X										Tetrachloroethylene	UG/L	34475	12	
	X										Toluene	UG/L	34012	1	K
	X										1, 1, 1 - Trichloroethane	UG/L	34506	1	K
	X										1, 1, 2 - Trichloroethane	UG/L	34511	1	K
	X										Trichloroethylene	UG/L	39180	14	
	X										Vinyl Chloride	UG/L	39175	2	K
	X										Acrolein	UG/L	34210	50	K
	X										Chloroethane	UG/L	34311	2	K
	X										2 - Chloroethylvinyl Ether	UG/L	34576	2	K
	X										Dichlorobromomethane	UG/L	32105	1	K
	X										1, 3 - Dichloropropylene	UG/L	34699	1	K
	X										Methyl Bromide	UG/L	34413	2	K
	X										Methyl Chloride	UG/L	34418	2	K
	X										1, 2 - trans - Dichloroethylene	UG/L	34546	3.0	
	X										1, 2 Dichlorobenzene	UG/L	34536	1	K
	X										1, 3 Dichlorobenzene	UG/L	34566	1	K
	X										1, 4 Dichlorobenzene	UG/L	34571	1	K
													29 42 55 68	33 34 46 47 59 60 72 73	40 41 53 54 66 67 79 80

VALUE CODING RULES AND
REMARK CODES ON REVERSE

ATTACHMENT

DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

EA[illegible]YPE OR PRINT WITH BALLPOINT PEN

CILITY NAME City of Camden Purchase Plant | SW ID NO.

B NAME Rossnagel & Assoc

T	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
1	NJ 2–8	9–16	86 03 26 (17–22)	03117 (23–27)	28

HE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 0386 (MO. YR.) TO 0386 (MO. YR.)

SUBMIT WITH SIGNED T-VWX-014

ND-K

SAMPLING MONTHS

Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
	X										Acrylonitrile	UG/L	34215	50	K
	X										Benzene	UG/L	34030	1	K
	X										Bromoform	UG/L	32104	1	K
	X										Carbon Tetrachloride	UG/L	32102	1	K
	X										Chlorobenzene	UG/L	34301	1	K
	X										Chlorodibromoethane	UG/L	34306	1	K
	X										Chloroform	UG/L	32106	1	K
	X										1, 1 - Dichloroethane	UG/L	34496	1	K
	[illegible]										1, 2 - Dichloroethane	UG/L	34531	1	K
	X										1, 1 - Dichloroethylene	UG/L	34501	1	K
	X										1, 2 - Dichloropropane	UG/L	34541	1	K
	X										Ethylbenzene	UG/L	34371	1	K
	X										Methylene Chloride	UG/L	34423	1	K
	X										1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1	K
	X										Tetrachloroethylene	UG/L	34475	1.0	
	X										Toluene	UG/L	34012	1	K
	X										1, 1, 1 - Trichloroethane	UG/L	34506	1	K
	X										1, 1, 2 - Trichloroethane	UG/L	34511	1	K
	X										Trichloroethylene	UG/L	39180	6.0	
	X										Vinyl Chloride	UG/L	39175	2	K
	X										Acrolein	UG/L	34210	50	K
	X										Chloroethane	UG/L	34311	2	K
	X										2 - Chloroethylvinyl Ether	UG/L	34576	2	K
	X										Dichlorobromomethane	UG/L	32105	1	K
	X										1, 3 - Dichloropropylene	UG/L	34699	1	K
	X										Methyl Bromide	UG/L	34413	2	K
	X										Methyl Chloride	UG/L	34418	2	K
	X										1, 2 - trans - Dichloroethylene	UG/L	34546	2.0	
	X										1, 2 Dichlorobenzene	UG/L	34536	1	K
	X										1, 3 Dichlorobenzene	UG/L	34566	1	K
	[illegible]										1, 4 Dichlorobenzene	UG/L	34571	1	K

VALUE CODING RULES AND
REMARK CODES ON REVERSE

29 33 34 40 41
42 46 47 53 54
55 59 60 66 67
68 72 73 79 80

ATTACHMENT ____

0408 C.01

CITY OF CAMDEN
DEPARTMENT OF UTILITIES
City Hall - Room 419A
Sixth and Market Streets
Camden, New Jersey 08101
609-757-7680

FREDERICK HUGH MARTIN, JR.
DIRECTOR

MELVIN R. PRIMAS, JR.
MAYOR

ENTERED
MAY 1986
NJ DEP Bureau of Potable Water

May 27, 1986

Bureau of Safe Drinking Water
Division of Water Resources
NJDEP
CN 029
Trenton, NJ 08625

Gentlemen,

Here are the lab results for the April volatile organic scans for the Parkside and Puchack plants. These are submitted as per your letter of January 7.

Note that where a "K" appears in the "remarks" column, the substance listed was not detected.

This table summarizes the results of the April 10 sampling:

Concentration (PPB) of Listed Substances,
Sample of April 10, 1986

	Parkside	Puchack	Level III
1,1 Dichloroethane	1.0	ND	unlisted
1,2 Dichloroethane	5.0	ND	7<C<70
Trichloroethylene	5.0	2.0	30<C<309

The original lab report is available at Rossnagel & Associates. If you have any questions concerning these results, contact them or me.

Sincerely,

Frank Al-Greene
Administrative Analyst

RECEIVED
MAY 30 1986
N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

ATTACHMENT

REFERENCE NO. 11

N. C. Associate Firm
Analytical Testing Consultants
506 Broad Street
Kannapolis, N. C. 28081
(704) 932-3193

ROSSNAGEL & ASSOCIATES INC

Engineering & Testing Consultants
234 RT. 70
MEDFORD, N. J. 08055
(609) 654-1441

(11)

R.C.R.A. - RESOURCE CONSERVATION & RECOVERY ACT

E.C.R.A. - ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT

AIR - WATER - ENERGY - INDUSTRIAL HYGIENE - NOISE - WASTE

- STACK & EXHAUST TESTING
- DESIGN OF AIR/WATER/NOISE POLLUTION CONTROL SYSTEMS
- BACTERIA / MOLD / FUNGUS / SPORES
- SPECIFICATIONS / DRAWINGS
- WATER / WASTEWATER / SLUDGE
- CHEMICAL ANALYSES
- GAS CHROMATOGRAPHY, I.R. & A.A.
- ENVIRONMENTAL IMPACT STUDIES

TEST REPORT # 24,353 May 23, 1986

Lab Report # 21,101

City of Camden
Department of Utilities
City Hall, Room 419A
Sixth & Market Streets
Camden, NJ 08101

Attention: Mr. Frank Al-Greene

The results are listed on the following pages of the analyses performed on the water samples from the Parkside and Puchack Plants obtained by ROSSNAGEL & ASSOCIATES on Apr. 10, 1986.

If you have any questions, please do not hesitate to contact us.

John M. Rissel
Lab Manager
ROSSNAGEL & ASSOCIATES

JMR/klw
cc: WBR

Notes: 1) All procedures used may be found in "Standard Methods for the Examination of Water and Wastewater," 14th Edition.

2) The liability of ROSSNAGEL & ASSOCIATES and its divisions, with respect to the services charged for herein, shall in no event exceed the amount of the invoice.

RECEIVED
MAY 30 1986
N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

Form #RA-898

ATTACHMENT D

WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME CITY OF CAMDEN – PARKSIDE PLANT SW ID NO.

LAB NAME ROSSNAGEL + ASSOC

T	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
1	NJ 2–8	9–16	86 04 10 (17–22)	03117 (23–27)	28

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 0486 (MO. YR.) TO 0486 (MO. YR.)

SUBMIT WITH SIGNED T-VWX-014

SAMPLING MONTHS

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
			X									Acrylonitrile	UG/L	34215	50	K
			X									Benzene	UG/L	34030	1.0	K
			X									Bromoform	UG/L	32104	1.0	K
			X									Carbon Tetrachloride	UG/L	32102	1.0	K
			X									Chlorobenzene	UG/L	34301	1.0	K
			X									Chlorodibromoethane	UG/L	34306	1.0	K
			X									Chloroform	UG/L	32106	1.0	K
			X									1, 1 - Dichloroethane	UG/L	34496	1.0	
			X									1, 2 - Dichloroethane	UG/L	34531	5.0	
			X									1, 1 - Dichloroethylene	UG/L	34501	1.0	K
			X									1, 2 - Dichloropropane	UG/L	34541	1.0	K
			X									Ethylbenzene	UG/L	34371	1.0	K
			X									Methylene Chloride	UG/L	34423	6.0	K
			X									1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1.0	K
			X									Tetrachloroethylene	UG/L	34475	1.0	K
			X									Toluene	UG/L	34012	1.0	K
			X									1, 1, 1 - Trichloroethane	UG/L	34506	1.0	K
			X									1, 1, 2 - Trichloroethane	UG/L	34511	1.0	K
			X									Trichloroethylene	UG/L	39180	5.0	
			X									Vinyl Chloride	UG/L	39175	2.0	K
			X									Acrolein	UG/L	34210	50	K
			X									Chloroethane	UG/L	34311	2.0	K
			X									2 - Chloroethylvinyl Ether	UG/L	34576	2.0	K
			X									Dichlorobromomethane	UG/L	32105	1.0	K
			X									1, 3 - Dichloropropylene	UG/L	34699	1.0	K
			X									Methyl Bromide	UG/L	34413	2.0	K
			X									Methyl Chloride	UG/L	34418	1.0	K
			X									1, 2 - trans - Dichloroethylene	UG/L	34546	1.0	K
												1, 2 Dichlorobenzene	UG/L	34536		
												1, 3 Dichlorobenzene	UG/L	34566		
												1, 4 Dichlorobenzene	UG/L	34571		

29 42 55 68 — 33 34 46 47 59 60 72 73 — 40 41 53 54 66 67 79 80

VALUE CODING RULES AND REMARK CODES ON REVERSE

RECEIVED

MAY 30 1986

N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

ATTACHMENT

DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME: CITY OF CAMDEN - PUCHACK PLANT SW ID NO.

LAB NAME: ROSSNAGEL + ASSOC

	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
T	NJ		86 04 10	03117	
1	2 – 8	9 – 16	17 – 22	23 – 27	28

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 0486 (MO. YR.) TO 0486 (MO. YR.)

SUBMIT WITH SIGNED T-VWX-014

SAMPLING MONTHS

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
			X									Acrylonitrile	UG/L	34215	50	K
			X									Benzene	UG/L	34030	1.0	K
			X									Bromoform	UG/L	32104	1.0	K
			X									Carbon Tetrachloride	UG/L	32102	1.0	K
			X									Chlorobenzene	UG/L	34301	1.0	K
			X									Chlorodibromoethane	UG/L	34306	1.0	K
			X									Chloroform	UG/L	32106	1.0	K
			X									1, 1 - Dichloroethane	UG/L	34496	1.0	K
			X									1, 2 - Dichloroethane	UG/L	34531	1.0	K
			X									1, 1 - Dichloroethylene	UG/L	34501	1.0	K
			X									1, 2 - Dichloropropane	UG/L	34541	1.0	K
			X									Ethylbenzene	UG/L	34371	1.0	K
			X									Methylene Chloride	UG/L	34423	4.0	K
			X									1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1.0	K
			X									Tetrachloroethylene	UG/L	34475	1.0	K
			X									Toluene	UG/L	34012	1.0	K
			X									1, 1, 1 - Trichloroethane	UG/L	34506	1.0	K
			X									1, 1, 2 - Trichloroethane	UG/L	34511	1.0	K
			X									Trichloroethylene	UG/L	39180	2.0	
			X									Vinyl Chloride	UG/L	39175	2.0	K
			X									Acrolein	UG/L	34210	50	K
			X									Chloroethane	UG/L	34311	2.0	K
			X									2 - Chloroethylvinyl Ether	UG/L	34576	2.0	K
			X									Dichlorobromomethane	UG/L	32105	1.0	K
			X									1, 3 - Dichloropropylene	UG/L	34699	1.0	K
			X									Methyl Bromide	UG/L	34413	2.0	K
			X									Methyl Chloride	UG/L	34418	1.0	K
			X									1, 2 - trans - Dichloroethylene	UG/L	34546	1.0	K
												1, 2 Dichlorobenzene	UG/L	34536		
												1, 3 Dichlorobenzene	UG/L	34566		
												1, 4 Dichlorobenzene	UG/L	34571		

VALUE CODING RULES AND
REMARK CODES ON REVERSE

29 33 34 40 41
42 46 47 53 54
55 59 60 66 67
68 72 73 79 80

ATTACHMENT ____

REFERENCE NO. 12

BSDW

0408001

05-30-1986
Monthly Monitoring

RECEIVED (12)
JUN 30 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

CITY OF CAMDEN
DEPARTMENT OF UTILITIES
City Hall - Room 419A
Sixth and Market Streets
Camden, New Jersey 08101
609-757-7680

FREDERICK HUGH MARTIN, JR.
DIRECTOR

MELVIN R. PRIMAS, JR.
MAYOR

LISTED
JUN 30 1986
NJ DEP Bureau of Potable Water

June 24, 1986

Bureau of Safe Drinking Water
Division of Water Resources
NJDEP
CN 029
Trenton, NJ 08625

Gentlemen,

Here are the lab results for the May volatile organic scans for our Prakside and Puchack plants. These are submitted as per your letter of January 7.

Note that where a "K" appears in the "remarks" column, the substance listed was not detected. Puchack shows all K's.

This table summarizes the results of the May 30 sampling:

Parkside
Concentration (PPB) of Listed Substances,
Sample of May 30, 1986

BB	Tetrachloroethylene	8.0	III	(Level III, 6.6<C<66 PPB)
AA	Trichloroethylene	14.0	II	(Level II, 3.1<C<30 PPB)

The original lab report is available at Northeastern Analytical Corporation. If you have any questions concerning these results, contact them or me.

Sincerely,

Frank Al-Greene
Administrative Analyst

ATTACHMENT 6

rm VWX-016
33

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

RECEIVED
JUN 30 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

SW ID NO.

FACILITY NAME: CITY OF CAMDEN Parkside

LAB NAME: NORTHEASTERN ANALYTICAL CORP

	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
T (1)	NJ (2–8)	(9–16)	860530 (17–22)	03117 (23–27)	(28)

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 0586 (MO. YR.) TO 0586 (MO. YR.)

SUBMIT WITH SIGNED T-VWX-014

SAMPLING MONTHS: Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
Acrylonitrile	UG/L	34215	50	K
Benzene	UG/L	34030	1.0	K
Bromoform	UG/L	32104	1.0	K
Carbon Tetrachloride	UG/L	32102	1.0	K
Chlorobenzene	UG/L	34301	1.0	K
Chlorodibromoethane	UG/L	34306	1.0	K
Chloroform	UG/L	32106	1.0	K
1, 1 - Dichloroethane	UG/L	34496	1.0	K
1, 2 - Dichloroethane	UG/L	34531	1.0	K
1, 1 - Dichloroethylene	UG/L	34501	1.0	K
1, 2 - Dichloropropane	UG/L	34541	1.0	K
Ethylbenzene	UG/L	34371	1.0	K
Methylene Chloride	UG/L	34423	1.0	K
1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1.0	K
Tetrachloroethylene	UG/L	34475	8.0	
Toluene	UG/L	34012	1.0	K
1, 1, 1 - Trichloroethane	UG/L	34506	1.0	K
1, 1, 2 - Trichloroethane	UG/L	34511	1.0	K
Trichloroethylene	UG/L	39180	14	
Vinyl Chloride	UG/L	39175	2.0	K
Acrolein	UG/L	34210	50	K
Chloroethane	UG/L	34311	2.0	K
2 - Chloroethylvinyl Ether	UG/L	34576	2.0	K
Dichlorobromomethane	UG/L	32105	1.0	K
1, 3 - Dichloropropylene	UG/L	34699	1.0	K
Methyl Bromide	UG/L	34413	2.0	K
Methyl Chloride	UG/L	34418	2.0	K
1, 2 - trans - Dichloroethylene	UG/L	34546	1.0	K
1, 2 Dichlorobenzene	UG/L	34536	1.0	K
1, 3 Dichlorobenzene	UG/L	34566	1.0	K
1, 4 Dichlorobenzene	UG/L	34571	1.0	K

29 42 55 68 | 33 34 46 47 59 60 72 73 | 40 41 53 54 66 67 79 80

VALUE CODING RULES AND REMARK CODES ON REVERSE

ATTACHMENT 6

Form VWX-016
/83

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

RECEIVED
JUN 30. 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME CITY OF CAMDEN Pachack SW ID NO.

LAB NAME NORTHEASTERN ANALYTICAL CORP

NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
T NJ		860530	03417	

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 05 86 (MO. YR.) TO 12 86 (MO. YR.)

SUBMIT WITH SIGNED T-VWX-014

SAMPLING MONTHS: Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
Acrylonitrile	UG/L	34215	50	K
Benzene	UG/L	34030	1.0	K
Bromoform	UG/L	32104	1.0	K
Carbon Tetrachloride	UG/L	32102	1.0	K
Chlorobenzene	UG/L	34301	1.0	K
Chlorodibromoethane	UG/L	34306	1.0	K
Chloroform	UG/L	32106	1.0	K
1, 1 - Dichloroethane	UG/L	34496	1.0	K
1, 2 - Dichloroethane	UG/L	34531	1.0	K
1, 1 - Dichloroethylene	UG/L	34501	1.0	K
1, 2 - Dichloropropane	UG/L	34541	1.0	K
Ethylbenzene	UG/L	34371	1.0	K
Methylene Chloride	UG/L	34423	1.0	K
1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1.0	K
Tetrachloroethylene	UG/L	34475	1.0	K
Toluene	UG/L	34012	1.0	K
1, 1, 1 - Trichloroethane	UG/L	34506	1.0	K
1, 1, 2 - Trichloroethane	UG/L	34511	1.0	K
Trichloroethylene	UG/L	39180	1.0	K
Vinyl Chloride	UG/L	39175	2.0	K
Acrolein	UG/L	34210	50	K
Chloroethane	UG/L	34311	2.0	K
2 - Chloroethylvinyl Ether	UG/L	34576	2.0	K
Dichlorobromomethane	UG/L	32105	1.0	K
1, 3 - Dichloropropylene	UG/L	34699	1.0	K
Methyl Bromide	UG/L	34413	2.0	K
Methyl Chloride	UG/L	34418	2.0	K
1, 2 - trans - Dichloroethylene	UG/L	34546	1.0	K
1, 2 Dichlorobenzene	UG/L	34536	1.0	K
1, 3 Dichlorobenzene	UG/L	34566	1.0	K
1, 4 Dichlorobenzene	UG/L	34571	1.0	K

29 33 34 40 41
42 46 47 53 54
55 59 60 66 67
68 72 73 79 80

VALUE CODING RULES AND
REMARK CODES ON REVERSE

ATTACHMENT

REFERENCE NO. 13

Entered 9/29/86 MO

A-200

RECEIVED
SEP 5 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

(13)

CITY OF CAMDEN
DEPARTMENT OF UTILITIES
City Hall - Room 419A
Sixth and Market Streets
Camden, New Jersey 08101
609-757-7680

FREDERICK HUGH MARTIN, JR.
DIRECTOR

MELVIN R. PRIMAS, JR.
MAYOR

August 28, 1986

Bureau of Safe Drinking Water
Division of Water Resources
NJDEP
CN 029
Trenton, NJ 08625

Gentlemen,

Here are the lab results of the July and August volatile organic scans for our Parkside and Puchack plants. These are submitted as per your letter of January 7.

Note that where a "K" appears in the "remarks" column, the substance listed was not detected. Level II concentrations of the following chemicals were found at the locations and times listed below:

1,2 dichloroethane	Parkside (August)
tetrachloroethylene	Parkside, Puchack (August)
1,2 trans-dichloroethene	Parkside, Puchack (July, August)

The original lab reports are available at Northeastern Analystical. If you have any questions concerning these results, contact them or me.

Sincerely,

Frank Al-Greene

ATTACHMENT

WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME: CITY OF CAMDEN PARKSIDE

SW ID NO.:

LAB NAME: NORTHEASTERN ANALYTICAL CORP.

	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
T	NJ		86 07 23	03117	
1	2 3	8 16	17 22	23 27	28

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 07 86 (MO. YR.) TO 07 86 (MO. YR.)

RECEIVED
SEP 5 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

SUBMIT WITH SIGNED T-FWX-014

SAMPLING MONTHS

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	ANALYSIS	UNITS	PARAMETER CODE	VALUE	REMARKS
												Acrylonitrile	UG/L	34215	100	K
												Benzene	UG/L	34030	10	K
												Bromoform	UG/L	32104	10	K
												Carbon Tetrachloride	UG/L	32102	10	K
												Chlorobenzene	UG/L	34301	10	K
												Chlorodibromoethane	UG/L	34306	10	K
												Chloroform	UG/L	32106	10	K
												1, 1 - Dichloroethane	UG/L	34496	10	K
												1, 2 - Dichloroethane	UG/L	34531	10	K
												1, 1 - Dichloroethylene	UG/L	34501	10	K
												1, 2 - Dichloropropane	UG/L	34541	10	K
												Ethylbenzene	UG/L	34371	10	K
												Methylene Chloride	UG/L	34423	10	K
												1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	10	K
												Tetrachloroethylene	UG/L	34475	10	K
												Toluene	UG/L	34012	10	K
												1, 1, 1 - Trichloroethane	UG/L	34506	10	K
												1, 1, 2 - Trichloroethane	UG/L	34511	10	K
												Trichloroethylene AA II	UG/L	39180	25	
												Vinyl Chloride	UG/L	39175	10	K
												Acrolein	UG/L	34210	100	K
												Chloroethane	UG/L	34311	10	K
												2 - Chloroethylvinyl Ether	UG/L	34576	10	K
												Dichlorobromomethane	UG/L	32105	10	K
												1, 3 - Dichloropropylene	UG/L	34699	10	K
												Methyl Bromide	UG/L	34413	10	K
												Methyl Chloride	UG/L	34413	10	K
												1, 2 - trans - Dichloroethylene	UG/L	34546	10	K
												1, 2 Dichlorobenzene	UG/L	34536	10	K
												1, 3 Dichlorobenzene	UG/L	34566	10	K
												1, 4 Dichlorobenzene	UG/L	34571	10	K

VALUE CODING RULES AND REMARK CODES ON REVERSE

29 33 34 40 41
42 46 47 53 54
55 59 60 66 67
68 72 73 79 80

ATTACHMENT

DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

RECEIVED
SEP 5 1986

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME: CITY OF CAMDEN PUCHACK

LAB NAME: NORTHEASTERN ANALYTICAL CORP

SW ID NO. N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION BUREAU OF SAFE DRINKING WATER

	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
T	NJ		8 6 0 7 2 3	0 3 1 1 7	
1	2 – 8	9 – 16	17 – 22	23 – 27	28

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 0 5 8 6 (MO. YR.) TO (MO. YR.)

SUBMIT WITH SIGNED T-FWX-014

SAMPLING MONTHS: Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
Acrylonitrile	UG/L	34215	100	K
Benzene	UG/L	34030	10	K
Bromoform	UG/L	32104	10	K
Carbon Tetrachloride	UG/L	32102	10	K
Chlorobenzene	UG/L	34301	10	K
Chlorodibromoethane	UG/L	34306	10	K
Chloroform	UG/L	32106	10	K
1, 1 - Dichloroethane	UG/L	34496	10	K
1, 2 - Dichloroethane	UG/L	34531	10	K
1, 1 - Dichloroethylene	UG/L	34501	10	K
1, 2 - Dichloropropane	UG/L	34541	10	K
Ethylbenzene	UG/L	34371	10	K
Methylene Chloride	UG/L	34223	10	K
1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	10	K
Tetrachloroethylene	UG/L	34475	10	K
Toluene	UG/L	34012	10	K
1, 1, 1 - Trichloroethane	UG/L	34506	10	K
1, 1, 2 - Trichloroethane	UG/L	34511	10	K
Trichloroethylene AA II	UG/L	39180	10	
Vinyl Chloride	UG/L	39175	10	K
Acrolein	UG/L	34210	100	K
Chloroethane	UG/L	34311	10	K
2 - Chloroethylvinyl Ether	UG/L	34576	10	K
Dichlorobromomethane	UG/L	32105	10	K
1, 3 - Dichloropropylene	UG/L	34699	10	K
Methyl Bromide	UG/L	34413	10	K
Methyl Chloride	UG/L	34418	10	K
1, 2 - trans - Dichloroethylene	UG/L	34545	10	K
1, 2 Dichlorobenzene	UG/L	34536	10	K
1, 3 Dichlorobenzene	UG/L	34566	10	K
1, 4 Dichlorobenzene	UG/L	34571	10	K

SEE CODING RULES AND REMARK CODES ON REVERSE

29 42 55 68 | 33 34 46 47 59 60 72 73 | 40 41 53 54 66 67 79 80

ATTACHMENT _____

6

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

RECEIVED
SEP 5 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME City of Camden Parkside Plant

SW ID NO.

LAB NAME Northeastern Analytical Corp

	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
T	NJ		860813	03117	
1	2–8	9–16	17–22	23–27	28

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 08/86 (MO. YR.) TO 08/86 (MO. YR.)

SUBMIT WITH SIGNED T-FWX-014

SAMPLING MONTHS: Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
Acrylonitrile	UG/L	34215	100	K
Benzene	UG/L	34030	1.0	K
Bromoform	UG/L	32104	1.0	K
Carbon Tetrachloride	UG/L	32102	1.0	K
Chlorobenzene	UG/L	34301	1.0	K
Chlorodibromoethane	UG/L	34306	1.0	K
Chloroform	UG/L	32106	1.0	K
1, 1 - Dichloroethane	UG/L	34496	1.0	K
1, 2 - Dichloroethane EE II	UG/L	34531	4.3	
1, 1 - Dichloroethylene	UG/L	34501	1.0	K
1, 2 - Dichloropropane	UG/L	34541	1.0	K
Ethylbenzene	UG/L	34371	1.0	K
Methylene Chloride	UG/L	34423	1.0	K
1, 1, 2, 2 - Tetrachloroethane	UG/L	34516	1.0	K
Tetrachloroethylene BB II	UG/L	34475	5.7	
Toluene	UG/L	34012	1.0	K
1, 1, 1 - Trichloroethane	UG/L	34506	1.0	K
1, 1, 2 - Trichloroethane	UG/L	34511	1.0	K
Trichloroethylene AA II	UG/L	39180	9.8	
Vinyl Chloride	UG/L	39175	1.0	K
Acrolein	UG/L	34210	100	K
Chloroethane	UG/L	34311	1.0	K
2 - Chloroethylvinyl Ether	UG/L	34576	1.0	K
Dichlorobromomethane	UG/L	32105	1.0	K
1, 3 - Dichloropropylene	UG/L	34699	1.0	K
Methyl Bromide	UG/L	34413	1.0	K
Methyl Chloride	UG/L	34418	1.0	K
1, 2 - trans - Dichloroethylene	UG/L	34546	1.0	K
1, 2 Dichlorobenzene	UG/L	34536	1.0	K
1, 3 Dichlorobenzene	UG/L	34566	1.0	K
1, 4 Dichlorobenzene	UG/L	34571	1.0	K

VALUE CODING RULES AND REMARK CODES ON REVERSE

29 33 34 40 41
42 46 47 53 54
55 59 60 66 67
68 72 73 79 80

ATTACHMENT

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

RECEIVED
SEP 5 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

FACILITY NAME City of Camden - Puchack Plant

SW ID NO.

LAB NAME Northeastern Analytical Corp

T	NJPDES NO.	WELL PERMIT NO.	SAMPLE DATE YR. MO. DAY	NJ LAB CERT. NO.	WQM USE
1	NJ 2–8	9–16	17–22: 8 6 0 8 1 3	23–27: 0 3 1 1 7	28

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM 0 9 1 8 6 (MO. YR.) TO 0 8 1 8 6 (MO. YR.)

SUBMIT WITH SIGNED T-VWX-014

SAMPLING MONTHS: Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

ANALYSIS	UNITS	PARAMETER	VALUE	REMARKS
Acrylonitrile	UG/L	3 4 2 1 5	1.00	K
Benzene	UG/L	3 4 0 3 0	1.0	K
Bromoform	UG/L	3 2 1 0 4	1.0	K
Carbon Tetrachloride	UG/L	3 2 1 0 2	1.0	K
Chlorobenzene	UG/L	3 4 3 0 1	1.0	K
Chlorodibromoethane	UG/L	3 4 3 0 6	1.0	K
Chloroform	UG/L	3 2 1 0 6	1.0	K
1, 1 - Dichloroethane	UG/L	3 4 4 9 6	1.0	K
1, 2 - Dichloroethane	UG/L	3 4 5 3 1	1.0	K
1, 1 - Dichloroethylene	UG/L	3 4 5 0 1	1.0	K
1, 2 - Dichloropropane	UG/L	3 4 5 4 1	1.0	K
Ethylbenzene	UG/L	3 4 3 7 1	1.0	K
Methylene Chloride	UG/L	3 4 4 2 3	1.0	K
1, 1, 2, 2 - Tetrachloroethane	UG/L	3 4 5 1 6	1.0	K
Tetrachloroethylene BB II	UG/L	3 4 4 7 5	1.7	
Toluene	UG/L	3 4 0 1 2	1.0	K
1, 1, 1 - Trichloroethane	UG/L	3 4 5 0 6	1.0	K
1, 1, 2 - Trichloroethane	UG/L	3 4 5 1 1	1.0	K
Trichloroethylene AA II	UG/L	3 9 1 3 0	4.4	
Vinyl Chloride	UG/L	3 9 1 7 5	1.0	K
Acrolein	UG/L	3 4 2 1 0	1.00	K
Chloroethane	UG/L	3 4 3 1 1	1.0	K
2 - Chloroethylvinyl Ether	UG/L	3 4 5 7 6	1.0	K
Dichlorobromomethane	UG/L	3 2 1 0 5	1.0	K
1, 3 - Dichloropropylene	UG/L	3 4 6 9 9	1.0	K
Methyl Bromide	UG/L	3 4 4 1 3	1.0	K
Methyl Chloride	UG/L	3 4 4 1 8	1.0	K
1, 2 - trans - Dichloroethylene MMI	UG/L	3 4 5 4 6	3.0	
1, 2 Dichlorobenzene	UG/L	3 4 5 3 6	1.0	K
1, 3 Dichlorobenzene	UG/L	3 4 5 6 6	1.0	K
1, 4 Dichlorobenzene	UG/L	3 4 5 7 1	1.0	K

VALUE CODING RULES AND REMARK CODES ON REVERSE

29 33 34 40 41
42 46 47 53 54
55 59 60 66 67
68 72 73 79 80

REFERENCE NO. 14

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

Camden City (W)

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.
Morris-Delair Water Treatment Plt.
8900 Zimmerman Avenue
Pennsauken, NJ 08110

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent
City Hall
Camden, NJ 08101

P.O. #1747

Copy to: Frank Al-Greene
Rm. 419A, City Hall
Camden, NJ 08101

Sample Designation: Water/Sampling Date - 8/26/88

#8082615 - Well #6	#8082622 - Well #1 at Puchak
#8082616 - Well #7	#8082623 - Well #3 at Northfield
#8082617 - Well #8	#8082624 - Well #2 at Delair
#8082618 - Well #10	#8082625 - Well #3 at Delair
#8082619 - Well #11	#8082626 - Well #17 at Parkside
#8082620 - Well #12	#8082627 - Well #18 at Parkside
#8082621 - Well #13	#8082628 - Well #13 at Parkside

Parameter	Well #6 #8082615
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: HB
Laboratory Director/Manager

ATTACHMENT E

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #7 #8082616
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [signature]
Laboratory Director/Manager

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #8 #8082617
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [illegible]
Laboratory Director/Manager

ATTACHMENT

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
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THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #10 #8082618
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept 15 1988

Signed: Laboratory Director/Manager

ATTACHMENT F

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #11 #8082619
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept 15 1988

Signed: [illegible]
Laboratory Director/Manager

ATTACHMENT —

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #12 #8082620
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [illegible]
Laboratory Director/Manager

ATTACHMENT

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #13 #8082621 ppb
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	3.3 JC NE
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [signature]
Laboratory Director/Manager

ATTACHMENT —

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #13 at Puchak #8082622
EPA Method 601/602, ug/l:	ppb
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	SS 1.8
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	GG 2.4
trans-1,2-Dichloroethylene (601)	MM 3.1
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	3.1
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [signature]
Laboratory Director/Manager

ATTACHMENT F

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #3 at Northfield #8082623
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	11.0 JB
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	4.8 JC
Tetrachloroethylene (601)	5.9 BB
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

Date: Sept 15 1988

Signed: [signature]
Laboratory Director/Manager

ATTACHMENT F

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CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

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Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #2 at Delair #8082624
EPA Method 601/602, ug;l:	ND
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept 15 1988 Signed: [illegible]

ATTACHMENT ____

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
THOROFARE, NJ 08086
(609)848-7227
FAX 609-848-9591

LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #3 at Delair #8082625
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	<1.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	<1.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	2.4
trans-1,2-Dichloroethylene (601)	<1.0
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	<1.0
1,2-Dichloroethane (601)	<1.0
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [signature]
Laboratory Director/Manager

ATTACHMENT

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LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #17 at Parkside #8082626
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	52.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	23.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	23.0
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	2.5
trans-1,2-Dichloroethylene (601)	5.9
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	17.0
1,2-Dichloroethane (601)	6.7
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: [signature]
Laboratory Director/Manager

ATTACHMENT

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CSAS JOB #808260775A
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CITY OF CAMDEN
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Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #18 at Parkside #8082627
EPA Method 601/602, ug/l:	
Chlorobenzene (601/602)	<1.0
Carbon tetrachloride (601)	<1.0
Chloroform (601)	<1.0
1,1-Dichloroethylene (601)	<1.0
1,2-Dichlorobenzene (602)	<1.0
Toluene (602)	34.0
Dibromochloromethane (601)	<1.0
Bromodichloromethane (601)	<1.0
Bromoform (601)	6.2
1,1,2,2-Tetrachloroethane (601)	<1.0
1,3-Dichlorobenzene (602)	<1.0
Benzene (602)	<1.0
1,1,1-Trichloroethane (601)	<1.0
Methylene chloride (601) (Dichloromethane)	<1.0
trans-1,2-Dichloroethylene (601)	4.8
1,4-Dichlorobenzene (602)	<1.0
Tetrachloroethylene (601)	<1.0
Ethylbenzene (602)	<1.0
Trichloroethylene (601)	19.0
1,2-Dichloroethane (601)	5.9
1,1,2-Trichloroethane (601)	<1.0

JAN 3 1989

Date: Sept. 15 1988

Signed: HB
Laboratory Director/Manager

ATTACHMENT

CHEMICAL SAMPLES & ANALYTICAL SVCS CO
POB 514
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LABORATORY ANALYSIS REPORT
CSAS JOB #808260775A
September 15, 1988

CITY OF CAMDEN
Dept. of Utilities
Attn.: Edward Papale, Supt.

Bill to: CITY OF CAMDEN
Richard Felicione
Purchasing Agent

P.O. #1747

Copy to: Frank Al-Greene

Parameter	Well #13 at Parkside #8082628	
EPA Method 601/602, ug/l:		
Chlorobenzene (601/602)	<1.0	
Carbon tetrachloride (601)	<1.0	
Chloroform (601)	2.8	RR
1,1-Dichloroethylene (601)	<1.0	
1,2-Dichlorobenzene (602)	<1.0	
Toluene (602)	230.0	HB
Dibromochloromethane (601)	<1.0	
Bromodichloromethane (601)	<1.0	
Bromoform (601)	7.8	[illegible]
1,1,2,2-Tetrachloroethane (601)	<1.0	
1,3-Dichlorobenzene (602)	<1.0	
Benzene (602)	14.0	HH
1,1,1-Trichloroethane (601)	<1.0	
Methylene chloride (601) (Dichloromethane)	<1.0	
trans-1,2-Dichloroethylene (601)	26.0	MM
1,4-Dichlorobenzene (602)	<1.0	
Tetrachloroethylene (601)	<1.0	
Ethylbenzene (602)	<1.0	
Trichloroethylene (601)	130.0	AA
1,2-Dichloroethane (601)	8.3	EE
1,1,2-Trichloroethane (601)	<1.0	

JAN 3 1989

Date: Sept. 15 1988

Signed: [signature]
Laboratory Director/Manager

ATTACHMENT F

REFERENCE NO. 15

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection
Water Supply Element
CN 426
Trenton, New Jersey 08625-0426
Tel# 609-292-7219
Fax# 609-292-1654

Robert C. Shinn, Jr.
Commissioner

August 3, 1995

CERTIFIED MAIL # Z 359 021 497
RETURN RECEIPT REQUESTED

Honorable Arnold W. Webster, Ph.D. and Council
City of Camden
c/o Dorothy A. Burley, Municipal Clerk
City Hall
Sixth and Market Streets
Camden, New Jersey 08101

Dear Mayor Webster and Council:

Subject: Safe Drinking Water Act Violations
Camden City Water Department
PWSID #0408001

Summarized below are the results of analysis of water samples collected by the Camden City Water Department at the Parkside Water treatment plant (point of entry) from January, 1994 through May 8, 1995.

Date	Contaminant	Result (ppb)	Maximum Contaminant Level (MCL) in ppb
1-14-94	TCE	49	1
3-4-94	TCE	18	1
4-8-94	TCE	39	1
5-9-94	TCE	29	1
6-10-94	TCE	29	1
8-12-94	TCE	26	1
11-23-94	TCE	29	1
2-9-95	TCE	34	1
5-8-95	TCE	31	1

As evidenced from the above mentioned summary, the City isfailing to comply with the Maximum Contaminant Level (MCL) for TCE, in violation of Federal Safe Drinking Water Act 40 CFR 141.61(a). Therefore, you are directed to go to "Public Notification" in accordance with the National Primary Drinking Water Regulations (NPDWR), Section 141.32 of the Federal Safe Drinking Water Act. You are further directed to submit to this Bureau a copy of the "Public Notification" as proof of implementation within ten (10)

calendar days of completion of each required notification. This notification must include notification of the print and electronic media within 14 days from receipt of this letter and individual notifications within 45 days from receipt of this letter. Both notifications must include the enclosed EPA mandatory health effect language. The individual public notification must continue quarterly until the violation is resolved. The notification should include the information that the city has signed a consent agreement with the state to either provide adequate treatment or take the Parkside wellfield out of service by May 1, 1996.

Failure to fully comply with this letter will result in this matter being referred to the Southern Bureau of Water and Hazardous Waste Enforcement for formal enforcement action. Compliance with this letter shall in no way be construed, however, to indicate any exemption on your part from possible enforcement actions for the noncompliance as stated above.

If you have any additional questions concerning this directive, please contact Nasir Butt of the Bureau of Safe Drinking Water at (609) 292-5550.

Very truly yours,

Barker Hamill, Chief

Enclosure

c: Bob Gibson, Acting Commissioner
City of Camden Water Department
Ed Post, Bureau Chief
Southern Enforcement

c:\barker\camdenvi.nb

New Jersey Department of Environmental Protection and Energy
Bureau of Safe Drinking Water
CN-426, Trenton, NJ 08625-0426
(609) 292-5550

LAB USE ONLY
LAB ID# 889811

HZ

DRINKING WATER ANALYSIS - VOLATILE ORGANICS

System Name: CITY OF CAMDEN
Address: 8900 ZIMMERMAN AVENUE
City: PENNSAUKEN
State: NJ Zip: 08110

PWS ID#: 0408001
Facility Name: PRKSD TREAT PLT
Facility ID #: 03
Laboratory ID#: 77166
Laboratory Name: QC INC.

Method: 502.2

Sample Type: P

Collection Date: 05 (MM) 08 (DD) 95 (YY)

Analysis Date: 05 (MM) 12 (DD) 95 (YY)

Contaminant ID and Name	"X" if > MCL	MCL ug/l	MDL ug/l	Analysis Results Sign (<)	Analysis Results ug/L (ppb)
2212 - Dichlorodifluoromethane			0.24	<	0.5
2210 - Chloromethane			0.44	<	0.5
2976 - Vinyl Chloride		2	0.21	<	0.5
2214 - Bromomethane			0.17	<	0.5
2216 - Chloroethane			0.28	<	0.5
2218 - Trichlorofluoromethane			0.26	<	0.5
2977 - 1,1-Dichloroethene		2	0.31	<	0.5
2964 - Methylene Chloride		2	0.22	<	0.5
2979 - trans-1,2-Dichloroethene		10	0.11	<	0.5
2978 - 1,1-Dichloroethane			0.30		1.1
2416 - 2,2-Dichloropropane			0.19	<	0.5
2380 - cis-1,2-Dichloroethene		10	0.47		4.1
2941 - Chloroform			0.11	<	0.5
2430 - Bromochloromethane			0.09	<	0.5
2981 - 1,1,1-Trichloroethane		26	0.20	<	0.5
2410 - 1,1-Dichloropropene			0.19	<	0.5
2982 - Carbon Tetrachloride		2	0.17	<	0.5
2990 - Benzene		1	0.14	<	0.5
2980 - 1,2-Dichloroethane	X	2	0.15		3.2
2984 - Trichloroethene	X	1	0.49		31.
2983 - 1,2-Dichloropropane		5	0.15	<	0.5
2943 - Bromodichloromethane			0.13	<	0.5
2408 - Dibromomethane			0.16	<	0.5
2228 - cis-1,3-Dichloropropene			0.10	<	0.5
2991 - Toluene		1000	0.10	<	0.5
224 - trans-1,3-Dichloropropene			0.11	<	0.5

PWS ID# 0408001

System Name CITY OF CAMDEN

Facility ID # 03

Method 502.2

Collection Date

05	08	95
MM	DD	YY

Contaminant ID and Name	"X" if > MCL	MCL ug/l	MDL ug/l	Analysis Results Sign (<)	Analysis Results ug/L (ppb)
2985 - 1,1,2-Trichloroethane		5	0.48	<	0.5
2987 - Tetrachloroethene	X	1	0.24		2.9
2412 - 1,3-Dichloropropane			0.15	<	0.5
2944 - Dibromochloromethane			0.14	<	0.5
2946 - 1,2-Dibromoethane			0.16	<	0.5
2989 - Chlorobenzene		4	0.11	<	0.5
2992 - Ethylbenzene		700	0.13	<	0.5
2986 - 1,1,1,2-Tetrachloroethane			0.13	<	0.5
2995 - m-Xylene			0.43	<	0.5
2962 - p-Xylene			0.43	<	0.5
2997 - o-Xylene			0.15	<	0.5
2996 - Styrene		100	0.14	<	0.5
2994 - Isopropylbenzene			0.22	<	0.5
942 - Bromoform			0.14	<	0.5
2988 - 1,1,2,2-Tetrachloroethane			0.20	<	0.5
2414 - 1,2,3-Trichloropropane			0.25	<	0.5
2998 - n-Propylbenzene			0.34	<	0.5
2993 - Bromobenzene			0.34	<	0.5
2424 - 1,3,5-Trimethylbenzene			0.44	<	0.5
2965 - 2-Chlorotoluene			0.12	<	0.5
2966 - 4-Chlorotoluene			0.17	<	0.5
2426 - tert-Butylbenzene			0.07	<	0.5
2418 - 1,2,4-Trimethylbenzene			0.08	<	0.5
2428 - sec-Butylbenzene			0.18	<	0.5
2030 - p-Isopropyltoluene			0.26	<	0.5
2967 - 1,3-Dichlorobenzene		600	0.12	<	0.5
2969 - 1,4-Dichlorobenzene		75	0.14	<	0.5
2422 - n-Butylbenzene			0.19	<	0.5
2968 - 1,2-Dichlorobenzene		600	0.14	<	0.5
2931 - 1,2-Dibromo-3-Chloropropane			0.19	<	0.5
78 - 1,2,4-Trichlorobenzene		8	0.23	<	0.5

PWS ID# 0408001

System Name CITY OF CAMDEN

Facility ID # 03

Method 502.2

Collection Date

05	08	95
MM	DD	YY

Contaminant ID and Name	"X" if > MCL	MCL ug/l	MDL ug/l	Analysis Results Sign (<)	Analysis Results ug/L (ppb)
2246 - Hexachlorobutadiene			0.21	<	0.5
2248 - Naphthalene			0.28	<	0.5
2420 - 1,2,3-Trichlorobenzene			0.18	<	0.5
2955 - Total Xylenes		44	0.43	<	0.5

☐ Check if non-targeted compounds are found, then comment.*

ab Sample ID # 1889811

certify that this water sample was collected in accordance with approved procedures established by the New Jersey Department f Environmental Protection and Energy from the location described above.

lame ROBERT B. BRADY of QC INC.

certify that this water sample was analyzed in accordance with the approved procedures established by the New Jersey epartment of Environmental Protection and Energy.

'rint Name MICHELLE DWORAK Signature Michelle Dworak Date 05/23/95

orm prepared by: ____ Owner/Operator or X Laboratory Phone No. (215) 355-3900

EPA ANALYSIS METHOD

502.2 - Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in series.

SAMPLE TYPE

C = Check Sample P = Plant Tap (Treated Water) Sample R = Raw Water (Untreated) Sample

Comments:

Compound Approximate % Confidence

REFERENCE NO. 16

(16)

Form DWR-143
7/81

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE October 18 and 19, 1983

GENERAL INFORMATION			
PURVEYOR/ FACILITY	Camden City Water Department		
FILE LOCATION	Camden City, Camden County	PW-ID # 0408001	
MAILING ADDRESS	City Hall Room 419A, Camden, New Jersey 08101		
ADMIN.	Richard Cummings	REQUIRED LICENSES	T - 1 W - 1
BUSINESS TELEPHONE # Admin.:	(609) 757-7000	Licensed Operators:	Michael D. Vena T -1 W-1

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): See Attached

Est Tot Eff Cap: 33.04MGD(2)

TREATMENT: source, type, capacities(mgd): See Attached

Est Tot Eff Cap: 27.6 MGD(1)

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): See Attached

Est Tot Cap: 5 MG

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): Tentatively 1 w/Gloucester City Water Department, 3 w/New Jersey Water Company, 1 or 2 with Borough of Collingswood, 7 w/Borough of Woodlyne. Sizes and capacities to be determined pursuant to 9/14/83 Administrative Order.

Est Tot Avail: Unknown

AUXILIARY POWER: location, type, capabilities: Morris-Delair Water Treatment Plant-755 Kilowatt Detroit Diesel, capable of operating the plant and all supplying wells. Puchack Water Treatment Plant-565 Kilowatt Detroit Diesel, capable of operating the plant and all supplying wells.

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year)	Max 26.48 August 1983	Min 19.86 April 1983	Annual Average 22.42 October 1982 September 1983
BULK PURCHASES (provider,mgd)	NONE		
BULK SALES (customer, mgd)	NONE		
NUMBER OF SERVICES	17,000 (1)	% METERED	94 (1)
MUNICIPALITIES SERVED (est. services in each)	City of Camden Only		
		TOTAL ESTIMATED POPULATION SERVICED	50,900
CURRENT/RECENT WATER RESTRICTIONS	Use of Puchack Run Wells 5 an 7, City Well 11 restricted,		See (4)
NEW CONSTRUCTION (Project Numbers)			

DISTRIBUTION MAINS: Sizing 4" (min) to 36" (max)
Pressures 30 (min) to 60 (max)
Hydrants/Flushing Program Yes

MONITORING & REPORTING

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED
		SATISFACTORY
Coliform	60/month	"
Inorganics	1/3 years	"
Nitrate	1/3 years	"
Trihalomethanes	4/plant/3 months	"
~~Organics~~		
~~Turbidity~~		
Radionuclides	1/4 years	"
Sodium	1/3 years	"
Corrosivity	Once	"

NAME OF LABORATORY City of Camden CERTIFICATION # 04127

ADDRESS Morris-Delair Water Treatment Plant
Also Stablex-Reutter, Post Office Box 499, Camden, New Jersey-----#04012

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES See Source Descriptions with Deficiencies noted and General Deficiencies (attached)

TREATMENT DEFICIENCIES See Treatment Facility Descriptions with Deficiencies noted and General Deficiencies (attached)

PUBLIC COMMUNITY WATER SUPPLY INSPECTION

COMPLIANCE EVALUATION (Continued)

STORAGE AND/OR DISTRIBUTION DEFICIENCIES See Finished Water Storage with Deficiencies noted. Total effective finished water storage capacity is inadequate, should be increased in accordance with the 9/14/83 Administrative Order

LICENSING, MONITORING AND/OR REPORTING DEFICIENCIES Self monitoring at Parkside Water Treatment Plant inadequate. pH should be monitored and recorded on a daily basis.

COMPLIANCE SAMPLING VIOLATIONS: NONE NOTED

LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT	LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT

OVERALL COMPLIANCE RATING:

☐ ACCEPTABLE ☒ CONDITIONALLY ACCEPTABLE ☐ UNACCEPTABLE

NOTICE: YOU ARE REQUIRED TO INFORM THE N.J.D.E.P. IN WRITING OF YOUR ACTUAL OR INTENDED ACTIONS TO COMPLY WITH N.J.S.A. 58:12A-1 ET SEQ. VIA IMPLEMENTATION OF REMEDIAL MEASURES TO CORRECT THE DEFICIENCIES LISTED IN THIS REPORT. FAILURE TO ADEQUATELY RESPOND IN A TIMELY FASHION WILL RENDER YOU LIABLE FOR PENALTIES OF UP TO $5,000.00 FOR EACH VIOLATION, PURSUANT TO N.J.A.C. 7:10-3.

INSPECTOR: Joseph R. Douglass
Signature

Joseph R. Douglass
Name

Senior Environmental Specialist
Title

Southern Enforcement
Region

PERSON INTERVIEWED: Frederick H. Martin, Jr.
Name

Senior Administrative Analyst
Title

City of Camden Department of Utilities
Organization

Attachment B

REFERENCE NO. 17

104

17

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER RESOURCES
P.O. BOX CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

IN THE MATTER OF

CITY OF CAMDEN

CAMDEN CITY WATER DEPARTMENT

****
* ADMINISTRATIVE *
* ORDER *
****

The following FINDINGS are made and ORDER issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (NJDEP) by N.J.S.A. 13:1D-1 et seq. and the New Jersey Safe Drinking Water Act, N.J.S.A. 58:12A-1 et seq. and duly delegated to the Assistant Director of Enforcement of the Division of Water Resources pursuant to N.J.S.A. 13:1B-4e and N.J.S.A. 58:12A-9g.

FINDINGS

1. The City of Camden, through the Camden City Water Department, (hereinafter "the City") owns, operates, and maintains a potable water supply and distribution system (hereinafter "the system") which serves residential and commercial users within the City. The wells supplying the system are situated in five locations within the City and two locations in neighboring Pennsauken Township. The total safe pumping capacity of the well network is approximately 31.8 million gallons per day (mgd).

2. On August 18, 1971, NJDEP issued an Administrative Order (hereinafter "1971 Order") to the City because of the many sub-standard conditions which existed within the system at that time. The 1971 Order required the City to make extensive improvements in the operation and maintenance of the system, to seal abandoned wells, to provide treatment and disinfection where lacking, to maintain operating records, and to provide additional elevated storage capacity. The City complied with most of the requirements of the 1971 Order. However, several of the deficiencies which were addressed in that Order remain uncorrected to date. The outstanding requirements of the 1971 Order are:

a. Provide effective chlorination facilities for City Well No. 11.

b. Improve operation of all water treatment facilities to attain delivered water with non-corrosive characteristics and with a total iron concentration of 0.3 mg/l or less.

c. Provide additional elevated storage capacity, or a combination of additional elevated storage capacity and auxiliary power to operate pumping equipment at the storage facility.

3. On March 25, April 2, and May 14, 1980, NJDEP conducted inspections of the City's potable water system. Besides the aforementioned deficiencies, additional major problems were noted during these inspections. The inspections revealed that several wells were pumping raw untreated ground water directly into the City's distribution system. Various wells in the system were found to produce water which violates maximum contaminant levels set forth in the New Jersey Safe Drinking Water Act Regulations for one or more of the following parameters: chromium, iron, manganese, color, and corrosivity. NJDEP also determined that the City required additional finished water storage capacity, as stated in the 1971 Order, and additional prime sources of water supply.

4. Since July of 1981, NJDEP has endeavored to enter with the City into an Administrative Consent Order. The objective of this proposed Consent Order was to bring the system into compliance with the requirements of the New Jersey Safe Drinking Water Act, N.J.S.A. 58:12A-1 et seq., over a mutually agreeable period of time. The City has repeatedly stated its preference to correct the outstanding system deficiencies on its own schedule and has therefore declined to enter into the proposed Consent Order.

5. In June 1981, an engineering report entitled "Report on Exploratory Leak Detection Study" was completed by Malcolm Pirnie, Inc., consulting engineers for the City. In September 1981, a more comprehensive engineering report entitled "Water System Improvements" was completed by Malcolm Pirnie, Inc. These reports contain in-depth analyses of the existing facilities in the City's system, and recommend specific short and long term capital improvements necessary to insure an adequate and safe water supply to the City. The Malcolm Pirnie reports served as the basis for extensive discussions between NJDEP and the City, and were useful for the purpose of refining the proposed Consent Order and this Administrative Order.

ATTACHMENT W7

6. The purity and quantity of water as furnished by the City is presently endangered by numerous system deficiencies in the derivation, treatment, storage, and distribution of the water. The City does not have adequate treatment facilities, and has inadequate and insufficient treated water storage capacity. These conditions constitute violations of the New Jersey Safe Drinking Water Act, N.J.S.A. 58:12A-1 et seq., the Safe Drinking Water Act Regulations N.J.A.C. 7:10-1 et seq.. Abandoned wells left unsealed pose a threat of further contamination to the aquifer serving as the City's prime source of water, and constitute violations of N.J.S.A. 58:4A-4 et seq.

ORDER

NOW, THEREFORE, IT IS ORDERED THAT THE CITY OF CAMDEN shall:

7. Within twelve (12) months from the effective date of this Order, seal wells 3, 5, 12 and 15 pursuant to N.J.S.A. 58:4A-4.2 and in accordance with the provisions of N.J.A.C. 7:9-9.1 et seq.. Also within twelve (12) months from the effective date of this Order wells 1, 4, 6, 10, and 16 shall be modified as follows:

a. Disconnected from the system.

b. Made functional for ground water monitoring purposes.

c. Adequately protected from unauthorized access and vandalism..

The City shall provide NJDEP with at least one week prior notification of the intended date for performing each of the actions required above.

8. Immediately cease the discharge of water from City Well No. 11 into the City's distribution system. Until such time as the finished water from City Well No. 11 is brought into compliance with the New Jersey Safe Drinking Water Act, N.J.S.A. 58:12A-1 et seq., Well No. 11 may be used in emergency situations only and chlorination must then be provided. Notification must subsequently be given to NJDEP within ten (10) days as to the nature of the emergency, the length of time the well was in use, and the total gallonage pumped into the system from the well.

9. Develop and submit to NJDEP within twenty-four (24) months from the effective date of this Order a comprehensive operation and maintenance manual which will cover all treatment facilities, pumping stations, and distribution mains within the system.

10. Provide an additional effective above-ground finished water storage capacity of five (5) million gallons within forty-eight (48) months from the effective date of this Order.

11. Undertake a two-phase program of leak correction as discussed in the "Report on Exploratory Leak Detection Study" prepared by Malcolm Pirnie, Inc. dated June 1981. Phase I of this program shall correct the major system leaks and shall be completed by the City within thirty-six (36) months of the effective date of this Order. Phase II of the leak correction program will address all remaining identifiable leakage in the system, and shall be completed within sixty (60) months of the effective date of this Order. The City shall submit to NJDEP semi-annual status reports on the progress of the leak correction program until it has been completed. The first such report shall be due by June 1, 1984. Upon completion of both phases of this leak correction program, the City shall commence a program of routine system leak detection and correction. This routine program must be detailed in the operation and maintenance manual described in paragraph 9 of this Order.

12. Investigate and throughly evaluate all interconnections which exist between the system and neighboring public community water supplies. A detailed report on the findings of this effort shall be submitted to NJDEP within six (6) months from the effective date of this Order.

13. All submittals required by this Order shall be made to:

James K. Hamilton, Chief
Southern Region
Enforcement Element
Division of Water Resources
CN-029
Trenton, New Jersey 08625

14. Nothing in this Order shall constitute a waiver of any statutory or other right of NJDEP pertaining to the provision of an adequate potable water supply to the City of Camden should NJDEP determine that further remedial measures are necessary to protect the public health, safety and/or welfare.

Upon completion of the feasibility study currently in progress for the State's Water Supply Master Plan, this Order shall be amended and expanded as required to resolve the remaining outstanding deficiencies in accordance with the Water Supply Master Plan.

15. NOTICE IS HEREBY GIVEN that pursuant to N.J.S.A. 52:14B-1 et seq., the Camden City Water Department is entitled to a hearing before NJDEP. Any hearing request shall be delivered to the address listed in paragraph thirteen (13) within twenty (20) days from receipt of this Order. Said hearing request shall not stay the terms or effects of this Order.

16. NOTICE IS FURTHER GIVEN that pursuant to N.J.S.A. 52:14B-9(b)(4) and N.J.A.C. 1:1-6.1(b), the applicant in its application for a hearing shall furnish NJDEP with the following:

a. A statement of the legal authority and jurisdiction under which the hearing or action to be held is requested pursuant to N.J.A.C. 1:1-6.1(b)(1);

b. A reference to the particular sections of the statutes and rules involved;

c. A short and plain statement of the matters of fact and law asserted; and

d. The Order provisions of which the applicant objects, the reasons for such objections, and any alternative provisions proposed by the applicant.

17. NOTICE IS FURTHER GIVEN that if no request for a hearing is received within twenty (20) calendar days, this shall become a final Order.

18. NOTICE IS FURTHER GIVEN that pursuant to N.J.S.A. 58:12A-10, any person who violates this Order shall be subject to civil penalties of up to $5,000 per day for each day of the violation.

19. The provisions of this Order shall be binding upon the City of Camden, its principals, agents, employees, successors, assigns and tenants.

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20. No obligations imposed by this Order are intended to constitute a debt, damage claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey, intended to protect the public, health, safety and welfare.

This Order shall be effective upon receipt.

DATE SEP 1 4 1983

BY AUTHORITY OF
JOHN W. GASTON, JR., P.E.
DIVISION OF WATER RESOURCES

George G. McCann

GEORGE G. McCANN
Assistant Director
Enforcement Element

REFERENCE NO. 18

(18)

State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

IN THE MATTER OF THE	:	AMENDED
CITY OF CAMDEN	:	ADMINISTRATIVE CONSENT
WATER DEPARTMENT	:	ORDER

This Amended Administrative Consent Order ("Amended ACO") is entered into pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection ("Department") by N.J.S.A. 13:1D-1 et seq., and the New Jersey Water Supply Management Act, N.J.S.A. 58:1A-1 et seq., and duly delegated to the Assistant Director of the Division of Enforcement Field Operations, Water and Hazardous Waste Enforcement Element pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. The City of Camden ("the City") owns and operates the City of Camden Water Department ("the Water Department"), a public community water system, I.D. No. 0408001 ("the system"), which distributes potable water to the City.

2. On July 10, 1991, a Water Allocation Permit No. 5302 ("the Permit") was issued by the Department's Bureau of Water Allocation ("BWA") to the City. The Permit authorized the City to divert water from the Water Department's twenty-four (24) existing potable supply wells ("the wells") and two (2) previously approved proposed wells (wells 14 & 15). The wells are located in both Pennsauken Township, Camden County, and the City. The Permit was issued with an expiration date of April 30, 1992, unless the City complied with Conditions 5, 7, 12, 13, 14, and 18 of the Permit, in which event the expiration date would be automatically extended to April 30, 1995. By letter dated May 6, 1992, the BWA granted the City a six (6) month extension of the April 30, 1992 expiration date of the Permit, extending the expiration date to October 31, 1992.

3. On October 30, 1992, the City submitted to the BWA a revised Water Allocation Conservation Plan to comply with Condition 13 of the Permit. The City also indicated to the BWA that it would be unable to comply with Condition 12 (installation of flow meters), Condition 17 (construction of proposed wells 14 & 15), Condition 5 (static water level reports), and Condition 7 (chloride concentration reports) by the October 31, 1992 expiration date.

4. On January 11, 1993, a public hearing was held, in accordance with N.J.A.C. 7:19-2.17, to recall the Permit because

the City had not complied with the conditions referenced in paragraph three (3) above. During this public hearing, the City set forth a proposal for achieving compliance with the Permit.

5. In accordance with the recommendations set forth in the Fact Finding Report prepared by the Department in response to the January 11, 1993 hearing, the Department and the City entered into an Administrative Consent Order dated September 30, 1993 ("September 30, 1993 ACO") setting forth specific provisions for compliance with the Permit and the sealing of all unused and abandoned wells in lieu of monetary penalties. The September 30, 1993 ACO also set forth a expiration date of June 1, 1994 if the City failed to comply with the September 30, 1993 ACO. The City would also forfeit the diversion rights to wells 14 and 15.

6. By letter dated July 6, 1994, the Department notified the City that it had missed most of the deadlines in the September 30, 1993 ACO and the Permit requirements that prompted the January 11, 1993 hearing to recall the Permit. Accordingly, as ordered and agreed to in the September 30, 1993 ACO, the Permit expired on June 1, 1994.

7. Based on these FINDINGS, the Department has determined that the City has violated the Permit and the Water Supply Management Act, N.J.S.A. 58:1A-1 et seq., and the regulations promulgated pursuant thereto, N.J.A.C. 7:19-1 et seq.

8. Based upon the information available to the parties on the effective date of the Amended ACO and to amicably resolve the above matters, the Department and the City enter into this Amended ACO without trial, adjudication, or admission of any of the facts or issues contained herein.

ORDER

NOW THEREFORE IT IS HEREBY ORDERED AND AGREED THAT:

I. ENFORCEMENT COMPLIANCE SCHEDULE

9. Under the terms and conditions of this Amended ACO, the City may continue to divert water from the Water Department's twenty-four existing potable supply wells at a rate not to exceed 644 million gallons per month and 6,928 million gallons per year in accordance with the terms and conditions of the expired Water Allocation Permit No. 5302, which also includes the payment of yearly permit fees, until a new Water Allocation Permit is issued by the Department based upon a Water Allocation Permit application which the City must submit to BWA on or before May 1, 1996 or until January 1, 1997, whichever occurs first. The diversion rights to proposed Wells 14 and 15 are forfeited. The base allocation of 2,117.343 million gallons a year from Puchack Wells 1, 2, 3, 5, and 7 and City Wells 7, 11, 13, 17, and 18 shall go into effect January 1, 1996.

10. The City shall not sell or offer to sell water to additional purveyors unless and until written permit approval to do so is received from the BWA.

11. On or before June 1, 1995, the City shall submit to the BWA at the address referenced in paragraph twenty-three (23) below, a detailed report including the dates by which the City will seal the abandoned wells in the order listed in BWA's Prioritized List for the Sealing of Wells of Camden (attached), a plan to employ or contract with an appropriately licensed and certified well driller who will seal those wells, and financial records showing the City account where the necessary funds to seal those wells have been set aside. All well sealing shall be done in accordance with N.J.S.A. 58:4A-4.1 et seq. and N.J.A.C. 7:9-9. The Prioritized List may be modified, expanded or changed as work proceeds or as new wells are discovered by BWA or the City and modified in writing by agreement between BWA and the City. Pursuant to N.J.A.C. 7:9-9.1(f), a detailed description of each well sealed, and the method used for sealing of that well, shall be submitted to the BWA, at the address referenced in paragraph twenty-two (22) below within thirty (30) calendar days from the date the well is sealed. The City shall have met the intent of this paragraph if the Department has determined that the City has made reasonable efforts to locate, obtain access to and seal the wells identified for sealing on the attached list.

12. On or before April 1, 1995, the City will prepare specification and send out advertisements for bid for the necessary equipment to seal the wells. On or before August 1, 1995, the City shall complete the bidding and secure a contract for the necessary equipment to seal the wells.

Agreed on March 18.

13. On or before March 18, 1996, the City shall submit to the BWA, at the address referenced in paragraph twenty-three (23) below, a comprehensive water supply system management plan ("plan"). The plan shall be based on the results of a Comprehensive Water System Management Study ("the study"), conducted by an outside company with direct experience in water supply system management operation and financing, which identifies and prioritizes needed capital improvements including those necessary to ensure that the delivered water from the Parkside Water Treatment Plant meets all point of entry MCL's by May 1, 1996 and considers management alternatives including but not limited to, privatisation of the Water Department, management of the Water Department in whole by an outside management corporation, and the formation of a separate City water utility whose funding source and funds are separate from the City's municipal budget. Upon completion of the study, the City shall develop a comprehensive water supply management plan that incorporates the recommendations and conclusions of the study. The Department will not issue a water allocation permit to the City until an acceptable plan is approved by the Department in writing. This plan and a detailed implementation schedule must be approved by the Department and shall become part of this

Amended ACO. In the event that the plan and implementation schedule are not approved by January 1, 1997, the City will cease all water diversions.

14. On or before May 15, 1995, the City shall:

A. Install, calibrate and operate three additional flow meters at the Morris-Delair Water Treatment Plant on the three aerator influent lines which are presently without operable meters;

B. Have all meters at the Morris-Delair Plant operational;

C. Install and operate one calibrated flow meter at the Puchack Run Plant to record the flow of water into the Plant from Puchack Well No. 1 currently in use; and

D. Submit to the BWA, the technical information for the flow meter at City Well No. 11 to verify that the existing metering system is accurate. If the existing metering system is not acceptable to the Department based upon a review of the information, new acceptable meters shall be installed within one hundred and twenty (120) days of the City's receipt of written notification from the Department.

15. On or before June 1, 1996, the City shall have flow meters installed and operational on all influent lines into the Parkside Plant from the diversion from Wells 13, 17, and 18.

II. STIPULATED PENALTIES

16. Upon a demand made by the Department, the City shall pay stipulated penalties to the Department for its failure to comply with any of the scheduled completion dates required by paragraphs eleven (11), twelve (12), thirteen (13), fourteen (14) and fifteen (15) of this Amended ACO. Each completion date not complied with shall be considered a separate violation. Payment of stipulated penalties shall be made according to the following schedule, unless the Department has modified the scheduled completion dates pursuant to the Force Majeure provisions hereinbelow:

Calendar Days After Completion Date	Stipulated Penalties
1 - 7	$100.00 per calendar day
8 - 14	$200.00 per calendar day
15 - over	$500.00 per calendar day

17. Any such penalty shall be due and payable thirty (30) calendar days following receipt of a written demand by the

Department. Payment of stipulated penalties shall be made by a cashier's or certified check payable to the "Treasurer, State of New Jersey" and shall be submitted to the address below:

Bureau of Revenue
New Jersey Department of Environmental Protection
Carroll Building, 428 East State Street, First Floor
CN - 417
Trenton, New Jersey 08625-0417

18. If the City fails to pay stipulated penalties pursuant to paragraphs (16) and (17), the Department may bring an action for a civil penalty or assess civil administrative penalties for violations of the Amended ACO or may institute civil proceeding to collect stipulated penalties. The Department may also bring an action in New Jersey Superior Court pursuant to N.J.S.A. 58:1A-16 to enforce these provision of the Amended ACO.

19. The payment of stipulated penalties does not alter the City's responsibilities to complete any requirements of the Amended ACO.

III. PROGRESS REPORTS

20. The City shall submit to the Department quarterly progress reports. Each report shall be submitted to the address in paragraph twenty-three (23) on or before the thirtieth (30th) calendar day of the month following the quarter being reported. Each progress report shall detail the status of the City's compliance with the Amended ACO and shall include the following:

a. identification of the site and reference to this Amended ACO;

b. status of work at the site and progress to date;

c. difficulties or problems encountered during the reporting period;

d. actions taken or to be taken to rectify difficulties or problems;

e. an explanation of any non-compliance with any approved schedule and/or sampling and reporting requirements; and

f. an evaluation of performance of all corrective, remedial measures implemented to date; and

g. a list of all wells that were sealed during this quarter and what wells are scheduled to be sealed during the next quarter.

IV. FORCE MAJEURE

21. If any event occurs which the City reasonably believes will or may cause delay in the compliance with any provision of the Amended ACO, the City shall notify the Department in writing within seven (7) calendar days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay, and the time required to take any such measure to prevent or minimize any such delay. The City shall take all necessary actions to prevent or minimize any such delay.

22. If the Department finds that: (a) the City has complied with the notice requirements of the preceding paragraph and; (b) that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike or other circumstances beyond the control of the City; and (c) that the City has taken all necessary actions to prevent or minimize the delay, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If the Department determines that the City has not complied with the Notice requirements of the preceding paragraph, or the event causing the delay is not beyond the control of the City or the City has not taken all necessary actions to prevent or minimize the delay, such failure to comply with the provisions of this Amended ACO shall constitute a violation of the requirements of the Amended ACO. The burden of proving that any delay is caused by circumstances beyond the control of the City, the length of any such delay attributed to those circumstances and that all necessary actions were taken to prevent or minimize the delay shall rest with the City. Increases in the costs or expenses incurred by the City in fulfilling the requirements of the Amended ACO shall not be a basis for an extension of time. Delay in an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements. Contractor's breach shall not automatically constitute Force Majeure.

V. GENERAL PROVISIONS

23. The City shall submit all documents required by the Amended ACO by certified mail, return receipt requested, or by hand delivery with an acknowledgement of receipt form for the Department's signature to:

Edward H. Post, P.E., Chief
Southern Bureau of Water and
Hazardous Waste Enforcement
20 East Clementon Road, Suite 301 South
Gibbsboro, New Jersey 08026

and

Richard Kropp, Chief
Bureau of Water Allocation
401 East State Street
CN0426
Trenton, New Jersey 08625

with the exception of the documents required to be submitted in paragraphs nine (9), eleven (11), thirteen (13) and fourteen (14) above, which shall be submitted only to the BWA.

24. Nothing in the Amended ACO shall preclude the Department from taking enforcement action against the City for violations not identified in the FINDINGS of the Amended ACO.

25. The provisions of the Amended ACO shall be binding on the City, its principals, directors, officers, agents, successors, assignees and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

26. Performance of the terms of the Amended ACO by the City is not conditioned in any way on the receipt of any federal or state funds.

27. The City shall perform all work conducted pursuant to the Amended ACO in accordance with prevailing professional standards.

28. The Amended ACO shall not relieve the City from obtaining and complying with all federal, state and local permits, as well as all applicable statutes and regulations while carrying out the obligations of the Amended ACO.

29. All reports, work plans and documents required under the terms of the Amended ACO are, upon approval by the Department, incorporated into the Amended ACO by reference and made a part thereof.

30. Obligations and penalties of the Amended ACO are imposed pursuant to the police powers of the State of New Jersey for the enforcement of law and the protection of the public health, safety and welfare and are not intended to constitute debt or debts which may be limited or discharged in a bankruptcy proceeding.

31. In addition to the Department's statutory and regulatory rights to enter and inspect, the City shall allow the Department and its authorized representatives access to the facility at reasonable times for the purpose of monitoring compliance with the Amended ACO.

32. The Department reserves the right to require the City to take additional action should the Department determine that such actions are necessary to protect human health or the environment. Nothing in the Amended ACO shall constitute a waiver of any

statutory right of the Department to require the City to undertake such additional measures should the Department determine that such measures are necessary.

33. The City shall not construe any informal advice, guidance, suggestions or comments by the Department, or by persons acting on behalf of the Department, as relieving the City of its obligation of obtaining written approvals as may be required herein, unless the Department specifically relieves the City of such obligations in writing.

34. The City hereby consents to and agrees to comply with the Amended ACO which shall be fully enforceable as an Order in the New Jersey Superior Court upon the filing of a summary action for compliance pursuant to the Water Management Act, N.J.S.A. 58:1A-1 et seq.

35. This Amended ACO shall be governed and interpreted under the laws of the State of New Jersey.

36. The City agrees not to contest the authority or jurisdiction of the Department to issue the Amended ACO and also agrees not to contest the terms of the Amended ACO in any action to enforce its provisions except as to interpretation or application of such terms and conditions, in any action brought by the Department to enforce the provisions of the Amended ACO.

37. The Amended ACO shall terminate upon receipt by the City of written notice from the Department that the requirements of the Amended ACO have been satisfied. Termination of the Amended ACO shall not relieve the City of any liabilities for unpaid stipulated penalties pursuant to the terms and conditions of the Amended ACO, nor shall it affect in any way the Department's rights and abilities to collect said unpaid stipulated penalties.

38. HEARING WAIVER. When the Amended ACO becomes effective, the City waives its rights to a hearing on the matters contained hereinabove pursuant to N.J.S.A. 52:14B-1 et seq. and N.J.S.A. 58:1A-1 et seq.

39. No modification or waiver of the Amended ACO shall be valid except by written amendment duly executed by the City and the Department, or by the Department's modification in writing of any of the provisions pursuant to the Force Majeure provisions hereinabove.

40. This Amended ACO shall take effect upon the signature of all parties.

NEW JERSEY DEPARTMENT
ENVIRONMENTAL PROTECTION

DATE 4-26-95 BY: James K. Hamilton

James K. Hamilton, Assistant Director
Division of Enforcement
Field Operations

DATE April 17, 1995 BY: Arnold W. Webster

Honorable Arnold W. Webster, Ph.D
Mayor, City of Camden

REFERENCE NO. 19

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CN 027, TRENTON, NJ 08625

Jorge H. Berkowitz, Ph D
Director

Anthony J. McMahon, Assistant Director
Environmental Enforcement

FILE

IN THE MATTER OF	:	ADMINISTRATIVE ORDER AND
CITY OF CAMDEN	:	
MORRIS-DELAIR WATER TREATMENT PLANT	:	NOTICE OF CIVIL ADMINISTRATIVE
8900 ZIMMERMAN AVENUE	:	
PENNSAUKEN, NEW JERSEY 08110	:	PENALTY ASSESSMENT
LEWIS SCHNEIDER, MANAGER	:	
LOG #Q890013	:	

This ORDER and NOTICE is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection ("the Department") by N.J.S.A. 13:1D-1 et seq., the New Jersey Safe Drinking Water Act, N.J.S.A. 58:12A-1 et seq., and the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and duly delegated to the Assistant Director for Environmental Enforcement of the Division of Environmental Quality pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. City of Camden Morris-Delair Water Treatment Plant operates a laboratory which is certified by the Department (N.J. Certification #04127), and is located at 8900 Zimmerman Avenue, Pennsauken Township, County of Camden, State of New Jersey.

2. Pursuant to N.J.A.C. 7:18-2.11(d), on December 2, 1988, the Department conducted an investigation which disclosed the following offenses of the Safe Drinking Water Act and the regulations promulgated thereto:

   a) The investigation disclosed that you violated N.J.A.C. 7:18-3.7(a)1xii by failing to perform analytical quality control tests to ensure that general laboratory practices and methodology are in compliance with the requirements of this subchapter. Specifically, the laboratory did not examine a minimum of one polluted water source per month in addition to analyzing the required number of distribution samples.

   b) The investigation disclosed that you violated N.J.A.C. 7:18-3.7(a)2x by failing to follow the procedures required by this subchapter in performing quality control checks of laboratory media, equipment, and supplies. Specifically, the laboratory failed to check at least one sample bottle from each batch of sterilized sample bottles, by adding approximately 25 ml of sterile LTB to the bottle(s) and then incubating the preparation at 35° ± 0.5°C for 24 hours and then checking the bottle(s) for growth.

   c) The investigation disclosed that you violated N.J.A.C. 7:18-3.7(a)2xx by failing to follow the procedures required by this subchapter in performing quality control checks of laboratory media, equipment, and supplies. Specifically, the laboratory failed to discard outdated material since expired media consisting of Brilliant Green Bile 2%, manufactured by Difco, Lot #714223, expiration date of March, 1988, was being used for the analyses of Total Coliform..

d) The investigation disclosed that you violated N.J.A.C. 7:18-4.7(e)1 by failing to insure that each analytical balance is checked monthly using at least two class "S" weights, one in the gram range and one in the milligram range. Specifically, the laboratory had not performed an analytical balance check with two class"S" weights since February 11, 1988.

e) The investigation disclosed that you violated N.J.A.C. 7:18-4.7(e)1iii by failing to conduct replicate sample analyses in the Limited Chemistry category to verify the precision of the method once a month and to document the result, the dates on which such verification analyses were performed, the method of verification, and the name of the analyst performing such verifications.

ORDER

3. NOW, THEREFORE, IT IS HEREBY ORDERED THAT on or before February 26, 1989, you cease the above listed violations of the New Jersey Administrative Code 7:18.

CIVIL ADMINISTRATIVE PENALTY ASSESSMENT

4. Based upon the above FINDINGS, and a review of the entire matter, the Department hereby assesses a Civil Administrative Penalty against you pursuant to N.J.S.A. 58:12A-10b of the Safe Drinking Water Act in the amount of $5,000.00.

5. Payment of the $5,000.00 Civil Administrative Penalty must be submitted to the Department within twenty (20) calendar days of receipt of this Order and Notice in accordance with the provisions of Paragraph 6. Payment shall be made by check payable to the New Jersey Department of Environmental Protection at the address listed in Paragraph B of Attachment I.

GENERAL PROVISIONS

6. Pursuant to N.J.S.A. 58:10A-10d and N.J.S.A. 58:12A-10b, you are entitled to a hearing if aggrieved by this Order and Notice. Application for such a hearing must be made in writing and received by the Department within twenty (20) calendar days from receipt of this Order and Notice. In applying for such hearing, you must furnish the Department with the information listed in Paragraph A of Attachment I. If no request for a hearing is received within twenty (20) calendar days, this Order and Notice shall become a final Order and the penalty will then become due and payable.

7. The provisions of this Order and Notice shall be binding on you, your principals, directors, officers, agents, successors, assigns, tenants, trustee in bankruptcy or any other trustee, and any receiver appointed pursuant to a proceeding in law or equity.

ATTACHMENT X2

8. No obligations imposed by this Order and Notice, with the exception of Paragraphs 4 and 5, are intended to constitute a debt, damage claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Order and Notice shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey, intended to protect the public health, safety and welfare.

9. NOTICE IS GIVEN that, pursuant to N.J.S.A. 58:12A-10b, any person who violates the provisions of the Safe Drinking Water Act or any rule, regulation or order promulgated pursuant to N.J.S.A. 58:12A-1 et seq. shall be liable to a civil administrative penalty of not more than $5,000 for the first offense, not less than $5,000 nor more than $10,000 for the second offense, and up to $25,000 for the third and each subsequent offense. If the violation is of a continuing nature, each day during which it continues subsequent to receipt of an order to cease the violation shall constitute an additional, separate and distinct offense.

Dated: January 27, 1989

Anthony J. McMahon, Assistant Director
Environmental Enforcement

CERTIFIED MAIL
QUALITY ASSURANCE

ATTACHMENT X3

QUALITY ASSURANCE ATTACHMENT I

A. The applicant in the application for an administrative hearing shall furnish the Department with the following:

a. A statement of the legal authority and jurisdiction under which the hearing or action to be taken is to be held;
b. A reference to the particular sections of the statutes and rules involved;
c. A short and plain statement of the matters of fact and law asserted; and
d. The specific provisions of this Order and Notice to which the applicant objects, the reasons for such objections, and any alternative provisions proposed by the applicant.

B. Any submission of information required by the attached Order and Notice shall be made to:

Anthony J. McMahon, Assistant Director
Environmental Enforcement
Department of Environmental Protection
Division of Environmental Quality
CN 027
Trenton, New Jersey 08625

C. Should you have any questions concerning this Order and Notice, please contact Mr. Jerry Bundy, Supervisor, Laboratory Certification, at (609)292-3950.

ATTACHMENT X4

REFERENCE NO. 20

STATE OF NEW JERSEY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

TELECOPIER DATA

TRANSMITTAL SHEET

DOCUMENT SENT TO Bob Gallagher

SENDING ADDRESS Pollution Assessment

DATE Aug. 14, 1989 NUMBER OF PAGES: 4

CONTACT PERSON TO CONFIRM RECEIPT OF DOCUMENT:

NAME: Cheryl Boharsik TELEPHONE: (609) 346-8032

DEP OFFICE: Southern Bureau of Regional Enforcement

M.

CAMDEN CITY WELL CONTAMINATION MEETING - JUNE 21, 1989

NEW JERSEY AMERICAN WATER COMPANY & CAMDEN CITY WATER SYSTEM

(Camden System)	(north of the Cooper River)
PW ID # 0408002	PW ID # 0408001

Contamination of New Jersey American Water Company's potable water supply initially referred to SBRE in December 1985. 12.7 to 13.1 ppb (Level II) of Trichloroethene (TCE) were detected in Wells number 51 (31st & Cleveland), 52 (29th & Cleveland) and 53 (32nd & Cleveland). Analysis of 04-06-88 indicated TCE contamination in Well # 51 - 36 ppb (Level III); # 52 - 76 ppb (Level III); # 53 - 1.1 ppb (Level I) first by the water company and confirmed by NJDEP-BSDW. TCE contamination of Camden City Wells in the same area occurred prior to 1985 referral of New Jersey American contamination.

Potential Responsible Parties

MAGNETIC METALS - 21st & Hayes
- Stored chemical drums - some labeled TCE
- facility had oil like substance that discharged to the ground which flowed onto Conrail's property.

CONRAIL PAVONIA RAILYARD -
- Major spill of diesel fuel in 1981
- TCE and other VOCs have been detected in MWs
- Facility had documented plume of diesel fuel and possibly kerosene which disappeared a few years ago, concensus at the time among the people involved with the case suggested that it migrated toward the Delaware River (NJ American Wells cone of influence was not taken into account due to previous studies that indicated that groundwater flow was tidal in that area.)
- Site investigation conducted by Conrail in November 1988, SBRE has requested a copy of the data but to date has not received it

DEHAWK TRANSMISSION - 2795 River Road
- discharged transmission fluid and degreasers into storm drains that flowed into the Cooper River

FLOWEN OIL-DELAWARE VALLEY CORPORATION - 18th & Carmen Avenue
- treated and stored hazardous waste
- facility had numerous spills

CONCORD CHEMICAL - 17th & Federal
- has USTs for chemical storage
- numerous spills have occurred at the facility's storage area

CLASSIC CHEMICAL - 17th & Admiral Wilson Blvd
- site of numerous chemical spills
- stored kerosene, methanol, naptha, mineral spirits and various solvents on site
- process wastewater discharged into sewer system
- facility now closed

HARRISON AVENUE LANDFILL - Harrison Avenue
- current MW data shows no VO contamination
- no GW monitoring data prior to 1986

ATTACHMENT M2

CAMDEN CITY WATER SYSTEM (south of the Cooper River)
PW ID # 0408001

Camden City has Volatile Organics, especially TCE, in their groundwater. The contamination was discovered around 1978 by the City of Camden and NJDEP-BSDW.

Camden City contains many abandoned industrial facilities. Contamination may have occurred as a result of direct discharge to the ground and/or seepage of sewage containing industrial waste from the sewer system. (Camden's sewer system is an old brick lined system and is plagued by frequent main ruptures and leaks).

Potential Responsible Parties

KRAMER CHEMICAL - Atlantic Avenue at the Delaware River
- inactive hazardous waste facility
- Discharged to septic system
- Facility had numerous documented spills

DRUM SERVICE OF CAMDEN - 1542 South Broadway
-Discharged hazardous waste into sewer system
-Facility had partially submerged surface basins into the ground
-Currently a Criminal Justice case

ELECTRIC EQUIPMENT & MACHINE COMPANY - 1929 South 6th Street
- Discharged hydrofluoric acid mixture and industrial wastewater from cleaning and rebuilding of air conditioning units and locomotive radiator cooling cores into the city sewer system and onto the facility's parking lot
- past Criminal Justice Case

CLARKSON LABS - Ferry Avenue
- Chemical manufacturing company
- process wastewater discharged to drainage ditch
- sampling of ditch confirmed presence of VOCs
- facility is closed

Numerous Drum Storage/Cleaning operations and Salvage Yards that have operated in the City of Camden over the past twenty years.

PARKSIDE WELLFIELD & OUR LADY OF LOURDES HOSPITAL
- Parkside is part of the Camden City water system
- Our Lady of Lourdes Hospital has a private potable well that is used for supplemental purposes only
- all the wells are located within the same area
- TCE , 1,2-Dichlorethane and Tetrachloroethene contamination
- area is mostly residential - responsible parties are not known at this time - may be same companies as noted above

M.

PUCHACK WELLFIELD
- Camden City Wellfield located in Pennsauken Twp.
- Chromium contamination first noted in 1982

Potential Responsible Parties

SGL MODERN HARD CHROME - 432 Cove & River Road
- has three (3) septic systems - two (2) of which accepted process wastewater
- chrome plating waste and steam condensation discharged to the ground via shallow ditches that lead to the septic system which were frequently overflowing
- soil around the facility has yellow color - soil samples are positive for Chromium
- ACO of 2/28/82 cites them as a suspected source of the wellfield contamination
- 1987 MW data showed Chromium (total) contamination of 300 ppm
- 1988 MW data (1st Quarter) no Chromium
- facility closed

PENLER ANODIZING COMPANY - 1400 Suckle Highway
- electroplating company
- site inspection in 1985 revealed an illegal discharge to the ground of process wastewater - Directive sent to cease discharge and redirect flow to Pennsauken Sewage Authority
- soil samples positive for Chromium

UNITED STEEL & WIRE - 1650 Suckle Highway
- nickel & chrome plating company
- past information indicates process wastewater may have been discharged to IPLs
- facility closed

SWOPE OIL - National Highway
- Superfund site
- Chromium contamination exists in the soil and groundwater at the site

ALUMINUM SHAPES - 9000 River Road
- aluminum smelting and molding company
- facility had documented chrome contamination in the soil and MWs
- RCRA facility for Chrome
- Past discharges to septic system
- currently has a parts cleaning pit (concrete lined), water in this pit has a pH of 2.0 to 3.0 SU
- history of petroleum products leaking from UST

PENNSAUKEN LANDFILL - River Road
- Chromium contamination noted in MWs
- contamination may come from adjacent Aluminum Shapes property

DEVOE MARINE COATINGS - River Road
- manufactures marine paints
- uses products that contain chrome in manufacturing process
- soil samples taken at facility contain chromium

REFERENCE NO. 21

GEOLOGY AND GROUND-WATER RESOURCES OF CAMDEN COUNTY, NEW JERSEY

By George M. Farlekas, Bronius Nemickas, and Harold E. Gill

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations 76–76

Prepared in cooperation with
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL
PROTECTION, DIVISION OF WATER RESOURCES

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A B S T R A C T

Camden County, New Jersey, is located in the Philadelphia-Camden metropolitan area. The western edge of the county is urban and industrial in character. The central part is less industrial and more suburban in character, and the eastern part is sparsely populated and predominantly agricultural, although urbanization is advancing eastward quite rapidly.

Camden County is in the Atlantic Coastal Plain physiographic province. Underlying the county are unconsolidated sediments of Quaternary, Tertiary, and Cretaceous age, consisting of mostly alternating sands, silts, and clays. The sediments dip gently to the southeast and thicken from 40 feet at the Delaware River to 2,900 feet at the Camden-Atlantic County line. Below the unconsolidated sediments is the pre-Cretaceous crystalline bedrock.

The major fresh-water aquifers in Camden County are sands and gravels of Cretaceous and Tertiary age in the Potomac Group and the Raritan and Magothy Formations; the Cohansey Sand; the Wenonah Formation-Mount Laurel Sand; and the Englishtown Formation. Minor aquifers are found in parts of the Merchantville Formation, the undifferentiated Vincentown and Manasquan Formations, and the Kirkwood Formation. Saturated sands and gravels in the surficial deposits of Quaternary age where in direct contact are commonly hydraulically connected to the underlying aquifers.

The rate of ground-water withdrawal for Camden County was 68 mgd (million gallons per day) in 1966. This was the largest average annual county pumpage in the State in 1966. Eighty-five percent (56 mgd) was pumped from the aquifer system in the Potomac Group and the Raritan and Magothy Formations.

The potentiometric surfaces of all the major artesian aquifers in Camden County declined from 1900 to 1970 as a result of pumping. The largest decline occurred in the aquifer system in the Potomac Group and the Raritan and Magothy Formations. At Haddon Heights, in the western part of the county, the potentiometric surface declined about 110 feet from 1900 to 1968. The potentiometric surface of the aquifer in the Wenonah Formation-Mount Laurel Sand declined 43 feet in about 60 years in the vicinity of Berlin Borough.

The chemical quality of ground water in Camden County

is generally satisfactory for most uses. Concentrations of iron greater than the State's potable-water standard of 0.3 milligrams per liter are found in some areas of the Potomac-Raritan-Magothy aquifer system, in scattered locations in the Wenonah Formation-Mount Laurel Sand, and in the Cohansey Sand. In general, higher values of dissolved solids, sulfate, and chloride occur in water in and near the outcrop of the Potomac-Raritan-Magothy aquifer system than downdip in the aquifer. In the southeastern part of the county chloride concentrations in excess of 250 milligrams per liter can be found in the same aquifer system. The high chloride water has remained in the aquifer system from the time of deposition or has re-entered the system from the ocean after changes in sea level since Pleistocene time.

Contamination of water in the Potomac-Raritan-Magothy aquifer system in the Philadelphia area has created a potential water-quality problem for the Camden area near the Delaware River. Contaminated ground water in Philadelphia, with high concentrations of sulfate and dissolved solids, is moving under the Delaware River toward Eagle Point in Gloucester County near the Camden County line. Decrease of pumping in Philadelphia and simultaneous increase of pumping in Camden and Gloucester Counties tends to draw ground water from Philadelphia toward New Jersey.

The greatest potential for additional ground-water development in the county is from the Cohansey Sand which is generally an unconfined aquifer. The Cohansey also has the greatest possibility of ground-water contamination because of the local effect of wastes from suburban and industrial development and the shallow depth of the Cohansey aquifer.

INTRODUCTION

PURPOSE AND SCOPE

This investigation of the ground-water resources and geology of Camden County is part of a statewide program of studies of the water resources of New Jersey. It was conducted by the U. S. Geological Survey in cooperation with the New Jersey State Department of Environmental Protection, Division of Water Resources.

Almost all public, industrial, and irrigation water supplies in Camden County are obtained from ground-water sources. The ground-water environment and its hydrologic and chemical characteristics must be understood in order to facilitate an orderly and safe development of this natural resource. The purpose of this investigation is to collect and interpret the basic hydrologic and geologic data and to appraise and report on the ground-water resources of Camden County. The objectives were to define the thickness and areal extent of the hydrologic units, evaluate the hydraulic characteristics of the aquifers, determine the effect of pumpage on the water levels of the area, define the source of recharge of the aquifers, and to evaluate the chemical quality of the ground water.

LOCATION AND EXTENT

Camden County is in the southwestern part of New Jersey (fig. 1). It is bounded by Burlington County on the northeast, Atlantic County on the southeast, Gloucester County on the southwest, and by the Delaware River on the northwest. The county is part of the Philadelphia standard metropolitan statistical area and occupies an area of 222.2 square miles. The City of Philadelphia, fourth largest city in the United States, is located across the Delaware River from Camden County.

PERSONNEL AND SUPERVISION

The investigation was made by the U. S. Geological Survey in cooperation with the State Department of Environmental Protection, Division of Water Resources. The

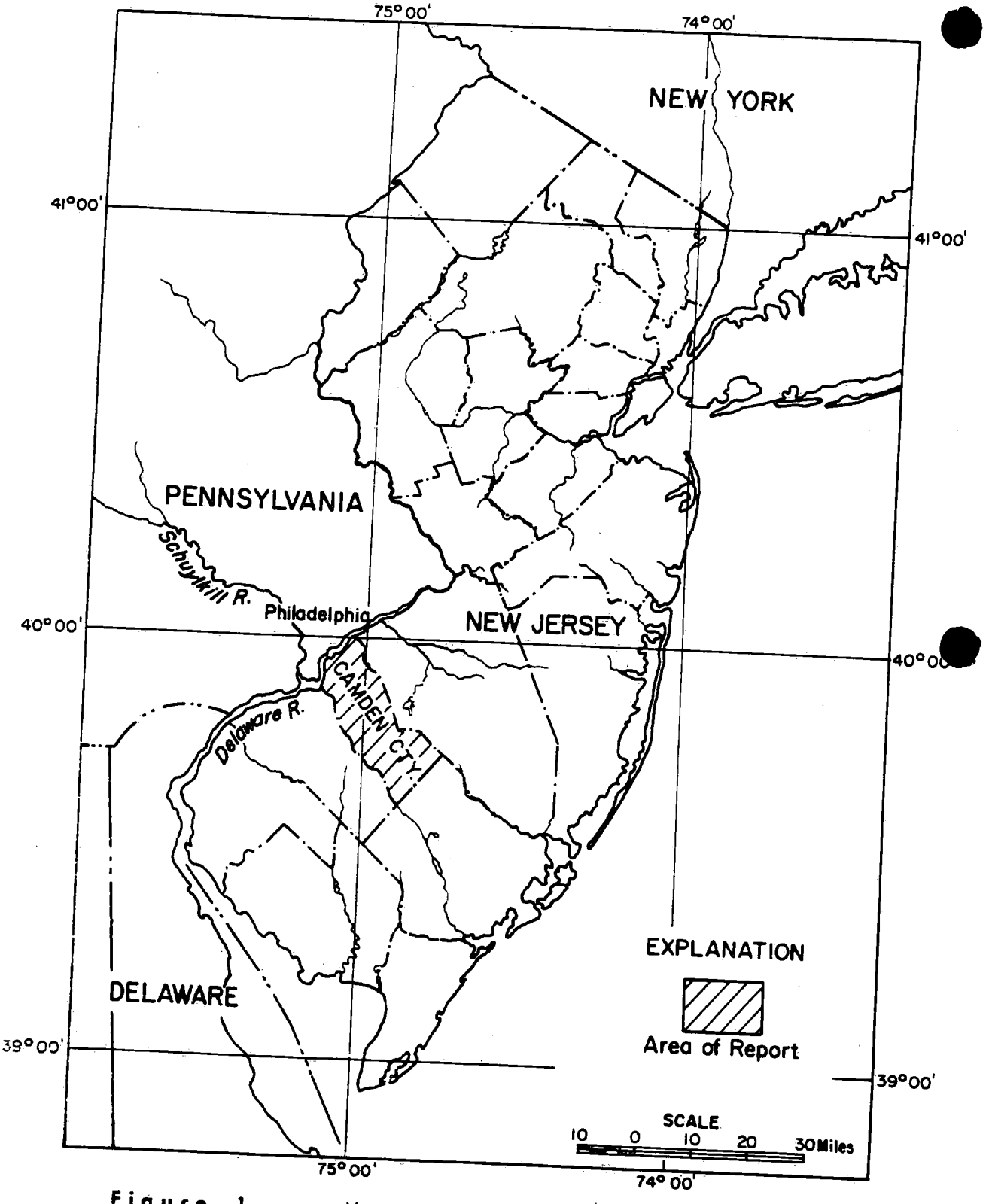


Figure 1. — Map of New Jersey showing location of Camden County.

work was performed under the general supervision of John E. McCall, District Chief, and under direct supervision of William Kam, Supervisory Hydrologist. The authors were assigned to the project in June 1969. Most of the material on the Potomac-Raritan-Magothy aquifer system in this report is from an unpublished study on the aquifer system from Trenton to Salem, New Jersey, by Gill and Farlekas. George M. Farlekas collected, compiled, and interpreted the data for the geologic units younger than the Magothy Formation up to and including the Mount Laurel Sand. Bronius Nemickas was responsible for the work on the geologic units younger than the Mount Laurel Sand. Data for wells tapping units younger than the Magothy were obtained from 1) field work in the summer and fall of 1969, 2) selected data from E. Donsky (1963), and 3) unpublished data from the Great Egg Harbor River basin compiled by P. R. Seaber in 1958. Data collection and analysis for the project was essentially completed in July 1970.

PREVIOUS INVESTIGATIONS

The geology and ground-water resources of the Camden area have been studied intermittently during the past 100 years. Almost all of the early information published in the annual reports of the State Geologist is limited to general descriptions of the water-bearing formations, with lists of wells tapping principal aquifers. Further information on the geology and hydrology of the Camden area was published by Bascom (1904) and Bascom and others (1909). The U. S. Geological Survey began ground-water investigations in New Jersey in 1923 in cooperation with the State. In 1932 a report on the ground-water supplies of the Camden area was published (Thompson, 1932). A progress report on the ground-water resources of the Lower Delaware Valley study was released in 1952 (Barksdale and Graham). The results of this tri-state study, which included Camden County, were reported later by Barksdale and others (1958). A report on the ground-water resources of the nearby Philadelphia Navy Base was prepared by Graham and Kammerer (1954). Greenman and others (1961) prepared a report on the ground-water resources of the Coastal Plain of southeastern Pennsylvania, which included the City of Philadelphia. A basic-data report on wells in Camden County was written by Donsky (1963).

Completed investigations of the geology and ground-water resources of neighboring counties include Burlington County (Rush, 1968), Gloucester County (Hardt and Hilton, 1969), and Atlantic County (Clark and others, 1968).

Iron in water of the aquifer system in the Potomac Group and Raritan and Magothy Formations has been investigated by Langmuir (1969a and 1969b). Regional geology, hydrology, and geochemistry of the aquifer system in the Potomac Group and Raritan and Magothy Formations from Salem County north to Trenton has been investigated by Gill and Farlekas (written commun., 1969).

Detailed geologic field work has been made in a number of 7-1/2 minute quadrangle areas in Burlington County (Minard, Owens, and Nichols, 1964, Owens and Minard, 1962 and 1964a), and one quadrangle in Salem County (Minard, 1965). A geologic map of part of the Coastal Plain at a scale of 1:250,000 was compiled by J. P. Owens in U. S. Geological Survey (1967).

WELL-NUMBERING AND LOCATION SYSTEM

Wells discussed in the report have been located on U. S. Geological Survey 7-1/2 minute quadrangle maps and are shown in figure 2. The municipality and the latitude and longitude in degrees, minutes, and seconds for each well were determined from the 7-1/2 minute quadrangles. Each well (table 1) has a unique number. The first six numbers and the letter N (for North) are the latitude for the well. The fifteenth number is the sequential number, usually "1". If more than one well is located at the same site, the second well will have a sequential number of 2 and the third well a sequential number of 3; with as many sequential numbers as there are wells at that latitude and longitude. The wells (table 1) are listed by municipality and numbered serially in order of decreasing latitude. Decreasing longitude is used to determine the order of the wells if two or more wells have the same latitudes.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the assistance of officials and private individuals of the Camden area who furnished information on their wells and permitted access to the wells for the collection of water samples and geophysical and hydrologic data. The staff of the New Jersey Division of Water Resources was helpful in furnishing data from their files. Special thanks are extended to the many well drillers, particularly A. C. Schultes and Sons, Layne-New York Inc., and A. A. and M., for their time and assistance in furnishing well data and geophysical logs.

GEOGRAPHY

TOPOGRAPHY AND DRAINAGE

Camden County lies entirely within the Atlantic Coastal Plain physiographic province, which extends from Massachusetts to Florida. The county is characterized as a low lying, gently rolling plain that ranges in altitude from sea level to about 220 feet. The maximum altitude of about 220 feet is located in the southeastern part of Voorhees Township.

A generalized topographic map of Camden County outlining the major drainage basins is shown in figure 3. In the northeastern part of the county the major streams, the Rancocas, Pennsauken, Newton, and Big Timber Creeks and the Cooper River, flow northeast and north into the Delaware River. In the southeastern part of the county the Mullica and Great Egg Harbor Rivers flow southeast towards the Atlantic Ocean.

Topographic highs in the central part of the county form the drainage divides between the basins. Topographic lows are in the southeastern part of the county and in the northern part of the county along the Delaware River and along streams flowing into the Delaware River.

CLIMATE

The climate of Camden County is continental, generally moderate, with mild winters, warm summers, and generally evenly distributed rainfall. The prevailing direction of air movement is from west to east. During the summer months the prevailing wind direction is from the southwest.

The average annual temperature of the Philadelphia Weather Bureau station for the period 1931-60 was 53.3°F (degrees Fahrenheit). Normal daily maximum and minimum are 40.3°F and 24.3°F for January, and 85.9°F and 65.2°F for July.

Average annual precipitation at the Philadelphia Weather Bureau station for 1931-60 was 42.48 inches. Precipitation is generally distributed evenly throughout the year, with the summer precipitation characterized by localized thundershowers. The winter precipitation is usually more widespread and less intense. Precipitation data for the same

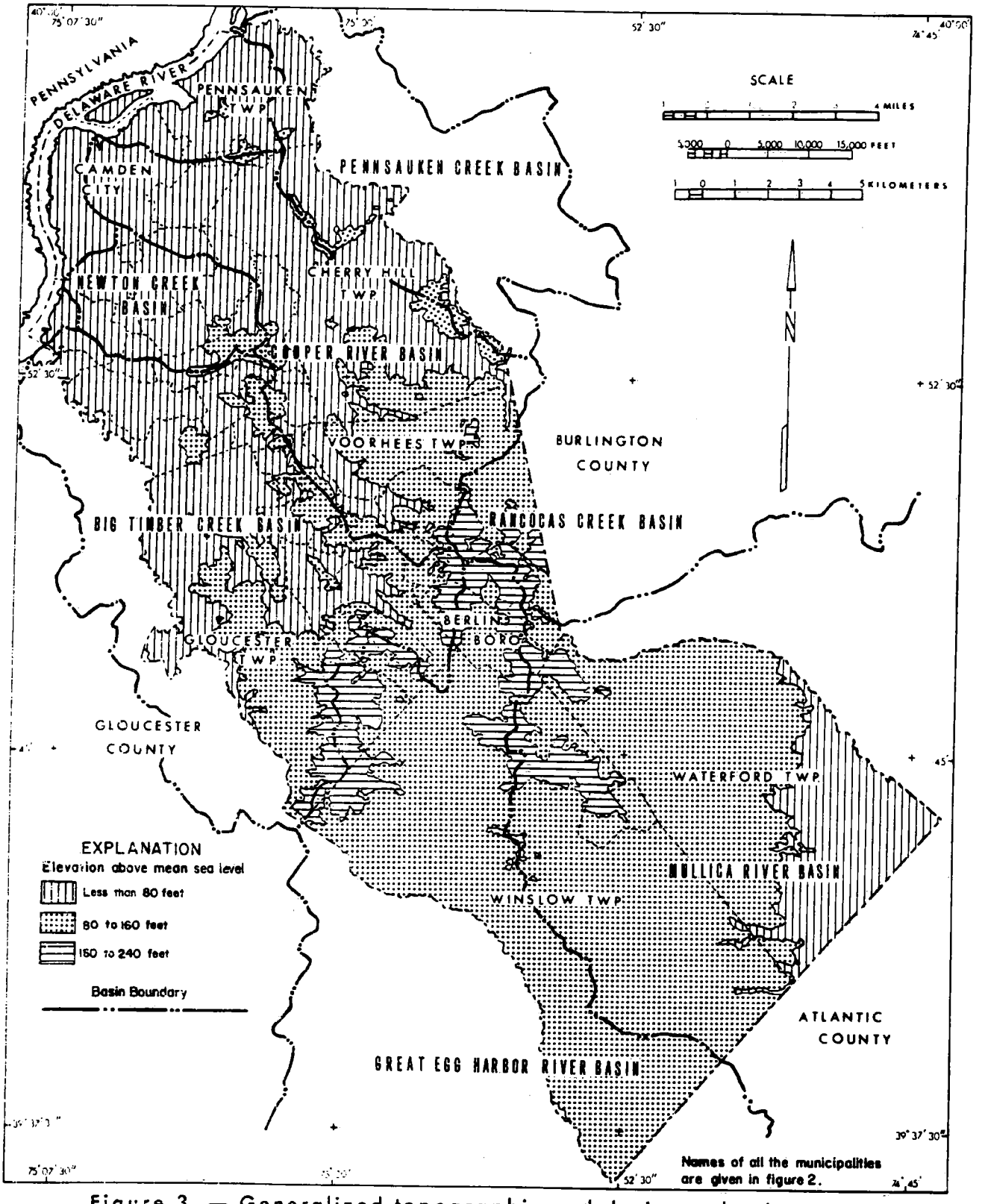


Figure 3. — Generalized topographic and drainage basin map of Camden County.

period indicate that the average of the wettest month of each year is 4.63 inches, while the average of the driest month of each year is 2.78 inches.

POPULATION AND ECONOMY

Camden County had a population of 456,291 in 1970, 392,035 in 1960, and 300,743 in 1950 (U. S. Bureau of Census). The increase from 1960 to 1970 was 16.4 percent and the increase from 1950 to 1960 was more than 30 percent. The most densely populated area is in the northern part of the county. In 1960 the municipalities north of Gloucester Township, Somerdale Borough, and Voorhees Township contained 82 percent of the total population, whereas the land area is only 31 percent. In 1970 the same municipalities contained 77 percent of the county's total population indicating a shift in population toward the southeast.

Camden County is in the Philadelphia metropolitan area and many of the county's residents work in the city or nearby counties. A large work force is employed by manufacturing companies located along the western edge of the county in the area near the Delaware River. The cities of Camden and Gloucester, as well as Pennsauken Township, have much of the manufacturing of the county, although a number of new manufacturing centers are being developed east of the New Jersey Turnpike. Three municipalities, Waterford and Winslow Townships and Chesilhurst Borough, have the largest proportion of land in the county used for agriculture. The percentage of land area used for farms in Camden County has been decreasing in recent years. The U. S. Department of Commerce, Bureau of Census reports indicate that the land area used for farms in Camden County was 8.6 percent in 1969, 10.2 percent in 1964, and 13.7 percent in 1959.

GEOLOGY

STRATIGRAPHY AND STRUCTURE

All exposed geologic units in Camden County are sedimentary and for the most part unconsolidated. They are part of the Atlantic Coastal Plain and range in age from Early Cretaceous to Quaternary. Figure 4 is a geologic map of Camden County delineating the outcrop area of the Cretaceous and Tertiary age sediments. Figures 5 and 6 show two geologic

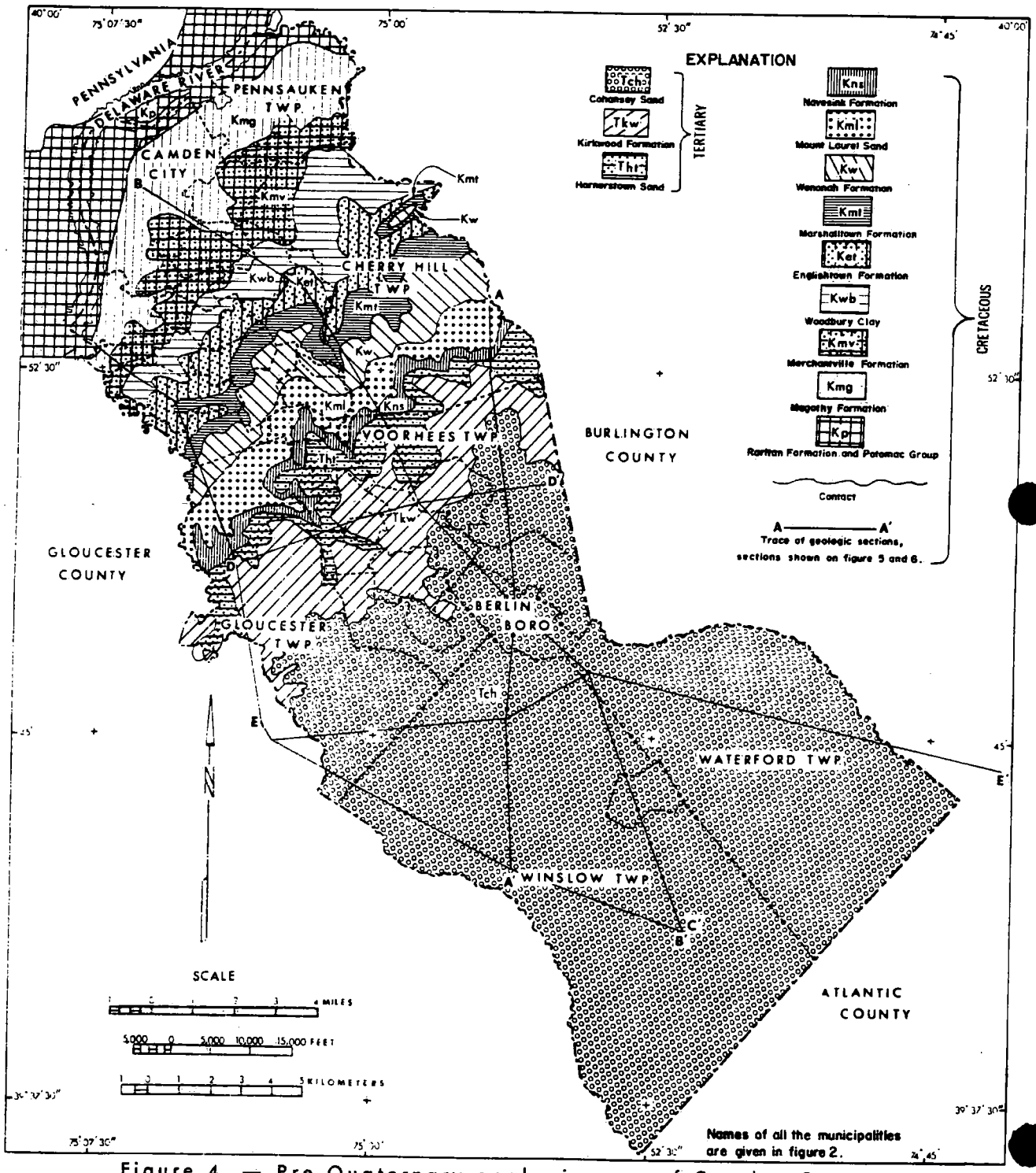


Figure 4. — Pre-Quaternary geologic map of Camden County.

sections of the Coastal Plain sediments in Camden County. The Cretaceous and Tertiary sediments dip gently to the southeast with the oldest sediments cropping out at the Delaware River. In general, the older the sediments are, the greater the dip. The Quaternary formations are essentially flat-lying beds that overlie the Cretaceous and Tertiary sediments.

Underlying the sediments of the Coastal Plain in Camden County are crystalline rocks of pre-Cretaceous age. The surface of the crystalline rocks slopes towards the southeast. The altitude of the crystalline rock surface is about 40 feet below mean sea level at the Delaware River in the vicinity of the Benjamin Franklin Bridge and about 2,800 feet below mean sea level at the Camden-Atlantic County line.

The formations present in Camden County and their water-bearing properties are described in table 2. Also given is the general lithology and range in thickness of the formations.

GEOLOGIC HISTORY

During the Precambrian a great thickness of sediments was deposited in the area. The sediments included sands, silts, clays, and carbonates. The sediments were buried by additional sediments, metamorphosed, and subsequently uplifted during Paleozoic time. Part of the sediments were reconstituted into the metamorphic rocks known as the Wissahickon Formation. In the Camden County area a period of erosion occurred in the Paleozoic Era and continued into the Mesozoic Era, extending through Triassic and Jurassic time. The next sequence of sediments found are the Cretaceous units above the metamorphic rocks. During Cretaceous time sands, clays, and silts were deposited in a deltaic complex somewhat similar to modern deltas. The streams supplying sediment to the deltaic complex flowed from the west-northwest to the east-southeast. They provided the fluvial sediments that make up the Potomac Group and the Raritan and Magothy Formations. In Late Cretaceous time marine seas inundated the area. The marine invasions were cyclic in nature rather than continuous, and periods of complete withdrawal of the sea occurred. During Late Cretaceous time deposits in the Camden area were mainly of deltaic, beach, and marine origin.

The marine environment persisted into Tertiary time, but the marine inundations were not as extensive as those in the Cretaceous. Early Tertiary deposits (Paleocene to Middle Eocene) are marine in origin; whereas, middle and late Tertiary

deposits (Miocene and Pliocene) are either beach or deltaic deposits.

Sands and gravels of fluvial origin were deposited during early Pleistocene time of the Quaternary Period in extensive areas of Camden County. These deposits, known as the Bridgeton and Pennsauken Formations, may be the result of several early glacial or interglacial stages. In middle Pleistocene time sea level rose during interglacial stage. This resulted in a marine invasion of the area along the Delaware River in Camden. Clays and silts were deposited in the low-lying areas while fluvial material such as sands and gravels were deposited in the higher areas.

As the Wisconsin ice sheet advanced into the northern parts of Pennsylvania and New Jersey, sea level declined and the sea withdrew from the Camden area. Glacial meltwaters deposited sands, silts, and clays. In addition, eolian materials were deposited. Sea level rose to its present level with the withdrawal of the Wisconsin glacier. Recent measurements of sea level suggest that it is still rising.

GROUND-WATER QUALITY

Ground water contains dissolved mineral matter as the result of leaching of soluble material, primarily from the soils, sediments, or rocks through which the water moves. Thus, the natural chemical characteristics of ground water are a function of time, pressure, temperature, composition, and solubility of the minerals with which the water is in contact. Consequently, the quality of ground water may very greatly from one place to another and from one aquifer to another. Superimposed on the natural chemical characteristics of ground water is deterioration of the quality of water caused by human activities, such as the utilization of unlined industrial-retention ponds, waste-disposal wells, and improperly located or constructed sanitary landfills and septic tanks.

Pumping also can have an effect on the local quality of ground water. Changes in the potentiometric surface caused by pumping may change the direction of movement of water or greatly accelerate the movement. Thus, ground water of poor quality may move into centers of pumping. Salt water also may move from adjacent aquifers or from tidal streams into the pumped aquifer.

Water-quality standards vary widely depending on the

intended use of the water. A particular industry may have requirements for water within a narrow range of a minor constituent. If the concentration is beyond this range the water may not be suitable for the particular use without treatment. The same water, however, may be acceptable for public-water supply. The Potable Water Standards of the New Jersey Department of Environmental Protection (1970) for some chemical constituents are as follows:

Chemical constituents	Maximum concentrations (mg/l)
Chloride (Cl)	250
Fluoride (F)	1.5
Hardness (as $CaCO_3$)	150
Iron (Fe)	.3
Manganese (Mn)	.05
Nitrate (NO_3-N)	30
Sodium (Na)	50
Sulfate (SO_4)	250
Dissolved solids	500

The source and significance of dissolved-mineral constituents and physical properties of ground water in Camden County are given in table 3.

Regional water-quality studies have been made for several aquifers in Camden County and vicinity. The aquifers are 1) Potomac-Raritan-Magothy aquifer system (Langmuir, 1969a and 1969b, and Gill and Farlekas, written commun., 1969); 2) the Englishtown aquifer (Seaber, 1965); and 3) the Cohansey Sand (Rhodehamel, 1966). Water-quality data for the neighboring counties are given in ground-water reports for Burlington (Rush, 1962 and 1968), Gloucester (Hardt and Hilton, 1969), and Atlantic Counties (Clark and others, 1968). The quality of water data for Camden County are given in table 4. The quality of water data for each aquifer is discussed under the appropriate sections of the individual formations.

GEOLOGIC FORMATIONS AND THEIR HYDROLOGIC CHARACTERISTICS

PRE-CRETACEOUS CRYSTALLINE ROCKS

Geology

Crystalline rocks of pre-Cretaceous age underlie the Coastal Plain sediments in Camden County. The crystalline rocks at or near the surface near Camden are part of the Wissahickon Formation. Much of the data available on the lithology and age of the rocks are from areas where the rocks are at or near the surface. Information about these rocks at depth is from drillers' logs and seismic studies.

The Wissahickon Formation is a medium to coarse-grained foliated crystalline rock that varies in composition and texture from schist to gneiss. The lithology of the formation varies greatly in both vertical and horizontal directions. The formation was probably a sedimentary series of sandstone, siltstone, and shale that have been deformed and re-crystallized by metamorphism.

The outcrop area of the Wissahickon Formation near the project area is in Pennsylvania a few miles west of the Delaware River. The formation is near the surface in the Camden City area near the Delaware River. The depth to the Wissahickon Formation at the Delaware River in the vicinity of the Benjamin Franklin Bridge is about 60 feet. The configuration of the crystalline rocks is shown in figure 7.

Hydrology

Few wells have been drilled for water supply in the crystalline rocks below the Coastal Plain of New Jersey. Two wells were drilled 600 feet into the Wissahickon Formation in Burlington County near the Delaware River. Neither well produced sufficient water to be useful to their owners. The data from these and other wells drilled into the crystalline rocks indicate that development of these rocks as a source of a large ground-water supply is unlikely.

Although the crystalline rocks do not produce a large quantity of water, they are hydrologically important. The basement rocks form a basal confining unit for the overlying unconsolidated aquifers. In addition, the configuration of the bedrock surface is hydrologically important. During Cretaceous and pre-Cretaceous time streams incised major river channels in the bedrock surface. These west to east-trending channels are filled with highly permeable Coastal Plain sediments (Gill and Farlekas, written commun., 1969).

MESOZOIC ERATHEM

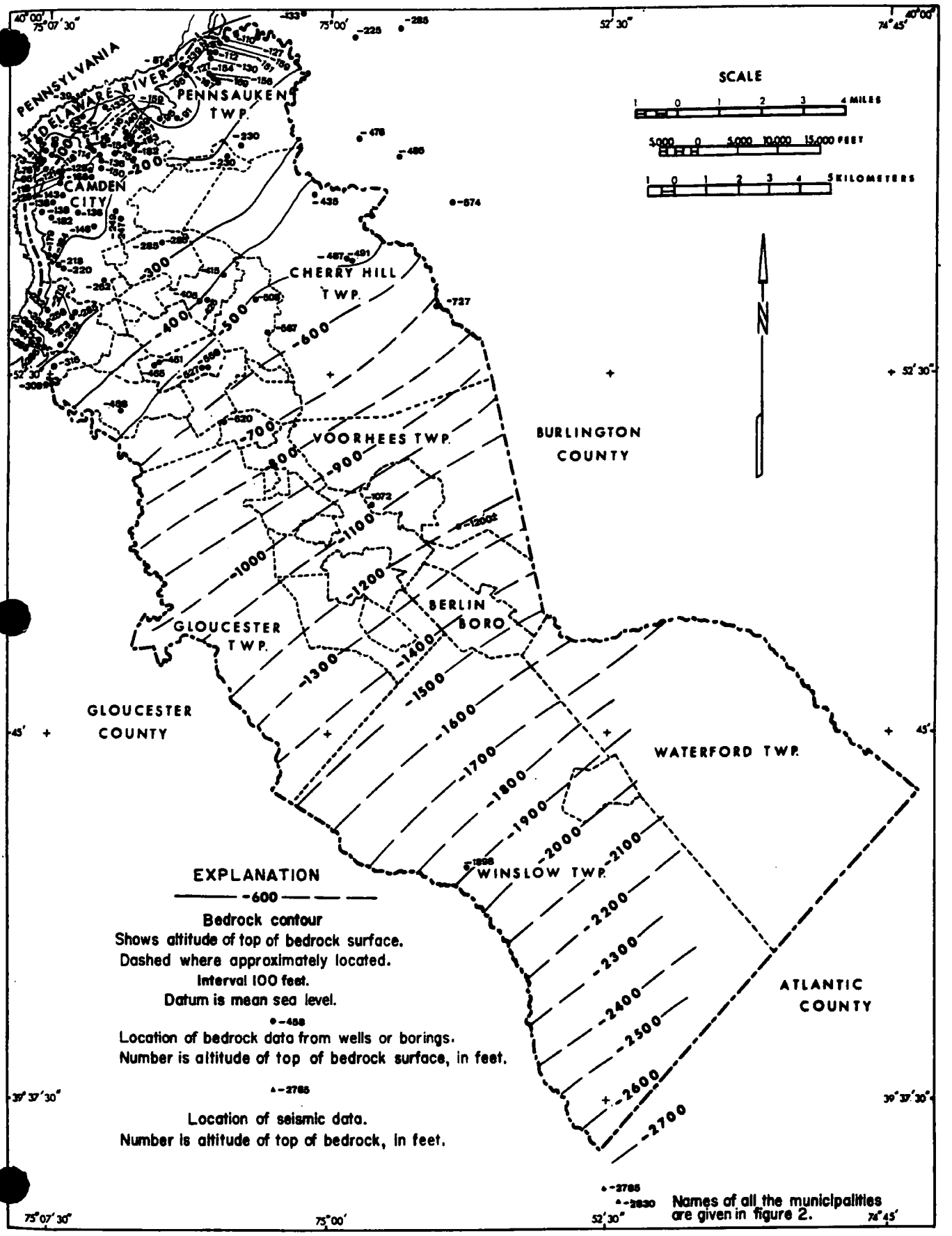


Figure 7. — Configuration of the bedrock surface beneath the Coastal Plain in Camden County.

Cretaceous System

Potomac Group and the Raritan and Magothy Formations

Regional Setting and Stratigraphic Framework

The Potomac Group and the Raritan and Magothy Formations are fluvial-marginal marine sediments of Early to Late Cretaceous age and overlie the pre-Cretaceous crystalline rocks. These sediments make up an extensive part of the Coastal Plain sediments in New Jersey and in the adjacent states. Major structures which contain the greatest thickness of sediments are the Salisbury embayment (Richards, 1945) in Delaware and the Raritan embayment in the vicinity of Raritan Bay and eastern Long Island. The area between these two embayments, which includes Camden County, contains smaller arches and troughs. The outcrop area of the Potomac Group and Raritan and Magothy Formations in Camden County (21 square miles in area) is in the northwestern part of the county near the Delaware River. The units are extensively overlain by permeable Pleistocene deposits in the outcrop area.

The Potomac Group and the Raritan and Magothy Formations form a wedge-shaped body that thickens in a downdip direction and is underlain by the crystalline basement. The configuration of the crystalline rocks is shown in figure 7. The upper limit of the wedge-shaped body is the contact between the Merchantville Formation and the top of the Magothy Formation (fig. 8). The difference between the basement and the top of the Magothy is the total thickness of Potomac Group and the Raritan and Magothy Formations (fig. 9).

In Camden County the thickness of the Potomac Group and Raritan and Magothy Formations ranges from approximately 260 feet at the Collingswood well 7 (CO 7), located near the outcrop area, to approximately 1,210 feet at the New Brooklyn Park test well (WI 27). This is shown on the thickness map in figure 9. The distance between the two wells is 13 miles.

Correlation of part of the Cretaceous stratigraphic section in northern New Jersey and Maryland as determined by Wolfe and Pakiser (1971) is given below.

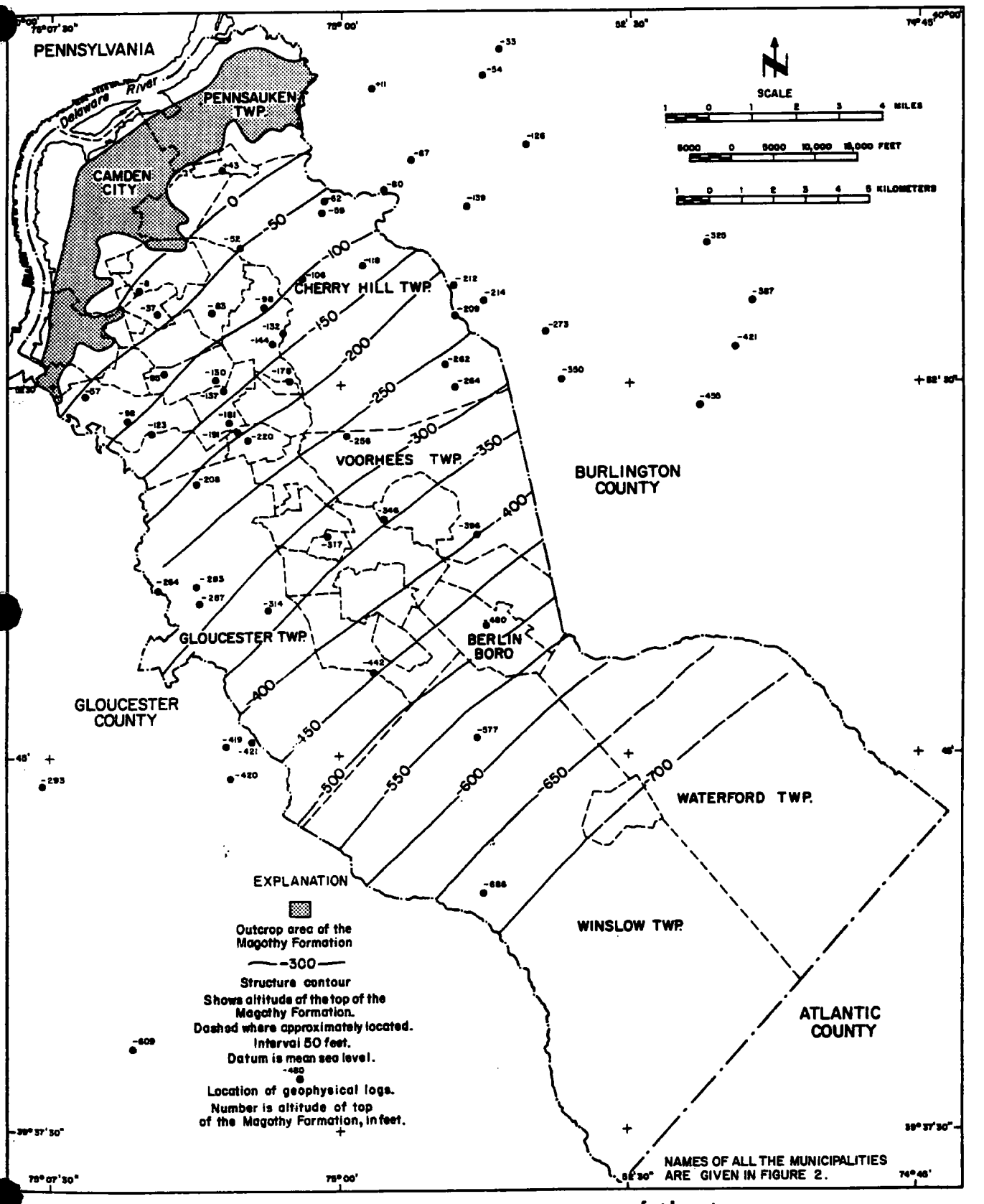


Figure 8. — Structure contour map of the top of the Magothy Formation in Camden County.

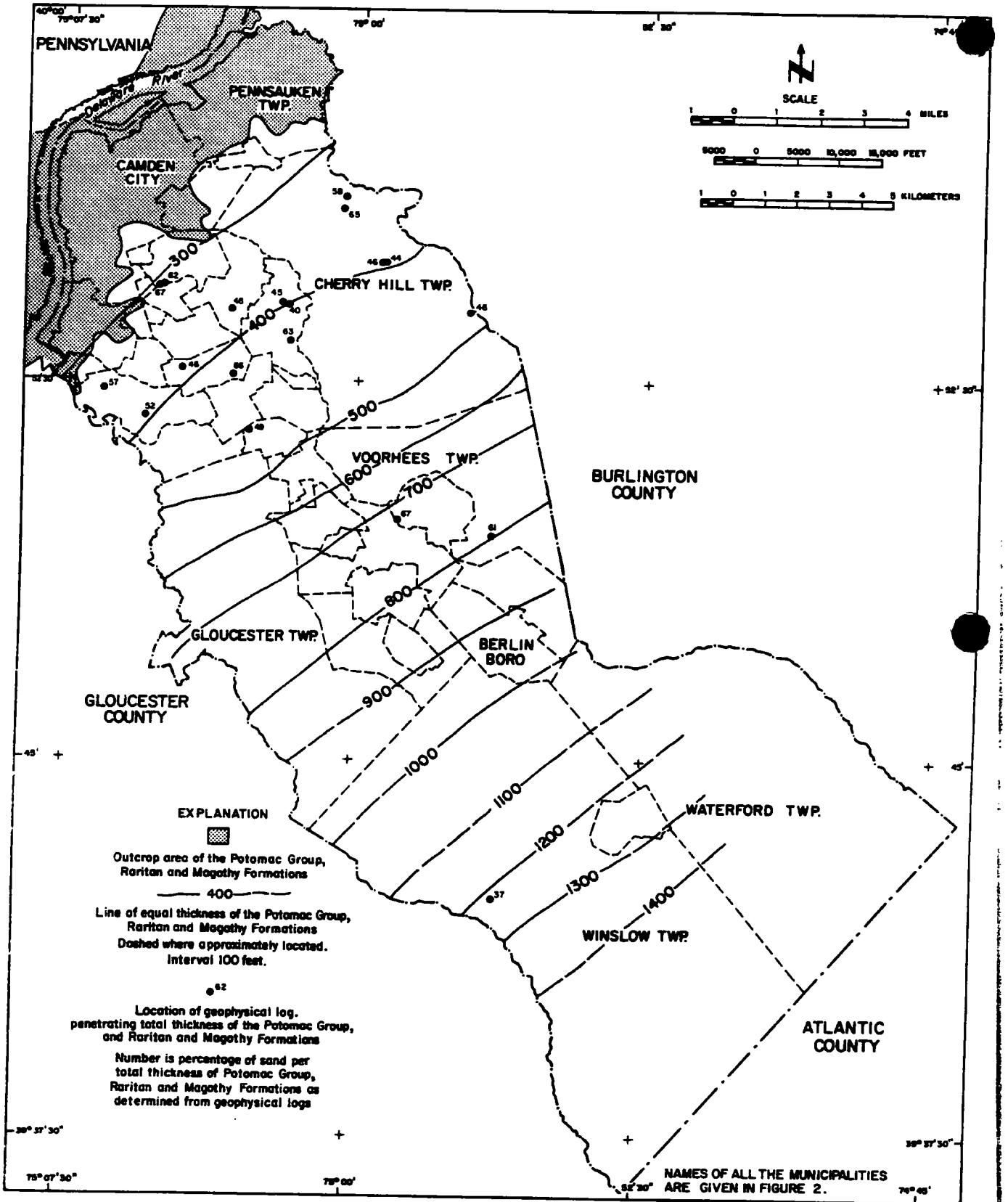
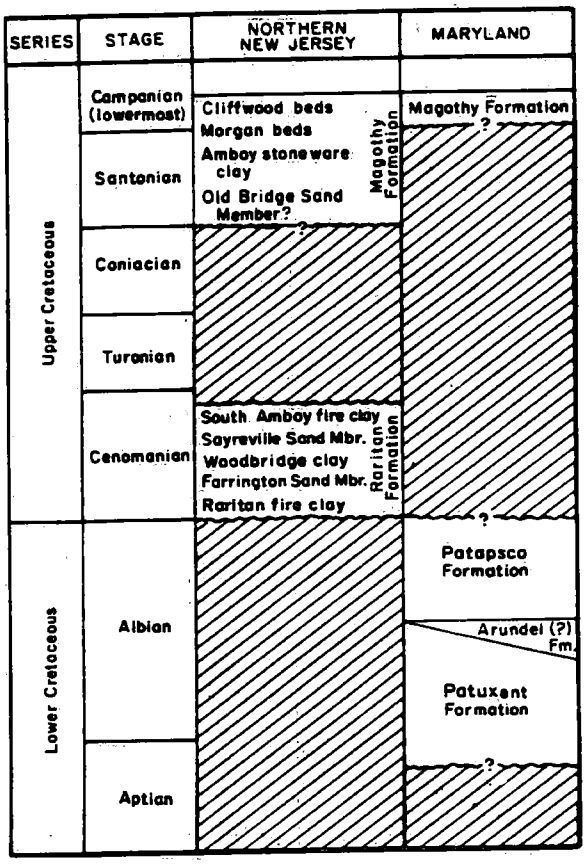


Figure 9. Thickness map of the Potomac Group and the Raritan and Magothy Formations in Camden County.



The lowermost part of the stratigraphic section, the Potomac Group, consists of the Patuxent, Arundel, and Patapsco Formations at the type locality in Maryland. Palynological studies of samples from three sites from the Camden County area by Wolfe and Pakiser (1971) and L. A. Sirkin (written commun., 1971) indicate that only the Upper Patapsco was found at two of the three sites. Berry (1911), from a study of megafossil flora, determined that the sample from a site in the outcrop near Camden is Upper Raritan. However, Wolfe and Pakiser (1971) who examined a sample from the same site indicate an uppermost Patapsco age based on palynologic data. According to Sirkin (written commun., 1971) the uppermost Patapsco can be found at Medford test well (ME 1), but not at the New Brooklyn Park test well (WI 27).

The Raritan Formation at the type locality at Raritan Bay, Middlesex County, was divided into seven units by Ries, Kümmel, and Knapp (1904) and later modified by Berry (1906). Barksdale and others (1943) assigned names to the three sand members. Recent palynological work by Wolfe and Pakiser (1971) and Doyle (1969) indicate that the upper two units, the Amboy stoneware clay and the Old Bridge Sand, are of Magothy age. Wolfe and Pakiser (1971) reassigned the Old Bridge Sand as the basal member of the Magothy Formation. However, the members of the Raritan Formation of the type area in Raritan Bay cannot be traced to the Delaware Valley as distinct lithologic units. Palynologic analysis of core samples from the New Brooklyn test well (WI 27) and the Medford test well (ME 1) indicate the Raritan Formation is present at the two sites (Sirkin, written commun., 1971).

The Magothy Formation in the Raritan Bay area has been re-examined by Owens, Minard, and Sohl (1968). Based on the then unpublished work of Wolfe and Pakiser (1971), Owens, Minard, and Sohl (1968) defined the Magothy as consisting of four units. The total thickness of the Magothy is more than 200 feet in the Raritan Bay area. Members of the Magothy Formation of the Raritan Bay area are not recognizable in the Delaware Valley. Palynological studies by Sirkin (written commun., 1971) indicate that there is about 300 feet of Magothy age sediments at New Brooklyn Park test well (WI 27) and about 100 feet at the Medford test well (ME 1).

Depositional Environment

The Potomac Group and the Raritan and Magothy Formations were deposited in a complex fluvial-deltaic environment (Owens and others, 1968). Figure 10 illustrates the idealized sand-dispersal system showing the various depositional environments for the Eocene deltas of Texas (Fisher and McGowen, 1969). The authors believed that the fluvial-deltaic sediments of the Potomac Group and the Raritan and Magothy Formations have a similar complex depositional history.

In the Camden area the sediments were deposited as part of the ancestral Schuylkill fluvial-deltaic system (Gill and Farlekas, written commun., 1969). Troughs in the bedrock surface represent erosional features that are of Late Cretaceous age or older. These troughs, filled mainly with coarse sands and gravels, have been delineated in Philadelphia by Greenman and others (1961). The sediments were deposited during Cretaceous time in the fluvial part of the system, which

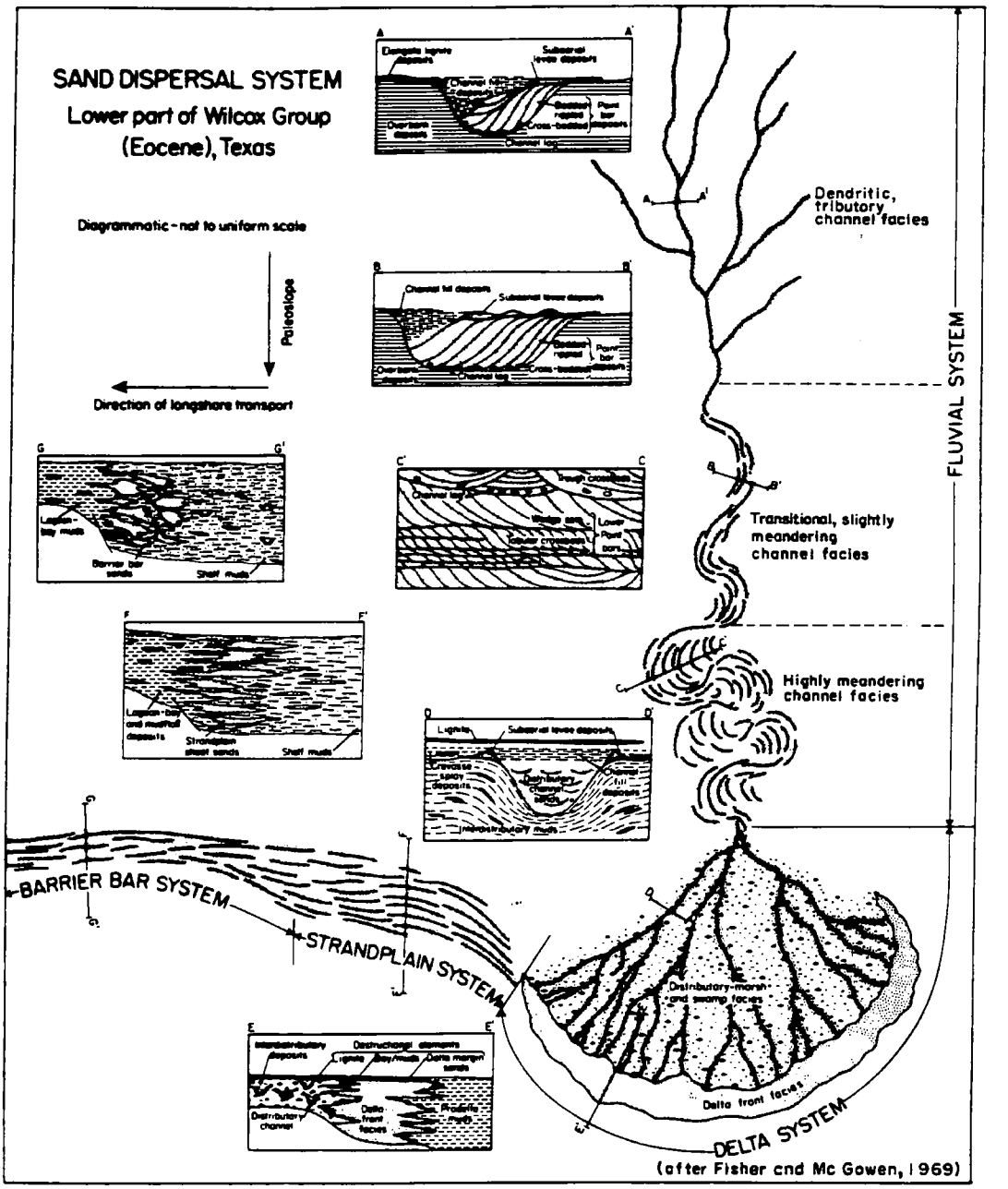


Figure 10. — Idealized sand-dispersal system in various depositional systems, Wilcox Group, Texas.

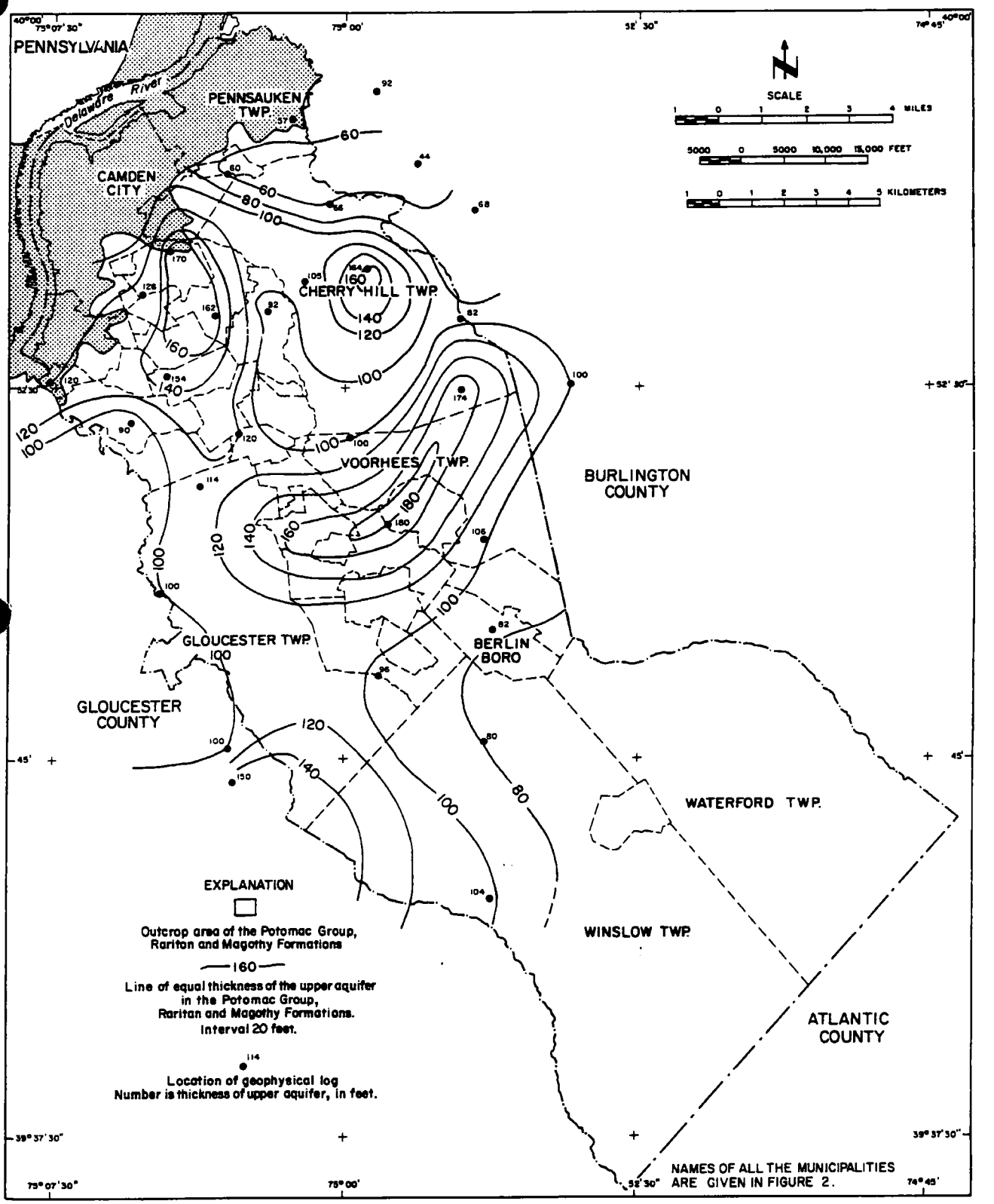
probably extended from Philadelphia to the area updip from New Brooklyn Park.

A thickness map of the Potomac Group and the Raritan and Magothy Formations is given in figure 9. Also shown is the percentage of sand as estimated from geophysical logs from wells that penetrate the section from the top of the Magothy to the crystalline rocks. The thickness lines show the thickening of the sediments downdip. The percentage of sand indicates greater values in the updip area and lower values in the downdip area. The estimated percentage of sand at the New Brooklyn Park well (WI 27) is 37. Based on the depositional concept developed by Fisher and McGowen (1969) the New Brooklyn Park well is interpreted as being in the distributary channel-marsh and swamp facies. The sediments found in the Haddonfield area are interpreted as including the transitional, slightly meandering channel facies of Fisher and McGowen (1969). The dendritic tributary channel facies is interpreted as occurring in the area from Philadelphia to the northern part of Camden County. The highly meandering channel facies probably occurs in the area downdip from Elm Tree Farms well (VO 12). Lack of data prevents the delineation of the extent of this facies downdip of the Elm Tree Farms area.

Particle-size analysis is available for samples from the New Brooklyn Park test well (WI 27) in Winslow Township (table 5). The particle-size analysis shows the predominant silt and clay values.

Hydrology

The most productive source of ground water in Camden County is the Potomac-Raritan-Magothy aquifer system. The aquifer system is made up of aquifers consisting of sand with some gravel and confining units consisting of silts and clays and is overlain in the outcrop area by highly permeable Pleistocene sand and gravel. The sands are separated into three hydrologic units, an upper, middle, and lower aquifer. The upper unit consists mainly of the sands of the Magothy Formation. The middle and lower units consist mainly of sands of the Raritan Formation and the Potomac Group. The thickness of the three hydrologic units are shown in figures 11, 12, and 13. The lower aquifer in the outcrop area is overlain by and hydraulically connected to the Pleistocene deposits and is a water-table aquifer in Philadelphia. The upper aquifer in the outcrop area is overlain by and hydraulically connected to the Pleistocene deposits in Camden County and is under water-table conditions.



ure 11. — Thickness map of the upper aquifer in the Potomac-Raritan-Magothy aquifer system in Camden County.

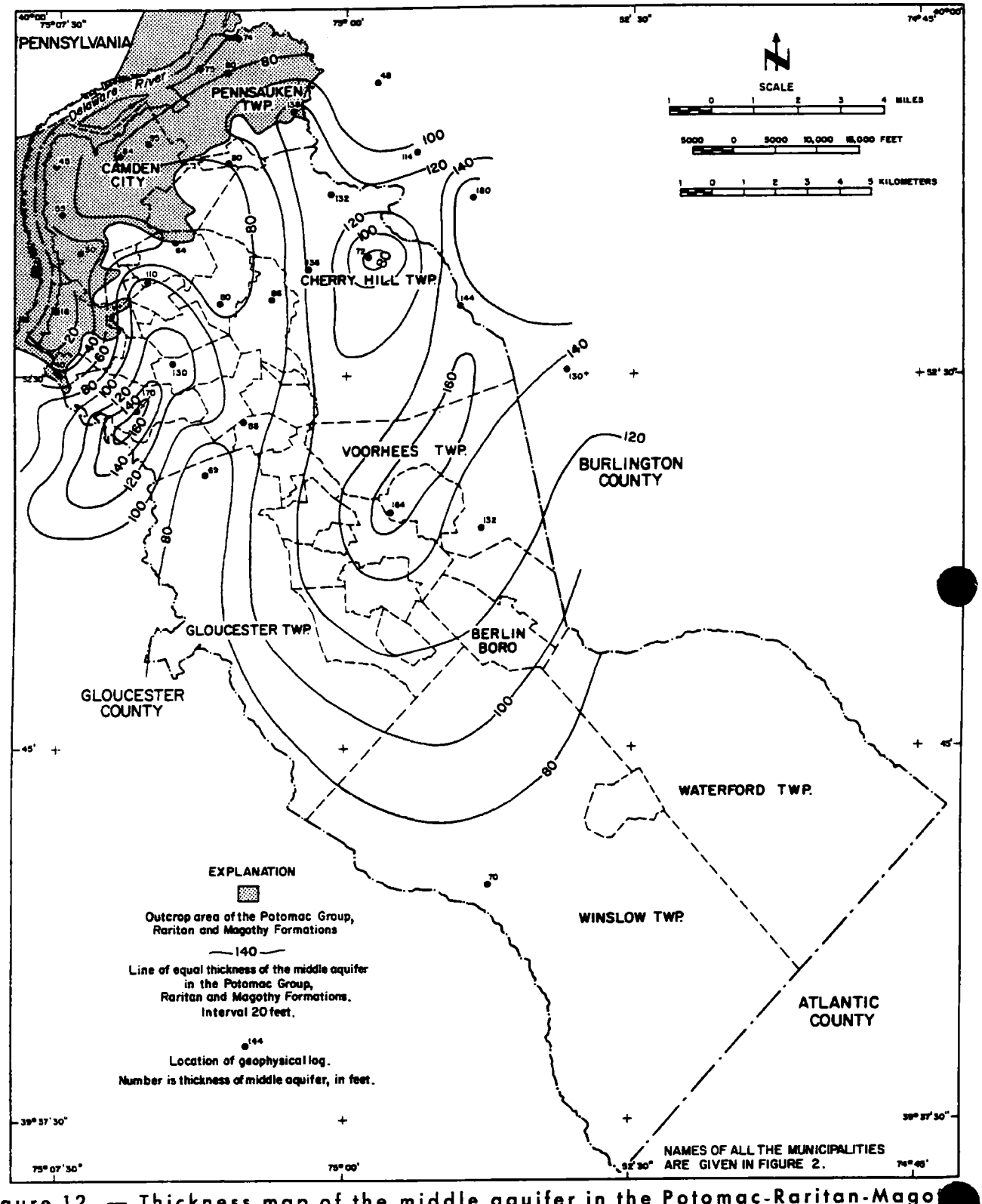


Figure 12. — Thickness map of the middle aquifer in the Potomac-Raritan-Magothy aquifer system in Camden County.

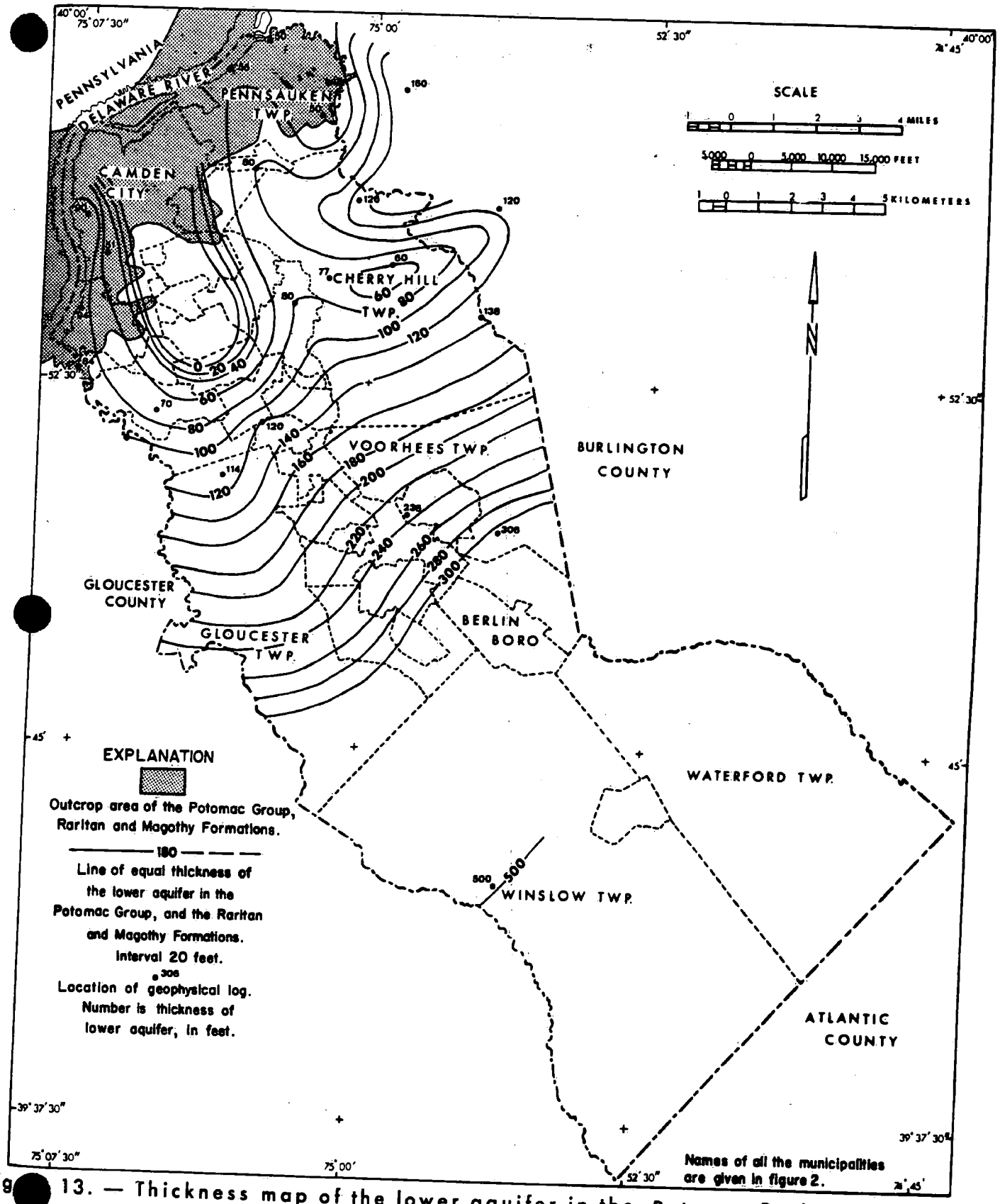


Fig. 13. — Thickness map of the lower aquifer in the Potomac-Raritan-Magothy aquifer system in Camden County.

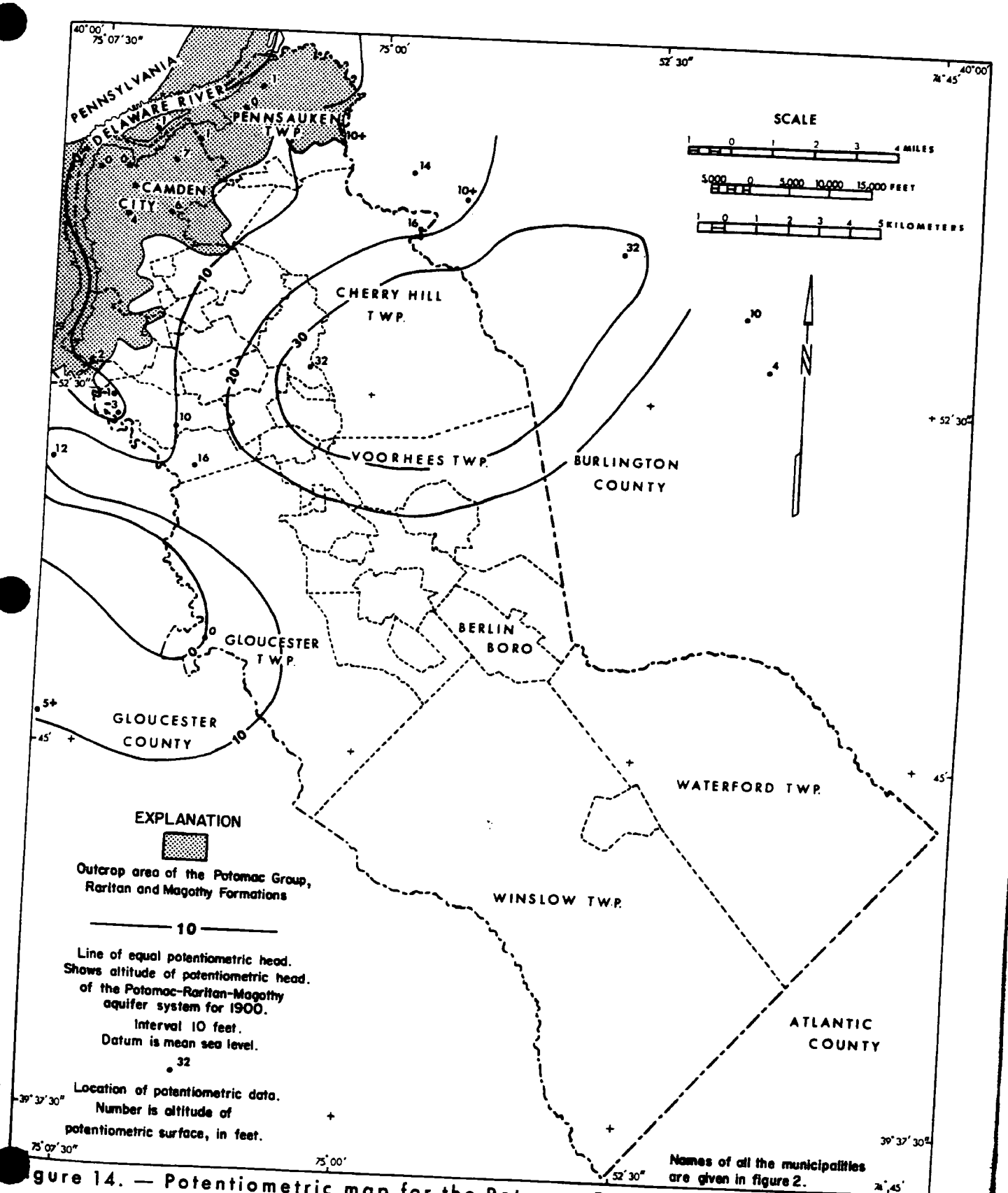
Patterns of Ground-water Movement

Pattern before development.--The natural ground-water flow regimen for the aquifer system prior to development was influenced by topography. The topographically high areas are the natural recharge zones for much of the ground-water system in the Coastal Plain. In areas of topographic highs the prepumping potentiometric surface of each aquifer was greater than that of the aquifer below. This indicates that vertical movement of ground water was downward through the semipervious confining units into the Potomac-Raritan-Magothy aquifer system. The discharge areas were the Delaware River, and to some extent, the topographic lows or stream valleys which cut across the outcrop areas.

The potentiometric map (fig. 14) represents the average natural conditions prior to 1900 for the Potomac-Raritan-Magothy aquifer system in Camden County. Most of the data for the map are from the annual reports of the State Geologist for the period 1888-1909. Water-level data for years after 1900 were used when there was reasonable certainty that the levels were indicative of natural or prepumpage conditions. In Camden County the topographically high recharge area occurs in northern Voorhees Township and southern Cherry Hill Township (fig. 14).

Pattern after development.--The first public-water supply obtained from the Potomac-Raritan-Magothy aquifer system and the hydraulically connected Pleistocene sediments in Camden County was from the Morris well field of the City of Camden in 1898. As the Camden City area's population and industry grew its need for ground water increased. Thompson (1932) describes in detail the ground-water development of the Camden area for 1898-1927. His data for Camden County were used to determine the annual pumpage from the Potomac-Raritan-Magothy aquifer system and the hydraulically connected Pleistocene sediments for 1917-27 shown in figure 15. Withdrawals by industrial wells were estimated by the present authors to be 4 mgd for 1917-27.

The early development of water in the Potomac-Raritan-Magothy aquifer system in Camden County was centered in the vicinity of Camden City, the area containing greatest concentration of population and industry. In later years suburban development had moved southeastward. During the 1950's and 1960's many new public-supply wells were drilled in



gure 14. — Potentiometric map for the Potomac-Raritan-Magothy aquifer system in Camden County, 1900.

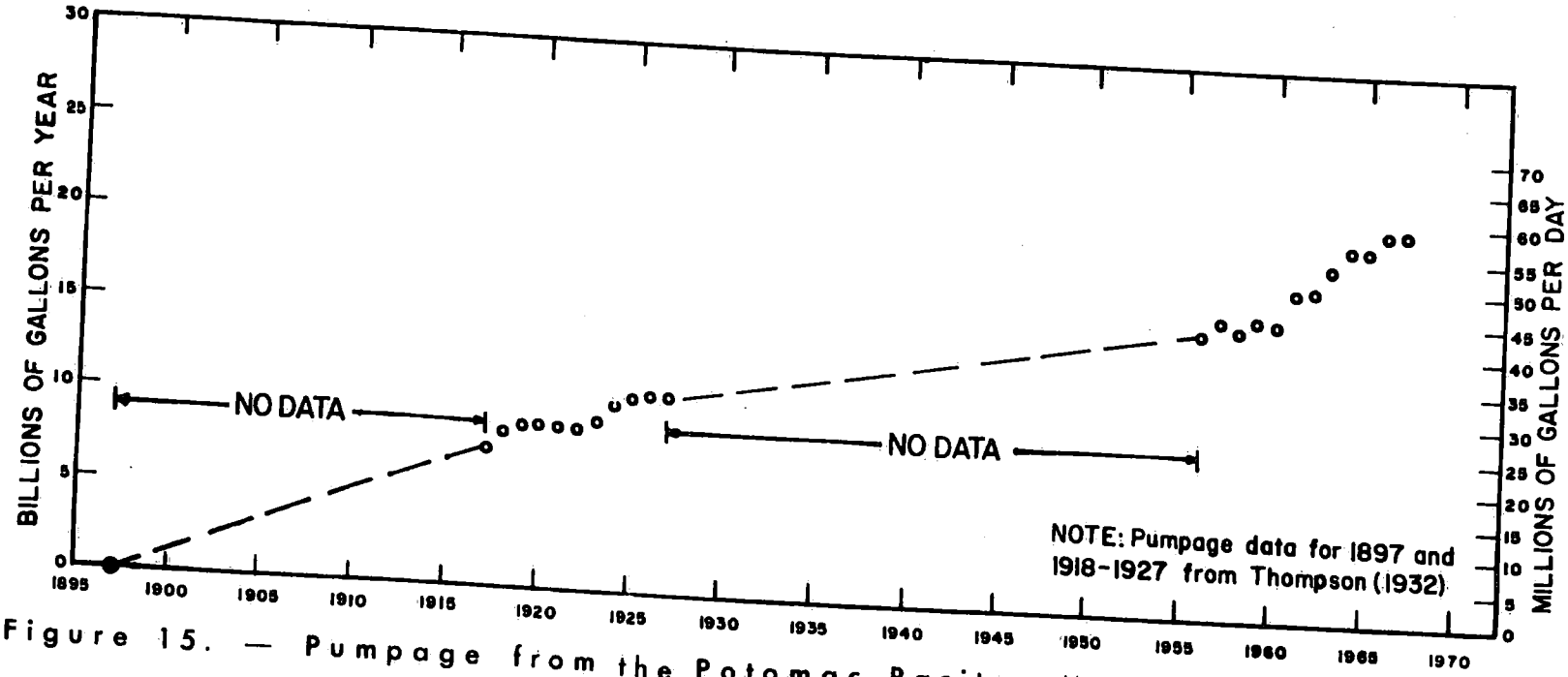


Figure 15. — Pumpage from the Potomac-Raritan-Magothy aquifer system in Camden County, 1897 - 1967.

areas where little or no water had been withdrawn from the Potomac-Raritan-Magothy aquifer system. Figure 16 shows the geographic distribution of the ground-water pumpage in 1966 for Camden County. Data used in figure 16 is tabulated in table 6. The effect of the increasing southeastward movement of demand on the aquifer system can be seen by comparing potentiometric surface maps. Figure 17 shows the 1956 potentiometric surface for the Potomac-Raritan-Magothy aquifer system. The map was developed from data from observation wells and reported data from newly drilled wells from mid-1955 to mid-1957. Figure 18 shows the potentiometric surface for 1968. This map was developed mainly from water-level measurements made over a three-day period from October 17 to October 19, 1968. A significant change in potentiometric surface occurred in the southeastern part of Camden County between 1956 and 1968. Prior to 1956 there was little ground-water diversion in the southeastern part of Camden County. New pumpage in this area after 1956, primarily from the upper and middle aquifer, is the probable cause for the change in potentiometric surface in the southeastern part of Camden County. Consequently, by 1968 a significant head difference existed between the upper and lower aquifer in southeastern Camden County and adjacent Gloucester County. The potentiometric heads for the upper and lower aquifers in the southeastern part of Camden County is shown in figure 18.

Three potentiometric decline maps were constructed from the potentiometric surface maps of the Potomac-Raritan-Magothy aquifer system. They are for 1) 1900 to 1956 (fig. 19), 2) 1956 to 1968 (fig. 20), and 3) 1900 to 1968 (fig. 21). Almost all of the decline from 1900 to 1956 occurred in the northern part of the county. The decline in the potentiometric surface during 1956 to 1968 (fig. 20) occurred throughout the county with the greatest declines in the Cherry Hill Township-Voorhees Township area and Berlin Borough area. From 1900 to 1968 the greatest potentiometric declines (more than 100 feet) occurred in the northcentral part of the county (fig. 21). Withdrawals from the Potomac-Raritan-Magothy aquifer system responsible for the decline in head are shown in figure 15. Pumpage was estimated for periods for which data were not available. Total pumpage from the Potomac-Raritan-Magothy aquifer system in Camden County from 1898 to 1968 based on figure 15 is 800 billion gallons. One-third of that pumpage was withdrawn in 13 years (1956 to 1968), which is 19 percent of the total period of pumpage.

Withdrawals in Philadelphia from the lower aquifer in the Potomac-Raritan-Magothy aquifer system has a direct effect on the potentiometric surface and ground-water flow in the Camden area. Greenman and others (1961) describe the history

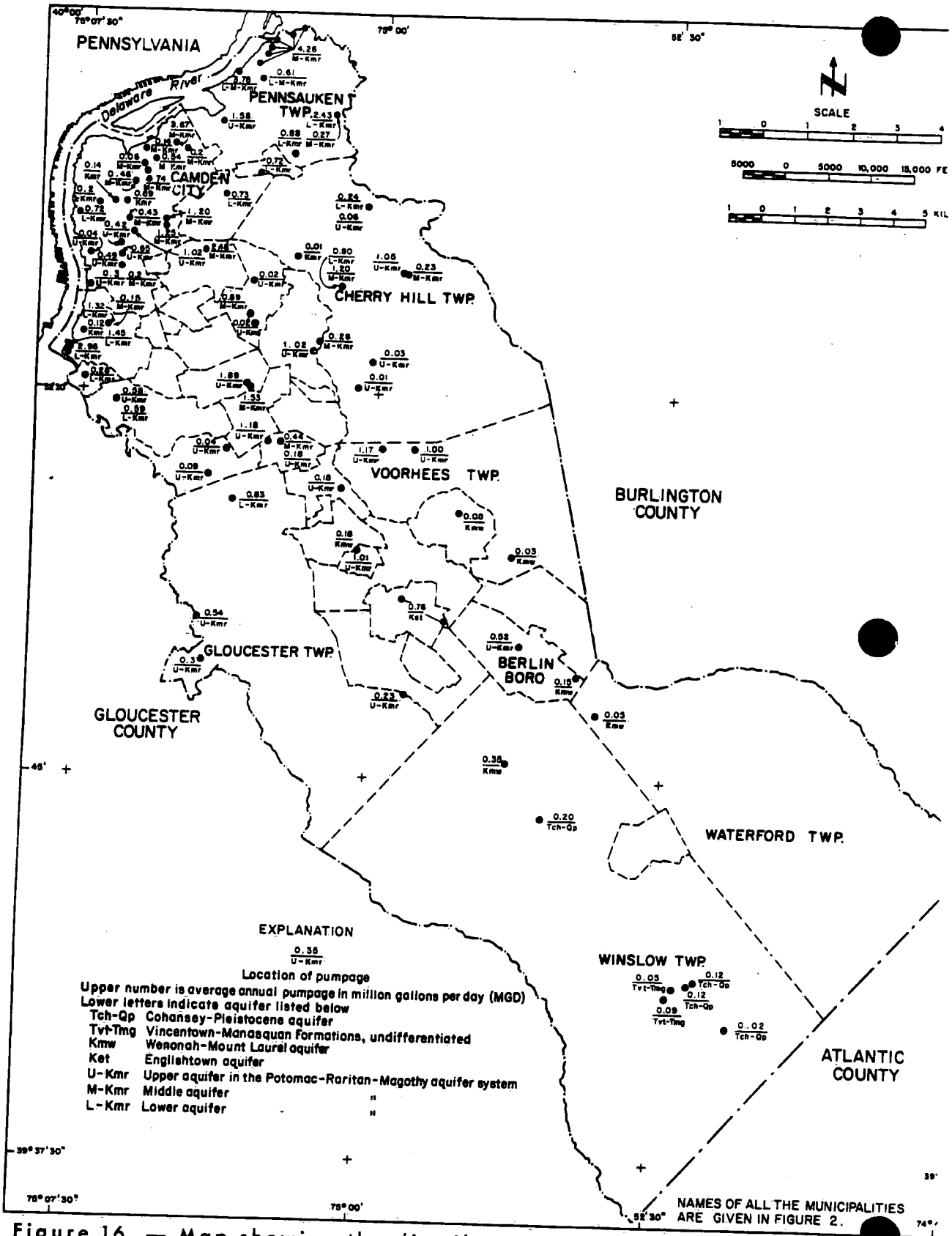


Figure 16. — Map showing the distribution of public and industrial pumpa in Camden County, 1966.

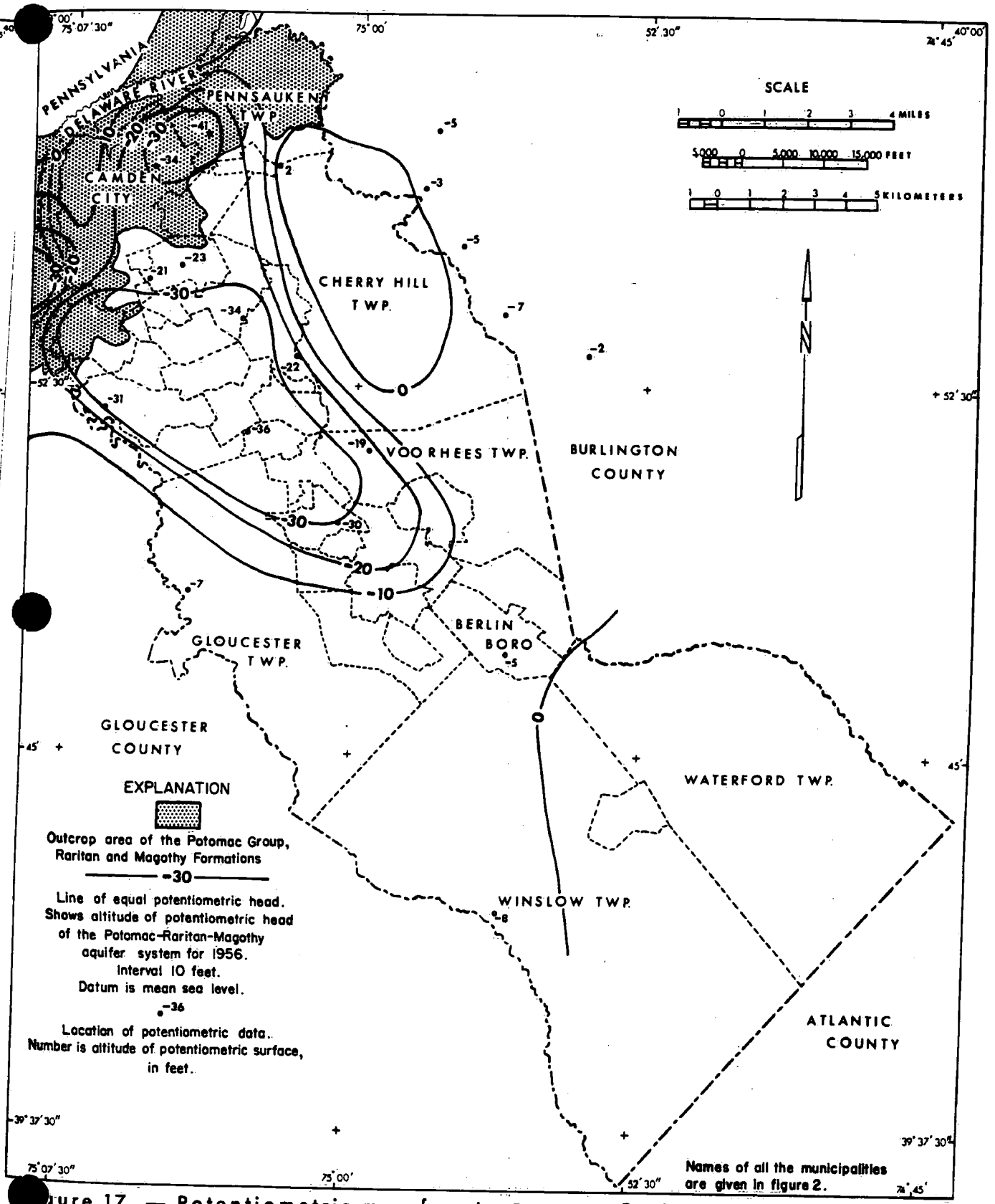


Figure 17. — Potentiometric map for the Potomac-Raritan-Magothy aquifer system in Camden County, 1956.

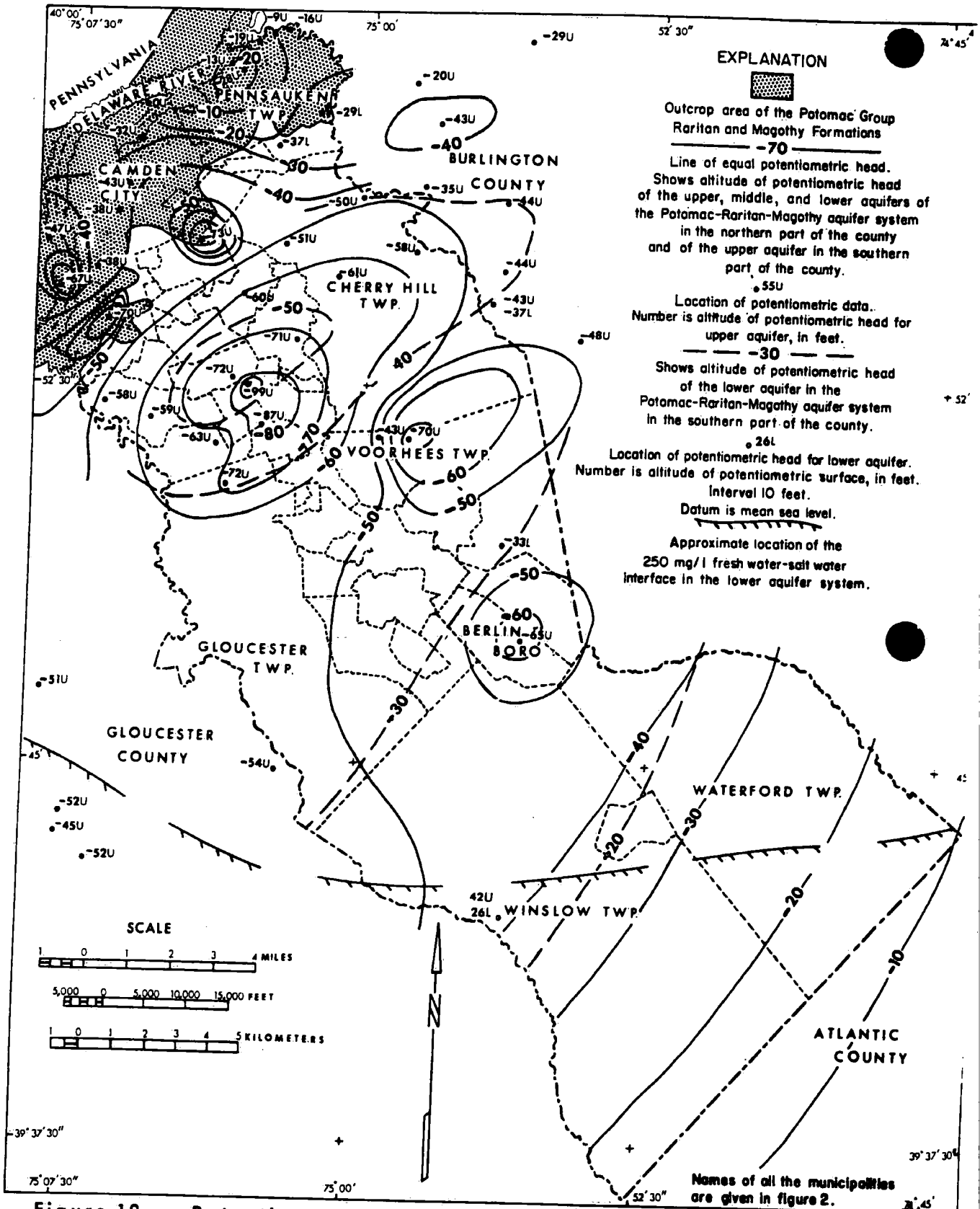


Figure 18. — Potentiometric map for the Potomac-Raritan-Magothy aquifer system in Camden County, October 17-19, 1968.

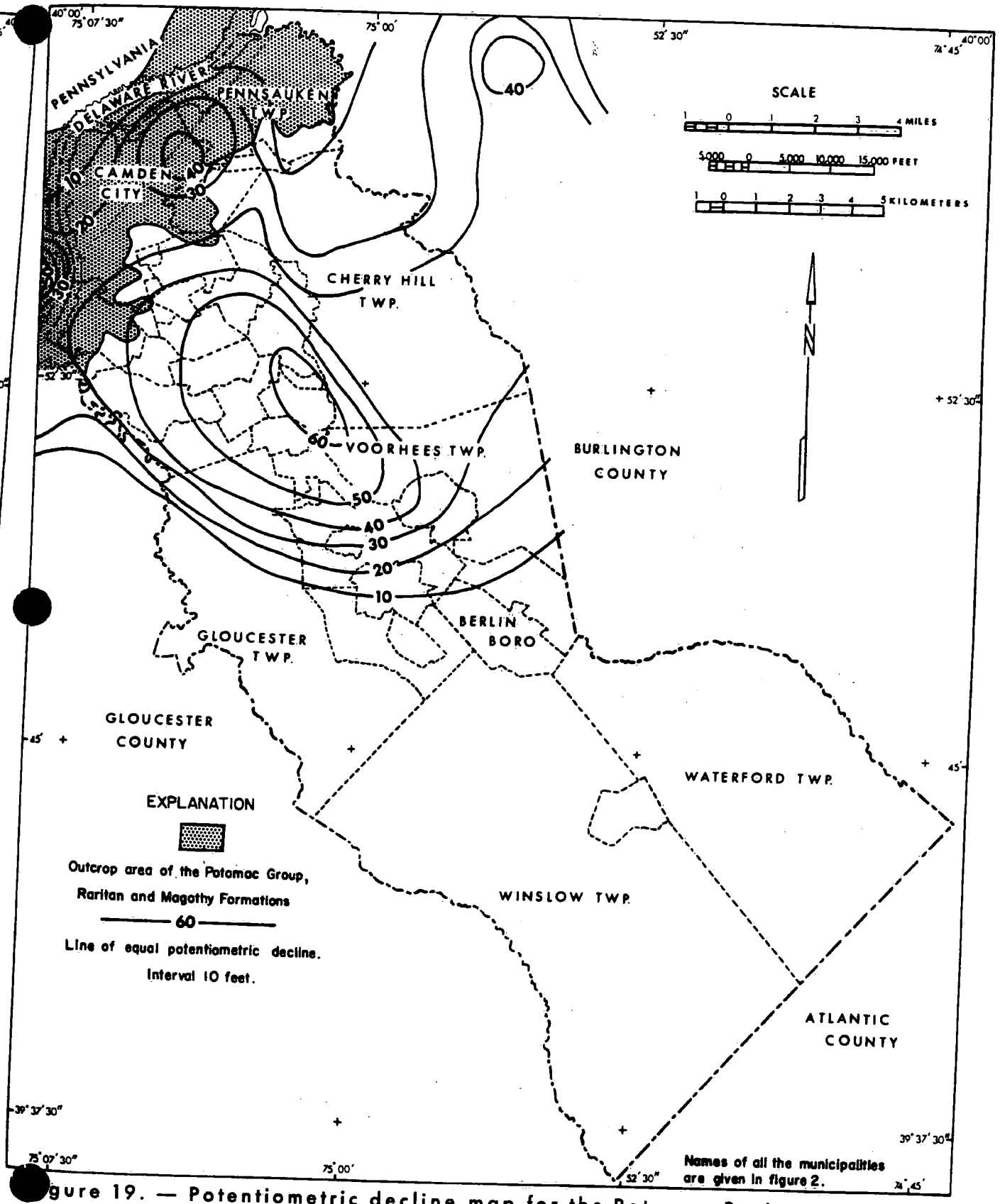


Figure 19. — Potentiometric decline map for the Potomac-Raritan-Magothy aquifer system in Camden County, 1900-56.

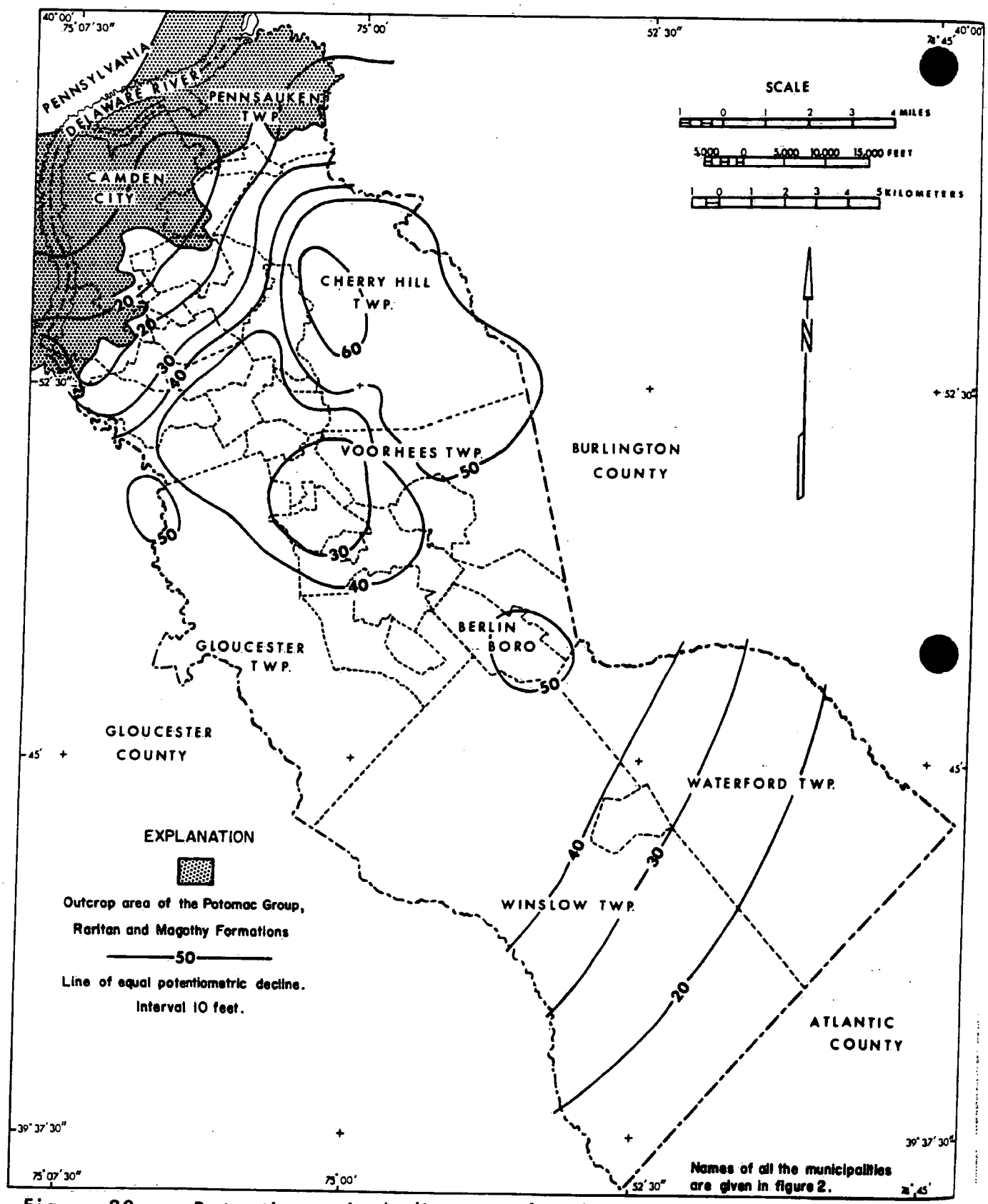


Figure 20. — Potentiometric decline map for the Potomac-Raritan-Magothy aquifer system in Camden County, 1956-68.

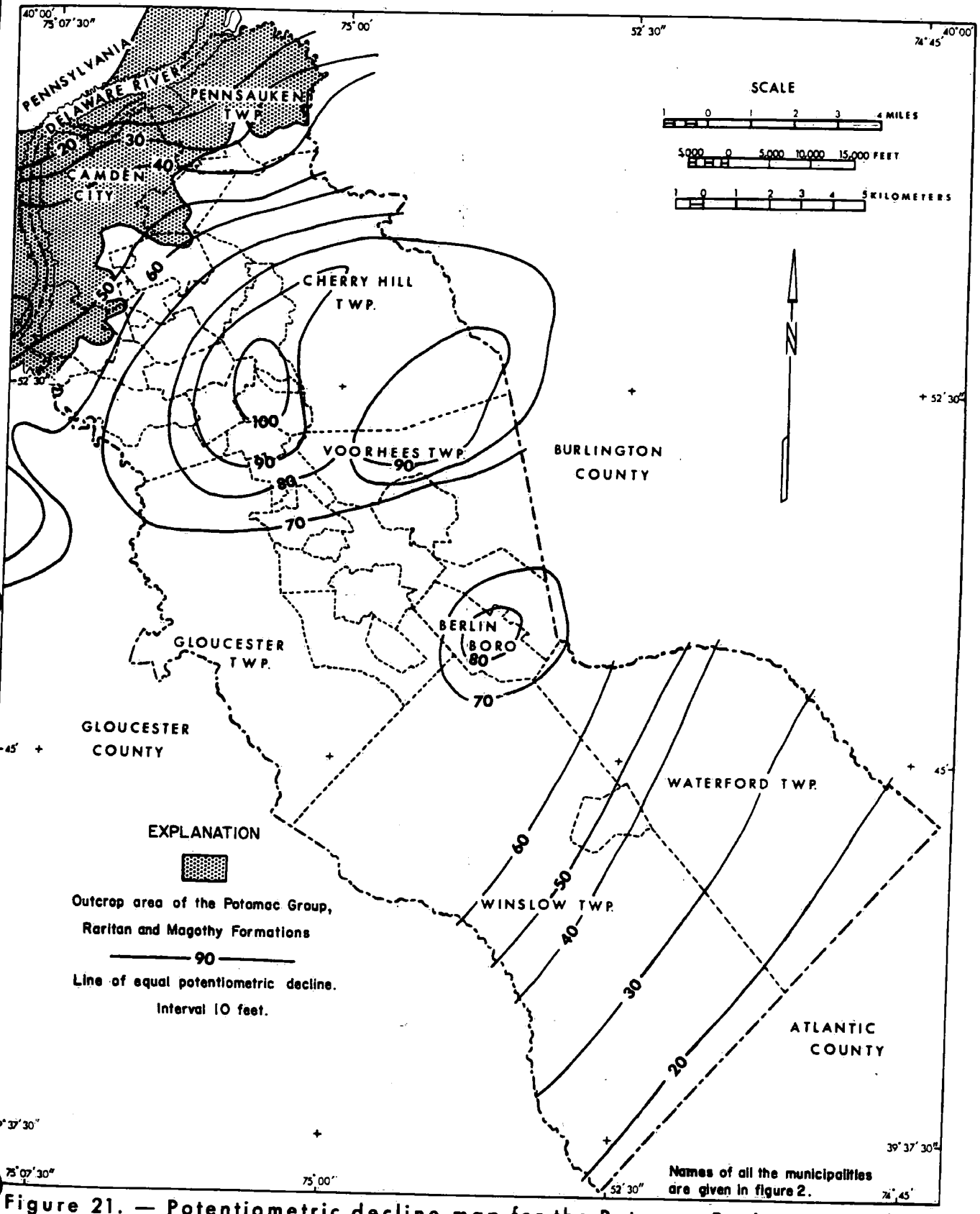


Figure 21. — Potentiometric decline map for the Potomac-Raritan-Magothy aquifer system in Camden County, 1900-68.

of development from the lower aquifer in Philadelphia and present maps of the potentiometric surface for the early 1920's, 1940, 1945, and 1954. The pumpage was approximately 5 mgd in 1920, 15 mgd in 1940, and 23 mgd in 1945. Withdrawals from the lower aquifer in Philadelphia decreased in 1946 and 1947, but again increased to 23 mgd in 1951. The rate of withdrawals declined after 1953 and pumpage in South Philadelphia in 1956 was 18 mgd. No recent complete inventory of withdrawal from the lower aquifer in Philadelphia has been made. However, spot inventories at the U. S. Navy Base and head measurements in 1968 in a few wells in Philadelphia indicate a much lower pumpage. Many wells pumped in 1956 were no longer in use in 1968.

Recharge and Movement of Ground Water

As presented in the section on patterns of ground-water movement the movement of water in the Potomac-Raritan-Magothy aquifer system prior to pumpage was influenced by recharge in topographically high areas while the discharge areas were the Delaware River, and to some extent, the topographic lows or stream valleys which cut across the outcrop areas.

Recharge and movement of water in the Potomac-Raritan-Magothy aquifer system was altered by the large amount of withdrawals, especially in the area near the Delaware River. As pumping increased the gradients were reversed in the water table and artesian aquifers near and under the Delaware River. Greenman and others (1961) suggest that induced recharge occurs from the Delaware River into the aquifers in Philadelphia. They compared the specific conductance of the water from a well located near the Delaware River and the specific conductance of the Delaware River. Fluctuations in specific conductance were similar except that there was a five-month time lag. Barksdale and others (1958) give substantial evidence to show that induced recharge from the Delaware River occurs in the heavily pumped parts of the aquifer near the river. They cite three types of evidence; aquifer test results, temperature fluctuations, and changes in chemical quality. An aquifer test at the Morro Phillips tract in Camden City near the Delaware River indicated a recharge boundary under the river and suggested that after two years of operation a well near the river would obtain 90 percent of its water from the river. Temperatures of water in a well near the river (at Beverly, Burlington County) change seasonally as does the temperature of water in the Delaware River. On the other hand the temperature of the water in a well several miles away from the river (at

Haddon Heights) remains essentially constant (Barksdale and others, 1958, p. 106-108). Changes in chemical quality of water from wells near the river were cited by Barksdale and others (1958) as evidence of induced recharge. Table 7 gives the chemical quality data of two wells, located in Pennsauken Township, used by Barksdale and others (1958, p. 121-123) and also includes more recent data. The water-quality analyses dated 1924 (table 7) were for samples collected just after completion of the wells. As pointed out by Barksdale and others (1958) the dissolved-solids content of the water from well 1 (PE 18), located near the river, more than doubled between 1924 and 1953 while the quality of water from well 4 (PE 21), located one mile from the river, remained the same. Much of the water obtained from well 1 is induced river water; whereas, well 4 receives a much greater part of its water from the aquifer and a lesser amount of water from the Delaware River. Data from samples taken after 1953 from well 1 indicate improved quality for a period of approximately 13 years. This was followed by a decline in quality as evidenced by increasing chlorides, sulfates, and specific conductance. Chlorides were 27 mg/l (milligrams per liter) in 1969, an increase from 8.0 mg/l in 1963. Changes in the quality of the river water probably caused the variation in quality of water in the wells.

Recharge of the aquifer system downdip from the outcrop area is mainly from vertical leakage through the overlying confining unit. In the area downdip of the outcrop there have been significant declines in the potentiometric surface--declines in excess of 100 feet at some locations. The difference in heads between those in the Potomac-Raritan-Magothy aquifer system and the overlying aquifers provides the driving mechanism for downward vertical leakage. The rate of vertical leakage is, with all other factors being equal, probably greater in the downdip area where large head differences occur. In the area near the outcrop the head difference is not as large, and thus the rate of vertical leakage is probably smaller. This area is also closer to the Delaware River, which is a recharge boundary. In addition to recharge of water through the confining units, significant amounts of water are released to the aquifer system from storage within the confining silts and clays in the Potomac Group and the Raritan and Magothy Formations and the overlying confining units.

An additional source of water lies outside of the political boundaries of Camden County. Water moves toward Camden from the adjacent areas outside the county line as the pumping cone of depression expands. Description of the regional pattern of ground-water flow for this aquifer system for the hydrologic unit in southern New Jersey has been studied

in detail by Gill and Farlekas (written commun., 1969).

The source of water in the Potomac-Raritan-Magothy aquifer system in Camden County is therefore 1) precipitation on the outcrop area and induced recharge from streams located in the outcrop area, for example, the Delaware River, 2) recharge through the confining units, 3) water released from storage from the silts and clays of the Potomac Group and Raritan and Magothy Formations and overlying units, and 4) water from the adjacent areas as the cone of depression expands.

Aquifer Characteristics

A number of aquifer tests in the Camden County area for wells tapping the Potomac-Raritan-Magothy aquifer system have been evaluated in the past using the Theis nonequilibrium method (Ferris and others, 1962, p. 92), which assumes that the confining layers are impermeable. Results were reported in Barksdale and others (1958, p. 96-98) and Rush (1968, p. 32-33). Four of these aquifer tests have been re-evaluated (Harold Meisler, written commun., 1973) to include leaky artesian aquifer conditions proposed by Hantush (1960). Two of the four re-evaluated aquifer tests are for wells located in Camden County near the Delaware River and tap the middle aquifer of the Potomac-Raritan-Magothy aquifer system. The results of the test at the site of the Camden Water Department well 14 (CA 18) indicate that the transmissivity ranges from 2,300 to 6,700 ft^2/day (17,000-50,000 gpd/ft) with an average of 4,300 ft^2/day (32,000 gpd/ft^2). The storage coefficient ranges from 1.0×10^{-4} to 3.5×10^{-4} with an average of 1.8×10^{-4}. The re-evaluated results of the aquifer test at the Stockton pumping station (Camden Division) of the New Jersey Water Company indicate that the transmissivity ranges from 3,200 to 3,700 ft^2/day (24,000-28,000 gpd/ft) and the storage coefficient ranges from 3.3×10^{-5} to 1.5×10^{-3}.

Many large diameter high-yielding wells tap the Potomac-Raritan-Magothy aquifer system. The yields of 106 wells in Camden County (diameter 12 inches or greater) range from 455 to 1,900 gpm (gallons per minute) (table 1). The average yield for 106 wells is 1,085 gpm. The specific capacities of these wells are high, indicating a high aquifer transmissivity. The range of specific capacity of 96 wells (diameter 12 inches or greater) tapping the Potomac-Raritan-Magothy aquifer system in Camden County is 6.1 to 80 gpm/ft (gallons per minute per foot of drawdown) (table 1). The average specific capacity of these wells is 29.3

gpm/ft. Two-thirds of the specific capacities range between 15 to 35 gpm/ft. Figure 22A shows the distribution of the specific capacities of the 96 large diameter wells.

Another method for determining the hydraulic properties of aquifers is the specific capacity of a well divided by the length of well screen. The specific capacity of the well per foot of well screen may be more meaningful than specific capacity where the length of well screens differ considerably. The distribution of values of specific capacity per foot of well screen for 95 wells (diameter 12 inches or greater) tapping the Potomac-Raritan-Magothy aquifer system in Camden County is shown in figure 22B. These values range from 0.12 to 2.29 gpm per foot of screen. About 56 percent of the values range between 0.6 and 1.0 gpm per foot of screen. The average specific capacity per foot of well screen is 0.83 gpm per foot of screen. Values of specific capacity per foot of well screen for wells tapping the Potomac-Raritan-Magothy aquifer system located in the outcrop area are generally higher than those located downdip from the outcrop. The average specific capacity per foot of well screen for 60 wells located in the outcrop area is 0.95 gpm per foot of screen and the range is from 0.35 to 2.29 gpm per foot of screen. The average specific capacity per foot of well screen for 35 wells located downdip from the outcrop is 0.52 gpm per foot of screen and the range is from 0.22 to 1.7 gpm per foot of screen. The higher values for wells located in the outcrop area are attributed to better hydraulic properties of the aquifer and proximity to source of recharge, primarily from the Delaware River. This is in agreement with the evidence cited by Barksdale and others (1958) and Greenman and others (1961) indicating recharge from the Delaware River.

Quality of Water

Detailed analysis of water-quality data for the Potomac-Raritan-Magothy aquifer system has been presented in recent publications by Langmuir (1969a and 1969b) and Gill and Farlekas (written commun., 1969). Camden County was one of the counties included in these recent studies. Some of the data used in the recent studies are given in table 4.

Water from the Potomac-Raritan-Magothy aquifer system in a large part of Camden County, with the exception of iron content, meets the State's standards for potable water (New Jersey State Department of Environmental Protection, 1970) with little or no treatment and is suitable for most industrial and agricultural needs. Recent analyses of water from two wells in Camden City suggest that chromium values are equal to or above

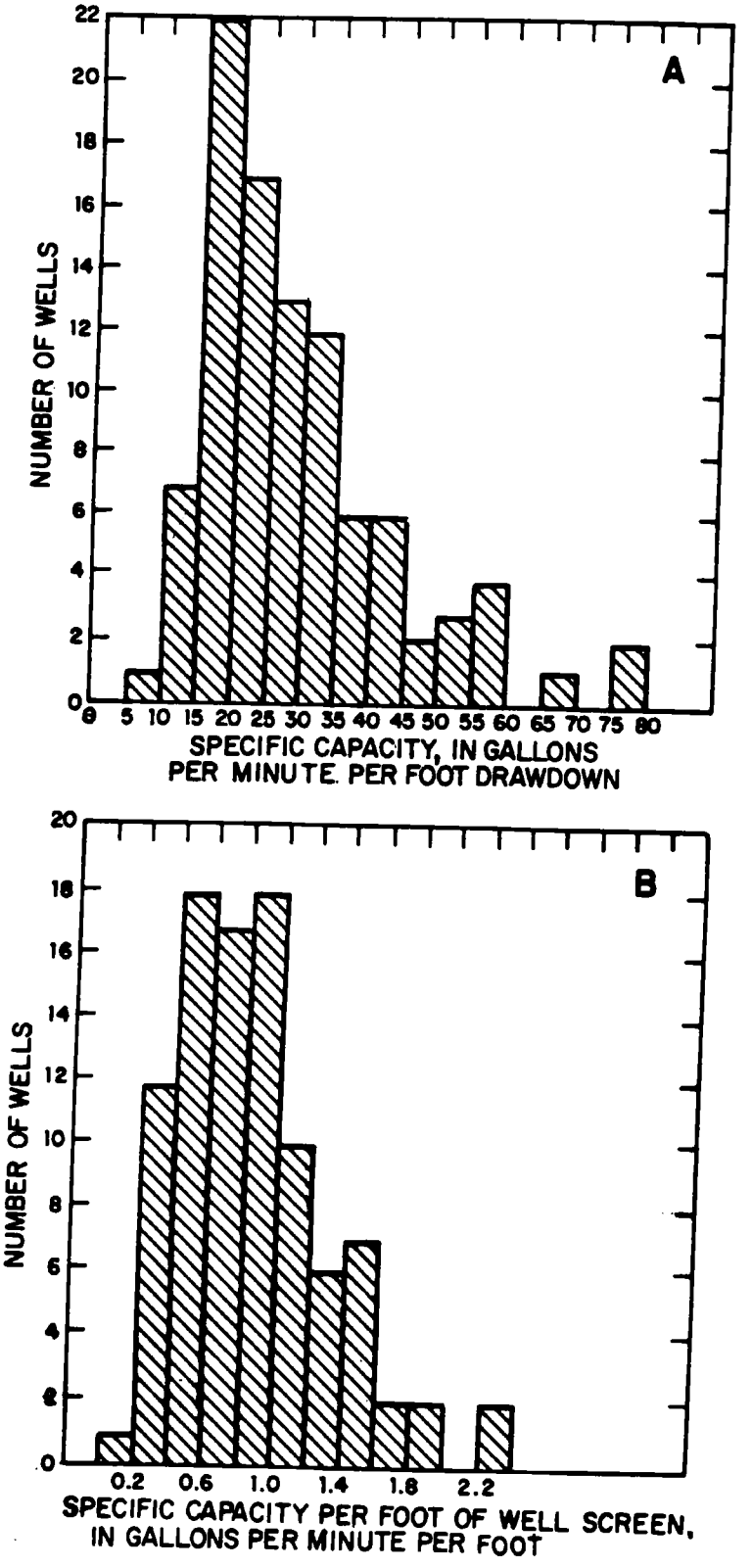


Figure 22. — Distribution of specific capacities of large diameter wells (12 inches or greater) tapping the Potomac-Raritan-Magothy aquifer system in Camden County.

the State's standards. This and additional water-quality problems are described below.

A summary of chemical analyses of water from wells tapping the Potomac-Raritan-Magothy aquifer system in Camden County is shown in table 8. This table gives maximum, average, and minimum parameters for samples from wells located in the outcrop area of the Potomac-Raritan-Magothy aquifer system and from samples from wells located downdip from the same outcrop area. Only the most recent analyses (table 4) were used to determine values shown in table 8.

The quality of water from wells located in the outcrop area of the Potomac-Raritan-Magothy aquifer system in Camden County varies from well to well. The variation is partly dependent on the depth of the well, the nature of the overlying sediments, and on the distance from the Delaware River. Chemical analyses (table 8) indicate that dissolved solids range from 39-445 mg/l; sulfates, 0.8-178 mg/l; and chlorides, 5.5-59 mg/l for samples from wells located in the outcrop area. Hardness ranges from soft to very hard (14-274 mg/l).

The quality of water of the Potomac-Raritan-Magothy aquifer system is, with the exception of iron content, within the State's standards for potable water in the area from the southeast limit of the outcrop area downdip to the vicinity of the New Brooklyn Park observation wells in Winslow Township. Water obtained from wells tapping the aquifer in the area that is overlain by the Merchantville-Woodbury confining unit, excluding the New Brooklyn Park area, is low in dissolved solids (48-150 mg/l), sulfates (2.6-34 mg/l), and chlorides (1.4-18 mg/l). Hardness ranges from soft to moderately hard (14-114 mg/l).

Samples collected in 1961 from the New Brooklyn Park well (WI 27) tapping the upper aquifer indicate chloride concentrations of approximately 4.0 mg/l; whereas, water from well (WI 28) tapping the lower aquifer in 1960 had a chloride concentration of approximately 300 mg/l (Donsky, 1963). Analyses of samples collected in 1972 for these two wells have similar values (table 4). The difference in chloride data from the New Brooklyn Park wells and other wells tapping the Potomac-Raritan-Magothy aquifer system in Ocean and Gloucester Counties (Gill and Farlekas, written commun., 1969) suggests lateral as well as vertical differences in chloride content in the aquifer system. This difference in chloride content as well as other water-quality parameters suggest that an interface exists between the salt water to the southeast and fresh water to the northwest and is represented by a broad zone of diffusion in the aquifer system. The 250 mg/l chloride line

for the upper aquifer is located several miles southeastward of the 250 mg/l chloride line for the lower aquifer (fig. 19). The 250 mg/l chloride line may be considered the limit of sea-water encroachment, inasmuch as the interface of salt and fresh water probably is not far seaward from this line (Parker, 1964). The high-chloride water in the southeastern part of the Potomac-Raritan-Magothy aquifer system is probably due to brackish-marine water entering the aquifer system during deposition of the sediments or the re-entering of ocean water after changes in sea level.

Water-quality analyses for wells tapping the Potomac-Raritan-Magothy aquifer system in Camden County indicate change in quality of water in the aquifers with time. In some cases the analyses show decreases in chloride and nitrate concentrations over a period of time; whereas, in other cases analyses show increases in chloride, sulfate, and dissolved solids. A summary of chemical analyses for selected wells tapping the Potomac-Raritan-Magothy aquifer system in Camden City for 1923-70 is shown in table 9. Data used in table 9 is from Thompson (1932), Donsky (1963), and table 4.

Chlorides, as reported (Thompson, 1932) for wells at two different sites tapping the upper aquifer in Camden City, were higher than those reported for the same or comparable well samples in 1966-67. The chloride content at one of the sites (Camden City Water Department wells 3-3A) decreased from 51 mg/l in 1928 (Thompson, 1932) to 28 mg/l in 1949 (Donsky, 1963). The chloride content for the same site was 41 mg/l in 1969 (table 4). At the second site (Camden City Water Department wells 6-6N) the chloride content decreased from 72 mg/l in 1932 (Donsky, 1963) to 32 mg/l in 1969 (table 4).

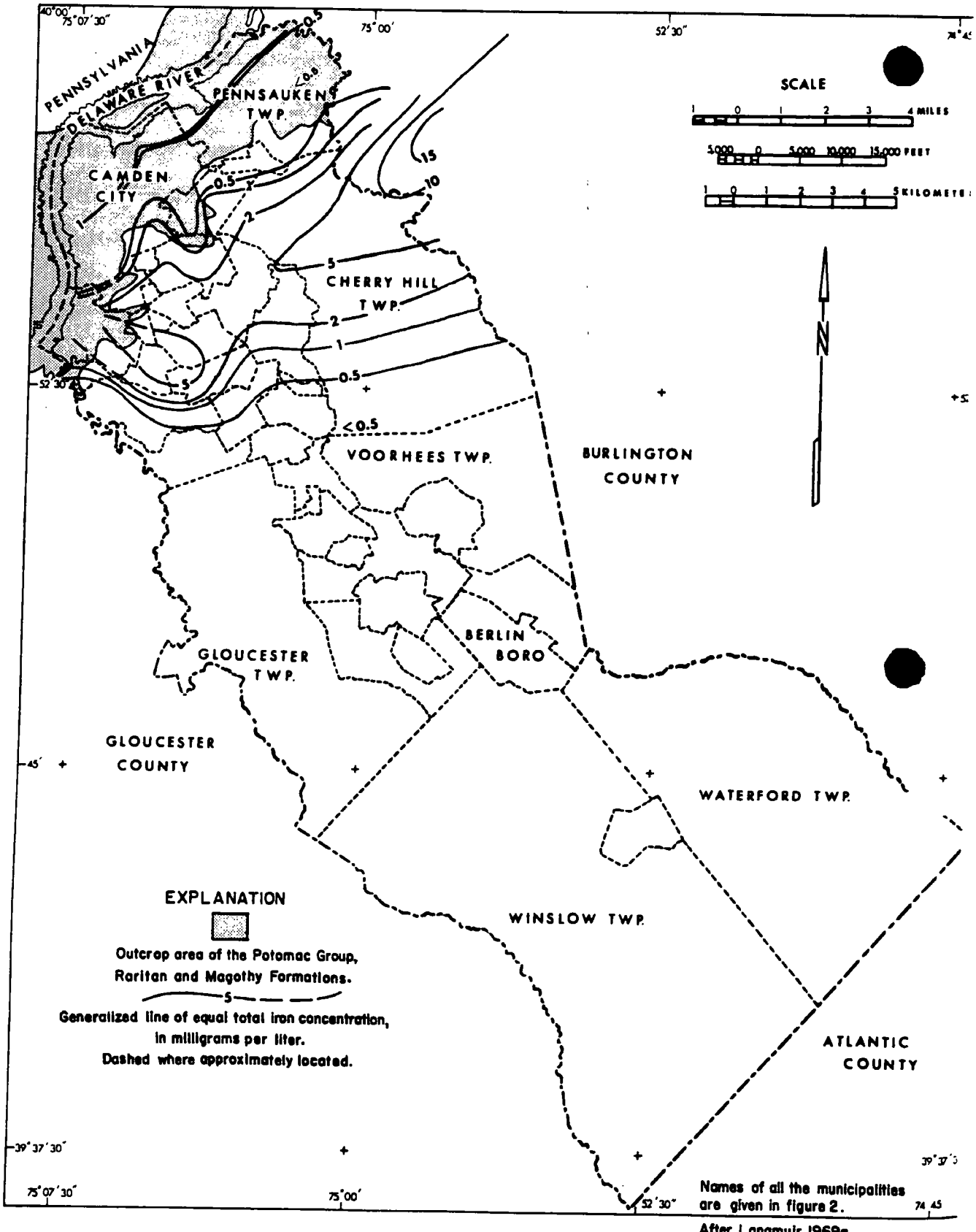
Wells tapping the middle or lower aquifer near the Delaware River generally have shown a deterioration in water quality over a period of time, as indicated by an increase in chloride and sulfate concentrations. Camden City Water Department wells at four sites (1A, 5-5N, 7, and 11) indicate a rise in chloride concentration over a period of years (table 4). There is also a corresponding rise in sulfate concentration in Camden City Water Department wells 1, 3, 4, 5, 6, and 10 (table 4). Water-quality analyses from Camden City wells 13 and 17, which tap the middle or lower aquifer, indicate that there has not been a change in quality at the two sites during the period samples. These two wells are located farther east than the other Camden City wells cited above, suggesting no change in water quality of the middle and lower aquifer in this area.

It can be assumed that water from wells in the Camden City area prior to 1920 probably was of slightly better quality than that reported by Thompson (1932). The change in the quality of water in the shallow and deeper aquifer between 1900 and 1967 as noted above may have been due to contamination from disposal ponds, waste-injection wells, and improperly sealed abandoned wells. The contamination may be similar to that documented by Greenman and others (1961) in adjacent areas of Philadelphia, but on a smaller scale.

Iron in the water of the Potomac-Raritan-Magothy aquifer system is the most troublesome water-quality parameter for many users. New Jersey's Potable Water Standards (1970) recommends a maximum iron concentration of less than 0.3 mg/l for potable supplies; however, most of the water analyses for the aquifer system indicate concentrations greater than 0.3 mg/l. Thus, treatment for iron removal is required for most users. The iron is present in the water as dissolved Fe^{+2} and $FeOH^{+1}$, and as suspended ferric oxyhydroxides, probably caused by the oxidation of ferrous species already in solution (Langmuir, 1969b). Langmuir (1969b) suggests that the oxyhydroxides are mixtures of goethite and amorphous materials with small amounts of hematite.

Samples from wells in the Camden County area were collected and analyzed separately for total iron and ferrous iron, with the difference assumed to be the concentration of particulate ferric hydroxide (Langmuir, 1969a, p. 19). Total iron, therefore, represents the sum of dissolved ferrous iron and colloidal ferric hydroxide. The distribution of total iron and ferrous iron concentrations in water of the Potomac-Raritan-Magothy aquifer system in the vicinity of Camden County as determined by Langmuir (1969b) is shown in figures 23 and 24. In the outcrop area dissolved ferrous or suspended ferric species are generally less than 0.5 mg/l in unpolluted waters. High concentrations in the outcrop area are interpreted by Langmuir (1969b) as the result of local ground-water contamination.

Immediately downdip of the outcrop area the ferrous and ferric iron species increase abruptly to about 7.0 mg/l. The high build-up of ferrous iron species in this area is due to the reaction with the ferrous iron minerals, such as pyrite and siderite, in the Merchantville-Woodbury confining bed. Langmuir (1969b) concluded that the parallel increase in ferric species to 6.0-11 mg/l may be caused by partial oxidation of Fe^{+2} and $FeOH^{+1}$. Total iron concentrations in the water of the Potomac-Raritan-Magothy aquifer system are highest in areas adjacent to the outcrop area. Seaber (1965) in his geochemical analysis of the Englishtown Formation also noted that the



After Langmuir 1969a.

Figure 23. — Map showing generalized total iron concentrations in water of the Potomac-Raritan-Magothy aquifer system in Camden County, 1965.

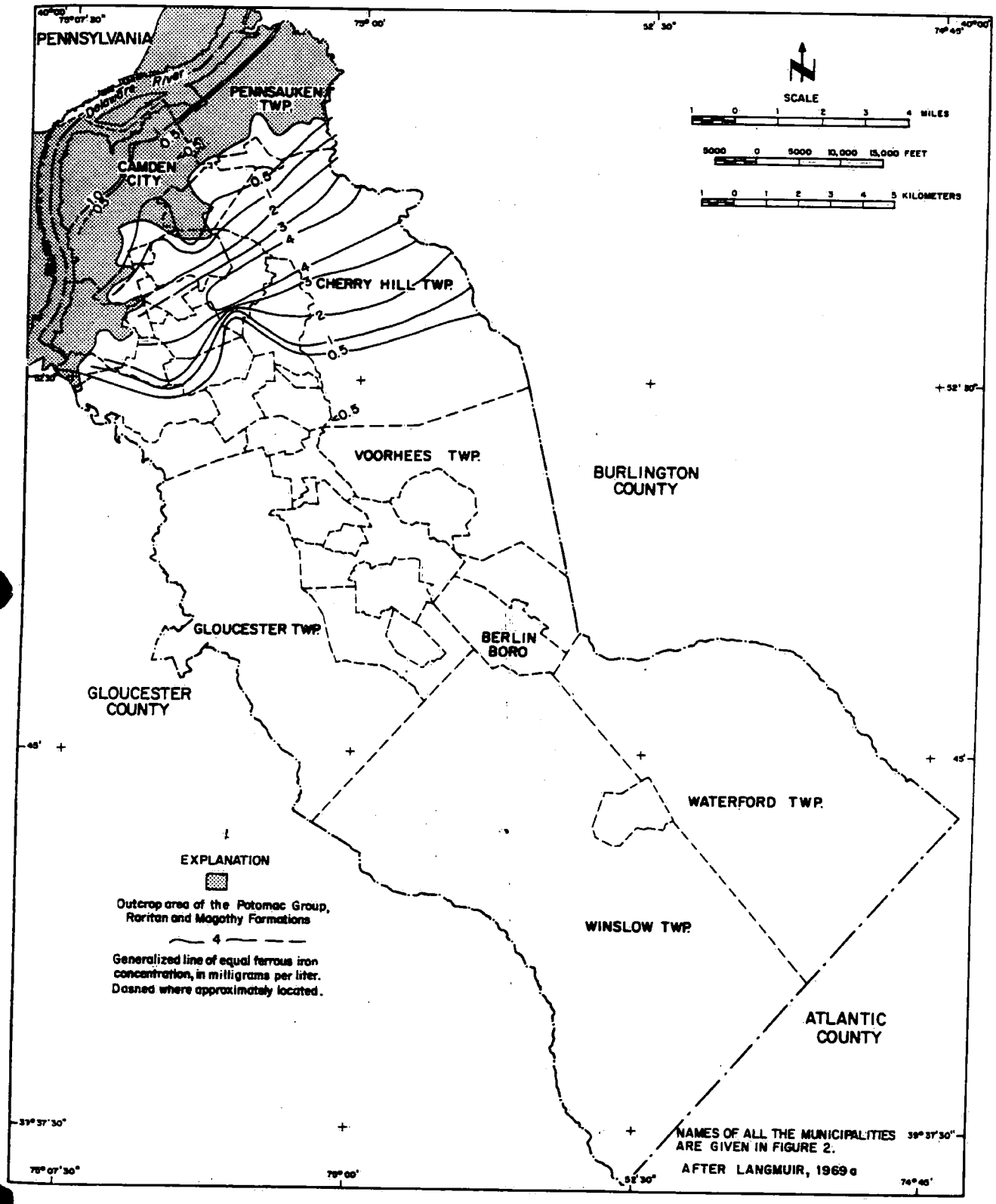


Figure 24. — Map showing generalized ferrous iron concentrations in water of the Potomac-Raritan-Magothy aquifer system in Camden County, 1965.

highest total iron concentrations occurred adjacent t th outcrop area.

Farther downdip both the dissolved ferrous an suspended ferric iron species decrease gradually to less tha 0.5 mg/l. Langmuir (1969b) attributed the gradual decline i ferrous species to an increase in the stability of th suspended amorphous material due to aging, coupled wit adsorption of ferrous iron by the oxyhydroxides and partia conversion of the amorphous phase to goethite. The decrease i suspended ferric species is interpreted by Langmuir as bein caused by cation adsorption, aging, coagulation, and settling.

Ground-Water Contamination

Contamination of the water in the Potomac-Raritan Magothy aquifer system is presently limited to the area at o near the outcrop. Contamination of the water-table and th artesian aquifer underlying Philadelphia has been thoroughl documented for the period prior to 1956 by Greenman and other (1961). They cite many instances of contamination, with th largest known area of contamination from industrial waste located in the League Island Trough.

The League Island Trough is shown on the b roc surface map of the Philadelphia area (fig. 25). The t gh filled with highly permeable sediments, has a northwest trend A geologic section showing the distribution of th water-bearing sands and gravels from the Schuylkill River i Philadelphia through the Philadelphia Navy Base to the Texa Company's Eagle Point works near Westville, New Jersey, jus south of the Camden County line, is shown in figure 26. Th lower artesian aquifer (Farrington Sand of Greenman and others 1961), consisting of sands and gravel immediately above th bedrock, has a direct hydraulic connection with the lowe aquifer being tapped by the Texas Company wells in Wes Deptford Township, Gloucester County.

Barksdale and others (1958, p. 121) stated that "Originally, the wells at the Navy Base yielded waters tha were similar in chemical characteristics to that from the well of The Texas Co." Greenman and others (1961, plates 21 and 22 indicate high concentrations of sulfates and dissolved solid in the water of the lower artesian aquifer in the League Islan Trough in 1956. A sample from one well had more than 1,30 mg/l of sulfate. The movement of ground water with hig

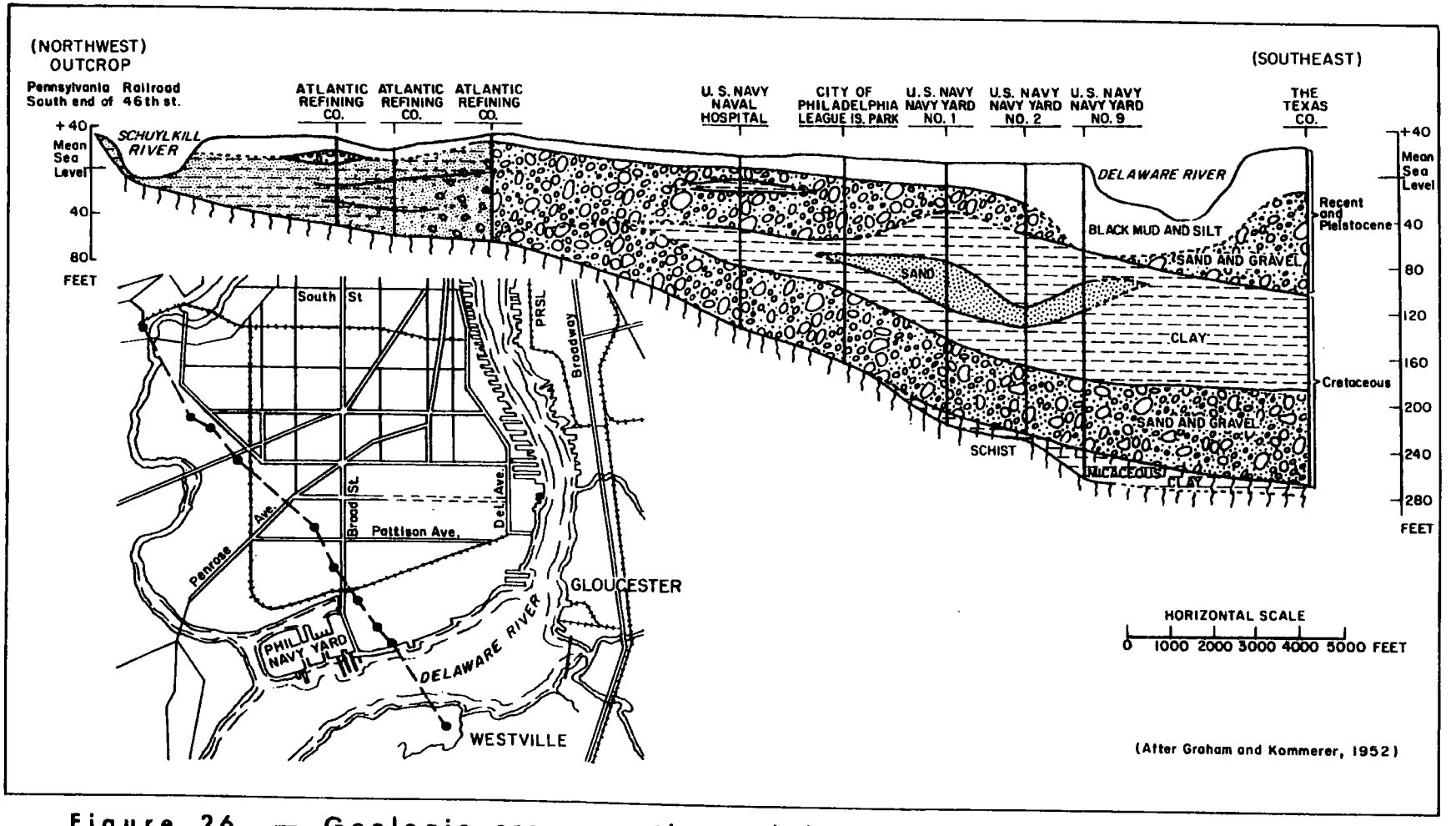


Figure 26. — Geologic cross section, Philadelphia, Pa. - Westville, N. J.

concentration of sulfates and dissolved solids was documente (Greenman and others, 1961) as moving downdip along the trough. The location of the 200 mg/l sulfate line in 1956 (Greenman and others, 1961) is shown in figure 27.

Withdrawal of water at the Philadelphia Navy Base from the lower aquifer had a regional effect on the potentiometric surface. As documented by Greenman and others (1961), heavy pumping at the Philadelphia Navy Base provided the hydraulic gradient that caused the movement of poor quality water from the head of League Island Trough downdip toward the Navy Base. Barksdale and others (1958, p. 121) stated that if pumping were greatly curtailed at the Navy Base the contaminated water would move beneath the river into New Jersey. In 1966 withdrawals at the Navy Base were substantially curtailed, while other wells in the area had been shut down. The Navy Base wells no longer act as a shield for the New Jersey wells and pumping at the Texas Company wells and other wells in New Jersey provided a new hydraulic gradient. A map of the potentiometric surface for the artesian aquifer in the Philadelphia area in October 1968 is shown on figure 28. The area with the lowest potentiometric surface is the area of the Texas Company well field. The nearest pumping to Navy Base wells is the Texas well field. Pumpage for 1968 for this well field was an average of 5.5 mgd. This was the largest total daily pumpage from the lower aquifer in the vicinity. In 1968 water samples of wells tapping the lower aquifer in Philadelphia, Camden area, and the Texas Company well field were collected and analyzed. Figure 27 shows the change in the 200 mg/l sulfate line from 1956 to 1968. The high sulfate, high dissolved-solids water will probably continue to move towards the Texas Company well field if present or increased pumpage rates are maintained.

Additional water samples were collected in 1971 from wells tapping the lower artesian aquifer for chemical (table 4) and trace-element analyses (table 10). The sulfate concentrations are shown in figure 27. Results indicate a decrease in concentrations of sulfate and dissolved solids from 1968 to 1971 in Navy Base wells 4 (PH 11) and 11 (PH 16), but an increase in Navy Base well 9 (PH 13). Navy Base wells 4 and 11 are located downdip from an area that had lower concentrations of sulfate in 1956 (Greenman and others, 1961, plate 22). If movement of ground water did occur downdip, there would be first an increase and then a decrease of sulfate content. Analyses for 1968 and 1971 indicate the decrease in sulfate concentration suggesting movement of ground water downdip. The sulfate concentration updip from Navy Base well 9 in 1956, as given in Greenman and others (1961, plate 22), indicates progressively higher sulfate concentrations.

Analysis of samples taken from Navy Base well 9 in 1967 and 1971 indicates progressively higher sulfate also suggesting movement of ground water downdip toward the Texas Oil Company well field.

The concentration of 24 trace elements in the water samples were obtained from wells tapping the lower aquifer. Results of the analysis (table 10) indicate that only iron and manganese exceed the limits suggested by the U. S. Public Health Service for drinking water. High concentrations of both these elements are not uncommon in the Potomac-Raritan-Magothy aquifer system and have been found in areas of no known contamination resulting from man's activities.

Another area of ground-water contamination, documented by Greenman and others (1961), is the artesian aquifer in the area north of the Philadelphia Navy Base, northwest of the Walt Whitman Bridge. Water from the well (PH 6) at the center of this area had a sulfate concentration of 231 mg/l in 1956 (Greenman and others, 1961, plate 22). Recent analyses of water from wells in this same area (table 4) show a lower sulfate concentration at the center of the area. Water from the same well (PH 6) at the center of the area had a sulfate concentration of 162 mg/l in July 1967 (table 4), a decrease in sulfate concentration of over 30 percent. However, sulfate and dissolved solids in water from PH 7, a well downdip from well PH 6, increased substantially. Sulfate concentration of water from well PH 7 in February 1956 was 18 mg/l (Greenman and others, 1961). In July 1967 the sulfate concentration was 22 mg/l and in May 1971, 131 mg/l (table 4), a 600 percent increase. The increase in sulfate concentration may be due to movement of water from well PH 6 toward well PH 7. Figure 28 shows the area at well PH 7 to be a center of a regional cone of depression. There is a possibility that the contaminated water in the Navy Base area may also move northward due to the much greater gradient in that direction since 1966. Continued surveillance of the quality of ground water would be a method that could be used to determine the change in quality and its possible effect on the ground-water supplies of New Jersey.

Another area of possible water-quality problems in the Potomac-Raritan-Magothy aquifer system in Camden County is located approximately one mile south of the Benjamin Franklin Bridge. Water samples from wells in Philadelphia (one mile south of the Benjamin Franklin Bridge) indicate that water in the lower aquifer contained high sulfates (as much as 284 mg/l) and dissolved solids (as much as 646 mg/l) in 1956 (Greenman and others, 1961, plates 21 and 33). Recent potentiometric measurements in the area show a gradient to the east and to the south; thus, it is possible for this poor quality water to move

to New Jersey. No water samples have been collected from wells in immediately adjacent areas of Camden County. Analyses of water from wells inland show that the quality in the lower aquifer has improved since 1927 (Thompson, 1932) to 1967 (table 4).

Chromium equal to or in excess of the State's standards for potable water has been found in water from two wells in Camden City. Routine sampling of the Camden City Water Department's distribution system by the State in December 1972 showed a high chromium content in the water delivered to a residence. Analyses for chromium from samples obtained from Camden City Water Department public-supply wells in the same area indicated that well 4 (CA 42) had chromium values in excess of the State's standards. Sampling of additional wells located nearby showed even higher chromium values for the West Jersey Hospital well (CA 47). Re-sampling of water from five wells in November 1973 confirmed the high chromium values for two of the five wells. The results of the analysis are given in table 10. The chromium values are 200 µg/l (micrograms per liter) for the West Jersey Hospital well and 50 µg/l for Camden City Water Department well 4. The State's standard for potable water is 50 µg/l for hexavalent chromium. It can be assumed that most of the chromium reported in table 10 is hexavalent chromium. Both wells tap the same sand unit in the aquifer system. The well yielding water with the lower chromium values is located 600 feet east of the West Jersey Hospital well. The potentiometric head measurements made in November and December 1973 show water levels were lower east of the two wells, indicating an easterly hydraulic gradient with ground-water movement in that direction. Water-level measurements made in October 1968 indicated the same gradient direction. This would suggest the chromium content in the ground water in this sand unit would be higher in the area west of the West Jersey Hospital well.

The source of the chromium is not known. However, at least three metal plating companies are located within a radius of 1,600 feet. Analyses of waste water to sewer lines from three metal plating companies for samples collected in February and March 1973 show high chromium values in excess of 9 mg/l (written commun., New Jersey Department of Environmental Protection, 1973).

Barksdale and others (1953) and Greenman and others (1961) have shown that induced recharge from the Delaware River does occur. Deterioration of the quality of the river by man's activities may, in turn, cause water-quality problems in that part of the aquifer being recharged by the river. A "polluted" Delaware River is a possible source of water contamination in

the Potomac-Raritan-Magothy aquifer system in the northeastern part of Camden County.

Salt-Water Encroachment

There are two areas of potential salt-water encroachment in the Potomac-Raritan-Magothy aquifer system in Camden County. One area is along the Delaware River and the second is near the fresh water-salt water interface in Winslow Township.

The Delaware River in the vicinity of Camden County is tidal. Normally salt water from the ocean does not reach the vicinity of Camden. In extended drought, such as that between 1961 and 1966, a decrease in fresh-water inflow to the estuary permits salt water to move farther upstream. For example, in 1965 and 1966 the salt front advanced farther upstream in the Delaware estuary than had been previously recorded. On September 1966 the 250 mg/l chloride line reached the vicinity of the Benjamin Franklin Bridge (Keighton, 1969). At the same time the chloride concentration of the Delaware River at Delaware Memorial Bridge was 4,340 mg/l. Aquifer test and water-quality data given in another section of this report have indicated hydraulic connection between the river water and nearby wells. If the river's chloride content in the Philadelphia-Camden area were to remain at relatively high levels for a long period of time, there could be movement of this water from the river into the aquifer system, especially the middle and upper aquifers.

The second area of potential salt-water encroachment in the aquifer system is in the vicinity of the salt water-fresh water interface. The interface in the aquifer system is actually a broad zone. An approximate location in Camden County based primarily on the chloride concentration of the water from the New Brooklyn Park well 1 (WI 27) is shown on figure 18. The chloride concentration of water from this well in 1960 (Donsky, 1961) was 310 mg/l. In 1967 and in 1972 the chloride concentration (table 4) was approximately the same suggesting no change in the lower aquifer for the 12-year period. The chloride concentration of a water sample from the upper aquifer (New Brooklyn Park 2, WI 28) was 4.2 mg/l in 1961 (Donsky, 1961) and 2.5 mg/l in 1972 (table 4).

The ground-water system is a dynamic one. Changes in the hydraulic gradients due to pumping may cause the movement of higher chloride water towards centers of pumpage. Withdrawals from the Potomac-Raritan-Magothy aquifer system in the central part of the county is almost all from the upper

aquifer (fig. 16). In addition pumping withdrawals from the upper aquifer at Bell's Lake, Pitman, Glassboro, and Clayton in Gloucester County to the south has further enlarged the cone of depression over a sizable area (fig. 18). Increased pumping in this area of Gloucester County and additional pumping downdip of areas of existing pumping in Camden County may move water of high chloride content toward the centers of pumping. Water-level measurements made in October 1968 indicate that the potentiometric surface in the upper aquifer is lower in the area of pumping than in the downdip area (fig. 18). The direction of the hydraulic gradient is from the interface toward the center of pumping. It is, therefore, possible for the high-chloride water to migrate toward the centers of pumping.

An extensive aquifer test at Courses Landing in Salem County has shown that the most immediate danger of salt-water contamination of middle and upper aquifers is probably by vertical coning of the salt water from the lower aquifer (Gill and Farlekas, written commun., 1969). For example, heads in the upper aquifer at Courses Landing were lowered by withdrawals causing a head difference to develop between the upper and lower aquifer. This change in the hydraulic gradient caused the higher chloride water to move upward from the lower aquifer. A similar situation may exist in southeastern Camden County and adjacent Gloucester County. Head measurements made in October 1968 at the New Brooklyn Park observation wells (WI 27 and WI 28) indicate that a 16-foot head differential exists between the upper aquifer and the lower aquifer. The well tapping the upper aquifer had the lower head. The head in the upper aquifer was at an altitude of 42 feet below mean sea level. The nearest withdrawal point from the Potomac-Raritan-Magothy aquifer system is 6 miles from the New Brooklyn Park wells. In Glassboro, Gloucester County head measurements of approximately 50 feet below mean sea level were observed in October 1968 during non-pumping conditions in three wells tapping the upper aquifer. Under pumping conditions the water levels would be at least 20 feet lower near the pumping wells. The potentiometric surface for the lower aquifer is not known for the Glassboro area, but in all probability it is higher than the potentiometric surface in the upper aquifer. If the head in the lower aquifer is significantly higher than the head in the upper aquifer, the head differential would cause water to move upward into the upper aquifer. High-chloride water (chloride content greater than 250 mg/l) underlies the water in the upper aquifer in the southeastern part of Camden and adjacent Gloucester County (fig. 18). Hence, vertical coning of high-chloride water is a possibility in this area.

Merchantville Formation and Woodbury Clay

Geology

The Merchantville Formation and Woodbury Clay crop out in an irregular-shaped belt in the northwestern part of Camden County (fig. 4). Together they have an outcrop area of 18.7 square miles.

The Merchantville Formation is the oldest major marine glauconitic unit in the New Jersey Coastal Plain. The contact between the Merchantville Formation and the underlying Magothy Formation is always sharp and disconformable (Owens and Sohl, 1969). The thickness of the Merchantville Formation is consistently 50 feet in outcrop but the lithology varies along strike. The formation is essentially a dark gray to grayish-black micaceous clay to clayey silt with beds and lenses of glauconite sand, especially near the top of the formation. A sand unit which ranges from 0-30 feet thick in Camden County has been mapped from geophysical logs. The thickness is shown on figure 29. The structure contour map of the top of the sand unit is given in figure 30. Three cross sections (fig. 31) based on geophysical logs suggest that this unit is near the top of the Merchantville Formation.

The Woodbury Clay which overlies the Merchantville Formation is a grayish-black massive micaceous clayey silt. The thickness of the Woodbury in the outcrop area is reported to be 50 feet (Owens and Sohl, 1969). Calcareous fossils found at Haddonfield indicate a marine origin for the unit (Owens and Sohl, 1969). The top of the Woodbury Clay is delineated in figure 32. The thickness of the Merchantville Formation and Woodbury Clay ranges from 106 to 165 feet in Camden County and thickens downdip as shown on figure 33.

Particle-size analyses of samples of the Merchantville Formation and Woodbury Clay from the New Brooklyn Park well (WI 27) in Winslow Township are given in table 5. The analyses of the Woodbury Clay indicate a range of 70 to 98 percent clay and silt. The analyses of the Merchantville Formation indicate a range of 42 to 56 percent of clay and silt.

Hydrology

The Merchantville Formation and Woodbury Clay function

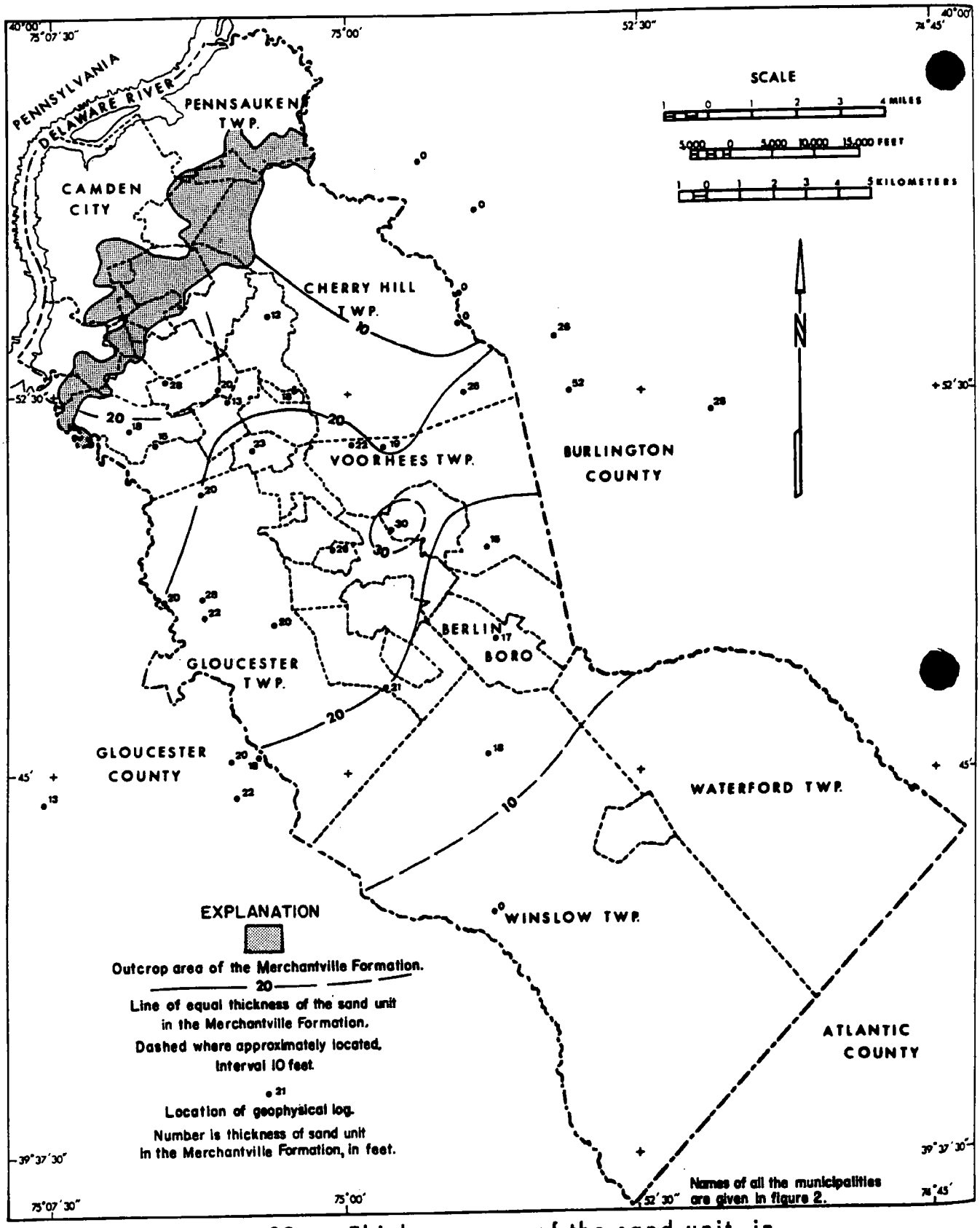


Figure 29. — Thickness map of the sand unit in the Merchantville Formation in Camden County.

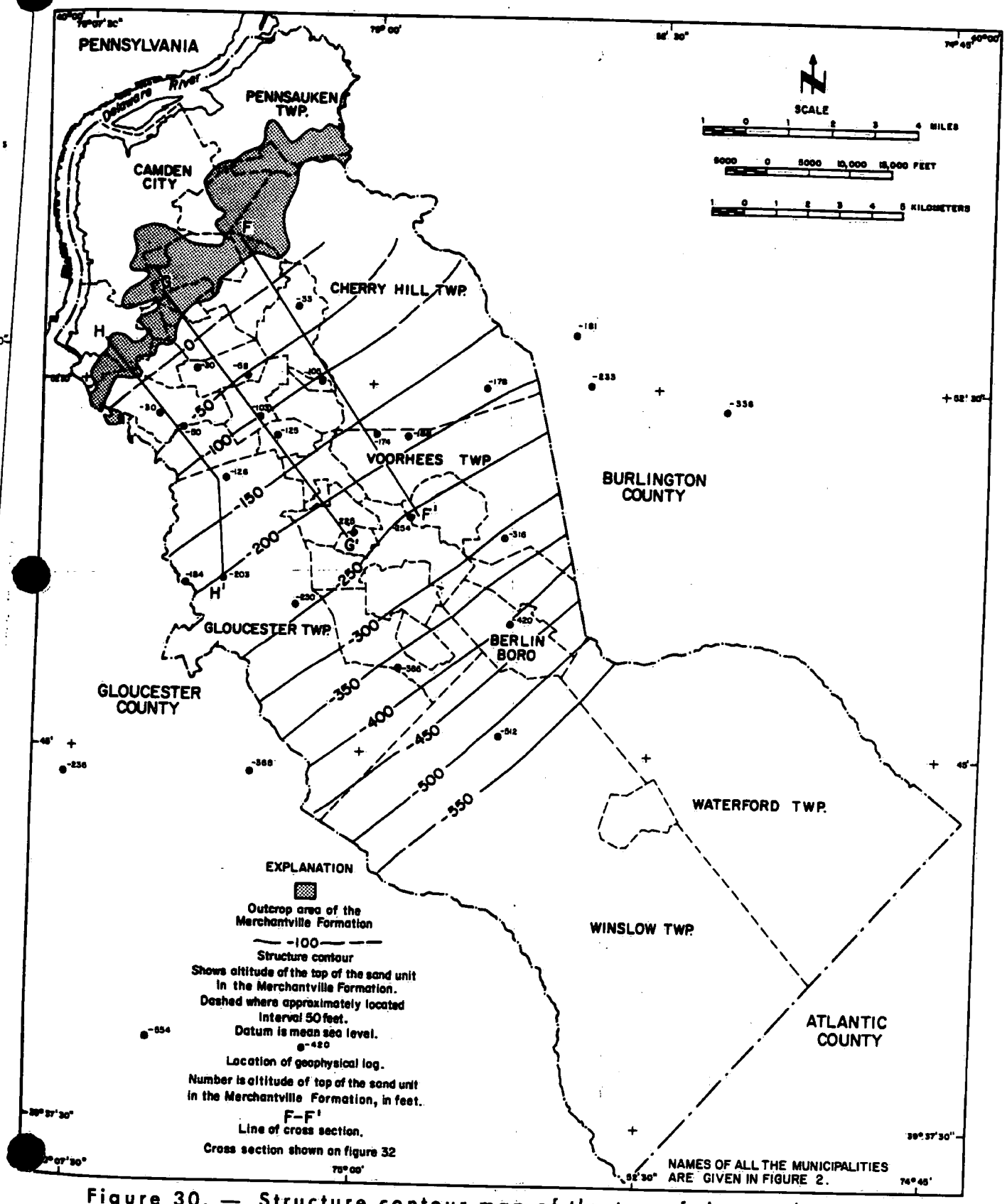


Figure 30. — Structure contour map of the top of the sand unit in the Merchantville Formation in Camden County.

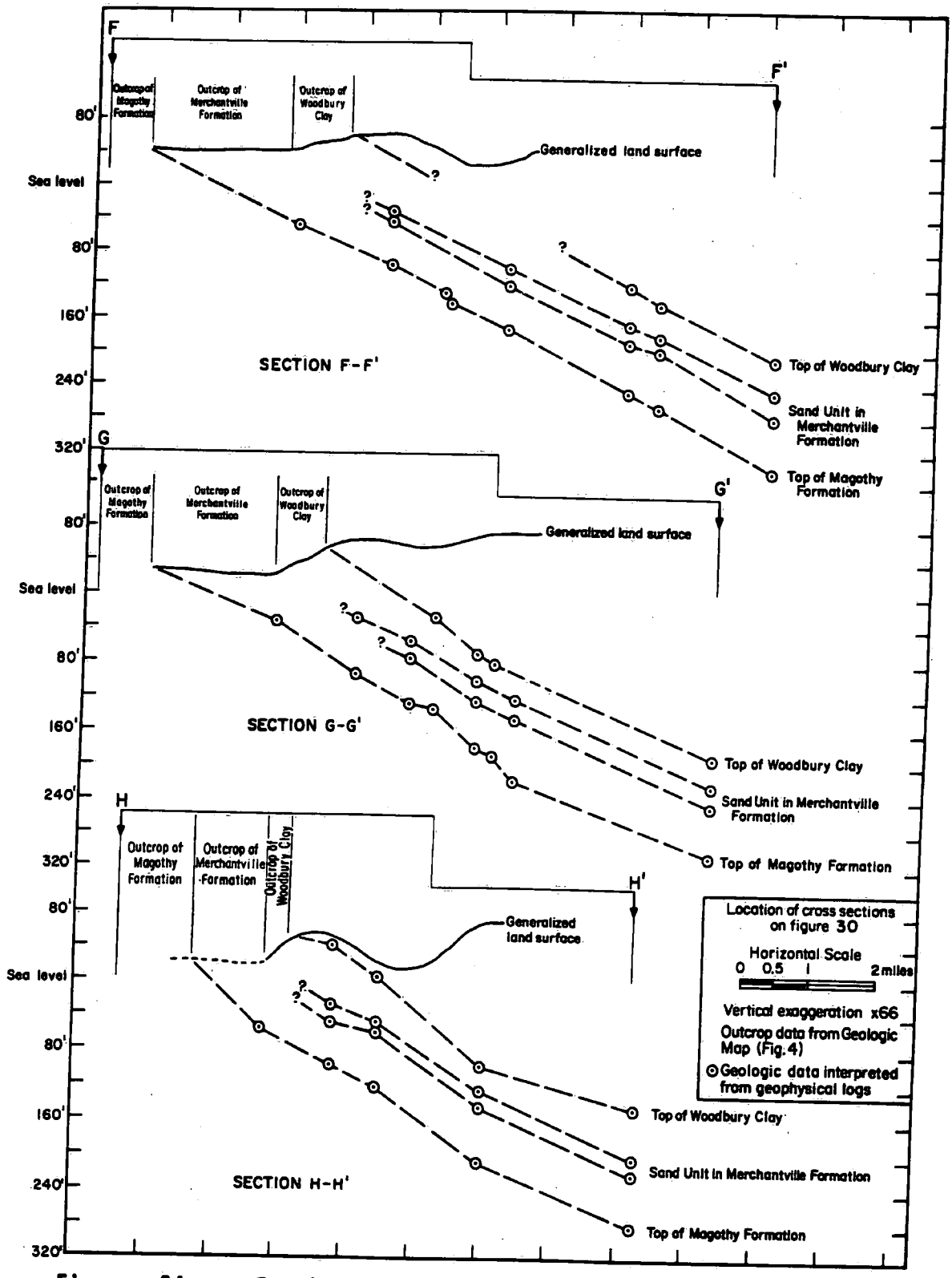


Figure 31. — Geologic sections of the Coastal Plain in the northeastern part of Camden County.

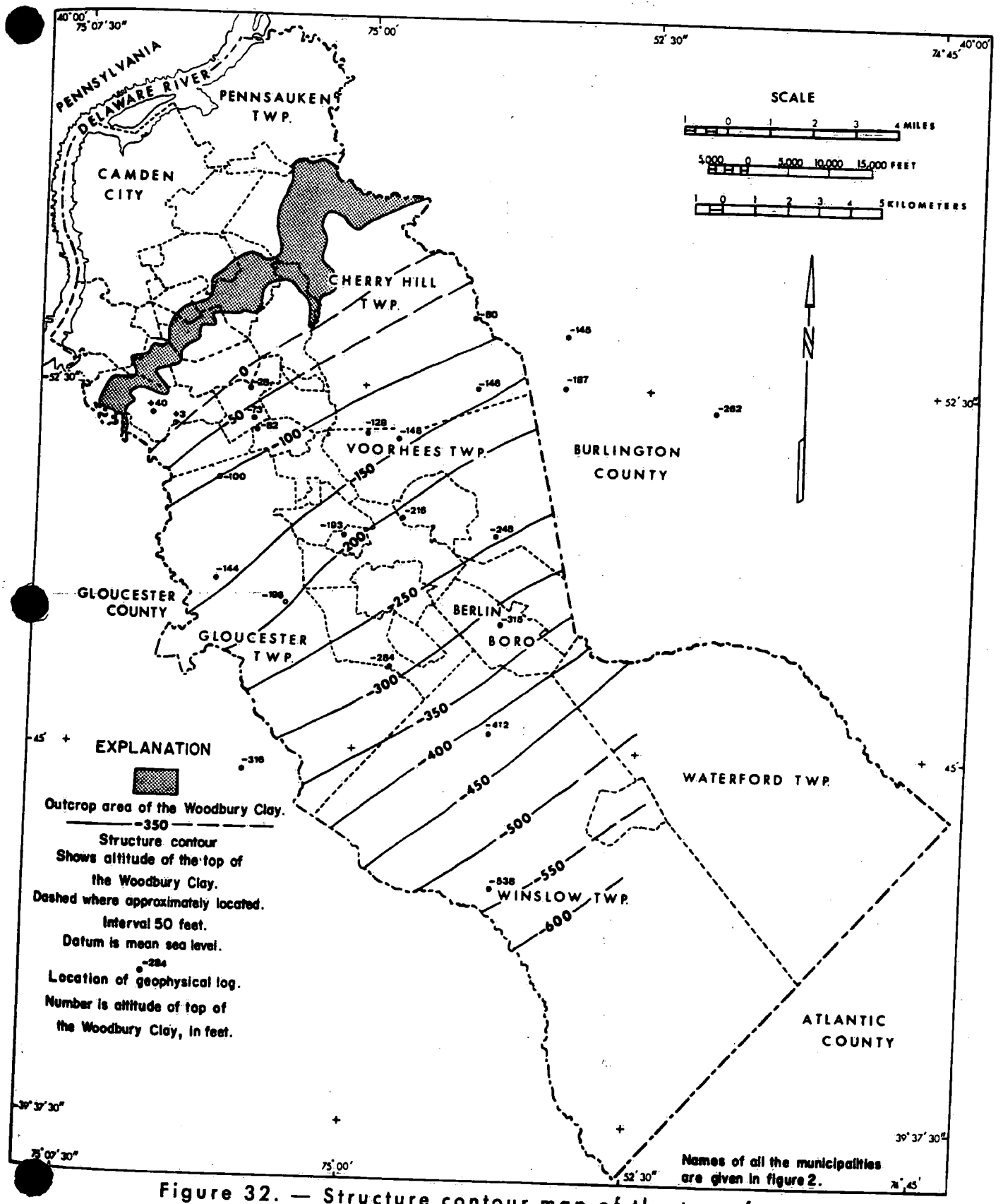


Figure 32. — Structure contour map of the top of the Woodbury Clay in Camden County.

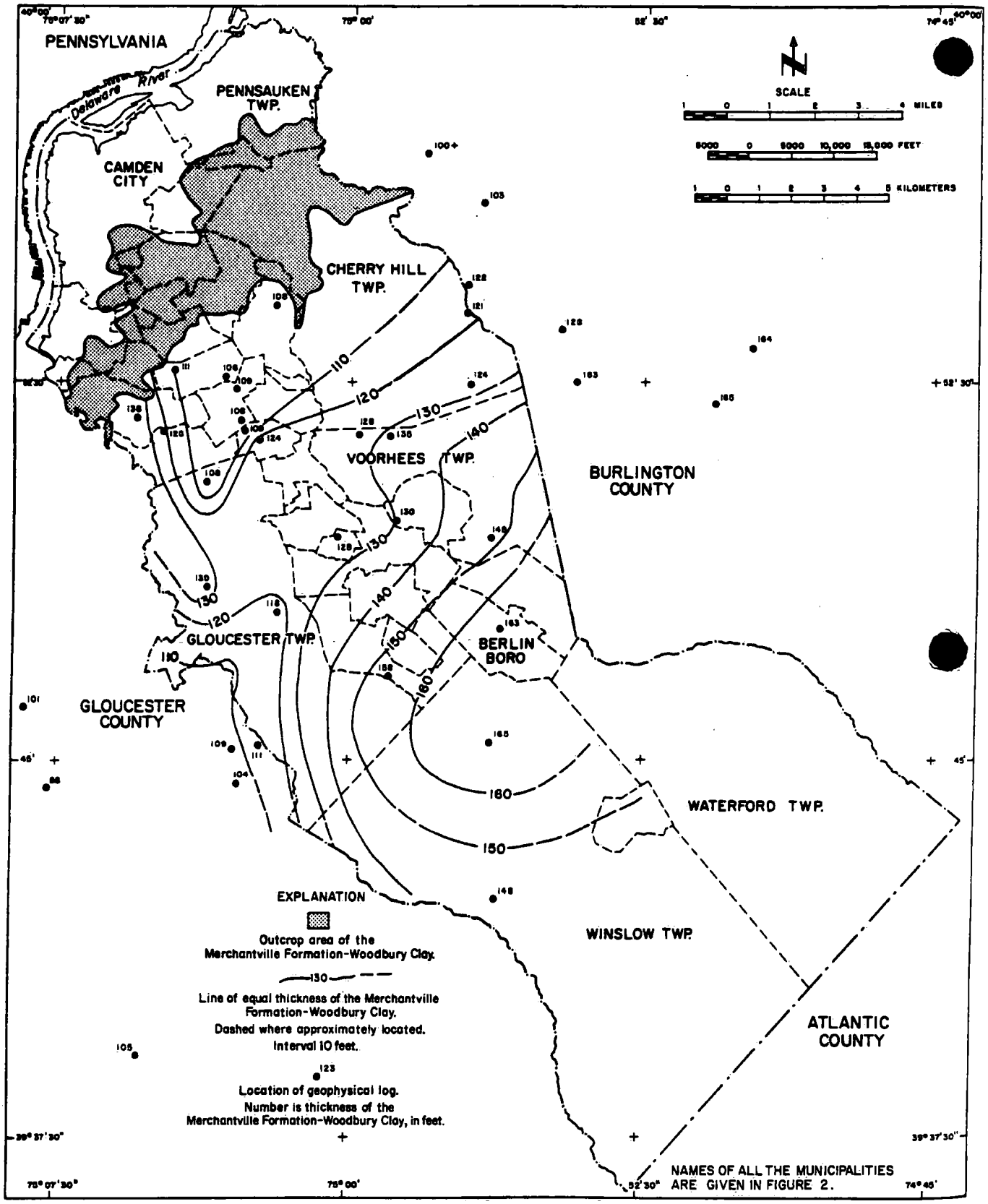


Figure 33. — Thickness map of the Merchantville Formation-Woodbury Clay in Camden County.

as semipervious confining units. However, the lensing sand unit near the top of the Merchantville Formation is tapped for domestic water supplies. Yields range from 15 to 50 gpm for the wells given in table 1. Wells that tap this sand unit are located near the outcrop area. The prepumpage potentiometric surface in this unit in Camden County was at a higher level than the prepumpage potentiometric surface of the Potomac-Raritan-Magothy aquifer system and at a lower level than the prepumpage potentiometric surface in the overlying Englishtown Formation, for the same area. Sparse water-level data from drillers' records of wells drilled in the early to mid-1950's suggest a decline in potentiometric surface from 1900 to the 1950's.

Quality of Water

Only one sample (GT 4) was obtained from a well tapping the sand unit in the Merchantville Formation. The sample (table 4) had a high pH (8.3), low chloride content (0.8 mg/l), low sulfate content (3.9 mg/l), and low dissolved solids (107 mg/l).

Englishtown Formation

Geology

The Englishtown Formation crops out in the northwestern part of the county in an area of approximately 7.7 square miles (fig. 4). It lies conformably above the Woodbury Clay. The transition from the Woodbury Clay to the Englishtown Formation is marked by a gradual increase of quartz sand and a decrease in silt and clay.

The lithology of the Englishtown Formation in New Jersey varies along strike and downdip. Several lithofacies have been recognized. In the southern part of the coastal plain the Englishtown is a massive dark-colored silty sand that resembles the non-glauconitic beds of the Merchantville Formation (Owens and Sohl, 1969). It is 40 feet thick in outcrop. Rush (1968, fig. 22) has shown that the aggregate thickness of sand in the Englishtown decreases downdip toward the south in Burlington County.

The structure contours (fig. 34) on the top of the Englishtown Formation in Camden County indicate that the

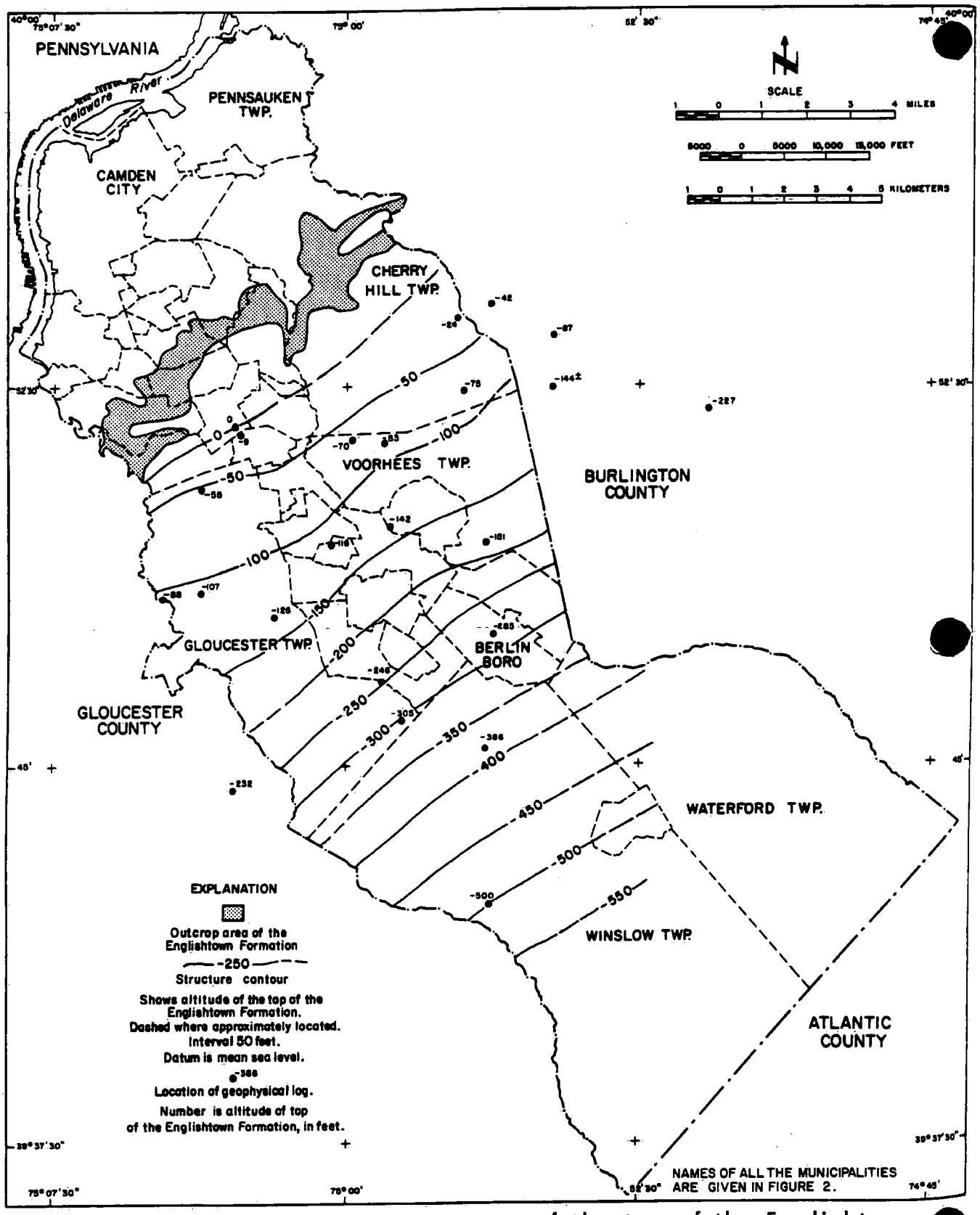


Figure 34. — Structure contour map of the top of the Englishtown Formation in Camden County.

Englishtown strikes in a northeasterly direction and has a dip of approximately 40 feet per mile toward the southeast.

Figure 35 is a lithologic map of the sand facies of the Englishtown Formation in Camden County. The aggregate thickness of the sand ranges from 5 to 30 feet with the greatest thickness of the sand in the central part of the county. The farthest downdip data available for the Englishtown in Camden County is from the New Brooklyn Park well 1 (WI 27). Particle-size analyses of samples from this test well (table 5) indicate a range of 67 to 87 percent of clay and silt.

Hydrology

Few wells tap the Englishtown Formation in Camden County (table 1). Domestic wells tapping the unit are located near the outcrop area. The only known public-supply or industrial wells tapping the formation in Camden County belong to the Clementon Water Department. All but one of their wells tap the Englishtown aquifer. The Clementon Water Department wells are located in the central part of the county, the area of greatest sand thickness. Yields of three wells in the Englishtown (Clementon Water Department wells 6, 8 and 9) are 250, 510, and 503 gpm, respectively. The specific capacities for wells 8 and 9 are 9.8 and 5.3 gpm, respectively.

Analysis of data from an aquifer test conducted in 1959 in Lakewood, Ocean County, (Seaber, 1965, p. B16) indicated a transmissivity of 1,340 ft^2/day (10,000 gpd/ft) and a coefficient of storage of 2.7×10^{-4} for the pumping phase of the test. For the recovery phase of this test the transmissivity is 2,144 ft^2/day (16,000 gpd/ft) and storage coefficient is 2.0×10^{-4}. The computed average hydraulic conductivity is about 40 ft/day (300 gpd/ft^2).

The transmissivity of the aquifer near the Clementon Water Department wells 8 and 9 was calculated using the method devised by Hurr (1966) which is based on the analysis of a single observation of drawdown at one well. This method is useful although it provides only an estimate. The computed transmissivity of the aquifer using data from the Clementon Water Department well 8 (CL 3) is 2,150 ft^2/day (16,050 gpd/ft); whereas, well 9 (CL 5) is 1,290 ft^2/day (9,630 gpd/ft). An assumed coefficient of storage of 2.7×10^{-4} was used in the calculations.

Porosity and hydraulic conductivity values obtained

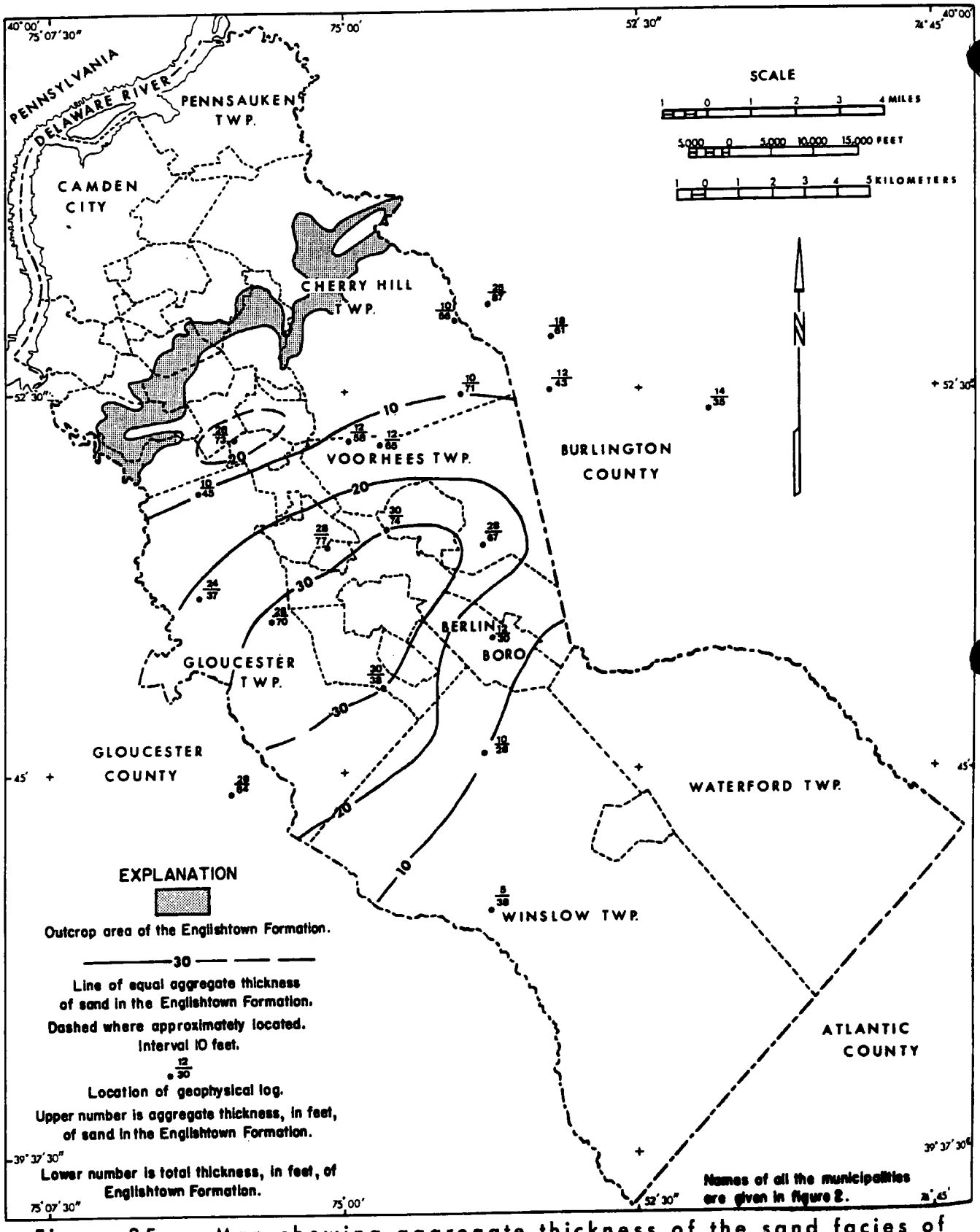


Figure 35. — Map showing aggregate thickness of the sand facies of the Englishtown Formation in Camden County.

from laboratory analyses of samples from the New Brooklyn Park well (WI 27) in Winslow Township are listed in table 5. The hydraulic conductivity values are very low indicating that the Englishtown Formation in the New Brooklyn Park area is not suitable for development as a source of water.

Seaber (1965, p. 16) indicates that the Englishtown Formation does not receive its major recharge from the outcrop area but rather from vertical leakage. The recharge is obtained from the overlying Wenonah-Mount Laurel aquifer through the Marshalltown Formation in areas of topographic highs. Figure 36 shows the potentiometric surface for the Englishtown Formation based on limited available data. The data suggest that a potentiometric high occurs in the Marlton area of Burlington County just east of Cherry Hill Township.

Pumpage from the Englishtown Formation in Camden County during 1966 amounted to 0.76 mgd. Peak use occurred in July with an average of 1.02 mgd. Additional amounts of water can be derived from the Englishtown Formation, especially in the central part of the county where the sand is thickest. However, greatly increased withdrawals from the aquifer in the county may accelerate the rate of water-level decline.

Quality of Water

Only one analysis of a well sample from the Englishtown Formation in Camden County is given in table 4. Seaber (1965, p. 6) in his study on the variations in chemical character of water from the Englishtown Formation lists additional water analyses of six wells in Camden County. The quality of the water from the Englishtown Formation in Camden County, as reported by Seaber (1965), is within the State's standards for potable water. Chloride concentration of water from the six wells ranges from 1.9-10 mg/l; sulfate from 6.9-25 mg/l; dissolved solids from 35-105 mg/l; and iron from 0.26-7.8 mg/l.

An analysis in September 1969 of a sample from the Clementon Water Department well 8 (CL 3) (table 4) is similar to a 1957 analysis of the Water Department's well 9 (CL 5). This suggests that very little change has occurred in the quality of water of the Englishtown Formation in the area.

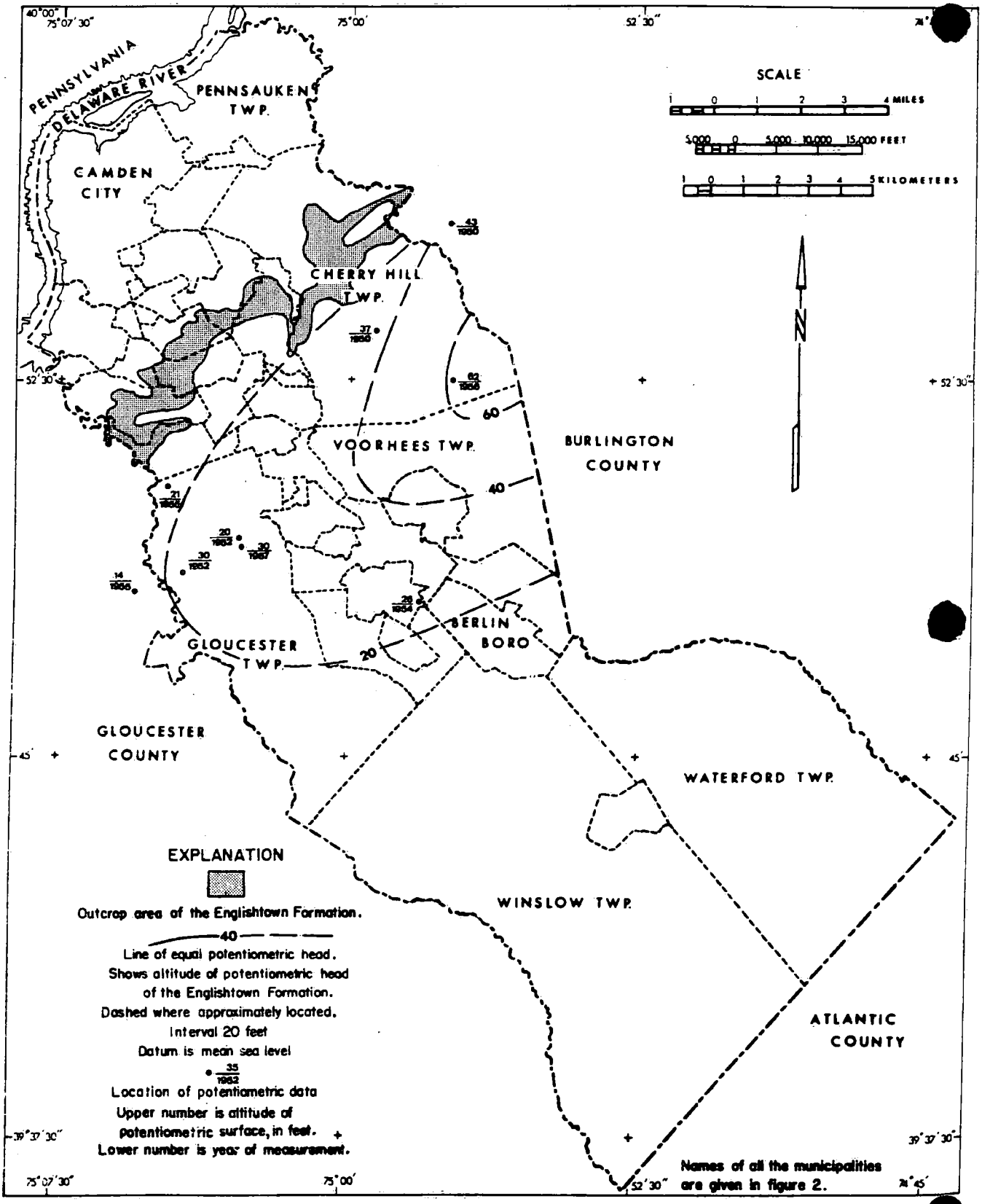


Figure 36. — Generalized potentiometric map of the Englishtown Formation in Camden County.

Marshalltown Formation

Geology

The Marshalltown Formation crops out in a northeasterly direction in northwestern Camden County in the vicinity of the New Jersey Turnpike (fig. 4) and has an outcrop area of approximately 6.3 square miles. The Marshalltown is characteristically a dark gray, micaceous, silty, glauconite sand overlying the Englishtown Formation. The abrupt change in lithology between the Marshalltown Formation and Englishtown Formation suggests a disconformable contact (Owens and Sohl, 1969). Glauconite and fossils in the Marshalltown indicate that it is of marine origin. Particle-size analysis of a sample from the New Brooklyn Park well (WI 27) in Winslow Township indicates a silty sand composition (table 5).

In the outcrop area the thickness of the Marshalltown Formation is about 20 feet. Its thickness downdip is about 20-25 feet. Hence, the altitude of the top of the Marshalltown Formation may be approximated by adding 20-25 feet to the top of the Englishtown Formation shown in figure 34.

Hydrology

The Marshalltown Formation functions as a confining layer between the Englishtown Formation and the overlying Wenonah Formation and Mount Laurel Sand. Clayey and silty beds of the lower part of the Wenonah Formation and the Marshalltown Formation form a confining layer 40 to 50 feet thick in Camden County. Vertical leakage from the Wenonah-Mount Laurel aquifer through the Marshalltown Formation recharges the Englishtown Formation. Porosity and hydraulic conductivity values from a laboratory analysis of a sample from the New Brooklyn Park well (WI 27) in Winslow Township are given in table 5. The value of hydraulic conductivity supports the contention that vertical leakage occurs through the Marshalltown Formation.

Wenonah Formation and Mount Laurel Sand

Geology

The Wenonah Formation and the Mount Laurel Sand in Camden County crops out in a northeasterly direction and has an

outcrop area of about 16.6 square miles (fig. 4). The Wenonah Formation is a dark gray, poorly sorted, very micaceous, silty, fine quartz sand. Glauconite is abundant in the lower part but rapidly diminishes in the upper part (Owens and Sohl, 1969). The contact of the Wenonah Formation with the underlying Marshalltown Formation is gradational as is the contact with the overlying Mount Laurel Sand. The change from the Wenonah Formation to the Mount Laurel Sand is generally marked by an increase in average grain size, a decrease in mica, and a change in color from dark gray to lighter gray (Owens and Sohl, 1969). In general, the Mount Laurel Sand is a coarser sand unit than the Wenonah Formation and is the major component of the aquifer. The Wenonah Formation and the Mount Laurel Sand are distinct lithologic units but are hydraulically connected. Particle-size analysis of samples from the New Brooklyn Park well (WI 27) in Winslow Township are given in table 5.

The top of the Mount Laurel Sand in Camden County (fig. 37) strikes in a northeasterly direction and has a dip toward the southeast of approximately 30-35 feet per mile near the outcrop and 27 feet per mile downdip.

The combined thickness of the Wenonah Formation and Mount Laurel Sand in outcrop is about 100 feet in the Mount Holly 7-1/2 minute quadrangle, Burlington County (Minard, Owens, and Nichols, 1964). The Wenonah Formation-Mount Laurel Sand is about the same thickness in the outcrop area in Camden County. In the subsurface the Wenonah Formation and Mount Laurel Sand range in thickness from 80-90 feet near the outcrop to almost 130 feet at the New Brooklyn Park well (WI 27) in Winslow Township. The thickness map of the Wenonah Formation-Mount Laurel Sand (fig. 38) shows that the unit thickens downdip. Interpretation of geophysical logs suggest that the Wenonah Formation-Mount Laurel Sand is mainly a sand unit although the lower 20 percent of the unit consists of silt. A lithologic map of the sand facies is shown in figure 39. The greatest thickness of the sand facies is in the southcentral part of the county.

Hydrology

The Wenonah-Mount Laurel aquifer is an important water-bearing unit in Camden County. Industrial and public-supply wells are screened in this aquifer. In addition many domestic wells southeast of the outcrop area tap this unit. Almost all the wells in Camden County tapping the Wenonah-Mount Laurel aquifer are located in a northeast-trending area less than ten miles from the outcrop.

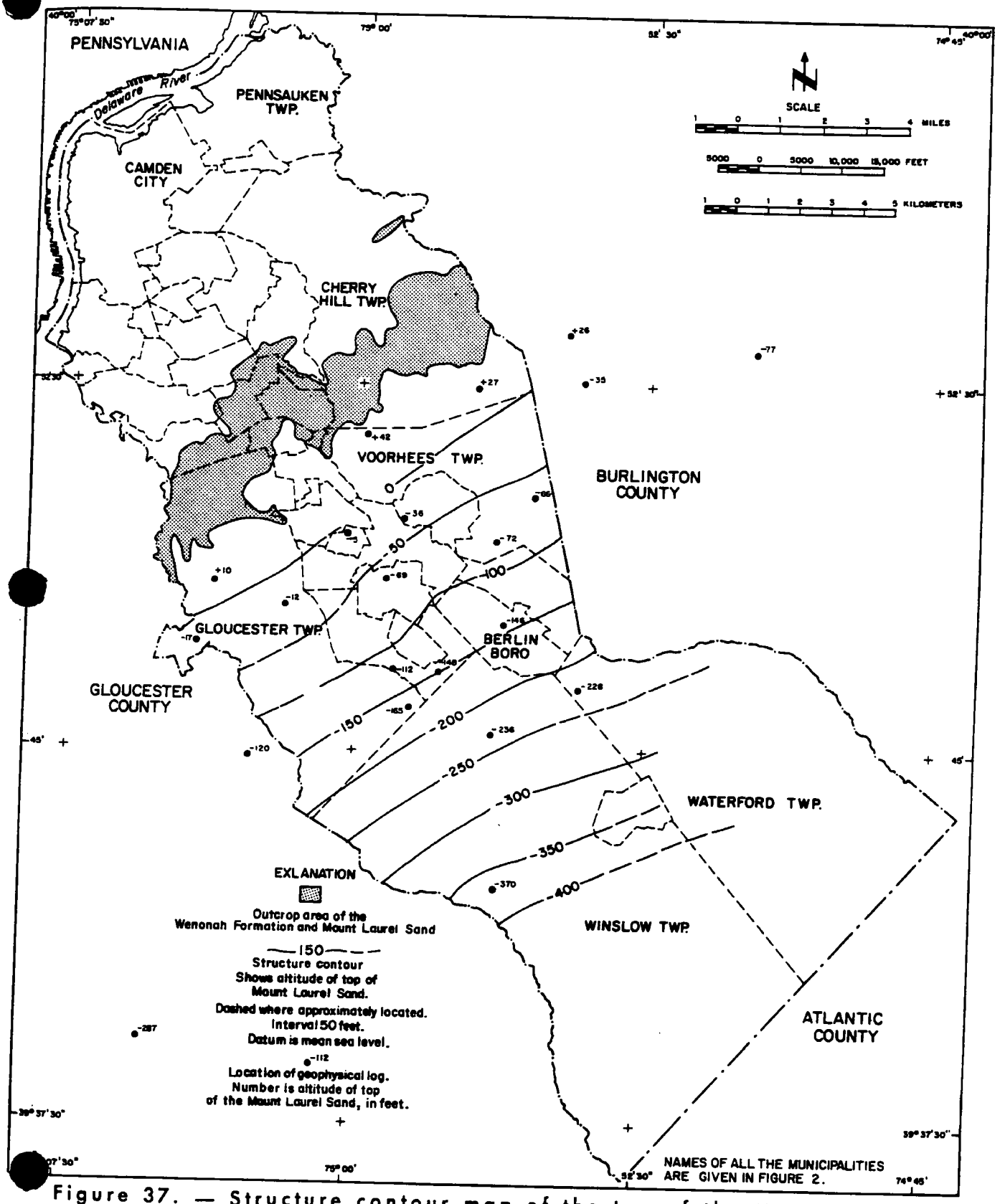


Figure 37. — Structure contour map of the top of the Mount Laurel Sand in Camden County.

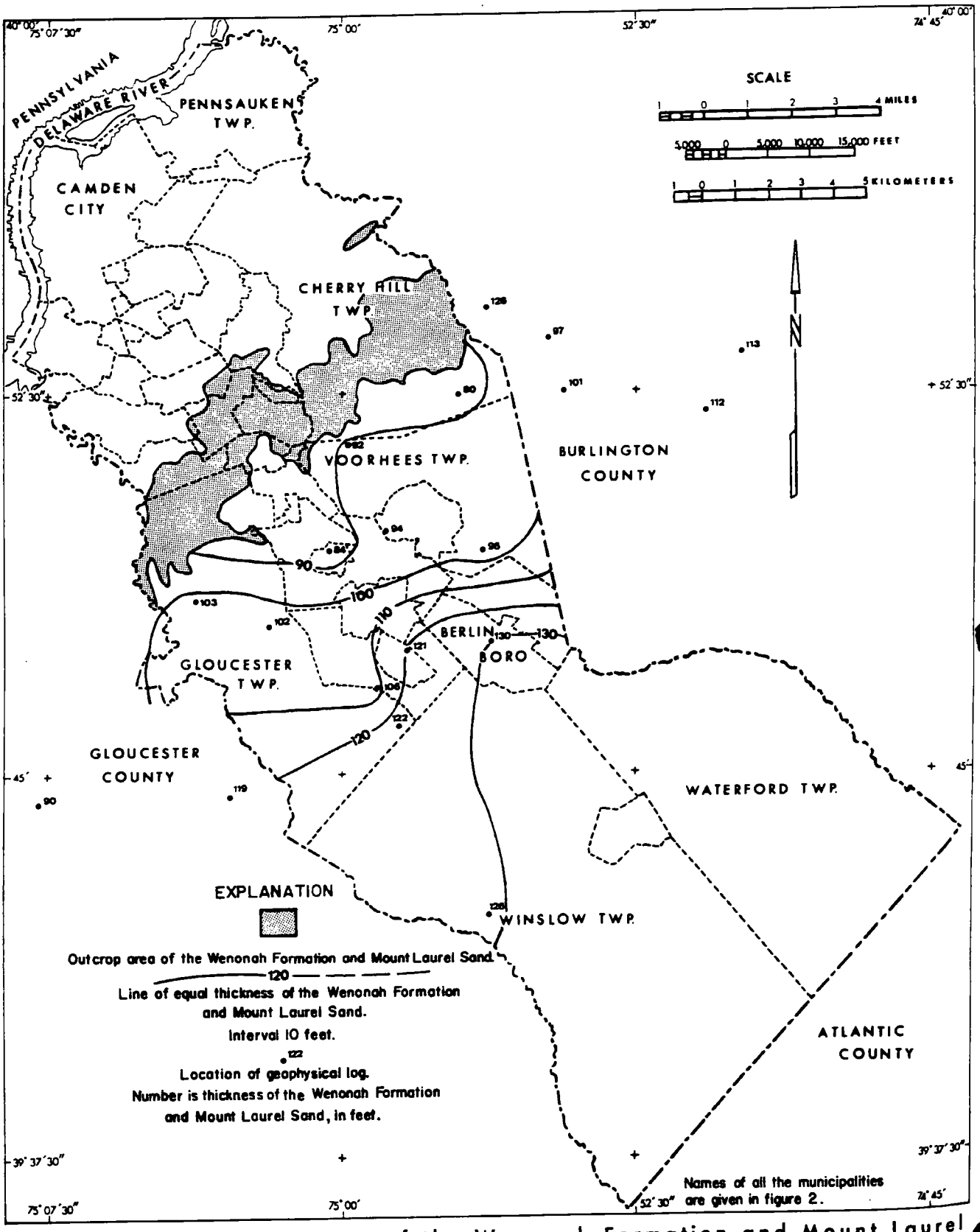


Figure 38. — Thickness map of the Wenonah Formation and Mount Laurel Sand in Camden County.

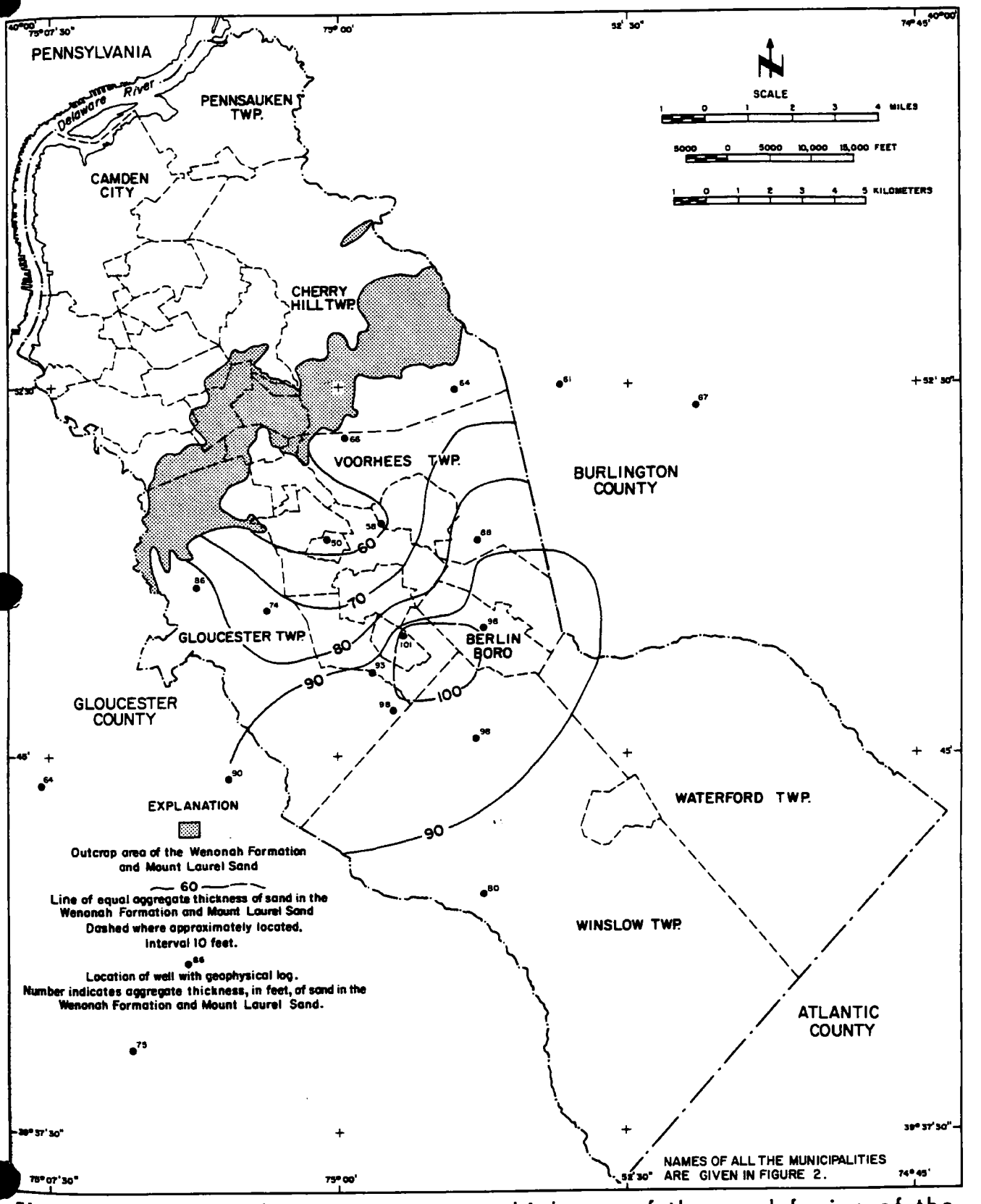
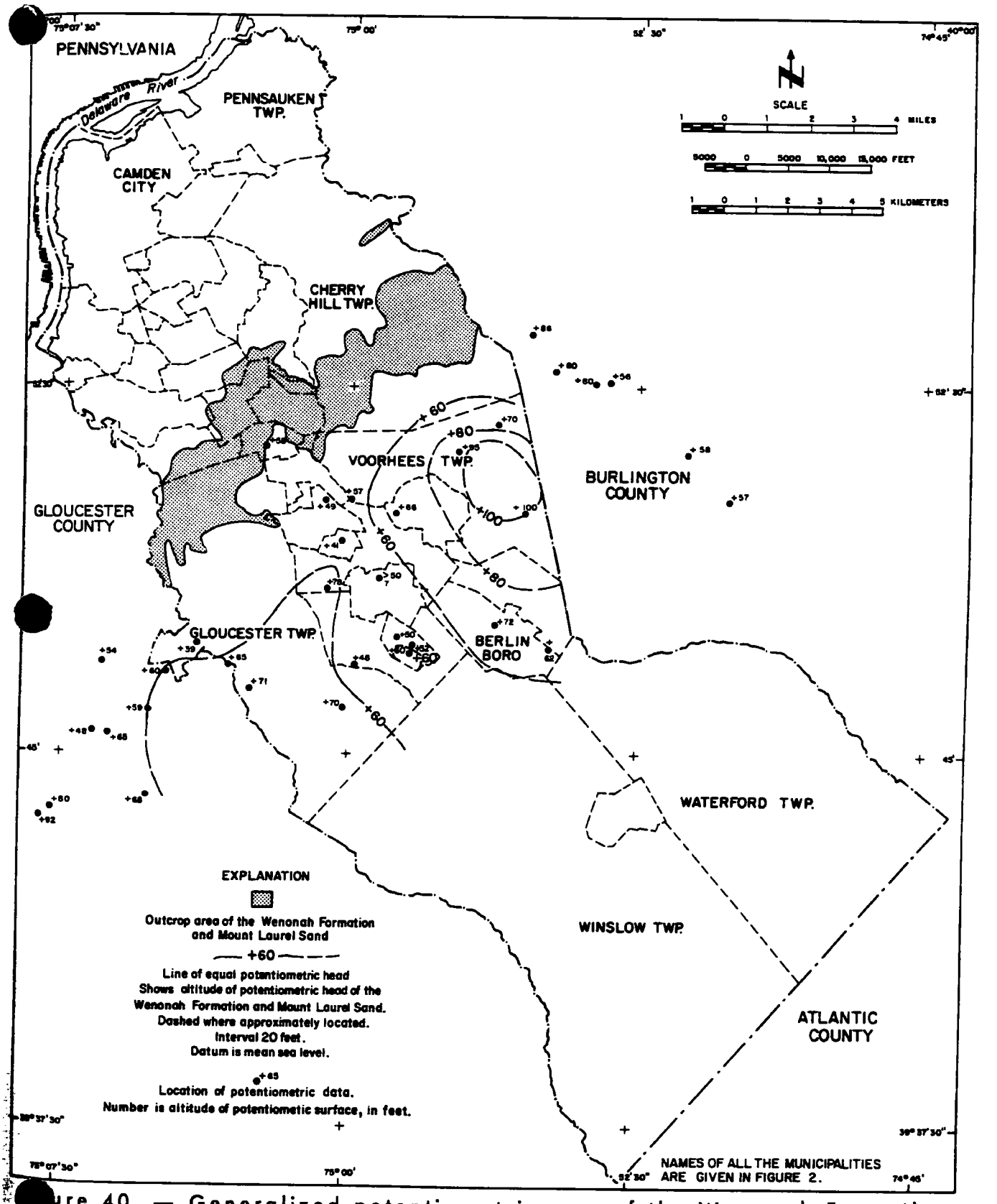


Figure 39. — Map showing aggregate thickness of the sand facies of the Wenonah Formation and Mount Laurel Sand in Camden County.

Data from three aquifer tests of the Wenonah-Mount Laurel aquifer are available. The analysis of aquifer tests conducted in 1954 at Bradley Beach in Monmouth County (Jablonski, 1968, p. 62) indicated an average transmissivity of 670 ft^2/day (5,000 gpd/ft) with a range of 360 to 1,420 ft^2/day (2,700 to 10,700 gpd/ft). The average coefficient of storage is about 1.2×10^{-4} with a range from 7.0×10^{-5} to 2.1×10^{-4}. The average hydraulic conductivity is about 17 ft/day (130 gpd/ft^2). In 1965 an aquifer test was run at Salem City, Salem County. The average transmissivity of the Wenonah-Mount Laurel aquifer was determined to be 1,200 ft^2/day (9,000 gpd/ft). The storage coefficient is 3.5×10^{-4} and the hydraulic conductivity is about 13 ft/day (100 gpd/ft^2) (Rosenau and others, 1969, p. 40). An aquifer test was run at Artificial Island in Salem County in 1968 by Dames and Moore, consulting engineers for Public Service Electric and Gas Company (Dames and Moore, 1968). The transmissivity was about 940 ft^2/day (7,000 gpd/ft), and the hydraulic conductivity was about 19 ft/day (140 gpd/ft^2).

Ten industrial and public-supply wells tapping the Wenonah-Mount Laurel aquifer in Camden County furnish sufficient specific capacity data for estimating the transmissivity by the Hurr (1966) method (table 11). Transmissivity computed for the 10 wells ranges from 430 to 1,780 ft^2/day (3,200 to 13,300 gpd/ft). The median transmissivity for the 10 wells is 780 ft^2/day (5,820 gpd/ft). The specific capacities for the 10 wells range from 1.8 to 6.[illegible] gpm/ft. The median specific capacity for the 10 wells is 3.2 gpm/ft. A coefficient of storage of 2.4×10^{-4} was used in calculations to estimate transmissivity. Porosity and hydraulic conductivity values obtained from laboratory analyses of samples from the New Brooklyn Park well in Winslow Township are given in table 5.

A generalized potentiometric surface map of the Wenonah-Mount Laurel aquifer based on the earliest record for each well is given in figure 40. Almost all of these wells are within 10 miles of the outcrop area. The map indicates a high potentiometric surface in northeastern Voorhees Township and in southern Gloucester Township. These areas are the main recharge areas for the Wenonah-Mount Laurel aquifer in Camden County and they coincide with areas of topographic highs as shown in figure 3. Recharge is mainly from downward vertical leakage. Potentiometric highs coinciding with topographic highs have been shown to exist for the Wenonah-Mount Laurel aquifer in Burlington County (Rush, 1968, p. 49) and Gloucester County (Hardt and Hilton, 1969, p. 23).



ure 40. — Generalized potentiometric map of the Wenonah Formation and Mount Laurel Sand, based upon earliest record for each control point.

Natural discharge areas for the aquifer occur along topographic lows in the outcrop area. One of the discharge areas for the Wenonah-Mount Laurel aquifer prior to pumpage was along Cooper River in northern Somerdale Borough.

The potentiometric map of the Wenonah-Mount Laurel aquifer based on data for the period November 1968 to May 1970 is shown in figure 41. The potentiometric surface has been lowered in several areas mainly during the past 20 years. The greatest decline in head (43 feet) known in Camden County for the Wenonah-Mount Laurel aquifer is in the vicinity of Berlin Borough, an area where most of the industrial and public-supply pumpage occurs.

An observation well in the Wenonah-Mount Laurel aquifer was drilled at New Brooklyn Park (WI 29) in 1961. Head data from 1963 to 1970 are given in figure 42. From May 1962 to September 1964 the head declined about 9 feet. The decline is interpreted as being mainly due to additional pumping in the area of Berlin and northern Winslow Township including withdrawals from the Johns-Manville well (WI 3), located 3.5 miles north of the New Brooklyn Park observation well. Pumpage at Johns-Manville began in late 1963.

Quality of Water

The quality of water from the Wenonah-Mount Laurel aquifer is generally within the State's standards for potable water with the exception of high iron concentrations in local areas. A summary of chemical analyses of ground water from wells tapping the Wenonah-Mount Laurel aquifer in Camden County is shown in table 12. The water is generally low in dissolved solids (97-178 mg/l), sulfates (0-28 mg/l), and chloride (0.3-9.7 mg/l). Laboratory analyses of water samples (table 4) indicate 6 of 13 analyses have iron concentrations exceeding the State's potable-water standard of 0.3 mg/l. The range in iron concentration is 0-3.6 mg/l. There is no apparent regional distribution of the high iron concentration in the aquifer in Camden County. Hardness ranges from soft to moderately hard (17-126 mg/l).

Sulfate concentration of 28 mg/l was determined for a sample obtained in January 1970 from the New Jersey Water Company's well 4 (LS 6) at Laurel Springs. Chemical analyses (Donsky, 1963) indicate sulfate concentrations of 13 mg/l in May 1951 and 17 mg/l in August 1960 for well 8 (LS 4) which is screened at the same interval and is located near well 4. In

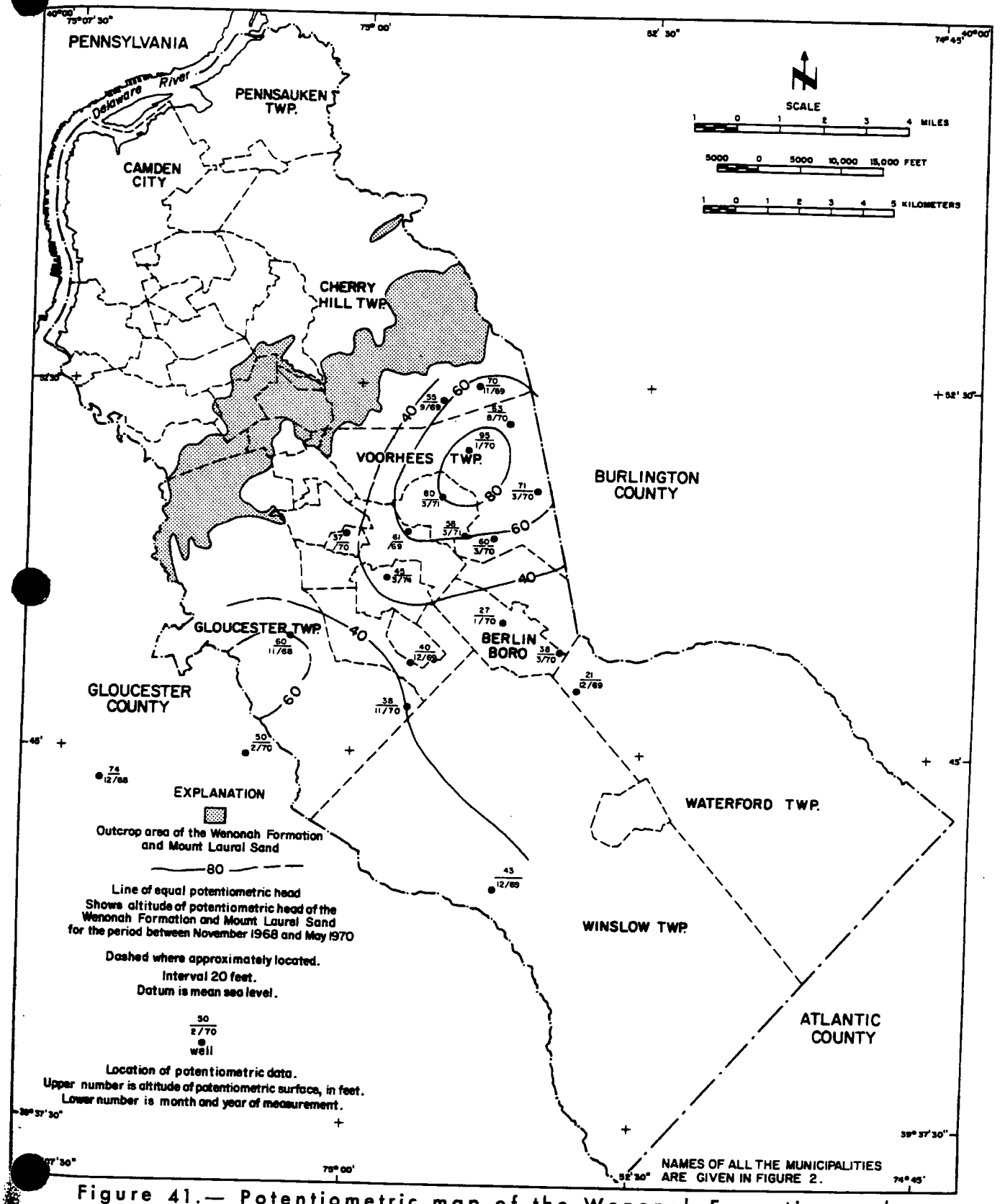


Figure 41.— Potentiometric map of the Wenonah Formation and Mount Laurel Sand, November 1968 - May 1970.

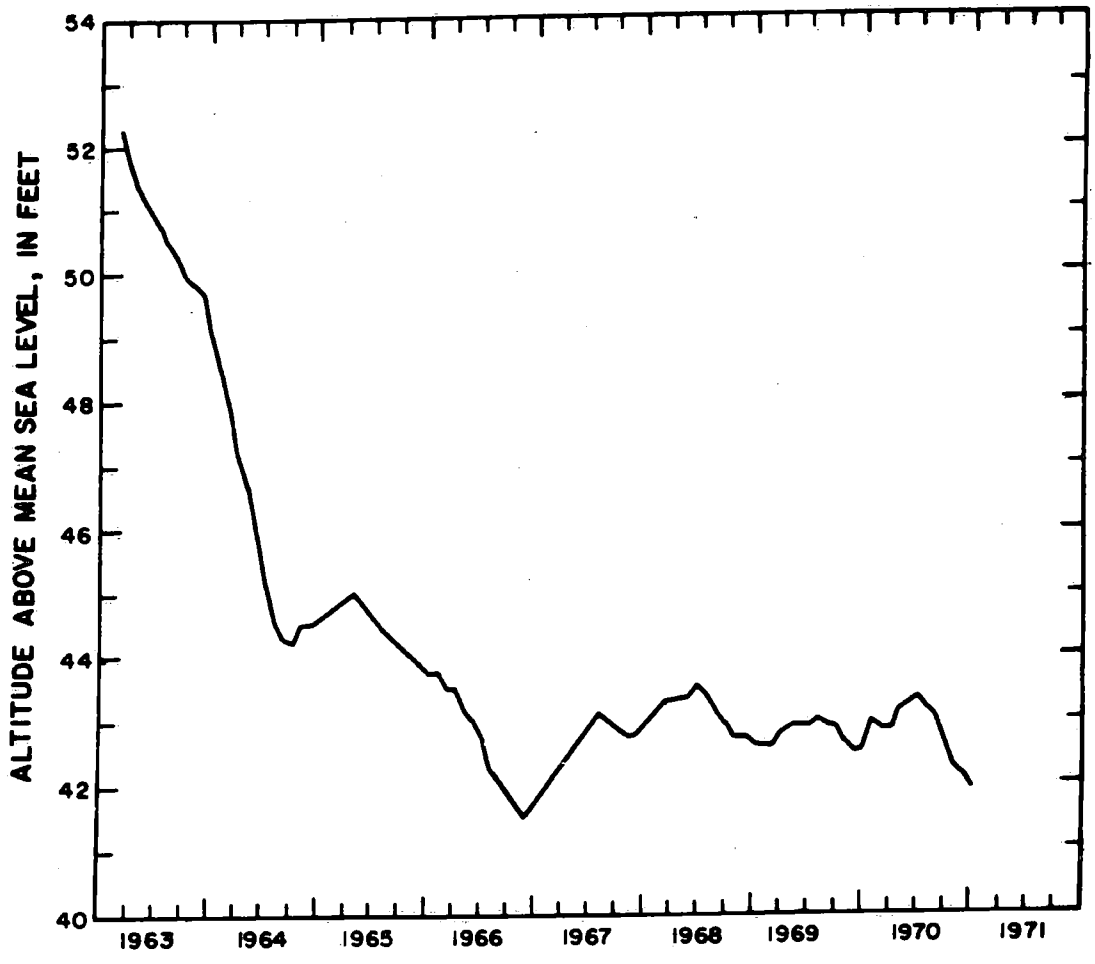


Figure 42. — Hydrograph of the lowest monthly water level in the observation well tapping the Wenonah-Mount Laurel aquifer at New Brooklyn Park, Winslow Township, January 1963 - December 1970.

addition to the increase in sulfate, there was an increase in dissolved solids. Although sulfate and dissolved solids are well within the State's Potable Water Standards, the increase may indicate a rising trend. Withdrawals from the Wenonah-Mount Laurel aquifer at Laurel Springs may have reversed the hydraulic gradient, thereby causing the water to move from the outcrop area to the well field.

A water sample obtained in February 1970 from a domestic well (GT 10) located very close to the outcrop area of the Wenonah Formation and Mount Laurel Sand had a nitrate concentration of 15 mg/l. Nitrate in the Wenonah-Mount Laurel aquifer is generally much lower (0 to 1.4 mg/l). The high nitrate suggests local ground-water contamination, possibly from fertilizers in the outcrop area or through the overlying sediments.

Navesink Formation

Geology

The Navesink Formation crops out in an irregular belt southeast of the Mount Laurel Sand in Camden County and is approximately 3.9 square miles in area (fig. 4).

The Navesink Formation in Camden County is the uppermost unit of the Cretaceous System. It is unconformably overlain by the Hornerstown Sand of Tertiary age and underlain conformably by the Mount Laurel Sand. Fossils and glauconite found in the Navesink indicate that it is of marine origin.

The Navesink Formation consists of a dark green to black glauconitic sand and clay mixed with varying amounts of quartz sand. A prominent shell zone occurs at the base of this formation and is one of the best marker horizons in Camden County. The bulk of the fossils are the thick-shelled Exogyra, Gryphaea, and Belemnites (Owens and Minard, 1960, p. 28). The formation dips about 30 feet per mile to the southeast and ranges in thickness from 15 feet in Laurel Springs Borough near the outcrop area to 34 feet in Winslow Township. Particle-size analysis of samples from the New Brooklyn Park well (WI 27) in Winslow Township are listed in table 5.

Hydrology

The Navesink Formation functions as a confining layer in Camden County. Recharge to the underlying Wenonah Formation and Mount Laurel Sand takes place as a result of vertical leakage through the Navesink Formation. Porosity and hydraulic conductivity values for samples of the formation from the New Brooklyn Park well (WI 27) in Winslow Township are listed in table 5.

In this report the Navesink Formation and the Hornerstown Sand are treated as a hydrologic unit. The total thickness of the Navesink Formation and Hornerstown Sand is shown in figure 43.

CENOZOIC ERATHEM

Tertiary System, Paleocene-Eocene Series

Hornerstown Sand

Geology

The Hornerstown Sand of Paleocene age crops out in an irregular belt southeast of the Navesink Formation (fig. 4). The outcrop area in Camden County is approximately 9.4 square miles.

The Hornerstown Sand in Camden County is the lowest unit of the Tertiary System. It unconformably overlies the Navesink Formation. Fossils and the high glauconite content of the Hornerstown Sand indicate that it is of marine origin. Dorf and Fox (1957, p. 5) suggest that the Hornerstown represents a transgressive marine phase.

The Hornerstown Sand is composed of sand and clay and contains as much as 90 percent glauconite. This mineral gives the Hornerstown Sand its dark-green color. The formation dips about 30 feet per mile to the southeast and ranges in thickness from 36 feet in Voorhees Township near the outcrop area to 18 feet in Waterford Township. Particle-size analysis of samples from the New Brooklyn Park well (WI 27) in Winslow Township are given in table 5.

Gamma-ray logs of wells in Camden County indicate that two relatively high radioactive layers occur 25 to 40 feet apart in the Navesink-Hornerstown confining layer. The layers

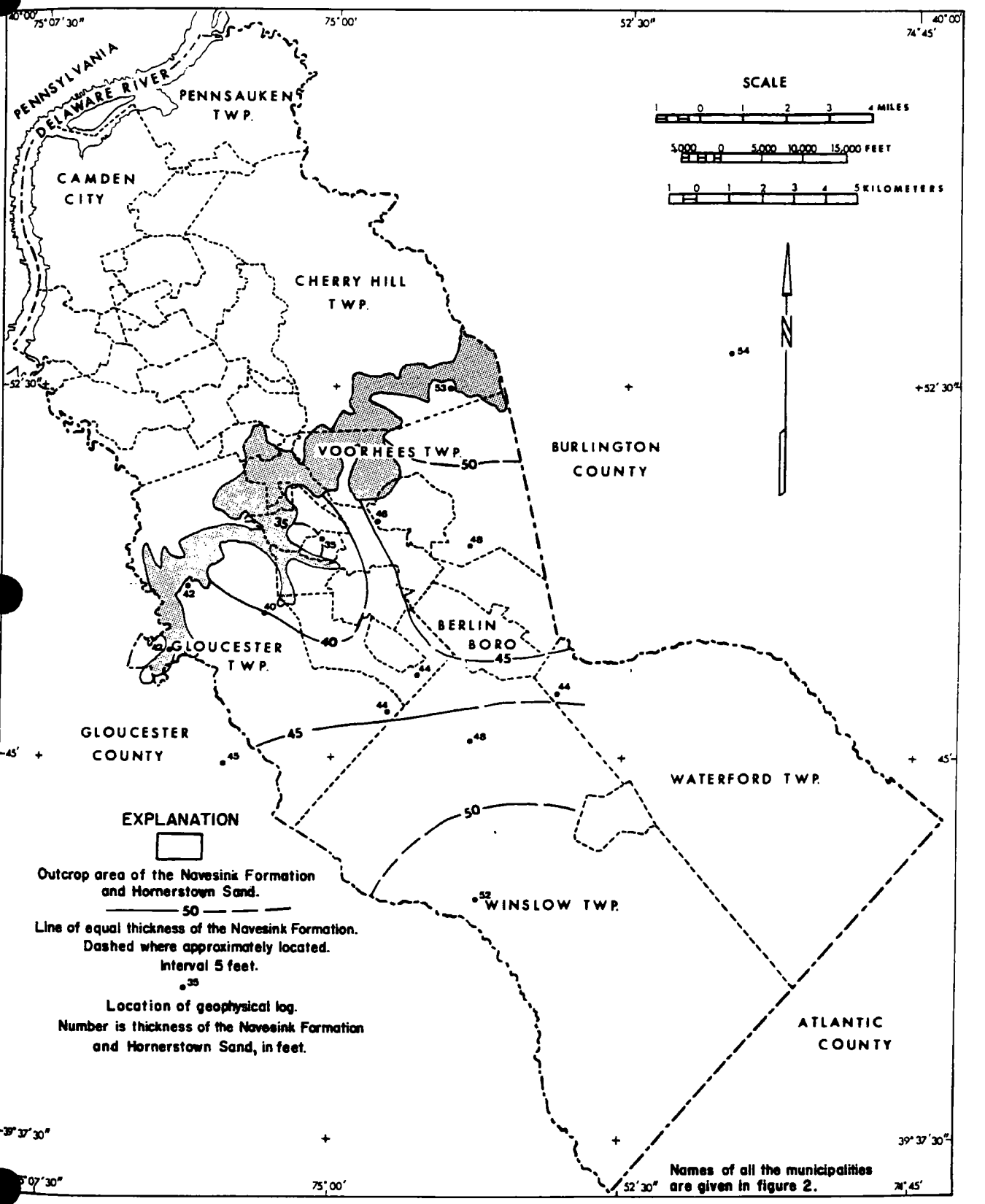


Figure 43. — Thickness map of the Navesink Formation and Hornerstown Sand in Camden County.

appear to coincide in position with high concentrations of glauconitic sand or with reported shell layers near the top of the Hornerstown Sand and the bottom of the Navesink Formation. Thus, one can establish the Tertiary-Cretaceous (Hornerstown Sand-Navesink Formation) contact zone in Camden County. These two layers were used as markers in correlating well logs shown in figure 6.

Hydrology

The Hornerstown Sand in conjunction with the underlying Navesink Formation is a leaky confining unit. Recharge to the Mount Laurel Sand takes place as a result of vertical leakage through these overlying formations. One domestic well is known to tap the Hornerstown Sand and three wells are known to tap the undifferentiated Hornerstown Sand and overlying Vincentown Formation in Camden County. Porosity and hydraulic conductivity values for samples from the New Brooklyn Park well (WI 27) in Winslow Township are given in table 5.

Vincentown and Manasquan Formations

Vincentown Formation

Geology

The Vincentown Formation of Paleocene age does not crop out in Camden County. In the subsurface the formation thickens to the southeast. The authors were unable to differentiate the Vincentown Formation from the overlying Manasquan Formation on geophysical logs. The total thickness of the Vincentown and Manasquan Formations in Camden County ranges from 0 to 210 feet (fig. 44). The Vincentown Formation is estimated to range in thickness in Camden County from 0 to 80 feet. The contact with the underlying Hornerstown Sand is unconformable.

The Vincentown Formation in Camden County consists chiefly of a light brown to light gray, very fine, calcareous, micaceous sand. The formation has two recognizable facies; (1) a quartzose sand with glauconite, and (2) a limey sandstone which contains fossil shells. Neither facies is traceable for any great distance because of the lensing nature of the limey

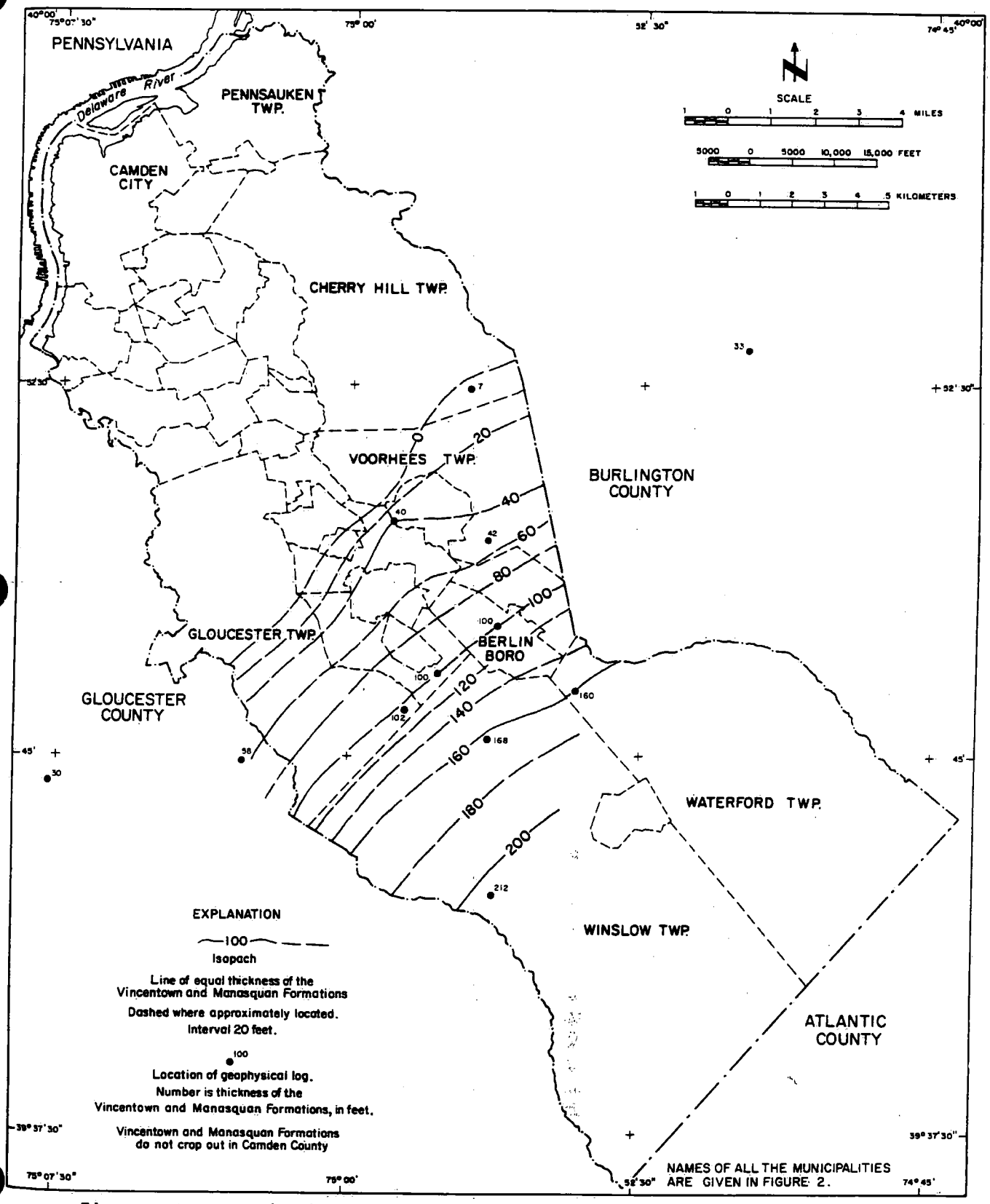


Figure 44. — Thickness map of the Vincentown and Manasquan Formations in Camden County.

sandstone. The sand fraction in the limey sandstone facies consists primarily of calcareous fragments of bryozoans, foraminifera, and corals. The clay-size fraction is primarily calcite with small amounts of montmorillonite (Owens and Minard, 1960, p. 25). The limey sandstone facies is predominant in Camden County. Particle-size analysis of samples from the New Brooklyn Park well (WI 27) in Winslow Township are given in table 5.

Manasquan Formation

Geology

The Manasquan Formation of Eocene age does not crop out in Camden County. In the subsurface the formation thickens to the southeast. The total thickness of the Manasquan and Vincentown Formations in Camden County ranges from 0 to about 210 feet (fig. 44). The Manasquan Formation is estimated to range in thickness in Camden County from 0 to about 140 feet.

The Manasquan Formation overlies the Vincentown Formation. The contact between the Manasquan Formation and the overlying Kirkwood Formation is unconformable. Fossils and glauconite found in the Manasquan Formation indicate that it is of marine origin. Dorf and Fox (1957, p. 12) considered the Manasquan Formation to represent a second transgressive phase of the lower Tertiary. Perfectly preserved specimens of Maringulina vacavillensis (Hanna) and associated small foraminifera found in the New Brooklyn Park test well (WI 27) suggest marine conditions during middle Eocene time similar to that of the present day Gulf Coast (Herrick, 1962).

The Manasquan Formation is described by Owens and Minard (1960, p. 25-26) as a clayey, quartz, glauconite sand similar to the Hornerstown Sand, except that the Manasquan has more clay and quartz sand. Samples taken from two test wells of the Manasquan Formation in Burlington County were olive gray, glauconitic, clayey sand having small amounts of mica and shell fragments. Mechanical analyses were made on six samples and a typical sample gave the following particle-size distribution: gravel, 1 percent; very coarse-grained sand, 3 percent; coarse-grained sand, 3 percent; medium-grained sand, 12 percent; fine-grained sand, 36 percent; very fine-grained sand, 20 percent; silt, 8 percent; and clay, 17 percent (Rush, 1968, p. 54). Particle-size analysis of samples from the New Brooklyn Park well (WI 27) in Winslow Township, Camden County, are given in table 5. The samples in general have more than 30

percent clay and as much as 82 percent clay.

Vincentown and Manasquan Formations Undifferentiated

Hydrology

The Vincentown and Manasquan Formations, along with the Hornerstown Sand and Navesink Formation, function as confining layers between the underlying Wenonah-Mount Laurel aquifer and overlying aquifers of the Kirkwood Formation and Cohansey Sand.

Laboratory analysis of an outcrop sample of the Vincentown Formation taken between Jacobstown and New Egypt in Burlington County indicates a hydraulic conductivity of 21 ft/day (160 gpd/ft^2). Laboratory analyses of six samples of the Manasquan Formation in Burlington County give a range for hydraulic conductivity from 0.04 to 16 ft/day (0.3 to 120 gpd/ft^2) with most hydraulic conductivity values grouped between 0.5 and 0.8 ft/day (4 and 6 gpd/ft^2) (Rush, 1968, p. 55). Hydraulic conductivity values of samples from the New Brooklyn Park well (WI 27) in Winslow Township range from 8 x 10^{-5} to 4 x 10^{-2} ft/day (0.0006 to 0.3 gpd/ft^2) (table 5).

Ancora State Hospital in Winslow Township has three wells that tap the undifferentiated Vincentown and Manasquan Formations (reported by Rush, 1968, as wells tapping the Kirkwood Formation). Wells 1 (WI 40) and 2 (WI 38) yield 185 gpm and 360 gpm, respectively. Specific capacities for wells 1 and 2 are 1.9 and 1.3 gpm/ft drawdown, respectively.

Continuous water-level data have been collected at observation well 3 (WI 37), Ancora State Hospital, since 1953. A hydrograph of monthly low water levels is shown on figure 45. A close relationship is found between monthly head fluctuations and variation in the monthly pumpage for wells 1 (WI 40) and 2 (WI 38) (fig. 45). The increased rate of head decline in 1955-56, 1958-59, and 1966-67 is the result of increased withdrawals from wells 1 and 2 as shown in figure 45.

Piney Point(?) Formation

The Piney Point(?) Formation of Eocene age does not crop out in New Jersey. The Eocene age marine sediments which are correlated with the Jackson Formation of the Gulf Coast are

recognized in well logs from Delaware (Marine and Rasmussen, 1955) and southern New Jersey (Richards, 1956, p. 84). The glauconitic sands and shell beds in southern Maryland were named the Piney Point Formation (Otton, 1955, p. 85) from a well located at Piney Point, St. Mary's County, Maryland. The name was extended (Rasmussen and others, 1957, p. 61-67) to include a similar unit on the eastern shore of Maryland. The sediments penetrated by a deep well at Atlantic City, New Jersey, were tentatively assigned the name Piney Point Formation by Parker and others (1964, p. 60). The total thickness of the Piney Point Formation at Atlantic City is 290 feet (Parker and others, 1964).

Interpretation of geophysical and geologic logs suggests that the Ancora State Hospital well 3 (WI 37) may penetrate about 35 feet of sand which may be part of the Piney Point(?) Formation. This interpretation is based on stratigraphic correlation study conducted primarily in Cumberland County on the Piney Point aquifer by Nemickas and Carswell (written commun., 1974). The Piney Point aquifer in their study was extended from the Cumberland County area to the New Brooklyn Park wells. Data from the New Brooklyn Park well (WI 27) in Winslow Township in the southern part of Camden County suggests the presence of about 35 feet of sand that may be the extension of the Piney Point aquifer. In the central part of Camden County the Piney Point sand probably pinches out or is truncated by the overlying Kirkwood Formation. Figure 5 shows stratigraphic section (C-C') from Ancora State Hospital well 3 (WI 37) to the Gino's Restaurant well 1 (WA 12) showing the pinching out of the Piney Point sand. Geophysical data indicate that the Piney Point sand is present in Winslow Township in Camden County but would probably be less than 40 feet thick.

Tertiary System, Miocene Series

Kirkwood Formation

Geology

The Kirkwood Formation of Miocene age crops out in an irregular northeasterly-trending belt southeast of the outcrop area of the Hornerstown Sand (fig. 4). The outcrop area of the Kirkwood Formation in Camden County is approximately 18.9 square miles. The formation dips 15 to 25 feet per mile to the southeast and ranges in thickness from 57 feet in Voorhees Township to 96 feet in Gloucester Township. The thickness map of the Kirkwood Formation in Camden County is shown in figure 46. The Kirkwood Formation in Camden County rests

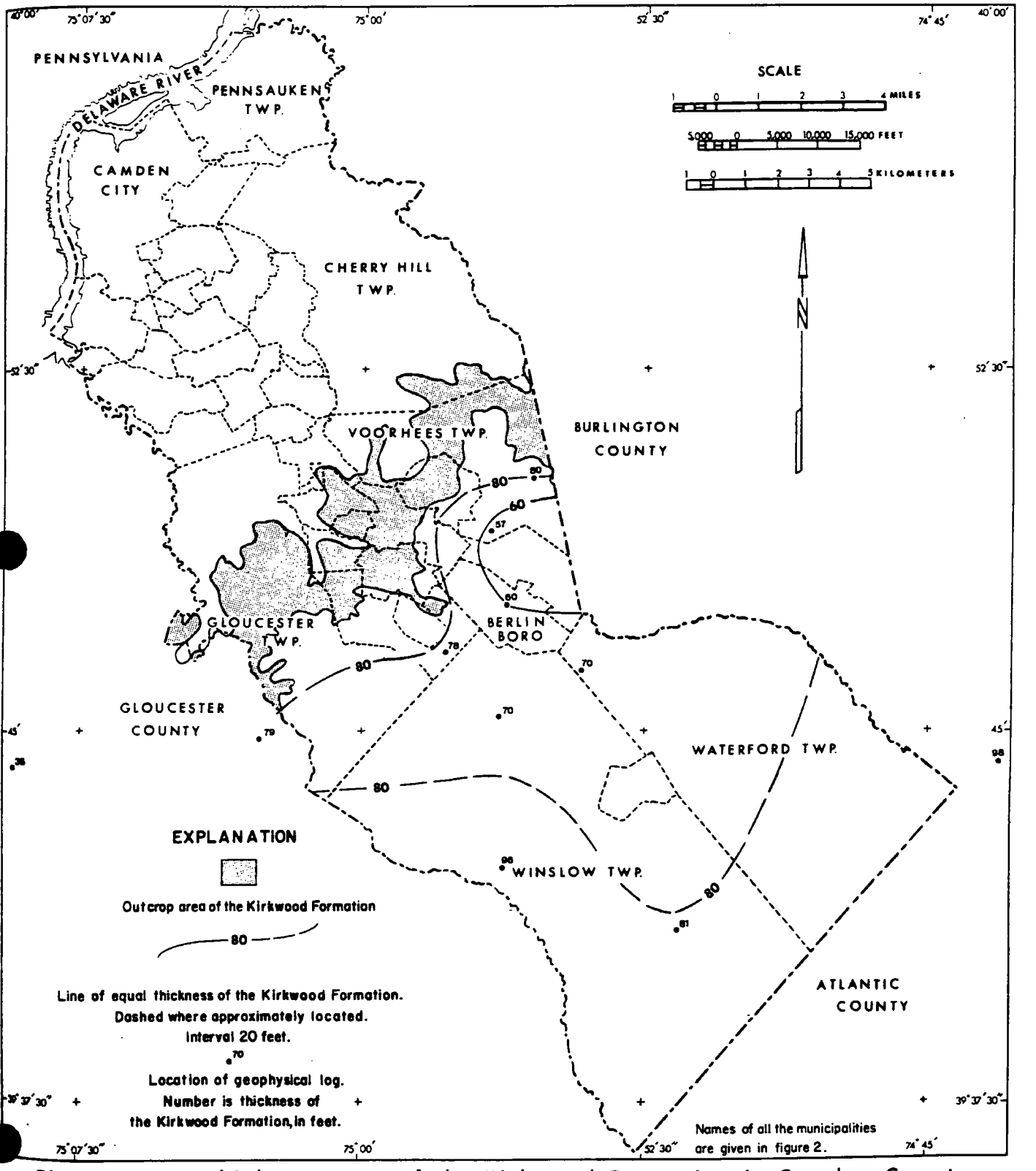


Figure 46. — Thickness map of the Kirkwood Formation in Camden County.

unconformably on the Hornerstown Sand in the outcrop area and on the Manasquan Formation in the subsurface. The structure contour maps of the base and the top of the Kirkwood Formation in Camden County (figs. 47 and 48) are based on the interpretation of geophysical and geologic logs. The Cohansey Sand unconformably overlaps the Kirkwood Formation in Camden County.

The Kirkwood Formation consists chiefly of sand, silt, and clay; dark gray where unaltered; light gray, yellowish- and grayish-orange to grayish-yellow, light red to moderate reddish-brown, and moderate to dusky yellow and yellowish-gray where weathered (Minard, 1965). The lower part of the formation is mostly thick bedded, very fine to fine-grained sand, and is typically micaceous. The basal 2 to 4 feet consists of poor to moderately sorted pebbly coarse sand with abundant glauconite. The upper part of the formation is interbedded poorly sorted silt and clay. Quartz is the dominant sand-size constituent throughout the formation; feldspar and mica (mostly muscovite) are less common (Minard, 1965). Carbonaceous matter is abundant in the basal dark-gray beds. The Kirkwood Formation unconformably overlies the Hornerstown Sand on the surface in Camden County and the Manasquan Formation in the subsurface. Particle-size analyses of samples from the New Brooklyn Park well (WI 27) in Winslow Township Atsion well 1 (SH 1) in Burlington County are listed in tables 5 and 13.

Hydrology

The Kirkwood Formation is not being utilized for water supply in Camden County. The overlying Cohansey Sand is preferred for water supply because of its shallower depth. Recharge to the Kirkwood takes place principally in upland areas by percolation into the formation from the overlying Cohansey Sand. Ground-water movement is probably toward the lowland areas where the water is discharged mostly to streams.

The Kirkwood Formation is of hydrologic importance in Camden County because its large surface area absorbs precipitation that is partly transmitted to deeper aquifers. Porosity and hydraulic conductivity values of samples from the New Brooklyn Park well (WI 27) in Winslow Township and Atsion well 1 (SH 1) in Burlington County are listed in tables 5 and 13.

The Kirkwood Formation can be developed as a source of water in the southern part of Camden County. Just southeast of

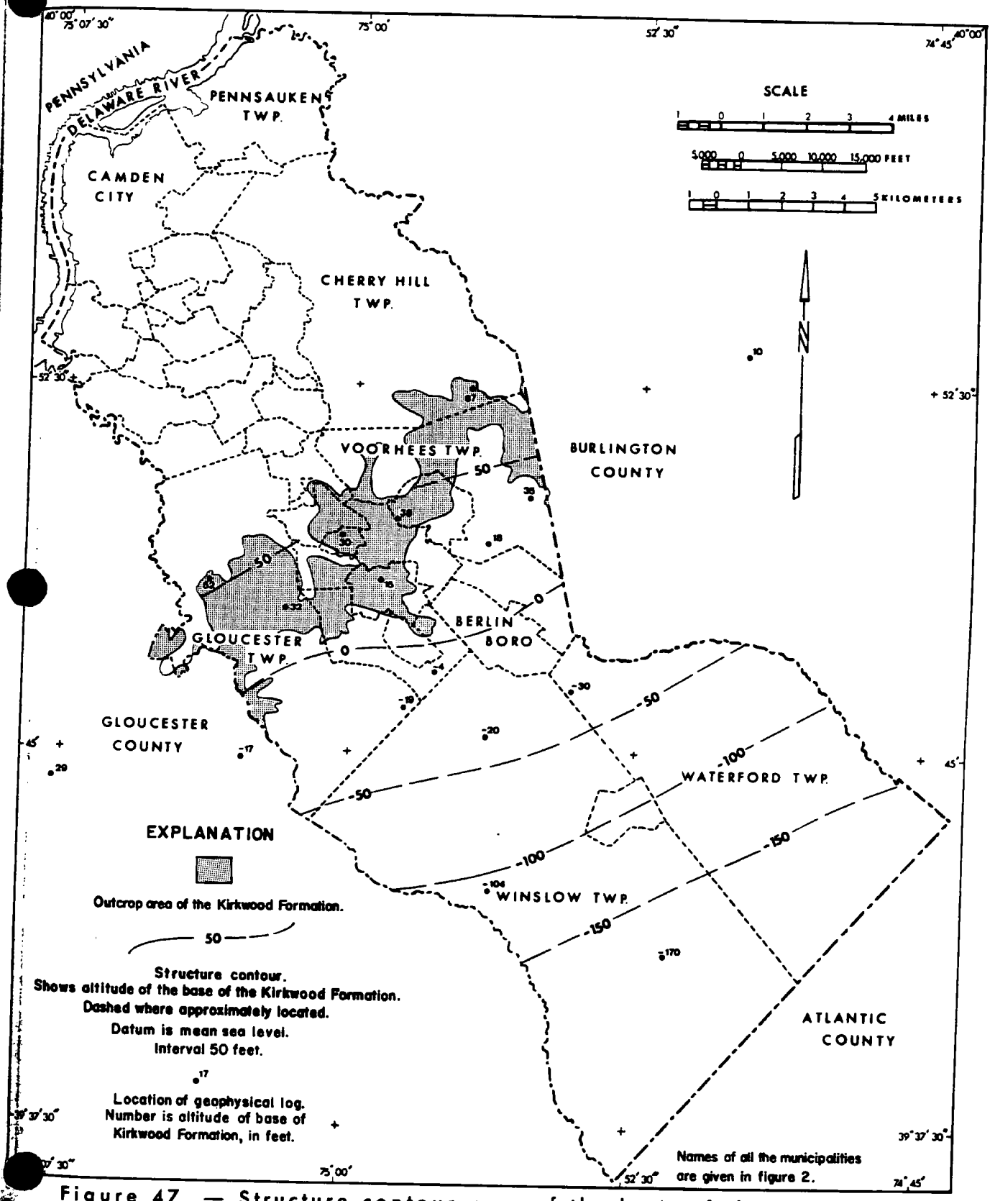


Figure 47. — Structure contour map of the base of the Kirkwood Formation in Camden County.

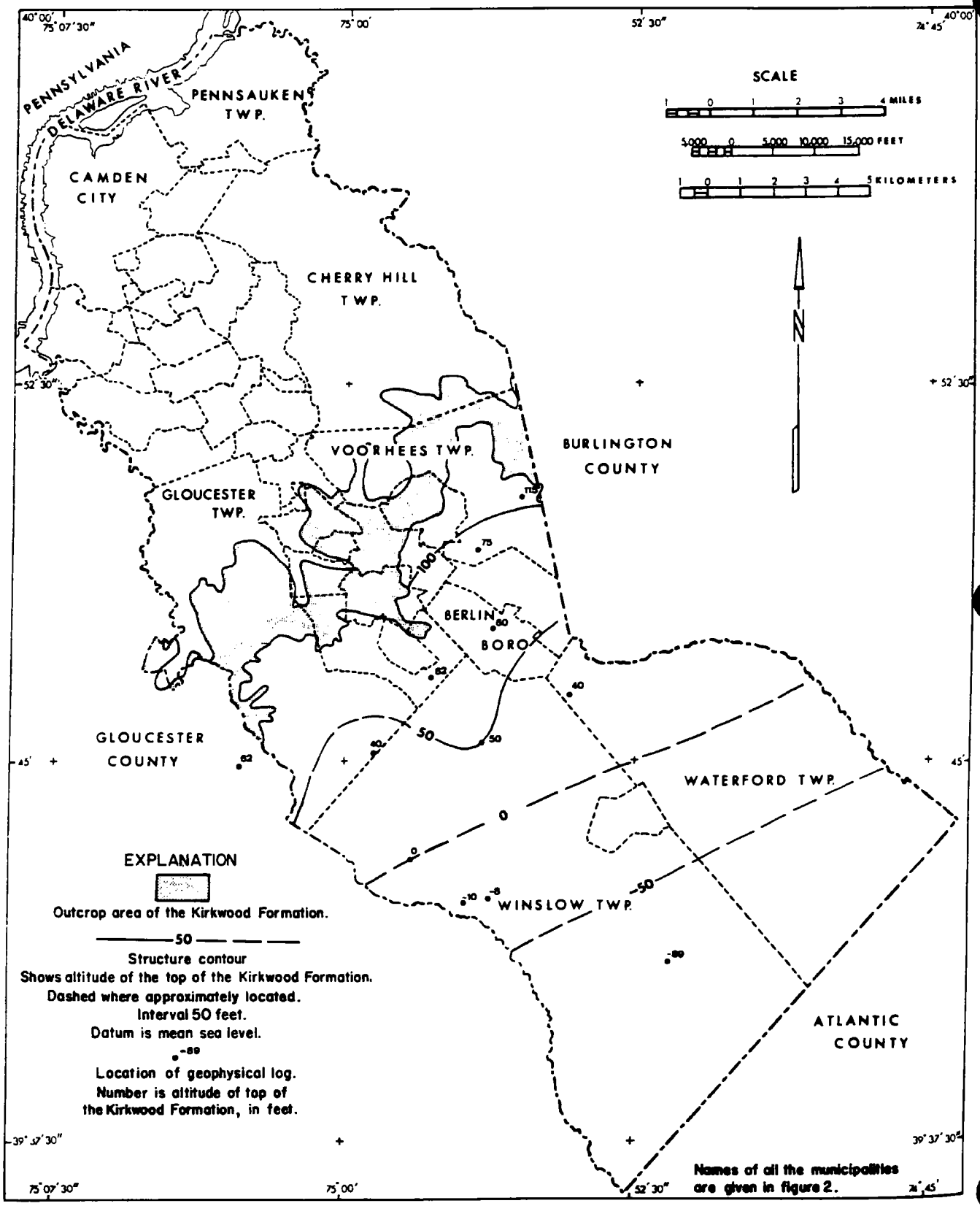


Figure 48. — Structure contour map of the top of the Kirkwood Formation in Camden County.

the Camden County line in Atlantic County yields from wells in the Kirkwood are as high as 700 gpm (Clark and others, 1968). In the outcrop area of the Kirkwood in central Camden County it has been found desirable to drill to the Wenonah Formation and Mount Laurel Sand because the Kirkwood has poor water-transmitting characteristics.

Quality of Water

One chemical analysis of water is available from the Kirkwood Formation in Camden County. The analysis, from the New Brooklyn Park well 4 (WI 30), indicates an iron concentration of 6.0 mg/l and dissolved solids of 136 mg/l. In adjacent Burlington County, analyses from eight wells indicate generally good chemical quality; however, some analyses showed high iron concentrations, ranging from 0.02 to 2.9 mg/l. The water is generally very soft (2 to 94 mg/l) and the dissolved solids are low, ranging from 13 to 125 mg/l.

In Atlantic County (Clark and others, 1968) analyses of water samples from seven wells located 1 to 8 miles from the Camden County line indicate some objectionable chemical characteristics. Iron concentrations range from 0.13 to 4.6 mg/l. Six of the seven samples are above the limit set in the State's Potable Water Standards. Dissolved solids range from 51 to 98 mg/l. Hardness of the seven samples ranges from 9 to 28 mg/l and pH from 5.0 to 7.4.

Tertiary System, Miocene(?) and Pliocene(?) Series

Cohansey Sand and Younger Sediments

Geology

The Cohansey Sand was named and defined by Ries, Kümmel, and Knapp (1904, p. 139). It crops out in all of the southeastern half of Camden County (fig. 4). The outcrop area in Camden County is approximately 124 square miles or about 55 percent of the total county area. The Cohansey Sand rests unconformably on the Kirkwood Formation and is unconformably overlain by the Bridgeton Formation of Pleistocene age.

The structure contour map of the top of the Kirkwood Formation in Camden County, shown in figure 48, also delineates

the base of the Cohansey Sand. The Cohansey Sand strikes in a northeasterly direction and dips from 10 to 20 feet per mile to the southeast. The steeper dips, in general, are encountered to the southeast. The estimated thickness of the Cohansey Sand ranges from 0 to 140 feet. The saturated thickness of the Cohansey Sand and the overlying younger sediments ranges from 0 to 190 feet as shown on figure 49 which is based on interpretation of geophysical and geologic logs and water-level measurements (1951 to 1969).

The Cohansey Sand in Camden County consists chiefly of yellowish-orange, fine- to coarse-grained quartzose sand and fine gravel. The sand also contains lenses of silt and clay which are as much as 30 feet thick. The average grain size of the materials decreases southeastward; beds of silt and clay become thicker, more numerous, and more extensive to the southeast. Mechanical analysis of samples from the New Brooklyn Park well (WI 27) in Winslow Township, Camden County, and Atsion well (SH 1) in Burlington County are given in tables 5 and 13.

The Cohansey Sand was derived in part from older sedimentary rocks and from deeply weathered crystalline rocks of the New Jersey Highlands. Sedimentary rocks of Paleozoic age, as indicated by fossiliferous chert pebbles, were incorporated into the Cohansey Sand. The almost complete absence of glauconite in the Cohansey Sand indicates that the older marine Coastal Plain sediments (pre-Kirkwood) were not a major contributing source of sediments. These older glauconitic sediments were either covered by the Kirkwood Formation or the sediments were being transported by longshore currents from the north. The clearness and angularity of most of the quartz grains and the absence of amphiboles, pyroxene, and feldspars indicate a deeply weathered crystalline source. The absence of fossils and the lack of glauconite in the Cohansey Sand indicate a non-marine environment. "Cross-bedding, local cut and fill structures, and heterogenity of grain size suggest an active stream environment on an extensive alluvial plain in the inland deposits" (Markewicz, 1969, p. 368-369). Its coarse texture, poor sorting, and cross-bedding fit this interpretation. However, Owens and Minard (1960, p. 27) discount this hypothesis on the grounds that the formation is too widespread. They favor a hypothesis of beach deposition. Rhodehamel (oral communication, 1970) interprets the Cohansey Sand as a deltaic deposit.

Hydrology

The Cohansey Sand is one of the important aquifers in

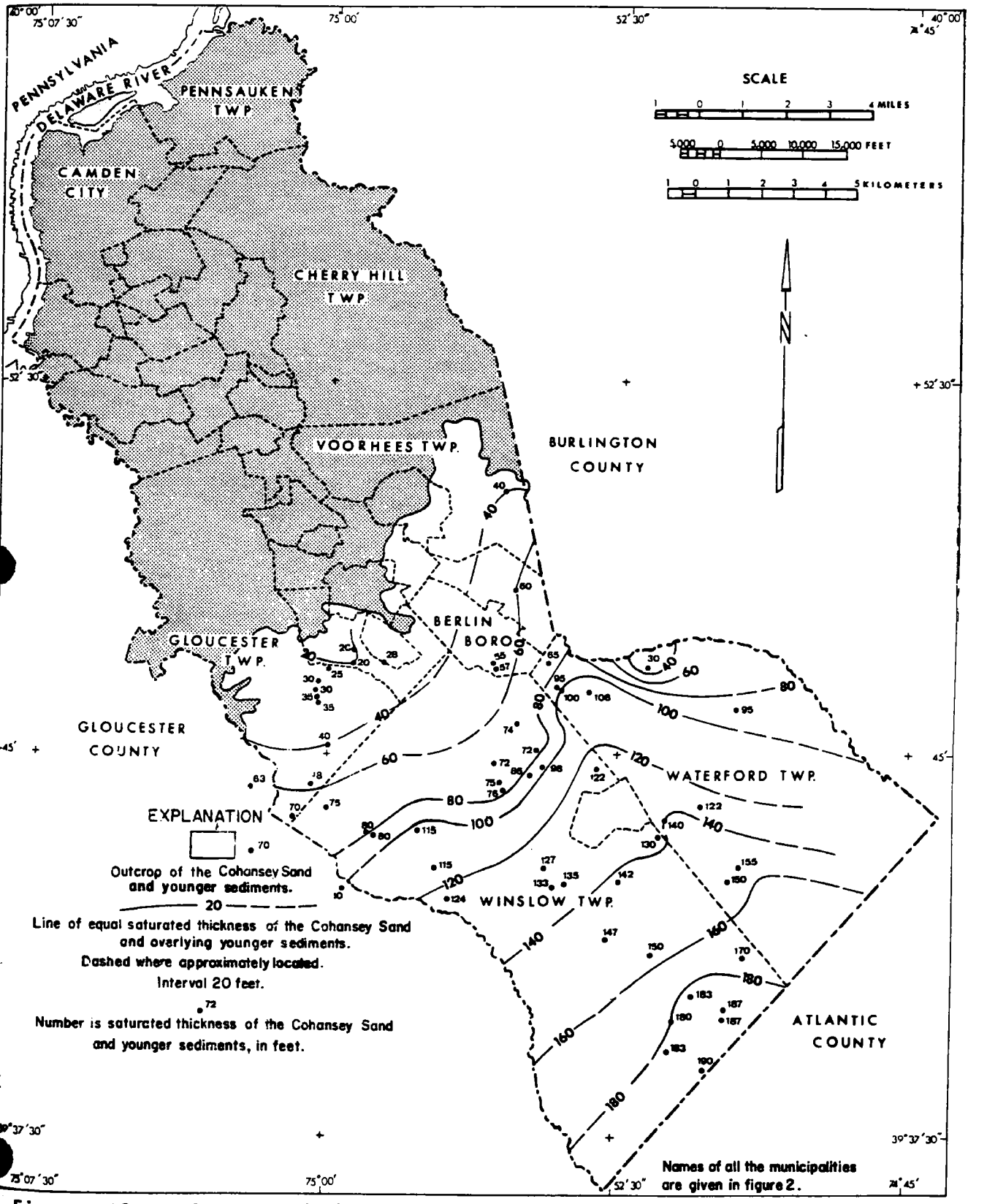


Figure 49. — Saturated thickness of the Cohansey Sand and overlying younger sediments in Camden County.

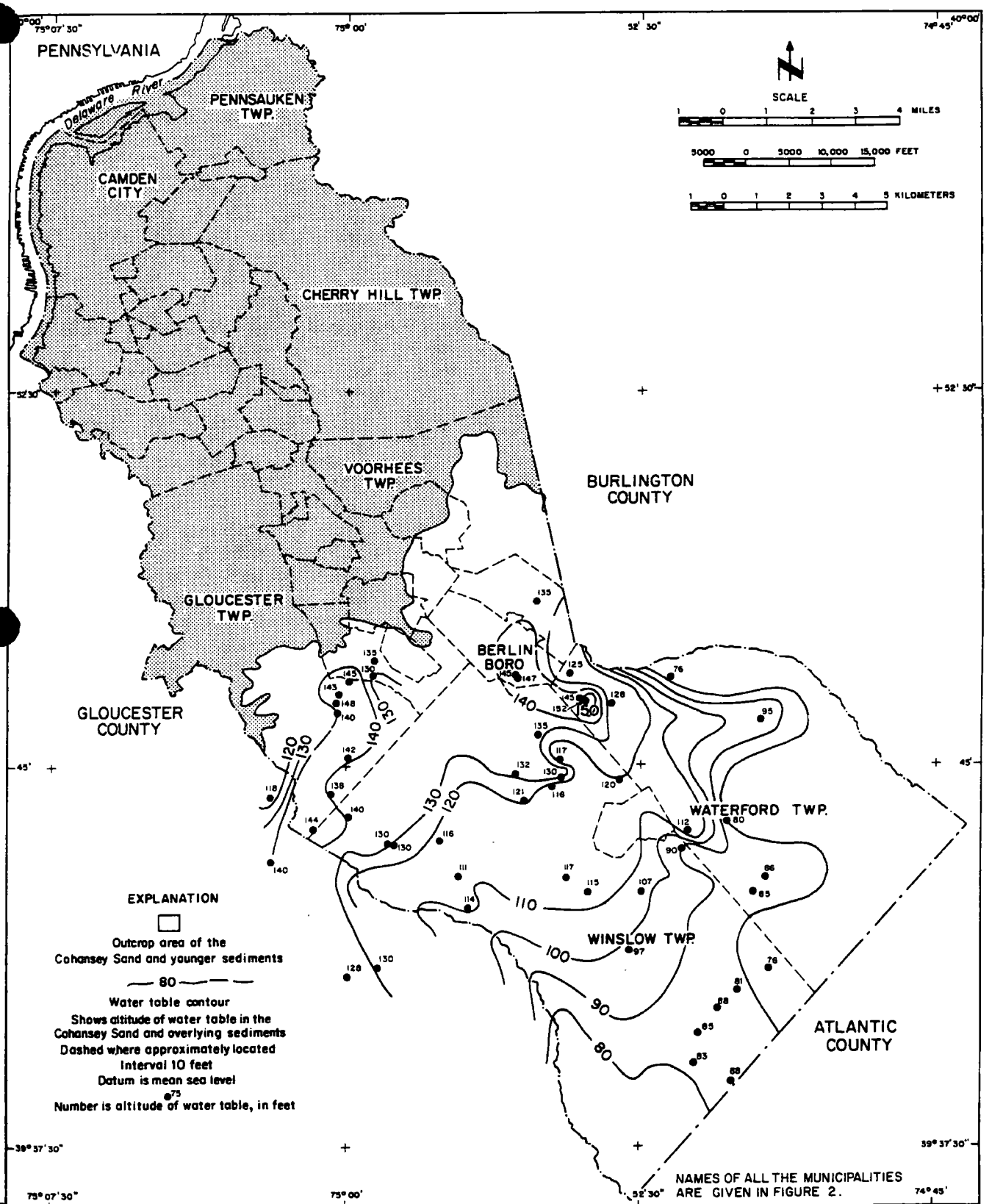
Camden County. The Cohansey Sand and the overlying younger material consist of as much as 190 feet of saturated sediments of high porosity and permeability. It is virtually untapped by wells and has an excellent potential for water development in the southeastern part of the county. The Cohansey Sand in many areas is hydraulically connected with the underlying Kirkwood Formation. There are no extensive confining beds overlying it, but clay lenses commonly cause local perched water-table conditions. However, most of the formation in Camden County is under water-table conditions.

Water enters the aquifer directly from precipitation and moves toward low-level areas where it is ultimately discharged into streams. The generalized water-table map of the Cohansey Sand and overlying sediments (fig. 50) is a subdued replica of the topography (fig. 3).

In Camden County the Cohansey Sand is tapped mostly by domestic and irrigation wells. Relatively few industrial and public-supply wells draw water from the Cohansey Sand as yet because of the rural nature of the area. Berlin Water Department well 5 (BB 4) yields 365 gpm. The other large diameter wells that draw water from the Cohansey Sand are located in Winslow Township. Water-yield data are given below.

Map Number	Owner	Well Number	Yield (gpm)	Specific Capacity (gpm/ft of drawdown)
WI 36	Ancora State Hospital	4	708	9.1
WI 35	Do.	5	502	8.4
WI 12	Certain-teed Saint Gobin	1	524	12.1
WI 11	Do.	2	510	19.6
WI 42	M. and R. Refractory Metals	-	377	10
WI 19	Winslow Water Company	Prod. 1	1,000	35
WI 14	Do.	Prod. 2	1,000	25.6

Aquifer tests on wells in the Cohansey have been conducted in Camden, Atlantic, Cape May, and Cumberland Counties. In these tests the aquifer was not completely penetrated and was partially confined beneath clay layers. The storage coefficient ranged from 2.7×10^{-3} to 4×10^{-5}. Computed transmissivity, which did not represent the total thickness of the Cohansey Sand, ranged from 2,410 to 20,100 ft^2/day (18,000 to 150,000 gpd/ft). Computed hydraulic



igure 50. — Generalized water-table surface of the Cohansey Sand and overlying younger sediments in Camden County.

conductivities range from 64 to 442 ft/day (480 to 3,300 gpd/ft^2), but typically range from 100 to 134 ft/day (750 to 1,000 gpd/ft^2) (Rhodehamel, 1972). Porosity and hydraulic conductivity values of samples from the New Brooklyn Park well (WI 27) and of samples from Atsion well (SH 1) in Burlington County are given in tables 5 and 13.

The Cohansey Sand has an estimated average specific yield of about 21 percent (Rhodehamel, 1970). Thus, where sufficiently thick, the Cohansey Sand can store and release substantial quantities of water.

Rhodehamel (1970) evaluated the hydrologic budget for the Pine Barrens region which includes the entire outcrop area of the Cohansey Sand in Camden County. The average annual stream runoff, measured as inches depth over the Pine Barrens region, was 22.5 inches (1.07 mgd per square mile). If the same value is used for the outcrop area of the Cohansey Sand in Camden County, the 22.5 inches of runoff over the area of 124 square miles is equivalent to about 130 mgd average runoff from the Cohansey Sand in Camden County.

The Cohansey Sand is capable of extensive development as a source of water in Camden County. At present the amount of water withdrawn is small compared to the quantity potentially available. Locally, there may be more than one water-bearing zone present; however, the formation is generally regarded as a hydrologic unit. Large diameter wells (12 or more inches in diameter) can continuously yield 500 to 1,000 gpm of water. A well pumping at a rate of about 700 gpm will produce 1 mgd--enough water for many moderate-sized industries (Rhodehamel, 1966). Development of the water resources could be achieved by a number of ways. One way mentioned by Rhodehamel (1970) is to locate high-yielding wells adjacent to the downstream reaches of major streams thus inducing recharge. Additional wells could be located farther from the stream for use during prolonged low-flow periods.

Reported industrial and institutional withdrawals from the Cohansey Sand in Camden County for 1966 amounted to 0.45 mgd. No public-supply pumpage was reported from the Cohansey Sand in 1966. Annual average use of water for irrigation in Camden County was estimated to be 10 mgd shown below (Asghar Hasan, 1970, New Jersey Division of Water Resources, written commun.).

Bridgeton Formation

The Bridgeton Formation occurs as isolated patches on topographic highs. It unconformably overlies the Cohansey Sand and the Kirkwood Formation and is connected hydraulically with them. The thickness of the formation ranges from a few feet to about 30 feet in Camden County.

The Bridgeton Formation consists of fine to very coarse quartzose sand and gravel. Mechanical analysis of a sample collected 2 miles northeast of Mullica Hill in Gloucester County contains more than 95 percent medium- to very coarse-grained sand. The sand is white to brown in color and usually is fairly well sorted and subangular (Hart and Hilton, 1969, p. 30-31).

Pensauken Formation

The Pensauken Formation crops out in isolated and irregular patches in the northcentral part of Camden County and near the Delaware River. The geohydrologic characteristics of the Pensauken Formation are similar to those of the Bridgeton Formation. The Pensauken Formation ranges in thickness from a few feet to 30 feet in Camden County.

The formation consists of medium- to coarse-grained quartzose sand, gravel, and clay. The sand is generally poorly sorted, subangular, and with color ranging from yellow to brown. Because the lithologies of the Pensauken Formation and the older Bridgeton Formation are similar it is difficult to differentiate the two formations.

Cape May Formation

The Cape May Formation occurs adjacent to the Delaware River and tributary streams. The outcrop area is fairly flat and precipitation infiltrates easily through the formation into the underlying Raritan and Magothy Formations. The Cape May Formation ranges in thickness from a few feet to 40 feet in Camden County. The hydrology of the Cape May Formation is discussed with the Potomac-Raritan-Magothy aquifer system, because where both are present they are hydraulically connected.

The Cape May Formation consists of medium- to coarse-grained quartzose sand, gravel, and clay. The sand and gravel is usually yellow to brown to gray in color. The clays are yellow, brown, gray, and black. The Cape May is commonly poorly sorted, and the sand grains are subangular. In some areas it is difficult to distinguish the Cape May Formation from the Pensauken Formation because of similar lithologies.

Quaternary System, Holocene Series

Eolian Deposits

Windblown deposits occur locally and are generally thin in Camden County. They are light gray, well sorted quartz sands that have been rounded by wind action. Due to the high permeability of the eolian deposits water percolates through the sands into the underlying aquifers.

Alluvium

The alluvium is a mixture of clay, silt, organic material, sand, and gravel deposited in tidal flats and low-gradient stream channels. Most of the alluvial material consists of fine silt and clay of relatively low permeability. The alluvial deposits retard brackish water from the Delaware River from entering the water-bearing sands of the Potomac-Raritan-Magothy aquifer system where the water levels in this aquifer are below the river level.

SUMMARY AND CONCLUSIONS

Nearly all of the water supplies of Camden County are derived from ground-water sources. The average annual ground-water use of approximately 68 mgd in Camden County during 1966 was the largest county use in the State.

The major fresh-water aquifers are in the unconsolidated sediments of Cretaceous and Tertiary age. The largest producer is the Potomac-Raritan-Magothy aquifer system. In 1966 almost 56 mgd was withdrawn from this aquifer system which was approximately 85 percent of the total pumpage in the county. Other aquifers yielding large amounts of water were

the aquifers in the Cohansey Sand, the Wenonah Formation and Mount Laurel Sand, and the Englishtown Formation. The Cohansey Sand is the only water-table aquifer producing significant amounts of water.

The artesian aquifers have had declines in the potentiometric surface due to pumping. The largest decline occurred in the Potomac-Raritan-Magothy aquifer system. The head decline at Haddon Heights from 1900 to 1968 has been over 110 feet. The decline in the potentiometric surface in the aquifer in the Wenonah Formation and Mount Laurel Sand has been about 43 feet at Berlin.

The quality of ground water is generally good; however, there are some exceptions. High iron concentrations (in excess of 0.3 mg/l) are found in some areas of the Potomac-Raritan-Magothy aquifer system, at scattered locations in the Wenonah Formation and Mount Laurel Sand aquifer, and in the Cohansey Sand. In the southeastern part of the county a fresh water-salt water interface exists in the Potomac-Raritan-Magothy aquifer system. Overdevelopment in this area may cause the water to move updip or move upward by vertical coning. There also exists a potential salt-water encroachment of the Potomac-Raritan-Magothy aquifer system in the vicinity of the Delaware River. Previous investigations have shown a hydraulic connection of the upper sands and gravels with the Delaware River. If the Delaware River in the vicinity of Camden sustains high chloride levels for an extended period of time, heavy withdrawals from along the river may induce the high-chloride water into the aquifer system.

Contamination of ground water in Philadelphia has created a potential water-quality problem for the Camden area near the Delaware River. High concentrations of sulfate (in excess of 250 mg/l) and dissolved solids (in excess of 500 mg/l) in water in the Potomac-Raritan-Magothy aquifer system underlying Philadelphia are moving under the Delaware River toward the Texas Company's Eagle Point Plant in Gloucester County near the Camden County line.

Camden County has an abundant supply of ground water. The Potomac-Raritan-Magothy aquifer system will probably remain the largest source for many years. The Cohansey Sand is capable of extensive development in Camden County. Additional supplies of water can be obtained from the aquifers in the Wenonah Formation-Mount Laurel Sand and the Englishtown Formation in parts of Camden County. The Kirkwood Formation, presently untapped in Camden County, can yield an additional supply of water under artesian conditions mainly in the area near the Atlantic County line.

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TABLES

1909, [Penr Sur

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Span

n Camden County and vicinity

					LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE-OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
					INTY				
					ITON 1	1964	77	220	230
					Y				
						1967	60	288	334
						1957	93	322	375
						1963	115	405	435
						1956	89	369	389
						1897	115	--	212
						1969	110	689	699
						1970	110	464	500
						1954	84	138	158
						1955	10	211	272
						1961	20	410	494
						--	35	413	493
						1965	40	173	208
						968	29	140	195
						58	75	--	260
						3	100	--	310
						29	120	--	320
						1967	72	1125	1145
						1967	70	740	750
						1963	70	400	410
						1957	48	506	536
						1968	45	506	536
						1968	50	--	130
					LWC 3	1968	55	523	544
					LAUNDROMAT 1	1967	50	193	209
					2	1950	52	180	200
				..ON LAKE WC 1		1950	57	230	252
				ORERT DICKSON	--	1951	66	222	242
				GEORGE AAMON	--	1952	116	320	340
			..1	W G FREEMAN	--	1955	65	260	275
			554.1	MOORESTOWN T WD	TEST HOLE 1-66	1966	88	320	340
		..3N0745905.1		CAMPBELL SOUP	CAMPBELL 1	1958	40	242	268
		3828N0745914.1		MOORESTOWN T WD	TEST HOLE 1-68	1968	35	315	375
		395751N0745932.1		LAYNE NY CO	LAYNE 1	1960	70	--	288
		395702N0745807.1		MOORESTOWN T WD	MTWD 5	1963	35	248	288
	TWP	395702N0745807.2		MOORESTOWN T WD	MTWD 6	1963	47	248	288
	LAUREL TWP	395607N0745843.1		MT LAUREL W CO	MLWC 1	1961	20	558	589
	..UNT LAUREL TWP	395555N0745152.1		EVA DIAMOND	--	1951	73	190	202
	MOUNT LAUREL TWP	395546N0745723.1		RALPH VASTURO	--	1950	68	100	119
	MOUNT LAUREL TWP	395552N0745703.1		NJ TNPKE AUTH	INTERCHANGE 4	1961	35	137	147
.	SHAMONG TWP	394422N0744309.1		US GEOL SURVEY	ATSION 1	1963	46	240	260
SH-2	SHAMONG TWP	394422N0744309.2		US GEOL SURVEY	ATSION 2	1963	49	63	65
SH-3	SHAMONG TWP	394422N0744309.3		US GEOL SURVEY	ATSION 3	1963	47	14	17
				CAMDEN COUNTY					
AU-1	AUDUBON BORO	395327N0750524.1		PUBLIC SERV E-G	PSEGC 1	1953	25	120	130
AU-2	AUDUBON BORO	395326N0750358.1		D CORVELLI	--	1949	65	183	191
BA-1	BARRINGTON BORO	395224N0750303.1		NJ WATER CO	TEST WELL T 1	1968	70	482	492
BA-2	BARRINGTON BORO	395224N0750303.2		NJ WATER CO	TEST WELL T 2	1968	70	350	360
BA-3	BARRINGTON BORO	395146N0750254.1		OWENS CORNING	CORNING 1	1956	60	285	318
BL-1	BELLMAWR BORO	395222N0750632.1		BELLMAWR B W D	BBWD 1	1942	31	111	160
BL-2	BELLMAWR BORO	395221N0750633.1		BELLMAWR B W D	BBWD 3	1956	31	331	356
BL-3	BELLMAWR BORO	395219N0750641.1		BELLMAWR B W D	BBWD 2	1942	31	111	159
BL-4	BELLMAWR BORO	395151N0750533.1		BELLMAWR B W D	BBWD 4	1965	82	380	557
BB-1	BERLIN BORO	394738N0745614.1		BERLIN WATER D	BWD 9	1955	150	650	713
BB-2	BERLIN BORO	394738N0745614.2		BERLIN WATER D	BWD 10	1967	145	645	713
BB-3	BERLIN BORO	394738N0745614.3		BERLIN WATER D	BWD 1	1923	145	299	339
BB-4	BERLIN BORO	394738N0745614.4		BERLIN WATER D	BWD 5	1950	150	67	82
BB-5	BERLIN BORO	394738N0745614.5		BERLIN WATER D	BWD 8	1952	150	310	360
BB-6	BERLIN BORO	394705N0745444.1		OWENS CORNING	1	1951	160	410	440
BB-7	BERLIN BORO	394653N0745543.1		D CHILLENNI	--	1951	160	68	78
BB-8	BERLIN BORO	394644N0745539.1		GREGORY PORRAL	--	1954	155	40	60
BT-1	BERLIN TWP	394816N0745512.1		ARTHUR TILLER	--	1952	175	34	40
BR-1	BROOKLAWN BORO	395244N0750727.1		BROOKLAWN B W D	BBWD 2	1956	13	133	167
BR-2	BROOKLAWN BORO	395244N0750727.2		BROOKLAWN B W D	BBWD 3	1961	13	307	328
BR-3	BROOKLAWN BORO	395243N0750724.1		BROOKLAWN B W D	BBWD NEW WELL	1967	13	288	321
BR-4	BROOKLAWN BORO	395242N0750725.1		BROOKLAWN B W D	LEGION	1942	13	120	161
CA-1	CAMDEN CITY	395732N0750532.1		NJ WATER CO	CAMDEN DIV 27	1924	10	102	135
CA-2	CAMDEN CITY	395728N0750520.1		NJ WATER CO	CAMDEN DIV 48	1954	10	122	164
CA-3	CAMDEN CITY	395726N0750518.1		NJ WATER CO	CAMDEN DIV 50	1958	10	139	170
CA-4	CAMDEN CITY	395725N0750521.1		NJ WATER CO	CAMDEN DIV 49	1955	9	137	169
CA-5	CAMDEN CITY	395722N0750523.1		NJ WATER CO	CAMDEN DIV 46	1950	9	148	178
CA-6	CAMDEN CITY	395722N0750514.1		NJ WATER CO	CAMDEN DIV 10	1932	11	--	150
CA-7	CAMDEN CITY	395720N0750513.1		NJ WATER CO	CAMDEN DIV 51	1965	10	140	192
CA-8	CAMDEN CITY	395719N0750517.1		NJ WATER CO	CAMDEN DIV 45	1950	10	142	173
CA-9	CAMDEN CITY	395718N0750513.1		NJ WATER CO	CAMDEN DIV 47	1953	20	159	174
CA-10	CAMDEN CITY	395718N0750507.1		H KOHNSTAMM CO	6	1967	30	163	183
CA-11	CAMDEN CITY	395716N0750608.1		CAMDEN CITY W D	CITY 15	1954	8	116	136
CA-12	CAMDEN CITY	395716N0750507.1		H KOHNSTAMM CO	3	1954	30	116	136
CA-13	CAMDEN CITY	395716N0750507.2		H KOHNSTAMM CO	4	1959	30	133	158
CA-14	CAMDEN CITY	395716N0750507.3		H KOHNSTAMM CO	5	1960	30	112	138
CA-15	CAMDEN CITY	395715N0750519.1		NJ WATER CO	CAMDEN DIV 52	1965	18	--	200
CA-16	CAMDEN CITY	395715N0750517.1		NJ WATER CO	CAMDEN DIV 44	1950	20	147	198
CA-17	CAMDEN CITY	395711N0750534.1		NJ WATER CO	36 OBS 27TH ST	1932	50	185	202
CA-18	CAMDEN CITY	395707N0750615.1		CAMDEN CITY W D	CITY 14	1953	8	105	145

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					ATLANTIC COUNTY						
HA-1	10	--	6	9	5-64	61	72	0.8	12	H	TM KW
					BURLINGTON COUNTY						
EV-1	46	--	10	104	6-67	608	64	9.5	6	P	KJ MR
EV-2	53	--	8	100	11-57	750	80	9.4	--	I	KJ MR
EV-3	30	--	10	135	10-63	800	85	9.4	8	P	KJ MR
EV-4	20	--	8	91	6-56	517	168	3.1	--	P	KJ MR
EV-5	--	--	6	42	--	100	--	--	--	P	KJ ET
EV-6	10	--	6	159	12-69	109	12	9.1	--	U	KJ MR
EV-7	36	--	12	172	5-70	1012	41	24.7	8	P	KJ MR
EV-8	20	--	8	41	6-54	200	43	4.7	--	--	KJ MW
MS-1	61	--	12	19	12-55	1020	42	24.3	48	P	KJ MR
MS-2	55	494	8	45	9-61	1001	64	15.6	8	P	KJ MR
MS-3	60	--	--	53	--	131	--	--	--	P	KJ MR
MS-4	25	--	12	57	12-65	1034	69	15.0	8	P	KJ MR
MS-5	55	--	8	60	7-68	600	60	10.0	8	P	KJ MR
ML-1	--	--	4	45	5-68	70	--	--	1	H	KJ MW
ML-2	--	--	4	75	10-68	100	--	--	1	H	KJ MW
ML-3	--	--	4	70	7-69	100	--	--	1	H	KJ MW
ME-1	--	--	6	95	1-68	--	--	--	--	U	KJ MR
ME-2	10	--	5	92	1-68	--	--	--	--	U	KJ MR
ME-3	10	--	5	86	10-63	--	--	--	--	U	KJ MR
ME-4	30	--	8	48	--	517	86	6.0	--	P	KJ MR
ME-5	30	--	8	94	10-68	524	35	15.0	8	P	KJ MR
ME-6	--	--	4	10	10-68	100	--	--	1	H	KJ MW
ME-7	21	--	8	93	10-68	307	78	3.9	8	P	KJ MR
ME-8	16	--	4	--	--	--	--	--	--	H	KJ MW
ME-9	20	--	6	20	1-50	100	--	--	6	P	KJ MW
ME-10	--	--	6	25	11-50	300	--	--	--	P	KJ MW
ME-11	20	--	4	20	1-51	100	--	--	--	H	KJ MW
ME-12	20	--	4	50	5-52	50	--	--	--	H	KJ MW
ME-13	15	--	4	20	1-55	40	--	--	--	H	KJ MW
MO-1	20	--	8	90	11-66	530	--	--	--	U	KJ MR
MO-2	21	--	10	41	10-56	560	54	10.4	8	A	KJ MR
MO-3	40	--	8	50	3-68	350	--	--	--	U	KJ MR
MO-4	--	--	--	--	--	--	--	--	--	N	KJ MR
MO-5	40	--	12	67	11-63	805	36	22.4	8	P	KJ MR
MO-6	40	--	12	55	10-63	1000	55	16.2	8	P	KJ MR
MT-1	31	594	8	35	8-61	548	78	7.0	8	P	KJ MR
MT-2	10	--	4	48	9-51	10	6	1.7	--	H	KJ ET
MT-3	19	--	5	25	--	10	--	--	--	H	KJ ET
MT-4	10	--	6	39	6-61	25	40	0.6	16	H	KJ MR
SH-1	20	--	6	+6	9-63	--	--	--	--	U	TE MA
SH-2	5	--	1	6	10-63	--	--	--	--	U	AA CP
SH-3	3	--	1	7	12-63	--	--	--	--	U	AA CP
					CAMDEN COUNTY						
AU-1	10	--	4	40	1-53	50	--	--	6	N	KJ MR
AU-2	4	--	4	62	9-49	30	18	1.7	--	H	KJ MR
BA-1	10	510	6	111	3-68	130	21	6.2	24	U	KJ MR
BA-2	10	510	4	116	3-68	40	6	6.7	60	U	KJ MR
BA-3	30	--	12	96	2-56	1045	43	24.3	8	N	KJ MR
BL-1	49	--	12	42	7-42	1000	18	55.6	36	P	KJ MR
BL-2	25	--	8	62	8-56	1001	71	14.1	8	P	KJ MR
BL-3	48	--	12	45	10-42	500	12	41.7	24	P	KJ MR
BL-4	59	570	12	127	8-66	1016	25	40.6	24	P	KJ MR
BR-1	63	--	8	155	7-55	1000	99	10.1	8	P	KJ MR
BR-2	42	--	8	--	--	1012	69	14.7	8	P	KJ MR
BR-3	40	--	6	73	12-23	155	--	--	--	P	KJ MW
BR-4	15	--	8	--	--	365	--	--	--	P	AA CP
BR-5	50	--	8	98	6-52	450	138	3.3	8	P	KJ MW
BR-6	30	--	6	98	6-51	115	63	1.8	8	N	KJ MW
BR-7	10	--	3	15	10-51	30	1	30.0	3	H	AA CP
BR-8	20	--	4	8	3-54	50	--	--	5	N	AA CP
BT-1	6	--	4	21	9-52	--	--	--	--	H	AA CP
BR-1	34	--	10	16	2-60	455	18	25.3	--	P	KJ MR
BR-2	21	328	5	11	6-61	500	33	15.2	--	P	KJ MR
BR-3	33	--	10	70	--	--	--	--	--	P	KJ MR
BR-4	25	--	12	22	8-42	455	18	25.3	8	P	KJ MR
CA-1	33	--	18	21	5-24	1050	22	47.7	--	P	KJ MR
CA-2	32	164	12	45	9-54	1412	54	26.1	2	--	KJ MR
CA-3	31	--	12	44	5-58	1000	52	19.2	8	P	KJ MR
CA-4	32	169	12	44	5-55	--	--	--	--	P	KJ MR
CA-5	30	--	12	35	11-50	1400	55	25.5	8	P	KJ MR
CA-6	--	--	8	10	3-33	--	--	--	--	U	KJ MR
CA-7	51	193	16	56	1-65	1471	74	19.9	5	P	KJ MR
CA-8	31	--	12	35	8-50	700	65	10.8	--	P	KJ MR
CA-9	25	--	12	38	9-53	1012	45	22.5	4	P	KJ MR
CA-10	20	--	8	40	2-67	200	--	--	48	N	KJ MR
CA-11	20	148	18	37	3-54	1000	70	14.3	8	P	KJ MR
CA-12	20	--	6	50	12-54	150	--	--	6	N	KJ MR
CA-13	25	--	6	40	3-59	250	20	12.5	6	N	KJ MR
CA-14	26	--	6	40	4-60	200	20	10.0	4	N	KJ MR
CA-15	--	200	16	60	7-65	1404	--	--	5	P	KJ MR
CA-16	51	--	12	61	5-50	1400	26	53.8	3	P	KJ MR
CA-17	10	--	6	57	6-32	--	--	--	--	U	KJ MR
CA-18	40	164	18	35	2-53	1000	52	19.2	8	P	KJ MR

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	MUNICIPALITY	LAT-LONG	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE-OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
			CAMDEN COUNTY					
CA-19	CAMDEN CITY	395706N0750553.1	CAMDEN CITY W D	CITY 16	1954	23	149	179
CA-20	CAMDEN CITY	395659N0750610.1	CAMDEN CITY W D	CITY 9	1957	9	116	146
CA-21	CAMDEN CITY	395659N0750610.2	CAMDEN CITY W D	TEST WELL 1950	1950	5	129	150
CA-22	CAMDEN CITY	395659N0750610.3	CAMDEN CITY W D	CITY 9-1924	1924	9	106	146
CA-23	CAMDEN CITY	395652N0750607.1	CAMDEN CITY W D	CITY 10	1935	10	126	158
CA-24	CAMDEN CITY	395649N0750743.1	ESTERBROOK PEN	ESTERBROOK 085	--	8	--	300
CA-25	CAMDEN CITY	395640N0750622.1	CAMDEN CITY W D	CITY 1-1940	1940	5	135	168
CA-26	CAMDEN CITY	395638N0750622.1	CAMDEN CITY W D	CITY 1A	1953	10	135	170
CA-27	CAMDEN CITY	395638N0750622.2	CAMDEN CITY W D	CITY 1-1922	1922	5	146	174
CA-28	CAMDEN CITY	395617N0750710.1	CAMDEN CITY W D	CITY 12	1945	23	136	166
CA-29	CAMDEN CITY	395615N0750633.1	CAMDEN CITY W D	CITY 5N	1963	22	134	169
CA-30	CAMDEN CITY	395614N0750633.2	CAMDEN CITY W D	CITY 5-1937	1937	22	142	172
CA-31	CAMDEN CITY	395614N0750633.1	CAMDEN CITY W D	CITY 5-1928	1928	22	152	171
CA-32	CAMDEN CITY	395604N0750735.1	PUBLIC SERV E G	6 REPLACEMENT	1954	5	118	145
CA-33	CAMDEN CITY	395603N0750736.1	PUBLIC SERV E-G	PSEGC 8	1955	4	119	145
CA-34	CAMDEN CITY	395602N0750744.1	PUBLIC SERV E-G	PSEGC 7	1947	4	116	145
CA-35	CAMDEN CITY	395557N0750629.1	CAMDEN CITY W D	CITY 3A	1953	15	91	115
CA-36	CAMDEN CITY	395557N0750629.2	CAMDEN CITY W D	CITY 3-1934	1934	15	91	113
CA-37	CAMDEN CITY	395557N0750629.3	CAMDEN CITY W D	CITY 3-1922	1922	15	85	110
CA-38	CAMDEN CITY	395552N0750535.1	CAMDEN CITY W D	CITY 13	1953	30	185	225
CA-39	CAMDEN CITY	395551N0750725.1	PUBLIC SERV E-G	PSEGC 14	1950	5	120	146
CA-40	CAMDEN CITY	395550N0750729.1	CAMDEN CITY W D	CITY 28	1953	8	111	136
CA-41	CAMDEN CITY	395546N0750533.1	CAMDEN CITY W D	CITY 17	1954	34	230	265
CA-42	CAMDEN CITY	395541N0750622.1	CAMDEN CITY W D	CITY 4	1950	41	131	156
CA-43	CAMDEN CITY	395541N0750622.2	CAMDEN CITY W D	CITY 4-1935	1935	40	121	156
CA-44	CAMDEN CITY	395541N0750622.3	CAMDEN CITY W D	CITY 4-1922	1922	40	--	--
CA-45	CAMDEN CITY	395540N0750742.1	CAMDEN CITY W D	CITY 8	1928	6	150	175
CA-46	CAMDEN CITY	395540N0750742.2	CAMDEN CITY W D	CITY 8A	1953	6	89	124
CA-47	CAMDEN CITY	395539N0750630.1	W JERSEY HOSP	W JERSEY HOSP1	1958	30	119	140
CA-48	CAMDEN CITY	395539N0750541.1	OLOL HOSPITAL	STAND BY WELL	1963	30	241	258
CA-49	CAMDEN CITY	395534N0750724.1	GALLAGHERS WHSE	EVRSN LVRNG 1	1929	10	--	170
CA-50	CAMDEN CITY	395532N0750720.1	GALLAGHERS WHSE	EVRSN LVRNG 2	1933	10	145	171
CA-51	CAMDEN CITY	395530N0750719.1	GALLAGHERS WHSE	EVRSN LVRNG 5	1929	10	--	203
CA-52	CAMDEN CITY	395528N0750538.1	A N STOLLWRECK	2	1950	28	111	131
CA-53	CAMDEN CITY	395527N0750646.1	CAMDEN CITY W D	CITY 6N	1948	14	111	136
CA-54	CAMDEN CITY	395527N0750646.2	CAMDEN CITY W D	CITY 6-1928	1928	14	111	135
CA-55	CAMDEN CITY	395523N0750729.1	CAMDEN CITY	SEWAGE PLANT 1	1954	9	163	193
CA-56	CAMDEN CITY	395512N0750640.1	CAMDEN CITY W D	CITY 11	1942	13	124	154
CA-57	CAMDEN CITY	395502N0750655.1	CAMDEN BREWERY	--	--	18	160	180
CA-58	CAMDEN CITY	395457N0750641.1	CAMDEN CITY W D	CITY 7	1945	21	126	160
CA-59	CAMDEN CITY	395457N0750641.2	CAMDEN CITY W D	CITY 7-1928	1928	21	126	164
CA-60	CAMDEN CITY	395457N0750640.1	CAMDEN CITY W D	CITY 7N	1966	21	123	163
CA-61	CAMDEN CITY	395455N0750716.1	SO JRSY PORT CM	NY SHIP 7	1942	12	187	229
CA-62	CAMDEN CITY	395449N0750716.1	SO JRSY PORT CM	NY SHIP 6	1941	12	119	225
CA-63	CAMDEN CITY	395447N0750711.1	SO JRSY PORT CM	NY SHIP 5A	1940	12	87	104
CA-64	CAMDEN CITY	395435N0750720.1	SO JRSY PORT CM	NY SHIP PW 1	1956	12	50	124
CA-65	CAMDEN CITY	395427N0750606.1	CAMDEN CITY W D	WATER WORKS T1	1942	15	247	300
CH-1	CHERRY HILL TWP	395621N0745840.1	ANTHONY MALADRA	--	1955	60	--	115
CH-2	CHERRY HILL TWP	395616N0750027.1	NJ WATER CO	COLUMBIA 22	1960	39	371	453
CH-3	CHERRY HILL TWP	395615N0750027.1	NJ WATER CO	COLUMBIA 24	1961	34	153	167
CH-4	CHERRY HILL TWP	395613N0750052.1	JERRY SCHAEFER	1	1965	45	100	105
CH-5	CHERRY HILL TWP	395612N0750142.1	RADIO CORP AMER	RCA 1	1955	128	220	--
CH-6	CHERRY HILL TWP	395606N0750148.1	GS RACING ASSCT	CHRY HLL INN 1	1954	80	--	179
CH-7	CHERRY HILL TWP	395606N0750148.2	GS RACING ASSCT	CHRY HLL INN 2	1967	60	148	172
CH-8	CHERRY HILL TWP	395603N0750031.1	NJ WATER CO	COLUMBIA 31	1967	45	376	427
CH-9	CHERRY HILL TWP	395556N0745924.1	M HOLZER	--	1953	75	178	183
CH-10	CHERRY HILL TWP	395530N0750301.1	E H ELLIS SON	1	1949	23	158	168
CH-11	CHERRY HILL TWP	395514N0750213.1	GARDEN STATE PK	RACE TRACK	--	25	128	158
CH-12	CHERRY HILL TWP	395511N0750202.1	WIDELL AND SONS	--	1953	27	125	135
CH-13	CHERRY HILL TWP	395502N0750221.1	N J NATIONAL GD	1	1956	10	97	111
CH-14	CHERRY HILL TWP	395455N0745929.1	NJ WATER CO	KINGSTON 25	1961	44	309	367
CH-15	CHERRY HILL TWP	395455N0745929.2	NJ WATER CO	KINGSTON 28	1964	44	175	207
CH-16	CHERRY HILL TWP	395455N0745924.1	NJ WATER CO	KINGSTON 27	1963	40	365	417
CH-17	CHERRY HILL TWP	395452N0750035.1	W J OSTERTAG	1	1953	55	87	115
CH-18	CHERRY HILL TWP	395442N0750103.1	NJ WATER CO	ELLISBURG 13	1960	39	491	527
CH-19	CHERRY HILL TWP	395441N0750104.1	NJ WATER CO	ELLISBURG 16	1957	39	187	220
CH-20	CHERRY HILL TWP	395438N0750107.1	NJ WATER CO	ELLISBURG 23	1960	32	318	375
CH-21	CHERRY HILL TWP	395422N0745841.1	DEEN PARK FIRE	CO 1	1954	70	252	258
CH-22	CHERRY HILL TWP	395419N0745721.1	FRANK POWERS	--	1949	72	310	320
CH-23	CHERRY HILL TWP	395409N0750048.1	P A VATTER	--	1953	64	224	234
CH-24	CHERRY HILL TWP	395409N0745957.1	ROBERT COLEMAN	--	195_	17	98	108
CH-25	CHERRY HILL TWP	395406N0745841.1	ARNOLD PALMER	DRIVING RANGE	1964	60	275	285
CH-26	CHERRY HILL TWP	395356N0745708.1	NJ WATER CO	OLD ORCHARD A	1967	71	743	748
CH-27	CHERRY HILL TWP	395356N0745708.2	NJ WATER CO	OLD ORCHARD B	1967	71	328	342
CH-28	CHERRY HILL TWP	395356N0745708.3	NJ WATER CO	OLD ORCHARD C	1967	71	487	500
CH-29	CHERRY HILL TWP	395356N0745708.4	NJ WATER CO	OLD ORCHARD 36	1968	8	299	349
CH-30	CHERRY HILL TWP	395356N0745708.5	NJ WATER CO	OLD ORCHARD 37	1968	6	454	488
CH-31	CHERRY HILL TWP	395356N0745708.6	NJ WATER CO	OLD ORCHARD 38	1968	72	443	493
CH-32	CHERRY HILL TWP	395331N0745920.1	A R ROSS	1	1950	100	125	135
CH-33	CHERRY HILL TWP	395321N0745617.1	EUGENE MILLER	1	1954	92	360	370

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					CAMDEN COUNTY						
CA-19	30	--	18	50	12-54	1130	53	21.3	8	P	K3 MR
CA-20	30	146	18	48	11-57	1020	53	19.2	--	P	K3 MR
CA-21	21	166	6	23	7-50	300	57	5.3	--	U	K3 MR
CA-22	40	146	26	15	3-24	1420	72	19.7	--	P	K3 MR
CA-23	30	158	18	57	11-57	1020	32	31.9	--	P	K3 MR
CA-24	--	--	6	--	--	--	--	--	--	U	WG
CA-25	32	--	18	--	--	--	--	--	--	P	K3 MR
CA-26	35	--	18	42	12-53	1000	54	18.5	8	P	K3 MR
CA-27	39	--	26	12	10-22	1050	67	15.7	--	P	K3 MR
CA-28	30	--	16	32	-45	857	74	11.6	--	P	K3 MR
CA-29	35	--	18	58	10-63	1000	32	31.2	--	P	K3 MR
CA-30	30	--	18	--	--	--	--	--	--	P	K3 MR
CA-31	19	--	26	31	5-28	1100	37	29.7	--	P	K3 MR
CA-32	32	--	8	35	12-54	350	25	14.0	24	N	K3 MR
CA-33	26	--	--	--	--	--	--	--	--	N	K3 MR
CA-34	29	--	--	--	--	--	--	--	--	N	K3 MR
CA-35	25	--	18	37	12-55	1000	46	21.7	8	P	K3 MR
CA-36	22	--	18	--	--	--	--	--	--	P	K3 MR
CA-37	24	--	26	15	8-22	1160	55	21.1	--	P	K3 MR
CA-38	40	--	18	46	6-53	1000	24	41.7	--	P	K3 MR
CA-39	26	--	10	31	5-50	506	34	14.9	12	N	K3 MR
CA-40	25	190	18	41	12-54	1000	46	21.7	8	P	K3 MR
CA-41	35	--	18	64	7-58	1250	32	39.1	8	P	K3 MR
CA-42	25	--	18	77	11-57	1000	27	37.0	--	P	K3 MR
CA-43	35	--	18	56	8-35	1200	34	35.3	--	P	K3 MR
CA-44	--	--	--	--	--	--	--	--	--	P	K3 MR
CA-45	25	--	18	21	9-26	1085	52	20.9	--	P	K3 MR
CA-46	35	--	18	12	7-53	1000	30	33.3	8	P	K3 MR
CA-47	21	--	8	52	12-58	205	58	3.5	8	T	K3 MR
CA-48	21	--	8	68	9-63	275	11	25.0	4	T	K3 MR
CA-49	--	--	4	--	--	150	--	--	--	N	K3 MR
CA-50	26	--	8	--	--	300	--	--	--	N	K3 MR
CA-51	--	--	12	--	--	--	--	--	--	N	K3 MR
CA-52	20	--	8	52	2-50	210	8	26.2	3	N	K3 MR
CA-53	25	--	18	39	2-48	1012	31	32.6	8	P	K3 MR
CA-54	25	--	26	18	9-28	1180	47	25.1	--	P	K3 MR
CA-55	--	201	10	36	1-54	907	--	--	--	U	K3 MR
CA-56	30	--	16	32	9-42	1005	30	33.5	8	P	K3 MR
CA-57	20	--	--	--	--	--	--	--	--	N	K3 MR
CA-58	40	--	18	49	7-45	775	47	16.5	--	P	K3 MR
CA-59	38	--	26	29	9-28	1000	38	26.3	--	P	K3 MR
CA-60	40	--	18	60	6-66	1023	21	48.7	8	P	K3 MR
CA-61	42	--	12	35	5-43	1005	57	17.6	--	U	K3 MR
CA-62	26	--	10	28	3-41	830	81	10.2	--	N	K3 MR
CA-63	17	--	8	28	4-41	533	37	14.4	--	U	K3 MR
CA-64	62	--	16	17	1-56	--	56	--	40	N	K3 MR
CA-65	--	--	6	27	5-42	--	--	--	--	U	K3 MR
CH-1	--	--	--	55	1-55	15	--	--	2	H	K3 MV
CH-2	82	--	12	57	3-60	1067	49	21.8	8	P	K3 MR
CH-3	14	--	12	26	--	1051	44	23.9	8	P	K3 MR
CH-4	5	--	4	50	1-65	20	10	2.0	5	H	K3 MR
CH-5	--	--	6	48	--	50	--	--	4	N	K3 MR
CH-6	25	--	8	92	9-54	400	43	9.3	10	U	K3 MR
CH-7	24	--	12	--	--	--	--	--	--	I	K3 MR
CH-8	47	--	12	85	1-67	1030	57	18.1	24	--	K3 MR
CH-9	5	--	4	45	3-53	15	10	1.5	2	H	K3 MR
CH-10	10	--	5	25	4-49	15	20	0.7	4	N	K3 MR
CH-11	30	--	--	--	--	--	--	--	--	I	K3 MR
CH-12	10	--	6	25	3-53	60	--	--	6	H	K3 MR
CH-13	5	--	6	36	5-56	150	14	10.7	8	T	K3 MR
CH-14	58	528	12	69	9-61	1000	--	--	8	P	K3 MR
CH-15	26	--	12	82	10-64	857	70	12.2	8	P	K3 MR
CH-16	52	531	12	73	12-63	812	70	11.6	8	P	K3 MR
CH-17	--	--	8	74	10-53	25	--	--	2	H	K3 MV
CH-18	36	--	10	54	4-53	1200	50	24.0	8	P	K3 MR
CH-19	33	--	12	59	11-57	1000	62	16.1	5	P	K3 MR
CH-20	57	--	12	62	5-60	1001	34	29.4	8	P	K3 MR
CH-21	6	--	4	85	11-54	20	15	1.3	2	H	K3 MR
CH-22	10	--	5	80	12-49	100	20	5.0	4	H	K3 MR
CH-23	10	--	3	80	2-53	40	--	--	4	H	K3 MR
CH-24	10	--	4	43	5-53	40	17	2.4	--	H	K3 MV
CH-25	10	--	4	90	5-64	50	10	5.0	--	I	K3 MR
CH-26	5	807	2	107	3-67	--	--	--	--	U	K3 MR
CH-27	5	--	3	110	3-67	--	--	--	--	U	K3 MR
CH-28	5	--	3	109	--	--	--	--	--	U	K3 MR
CH-29	50	--	12	123	4-68	703	116	6.1	24	P	K3 MR
CH-30	34	--	12	109	4-68	1209	47	25.7	24	P	K3 MR
CH-31	50	--	12	113	5-68	1455	49	29.7	24	P	K3 MR
CH-32	--	--	6	63	9-50	250	--	--	--	H	K3 ET
CH-33	10	--	6	92	7-54	200	18	11.1	6	H	K3 MR

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	MUNICIPALITY	LAT-LONG	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE-OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
			CAMDEN COUNTY					
CH-34	CHERRY HILL TWP	395308N0750015.1	NJ TURNPIKE AU	SERVICE 3S-2	1951	65	231	261
CH-35	CHERRY HILL TWP	395259N0745720.1	IMMAC CONCEPTN	NOVITIATE 2	1952	65	329	339
CH-36	CHERRY HILL TWP	395254N0745822.1	F MYERS	1	1967	60	321	331
CH-37	CHERRY HILL TWP	395238N0750030.1	HUSSMAN REFRIDG	HUSSMAN	1957	67	276	306
CH-38	CHERRY HILL TWP	395229N0745722.1	HAROLD SNYDER	1	1956	127	210	215
CH-39	CHERRY HILL TWP	395229N0745712.1	NJ WATER CO	HUTTON HILL 1	1965	156	552	562
CH-40	CHERRY HILL TWP	395229N0745712.2	NJ WATER CO	HUTTON HILL 2	1965	156	137	147
CH-41	CHERRY HILL TWP	395212N0745757.1	DR E BROWN	--	1969	100	105	115
CH-42	CHERRY HILL TWP	395150N0745916.1	WOODCREST CT CL	CLUB 1	1949	92	400	420
CH-43	CHERRY HILL TWP	395150N0745913.1	WOODCREST CT CL	CLUB 2	1955	100	354	385
CL-1	CLEMENTON BORO	394832N0745915.1	CLEMENTON W D	CWD 6	1924	59	--	240
CL-2	CLEMENTON BORO	394832N0745915.2	CLEMENTON W D	CWD 7	1943	59	543	633
CL-3	CLEMENTON BORO	394832N0745915.3	CLEMENTON W D	CWD 8	1950	60	251	276
CL-4	CLEMENTON BORO	394832N0745915.4	CLEMENTON W D	ABANDON WELL	--	55	126	168
CL-5	CLEMENTON BORO	394807N0745806.1	CLEMENTON W D	CWD 9	1954	150	367	457
CO-1	COLLINGSWOOD BORO	395526N0750424.1	COLLINGSWOOD WD	CWD 5	1956	20	248	278
CO-2	COLLINGSWOOD BORO	395522N0750432.1	COLLINGSWOOD WD	CWD 3	1960	10	257	287
CO-3	COLLINGSWOOD BORO	395521N0750435.1	COLLINGSWOOD WD	CWD 4	1942	9	275	304
CO-4	COLLINGSWOOD BORO	395519N0750432.1	COLLINGSWOOD WD	CWD 2R	1960	12	248	278
CO-5	COLLINGSWOOD BORO	395515N0750436.1	COLLINGSWOOD WD	CWD 1R	1950	16	266	306
CO-6	COLLINGSWOOD BORO	395506N0750507.1	FRIENDSHIP DAIR	DAIRY 1	1955	21	143	164
CO-7	COLLINGSWOOD BORO	395426N0750514.1	COLLINGSWOOD WD	CWD 7	1965	10	224	313
CO-8	COLLINGSWOOD BORO	395426N0750514.2	COLLINGSWOOD WD	CWD 6	1965	10	218	312
GI-1	GIBBSBORO BORO	395015N0745752.1	LUCAS PAINT CO	MAIN	--	93	--	165
GI-2	GIBBSBORO BORO	395015N0745752.2	LUCAS PAINT CO	STEAM PUMP	--	93	--	160
GI-3	GIBBSBORO BORO	394955N0745852.1	KARL W FUCHS	1	1951	70	108	108
GI-4	GIBBSBORO BORO	394946N0745855.1	NJ WATER CO	GIBBSBORO OB 1	1969	70	1081	1091
GI-5	GIBBSBORO BORO	394946N0745855.2	NJ WATER CO	GIBBSBORO OB 2	1969	70	940	950
GI-6	GIBBSBORO BORO	394946N0745855.3	NJ WATER CO	GIBBSBORO OB 3	1969	70	670	680
GI-7	GIBBSBORO BORO	394944N0745717.1	JAMES E HALE	--	1952	135	138	150
GI-8	GIBBSBORO BORO	394927N0745715.1	US AIR FORCE	RADAR 1	1959	191	260	290
GI-9	GIBBSBORO BORO	394923N0745714.1	US AIR FORCE	RADAR 2	1960	193	280	310
GC-1	GLOUCESTER CITY	395359N0750654.1	GLOUCESTER C WD	GCWD 41	1965	10	226	266
GC-2	GLOUCESTER CITY	395355N0750738.1	US GEOL SURVEY	COAST GUARD 1	1966	10	162	170
GC-3	GLOUCESTER CITY	395349N0750651.1	GLOUCESTER C WD	GCWD 40	1961	10	221	262
GC-4	GLOUCESTER CITY	395348N0750654.1	GLOUCESTER C WD	GCWD 37	1947	5	84	125
GC-5	GLOUCESTER CITY	395348N0750654.2	GLOUCESTER C WD	GCWD 30	1936	13	152	175
GC-6	GLOUCESTER CITY	395348N0750654.3	GLOUCESTER C WD	GCWD 34	1942	10	--	175
GC-7	GLOUCESTER CITY	395348N0750654.4	GLOUCESTER C WD	GCWD 35	1944	5	88	122
GC-8	GLOUCESTER CITY	395348N0750654.5	GLOUCESTER C WD	GCWD 36	1946	5	85	126
GC-9	GLOUCESTER CITY	395347N0750652.1	GLOUCESTER C WD	GCWD 33	1938	14	220	240
GC-10	GLOUCESTER CITY	395347N0750651.1	GLOUCESTER C WD	GCWD 38	1949	10	279	300
GC-11	GLOUCESTER CITY	395346N0750651.1	GLOUCESTER C WD	GCWD 32	1938	11	--	175
GC-12	GLOUCESTER CITY	395345N0750653.1	GLOUCESTER C WD	GCWD 2	1929	11	140	171
GC-13	GLOUCESTER CITY	395343N0750652.1	GLOUCESTER C WD	GCWD 42	1968	15	--	306
GC-14	GLOUCESTER CITY	395332N0750734.1	HINDE AND DAUCH	JERSEY AVE 1	1945	9	241	261
GC-15	GLOUCESTER CITY	395329N0750732.1	HINDE AND DAUCH	2	1945	9	241	261
GC-16	GLOUCESTER CITY	395324N0750736.1	HINDE AND DAUCH	3	1945	7	240	260
GC-17	GLOUCESTER CITY	395322N0750757.1	HARSHAW CHEM CO	HARSHAW 4	1953	5	235	260
GC-18	GLOUCESTER CITY	395322N0750751.1	HARSHAW CHEM CO	HARSHAW 2	1951	6	221	251
GC-19	GLOUCESTER CITY	395321N0750747.1	HARSHAW CHEM CO	HARSHAW 3	1952	8	245	265
GC-20	GLOUCESTER CITY	395318N0750755.1	HARSHAW CHEM CO	HARSHAW 1	1948	5	246	266
GC-21	GLOUCESTER CITY	395315N0750617.1	H W WILSON JR	1	1954	25	102	112
GC-22	GLOUCESTER CITY	395314N0750749.1	NJ ZINC CO	1-DEEP	1945	5	230	250
GC-23	GLOUCESTER CITY	395313N0750604.1	NJ ZINC CO	3-DEEP	1958	5	223	255
GC-24	GLOUCESTER CITY	395308N0750757.1	NJ ZINC CO	2-DEEP	1954	5	245	275
GC-25	GLOUCESTER CITY	395308N0750749.1	NJ ZINC CO	5-DEEP	--	5	--	175
GC-26	GLOUCESTER CITY	395308N0750744.1	NJ ZINC CO	4-DEEP	--	5	249	279
GC-27	GLOUCESTER CITY	395252N0750623.1	GLOUCESTER C WD	GCWD 39	1958	24	161	185
GT-1	GLOUCESTER TWP	395030N0750347.1	NJ WATER CO	OTTERBROOK 29	1965	58	612	712
GT-2	GLOUCESTER TWP	395030N0750347.2	NJ WATER CO	OTTERBROOK 39	1968	60	269	349
GT-3	GLOUCESTER TWP	395028N0750344.1	NJ WATER CO	OTTERBROOK 34	1967	60	288	377
GT-4	GLOUCESTER TWP	395026N0750502.1	EDWARD MARSH	--	1952	15	--	150
GT-5	GLOUCESTER TWP	395025N0750443.1	HOWARD BROWN	--	1955	44	65	75
GT-6	GLOUCESTER TWP	395017N0750459.1	W L DOUGHERTY	--	1949	31	132	142
GT-7	GLOUCESTER TWP	395007N0750425.1	J STEZZI	--	1955	30	274	287
GT-8	GLOUCESTER TWP	394932N0750301.1	JOHN WARGO	--	1949	71	359	377
GT-9	GLOUCESTER TWP	394914N0750244.1	JOHN BISHOP	1	1967	70	160	170
GT-10	GLOUCESTER TWP	394855N0750442.1	THEISS	1	1968	65	56	71
GT-11	GLOUCESTER TWP	394841N0750354.1	EILLEN GESSWIN	--	1952	70	170	180
GT-12	GLOUCESTER TWP	394840N0750314.1	ROBERT MANNING	--	1953	104	121	131
GT-13	GLOUCESTER TWP	394839N0750410.1	MARY BENNIE	1	1950	72	166	176
GT-14	GLOUCESTER TWP	394836N0750150.1	WARNER LOMBARDI	--	1955	81	275	290
GT-15	GLOUCESTER TWP	394833N0750355.1	ARTHUR JONES	--	--	70	179	185
GT-16	GLOUCESTER TWP	394830N0750428.1	WM D CATHCART	1	1967	68	175	185
GT-17	GLOUCESTER TWP	394829N0750347.1	SUN TEMP INDUST	--	1966	80	--	388
GT-18	GLOUCESTER TWP	394820N0750445.1	GLOUC M U AUTH	TREAT PLANT	1971	20	--	358
GT-19	GLOUCESTER TWP	394815N0750356.1	AMANDUS CARLSON	--	1953	25	188	198
GT-20	GLOUCESTER TWP	394806N0750426.1	GAR ST WC-BLKWD	BLACKWOD DIV 1	1948	20	335	386
GT-21	GLOUCESTER TWP	394806N0750426.2	GAR ST WC-BLKWD	BLACKWOD DIV 5	1930	60	49	79

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					CAMDEN COUNTY						
CH-34	30	--	8	81	8-51	13	24	0.5	48	H	K3 MR
CH-35	10	--	6	41	-52	--	--	--	--	H	K3 MR
CH-36	10	--	4	--	9-67	100	--	--	--	H	K3 MR
CH-37	30	--	8	87	7-59	317	19	16.7	4	N	K3 MR
CH-38	5	--	4	65	2-56	100	--	--	5	H	K3 ET
CH-39	10	--	6	200	10-65	--	--	--	--	U	K3 MR
CH-40	10	--	6	88	10-65	--	--	--	--	U	K3 MW
CH-41	10	--	4	45	9-69	30	10	3.0	1	H	K3 MW
CH-42	20	--	6	100	5-49	150	9	16.7	5	H	K3 MR
CH-43	31	--	10	90	7-55	300	15	20.0	8	H	K3 MR
CL-1	--	--	8	--	--	250	--	--	--	P	K3 ET
CL-2	90	--	6	53	4-50	500	135	3.7	--	P	K3 MR
CL-3	25	--	10	48	7-50	510	--	--	15	P	K3 ET
CL-4	42	--	8	10	3-70	--	--	--	--	U	K3 MW
CL-5	46	--	8	124	7-54	503	96	5.2	4	P	K3 ET
CO-1	30	--	12	43	2-56	1000	71	14.1	8	P	K3 MR
CO-2	30	--	12	57	-53	1000	63	15.9	8	P	K3 MR
CO-3	30	--	10	32	7-42	760	37	20.5	8	P	K3 MR
CO-4	30	300	12	57	6-60	1000	51	19.6	8	P	K3 MR
CO-5	40	--	12	54	10-49	1023	44	23.2	8	P	K3 MR
CO-6	21	--	6	41	1-55	100	38	2.6	68	N	K3 MR
CO-7	89	--	12	49	3-65	1034	18	57.4	8	P	K3 MR
CO-8	53	--	12	46	5-65	1034	13	79.5	8	P	K3 MR
GI-1	--	--	4	--	--	150	--	--	--	N	K3 MW
GI-2	--	--	--	--	--	--	--	--	--	I	K3 MW
GI-3	--	--	3	4	7-51	50	--	--	6	H	K3 MW
GI-4	10	1142	3	115	3-69	43	30	1.4	2	U	K3 MR
GI-5	10	1142	3	125	1-69	--	--	--	--	U	K3 MR
GI-6	10	1142	3	119	2-69	35	9	3.9	--	U	K3 MR
GI-7	--	--	4	42	11-52	60	--	--	--	H	TL --
GI-8	--	--	8	118	4-59	55	--	--	--	H	K3 MW
GI-9	--	--	8	130	8-60	102	--	--	24	H	K3 MW
GC-1	40	--	12	58	10-65	1034	42	24.6	8	P	K3 MR
GC-2	8	252	6	--	--	--	--	--	--	U	K3 MR
GC-3	40	--	12	58	6-61	1000	41	24.4	4	P	K3 MR
GC-4	41	--	6	--	8-61	70	--	--	--	U	K3 MR
GC-5	23	--	8	--	--	--	--	--	--	U	K3 MR
GC-6	--	--	8	--	--	--	--	--	--	U	K3 MR
GC-7	22	--	10	17	6-44	600	28	21.4	2	U	K3 MR
GC-8	24	--	8	29	1-46	400	13	30.8	2	U	K3 MR
GC-9	20	--	12	21	3-38	875	52	16.8	--	U	K3 MR
GC-10	21	--	8	36	--	300	--	--	24	U	K3 MR
GC-11	--	--	8	--	--	--	--	--	--	U	K3 MR
GC-12	30	--	8	33	4-53	200	32	6.2	--	U	K3 MR
GC-13	--	--	10	--	--	--	--	--	--	P	K3 MR
GC-14	20	--	10	--	--	--	--	--	--	N	K3 MR
GC-15	20	--	10	--	--	--	--	--	--	N	K3 MR
GC-16	20	--	10	--	--	--	--	--	--	N	K3 MR
GC-17	25	--	10	55	3-53	566	22	25.7	--	N	K3 MR
GC-18	30	--	10	77	3-51	578	24	24.1	8	N	K3 MR
GC-19	20	--	10	57	9-52	530	26	20.4	8	U	K3 MR
GC-20	20	--	10	38	9-48	560	45	12.4	8	N	K3 MR
GC-21	10	--	3	33	4-53	25	--	--	8	H	K3 MR
GC-22	20	--	--	34	-45	600	25	24.0	--	N	K3 MR
GC-23	30	260	10	64	12-57	600	24	25.0	8	N	K3 MR
GC-24	30	--	10	49	7-54	600	29	20.7	8	N	K3 MR
GC-25	--	--	--	--	--	--	--	--	--	N	K3 MR
GC-26	30	285	10	57	--	600	35	17.1	8	N	K3 MR
GC-27	24	--	10	49	3-60	500	46	10.9	48	U	K3 MR
GT-1	89	--	10	111	1-65	1010	32	31.6	5	P	K3 MR
GT-2	80	--	12	112	4-68	1529	54	28.3	24	P	K3 MR
GT-3	82	--	12	108	1-67	1000	35	28.6	8	P	K3 MR
GT-4	--	--	4	5	10-52	25	--	--	--	H	K3 MV
GT-5	6	--	4	12	1-55	60	4	15.0	--	H	K3 ET
GT-6	10	--	3	20	4-49	25	10	2.5	4	H	K3 MR
GT-7	10	--	3	47	1-55	20	7	2.9	8	H	K3 MR
GT-8	18	--	4	86	6-49	250	6	41.7	12	H	K3 MR
GT-9	10	--	4	40	10-67	50	10	5.0	1	H	K3 ET
GT-10	10	--	4	35	12-68	8	20	0.4	1	H	K3 MW
GT-11	10	--	3	40	1-52	20	--	--	2	H	K3 ET
GT-12	10	--	3	90	6-53	40	--	--	4	H	K3 MR
GT-13	10	--	4	45	3-50	--	--	--	2	H	K3 ET
GT-14	--	--	4	71	8-55	25	--	--	12	H	K3 MR
GT-15	6	--	4	--	--	--	10	--	4	H	K3 ET
GT-16	--	--	4	--	--	50	--	--	--	H	K3 ET
GT-17	--	--	6	123	9-66	--	--	--	--	N	K3 MR
GT-18	--	--	--	--	--	--	--	--	--	--	--
GT-19	10	--	3	43	2-53	--	--	--	--	H	K3 ET
GT-20	38	--	8	24	8-48	600	40	15.0	8	P	K3 MR
GT-21	30	--	6	4	1-30	100	--	--	10	P	K3 MW

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	MUNICIPALITY	LAT-LONG	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE-OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
			CAMDEN COUNTY					
GT-22	GLOUCESTER TWP	394759N0750158.1	GARDEN STATE WC	TEST 1	1970	78	458	466
GT-23	GLOUCESTER TWP	394754N0750343.1	GAR ST WC-BLKWD	BLACKWOD DIV 3	1956	81	426	447
GT-24	GLOUCESTER TWP	394739N0750227.1	GLOU TWP BD ED	LEWIS SCHOOL	1964	117	455	475
GT-25	GLOUCESTER TWP	394719N0750146.1	ROBERT BENNETT	MONARCH BOILER	1968	110	--	200
GT-26	GLOUCESTER TWP	394718N0750341.1	GARDEN STATE WC	PEOPLES 1	1953	65	419	449
GT-27	GLOUCESTER TWP	394716N0750420.1	CAMDEN COUNTY	LAKELAND 1	--	55	--	420
GT-28	GLOUCESTER TWP	394714N0750410.1	CAMDEN COUNTY	LAKELAND 3	--	25	--	93
GT-29	GLOUCESTER TWP	394712N0750413.1	CAMDEN COUNTY	LAKELAND 2	--	25	--	386
GT-30	GLOUCESTER TWP	394712N0750220.1	SOCIETY DIVINE	SAVIOR	1951	107	492	512
GT-31	GLOUCESTER TWP	394711N0750418.1	CAMDEN COUNTY	LAKELAND FOUNT	--	25	--	--
GT-32	GLOUCESTER TWP	394702N0750321.1	MYRA LORING	--	1957	73	109	130
GT-33	GLOUCESTER TWP	394658N0750305.1	P HENDRICKS	--	1956	81	100	135
GT-34	GLOUCESTER TWP	394641N0745959.1	P BARATTA	--	1951	180	56	66
GT-35	GLOUCESTER TWP	394626N0750015.1	A MINARDI	1	1954	175	52	62
GT-36	GLOUCESTER TWP	394620N0750032.1	ROBERT BENNETT	HOME WELL	--	172	--	72
GT-37	GLOUCESTER TWP	394618N0750235.1	H A SANDBERG	--	1952	130	218	250
GT-38	GLOUCESTER TWP	394617N0750237.1	J BECICA	--	1949	111	200	220
GT-39	GLOUCESTER TWP	394614N0750017.1	POWELL	--	1951	178	49	54
GT-40	GLOUCESTER TWP	394607N0750031.1	GLOUCESTER TWP	BD OF EDUCATN	1960	178	293	315
GT-41	GLOUCESTER TWP	394606N0750016.1	F MORRISEY	--	1955	178	55	65
GT-42	GLOUCESTER TWP	394605N0750016.1	HOWARD MORRISEY	--	1956	178	55	60
GT-43	GLOUCESTER TWP	394558N0750210.1	E G HOTHO	--	1955	98	122	135
GT-44	GLOUCESTER TWP	394556N0745835.1	CAMDEN CO BD ED	VOC&TECH H S 1	1967	145	322	401
GT-45	GLOUCESTER TWP	394512N0750145.1	WALTER JOHNSON	--	1954	110	220	240
GT-46	GLOUCESTER TWP	394509N0745958.1	US ARMY	--	1954	173	82	102
GT-47	GLOUCESTER TWP	394430N0745958.1	US ARMY	--	1954	170	62	82
GT-48	GLOUCESTER TWP	394421N0750025.1	JOSEPH A MELZI	--	1952	162	58	64
GT-49	GLOUCESTER TWP	394343N0750049.1	B W BAUER	--	1951	164	40	45
HA-1	HADDON TWP	395444N0750316.1	MILGRAM THEATER	WESTMONT	--	50	135	150
HA-2	HADDON TWP	395436N0750252.1	MORGAN BROTHERS	REPLACEMENT	1967	50	431	451
HA-3	HADDON TWP	395416N0750336.1	HADDON TWP BD E	HADDON TWP HS1	1966	10	141	165
HA-4	HADDON TWP	395412N0750338.1	HADDON TWP W D	HTWD 4	1965	82	417	448
HA-5	HADDON TWP	395406N0750317.1	HADDON TWP W D	HTWD 1	1952	56	436	468
HA-6	HADDON TWP	395406N0750317.2	HADDON TWP W D	HTWD 1-R	1968	56	--	480
HA-7	HADDON TWP	395403N0750322.1	HADDON TWP W D	HTWD 2	1952	50	439	470
HA-8	HADDON TWP	395359N0750322.1	HADDON TWP W D	HTWD 3	1956	61	432	469
HA-9	HADDON TWP	395351N0750313.1	GREEN VALLEY FM	FARM 2	1965	77	194	215
HF-1	HADDONFIELD BORO	395404N0750202.1	HADDONFIELD W D	TEST WELL 1965	1965	45	490	510
HF-2	HADDONFIELD BORO	395404N0750202.2	HADDONFIELD W D	LAKE ST WELL	1967	50	307	372
HF-3	HADDONFIELD BORO	395333N0750132.1	HADDONFIELD W D	RULON	1956	20	523	572
HF-4	HADDONFIELD BORO	395324N0750138.1	HADDONFIELD W D	CREEK 3	1938	18	211	245
HF-5	HADDONFIELD BORO	395322N0750154.1	HADDONFIELD W D	LAYNE 2	1956	30	206	246
HF-6	HADDONFIELD BORO	395322N0750147.1	HADDONFIELD W D	HWD 2	1956	38	152	192
HF-7	HADDONFIELD BORO	395317N0750141.1	HADDONFIELD W D	HWD 4	1943	18	186	240
HH-1	HADDON HGTS BORO	395248N0750433.1	NJ WATER CO	EGGBERT 18	1958	22	144	191
HH-2	HADDON HGTS BORO	395248N0750433.2	NJ WATER CO	EGGBERT 6	1926	23	154	202
HH-3	HADDON HGTS BORO	395247N0750432.1	NJ WATER CO	EGGBERT 35	1967	22	425	484
HH-4	HADDON HGTS BORO	395246N0750433.1	NJ WATER CO	EGBERT	1962	24	445	455
HH-5	HADDON HGTS BORO	395242N0750320.1	NJ WATER CO	HADDON 11	1945	84	212	272
HH-6	HADDON HGTS BORO	395240N0750324.1	NJ WATER CO	HADDON 14	1954	76	506	598
HH-7	HADDON HGTS BORO	395240N0750318.1	NJ WATER CO	HADDON 12	1947	66	227	267
HH-8	HADDON HGTS BORO	395238N0750317.1	NJ WATER CO	HADDON 30	1965	65	224	279
HH-9	HADDON HGTS BORO	395238N0750316.1	NJ WATER CO	HADDON 15	1956	65	452	631
HH-10	HADDON HGTS BORO	395231N0750314.1	NJ WATER CO	HADDON 20	1958	60	241	275
LS-1	LAUREL SPRGS BORO	394928N0750027.1	NJ WATER CO	LAUREL 15	1964	75	395	473
LS-2	LAUREL SPRGS BORO	394928N0750024.1	NJ WATER CO	LAUREL 13	1954	77	395	456
LS-3	LAUREL SPRGS BORO	394928N0750023.1	NJ WATER CO	LAUREL 6	1918	77	--	120
LS-4	LAUREL SPRGS BORO	394928N0750021.1	NJ WATER CO	LAUREL 8	1920	77	105	125
LS-5	LAUREL SPRGS BORO	394928N0750021.2	NJ WATER CO	LAUREL 10	1923	77	99	126
LS-6	LAUREL SPRGS BORO	394927N0750025.1	NJ WATER CO	LAUREL 4	1918	77	--	128
LS-7	LAUREL SPRGS BORO	394927N0750024.1	NJ WATER CO	LAUREL 1	1918	77	100	120
LI-1	LINDENWOLD BORO	394932N0745854.1	MUN UTIL AUTH	SEWAGE PLANT 1	1964	78	141	152
LI-2	LINDENWOLD BORO	394929N0745208.1	J A PIPPET	--	1954	93	92	100
LI-3	LINDENWOLD BORO	394805N0745732.1	LINDENWOLD ANM	ANIMAL SHELT 1	1967	160	--	285
MA-1	MAGNOLIA BORO	395135N0750246.1	OWENS CORNING	CORNING 2	1956	67	290	320
MA-2	MAGNOLIA BORO	395134N0750251.1	OWENS CORNING	TEST 2	1964	65	565	680
MA-3	MAGNOLIA BORO	395134N0750230.1	NJ WATER CO	MAGNOLIA 33	1967	60	271	348
MA-4	MAGNOLIA BORO	395134N0750229.1	NJ WATER CO	MAGNOLIA 16	1964	70	428	510
ME-1	MRCHNTVILLE BORO	395652N0750307.1	MERCH-PENNS W C	WOODBINE 1	1963	90	245	285
OA-1	OAKLYN BORO	395358N0750447.1	NJ WATER CO	OAKLYN TEST	1961	33	104	113
PE-1	PENNSAUKEN TWP	395943N0750212.1	CAMDEN CITY W D	MORRIS 1	--	9	77	107
PE-2	PENNSAUKEN TWP	395940N0750230.1	CAMDEN CITY W D	MORRIS 5NA	1960	5	79	114
PE-3	PENNSAUKEN TWP	395939N0750229.1	CAMDEN CITY W D	MORRIS 5	1932	5	80	115
PE-4	PENNSAUKEN TWP	395934N0750229.1	CAMDEN CITY W D	MORRIS 3A	1953	17	73	107
PE-5	PENNSAUKEN TWP	395929N0750253.1	CAMDEN CITY W D	MORRIS 4A	1960	8	95	134
PE-6	PENNSAUKEN TWP	395929N0750253.2	CAMDEN CITY W D	MORRIS 4	--	8	95	130
PE-7	PENNSAUKEN TWP	395925N0750230.1	KINGSTON TRAP	TRAP RK IND 2	1966	35	115	123
PE-8	PENNSAUKEN TWP	395923N0750300.1	CAMDEN CITY W D	MORRIS 10	1960	16	75	115
PE-9	PENNSAUKEN TWP	395916N0750303.1	CAMDEN CITY W D	MORRIS 7-	1932	10	85	120
PE-10	PENNSAUKEN TWP	395910N0750307.1	CAMDEN CITY W D	MORRIS 8	--	10	89	124

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					CAMDEN COUNTY						
GT-22	10	--	6	125	11-70	75	33	2.3	5	U	K3 MR
GT-23	21	--	12	88	7-56	708	43	16.5	8	P	K3 MR
GT-24	20	--	6	129	8-64	220	56	3.9	8	T	K3 MR
GT-25	--	--	4	50	11-68	100	--	--	1	N	K3 MW
GT-26	30	--	6	70	--	--	--	--	--	P	K3 MR
GT-27	--	--	--	--	--	--	--	--	--	T	K3 MR
GT-28	--	--	--	F	8-70	--	--	--	--	T	K3 MW
GT-29	--	--	--	--	--	--	--	--	--	T	K3 MR
GT-30	20	--	10	103	9-51	510	100	5.1	72	H	K3 MR
GT-31	--	--	--	+34	8-70	--	--	--	--	T	K3 MW
GT-32	21	--	3	25	11-57	100	--	--	3	H	K3 MW
GT-33	--	--	4	6	10-56	150	--	--	4	H	K3 NA
GT-34	10	--	3	35	10-51	25	5	5.0	--	H	AA CP
GT-35	10	--	3	32	7-54	8	3	2.7	6	H	AA CP
GT-36	--	--	--	--	--	--	--	--	--	--	AA CP
GT-37	32	--	4	48	6-52	170	--	--	--	H	K3 MW
GT-38	20	--	4	40	11-49	50	--	--	2	H	K3 MW
GT-39	5	--	3	30	11-51	5	6	0.8	--	H	AA CP
GT-40	--	--	6	125	4-60	80	--	--	8	H	K3 MW
GT-41	10	--	4	40	9-55	30	5	6.0	3	H	AA CP
GT-42	5	--	4	38	10-56	25	4	6.2	2	H	AA CP
GT-43	13	--	4	159	1-55	100	--	--	5	H	TL VH
GT-44	79	--	8	113	9-67	320	123	2.6	8	P	K3 MW
GT-45	20	--	4	40	11-54	80	15	5.3	5	H	TL MT
GT-46	20	--	8	36	6-54	240	48	5.0	24	P	AA CP
GT-47	20	--	8	30	6-54	240	40	6.0	24	P	AA CP
GT-48	6	--	4	24	9-52	25	--	--	5	H	AA CP
GT-49	5	--	3	20	10-51	5	5	1.0	--	H	AA CP
HA-1	15	--	8	--	--	150	--	--	--	--	K3 MR
HA-2	--	465	10	104	--	302	--	--	8	N	K3 MR
HA-3	20	--	6	60	11-66	200	23	8.7	--	I	K3 MR
HA-4	27	455	12	100	8-65	726	42	17.3	8	P	K3 MR
HA-5	32	475	10	80	2-52	800	40	20.0	8	P	K3 MR
HA-6	--	--	12	125	11-68	870	--	--	8	P	K3 MR
HA-7	31	--	10	74	4-52	1000	41	24.4	8	P	K3 MR
HA-8	37	--	10	95	6-56	800	35	22.9	--	P	K3 MR
HA-9	21	--	6	121	1-65	151	12	12.6	6	I	K3 MR
HF-1	20	553	6	90	1-65	350	35	10.0	8	U	K3 MR
HF-2	50	--	12	107	6-67	1030	48	21.5	8	P	K3 MR
HF-3	49	--	12	42	6-56	1100	38	28.9	48	P	K3 MR
HF-4	33	--	8	56	7-59	450	54	8.3	--	--	K3 MR
HF-5	40	--	12	105	5-56	1001	46	21.8	8	P	K3 MR
HF-6	40	--	8	55	7-59	600	31	19.4	--	P	K3 MR
HF-7	54	--	6	56	3-56	600	26	23.1	8	P	K3 MR
HH-1	47	--	12	69	7-58	708	45	15.7	8	P	K3 MR
HH-2	48	--	8	23	-26	535	25	21.4	3	P	K3 MR
HH-3	44	477	12	83	3-67	850	60	14.2	8	P	K3 MR
HH-4	10	479	6	61	1-62	30	30	1.0	8	U	K3 MR
HH-5	60	--	12	123	--	450	--	--	--	P	K3 MR
HH-6	53	603	8	101	8-54	1018	88	11.6	6	P	K3 MR
HH-7	40	--	10	93	--	--	--	--	--	P	K3 MR
HH-8	51	--	--	129	3-65	811	38	21.3	--	P	K3 MR
HH-9	74	--	8	72	2-56	1100	35	31.4	6	P	K3 MR
HH-10	21	--	12	36	8-58	950	52	18.3	8	P	K3 MR
LS-1	64	--	8	130	--	650	98	6.6	24	P	K3 MR
LS-2	61	--	8	84	6-54	759	80	9.5	--	P	K3 MR
LS-3	--	--	8	--	--	--	--	--	--	U	K3 MW
LS-4	20	--	8	44	9-52	175	--	--	--	P	K3 MW
LS-5	--	--	8	--	--	200	--	--	--	P	K3 MW
LS-6	--	--	8	--	--	330	--	--	--	P	K3 MW
LS-7	--	--	8	--	--	300	--	--	--	P	K3 MW
LI-1	11	--	6	16	11-64	60	--	--	--	--	K3 MW
LI-2	--	--	3	18	7-54	14	--	--	7	H	TL VH
LI-3	--	--	4	--	--	--	--	--	--	H	K3 MW
MA-1	30	--	12	96	3-56	1000	41	24.4	8	N	K3 MR
MA-2	60	--	6	128	6-64	668	48	13.9	22	N	K3 MR
MA-3	77	--	12	141	3-67	1090	46	23.7	24	P	K3 MR
MA-4	--	--	--	--	--	--	--	--	--	P	K3 MR
ME-1	--	--	12	85	9-63	1040	--	--	--	P	K3 MR
OA-1	8	--	6	56	10-61	50	16	3.1	16	U	K3 MR
PE-1	30	--	18	--	--	1180	--	--	--	P	K3 MR
PE-2	35	--	18	12	11-60	1450	46	31.5	--	P	K3 MR
PE-3	35	--	26	15	8-32	1630	37	44.1	8	P	K3 MR
PE-4	30	136	30	12	7-53	1000	34	29.4	8	P	K3 MR
PE-5	35	--	18	13	10-60	1585	28	56.6	8	P	K3 MR
PE-6	35	--	26	--	--	--	--	--	--	P	K3 MR
PE-7	8	--	8	26	8-66	200	34	5.9	2	N	K3 MR
PE-8	40	--	18	11	11-61	1450	35	41.4	8	P	K3 MR
PE-9	35	--	26	13	--	1680	32	52.5	8	P	K3 MR
PE-10	35	--	26	--	--	1412	--	--	--	P	K3 MR

Table 1.--Record[illegible]cted wells in Cam[illegible]ty and vicinity--Continued

MAP NUMBER	MUNICIPALITY	OWNER	DATE DRILLED (YEAR)	ALTITUDE OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
CH-34	CHERRY HIL[illegible]	GARDEN ST[illegible]	[illegible]2	10	118	143
CH-35	CHERRY HI[illegible]	GAR ST WO[illegible]		8	98	133
CH-36	CHERRY [illegible]	GLOU TWP[illegible]		40	195	231
CH-37	CHERRY	ROBERT [illegible]		8	86	126
CH-38	CHER[illegible]	GARDEN [illegible]		10	111	141
CH-39	[illegible]	CAMDE[illegible]			103	138
CH-40	[illegible]	CAMD[illegible]			127	175
CH-41	[illegible]	CAMD[illegible]			108	140
CH-42	[illegible]	OC[illegible]			102	122
CH-43	[illegible]	AM[illegible]			[illegible]6	169
CL-[illegible]		[illegible]				184
Cl[illegible]		[illegible]				136
[illegible]		[illegible]				186
		[illegible]				137
		[illegible]				[illegible]1
	[illegible]750237.[illegible]					[illegible]
	[illegible] TWP 394614N0750017.[illegible]					.70
	[illegible] TWP 394607N0750031[illegible]					275
	GLOUCESTER TWP 394606N0750016[illegible]					181
GT-42	GLOUCESTER TWP 394605N07500[illegible]					260
GT-43	GLOUCESTER TWP 394558N07502[illegible]				[illegible]	288
GT-44	GLOUCESTER TWP 394556N0745[illegible]				77	84
GT-45	GLOUCESTER TWP 394512N0750[illegible]				97	123
GT-46	GLOUCESTER TWP 394509N07[illegible]				115	145
GT-47	GLOUCESTER TWP 394430N07[illegible]				109	139
GT-48	GLOUCESTER TWP 394421N[illegible]			5	--	129
GT-49	GLOUCESTER TWP 394343N[illegible]			5	44	55
HA-1	HADDON TWP 3954[illegible]			61	243	278
HA-2	HADDON TWP 3954[illegible]			69	157	176
HA-3	HADDON TWP 3954[illegible]		[illegible]3	60	223	258
HA-4	HADDON TWP 3954[illegible]		.963	25	204	224
HA-5	HADDON TWP 39[illegible]		1965	30	110	140
HA-6	HADDON TWP 39[illegible]		1960	25	107	137
HA-7	HADDON TWP 3[illegible]		1963	25	118	138
HA-8	HADDON TWP		1955	165	56	60
HA-9	HADDON TWP		1954	160	40	50
HF-1	HADDONFIELD BORO[illegible]		1957	160	296	355
HF-2	HADDONFIELD BORO[illegible]		1960	160	31	86
HF-3	HADDONFIELD BORO[illegible]	--	1949	180	337	347
HF-4	HADDONFIELD BO[illegible]					
HF-5	HADDONFIELD BO[illegible]	JA 1	1962	150	600	687
HF-6	HADDONFIELD B[illegible]	--	1971	160	310	330
HF-7	HADDONFIELD [illegible]	--	1952	170	300	355
HH-1	HADDON HGTS[illegible]	[illegible] GOLF CLUB --	1955	85	--	267
HH-2	HADDON HGT[illegible]	--	1950	172	330	360
HH-3	HADDON HG[illegible]	[illegible]Y G C GOLF CLUB 1-49	1949	170	310	370
HH-4	HADDON HG[illegible]	[illegible]K CO 2	1963	40	196	222
HH-5	HADDON H[illegible]	[illegible]OCK IND 3	1968	40	195	215
HH-6	HADDON [illegible]	[illegible]RN RECORD EASTERN 1	1963	40	250	260
HH-7	HADDON[illegible]	[illegible] COACH INC HIRST	1964	79	302	312
HH-8	HADDO[illegible]	NJ WATER CO RUNNEMEDE 19	1958	67	301	338
HH-9	HADD[illegible]	NJ WATER CO RUNNEMEDE 7	1926	67	265	318
HH-10	HADD[illegible]	[illegible]1 NJ WATER CO SOMERDALE 14	1956	105	389	441
LS-1	LAU[illegible]	[illegible].1 TAVISTOCK CLUB COUNTRY CLUB 1	1968	30	217	246
LS-2	L[illegible]	[illegible]15.1 THOMAS DECAU 1	1957	115	127	147
LS-3	L[illegible]	[illegible]745906.1 NJ WATER CO VOORHEES 21	1959	129	422	482
LS-4	[illegible]	[illegible].0745954.1 NJ WATER CO ASHLAND TER 32	1966	70	--	459
LS-5	[illegible]	[illegible]N0745954.2 NJ WATER CO ASHLAND TER 9	1926	74	355	407
LS-6	[illegible]	[illegible].28N0745954.3 NJ WATER CO ASHLAND TER 9R	1966	74	364	437
LS-7		[illegible]5124N0745952.1 NJ WATER CO ASHLAND 17	1958	100	379	421
LI-1		395109N0745715.1 RADIO CORP AMER RCA	1955	175	220	234
LI-2		395107N0745854.1 R H DOBBS --	1949	121	140	161
LI-3		395044N0745749.1 HAINES BLOCK CO --	1955	118	--	160
MA-1		395015N0745528.1 CAMDEN LIME CO 3	--	155	--	265
MA-[illegible]	[illegible]P	394954N0745530.1 CAMDEN LIME CO 1	1955	175	260	280
MA-[illegible]	[illegible]S TWP 394922N0745633.1 NJ WATER CO ELM TREE 2		1963	148	1217	1227
MA-[illegible]	[illegible]ZES TWP 394922N0745633.2 NJ WATER CO ELM TREE 3		1963	147	706	717
MB[illegible]	[illegible]HEES TWP 394922N0745633.3 NJ WATER CO ELM TREE 26		1960	150	237	275
O[illegible]	[illegible]TERFORD TWP 394651N0745421.1 ATCO DRIVE-IN --		1955	170	65	76
	[illegible]ATERFORD TWP 394645N0745146.1 CENTRAL SUPPLY --		1955	121	78	83
	WATERFORD TWP 394620N0745403.1 GREEN ACRES MTL MOTEL 1		1968	165	71	81
	WATERFORD TWP 394618N0745413.1 IVYSTONE W W WATER WKS 2-62		1962	159	420	460
[illegible]	WATERFORD TWP 394618N0745413.2 IVYSTONE W W WATER WKS 3-65		1965	159	420	460
[illegible]-6	WATERFORD TWP 394615N0745358.1 WILLIAM JULANO --		1955	170	79	83
WA-7	WATERFORD TWP 394614N0745316.1 H W GSELL --		1947	159	93	103
WA-8	WATERFORD TWP 394613N0745353.1 AL GIORDANO 1		1965	170	98	113
WA-9	WATERFORD TWP 394552N0744930.1 JOSEPH LANNI --		1951	101	65	75
WA-10	WATERFORD TWP 394357N0745022.1 ALBERT PAGIA --		1952	102	72	82
WA-11	WATERFORD TWP 394341N0745117.1 BRIDGE VIEW FAR 1		1966	120	110	130
WA-12	WATERFORD TWP 394243N0744932.1 EUGENE BRITTIN --		1955	88	100	105

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					CAMDEN COUNTY						
PE-11	35	--	26	12	7-32	1900	28	67.9	8	P	K3 MR
PE-12	35	--	26	14	7-32	1700	46	37.0	8	P	K3 MR
PE-13	25	--	12	80	7-67	1000	29	34.5	8	P	K3 MR
PE-14	30	135	26	11	11-30	1850	49	37.8	8	P	K3 MR
PE-15	30	--	26	13	10-30	1330	75	17.7	8	P	K3 MR
PE-16	35	--	18	20	10-30	1680	21	80.0	--	P	K3 MR
PE-17	48	--	26	14	5-24	1175	67	17.5	--	P	K3 MR
PE-18	32	--	26	20	10-24	1400	48	29.2	--	P	K3 MR
PE-19	20	--	3	58	12-51	--	--	--	--	N	K3 MR
PE-20	43	174	26	20	4-24	1440	49	29.4	6	P	K3 MR
PE-21	48	--	26	18	5-24	1680	40	42.0	--	P	K3 MR
PE-22	11	--	6	--	11-50	75	--	--	--	H	K3 MR
PE-23	--	--	26	38	8-24	1000	--	--	--	P	K3 MR
PE-24	10	--	4	95	4-51	25	--	--	2	H	K3 MR
PE-25	10	--	6	14	3-61	100	5	20.0	6	N	K3 MR
PE-26	--	--	8	6	12-50	--	--	--	--	U	K3 MR
PE-27	25	--	12	17	10-43	1000	27	37.0	8	P	K3 MR
PE-28	30	--	12	15	11-47	1005	23	43.7	8	P	K3 MR
PE-29	35	--	12	39	8-58	1034	37	27.9	8	P	K3 MR
PE-30	35	--	10	34	7-33	600	36	16.7	12	P	K3 MR
PE-31	50	--	12	6	1-40	720	20	36.0	24	P	K3 MR
PE-32	40	--	12	22	4-48	1005	53	19.0	8	P	K3 MR
PE-33	--	71	10	--	--	--	--	--	--	U	K3 MR
PE-34	26	--	18	54	4-55	900	8	112.5	--	P	K3 MR
PE-35	30	--	12	50	7-55	728	23	31.7	8	P	K3 MR
PE-36	30	--	12	53	4-68	862	15	58.8	8	P	K3 MR
PE-37	--	116	10	--	--	--	--	--	--	U	K3 MR
PE-38	9	--	--	--	--	--	--	--	--	U	K3 MR
PE-39	35	--	12	59	7-57	1020	39	26.2	8	P	K3 MR
PE-40	20	--	10	67	--	130	--	--	--	U	K3 MR
PE-41	35	--	12	90	10-62	1000	43	23.3	8	P	K3 MR
PE-42	20	--	6	48	-63	250	16	15.6	--	U	K3 MR
PE-43	30	--	12	43	5-65	900	25	36.0	8	P	K3 MR
PE-44	30	--	12	47	12-59	875	26	33.7	8	P	K3 MR
PE-45	20	--	6	40	9-63	400	23	17.4	8	U	K3 MR
PH-1	10	--	3	30	9-55	25	10	2.5	3	H	AA CP
PH-2	10	--	4	30	8-54	15	5	3.0	4	H	AA CP
PH-3	36	--	4	120	8-57	197	61	3.2	4	P	K3 MW
PH-4	55	--	8	22	3-60	100	58	1.7	10	P	AA CP
PH-5	10	--	4	132	11-49	40	18	2.2	8	H	K3 MW
PH-6	61	--	8	180	10-62	759	35	21.7	8	P	K3 MR
PH-7	20	--	--	126	5-71	--	--	--	--	T	K3 MW
PV-1	55	--	6	124	2-52	100	--	--	10	H	K3 MW
PV-2	--	--	10	40	10-55	200	--	--	8	P	K3 MW
PV-3	--	--	6	120	8-50	50	--	--	8	H	K3 MW
PV-4	60	--	8	110	9-49	125	20	6.2	8	H	K3 MW
RU-1	26	--	8	62	8-63	250	18	13.9	2	N	K3 MR
RU-2	10	--	4	80	12-68	100	20	5.0	1	H	K3 MR
RU-3	10	--	6	90	8-63	150	9	16.7	--	I	K3 MR
RU-4	10	--	3	120	3-64	70	5	14.0	--	H	K3 MR
SU-5	42	--	12	98	4-56	1900	61	31.1	8	P	K3 MR
SU-6	53	--	6	90	9-26	527	25	21.1	--	P	K3 MR
SO-1	52	--	10	115	5-56	709	76	9.3	8	P	K3 MR
TA-1	23	--	8	101	7-68	285	25	11.4	4	I	K3 MR
VO-1	20	--	8	45	9-57	300	45	6.7	6	I	K3 MW
VO-2	60	--	12	161	6-59	1012	30	33.7	8	P	K3 MR
VO-3	--	--	12	--	--	--	--	--	--	P	K3 MR
VO-4	50	--	12	94	--	1000	57	17.5	--	P	K3 MR
VO-5	40	--	8	136	6-66	709	22	32.2	8	P	K3 MR
VO-6	42	--	12	93	12-57	1016	38	26.7	8	P	K3 MR
VO-7	14	--	6	80	4-55	50	--	--	4	H	K3 MW
VO-8	21	--	6	38	12-49	100	--	--	10	H	K3 MW
VO-9	--	--	4	11	2-55	50	--	--	--	N	K3 MW
VO-10	--	--	4	81	3-70	--	--	--	--	U	K3 MW
VO-11	20	--	4	50	11-55	50	10	5.0	4	N	K3 MW
VO-12	10	1259	6	183	2-63	10	258	0.0	--	U	K3 MR
VO-13	11	--	6	190	2-63	15	--	--	--	U	K3 MR
VO-14	42	--	8	81	6-60	--	--	--	--	P	K3 MW
WA-1	11	--	6	45	6-55	60	8	7.5	5	N	AA CP
WA-2	5	--	4	45	3-55	45	5	9.0	1	H	AA CP
WA-3	10	--	4	20	10-68	70	10	7.0	1	H	AA CP
WA-4	40	--	10	135	5-62	535	155	3.5	48	P	K3 MW
WA-5	40	--	6	140	2-65	500	108	4.6	8	P	K3 MW
WA-6	5	--	4	18	5-55	30	7	4.3	4	H	AA CP
WA-7	10	--	--	31	12-47	8	--	--	--	H	AA CP
WA-8	--	--	4	--	--	--	--	--	--	I	AA CP
WA-9	10	--	6	6	8-51	50	--	--	6	H	AA CP
WA-10	10	--	3	22	11-52	40	6	6.7	4	H	AA CP
WA-11	20	--	4	8	4-66	60	1	60.0	2	I	AA CP
WA-12	5	--	6	42	8-55	50	12	4.2	6	H	AA CP

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	MUNICIPALITY	LAT-LONG	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE-OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
			CAMDEN COUNTY					
WA-13	WATERFORD TWP	394243N0744918.1	E A CAPOFERRI	1	1966	92	10	130
WA-14	WATERFORD TWP	394229N0744941.1	E A CAPOFERRI	2	1966	89	30	129
WI-1	WINSLOW TWP	394623N0745544.1	HERBERT WILSON	1	1966	163	53	58
WI-2	WINSLOW TWP	394538N0745506.1	ROY W KRESGE	--	1956	160	61	67
WI-3	WINSLOW TWP	394522N0745625.1	JOHNS-MANVILLE	1	1963	160	410	450
WI-4	WINSLOW TWP	394522N0745625.2	JOHNS-MANVILLE	2	1963	160	410	450
WI-5	WINSLOW TWP	394522N0745625.3	JOHNS-MANVILLE	TEST HOLE 1	1963	160	--	890
WI-6	WINSLOW TWP	394507N0745438.1	PETER SEN	--	1952	143	90	97
WI-7	WINSLOW TWP	394449N0745540.1	FORMEGLI CORP	--	1957	150	86	106
WI-8	WINSLOW TWP	394443N0745434.1	CAMDEN CO R H S	REGIONAL H S 1	1957	175	102	110
WI-9	WINSLOW TWP	394443N0745304.1	DOMENIC CASARIO	--	1951	150	53	60
WI-10	WINSLOW TWP	394433N0745445.1	AMERICAN TELEPH	TELEGRAPH 1	1966	172	120	130
WI-11	WINSLOW TWP	394423N0745540.1	CERTAIN TEED ST	2	1969	160	113	138
WI-12	WINSLOW TWP	394417N0745538.1	CERTAIN TEED ST	1	1965	160	113	138
WI-13	WINSLOW TWP	394400N0745959.1	N TOMASELLA	1	1964	165	82	101
WI-14	WINSLOW TWP	394332N0745740.1	WINSLOW W C	PROD 2	1971	120	64	90
WI-15	WINSLOW TWP	394326N0745856.1	JOSEPH VOLPA	--	--	159	112	127
WI-16	WINSLOW TWP	394326N0745849.1	J LA GRATTO	--	1951	160	68	75
WI-17	WINSLOW TWP	394322N0745125.1	JAMES SARAPPA	--	1955	125	113	133
WI-18	WINSLOW TWP	394302N0745817.1	WINSLOW W C	TEST 5	1970	145	--	167
WI-19	WINSLOW TWP	394248N0745710.1	WINSLOW W C	PROD 1	1971	115	72	103
WI-20	WINSLOW TWP	394248N0745423.1	NICK ETTORE	--	1952	135	84	90
WI-21	WINSLOW TWP	394246N0745708.1	WINSLOW W C	OBS 1	1970	115	25	30
WI-22	WINSLOW TWP	394246N0745708.2	WINSLOW W C	OBS 2	1970	115	77	103
WI-23	WINSLOW TWP	394244N0745707.1	WINSLOW W C	OBS 3	1970	115	77	103
WI-24	WINSLOW TWP	394230N0745229.1	WINSLOW BD ED	1	1968	120	118	139
WI-25	WINSLOW TWP	394228N0745341.1	HOWARD BUSER	--	1955	130	87	94
WI-26	WINSLOW TWP	394221N0745412.1	A K BROWN JR	1	1967	140	40	100
WI-27	WINSLOW TWP	394215N0745617.1	US GEOL SURVEY	NEW BROOKLYN 1	1960	112	1485	1495
WI-28	WINSLOW TWP	394215N0745617.2	US GEOL SURVEY	NEW BROOKLYN 2	1961	112	829	839
WI-29	WINSLOW TWP	394215N0745617.3	US GEOL SURVEY	NEW BROOKLYN 3	1961	111	520	530
WI-30	WINSLOW TWP	394215N0745617.4	US GEOL SURVEY	NEW BROOKLYN 4	1961	112	200	210
WI-31	WINSLOW TWP	394210N0745654.1	WINSLOW W C	TEST 1	1970	115	94	114
WI-32	WINSLOW TWP	394139N0745424.1	RUDOLPH KRUGER	--	1953	134	49	55
WI-33	WINSLOW TWP	394129N0745055.1	ANCORA FARM	POOR FARM	1942	105	--	325
WI-34	WINSLOW TWP	394121N0745247.1	WINSLOW BD ED	--	1952	130	64	70
WI-35	WINSLOW TWP	394107N0745123.1	ANCORA STA HOSP	5	1953	105	117	138
WI-36	WINSLOW TWP	394105N0745134.1	ANCORA STA HOSP	4	1953	108	141	167
WI-37	WINSLOW TWP	394104N0745134.1	ANCORA STA HOSP	ASH 3	1952	109	326	356
WI-38	WINSLOW TWP	394100N0745157.1	ANCORA STA HOSP	2	1952	114	306	331
WI-39	WINSLOW TWP	394100N0744912.1	CARMEN GRASSE	--	1954	91	65	71
WI-40	WINSLOW TWP	394046N0745208.1	ANCORA STA HOSP	1	1952	135	344	372
WI-41	WINSLOW TWP	394038N0744958.1	WINSLOW BD ED	--	1951	93	144	151
WI-42	WINSLOW TWP	394015N0745030.1	M&R REFRACTORY	1	1965	110	70	104
WI-43	WINSLOW TWP	393957N0744940.1	JOSEPH DEMEGLIO	1	1966	105	20	200
WI-44	WINSLOW TWP	393946N0745102.1	SJ TRANSIT MIX	1	1965	100	33	53
WI-45	WINSLOW TWP	393946N0744940.1	JOSEPH PAGANO	1	1966	100	40	180
WI-46	WINSLOW TWP	393945N0745102.1	LORENZO ROMANO	--	1953	95	97	103
WI-47	WINSLOW TWP	393909N0745104.1	THOMAS FEBO	1	1969	98	57	67
WI-48	WINSLOW TWP	393845N0745009.1	A SCARDO JR	1	1968	102	122	122
			GLOUCESTER COUNTY					
CL-1	CLAYTON BORO	393912N0750522.1	CLAYTON W D	CWD 3	1956	133	746	800
DE-1	DEPTFORD TWP	395003N0750722.1	WALTER POTTS	--	1949	60	120	130
DE-2	DEPTFORD TWP	394950N0750626.1	LEROY LLOYD	--	1952	55	47	55
DE-3	DEPTFORD TWP	394947N0750731.1	WM PINTOZZI	--	1968	45	110	120
DE-4	DEPTFORD TWP	394827N0750758.1	MARION THOMPSON	--	1953	102	83	107
DE-5	DEPTFORD TWP	394821N0750530.1	ROBERT A GREER	--	1955	44	120	132
DE-6	DEPTFORD TWP	394816N0750730.1	NEW SHARON F C	--	1953	82	30	35
DE-7	DEPTFORD TWP	394805N0750913.1	DEPTFORD T M A	DTMA 2	1958	40	255	281
DE-8	DEPTFORD TWP	394628N0750813.2	WOODBURY W D	SEWELL 1A	1967	20	263	311
GL-1	GLASSBORO BORO	394142N0750608.1	E FOULKES	1	1966	138	306	311
MA-1	MANTUA TWP	394712N0751008.1	MANTUA WATER CO	MWC 2	1954	65	295	317
MA-2	MANTUA TWP	394636N0751115.1	EDENWOOD W C	EWC 1	1957	88	315	337
MA-3	MANTUA TWP	394629N0750859.1	SEWELL W C	SWC 2	1965	60	336	368
MA-4	MANTUA TWP	394617N0750833.1	PRICKETTS NURS	NURSERY 1	1969	80	377	397
MA-5	MANTUA TWP	394430N0750911.1	PITMAN CNTY CLB	COUNTRY CLUB 1	1967	85	378	408
MO-1	MONROE TWP	394059N0745913.1	THOMAS BRYNELL	--	1968	140	75	85
MO-2	MONROE TWP	394050N0745958.1	VIOLET PACKING	2	1967	155	115	150
NP-1	NATIONAL PK BORO	395156N0751053.1	NATIONAL PK W D	NPWD 2	1956	30	241	282
PI-1	PITMAN BORO	394427N0750743.1	PITMAN W D	PWD P3	1960	99	447	487
WA-1	WASHINGTON TWP	394649N0750624.1	RUSSEL GRASMICK	--	1954	100	106	125
WA-2	WASHINGTON TWP	394649N0750624.2	RUSSEL GRASMICK	1	1968	105	--	124
WA-3	WASHINGTON TWP	394641N0750449.1	WILLIAM MICHAEL	--	1952	80	122	140
WA-4	WASHINGTON TWP	394623N0750328.1	RUTH SAGERS	--	1953	89	75	105
WA-5	WASHINGTON TWP	394610N0750303.1	PRIMROSE MOTEL	--	1955	83	164	190
WA-6	WASHINGTON TWP	394533N0750323.1	WASHINGTON TMUA	WTMUA 2	1965	90	543	577
WA-7	WASHINGTON TWP	394531N0750653.1	R KRAEMER	1	1968	60	72	104
WA-8	WASHINGTON TWP	394525N0750640.1	C BRETT	--	1960	70	--	90
WA-9	WASHINGTON TWP	394522N0750617.1	CARLTON GANT	--	1953	81	107	125
WA-10	WASHINGTON TWP	394520N0750218.1	WASHINGTON TMUA	WTMUA 1	1959	100	581	612
WA-11	WASHINGTON TWP	394517N0750300.2	BELLS LAKE W C	2	1968	130	547	620

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLIDATED ROCK (FT)	CASING DIAMETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					CAMDEN COUNTY						
•A-13	120	--	6	6	4-66	60	1	60.0	3	I	AA CP
•A-14	99	--	6	4	4-66	60	1	60.0	2	I	AA CP
•I-1	5	--	3	--	--	--	--	--	--	H	AA CP
•I-2	6	--	3	25	1-56	7	10	0.7	C	H	AA CP
•I-3	40	--	10	126	10-63	300	124	2.4	24	N	K3 MW
•I-4	40	--	8	126	8-63	200	98	2.0	48	N	K3 MW
•I-5	--	--	--	--	--	--	--	--	--	U	--
•I-6	7	--	3	26	2-52	15	2	7.5	5	H	AA CP
•I-7	20	--	6	18	2-57	100	--	--	4	N	AA CP
•I-8	8	--	6	48	9-57	240	12	20.0	8	T	AA CP
•I-9	7	--	3	30	8-51	10	--	--	5	H	AA CP
•I-10	--	--	6	59	1-66	150	--	--	4	C	AA CP
•I-11	--	--	--	35	7-69	510	--	--	--	N	AA CP
•I-12	--	--	8	39	7-65	524	--	--	--	N	AA CP
•I-13	21	--	12	32	1-64	596	42	14.2	8	I	AA CP
•I-14	26	--	24	4	1-71	1000	39	25.6	48	P	AA CP
•I-15	15	--	8	29	--	--	--	--	--	I	AA CP
•I-16	7	--	3	30	8-51	10	--	--	8	H	AA CP
•I-17	20	--	4	35	4-55	50	--	--	4	H	AA CP
•I-18	--	--	--	--	--	--	--	--	--	U	--
•I-19	31	--	24	5	12-70	1000	28	35.7	48	P	AA CP
•I-20	6	--	2	18	2-52	20	10	2.0	2	H	AA CP
•I-21	5	--	2	3	12-70	--	--	--	--	U	AA CP
•I-22	26	--	2	3	12-70	--	--	--	--	U	AA CP
•I-23	26	--	2	3	12-70	--	--	--	--	U	AA CP
•I-24	20	--	8	14	5-68	225	9	25.0	8	H	AA CP
•I-25	7	--	3	15	2-55	50	1	50.0	4	H	AA CP
•I-26	60	--	6	27	4-67	300	53	5.7	2	I	AA CP
•I-27	10	2010	4	120	8-60	30	4	7.5	8	U	K3 MR
•I-28	10	--	6	131	4-61	14	6	2.3	58	U	K3 MR
•I-29	10	--	5	56	5-61	6	49	0.1	8	U	K3 MW
•I-30	10	--	5	4	4-61	3	--	--	57	U	TM KW
•I-31	20	--	6	1	12-70	--	--	--	--	U	AA CP
•I-32	6	--	3	--	--	--	--	--	--	H	AA CP
•I-33	--	--	--	--	--	--	--	--	--	T	TS MV
•I-34	10	--	3	33	7-52	7	2	3.5	--	H	AA CP
•I-35	21	--	8	16	10-54	502	60	8.4	5	T	AA CP
•I-36	26	--	8	22	7-53	708	78	9.1	8	T	AA CP
•I-37	30	--	8	41	1-63	--	--	--	--	T	TS MV
•I-38	25	--	8	46	9-52	360	206	1.7	24	T	TS MV
•I-39	6	--	3	15	2-54	6	6	1.0	1	H	AA CP
•I-40	28	--	8	72	10-54	185	98	1.9	4	T	TS MV
•I-41	7	--	3	12	6-51	30	--	--	--	P	AA CP
•I-42	34	--	8	22	11-65	377	38	9.9	1	N	AA CP
•I-43	150	--	6	18	5-66	60	1	60.0	3	I	AA CP
•I-44	21	--	4	16	9-65	72	21	3.4	5	N	AA CP
•I-45	14	--	6	13	5-66	60	1	60.0	3	I	AA CP
•I-46	6	--	4	10	9-53	30	12	2.5	1	H	AA CP
•I-47	11	--	3	15	11-69	40	10	4.0	1	H	AA CP
•I-48	42	--	6	12	5-68	75	2	37.5	1	I	AA CP
					GLOUCESTER COUNTY						
[illegible]-1	31	--	8	151	11-56	708	90	7.9	8	P	K3 MR
DE-1	20	--	4	50	4-49	50	10	5.0	4	H	K3 MV
DE-2	12	--	3	4	10-52	25	--	--	6	H	K3 MW
DE-3	13	--	4	80	8-68	20	20	1.0	1	H	K3 MW
DE-4	24	--	4	23	4-53	25	--	--	8	H	K3 MW
DE-5	12	--	4	30	10-55	30	10	3.0	4	H	K3 ET
DE-6	8	--	4	10	12-53	25	--	--	2	H	K3 MW
DE-7	26	--	12	70	1-58	1018	59	17.3	8	P	K3 MR
DE-8	42	--	12	60	11-67	1150	25	46.0	8	P	K3 MR
SL-1	5	--	4	80	5-66	5	5	1.0	--	U	K3 MW
[illegible]-1	21	700	8	90	12-53	287	40	7.2	4	P	K3 MR
[illegible]-2	22	--	12	93	2-57	533	13	41.0	8	P	K3 MR
[illegible]-3	32	--	10	102	4-65	525	13	40.4	4	P	K3 MR
[illegible]-4	20	--	6	120	3-69	150	12	12.5	2	H	K3 MR
[illegible]-5	30	--	10	122	3-67	411	34	12.1	8	I	K3 MR
[illegible]-1	11	--	4	10	4-68	60	5	12.0	1	H	AA CP
[illegible]-2	35	--	8	27	11-69	300	20	15.0	3	N	AA CP
[illegible]-1	41	288	8	52	4-56	636	31	20.5	8	P	K3 MR
[illegible]-1	41	--	10	122	12-60	1000	27	37.0	8	P	K3 MR
[illegible]-1	19	--	4	44	2-54	90	--	--	--	H	K3 MW
[illegible]-2	--	--	--	--	--	--	--	--	--	H	K3 MW
[illegible]-3	18	--	4	20	5-52	100	--	--	8	H	K3 MW
[illegible]-4	31	--	3	23	9-53	50	--	--	2	H	TL --
[illegible]-5	21	--	4	30	7-55	150	--	--	3	H	K3 MW
[illegible]-6	31	--	8	119	7-65	503	33	15.2	8	P	K3 MR
[illegible]-7	32	--	4	7	2-68	50	10	5.0	1	H	K3 MW
[illegible]-8	--	--	3	--	--	--	--	--	--	H	TF CS
[illegible]-9	18	--	4	16	5-53	90	--	--	4	H	K3 MW
[illegible]-10	31	--	8	131	9-59	626	28	22.4	8	P	K3 MR
[illegible]-11	31	--	8	174	3-68	735	33	22.3	8	P	K3 MR

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	MUNICIPALITY	LAT-LONG	OWNER	LOCAL WELL NUMBER	DATE DRILLED (YEAR)	ALTI-TUDE-OF LSD (FT)	CASING DEPTH (FT)	WELL DEPTH (FT)
			GLOUCESTER COUNTY					
WA-12	WASHINGTON TWP	394452N0750243.1	GINO'S REST	1	1970	150	278	310
WA-13	WASHINGTON TWP	394442N0750504.1	WALTER F EMOND	1	1968	150	220	244
WA-14	WASHINGTON TWP	394433N0750250.1	FRIES MILLS W C	FMWC 1	1964	152	584	652
WA-15	WASHINGTON TWP	394423N0750157.1	C W GREENE	--	1954	150	57	67
WA-16	WASHINGTON TWP	394420N0750630.1	HARRY J DE SOI	1	1968	90	141	165
WA-17	WASHINGTON TWP	394309N0750155.1	JOSEPH BRYAN	--	1954	155	42	47
WE-1	WENONAH BORO	394751N0750912.1	WENONAH WATER D	WWD 2	1951	30	270	310
WE-2	WENONAH BORO	394743N0750902.1	WENONAH WATER D	WWD 1	1944	80	280	320
WD-1	WEST DEPTFORD TWP	395236N0750821.1	TEXAS OIL CO	EAGLE PT OBS 4	1948	10	214	224
WD-2	WEST DEPTFORD TWP	395232N0750942.1	TEXAS OIL CO	EAGLE PT OBS 3	1948	21	255	276
WD-3	WEST DEPTFORD TWP	395222N0750918.1	TEXAS OIL CO	EAGLE POINT 3	1947	20	258	288
WD-4	WEST DEPTFORD TWP	395221N0750856.1	TEXAS OIL CO	EAGLE POINT 5	1948	10	237	277
WD-5	WEST DEPTFORD TWP	395216N0750915.1	TEXAS OIL CO	EAGLE POINT 1	1947	32	248	288
WD-6	WEST DEPTFORD TWP	395213N0750936.1	TEXAS OIL CO	EAGLE POINT 4	1948	14	259	289
WD-7	WEST DEPTFORD TWP	395207N0750930.1	TEXAS OIL CO	EAGLE POINT 2	1948	17	263	289
WD-8	WEST DEPTFORD TWP	395159N0750907.1	TEXAS OIL CO	EAGLE PT OBS 1	1948	32	288	298
WD-9	WEST DEPTFORD TWP	395158N0750950.1	TEXAS OIL CO	EAGLE PT OBS 2	1948	10	285	295
WD-10	WEST DEPTFORD TWP	395153N0750946.1	TEXAS OIL CO	EAGLE POINT 6	1949	15	279	318
WD-11	WEST DEPTFORD TWP	394919N0751256.2	SHELL CHEM CO	SHELL 3	1962	30	358	384
WD-12	WEST DEPTFORD TWP	394917N0751307.1	SHELL CHEM CO	SHELL 1	1962	12	328	360
WS-1	WESTVILLE BORO	395221N0750737.1	WESTVILLE W D	WWD 4	1957	16	286	313
WS-2	WESTVILLE BORO	395221N0750737.2	WESTVILLE W D	WWD 3	1945	16	115	140
WB-1	WOODBURY CITY	394950N0750909.1	WOODBURY W D	RAILROAD 5	1960	35	405	457
			PHILADELPHIA COUNTY					
PH-1	PHILADELPHIA CITY	395538N0750843.1	CROWN PAPER BRD	1	1925	13	--	108
PH-2	PHILADELPHIA CITY	395536N0750905.1	S P DRESS BEEF	S PHILA BEEF 4	--	15	--	60
PH-3	PHILADELPHIA CITY	395534N0751106.1	GILBERT ADDEO	PRES THEATER	1936	30	65	86
PH-4	PHILADELPHIA CITY	395524N0750822.1	CONTINENTL DIST	CONT DIST R-7	1948	10	118	128
PH-5	PHILADELPHIA CITY	395511N0750833.1	WILSON-MARTIN	WILSON 1	1953	13	150	175
PH-6	PHILADELPHIA CITY	395448N0750856.1	TWIN PACKING CO	1	--	10	140	180
PH-7	PHILADELPHIA CITY	395428N0750804.1	PUBLICKER IND	P INDUSTRIES17	1937	8	159	189
PH-8	PHILADELPHIA CITY	395412N0751211.1	GULF OIL CORP	WEST WELL	1946	17	72	182
PH-9	PHILADELPHIA CITY	395342N0751021.1	U S NAVAL BASE	OBS WELL PH-12	1944	10	94	104
PH-10	PHILADELPHIA CITY	395329N0751012.1	U S NAVAL BASE	2	1940	10	207	232
PH-11	PHILADELPHIA CITY	395328N0751034.1	U S NAVAL BASE	4	1941	11	237	267
PH-12	PHILADELPHIA CITY	395328N0751028.1	U S NAVAL BASE	3	1941	12	238	268
PH-13	PHILADELPHIA CITY	395318N0750938.1	U S NAVAL BASE	9	1943	12	189	228
PH-14	PHILADELPHIA CITY	395316N0751049.1	U S NAVAL BASE	OBS WELL PH-20	1946	13	238	243
PH-15	PHILADELPHIA CITY	395316N0751031.1	U S NAVAL BASE	8	1944	12	200	230
PH-16	PHILADELPHIA CITY	395315N0751007.1	U S NAVAL BASE	11	1952	11	214	245

EXPLANATION

1. AQUIFER
   - WG WISSAHICKON FORMATION
   - K3RA RARITAN FORMATION
   - K3MR MAGOTHY-RARITAN FORMATIONS
   - K3MV MERCHANTVILLE FORMATION
   - K3ET ENGLISHTOWN FORMATION
   - K3MW MOUNT LAUREL SAND-WENONAH FORMATION
   - K3NA NAVESINK FORMATION
   - TLHT HORNERSTOWN SAND
   - TLVH VINCENTOWN FORMATION-HORNERSTOWN SAND
   - TSMV MANASQUAN-VINCENTOWN FORMATION
   - TEMA MANASQUAN FORMATION
   - TMKW KIRKWOOD FORMATION
   - TFCS COHANSEY SAND
   - AACP PLEISTOCENE-COHANSEY SAND
   - TL TERTIARY-PALEOCENE
   - OGCM CAPE MAY FORMATION

2. WATER LEVEL BELOW LAND SURFACE
   - F FLOWS

3. WATER USE
   - A AIR CONDITION
   - C COMMERCIAL
   - H DOMESTIC
   - I IRRIGATION
   - N INDUSTRIAL
   - P PUBLIC SUPPLY
   - T INSTITUTIONAL
   - U UNUSED
   - Z OTHER

Table 1.--Records of selected wells in Camden County and vicinity--Continued

MAP NUMBER	LENGTH OF WELL OPEN TO AQUIFER (FEET)	DEPTH TO CONSOLI-DATED ROCK (FT)	CASING DIAM-ETER (IN)	WATER LEVEL (FT)	DATE WATER LEVEL MEASURED	YIELD (GPM)	DRAW DOWN (FT)	SPECIFIC CAPACITY	PUMPING PERIOD (HOURS)	USE OF WATER	MAJOR AQUIFER
					GLOUCESTER COUNTY						
WA-12	32	--	6	100	2-70	--	--	--	--	C	K3 MW
WA-13	24	--	4	74	2-68	60	15	4.0	1	H	K3 MW
WA-14	68	--	8	188	9-64	858	50	17.2	--	P	K3 MR
WA-15	10	--	4	32	10-54	15	6	2.5	--	H	AA CP
WA-16	24	--	4	16	12-68	60	12	5.0	2	H	K3 MW
WA-17	5	--	3	15	5-54	9	7	1.3	4	H	AA CP
WE-1	46	--	12	67	2-51	1200	40	30.0	8	P	K3 MR
WE-2	40	700	12	90	5-44	500	30	16.7	24	P	K3 MR
WD-1	10	--	3	31	7-48	--	--	--	--	U	K3 MR
WD-2	20	298	6	42	11-52	--	--	--	--	U	K3 MR
WD-3	30	288	12	39	12-47	1012	43	23.5	24	N	K3 MR
WD-4	40	287	12	46	10-48	1029	44	23.4	8	N	K3 MR
WD-5	40	--	12	39	11-47	1110	34	32.6	8	N	K3 MR
WD-6	31	--	16	38	3-48	1100	52	21.2	90	N	K3 MR
WD-7	31	--	16	38	1-48	1100	59	18.6	24	N	K3 MR
WD-8	10	--	4	--	10-47	--	--	--	--	U	K3 MR
WD-9	10	--	3	18	7-48	250	--	--	--	U	K3 MR
WD-10	39	--	16	35	1-49	1200	76	15.8	48	N	K3 MR
WD-11	25	--	12	35	12-61	1000	105	9.5	8	N	K3 MR
WD-12	30	--	12	30	10-61	1000	36	27.8	8	N	K3 MR
WS-1	27	325	10	51	--	1205	95	12.7	8	P	K3 MR
WS-2	28	--	10	24	6-45	500	28	17.9	2	P	K3 MR
WB-1	52	--	12	62	4-60	1016	24	42.3	10	P	K3 MR
					PHILADELPHIA COUNTY						
PH-1	--	--	8	18	--	100	--	--	--	N	K3 MR
PH-2	--	--	--	--	--	--	--	--	--	Z	K3 MR
PH-3	21	--	8	39	6-36	90	30	3.0	--	A	QG CM
PH-4	17	--	10	41	10-48	--	--	--	--	N	K3 RA
PH-5	25	--	10	--	--	250	--	--	--	Z	K3 MR
PH-6	15	172	--	72	12-43	726	--	--	--	N	K3 RA
PH-7	30	--	18	48	--	1030	--	--	--	I	K3 RA
PH-8	10	--	6	14	3-46	420	--	--	--	N	K3 RA
PH-9	10	--	8	27	11-44	--	--	--	--	U	K3 MR
PH-10	35	--	12	18	7-40	730	75	9.7	--	N	K3 RA
PH-11	30	--	12	25	--	800	--	--	--	N	K3 RA
PH-12	--	--	12	30	--	860	--	--	--	N	K3 RA
PH-13	--	--	12	32	--	710	--	--	--	N	K3 RA
PH-14	5	--	8	23	5-46	--	--	--	--	U	K3 MR
PH-15	30	--	8	51	12-44	740	--	--	--	N	K3 RA
PH-16	31	--	12	47	--	640	--	--	--	N	K3 RA

REFERENCE NO. 22

DRAFT

SEP 25 1989

IN THE MATTER OF	:	DIRECTIVE
THE CITY OF CAMDEN	:	AND
PUCHACK WELLFIELD	:	NOTICE TO INSURERS
- AND -	:	
PENLER ANODIZING COMPANY; SGL MODERN HARD CHROME; ALPHA TOOL & MACHINE COMPANY; PENNSAUKEN SOLID WASTE MANAGEMENT AUTHORITY; ALUMINUM SHAPES, INC.; UNITED STEEL & WIRE; ADVANCED PROCESS SUPPLY; DeVOE MARINE COATINGS COMPANY; GROW COMPANY, INC.; SWOPE OIL & CHEMICAL COMPANY; CHAPMAN INDUSTRIAL FINISHES,INC; DENTON PLASTIC PRODUCTS COMPANY; DeSOTO, INC; E.I. DuPONT de NEMOURS & CO., INC HOBART CORPORATION; McCLOSKEY VARNISH COMPANY MINNESOTA MINING & MANUFACTURING COMPANY (3-M); NL INDUSTRIES, INC; PHILADELPHIA NEWSPAPERS, INC.; ROHM & HAAS COMPANY; TRIANGLE PUBLICATIONS, INC.; UNITED STATES STEEL CORPORATION;	:	
Respondents		

RECEIVED
SEP 27 1989
Ground Water Quality Mgt.
BGWPA

This Directive and Notice to Insurers is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP" or "Department") by N.J.S.A. 13:1D-1 et seq. and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq. (or "Act"), and duly delegated to the Director of the Division of Water Resources or other authorized representative of the Division pursuant to N.J.S.A. 13:1B-4. This Directive and Notice to Insurers is issued in order to notify the above captioned Respondents and their Insurers that the Department, pursuant to the provisions of the Act, has determined that it is necessary to remove or arrange for the removal of hazardous substances, and in order to notify the Respondents that the Department has determined them to be responsible for the discharge of hazardous substances and to notify the Insurers of the Respondents that claims for the cost and/or damages as set forth in or arising out

ATTACHMENT L1

of this Directive and Notice to Insurers may be directly asserted by the Department against the Insurers.

FINDINGS

A. The Site

__. The City of Camden owns and operates the Puchack Wellfield, a public community water system (P.W. ID No. 0408001) located at Lot ___ , Block ____ , in Pennsauken Township, Camden County, New Jersey. The Wellfield was constructed in 1959 and consists of seven (7) wells which are screened in the lower aquifer of the Potomac, Raritan, and Magothy aquifer system. In 1980 the wellfield produced on average 5.6 million gallons per day ("mgd") of potable water, twenty-five (25) percent of the City's total average daily demand. Today, due to groundwater contamination, the wellfield produces approximately three (3) mgd. The wellfield is bordered on the northeast by the Betsy Ross Bridge and the Puchack Creek, on the southwest by the Pennsylvania Reading Seashore Lines, on the northwest, approximately one mile away, by the Delaware River, and on the southeast by private homes.

B. Respondents

__. The City of Camden owns and operates ~~of~~ the Puchack Wellfield ("the Wellfield") which contains hazardous substances as defined in N.J.A.C. 7:1E-1.3.

___. Penler Anodizing Company ("Penler") of Pennsauken, New Jersey is a company involved with the electroplating of metal products. Penler uses and discharges various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. SGL Modern Hard Chrome ("SGL") of Camden, New Jersey is a company involved with the electroplating of metal products. SGL uses and discharges various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. Alpha Tool & Machine Company ("Alpha Tool") of Pennsauken, New Jersey is a company involved with the manufacture of machine parts. Alpha Tool uses and discharges various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. Pennsauken Solid Waste Management Authority ("Pennsauken SLF") owns and operates the Pennsauken Sanitary Landfill of Pennsauken, New Jersey. The landfill was permitted to

ATTACHMENT 2a

accept municipal, bulky, vegetative and non-chemical industrial wastes as well as dry sewage sludge.

__. Aluminum Shapes Inc. ("Aluminum Shapes") of Pennsauken, New Jersey is a corporation involved with aluminum smelting, extruding and the manufacturing of aluminum shapes. Aluminum Shapes uses and discharges various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. United Steel and Wire ("United Steel") of Pennsauken, New Jersey was a company involved in the manufacturing and electroplating of shopping carts. United Steel used and discharged various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. Advance Process Supply ("Advance Process") of Pennsauken, New Jersey is a company involved in the manufacturing and storing of water-based textile inks and dyes. Advance Process uses and discharges various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. DeVoe Marine Coatings Company ("DeVoe") of Pennsauken, New Jersey is a company involved in the manufacturing of corrosion resistant paints and coatings. DeVoe uses and discharges various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. Grow Group, Inc. ("Grow Group") of____ is the parent corporation of DeVoe.

__. Swope Oil and Chemical Company/Ashborne Company ("Swope Oil") of____ was a company involved in solvent reprocessing Swope used and discharged various chemical-based products and wastes, including Chromate which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. Chapman Industrial Finishers, Inc. ("Chapman") of___is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. Denton Plastic Products Company ("Denton") of___is a company involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

__. DeSoto, Inc. ("DeSoto") of___is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous

substance as defined in N.J.A.C. 7:1E-1.3.

___. E.I.DuPont de Nemours & Company, Inc. ("DuPont") of Wilmington, Delaware is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. Hobart Corporation ("Hobart") of ____ is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. McCloskey Varnish Company ("McCloskey") of ____ is a company involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. Minnesota Mining & Manufacturing Company (3-M) ("Minnesota Mining") of ___is a company involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. NL Industries, Inc. ("NL Industries") of ___ is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. Philadelphia Newspapers, Inc. ("Philadelphia Newspapers") of Philadelphia, Pennsylvania is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. Rohm & Haas Company ("Rohm & Haas") of ____ is a company involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. Triangle Publications, Inc. ("Triangle") of ____ is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

___. United States Steel Corporation (U.S. Steel") of ____is a corporation involved in the manufacture and distribution of various chemical-based products and wastes, including _____ which is a hazardous substance as defined in N.J.A.C. 7:1E-1.3.

C. Site History

REFERENCE NO. 23

REFERENCE 23

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

DATE: JUNE 30, 2000
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: RSCC / ESAT
TO: George Karras, Hazardous Waste Support Section

JUL 24 2000

Attached is the following ORGANIC Data Package to be reviewed for Quality Assurance

SITE	CAMDEN MUNICIPAL WELLS	CASE#	28192
CONTRACTOR	STARTW	#SAMPLES	MATRIX
PHASE	SI		
LAB	MITKEM	16	WATER
TURN-AROUND-TIME	14 DAYS	FRACTION	15 FULL TCL & ONE VOA
CERCLIS ID #	NJD980769087	SITE SPILL #	ZZ

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	Date/Time	Signature	Date/Time
		John Bulich	6-29-00
John Bulich	6-30-00	Hanif Shaikh	7/17/00
Hanif Shaikh	7/24/00	[illegible]	7/24/00

(over for instructions) revised 3/99

JUN 29 2000

SDG Narrative

Mitkem Corporation submits the enclosed data package in response to USEPA Case # 28192 and SDG# B01QK. Analyses were performed for sixteen aqueous samples that were received on June 14, 2000. The analyses were performed under USEPA Contract # 68-W-99-076.

The following samples are submitted in this data package:

Client ID	Lab ID	Analysis	VOA pH
B01QY	70890001	V, S, P	<2
B01QX	70890002	V, S, P	<2
B01T4	70890003	V, S, P	<2
B01T3	70890004	V, S, P	<2
B01T2	70890005	V, S, P	<2
B01T1	70890006	V, S, P	<2
B01QZ	70890007	V, S, P	<2
B01T0	70890008	V, S, P	<2
B01TK	70890009	V, S, P	<2
B01T7	70890010	V	<2
B01TP	70890011	V, S, P	<2
B01TN	70890012	V, S, P	<2
B01TJ	70890013	V, S, P	<2
B01QN	70890014	V, S, P	<2
B01QW	70890015	V, S, P	<2
B01QK	70890016	V, S, P	<2
B01T1MS	70890017	V, S, P	<2
B01T1MSD	70890018	V, S, P	<2

V = Volatiles
S = Semivolatiles
P = Pesticides/PCB

The analyses were performed using USEPA CLP Multi-Media, Multi-Concentration (OLM04.2) protocols. The analyses were performed with strict adherence to the SOW with the following exceptions and observations:

1. Overall Observation:

Where needed, manual integrations were performed to improve data quality. The corrections were reviewed and associated hardcopies generated and reported as required.

2. Volatile Analysis:

Traps used for instrument V1/V6: OI Analytical #10 trap containing 8 cm each of Tenax, silica gel and carbon molecular sieve.

GC column used: 30 m x 0.25 mm id (1.4 um film thickness) DB-624 capillary column.

Matrix spike and matrix spike duplicate were performed on sample B01T1. Spike recoveries and replicate RPDs were within the advisory QC limits.

Sample B01TK was analyzed at 2x dilution due to target analytes above the instrument calibration range.

No other unusual observation was made for the analysis.

3. Semivolatile Analysis:

GC column: 30 m x 0.25 mm id (0.5 um film thickness) DB-5MS capillary column

Matrix spike and matrix spike duplicate were performed on sample B01T1. Spike recoveries were within the advisory QC limits except for high recover of 4-nitrophenol in both the matrix spike and matrix spike duplicate. All RPDs were within the advisory QC limits.

No other unusual observation was made for the analysis.

4. Pesticides/PCB Analysis:

GC column used: 30 m x 0.53 mm id (0.81 um film thickness) DB-608 and 30 m x 0.53 mm id (0.5 um film thickness) DB-1701 megabore columns

Matrix spike and matrix spike duplicate were performed on sample B01T1. Spike recoveries were within QC limits except for high recovery of gamma-BHC in the matrix spike and high recovery of dieldrin in the matrix spike duplicate. Aldrin and endrin were recovered high in both the matrix spike and matrix spike duplicate. All RPDs were within the advisory QC limits.

No other unusual observation was made for the analysis.

All of the submittals to the region are originals other than log book pages and copies of tunes and standard files which are shared by many other cases. For these, the original copies are archived in the laboratory.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his designee, as verified by the following signature.

Agnes Ng
CLP Project Manager
6/27/00

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organic Analyses

CASE No: 280192 **SDG No:** B01QK **LABORATORY:** MITKEM

SITE: Camden Municipal Wells

DATA ASSESSMENT

The current SOP No. HW-6 (Revision 11), June 1996 for CLP Organics Review and Preliminary Review has been applied.

All data were found to be valid and acceptable except those analytes which have been rejected, "R" (unusable). Due to various QC problems some analytes may have been qualified with a "J" (estimated), "N" (presumptive evidence for the presence of the material), "U" (non-detect), or "JN" (presumptive evidence for the presence of the material at an estimated value) flag. All action is detailed on the attached sheets.

The "R" flag means that the associated value is unusable. In other words, significant data bias is evident and the reported analyte concentration is unreliable.

Reviewer's Signature: Hanif Shaikh **Date:** 7/24/00

Verified By: _____ **Date:** _____

sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for common contaminants), the analytes are qualified as non-detects, "U" The following analytes in the sample shown were qualified with "U" for these reasons:

A) Method blank contamination:

VOA: No contamination was discovered in the method blanks.

BNA: No contamination was discovered in the method blank.

PEST./PCBs: No contamination was discovered in the method blank.

B) Field or rinse blank contamination:

No Field or Rine Blank was collected withe samples.

C) Trip blank contamination:

VOA: Trip Blank was found to be contaminated with acetonre at 7ug/L. See attached CADRE Field QC Report foa alist samples qualified.

D) Storage blank contamination:

VOA: No results were qualified due to contaminationof benzene at i ug/L.

E) TIC

VOA: No TIC were detected.

BNA: The laboratory flagged chemically known TICs with "NJ" qualifier.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity.

Holding Time Report

SDG NO: B01QX
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QX.ASF

HOLDING TIME CRITERIA

Volatile

Preserved	Primary	Expanded
Water	14	28
Soil	14	28

	---- Aromatic ----		-- Non-aromatic --	
Unpreserved	Primary	Expanded	Primary	Expanded
Water	7	28	14	28
Soil	10	28	10	28

Semivolatile

	--- Extraction ---		---- Analysis ----	
	Primary	Expanded	Primary	Expanded
Water	7	28	40	60
Soil	7	28	40	60

Pesticide

	--- Extraction ---		---- Analysis ----	
	Primary	Expanded	Primary	Expanded
Water	7	28	40	60
Soil	7	28	40	60

No problems found for this qualification.

SMC/Surrogate Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

SMC/SURROGATE CRITERIA

Volatile

Percent Recovery Limits

	--- Water ---		---- Soil ---	
	Lower	Upper	Lower	Upper
Toluene-d8	88.0	110.0	84.0	138.0
Bromofluorobenzene	86.0	115.0	59.0	113.0
1,2-Dichloroethane-d4	76.0	114.0	70.0	121.0

Semivolatile

Percent Recovery Limits

	--- Water ---		---- Soil ---	
	Lower	Upper	Lower	Upper
Nitrobenzene-d5	35.0	114.0	23.0	120.0
2-Fluorobiphenyl	43.0	116.0	30.0	115.0
Terphenyl-d14	33.0	141.0	18.0	137.0
Phenol-d5	10.0	110.0	24.0	113.0
2-Fluorophenol	21.0	110.0	25.0	121.0
2,4,6-Tribromophenol	10.0	123.0	19.0	122.0
2-Chlorophenol-d4	33.0	110.0	20.0	130.0
1,2-Dichlorobenzene-d4	16.0	110.0	20.0	130.0

Pesticide

Percent Recovery Limits

	--- Water ---		---- Soil ---	
	Lower	Upper	Lower	Upper
Tetrachloro-m-xylene	30.0	150.0	30.0	150.0
Decachlorobiphenyl	30.0	150.0	30.0	150.0

No problems found for this qualification.

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

Matrix Spike Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

MATRIX SPIKE CRITERIA

Volatile

Percent Recovery Limits & RPD

	Water			Soil		
	Lower	Upper	RPD	Lower	Upper	RPD
1,1-Dichloroethene	61.0	145.0	14.0	59.0	172.0	22.0
Benzene	76.0	127.0	11.0	66.0	142.0	21.0
Trichloroethene	71.0	120.0	14.0	62.0	137.0	24.0
Toluene	76.0	125.0	13.0	59.0	139.0	21.0
Chlorobenzene	75.0	130.0	13.0	60.0	133.0	21.0

Semivolatile

Percent Recovery Limits & RPD

	Water			Soil		
	Lower	Upper	RPD	Lower	Upper	RPD
Phenol	12.0	110.0	42.0	26.0	90.0	35.0
2-Chlorophenol	27.0	123.0	40.0	25.0	102.0	50.0
N-Nitroso-di-n-propylamine	41.0	116.0	38.0	41.0	126.0	38.0
4-Chloro-3-methylphenol	23.0	97.0	42.0	26.0	103.0	33.0
Acenaphthene	46.0	118.0	31.0	31.0	137.0	19.0
4-Nitrophenol	10.0	80.0	50.0	11.0	114.0	50.0
2,4-Dinitrotoluene	24.0	96.0	38.0	28.0	89.0	47.0
Pentachlorophenol	9.0	103.0	50.0	17.0	109.0	47.0
Pyrene	26.0	127.0	31.0	35.0	142.0	36.0

Pesticide

Percent Recovery Limits & RPD

	Water			Soil		
	Lower	Upper	RPD	Lower	Upper	RPD
gamma-BHC (Lindane)	56.0	123.0	15.0	46.0	127.0	50.0

Heptachlor	40.0	131.0	20.0	35.0	130.0	31.0
Aldrin	40.0	120.0	22.0	34.0	132.0	43.0
Dieldrin	52.0	126.0	18.0	31.0	134.0	38.0
Endrin	56.0	121.0	21.0	42.0	139.0	45.0
4,4'-DDT	38.0	127.0	27.0	23.0	134.0	50.0

DC-51: The following semivolatile matrix spike/matrix spike duplicate samples have percent recovery outside criteria.
Hits and non-detects in the unspiked sample are qualified based on professional judgement.

B01T1MS
4-Nitrophenol

B01T1MSD
4-Nitrophenol

DC-170: The following pesticide matrix spike/matrix spike duplicate samples have percent recovery outside criteria.
Use professional judgement to qualify the data.

B01T1MS
gamma-BHC (Lindane), Aldrin, Dieldrin, Endrin

B01T1MSD
Aldrin, Dieldrin, Endrin

Laboratory Blanks Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

LABORATORY BLANKS CRITERIA

Volatile

Method Blank Contamination Threshold Multipliers

	First	Expanded
Common contaminant compounds	10.00	10.00
Other compounds	5.00	5.00

Semivolatile

Method Blank Contamination Threshold Multipliers

	First	Expanded
Common contaminant compounds	10.00	10.00
Other compounds	5.00	5.00

Pesticide

Method Blank Contamination Threshold Multipliers

	First	Expanded
All compounds	5.00	5.00

DC-402: The following volatile samples are associated with a contaminated storage blank.
Hits are qualified "U" and non-detects are not flagged.

Benzene
B01TMS, B01TMSD

sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for common contaminants), the analytes are qualified as non-detects, "U" The following analytes in the sample shown were qualified with "U" for these reasons:

A) Method blank contamination:

VOA: No contamination was discovered in the method blanks.

BNA: No contamination was discovered in the method blank.

PEST./PCBs: No contamination was discovered in the method blank.

B) Field or rinse blank contamination:

No Field or Rine Blank was collected withe samples.

C) Trip blank contamination:

VOA: Trip Blank was found to be contaminated with acetonre at 7ug/L. See attached CADRE Field QC Report foa alist samples qualified.

D) Storage blank contamination:

VOA: No results were qualified due to contaminationof benzene at i ug/L.

E) TIC

VOA: No TIC were detected.

BNA: The laboratory flagged chemically known TICs with "NJ" qualifier.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity.

The complete primary criteria for BFB are as follows:

Bromofluorobenzene (BFB)

m/z	ION ABUNDANCE CRITERIA (Volatile)
50	8.0 - 40.0% of m/z 95
75	30.0 - 66.0% of m/z 95
95	base peak, 100.0% relative abundance
96	5.0 - 9.0% of m/z 95
173	less than 2.0% of m/z 174
174	50.0 - 120.0% of m/z 95
175	4.0 - 9.0% of m/z 174
176	93.0 - 101.0% of m/z 174
177	5.0 - 9.0% of m/z 176

The complete primary criteria for DFTPP are as follows:

Decafluorotriphenylphosphine (DFTPP)

m/z	ION ABUNDANCE CRITERIA (Semivolatile)
51	30.0 - 80.0% of m/z 198
68	less than 2.0% of m/z 69
69	present
70	less than 2.0% of m/z 69
127	25.0 - 75.0% of m/z 198
197	less than 1.0% of m/z 198
198	base peak, 100.0% relative abundance
199	5.0 - 9.0% of m/z 198
275	10.0 - 30.0% of m/z 198
365	greater than 0.75% of m/z 198
441	present, but less than m/z 443
442	40.0 - 110.0% of m/z 198
443	15.0 - 24.0% of m/z 442

No problems found for this qualification.

These criteria are not sample specific. Instrument performance is determined using

standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene and for semi-volatiles Decafluorotriphenylphosphine (DFTPP).

If the mass calibration is in error, all associated data will be classified as unusable "R".

VOA: No problems

BNA: No Problems

6. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor GC/MS:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be > 0.05 in both initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected "R".

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be < 30% and % D must be < 25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If % RSD and % D grossly exceed QC criteria, non-detects data may be qualified "R".

For the PEST/PCB fraction, if % RSD exceeds 20% for all analytes except for the two surrogates (which must not exceed 30% RSD), qualify all associated positive results"J"and non-detects "UJ".

VOA: The Continuing Calibration RRF was found to be less than 0.05 for 1,2- dibromo -3-chloropropane. Results of the associated samples were rejected . See attached CADRE Calibration Report for a list of samples qualified.

The Continuing Calibration %D was found to be greater than 25% for a number of compounds. See attached CADRE Calibration Report for a list of compounds and samples flagged (J) as estimated.

PEST./PCBs: The calibration %RSD was found to exceed the acceptance criteria for alpha- BHC, delta-BHC and gamma lindane. See CADRE Calibration for a list of samples flagged (J) as estimated.

7. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than +30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

VOA: No Problems

BNA: No Problems

8. COMPOUND IDENTIFICATION:

A) Volatile and Semi-Volatile Fractions:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ± 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and

SDG NO: B01QX
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QX.ASF

CALIBRATION CRITERIA

Volatile

	Primary	Expanded
Minimum RRF	0.05	0.05
Maximum %RSD (initial calibration)	30	90
Maximum %D (continuing calibration)	25	90
Calibration time period	12	

Semivolatile

	Primary	Expanded
Minimum RRF	0.05	0.05
Maximum %RSD (initial calibration)	30	90
Maximum %D (continuing calibration)	25	90
Calibration time period	12	

Pesticide

Maximum %RSD (initial calibration)	- TCL analytes	20
	- surrogates	30
Maximum RPD (continuing calibration)		25
INDA/INDB percent resolution		90
Continuing calibration sequence time		12

DC-18: The following volatile samples are associated with a continuing calibration whose corresponding initial calibration has relative response factors (RRFs) outside primary criteria.
Hits are flagged "J" and non-detects are qualified "R".

B01QK
1,2-Dibromo-3-chloropropane

B01QN
1,2-Dibromo-3-chloropropane

B01QW
1,2-Dibromo-3-chloropropane

B01QX

1,2-Dibromo-3-chloropropane

B01QY
1,2-Dibromo-3-chloropropane

B01QZ
1,2-Dibromo-3-chloropropane

B01T0
1,2-Dibromo-3-chloropropane

B01T1
1,2-Dibromo-3-chloropropane

B01T1MS
1,2-Dibromo-3-chloropropane

B01T1MSD
1,2-Dibromo-3-chloropropane

B01T2
1,2-Dibromo-3-chloropropane

B01T3
1,2-Dibromo-3-chloropropane

B01T4
1,2-Dibromo-3-chloropropane

B01T7
1,2-Dibromo-3-chloropropane

B01TJ
1,2-Dibromo-3-chloropropane

B01TK
1,2-Dibromo-3-chloropropane

B01TN
1,2-Dibromo-3-chloropropane

B01TP
1,2-Dibromo-3-chloropropane

VBLK6B
1,2-Dibromo-3-chloropropane

VBLK6V
1,2-Dibromo-3-chloropropane

DC-23: The following volatile samples are associated with a continuing calibration percent difference (%D) outside primary criteria. Hits are qualified "J" and non-detects are qualified "UJ".

B01QZ
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

B01T0
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

B01T1MS
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

B01TJ
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

B01TK
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

B01TN
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

B01TP
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

VBLK1B
Dichlorodifluoromethane , Chloromethane, Vinyl Chloride, Bromomethane
Chloroethane, Trichlorofluoromethane

VBLK6B
Dichlorodifluoromethane , Vinyl Chloride, Chloroethane, Acetone
2-Hexanone

VHBLK1B
Dichlorodifluoromethane , Chloromethane, Vinyl Chloride, Bromomethane
Chloroethane, Trichlorofluoromethane

DC-24: The following volatile samples are associated with a continuing calibration relative response factor (RRF50) outside primary criteria.
Hits are flagged "J" and non-detects are qualified "R".

B01QK
1,2-Dibromo-3-chloropropane

B01QN
1,2-Dibromo-3-chloropropane

B01QW
1,2-Dibromo-3-chloropropane

B01QX
1,2-Dibromo-3-chloropropane

B01QY
1,2-Dibromo-3-chloropropane

B01QZ
1,2-Dibromo-3-chloropropane

B01T0
1,2-Dibromo-3-chloropropane

B01T1
1,2-Dibromo-3-chloropropane

B01T1MS
1,2-Dibromo-3-chloropropane

B01T1MSD
1,2-Dibromo-3-chloropropane

B01T2
1,2-Dibromo-3-chloropropane

B01T3
1,2-Dibromo-3-chloropropane

B01T4
1,2-Dibromo-3-chloropropane

B01T7

1,2-Dibromo-3-chloropropane

B01TJ
1,2-Dibromo-3-chloropropane

B01TK
1,2-Dibromo-3-chloropropane

B01TN
1,2-Dibromo-3-chloropropane

B01TP
1,2-Dibromo-3-chloropropane

VBLK6B
1,2-Dibromo-3-chloropropane

VBLK6V
1,2-Dibromo-3-chloropropane

DC-189: The following pesticide samples are associated with a three point initial calibration in which the % RSD of calibration factors exceeds criteria.
Hits are qualified "J" and non-detects are qualified "UJ".

B01QK
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01QN
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01QW
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01QX
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01QY
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01QZ
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T0
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T1
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T1MS
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T1MSD
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T2
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T3
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01T4
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01TJ
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01TK
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01TN
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

B01TP
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

PBLK2C
alpha-BHC, delta-BHC, gamma-BHC (Lindane)

DC-190: The following pesticide samples are not qualified for initial calibration due to missing calibration information. Visual inspection is recommended.

alpha-BHC
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

beta-BHC
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

delta-BHC
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

gamma-BHC (Lindane)
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Heptachlor
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Aldrin
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Heptachlor epoxide
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Endosulfan I
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Dieldrin
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

4,4'-DDE
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Endrin
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Endosulfan II

B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

4,4'-DDD
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Endosulfan sulfate
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

4,4'-DDT
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Methoxychlor
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Endrin ketone
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Endrin aldehyde
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

alpha-Chlordane
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

gamma-Chlordane
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

DC-197: The following pesticide samples are not qualified for continuing calibration because of missing continuing

calibration information.
Visual inspection of the data is required.

B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP, PBLK2C

Internal Standards Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

INTERNAL STANDARD CRITERIA

Volatile

Retention Time & Area Count Limits

	-- Primary --		- Expanded --	
	Lower	Upper	Lower	Upper
Retention time	- 0.5	+ 0.5	- 0.5	+ 0.5
Area count	/ 2	* 2	/ 4	* 4

Semivolatile

Retention Time & Area Count Limits

	-- Primary --		- Expanded --	
	Lower	Upper	Lower	Upper
Retention time	- 0.5	+ 0.5	- 0.5	+ 0.5
Area count	/ 2	* 2	/ 4	* 4

No problems found for this qualification.

Quantitation Limit Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

CONTRACT REQUIRED SAMPLE QUANTITY

	Water	Low Soil	Med Soil
VOA	5.0 (ML)	5.0 (G)	4.0 (G)
BNA	1000.0 (ML)	30.0 (G)	1.0 (G)
PES	1000.0 (ML)	30.0 (G)	

DC-45: The following volatile samples have analyte concentrations below the quantitation limit (CRQL). All results below the CRQL are qualified "J".

B01QK
Trichloroethene, Tetrachloroethene, Chlorobenzene

B01QN
tert-Butyl Methyl Ether , Chlorobenzene

B01QW
Acetone

B01QX
tert-Butyl Methyl Ether , 1,1-Dichloroethane , cis-1,2-Dichloroethene , Tetrachloroethene
Chlorobenzene

B01QY
cis-1,2-Dichloroethene , Tetrachloroethene, Chlorobenzene

B01QZ
Tetrachloroethene

B01T0
Acetone , Trichloroethene

B01T1MS
Tetrachloroethene

B01T1MSD
Methyl Acetate

B01T2
tert-Butyl Methyl Ether , Trichloroethene

B01T7
Acetone

B01TK
Vinyl Chloride, 1,1-Dichloroethene , Acetone , 1,1-Dichloroethane
Chloroform, Tetrachloroethene, Chlorobenzene

B01TN
1,1-Dichloroethene , Acetone , tert-Butyl Methyl Ether , 1,1-Dichloroethane
cis-1,2-Dichloroethene , 1,2-Dichloroethane

B01TP
Vinyl Chloride, 1,1-Dichloroethene , tert-Butyl Methyl Ether , 1,1-Dichloroethane
1,2-Dichloroethane

VHBLK1B
Benzene

DC-110: The following semivolatile samples have analyte concentrations below the quantitation limit (CRQL). All results below the CRQL are qualified "J".

B01QN
N-Nitrosodiphenylamine

Percent Moisture Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

PERCENT MOISTURE LIMITS

	Primary	Expanded
VOA	50%	90%
BNA	50%	90%
PES	50%	90%

No problems found for this qualification.

System Performance Report

SDG NO: B01QK
CASE NO: 28192

LABORATORY: MITKEM CORPOR
AGENCY INPUT FILE: B01QK.ASF

SYSTEM PERFORMANCE CRITERIA

Resolution & Breakdown Limits

RESC percent resolution	60.00
PEM percent resolution	90.00
4,4'-DDT percent breakdown	20.00
Endrin percent breakdown	20.00
Combined percent breakdown	30.00

No problems found for this qualification.

secondary m/e intensities within 20% of that in the standard compound. For the

tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

VOA: No Problems

BNA: N o Problems

PEST./PCBs: No Problems

B) Pesticide Fraction:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds l0 ng/ml in the final sample extract.

PEST./PCBs: No Problems

9. CONTRACT PROBLEMS NON-COMPLIANCE:

None

10. FIELD DOCUMENTATION:

11. OTHER PROBLEMS:

None

12. Dilutions & Extractions:

This package contains reextractions, reanalyses or dilutions. Upon reviewing the QA results, the following Form 1(s) are identified to not be used.

NONE

DC-136: The following volatile samples are affected by contamination in their corresponding trip blank for the indicated analytes. Hits are qualified "U" and non-detects are not flagged.

B01QK
Acetone

B01QN
Acetone

B01QW
Acetone

B01QX
Acetone

B01QY
Acetone

B01QZ
Acetone

B01T0
Acetone

B01T1
Acetone

B01T1MS
Acetone

B01T1MSD
Acetone

B01T2
Acetone

B01T3
Acetone

B01T4
Acetone

B01TJ
Acetone

B01TK

Acetone

B01TN
Acetone

B01TP
Acetone

DC-339: The following semivolatile samples are not fully qualified for field, trip, bottle, or equipment blanks because of missing information.
Hits and non-detects are not flagged.

B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP

DC-363: The following pesticide samples are not fully qualified for field, trip, bottle, or equipment blanks because of missing information.
Hits and non-detects are not flagged.

B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01TJ, B01TK, B01TN, B01TP

DC-404: The analytes indicated for the following volatile samples are associated with multiple invalid blank results.
Hits and non-detects are not flagged.

1,2-Dibromo-3-chloropropane
B01QK, B01QN, B01QW, B01QX, B01QY, B01QZ
B01T0, B01T1, B01T1MS, B01T1MSD, B01T2, B01T3
B01T4, B01T7, B01TJ, B01TK, B01TN, B01TP

DATA REJECTION SUMMARY

Type of Review: Organic Date:7/24/00 CASE No. 28192

Site Name:Camden Municip[al Wells

Lab Name: MITKEM Reviewer's Initials: HS

Number of Samples: 16 Water

Analytes Rejected Due To Exceeding Review Criteria For:

No. of Compounds/No. of Fractions(Samples)

	Surrogates	Holding Times	Calibra-tion	Contam-ination	ID	Internal Standards	Other	Total # Samples	Total # Rejected/ Total # in All Sampl
VOA(48)	0	0	16	0	0	0	0	16	16 / 768=2.1%
ACID(14)	0	0	0	0	0	0	0	15	0 /210=0.0%
B/N(51)	0	0	0	0	0	0	0	15	0 /765=0.0%
PEST(21)	0	0	0	0	0	0	0	15	0 /315=0.0%
PCB(7)	0	0	0	0	0	0	0	15	0 /105=0.0%

Note: Asterisk * indicates additional exceedance review criteria.

Analytes Estimated Due To Exceeding Review Criteria For:

No. of Compounds/No. of Fractions (Samples)

	Surrogates	Holding Times	Calibra-tion	Contam-ination	ID	Internal Standards	Clean-up	Total # Samples	Total # Estimated Total # in All Sa
VOA(33)	0	O	18	0	O	0	0	16	18/768=2.3%
ACID(14)	0	0	0	0	0	0	0	15	0 /210=0.0%
B/N(50)	0	0	0	0	0	0	0	15	0 /765=0.0%
PEST(21)	0	0	45	0	0	0	0	15	45 /315=14.2%
PCB(7)	0	0	0	0	0	0	0	15	0 /105=0.0%

Note: Asterisk * indicates additional exceedance criteria.

TPO: [ ]ACTION [X]FYI REGION II

ORGANIC REGIONAL DATA ASSESSMENT SUMMARY

CASE/SAS NO.: 228192 LABORATORY: COMPUCHEM

SDG NO.: B01QK DATA USER: EPA Region II

SOW: OLMO4.2 REVIEW COMPLETION DATE: 7/24/00

NO. OF SAMPLES: 16 WATER _____OTHER

REVIEWER: [X] DESA [ ] ESAT [ ] OTHER, CONTRACTOR
_____EPA_____

QC ITEM	VOA	BNA	PEST
HOLDING TIMES	O	O	O
GC-MS PERFORMANCE	O	O	O
INITIAL CALIBRATIONS	O	O	M
CONTINUING CALIBRATIONS	X	O	O
FIELD BLANKS(F = N/A)	O	O	O
LABORATORY BLANKS	O	O	O
SURROGATES	O	O	O
MATRIX SPIKE/DUPLICATES	O	O	O
QC SAMPLES(LCS, PVS)	O	O	O
INTERNAL STANDARDS	O	O	O
COMPOUND IDENTIFICATION	O	O	O
COMPOUND QUANTITATION	O	O	O
SYSTEM PERFORMANCE	O	O	O
OVERALL ASSESSMENT	X	O	M

O - No problems or minor problems that do not affect data usability.
X - No more than about 5% of the data points are qualified as either estimated or unusable.
M - More than about 5% of the data points are qualified as either estimated or unusable.
Z - More than about 5% of the data points are qualified as unusable.

DPO ACTION ITEMS:

AREAS OF CONCERNS:

SOP NO. HW-6

Revision #11

May 1996

CLP ORGANICS DATA REVIEW AND PRELIMINARY REVIEW (CLP/SOW OLMO 3.2)

By: George Karras — Date: 6/12/96
George Karras, Work Assignment Manager/Chemist
Toxic and Hazardous Waste Section

By: Karen Taylor — Date: 6/17/96
Karen Taylor, Chemist
Toxic and Hazardous Waste Section

CONCURRED BY: Kevin W. Kubik — Date: 6/18/96
Kevin Kubik, Chief
Toxic and Hazardous Waste Section

APPROVED BY: Robert A. Runyon — Date: 6/18/96
Robert Runyon, Chief
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Organic Regional Data Assessment Summary Form . . . Attachment 2

Data Rejection Summary Form . . . . . Attachment 3

INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the methods in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis OLM03.2," August 1994. The validation methods and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," February 1994. This document attempts to cover technical as well as contractual problems specific to each fraction and sample matrix; however, situations may arise where data limitations must be assessed based on the reviewer's professional judgement.

In addition to technical requirements, contractual requirements are also covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

Summary of Method

To ensure a thorough evaluation of each result in a data case, the reviewer must complete the checklist within this SOP, answering specific questions while performing the prescribed "ACTIONS" in each section. Qualifiers (or flags) are applied to questionable or unusable results as instructed. The data qualifiers discussed in this document are defined on page 4 of the National Functional Guidelines mentioned above.

The reviewer must prepare a detailed data assessment to be submitted along with the completed SOP checklist. The Data Assessment must list all data qualifications, reasons for qualifications, instances of missing data and contract non-compliance. This information is further summarized on the Organic Regional Data Assessment Summary and Data Rejection Summary forms (see attached).

Reviewer Qualifications

This SOP is intended for use by organic data validators who have successfully completed the USEPA Region II data validation training program. Data reviewers must possess a working knowledge of the USEPA Statement of Work and National Functional Guidelines mentioned above.

DEFINITIONS

Acronyms

BFB - bromofluorobenzene
BHC - benzene hexachloride
BNA - base neutral acid
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
%D - percent difference
DCB -decachlorobiphenyl
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenylethane
DDT - dichlorodiphenyltrichloroethane
GC - gas chromatography
GC/EC - gas chromatograph/electron capture detector
GC/MS - gas chromatograph/mass spectrometer
GPC - gel permeation chromatography
IS - internal standard
kg - kilogram
µg - microgram
MAGIC - Mainframe Access Graphical Interface with CARD
MS - matrix spike
MSD - matrix spike duplicate
ℓ - liter
mℓ - mililiter
PCB - polychlorinated biphenyl
PE - performance evaluation
PEM - Performance Evaluation Mixture
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - average relative response factor (from initial calibration)
RRT - relative retention time
RSD - relative standard deviation
RT - retention time
RSCC - Regional Sample Control Center
SDG - sample delivery group
SMC - system monitoring compound
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic analysis
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TCX -tetrachloro-m-xylene
TIC - tentatively identified compound

Acronyms (cont'd.)

TPO - technical project officer
VOA - volatile organic analysis
VTSR - validated time of sample receipt

Data Qualifiers

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J - The analyte was positively dienrified; the associated numerical value is the approximate concentration of the analyte in the sample.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."

NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality contrrol criteria. The presence or absence of the analyte cannot be verified.

YES NO N/

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: 28192 LABORATORY: MITKEM

SITE NAME: Camden Municipal Wells SDG Number(s): B01QK

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? ☑ ___ ___

ACTION: If no, contact RSCC or the lab to obtain replacement of missing or illegible copies.

1.2 Is the Sampling Trip Report present for all samples and all fractions? ☑ ___ ___

ACTION: If no, contact either RSCC or ask the prime contractor to provide this information.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ✓ ___

NOTE: The lab is required to submit data for only two analyses, for each fraction. (i.e., the original sample and one dilution, or the most concentrated dilution analyzed and one further dilution.)

ACTION: Contact the lab to obtain an explanation or resubmittal of any missing deliverables. If lab cannot provide them, note the effect on the review of the package in the Contract Problems/Non-compliance section of the Data Assessment and the Organic Regional Data Assessment Summary form.

2.2 Was CLASS CCS checklist included with package? [ ] ✓ ___

2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Report and Sample Tags? ☑ [ ] ___

ACTION: If yes, contact the lab to obtain an explanation or resubmittal of any missing deliverables.

	YES	NO	N/A
3.0 Cover Letter SDG Narrative			
3.1 Is the Narrative or Cover Letter Present?	[✓]		
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.6.1)?	[✓]		
3.3 Does the narrative contain the following information:			
VOA: description of trap and columns used during sample analyses?	[✓]		
BNA: description of columns used during sample analyses?	[✓]		
Pest: description of columns used during sample analyses?	[✓]		
NOTE: As per section 6.23.3.1 SOW/p. D-11/Pest, Packed columns are not permitted.			
3.4 Does the narrative, VOA and BNA sections, contain a list of all TICs identified as alkanes and their estimated concentrations?	[ ]	[✓]	
3.5 Does the narrative contain a record of all cooler temperatures? If the temperature of a cooler was exceeded, > 10° C, the lab must list by fraction and sample number, all affected samples.	[ ]	[✓]	
3.6 Does the narrative contain a list of the pH values determined for each water sample submitted for volatile analysis (SOW Exhibit B, section 2.6.1.2)?	[✓]		
3.7 Does the Case Narrative contain the statement, "verbatim", as required in Section B of the SOW?	[ ]		

ACTION: If "No", to any question in this section, contact the lab to obtain all necessary resubmittals. If information is not available, document in the Data Assessment under Contract Problems/Non-Compliance section.

	YES	NO	N/A
4.0 Data Validation Checklist			
4.1 Check the package for the following discrepancies:			
a. Is the package paginated in ascending order starting from the SDG narrative?	✓		
b. Are all forms and copies legible?	✓		
c. Is each fraction assembled in the order set forth in the SOW?	✓		
d. Is a Sample Data Summary Package submitted immediately preceding the Sample Data Package?	✓		
The following checklist is divided into three parts. Part A is for any VOA analyses, Part B is for BNAs and Part C is Pesticide/PCBs.			
Does this package contain:			
VOA Data?	✓		
BNA Data?	✓		
Pesticide/PCB data?	✓		

ACTION: Complete corresponding parts of checklist.

YES NO N/A

PART A: VOA ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50% - 90% water, all data should be flagged as estimated (J). If a soil sample other than TCLP contains more than 90% water, all data should be qualified as unusable (R).

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the cooler temperature was elevated (> 10° C), then flag all positive results with a "J" and all non-detects "UJ".

ACTION: If both VOA vials for a sample have air bubbles or the VOA vial analyzed had air bubbles, flag all positive results "J" and all non-detects "R".

ACTION: The smallest soil size permitted is 0.5g. If any soil sample is smaller than 0.5g, document in the Data Assessment under Contract Problems/Non-Compliance.

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded? ___ ✓ ___

Technical Holding Times: If unpreserved, aqueous samples, maintained at 4° C for aromatic hydrocarbons analysis must be analyzed within 7 days of collection. If preserved with HCl (pH < 2) and stored at 4° C, then aqueous samples must be analyzed within 14 days of collection. If uncertain about preservation, contact sampler to determine whether or not samples were preserved. The holding time for soils is 10 days from date of collection.

YES NO N/

Table of Holding Time Violations
(See Chain-of-Custody Records)

Sample ID	Sample Matrix	Was Sample Preserved?	Date Sampled	Date Lab Received	Date Analyzed

ACTION: If technical holding times are exceeded, flag all positive results as estimated "J" and sample quantitation limits as estimated "UJ", and document in the Data Assessment that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all results must be qualified "J", but the reviewer may determine that non-detect data are unusable "R". If holding times are exceeded by more than 28 days, all non detect data are unusable "R".

NOTE: Contractual Holding Times: Analysis of water and soil/sediment samples must be completed within 10 days of Validated Time of Sample Receipt (VTSR). This requirement does not apply to Performance Evaluation (PE) samples.

ACTION: If contractual holding times are exceeded, document in the Data Assessment and on the Organic Regional Data Assessment Summary form.

NOTE: The data reviewer must note in the Data Assessment whether or not technical and contractual holding times were met.

	YES	NO	N/A
3.0 System Monitoring Compound (SMC) Recovery (Form II)			
3.1 Are the VOA SMC Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water?	[✓]		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓
3.2 Are all the VOA samples listed on the appropriate System Monitoring Compound Recovery Summary for each of the following matrices:			
a. Low Water?	[✓]		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓
ACTION: Contact the lab to obtain an explanation or resubmittal of any missing deliverables. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.3 Were outliers marked correctly with an asterisk?	[ ]		✓
ACTION: Circle all outliers with red pencil.			
3.4 Was one or more VOA system monitoring compound recovery outside of contract specifications for any sample or method blank?		[✓]	
If yes, were samples re-analyzed?	[ ]		
Were method blanks re-analyzed?	[ ]		✓

ACTION: If recoveries are ≥ 10%, but 1 or more compounds fail to meet SOW specifications:

1. All positive results are qualified as estimated "J".

2. Flag all non-detects as estimated detection limits "UJ" where recovery is less than the lower acceptance limit.

YES NO N/A

3. If SMC recoveries are above allowable levels, do not qualify non-detects.

If any system monitoring compound recovery is < 10%:

1. Flag all positive results as estimated "J".

2. Flag all non-detects as unusable "R".

Professional judgement should be used to qualify data that only have method blank SMC recoveries out of specification in both original and re-analyses. Check the internal standard areas.

NOTE: Contractual requirements state that if any SMC fails the acceptance criteria, the sample must be re-analyzed. If the affected sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance and in the Organic Regional Data Assessment Summary.

NOTE: The laboratory must submit the following data:

1. If SMC recoveries and internal standard responses meet the acceptance criteria in the re-analyzed sample, then the laboratory must submit only the re-analysis.

2. If an SMC recovery and/or internal standard response fails to meet the acceptance criteria upon re-analysis, then submit data from both analyses.

(Refer to section 11.4.3.2, page D-46/VOA of the SOW for more information.)

3.5 Are there any transcription/calculation errors between raw data and Form II? ___ ✓ ___

ACTION: If large errors exist, contact the lab to obtain an explanation or resubmittal of corrected deliverables. Make any necessary corrections and note the effect in the Data Assessment.

	YES	NO	N/A
4.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	✓		
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water?	✓		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓

ACTION: If any matrix spike data are missing, take the action specified in section 3.2 above.

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils
0 out of 10	_____ out of 10

4.4 How many RPDs for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
0 out of 5	_____ out of 5

ACTION: No action is taken based upon MS/MSD data alone. However, using informed professional judgement, the MS/MSD results may be used in conjunction with other QC criteria to determine the need for qualification of the data.

ACTION: Circle all outliers with red pencil.

	YES	NO	N/A
5.0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[✓]		
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each SDG or every 20 samples of similar matrix (low water, low soil or medium soil), whichever is more frequent?	[ ]		

	YES	NO	N/
5.3 Has a VOA method blank been analyzed at least once every twelve hours for each concentration level and GC/MS system used?	✓		
5.4 Was a VOA instrument blank analyzed after each sample/dilution which contained a target compound that exceeded the initial calibration range?			✓
5.5 Was a VOA storage blank analyzed at the end of all samples for each SDG in a case?	✓		

ACTION: If any method/instrument blank data are missing, contact the lab to obtain any missing deliverables. If method blank data are not available, reject "R" all associated positive data. However, using professional judgement, the data reviewer may substitute field blank or trip blank data for missing method blank data.

If any instrument blank analyzed after a sample with high concentration is missing, contact the lab to obtain any missing deliverables. If the instrument blank was not analyzed or not available, inspect the chromatogram of the sample analyzed immediately after this analysis for possible carryover. Use professional judgement to determine if any contamination occurred and qualify analyte(s) accordingly.

If storage blank data is missing, contact the lab to obtain any missing deliverables. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.

5.6 The validator should verify that the correct identification scheme for the EPA Blank samples were used. See page B-33, section 3.3.7.3 of the SOW for further information.

	YES	NO	N/
Was the correct identification scheme used for all VOA blanks?	✓		

ACTION: Contact the lab to obtain missing deliverables, or make the required corrections on the forms. Document in the Data Assessment under Contract Problems/Non-compliance if corrections were made by the validator.

	YES	NO	N/A
5.7 Chromatography: review the blank raw data-chromatograms (RICs), quant. reports or data system printouts and spectra. Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	✓		

ACTION: Use professional judgement to determine the effect on the data.

5.8 Are all detected hits for target compounds in method, instrument and storage blanks less than the CRQL for that analyte?	✓		

Exception: Acetone and 2-butanone must be less than 5 times the CRQL, and methylene chloride must be less than 2.5 times its CRQL.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

NOTE: "Water blanks", "drill blanks", and "distilled water blanks" are validated like any other sample, and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent/storage blanks have positive results (TCL and/or TIC) for VOAs?		✓	

NOTE: When applied as directed in the table below, the contaminant concentration in these blanks are multiplied by the sample dilution factor and corrected for %moisture when necessary.

NOTE: A contaminated instrument blank is not allowable under this SOW. See page D-48/VOA, section 12.1.2.4 for additional information. Document in the Data Assessment under Contract Problems/Non-Compliance if contaminated instrument blank was submitted.

trip blank → acetone =73

6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	✓		

YES NO N

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped and are not required for non-aqueous matrices. Blanks may not be qualified because of contamination in another blank. Field Blanks & Trip Blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated, all associated data should be qualified as unusable "R".

For:	Flag sample result with a "U" when:	Report CRQL & qualify "U" when:	No qualification is needed when:
Methylene Chloride Acetone Toluene 2-Butanone	Sample conc. is > CRQL, but ≤ 10× blank value.	Sample conc. is < CRQL and ≤ 10× blank value.	Sample conc. is > CRQL and > 10× blank value.
Other Conta-minants	Sample conc. is > CRQL, but ≤ 5× blank value.	Sample conc. is < CRQL and ≤ 5× blank value.	Sample conc. is > CRQL and > 5× blank value.

NOTE: Analytes qualified "U" for blank contamination are still considered as "hits" when qualifying for calibration criteria.

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R".

	YES	NO	N/A
6.3 Are there field/rinse/equipment blanks associated with every sample?	[ ]		✓

ACTION: For low level samples, note in the Data Assessment that there is no associated field/rinse/equipment blank. For samples with high concentrations of suspected blank contaminants, use professional judgement to qualify these values and make a note in the Data Assessment.

Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	✓		
7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[ ]	✓	
7.3 Has an instrument performance check been analyzed for every analytical sequence on each instrument?	✓		

ACTION: List date, time, instrument ID, and sample numbers for which associated GC/MS tuning data are unavailable.

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: Notify the lab to obtain missing data, if possible. If the lab cannot provide the missing data, reject, "R", all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundances been normalized to m/z 95 as specified in Exhibit D, page D-56/VOA?	✓		

NOTE: All ion abundance ratios must be normalized to m/z 96, the nominal base peak, even though the

	YES	NO	N/A
ion abundance of m/z 174 may be up to 120% that of m/z 95.			
ACTION: If mass assignment is in error, qualify all associated data as unusable "R".			
7.5 Have the ion abundance criteria been met for each instrument used?	✓		
ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).			
ACTION: If ion abundance criteria are not met, the Region II TPO must be notified.			
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values, but if errors are found check more.)		✓	
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given for each ion in the ion abundance criteria column?	✓		
ACTION: If large errors exist, take action as specified in section 3.5 above.			
7.8 Are the spectra of the mass calibration compound acceptable?	✓		
ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.			

8.0 Target Compound List (TCL) Analytes (FORM I VOA)

	YES	NO	N/A
8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:			
a. Samples and/or fractions as appropriate?	✓		
b. Matrix spikes and matrix spike duplicates?	✓		
c. Blanks?	✓		
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (quant. reports) included in the sample package for each of the			

	YES	NO	N/A
following:			
a. Samples and/or fractions as appropriate?	[✓]	___	___
b. Matrix spikes and matrix spike duplicates (mass spectra not required)?	[✓]	___	___
c. Blanks?	[✓]	___	___
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the quant. report?	[✓]	___	___
8.4 Is chromatographic performance acceptable with respect to:			
a. Baseline stability?	[✓]	___	___
b. Resolution?	[✓]	___	___
c. Peak shape?	[✓]	___	___
d. Full-scale graph (attenuation)?	[✓]	___	___
e. Other: _____?	[ ]	___	___
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	___	___
ACTION: If any mass spectra are missing, take action as specified in 3.2 above. If the lab does not generate its own standard spectra, document in the Contract Problems/Non-compliance section of the Data Assessment and the Organic Regional Data Assessment Summary.			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___

	YES	NO	N/A
8.8 Do sample and standard relative ion intensities agree within ±20%?	✓		

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected "R", flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected "U" at the calculated detection limit. In order to be positively identified, the data must comply with the criteria listed in 8.6, 8.7, and 8.8.

ACTION: When sample carry-over is suspected, use professional judgement determine if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

	YES	NO	N/A
9.1 Are all Tentatively Identified Compound Forms (Form I Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier?	✓		
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:	No TICs detected		
a. Samples and/or fractions as appropriate?			✓
b. Blanks?			✓
c. Alkanes listed for each sample?			✓

ACTION: If any TIC data are missing, take action specified in 3.2 above.

ACTION: Add "JN" qualifier to all chemically named TICs, if missing.

	YES	NO	N/A
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds? (Example: 1,2- dimethylbenzene is xylene, a VOA TCL analyte, and should not be reported as a TIC.)			✓

ACTION: Flag with "R" any TCL compound listed as a TIC.

	YES	NO	N/A
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[ ]		✓
9.5 Do TIC and "best match" standard relative ion intensities agree within ±20%?	[ ]		✓

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined an incorrect identification was made, change the identification to "unknown," or to some less specific identification as appropriate. (Example: "C3 substituted benzene.")

Also, when a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable "R". (E.g., Common Lab Contaminants: CO_2 (M/E 44), siloxanes (M/E 73) hexane, aldol condensation products, solvent preservatives, and related by-products - see the National Functional Guidelines for further guidance.)

	YES	NO	N/A
9.6 Are TICs with responses < 10% of the internal standard (as determined by inspection of the peak areas or height) reported?		[ ]	✓

ACTION: If yes, cross out questionable TIC(s).

10.0 Compound Quantitation and Reported Detection Limits

	YES	NO	N/A
10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRF were used to calculate Form I results.)		[✓]	
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	[ ]		✓ No Dilutions

ACTION: If errors are large, take action as specified in section 3.5 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample). Replace

YES NO N/A

concentrations that exceeded the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from the diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form Is not to be used, including any in the data summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete at concentrations of 10, 20, 50, 100, 200ng for separate calibrations of low water/med soils (unheated purge) and low soils (heated purge)? [✓] ___

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Were all low level soil standards, blanks and samples analyzed by heated purge? [ ] ___ [✓]

ACTION: If low level soil samples were not heated during purge, qualify positive hits "J" (estimated) and non-detects "R".

12.3 Are the % relative standard deviation (%RSD) values for VOAs ≤ 30% over the concentration range of the calibration? [✓] ___ ___

NOTE: Although 11 VOA compounds have a contractual minimum RRF and no maximum %RSD, the technical acceptance criteria are the same for all analytes.

ACTION: Circle all outliers with red pencil.

ACTION: If %RSD is > 30.0%, qualify associated positive results for that analyte "J" (estimated) and non-detects using professional judgement. When

YES NO N/A

%RSD is > 90%, flag all non-detects for that analyte "R" (unusable) and positive hits "J".

NOTE: Analytes previously qualified "U" for blank contamination are still considered as "hits" when qualifying for initial calibration criteria.

1, 2, dibromo-3 chloro propane

12.4 Are any average RRFs < 0.05? [✓] [ ] ___

ACTION: Circle all outliers with red pencil.

ACTION: If the average RRF is < 0.05, then qualify associated non-detects with an "R" and flag associated positive data as estimated "J".

NOTE: Contract Requirement: The SOW allows up to two of the required analytes to fail contractual %RSD or RRF criteria, provided the %RSD is ≤ 40% and RRF is ≥ 0.010. (See Table 5, page D-59/VOA and analytes marked with a "." on Form VI for required analytes and contractual criteria.) Technical criteria, however, are the same for all analytes.

ACTION: If more than two analytes failed %RSD or RRF criteria, document in the Data Assessment under Contract Problems/Non-Compliance and the Organic Regional Data Assessment Summary.

12.5 Are there any transcription/calculation errors in the reporting of average relative response factors (RRF) or %RSD? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, contact the lab to obtain an explanation/resubmittal, document in the Data Assessment under Contract Problems/Non-Compliance and in the Organic Regional Data Assessment Summary.

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for separate calibration of low water/med soil and low soil samples? [✓] ___ ___

13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample

	YES	NO	N/A
analysis per instrument?	[ ]		

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, contact the lab to request an explanation/resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable "R".

ACTION: List below all sample(s) that were not analyzed within twelve hours of the previous continuing calibration.

_____

_____

_____

13.3 Do any volatile compounds have a percent difference (%D) between the initial and continuing RRF which exceeds the ±25% criteria?	✓	[ ]	

NOTE: Although 11 VOA compounds have a contractual minimum RRF and no maximum %D, the technical acceptance criteria are the same for all analytes.

ACTION: Circle all outliers with red pencil.

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated. When %D is > 90%, qualify all non-detects for that analyte unusable (R) and positive results estimated (J).

13.4 Are any continuing calibration RRFs < 0.05?	✓	[ ]	

ACTION: Circle all outliers with red pencil.

ACTION: If the RRF is < 0.05, qualify the associated non-detects as unusable "R" and the associated positive values "J".

NOTE: Contract Requirement: The SOW allows up to two of the required analytes to fail contractual %D and RRF criteria, provided that the %D is ≤ 40% and the RRF is ≥ 0.010. (See Table 5 pg. D-59/VOA or

YES NO N/A

analytes marked with a "." on Form VI for required analytes.) Technical criteria however, are the same for all analytes.

ACTION: If more than two analytes failed %D and RRF, criteria document in the Data Assessment under contract Problems/Non-Compliance and on the Organic Regional Data Assessment Summary form.

13.5 Are there any transcription/calculation errors in the reporting of RRF or %D between initial and continuing RRFs? (Check at least two values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, contact the lab to obtain an explanation/resubmittal, document in the Data Assessment under Contract Problems/Non-Compliance.

14.0 Internal Standard (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to +100%) for each continuing calibration? [✓] ___ ___

If no, was the sample re-analyzed? [ ] ___ ___

ACTION: 1. Circle all outliers with red pencil.

2. List all the outliers below.

Sample #	Internal Std.	Area	Lower/Upper Limit
			/
			/
			/
			/

(Attach additional sheets if necessary, or attach copies of Form VIIIs.)

ACTION: If any sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

YES NO N/A

ACTION: 1. If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results quantitated with this internal standard.

2. Do not qualify non-detects when associated IS area counts are > 100%.

3. If the IS area in the sample is below the "lower limit," < 50%, qualify all analytes associated with that IS estimated, "J". If the area counts are extremely low, < 25% of the area in the 12 hour standard, or if performance exhibits a major abrupt drop- off, flag all associated non-detects as unusable, "R", and positive hits estimated, "J".

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

NOTE: Contractual requirements state that if any internal standard fails the acceptance criteria, the sample must be re-analyzed. If the affected sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

NOTE: See Notes in section 3.4, page 7 for a description of sample data the laboratory must submit.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for VOA analysis? [✓] ___ ___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

YES NO N/A

PART B: BNA ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody records or laboratory SDG Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50% - 90% water, all data should be flagged as estimated "J". If a soil sample, other than TCLP, contains more than 90% water, all data should be qualified as unusable "R".

ACTION: If samples were not iced or if the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10° C), flag all positive results "J" and all non-detects "UJ".

2.0 Holding Times

2.1 Have any BNA technical holding times, determined from date of collection to date of extraction, been exceeded? ___ [✓] ___

Technical Holding Time: Continuous extraction of water samples for BNA analysis must be started within seven days of the date of collection. Soil/sediment samples must be extracted within 7 days of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations
(See Chain-of-Custody Records)

Sample Analyzed	Sample Matrix	Date Sampled	Date Lab Received	Date Extracted	Date Analyzed

YES NO N/A

ACTION: If technical holding times were exceeded, flag all positive results as estimated (J) and sample quantitation limits as estimated (UJ), and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on sample results. At a minimum, all results should be qualified "J", but the reviewer may determine that non-detect data are unusable "R". If holding times were exceeded by more than 28 days, all non-detect data must be qualified "R", unusable.

NOTE: Contractual Holding Times: Extraction of water samples must be started within 5 days VTSR. Soil/sediment samples must be extracted within 10 days of VTSR. This requirement does not apply to Performance Evaluation (PE) samples. Water and soil/sediment extracts must be analyzed within 40 days following extraction.

ACTION: If contractual holding times are exceeded, document in the Data Assessment and on the Organic Regional Data Assessment Summary form.

NOTE: The data reviewer must note in the Data Assessment whether or not technical and contractual holding times were met.

3.0 Surrogate Recovery (Form II)

3.1 Are BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water? [✓] ___ ___

b. Low Soil? [ ] ___ ✓

c. Med Soil? [ ] ___ ___

3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water? [✓] ___ ___

b. Low Soil? [ ] ___ ✓

	YES	NO	N/A
c. Med Soil?	[ ]		✓

ACTION: Contact the lab for an explanation or resubmittal of any missing deliverables. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.3 Were outliers marked correctly with an asterisk?	[ ]		✓

ACTION: Circle all outliers with red pencil.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?		[✓]	
If yes, were samples reanalyzed?	[ ]		✓
Were method blanks reanalyzed?	[ ]		✓

ACTION: If all BNA surrogate recoveries are ≥ 10%, but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. acid or base-neutral compounds):

1. Flag all positive results as estimated (J).

2. Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.

3. Do not qualify non-detects if recoveries are greater than the upper acceptance limit.

If any base-neutral or acid surrogate has a recovery of < 10%:

1. Qualify positive results for that fraction as estimated (J).

2. Qualify non-detects for that fraction as unusable (R).

Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and reanalyses. Check the internal standard areas.

	YES	NO	N/A

NOTE: Contractual requirements state that if any surrogate fails acceptance criteria, the sample must be re-analyzed. If sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

NOTE: The laboratory must submit the following data:

1. If surrogate recoveries and internal standard responses meet the acceptance criteria in the re-analyzed sample, then the laboratory must submit only the re-analysis.

2. If surrogate recoveries and/or internal standard responses fail to meet the acceptance criteria upon re-analysis, then submit data from both analyses.

3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[✓]	___

ACTION: If large errors exist, contact the lab for an explanation or resubmittal of corrected deliverables. Make necessary corrections and note errors in the Data Assessment.

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	[✓]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water?	[✓]	___	___
b. Low Soil?	[ ]	___	✓
c. Med Soil?	[ ]	___	✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

4.3 How many BNA spike recoveries are outside QC limits?

Water	Soils
~~0~~ 1 out of 22	____ out of 22

YES NO N/A

4.4 How many RPDs for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water: 1 out of 11 Soils: ____ out of 11

ACTION: No action is taken based upon MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the matrix spike and matrix spike duplicate results in conjunction with other QC criteria and determine the need for some qualification of the data.

ACTION: Circle all outliers with red pencil.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [✓] ___ ___

5.2 Frequency of Analysis: Has a reagent/method blank analysis been reported per 20 samples of similar matrix, or concentration level, and for each extraction batch? [ ] ___ ___

5.3 Has a BNA method blank been analyzed for each GC/MS system used? (See SOW pg. D-54/SVOA, Section 12.1.2.) [✓] ___ ___

ACTION: If any method blank data are missing, contact the lab to obtain an explanation/resubmittal. If resubmittals are unavailable, use professional judgement to determine if the associated sample data should be qualified.

5.4 The validator should verify that the correct identification scheme for the EPA Blank samples were used. See page B-33, sec. 3.3.7.3 of the SOW for further information.

Was the correct identification scheme used for all BNA blanks? [✓] ___ ___

ACTION: Contact the lab to obtain resubmittals, or make the required corrections on the forms. Document all corrections made by the validator in the Data Assessment under Contract Problems/Non-Compliance.

YES NO N/

5.5 Chromatography: review the blank raw data - chromatograms (RICs), quant. reports or data system printouts and spectra. Is the chromatographic performance (baseline stability) acceptable for each instrument? [✓] ___ ___

ACTION: Use professional judgement to determine the effect on the data.

5.6 Are all detected hits for target compounds less than the CRQL for that analyte in all method blanks? [ ] ___ [✓]

Exception: Phthalate esters must be less than five times (5x) the CRQL.

6.0 Contamination

NOTE: "Water blanks", "drill blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/reagent blanks have positive results (TCL and/or TIC)? ___ [✓] ___

NOTE: Water: When applied as directed in the table below (page 29), the contaminant concentration in method/instrument/reagent blanks is multiplied by the sample dilution factor, where necessary.

Soil: If the lab has not already done so, the contaminant concentration in soil blanks is multiplied by 33 times the sample dilution factor and corrected for %moisture (fraction of solid) where necessary. 30 grams of sodium sulfate (1 gram for medium level soils) are used to prepare the soil reagent/method blank as instructed on page D-54/SVOA, section 12.1.3. Contact the lab to obtain resubmittals if the soil blanks are not reported in soil units (µg/kg).

6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)? ___ [ ] [✓]

ACTION: Prepare a list of samples associated with each contaminated blank. (Attach a separate sheet.)

NOTE: All field blank results associated to a particular group of samples (may exceed one per case) must be

YES NO N/A

used to qualify sample data. Do not convert field blank results to account for the difference in soil CRQLs. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for surrogate, spectral, instrument performance or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If gross contamination exists, all data in the associated samples should be qualified as unusable "R".

For:	Flag sample result with a "U" when:	Report CRQL & qualify "U" when:	No qualification is needed when:
Common Phthalate-Esters	Sample conc. is > CRQL, but ≤ 10× blank value.	Sample conc. is < CRQL and ≤ 10× blank value.	Sample conc. is > CRQL and > 10× blank value.
Other Conta-minants	Sample conc. is > CRQL, but ≤ 5× blank value.	Sample conc. is < CRQL and ≤ 5× blank value.	Sample conc. is > CRQL and > 5× blank value.

NOTE: Analytes qualified "U" for blank contamination are still treated as "hits" when qualifying for calibration criteria.

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] ✓ ✓

ACTION: For low level samples, note in the Data Assessment that there is no associated field/rinse/equipment blank. For analytes with high concentration, use professional judgement on qualification of these values and make a note in the Data Assessment.

Exception: samples taken from a drinking water tap do not have associated field blanks.

A\

YES NO N/A

7.0 GC/MS Instrument Performance Check

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

7.2 Are the enhanced ~~bar gra~~ph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [✓] ___ ___

7.3 Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: List date, time, instrument ID, and sample number for which no associated GC/MS tuning data are valid.

SAMPLE NUMBERS	DATE	TIME	INSTRUMENT ID

ACTION: If the lab cannot provide the missing data, reject "R" all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundances been normalized to m/z 198 (see SOW, page D-61/SVOA)? [✓] ___ ___

NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may up to 110% that of m/z 198.

ACTION: If mass assignment is in error, flag all associated sample data as unusable "R".

7.5 Have the ion abundance criteria been met for each instrument used? [✓] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

	YES	NO	N/A
ACTION: If ion abundance criteria are not met, the Region II TPO must be notified.			
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values, but if errors are found check more.)		✓	
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given for each ion in the ion abundance criteria column?	✓		
ACTION: If large errors exist, take action as specified in section 3.5 above.			
7.8 Are the spectra of the mass calibration compound acceptable?	✓		
ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.			
8.0 Target Compound List (TCL) Analytes (FORM I SV)			
8.1 Are the Organic Analysis Data Sheets (Form I SV) present with required header information on each page, for each of the following:			
a. Samples and/or fractions as appropriate?	✓		
b. Matrix spikes and matrix spike duplicates?	✓		
c. Blanks?	✓		
8.2 Has GPC cleanup been performed on all soil/ sediment sample extracts?			✓
ACTION: If data suggests that GPC was not performed, use professional judgement. Make note in Contract Problems/Non-Compliance section of the Data Assessment and the Organic Regional Data Assessment Summary.			
8.3 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (quant. reports) included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate?	✓		

	YES	NO	N/A
b. Matrix spikes and matrix spike duplicates (mass spectra not required)?	[✓]		
c. Blanks?	[✓]		
ACTION: If any data are missing, take action specified in 3.2 above.			
8.4 Are the response factors shown in the quant. report?	[✓]		
8.5 Is chromatographic performance acceptable with respect to:			
Baseline stability?	[✓]		
Resolution?	[✓]		
Peak shape?	[✓]		
Full-scale graph (attenuation)?	[✓]		
Other:_____?	[ ]		
ACTION: Use professional judgement to determine the acceptability of the data.			
8.6 Are lab-generated standard mass spectra of identified BNA compounds present for each sample?	[✓]		
ACTION: If any mass spectra are missing, take action specified in 3.2 above. Note under Contract Non-compliance if lab does not generate their own standard spectra. If spectra are missing, reject all positive data.			
8.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[ ]		
8.8 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[ ]		
8.9 Do sample and standard relative ion intensities agree within ±20%?	[ ]		
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all			

YES NO N/A

such data should be rejected "R", flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected "U" at the calculated detection limit. In order to be positively identified, the data must comply with the criteria listed in 8.7, 8.8, and 8.9.

ACTION: When sample carry-over is a possibility, professional judgement should be used to determine if instrument cross-contamination has affected any positive compound identification.

9.0 Tentatively Identified Compounds (TIC)

9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier? [✓] ___ ___

9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:

a. Samples and/or fractions as appropriate? [✓] ___ ___

b. Blanks? [✓] ___ ___

c. Alkanes listed for each sample? [ ] [✓] ___

ACTION: If any TIC data are missing, take action specified in 3.2 above.

ACTION: Add "N" qualifier to all chemically named TICs, if missing.

9.3 Are any TCL compounds (from any fraction) listed as TIC compounds? (Example: 1,2-dimethylbenzene is xylene - a VOA TCL - and should not be reported as a TIC.) ___ [✓] ___

ACTION: Flag with "R" any TCL compound listed as a TIC.

9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum? [✓] ___ ___

9.5 Do TIC and "best match" standard relative ion intensities agree within ±20%? [✓] ___ ___

YES NO N/A

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change the identification to "unknown," or to some less specific identification (example: "C3 substituted benzene") as appropriate. Also, when a compound is not found in any blank, but is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable, "R".

9.6 Are any TICs with responses < 10% of the internal standard (as determined by inspection of the peak areas or height) reported? ___ [✓] ___

ACTION: If yes, cross out questionable TIC(s).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result.) ___ [✓] ___

10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture? No Dilutions or Re-extraction [ ] ___ [✓]

ACTION: If errors are large, take action as specified in section 3.5 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its associated value on the original Form I and substituting the data from the analysis of the diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form Is that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (quant. reports) present for initial and continuing calibration? [✓] ___ ___

	YES	NO	N/A

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction?	[✓]		

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are the % relative standard deviation (%RSD) values for BNAs ≤ 30% over the concentration range of the calibration?	[✓]		

ACTION: Circle all outliers with red pencil.

NOTE: Although 21 BNA compounds have a contractual minimum RRF and no maximum %RSD, the technical criteria are the same for all analytes.

NOTE: Eight BNA compounds do not require a 20ng standard. Refer to SOW section 7.2.4.5.1, page D-15/SVOA for a list of required compounds and contractual criteria.

ACTION: If the %RSD is > 30.0%, qualify positive results for that analyte "J" and non-detects using professional judgement. When %RSD is > 90%, flag all non-detect results for that analyte "R" (unusable) and all positive results "J" (estimated).

NOTE: Analytes previously qualified "U" due to blank contamination are still considered as "hits" when qualifying for calibration criteria.

12.3 Are any average RRFs < 0.05?		[✓]	

ACTION: Circle all outliers with red pencil.

ACTION: If the average RRF is < 0.05 then:

1. "R" all non-detects.
2. "J" all positive results.

12.4 Are there any transcription/calculation errors in the reporting of RRFs and/or %RSDs? (Check at least two values; if errors are found check more.)		[✓]	

YES NO N/A

ACTION: Circle errors with red pencil.

ACTION: If errors are large, take action as specified in section 3.5 above.

NOTE: Contract Requirement: The SOW allows up to four of the required analytes to fail contractual %RSD or RRF criteria provided the %RSD is ≤ 40% or RRF is ≥ 0.010. (See Table 5, page D-66/SVOA and analytes marked with a "." on Form VI for a list of required analytes and contractual criteria.) Technical criteria, however, are the same for all analytes.

ACTION: If more than four analytes fail %RSD or RRF criteria, document in the Data Assessment under Contract Problems/Non-Compliance and on the Organic Regional Data Assessment Summary form.

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction? ✓ ___ ___

13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument? ✓ ___ ___

ACTION: List below all sample analyses that were not analyzed within twelve hours of a continuing calibration standard for each instrument used.

_____

_____

_____

ACTION: If any forms are missing, or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, contact the lab to obtain an explanation/resubmittal. If continuing calibration data are unavailable, flag all associated sample data as unusable "R".

13.3 Does any BNA compound have a percent difference (%D) between the initial and continuing calibration RRFs which exceeds the ±25.0% criteria? ___ ✓ ___

YES NO N/A

ACTION: Circle all outliers with red pencil.

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated "J". When %D is > 90%, reject all non-detects for that analyte, "R", and qualify positive results "J" (estimated).

13.4 Are any continuing RRFs < 0.05? ___ [✓] ___

ACTION: Circle all outliers with red pencil.

ACTION: If the RRF is < 0.05, qualify as unusable (R) associated non-detects and "J" associated positive values.

NOTE: Contract Requirement: The SOW allows up to four of the required analytes to fail contractual %D and RRF criteria, provided that the %D is ≤ 40% and the RRF is ≥ 0.010. (See Table 5 page D-66/SVOA or analytes marked with a "." on Form VI for a list of the required analytes.) Technical criteria, however, are the same for all analytes.

ACTION: If more than four analytes failed %D and RRF criteria, document in the Data Assessment under Contract Problems/Non-Compliance and on the Organic Regional Data Summary Form.

13.5 Are there any transcription/calculation errors in the reporting of average relative response factors (RRF) or %difference (%D) between initial and continuing RRFs? (Check at least two values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, take action as specified in section 3.5 above.

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to +100%) for each continuing calibration? [✓] ___ ___

If no, was sample re-analyzed? [ ] ___ [✓]

YES NO N

ACTION: 1. Circle all outliers with red pencil.

2. List all the outliers below.

ACTION: If sample was not reanalyzed, document in Data Assessment in Contract Problems/Non-Compliance.

Sample #	Internal Std.	Area	Lower/Upper Limit
			/
			/
			/
			/

(Attach additional sheets if necessary.)
(or attach copies of Form VIIIs)

ACTION: 1. If the internal standard area count is outside the "upper" or "lower" limit, flag with "J" all positive results and non-detects quantitated with this internal standard.

2. Do not qualify non-detects associated with IS area > 100%.

3. If the IS area in the sample is < 50%, qualify all analytes associated with that IS estimated (J). If area counts are extremely low (< 25% of the area in the 12 hour standard), or if performance exhibits a major abrupt drop-off, flag all associated non-detects as unusable (R) and positive hits estimated (J).

14.2 **Are the retention times of the internal standards within 30 seconds of the associated calibration standard?** ✓ ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

NOTE: Contractual requirements state that if any internal standard fails the acceptance criteria, the sample must be re-analyzed. If the affected sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

YES NO N/A

NOTE: See Notes in section 3.4, page 24 for a description of sample data the laboratory must submit.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for BNA analysis? ✓ ___ ___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

YES NO N/A

PART C: PESTICIDE/PCB ANALYSIS

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records or SDG Narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50% - 90% water, all data should be qualified as estimated "J". If a soil sample, other than TCLP, contains more than 90% water, all data should be qualified as unusable "R".

ACTION: If samples were not iced, or if the ice was melted upon arrival at the laboratory, and the temperature of the cooler was elevated > 10^0 C, flag all positive results "J" and all non-detects "UJ".

ACTION: Check aqueous extraction log for sample pH, if adjustment was needed, it should have been noted in the SDG Narrative. If more information is needed, contact the lab.

2.0 Holding Times

2.1 Have any PEST/PCB technical holding times, determined from date of collection to date of extraction, been exceeded? ___ [✓] ___

NOTE: Technical Holding Times: Water and soil samples for PEST/PCB analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated "J" and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of

YES NO N/A

additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable "R".

Table of Holding Time Violations
(See Chain-of-Custody Records)

Sample Analyzed	Sample Matrix	Date Sampled	Date Lab Received	Date Extracted	Date Analyzed

NOTE: Contractual Holding Times: Extraction of water samples must be completed within 5 days VTSR. Soil/sediment samples must be extracted within 10 days of VTSR. This requirement does not apply to Performance Evaluation (PE) samples. Extracts of water and soil/sediment samples must be analyzed within 40 days following start of extraction.

ACTION: If contractual holding times are exceeded, document in the Data Assessment and Organic Regional Data Assessment Summary form.

NOTE: The data reviewer must note in the Data Assessment whether or not technical and contractual holding times were met.

3.0 Surrogate Recovery (Form II)

3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water? [✓] ___ ___

b. Soil? [ ] ___ [✓]

3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summary for each of the following matrices:

	YES	NO	N/A
a. Low Water?	✓		
b. Soil?			✓

ACTION: Contact the lab to obtain an explanation or resubmittal of any missing deliverables. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.3 Were outliers marked correctly with an asterisk?			✓

ACTION: Circle all outliers with red pencil.

3.4 Were surrogate recoveries of TCX or DCB outside of the contract specification for any sample, method blank or sulfur clean-up blank (30-150%)?			

ACTION: In the absence of matrix interference, qualification of the data is not required in the following three situations:

1. When surrogates on both columns are diluted out.

2. When one surrogate on one column was outside (either above or below) the contract limits but above 10%.

3. When the same surrogate on both columns is above the contract limit.

If the same surrogate on both columns is below the contract limit but above 10%, check chromatograms for interference. The reviewer may use professional judgement, and qualify only those analytes which elute in the region of the GC chromatogram where interference was observed.

If the same surrogate on both columns is below the contract limit but above 10% (with no interference), qualify non-detects and positive hits "J" (estimated).

If recoveries for both surrogates on both columns are below the contract limit but above 10%, flag positive results and non-detects for that sample "J".

YES NO N/A

If recoveries are above the contract limit for both surrogates on both columns, then qualify positive values "J".

If both surrogates on one column are below the contract limit but above 10%, then use the data from the other column, providing both surrogates on that column are within contract limits. The validator must check from which column the concentration is reported for each analyte. If the value is reported from the failed column, then cross it out and use the value from the other column. Document this change in the Data Assessment.

If recovery is below 10% for either surrogate on any column, qualify positive results "J" and flag non-detects "R".

3.5 Were surrogate retention times (RT) within the windows established during the initial 3-point analysis of Individual Standard Mixture A (see Form VI Pest-1)? ☑ ___ ___

ACTION: If the RT limits are not met, positive results and non-detects for that sample may be qualified unusable, "R", based on professional judgement.

3.6 Are there any transcription/calculation errors between raw data and Form II? ___ [ ] ___

ACTION: If large errors exist, contact the lab to obtain an explanation or resubmittal of corrected deliverables. Make any necessary corrections and document the effect in the Data Assessment.

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present? ☑ ___ ___

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices (one MS/MSD must be performed for every 20 samples of similar matrix or concentration level):

a. Low Water? ☑ ___ ___

YES NO N/

b. Soil? [ ] ___ ✓

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.

ACTION: Circle all outliers with red pencil.

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water	Soil
3 out of 12	____ out of 12

4.4 How many RPDs for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soil
3 out of 6	____ out of 6

ACTION: No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the matrix spike and matrix spike duplicate results in conjunction with other QC criteria and determine the need for some qualification of the data.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [✓] ___ ___

5.2 Frequency of Analysis: Has a reagent/method blank been analyzed for each SDG, every 20 samples of similar matrix and concentration level or each extraction batch, whichever is more frequent? [ ] ___ ___

ACTION: If any blank data are missing, take action as specified above in section 3.2. If blank data is not available, reject "R" all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

5.3 A separate Form IV should be present if part of an extraction batch required sulfur removal. In such cases some samples will be listed on two blank summary forms - once under the method

	YES	NO	N/A
blank, and once under the sulfur clean-up blank (PCBLK). Was this additional blank raw data and Form IV submitted when required?	[ ]		
ACTION: If sulfur clean-up blank data and Form IV are missing, take action as specified in 3.2 above.			
5.4 Has a PEST/PCB instrument blank been analyzed at the beginning of every 12 hr. period following the initial calibration sequence (minimum contract requirement)?	[✓]		
ACTION: If any blank data are missing, take action as specified in section 3.2 above.			
5.5 Was the correct identification scheme used for all Pest/PCB blanks? (See page B-33, sec. 3.3.7.3 of the SOW for further information.)	[✓]		
ACTION: Contact the lab to obtain resubmittals or make the required corrections on the forms. Document in the Data Assessment under Contract Problems/Non-Compliance all corrections made by the validator.			
5.6 <u>Chromatography</u>: review the blank raw data - chromatograms, quant. reports and data system printouts. Is the chromatographic performance (baseline stability) for each instrument acceptable?	[✓]		
ACTION: Use professional judgement to determine the effect on the data.			

6.0 Contamination

NOTE: "Water blanks", "distilled water blanks" and "drilling water blanks" are validated like any other sample and are <u>not</u> used to qualify the data. Do not confuse them with the other QC blanks discussed below.

	YES	NO	N/A
6.1 Do any method/reagent, instrument, or cleanup blanks show positive hits for pest/PCBs?		[✓]	
6.2 If any method blanks and/or sulfur clean-up blanks contain "hits" for target compounds, are these hits greater than the CRQL for that			

	YES	NO	N/A
analyte?		✓	
6.3 In any instrument blanks, is the concentration of any target hit > 0.5 times CRQL for that analyte (see SOW, section 12.1.4.4.2, page D-77/PEST)?		✓	

NOTE: Most labs will report 0.5 times CRQLs on the instrument blank Form I instead of the actual method CRQLs. If the lab reported the actual CRQLs, then check if any detected hits are above 0.5 times the CRQLs reported on the Form I.

ACTION: If yes to any of the above questions: note in the Data Assessment under Contract Problems/Non-Compliance if any method or clean-up blanks contain hits > the CRQL, or of instrument blank contained hits > 0.5 times CRQL for that analyte.

	YES	NO	N/A
6.4 Do any field/rinse blanks have positive pest/PCB results?			✓

ACTION: Prepare a list of the samples associated with each contaminated blank. (Attach a separate sheet)

NOTE: All field blank results associated to a particular group of samples (may exceed one per case or one per day) may be used to qualify data. Do not convert field blank results to account for the difference in soil CRQLs. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for surrogate, and/or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

NOTE: When applied as directed in the table below, the contaminant concentration in method/instrument/reagent/cleanup blanks is multiplied by the sample dilution factor, where necessary.

If the laboratory has not already done so, the contaminant concentration in soil blanks is multiplied by 33 times the sample dilution factor and corrected for %moisture (fraction of solid) where necessary. 30 grams of sodium sulfate are used to prepare each soil reagent/method blank as instructed on page D-72/PEST, section 12.1.2.3.1. Contact the

YES NO N/A

laboratory if the soil blanks are not reported in soil units (µg/kg).

Flag sample result with a "U":	Report CRQL & qualify "U":	No qualification is needed:
Sample conc. > CRQL, but ≤ 5× blank.	Sample conc. < CRQL & is ≤ 5× blank value.	Sample conc. > CRQL & > 5× blank value.

NOTE: If gross blank contamination exists, all data in the associated samples should be qualified as "R", unusable.

6.5 Are there field/rinse/equipment blanks associated with every sample? [✓] ___ ✓

ACTION: For low level samples, note in the Data Assessment that there is no associated field/rinse/equipment blank. For analytes with high concentrations, use professional judgement to qualify these values and document in the Data Assessment.

<u>Exception</u>: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and GC Performance

7.1 Are the following Gas Chromatograms and Data Systems Printouts for both columns present for all samples, blanks and MS/MSD: Calib. Raw data after Form 10

a. Peak resolution check? ___ [✓] ___ ___

b. Performance evaluation mixtures? [✓] ___ ___

c. Aroclor 1016/1260? [✓] ___ ___

d. Aroclors 1221, 1232, 1242, 1248, 1254? [✓] ___ ___

e. Toxaphene? [✓] ___ ___

f. Low points individual mixtures A & B? [✓] ___ ___

g. Med points individual mixtures A & B? [✓] ___ ___

h. High points individual mixtures A & B? [✓] ___ ___

	YES	NO	N/A
i. Instrument blanks?	[✓]		
j. Were the appropriate GC columns used as specified on pg. D-11/PEST, sections 6.23.3.1 to 6.23.3.7, in the SOW?	[✓]		
7.2 Do the chromatograms for all Individual Standard Mixtures and PEM analyses display single component analytes at > 10% but < 100% of full scale (see sections 9.3.5.8.1 thru 9.3.5.8.4, pages D-32 & 33/PEST)?	[✓]		
• Have chromatograms for Individual Standard Mixtures and PEM analyses been replotted, showing scaling factor(s), to meet the above requirements when necessary?	[ ]		✓

NOTE: All standard chromatograms must clearly display all peaks at > 10% but < 100% of full scale, and replotted if necessary to accommodate peaks not properly scaled in the initial chromatogram(s). Both the initial and replotted chromatograms must be submitted with the data package.

ACTION: If all single component peaks are not clearly displayed on chromatograms for all Individual Standard Mixtures and PEM analyses, contact the lab to obtain resubmittal of the necessary data.

	YES	NO	N/A
7.3 Are Forms VI PEST 1-7 present and complete for each column and each analytical sequence?	[✓]		

ACTION: If no, take action as specified in 3.2 above.

	YES	NO	N/A
7.4 Are there any transcription/ calculation errors between raw data and Forms VI?		[✓]	

ACTION: If large errors exist, take action as specified in section 3.6 above.

	YES	NO	N/A
7.5 Do all standard retention times, including each pesticide in each level of Individual Mixtures A & B, fall within the windows established during the Initial Calibration (see Form VI PEST-1)?	[✓]		

ACTION: If no, all samples in the entire analytical sequence are potentially affected. Check to see if the chromatograms contain peaks within an expanded window surrounding the expected

YES NO N/A

retention times. If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present and cannot be identified through pattern recognition or using a revised RT window, qualify all positive results "JN" and non-detects as unusable (R). For aroclors, the RT may be outside the window, but the aroclor may still be identified from its distinctive pattern.

7.6 Are the linearity criteria for the initial analyses of Individual Standards A & B within limits for both columns? (%RSD must be ≤ 25.0 for alpha and delta BHC, ≤ 30.0 for the two surrogates and ≤ 20% for all other analytes.) [ ] ___ ___

NOTE: Contractual requirements allow up to two single component TCL compounds, but not surrogates, on each column to exceed the criteria provided the %RSD is ≤ 30%. (See page D-28/Pest, sec. 9.2.5.7 in the SOW.) Technical criteria, however, are the same for all analytes.

ACTION: If technical criteria were not met, qualify all associated positive results generated during the entire analytical sequence "J" and all non-detects "UJ". When %RSD > 90%, flag all non-detect results for that analyte "R" (unusable).

ACTION: If more than two analytes failed %RSD, document in the Data Assessment Contract Problems/Non-Compliance section and Organic Regional Data Assessment Summary form.

7.7 Is the resolution between each pair of adjacent peaks in the Resolution Check Mixture ≥ 60.0% for both columns? (See Form VI PEST-4.) [✓] ___ ___

ACTION: If no, qualify positive results for compounds that were not adequately resolved "J". Use professional judgement to determine if non-detects which elute in areas affected by co-eluting peaks should be qualified "N" as presumptive evidence of presence or unusable (R).

7.8 Is Form VI PEST-5 present and complete for each Performance Evaluation Mixture (PEM) standard used for both initial and continuing calibrations (see SOW section 3.12.4.4, page B-52)? [✓] ___ ___

	YES	NO	N/A
ACTION: If no, take action as specified in section 3.2 above.			
7.9 For each PEM standard, was the resolution between each pair of adjacent peaks ≥ 90.0% on both columns?	✓		
ACTION: Qualify positive results for compounds not adequately resolved estimated (J). Qualify non-detects based on professional judgement.			
7.10 Have Forms VI PEST-6 & PEST-7 been completed for all midpoint Individual Standards A and B used for initial calibration?	✓		
For each standard, was the resolution between each pair of adjacent peaks ≥ 90.0% on both columns?	✓		
ACTION: If no, qualify positive results for compounds that were not adequately resolved estimated (J). Use professional judgement to determine if non-detects which elute in areas affected by co-eluting peaks should be qualified "N" as presumptive evidence of presence or unusable "R".			
7.11 Is Form VII Pest-1 present and complete for each PEM standard analyzed during the analytical sequence for both columns?	✓		
Was the %Breakdown of DDT and Endrin calculated using the equations given on page D-26/PEST, sec. 9.2.4.8 in the SOW?	✓		
Were all pesticides and surrogates in each PEM standard within the RT windows established during the Initial Calibration?	✓		
ACTION: If no, take action as specified in 3.2 above.			
7.12 Has the individual percent breakdown for DDT/Endrin exceeded 20.0% in any PEM on either column? (See Form VII PEST-1.)			
- for 4,4'-DDT?		✓	
- for Endrin?		✓	
Has the combined percent breakdown for DDT/Endrin			

YES NO N/A

exceeded 30.0% in any PEM on either column (required for all PEM analyses)? ___ ✓ ___

ACTION: 1. If any percent breakdown has failed the QC criteria in either PEM in steps 2 and 17 in the initial calibration sequence (page D-28/Pest, sec. 9.2.5.6 in the SOW), qualify all samples in the entire analytical sequence as described in sections 2.a, b and c below.

2. If any percent breakdown failed the QC criteria in a PEM calibration verification analysis, review data beginning with the samples which followed the last in-control standard until the next acceptable PEM and qualify the data as described below.

a. 4,4'-DDT Breakdown: If DDT breakdown was > 20.0%:

i. Qualify all positive results for DDT with "J". If DDT was not detected, but DDD and DDE are positive, then qualify the quantitation limit for DDT unusable, "R".

ii. Qualify positive results for DDD and/or DDE as presumptively present at an approximated quantity "JN".

b. Endrin Breakdown: If endrin breakdown was > 20.0%:

i. Qualify all positive results for endrin with "J". If endrin was not detected, but endrin aldehyde and endrin ketone are positive, then qualify the quantitation limit for Endrin as unusable "R".

ii. Qualify positive results for endrin ketone and endrin aldehyde as presumptively present at an approximated quantity "JN".

c. Combined Breakdown: If the combined 4,4'-DDT and endrin breakdown is greater than 30.0%:

i. Qualify all positive results for DDT and Endrin with "J". If endrin was not detected, but endrin aldehyde and endrin ketone are positive, then qualify the quantitation limit for endrin as unusable

	YES	NO	N/A
"R". If DDT was not detected, but DDD and DDE are positive, then qualify the quantitation limit for DDT as unusable "R".			
ii. Qualify positive results for endrin ketone and endrin aldehyde as presumptively present at an approximated quantity "JN". Qualify positive results for DDD and/or DDE as presumptively present at an approximated quantity "JN".			
7.13 Are all percent difference (%D) values for PEM analytes and surrogates on both columns ≥ -25% and ≤ +25.0%? (See Form VII PEST-1.)	☑		
ACTION: If no, qualify all associated positive results generated during the analytical sequence "J" and sample quantitation limits "UJ".			
NOTE: If the failing PEM is part of the initial calibration, all samples are potentially affected. If the offending standard is a calibration verification, the associated samples are those which followed the last in-control standard until the next passing standard.			
7.14 Is Form VII Pest-2 present and complete for each INDA and INDB calibration verification analyzed?	☑		
ACTION: If no, take action specified in 3.2 above.			
7.15 Are there any transcription/calculation errors between raw data and Form VII Pest-2?		☑	
ACTION: If large errors exists, take action as specified in section 3.6 above.			
7.16 Do all standard retention times for each INDA and INDB calibration verification fall within the RT windows established during the initial calibration sequence? (See Form VII PEST-2.)	☑		
ACTION: If no, beginning with the samples which followed the <u>last in-control standard</u>, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present and cannot be identified through pattern recognition or using a revised			

	YES	NO	N/A
RT window, qualify all positive results and non-detects as unusable (R).			
7.17 Are all %D values for INDA and INDB calibration verification compounds ≥ -25.0% and ≤ +25.0%?	✓		
ACTION: If the %D is outside the ±25.0% range for any compound(s), qualify associated positive results for that compound "J" and non-detects "UJ". The "associated samples" are those which followed the last in-control standard up to the next passing standard containing the analyte(s) in question. If the %D is > 90%, flag all non-detects for that analyte "R" (unusable).			
8.0 Analytical Sequence Check (Form VIII-PEST)			
8.1 Is Form VIII present and complete for each column and each period of analyses?	✓		
ACTION: If no, take action specified in 3.2 above.			
8.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses, and all standards analyzed at the required frequency for each GC/EC instrument used.? (See SOW pages D-23 & D-58/PEST.)	✓		
ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify accordingly. Generally, the effect is negligible unless the sequence was grossly altered and/or the calibration was out of QC limits.			
8.3 Were all samples analyzed within a 12 hour time period beginning with the injection of an instrument blank and bracketed by acceptable analyses of the proper standards?	✓		
ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify accordingly. Document in the Data Assessment under Contract Problems/Non-Compliance and Organic Regional Data Assessment Summary.			
8.4 If a multi-component analyte was detected in a sample, was a matching multi-component standard analyzed within 72 hours of the injection of the			

	YES	NO	N/A
sample and within a valid 12 hour sequence?	[ ]	___	___

NOTE: This additional standard is for identification purposes only. Positive results for Aroclors and Toxaphene are quantitated from the initial calibration.

ACTION: If no, document in the Data Assessment under Contract Problems/Non-Compliance and on the Organic Regional Data Assessment Summary form.

9.0 Cleanup Efficiency Verification (Form IX)

9.1 Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts.)	[✓]	___	___
Are all samples listed on the Pesticide Florisil Cartridge Check Form?	[✓]	___	___

ACTION: If no, take action specified in 3.2 above. If data suggests florisil clean-up was not performed, document in the Data Assessment under the Contract Non-compliance section.

9.2 Are percent recoveries (%REC) of the pesticide and surrogate compounds used to check the efficiency of the florisil clean-up procedure within QC limits of 80 - 120%?	[✓]	___	___

ACTION: Qualify only the analyte(s) which failed the recovery criteria as follows:

If %REC is < 80%, qualify positive results "J" and non-detects "UJ".

If any pesticide %REC was zero, flag non-detects "R" for that compound.

Use professional judgement to qualify positive results if any recoveries are > 120%.

NOTE: Sample data should be evaluated for potential interferences if recovery of 2,4,5-trichlorophenol was > 5% in the Florisil Cartridge Performance Check analysis. Document any problems found in the Data Assessment under the Contract Problems/Non-Compliance section.

	YES	NO	N/A
9.3 If GPC Cleanup was performed (mandatory for all soil sample extracts), is Form IX Pest-2 present?	[ ]	✓	✓
Are all soil samples listed on Form IX Pest-2?	[ ]		✓

ACTION: If no, take action specified in 3.2 above. If data suggests GPC clean-up was not performed when required, document in the Data Assessment under the Contract Problems/Non-Compliance section and Organic Regional Data Assessment Summary.

Are the %REC values for all pesticides in the GPC calibration solution between 80 - 110%?	[ ]		✓

ACTION: Qualify only those analytes which failed the recovery criteria as follows:

If %REC are < 80%, qualify positive results "J" and non-detects "UJ".

If any pesticide %REC was zero, flag non-detects "R" for that compound.

Use professional judgement to qualify positive results if any recoveries are > 110%.

NOTE: An Aroclor mixture containing Aroclors 1016 and 1260 is also analyzed during GPC calibration; however, Aroclor data is not listed on Form IX PEST-2. The raw GPC data for Aroclors 1016/1260 must be evaluated for pattern similarity with previously analyzed Aroclor standards.

9.4 The validator should verify that the correct identification scheme for the EPA Blank samples were used. See page B-35, sec. 3.3.7.8 and 3.3.7.9 of the SOW for further information.			
Was the correct identification scheme used for GPC and Florisil blanks?	✓ [ ]		

10.0 Pesticide/PCB Identification

10.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	[ ]		

ACTION: If no, take action specified in 3.2 above.

	YES	NO	N/A
10.2 Are all sample chromatograms properly scaled, attenuated, etc. as required for proper identification of single and multi-component analytes? (Refer to SOW sections 11.3.7.1 thru 11.3.7.8, page D-70/Pest for specific details.)	[✓]		

NOTE: Proper verification of Pest/PCB results depends on clear, legible presentation of the raw data. Single component pesticides and all peaks chosen for quantitation of multi-component analytes must appear at less than full scale. Toxaphene and PCB patterns must be clearly visible to enable comparison with standard chromatograms.

ACTION: If retention times or apex of peaks cannot be verified, or if multi-component peak patterns cannot be discerned, contact the lab to obtain rescaled chromatograms.

	YES	NO	N/A
10.3 Are there any transcription/calculation errors between raw data and Forms 10A and 10B?		[✓]	

ACTION: If large errors exist, take action as specified in section 3.6 above.

	YES	NO	N/A
10.4 Are RTs of sample compounds within the established RT windows for analyses on both columns?	[✓]		
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/mℓ in the final extract)?	[ ]		[✓]

ACTION: Use professional judgement to qualify positive results which were not confirmed by GC/MS analysis. Qualify as unusable (R) all positive results which were not confirmed on a second GC column. Also qualify as unusable (R) all positive results which do not meet RT window criteria, unless associated standard compounds are similarly biased. Use professional judgement to assign an appropriate quantitation limit.

	YES	NO	N/A
10.5 Is the percent difference (%D) calculated for the positive sample results on both columns > 25.0%?		[✓]	

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be flagged as follows:

YES NO N/A

% Difference	Qualifier
0 - 25%	None
25 - 70%	"J"
70 - 100%	"JN"
> 100%	"R"
>100 ~~100 - 200%~~ (Interference detected)*	"JN"
> 50% (Pesticide value is < CRQL)**	"U"

* When the reported %D is ~~100 - 200%~~ >100 %, but interference is detected on either column, qualify the data with "~~J~~". JN

** When the <u>reported pesticide value</u> is lower than the CRQL, and the %D is > 50%, raise the value to the CRQL and qualify "U", undetected.

NOTE: For Aroclors, if the %D is > 50%, but the pattern of GC peaks on both columns indicates a specific Aroclor is present, qualify that Aroclor "J".

NOTE: The lower of the two values is reported on Form I. If using professional judgement, the reviewer determines that the higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the Data Assessment.

10.6 Check chromatograms for false negatives, especially the multiple-peak compounds (Toxaphene and the PCBs). Were there any false negatives? ___ ✓ ___

ACTION: Use professional judgement to decide if the compound should be reported. If the appropriate PCB standards were not analyzed within 72 hrs. of the sample(s) in question, qualify the data unusable "R".

Also note in Data Assessment under Contract Problems/Non-Compliance if the lab failed to analyze Aroclor standards when required.

11.0 Target Compound List (TCL) Analytes

11.1 Are the Organic Analysis Data Sheets (Form I Pest) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate? ✓ ___ ___

b. Matrix spikes and matrix spike duplicates? ✓ ___ ___

	YES	NO	N/A
c. Blanks?	[✓]		
d. Instrument Blanks (per column & analysis)?	[✓]		
11.2 Are the Pest chromatograms and quant. reports included in the sample data package for each of the following:			
a. Samples and/or fractions as appropriate?	[✓]		
b. Matrix spikes and matrix spike duplicates?	[✓]		
c. Blanks?	[✓]		
d. Instrument Blanks (per column & analysis)?	[ ]		
ACTION: If any data are missing, take action specified in 3.2 above.			
11.3 Are the calibration factors shown in the quant. reports?	[✓]		
11.4 Is chromatographic performance acceptable with respect to:			
a. Baseline stability?	[✓]		
b. Resolution?	[✓]		
c. Peak shape?	[✓]		
d. Full-scale graph attenuation?	[✓]		
e. Other: _____?	[ ]		
11.5 Were any electropositive displacement (negative peaks) or unusual peaks seen?		[✓]	
ACTION: Use professional judgement to determine the acceptability of the data. Address comments under System Performance section of the Data Assessment.			

12.0 Compound Quantitation and Reported Detection Limits

12.1 Are there any transcription/calculation errors in Form I results? Check at least two positive results. Were any errors found?		[✓]	

YES NO N/A

NOTE: Single-peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. Use professional judgement to decide whether a large discrepancy indicates the presence of an interfering compound. If an interfering compound is visible on the chromatogram, the lower of the two values should be reported and qualified as presumptively present at an approximated quantity "JN". This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has interfered with the evaluation of the second column confirmation.

12.2 Are the CRQLs adjusted to reflect sample dilutions? [ ] ___ ✓

ACTION: If large errors exist, take action as specified in section 3.6 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs from the diluted sample). Replace concentrations which exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with the result from the diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including those in the data summary package.

ACTION: Quantitation limits affected by large, off-scale peaks should be qualified as unusable (R). If the interference is on-scale, the reviewer may offer an approximated quantitation limit (UJ) for each affected compound.

NOTE: If a sample required greater than a 10 times dilution, then a 10 times more concentrated analysis must also be performed and submitted (see SOW, page D-60/PEST, section 10.2.3.5).

ACTION: If a more concentrated analysis is unavailable, document in the Contract Problems/Non-Compliance section of the Data Assessment. Use professional judgement to qualify non-detects and positive hits below the CRQL.

	YES	NO	N/A
13.0 Field Duplicates			
13.1 Were any field duplicates submitted?		✓	✓

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

Contract Laboratory Program

Sample Delivery Group (SDG)
Traffic Report (TR) Cover Sheet

SDG Number B0IQK

Laboratory Name Mitkem Corporation Laboratory Code MITKEM

Contract No. 68-W-99-076 Case No. 28192

Analysis Price _____ SDG Turnaround 14 days

EPA Sample Numbers in SDG (Listed in Numerical Order)

1) B0IQK	7) B0IT0	13) B0IT4	19)
2) B0IQN	8) B0IT1	14) B0IT7	20)
3) B0IQW	9) B0IT1MS	15) B0ITJ	21)
4) B0IQX	10) B0IT1MSD	16) B0ITK	22)
5) B0IQY	11) B0IT2	17) B0ITN	23)
6) B0IQZ	12) B0IT3	18) B0ITP	24)

B0IQK
First Sample in SDG

B0ITP
Last Sample in SDG

6/14/00
First Sample Receipt Date

6/14/00
Last Sample Receipt Date

Note: *There are a maximum of 20 **field** samples (excluding PE samples) in an SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).*

Signature [signature] Date 6/15/00

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5148

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	17	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	1	J
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5148

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	5	J
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5148

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5150

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	13	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	28	
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5150

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	7	J
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	6	J
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	6	J
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5150

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5149

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	10 ~~8~~ ~~J~~	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5149

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5149

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5136

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/17/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	17	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	3	J
75-34-3	1,1-Dichloroethane	1	J
156-59-2	cis-1,2-Dichloroethene	4	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5136

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/17/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	27	
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	3	J
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	2	J
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5136

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/17/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5135

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/17/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	2	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5135

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/17/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	15	
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	1	J
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	1	J
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5135

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/17/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5279

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U J
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U J
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U J
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	13	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5279

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	1	J
591-78-6	2-Hexanone	10	UJ
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5279

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5280

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U J
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U J
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U J
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	~~9~~ 10	~~J~~ U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5280

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	2	J
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U J
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5280

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5140

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	12	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5140

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5140

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5139

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	19	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	1	J
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5139

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	5	J
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5139

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5138

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	12	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5138

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5138

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T4

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5137

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	17	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T4

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5137

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	UR
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T4

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5137

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T7
TRIP BLANK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890010

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5144

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	7	J
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T7

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890010

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5144

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T7

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890010

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5144

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/18/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5283

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U J
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U J
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U J
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	15	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5283

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U J
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5283

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5284

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 2.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	20	U J
74-87-3	Chloromethane	20	U
75-01-4	Vinyl Chloride	2	~~J~~ J
74-83-9	Bromomethane	20	U
75-00-3	Chloroethane	20	U J
75-69-4	Trichlorofluoromethane	20	U
75-35-4	1,1-Dichloroethene	8	J
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	20	U
67-64-1	Acetone	20 ~~8~~	~~J~~ U
75-15-0	Carbon Disulfide	20	U
79-20-9	Methyl Acetate	20	U
75-09-2	Methylene Chloride	20	U
156-60-5	trans-1,2-Dichloroethene	20	U
1634-04-4	Methyl tert-Butyl Ether	20	U
75-34-3	1,1-Dichloroethane	9	J
156-59-2	cis-1,2-Dichloroethene	21	
78-93-3	2-Butanone	20	U
67-66-3	Chloroform	2	J
71-55-6	1,1,1-Trichloroethane	20	U
110-82-7	Cyclohexane	20	U
56-23-5	Carbon Tetrachloride	20	U
71-43-2	Benzene	20	U
107-06-2	1,2-Dichloroethane	26	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5284

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 2.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	330	
108-87-2	Methylcyclohexane	20	U
78-87-5	1,2-Dichloropropane	20	U
75-27-4	Bromodichloromethane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
108-10-1	4-Methyl-2-Pentanone	20	U
108-88-3	Toluene	20	U
10061-02-6	trans-1,3-Dichloropropene	20	U
79-00-5	1,1,2-Trichloroethane	20	U
127-18-4	Tetrachloroethene	10	J
591-78-6	2-Hexanone	20	UJ
124-48-1	Dibromochloromethane	20	U
106-93-4	1,2-Dibromoethane	20	U
108-90-7	Chlorobenzene	6	J
100-41-4	Ethylbenzene	20	U
1330-20-7	Xylene (Total)	20	U
100-42-5	Styrene	20	U
75-25-2	Bromoform	20	U
98-82-8	Isopropylbenzene	20	U
79-34-5	1,1,2,2-Tetrachloroethane	20	U
541-73-1	1,3-Dichlorobenzene	20	U
106-46-7	1,4-Dichlorobenzene	20	U
95-50-1	1,2-Dichlorobenzene	20	U
96-12-8	1,2-Dibromo-3-chloropropane	20	UR
120-82-1	1,2,4-Trichlorobenzene	20	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5284

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 2.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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FORM I VOA-TIC

OLM04.2

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5282

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U J
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U J
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U J
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	1	J
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	10 ~~7~~	~~J~~ U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	6	J
75-34-3	1,1-Dichloroethane	2	J
156-59-2	cis-1,2-Dichloroethene	5	J
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	7	J

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5282

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	21	
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	19	
591-78-6	2-Hexanone	10	UJ
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5282

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5281

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U J
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	1	~~J~~ J
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U J
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	J
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	13	U
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	2	J
75-34-3	1,1-Dichloroethane	5	J
156-59-2	cis-1,2-Dichloroethene	12	
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	7	J

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5281

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	170	
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	13	
591-78-6	2-Hexanone	10	UJ
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-chloropropane	10	~~U~~ R
120-82-1	1,2,4-Trichlorobenzene	10	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6A5281

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: not dec. _____ Date Analyzed: 06/22/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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FORM I VOA-TIC

OLM04.2

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5959

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	25	U
95-95-4	2,4,5-Trichlorophenol	10	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	25	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	25	U
99-09-2	3-Nitroaniline	10	U
83-32-9	Acenaphthene		

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5959

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5959

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 2

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 934-34-9	2(3H)-BENZOTHIAZOLONE	12.90	20	NJ
2. 957-51-7	BENZENEACETAMIDE, N,N-DIMETH	15.73	4	NJ
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5958

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5958

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	1	J
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5958

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 2

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	12.59	2	J
2.	934-34-9	2(3H)-BENZOTHIAZOLONE	12.90	17	NJ
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5957

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5957

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5957

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5941

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5941

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5941

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 934-34-9	2(3H)-BENZOTHIAZOLONE	12.81	5	NJ
2.				
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5940

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5940

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5940

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 934-34-9	2(3H)-BENZOTHIAZOLONE	12.82	5	NJ
2.				
3.				
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5950

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5950

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5950

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 934-34-9	2(3H)-BENZOTHIAZOLONE	12.82	5	NJ
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5952

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5952

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5952

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 934-34-9	2(3H)-BENZOTHIAZOLONE	12.82	5	NJ
2.				
3.				
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5948

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5948

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5948

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5947

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5947

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5947

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5943

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5943

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5943

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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FORM I SV-TIC

OLM04.2

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T4

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5942

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T4

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5942

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

EPA SAMPLE NO.

B01T4

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5942

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/19/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5962

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5962

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5962

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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FORM I SV-TIC

OLM04.2

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5953

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5953

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Q
51-28-5	2,4-Dinitrophenol	25 U
100-02-7	4-Nitrophenol	25 U
132-64-9	Dibenzofuran	10 U
121-14-2	2,4-Dinitrotoluene	10 U
84-66-2	Diethylphthalate	10 U
86-73-7	Fluorene	10 U
7005-72-3	4-Chlorophenyl-phenylether	10 U
100-01-6	4-Nitroaniline	25 U
534-52-1	4,6-Dinitro-2-methylphenol	25 U
86-30-6	N-Nitrosodiphenylamine (1)	10 U
101-55-3	4-Bromophenyl-phenylether	10 U
118-74-1	Hexachlorobenzene	10 U
1912-24-9	Atrazine	10 U
87-86-5	Pentachlorophenol	25 U
85-01-8	Phenanthrene	10 U
120-12-7	Anthracene	10 U
86-74-8	Carbazole	10 U
84-74-2	Di-n-butylphthalate	10 U
206-44-0	Fluoranthene	10 U
129-00-0	Pyrene	10 U
85-68-7	Butylbenzylphthalate	10 U
91-94-1	3,3'-Dichlorobenzidine	10 U
56-55-3	Benzo(a)anthracene	10 U
218-01-9	Chrysene	10 U
117-81-7	bis(2-Ethylhexyl)phthalate	10 U
117-84-0	Di-n-octylphthalate	10 U
205-99-2	Benzo(b)fluoranthene	10 U
207-08-9	Benzo(k)fluoranthene	10 U
50-32-8	Benzo(a)pyrene	10 U
193-39-5	Indeno(1,2,3-cd)pyrene	10 U
53-70-3	Dibenzo(a,h)anthracene	10 U
191-24-2	Benzo(g,h,i)perylene	10 U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5953

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 10544-50-0	SULFUR, MOL. (S8)	16.04	19	NJ
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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5955

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5955

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5955

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	2.01	4	J
2.				
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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5954

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N) ___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	10	U
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
98-86-2	Acetophenone	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
105-60-2	Caprolactam	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
92-52-4	1,1'-Biphenyl	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5954

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S1B5954

Level: (low/med) LOW Date Received: 06/14/00

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/15/00

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/20/00

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Extraction: (Type) CONT

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890016

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9797F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890014

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9795F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QW

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890015

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9796F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.6	
11096-82-5	Aroclor-1260	1.0	U

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QX

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9781F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QY

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9780F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01QZ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9786F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T0

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890008

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9787F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T1

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9785F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T2

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890005

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9784F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T3

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890004

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9783F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01T4

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9782F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/26/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TJ

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890013

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9794F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TK

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890009

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9791F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TN

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890012

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9793F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B01TP

Lab Name: MITKEM CORPORATION Contract: 68W99076

Lab Code: MITKEM Case No.: 28192 SAS No.: _____ SDG No.: B01QK

Matrix: (soil/water) WATER Lab Sample ID: 70890011

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E2B9792F

% Moisture: _____ Decanted: (Y/N) ___ Date Received: 06/14/00

Extraction: (Type) SEPF Date Extracted: 06/16/00

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 06/27/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U J
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U J
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

MITKEM CORPORATION: Telephone Log

Called/Caller: Nicole Coene

Date: 6/14/00

Phone Number: 703-264-9280

Time: 9:20

Company: DynCorp

Call made by: Agnes

Left Message? Yes No

Date call returned:

Time call returned:

Reason for call: Case 28192

-All COC/TR's does not designate whether case is complete or not.

-Received pink copies of the COC/TR.

Result of call: Case is complete.

Send pink copies of COC/TR to DynCorp.

7:6

REFERENCE NO. 24

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

AUG 02 2000

DATE: JUNE 28, 2000
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: RSCC / ESAT
TO: Hanif Sheikh, Hazardous Waste Support Section

Attached is the following INORGANIC Data Package to be reviewed for Quality Assurance

SITE	CAMDEN MUNICIPAL WELLS	CASE#	28192
CONTRACTOR	START W	#SAMPLES	MATRIX
PHASE	SI		
LAB	SENTIN	15	WATER
TURN-AROUND-TIME	14 DAYS	FRACTION	TAL ONLY
CERCLIS ID #	NJD980769087	SITE SPILL #	ZZ

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	Date/Time	Signature	Date/Time
		John Bulich	6-27-00
John Bulich	6-28-00	CS	7/17/00
CS	7/31/00	John Bulich (DCR)	7-31-00
John Bulich (DCR)	7-31-00	Hanif Sheikh	7/31/00
Hanif Sheikh	8/2/00	DCR	8/2/00

(over for instructions) revised 3/99

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Jan. 1992
Number: HW-2
Revision: 11

CASE: 28192	SITE: CAMDEN MUNICIPAL WELLS	SOIL:
SDG: MB02FT	LAB: SENTINEL	WATER: 15
CONTRACTOR: STARTW	REVIEWER: C. STANCA	OTHER:

A.2.1. Validation flags -The following flags have been applied in red by the data validator and must be considered by the data user.

J -This flag indicates the result qualified as **estimated.**

Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

Fully Usable Data -The results that do not carry "J" or "red-line" are fully usable.

Contractual Qualifiers -The legend of contractual qualifiers applied by the lab on Form I's is found on page B-20 of SOW ILM01.0

A.2.2. The data assessment is given below and on the attached sheets.

This case consists of fifteen (15) aqueous samples collected at the Camden Municipal Wells site on 06/13/00 for TAL Metals analysis according to the USEPA CLP SOW No. ILM04.0. Samples MB02P9/MB02PB are the field duplicate pair for this sampling event. Matrix spike, laboratory duplicate and serial dilution analyses were performed on sample MB02PC.

All QC parameters, other than those discussed here, have been met.

CRDL STANDARD

The CRDL standard recoveries fell outside the control limits of 80 - 120% for Pb ($\%R_2$ = 132.3). (Only out of control recoveries that affected samples in this SDG were mentioned.) All associated results and all associated positive results within the affected range of True Value $\pm$ 2CRDL have been considered estimated and flagged "J".

"J": Pb in MB02FT, -FW, -FX, MB02P7, -P8

A.2.2. (continuation)

FIELD DUPLICATE

The absolute difference between sample (MB02P9) and duplicate (MB02PB) results was greater than CRDL for Pb when sample and/or duplicate results were less than 5 X CRDL. All associated sample results have been considered estimated and flagged "J".

"J": Pb in MB02P9, MB02PB

A.2.3. Contract-Problems/Non-Compliance

None.

MMB Reviewer: _____ Date: 8/2/
Signature

Contractor Reviewer: Constantin Stanescu Date: 7/31/00
Signature

Verified by: _____ Date: _____
Signature

CLP DATA ASSESSMENT SUMMARY FORM

TYPE OF REVIEW: INORGANIC **DATE:** 7/31/00 **CASE #:** 28192

SITE: CAMDEN MUNICIPAL WELLS **LAB NAME:** SENTINEL

REVIEWER'S INITIALS: CS **NUMBER OF SAMPLES:** 15 WATER

ANALYTES REJECTED DUE TO EXCEEDING REVIEW CRITERIA:*

	Holding Time	CRDL	Prep Blank	Field Blank	Inter-ference	Spike Recov.	Det. Limit	LCS	Serial Dil.	MSA	Total Analytes	Rejections
ICP											330	0
Flame AA												
Furnace AA												
Mercury											15	0
Cyanide												
Total											345	0

ANALYTES FLAGGED AS ESTIMATED (J) DUE TO EXCEEDING CRITERIA FOR:*

	Holding Time	CRDL	Prep Blan	% Solids	Preser vation	Spike Recov.	Dup Lab	Dup Field	Det. Limit	LCS	Serial Dilution	MSA	Total Analytes	Estimation
ICP		5						2					330	7
Flame AA														
Furnace AA														
Mercury													15	0
Cyanide														
Total		5						2					345	7

Note: Asterisk (*) indicates additional exceedances of review criteria.

Region II

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO.: 28192

SITE: CAMDEN MUNICIPAL WELLS

LABORATORY: SENTINEL

NO. OF SAMPLES/MATRIX: 15 WATER

SDG#: MB02FT

REVIEWER (IF NOT ESD):

SOW#: ILM04.0

REVIEWER'S NAME: C. STANCA

DPO: ACTION FYI

COMPLETION DATE: 7/31/00

DATA ASSESSMENT SUMMARY

	ICP	AA	MERCURY	CYANIDE
Holding Times	O		O	
Calibration	O		O	
Blanks	O		O	
ICS	O		N/A	N/A
LCS	O		N/A	N/A
Duplicate Analysis	O		O	
Matrix Spike	O		O	
MSA	N/A		N/A	N/A
Serial Dilution	O		N/A	N/A
Sample Verification	O		O	
Other QC	O		O	
Overall Assessment	O		O	

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.
ACTION ITEMS:
AREAS OF CONCERN:
NOTABLE PERFORMANCE:

CADRE VALIDATION

Percent Moisture Report

SDG NO: **MB02FT**
CASE NO: **28192**

LABORATORY: **SENTINEL, INC**
AGENCY INPUT FILE: **MB02FT.ASF**

PERCENT MOISTURE LIMITS

	Primary	Expanded
INORG	50%	90%

No problems found for this qualification.

Holding Time Report

SDG NO: **MB02FT**
CASE NO: **28192**

LABORATORY: **SENTINEL, INC**
AGENCY INPUT FILE: **MB02FT.ASF**

HOLDING TIME CRITERIA

Inorganic

	-- Holding Time --		------- pH -------	
	Primary	Expanded	Primary	Expanded
Metals	180	16704	2.0	2.6
Mercury	28	0	2.0	50.0
Cyanide	14	0	12.0	1.0

No problems found for this qualification.

SDG NO: MB02FT
CASE NO: 28192

LABORATORY: SENTINEL, INC
AGENCY INPUT FILE: MB02FT.ASF

CALIBRATION CRITERIA

Inorganic

Percent Recovery Limits

	--- Primary ---		-- Expanded ---	
	Low	High	Low	High
Cyanide	85.00	115.00	70.00	130.00
AA	90.00	110.00	75.00	125.00
ICP	90.00	110.00	75.00	125.00
Mercury	80.00	120.00	65.00	135.00

No problems found for this qualification.

SDG NO: MB02FT
CASE NO: 28192

LABORATORY: SENTINEL, INC
AGENCY INPUT FILE: MB02FT.ASF

MATRIX SPIKE CRITERIA

Inorganic

Percent Recovery Limits

Upper	125.0
Lower	75.0
Extreme lower	30.0

No problems found for this qualification.

LCS Report

SDG NO: MB02FT

CASE NO: 28192

LABORATORY: SENTINEL, INC

AGENCY INPUT FILE: MB02FT.ASF

No problems found for this qualification.

Sample Result Verification Report

SDG NO: **MB02FT**

CASE NO: **28192**

LABORATORY: **SENTINEL, INC**

AGENCY INPUT FILE: **MB02FT.ASF**

No problems found for this qualification.

FIELD DUPLICATES

Lab Code: SENTIN Case: 28192\W SDG: MB02FT

Reviewer: C. STANCA Matrix: WATER

Concentration Units: UG/L

Analyte	Control Limit	Sample MB02P9	C	Sample MB02PB	C	RPD	Q
ALUMINUM		43.50	B	46.50	B		
ANTIMONY		2.60	U	2.60	U		
ARSENIC		1.90	U	1.90	U		
BARIUM		54.70	B	54.80	B		
BERYLLIUM		0.10	U	0.10	U		
CADMIUM		0.30	U	0.30	U		
CALCIUM	5000.00	21800.00		21900.00		100.00	
CHROMIUM		0.60	B	0.50	U		
COBALT		34.20	B	33.40	B		
COPPER		6.00	B	5.60	B		
IRON		5410.00		5520.00		2.01	
LEAD	3.00	1.80	U	9.80		8.00	*
MAGNESIU	5000.00	12300.00		12300.00		0.00	
MANGANE		1600.00		1590.00		0.63	
MERCURY		0.10	U	0.10	U		
NICKEL		4.40	B	4.10	B		
POTASSIU	5000.00	6070.00		6050.00		20.00	
SELENIUM		2.20	U	2.20	U		
SILVER		0.70	U	0.70	U		
SODIUM	5000.00	13900.00		13900.00		0.00	
THALLIUM		3.50	U	3.50	U		
VANADIUM		0.70	U	0.70	U		
ZINC		12.80	B	19.00	B		
CYANIDE		0.00		0.00			

COMMENTS:

Analytical Results (Qualified Data)

Case #: 28192
SDG : MB02FT
Site : CAMDEN MUNICIPAL WELLS
Lab. : SENTIN
Reviewer :
Date :

Number of Soil Samples : 0
Number of Water Samples : 15

Sample Number :	MB02FT		MB02FW		MB02FX		MB02FY		MB02PB	
Sampling Location :	6532-GW-D1		6532-GW-P13		6532-GW-P17		6532-GW-P18		6532-GW-M15	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000	
Time Sampled :	13:50		14:35		15:25		15:00		09:30	
%Solids :	0.0		0.0		0.0		0.0		0.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	27.1	U	27.1	U	81.4	B	94.5	B	46.5	B
ANTIMONY	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U
ARSENIC	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
BARIUM	47.1	B	62.8	B	60.2	B	51.1	B	54.8	B
BERYLLIUM	0.10	U	0.10	U	0.20	B	0.10	B	0.10	U
CADMIUM	0.30	U	0.30	U	0.40	B	0.30	U	0.30	U
CALCIUM	15000		48300		32800		33500		21900	
CHROMIUM	0.50	U	0.50	U	0.60	B	6.8	B	0.50	U
COBALT	58.2		8.8	B	15.1	B	8.4	B	33.4	B
COPPER	2.1	B	4.9	B	18.8	B	13.9	B	5.6	B
IRON	4140		3120		838		446		5520	
LEAD	2.3	BJ	2.3	BJ	2.2	BJ	1.8	U	9.8	J
MAGNESIUM	5020		18600		14300		12900		12300	
MANGANESE	1180		922		204		251		1590	
MERCURY	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
NICKEL	3.4	B	6.0	B	18.8	B	8.5	B	4.1	B
POTASSIUM	2310	B	6960		7070		6670		6050	
SELENIUM	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U
SILVER	0.70	U	0.70	U	0.70	U	0.70	U	0.70	U
SODIUM	13900		46800		34300		36200		13900	
THALLIUM	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U
VANADIUM	0.70	B	2.1	B	0.70	U	2.0	B	0.70	U
ZINC	8.3	B	12.0	B	31.9		22.7		19.0	B
CYANIDE	N/A		N/A		N/A		N/A		N/A	

Analytical Results (Qualified Data)

Case #: 28192 SDG : MB02FT
Site : CAMDEN MUNICIPAL WELLS
Lab. : SENTIN
Reviewer :
Date :

Sample Number :	MB02PC		MB02PCD-Do Not Use		MB02PCS-Do Not Use		MB02PF		MB02PG	
Sampling Location :	6532-GW-M10		6532-GW-M10		6532-GW-M10		6532-GW-M11		6532-GW-M12	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000	
Time Sampled :	09:00		09:00		09:00		10:35		11:00	
%Solids :	0.0		0.0		0.0		0.0		0.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	33.5	B	27.1	U	2090		40.6	B	27.1	U
ANTIMONY	2.6	U	2.6	U	509		2.6	U	2.6	U
ARSENIC	1.9	U	1.9	U	42.3		1.9	U	1.9	U
BARIUM	58.8	B	58.8	B	2160		63.0	B	23.3	B
BERYLLIUM	0.10	U	0.10	U	52.2		0.10	U	0.10	U
CADMIUM	0.30	U	0.30	U	51.4		0.30	U	0.30	U
CALCIUM	14700		14700				17000		15000	
CHROMIUM	7.4	B	0.50	U	209		1.0	B	0.50	U
COBALT	19.8	B	20.2	B	547		103		13.8	B
COPPER	2.1	B	0.90	U	262		3.8	B	3.8	B
IRON	21800		21800		23400		7440		3050	
LEAD	1.8	U	1.8	U	22.2		13.4		1.8	U
MAGNESIUM	8760		8880				6250		5210	
MANGANESE	2390		2420		3000		2480		678	
MERCURY	0.10	U	0.10	U	1.0		0.10	U	0.10	U
NICKEL	5.5	B	1.8	B	529		7.6	B	0.90	U
POTASSIUM	3810	B	3810	B			2650	B	2100	B
SELENIUM	2.2	U	2.2	U	8.9		2.2	U	2.2	U
SILVER	0.70	U	0.70	U	51.2		0.70	U	0.70	U
SODIUM	12000		12300				13900		14100	
THALLIUM	3.5	U	3.5	U	42.3		3.5	U	3.5	U
VANADIUM	0.70	U	0.70	U	519		0.70	U	5.8	B
ZINC	7.6	B	5.6	B	538		28.0		8.0	B
CYANIDE	N/A		N/A		N/A		N/A		N/A	

Analytical Results (Qualified Data)

Case #: 28192 SDG : MB02FT
Site : CAMDEN MUNICIPAL WELLS
Lab. : SENTIN
Reviewer :
Date :

Sample Number :	MB02PH		MB02P4		MB02P5		MB02P6		MB02P7	
Sampling Location :	6532-GW-M1B		6532-GW-M2		6532-GW-M3		6532-GW-M4		6532-GW-M6	
Matrix :	Water		Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :	06/13/2000		06/13/2000		06/13/2000		06/13/2000		06/13/2000	
Time Sampled :	10:55		11:35		11:25		12:00		10:15	
%Solids :	0.0		0.0		0.0		0.0		0.0	
Dilution Factor :	1.0		1.0		1.0		1.0		1.0	
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	27.1	U	27.1	U	27.1	U	27.1	U	46.9	B
ANTIMONY	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U
ARSENIC	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
BARIUM	17.8	B	83.8	B	202		61.0	B	71.8	B
BERYLLIUM	0.10	U	0.10	U	0.10	U	0.10	U	0.10	B
CADMIUM	0.60	B	0.30	U	0.30	U	0.30	U	0.30	U
CALCIUM	15800		21300		23000		14500		16700	
CHROMIUM	0.50	U	0.50	B	0.50	U	0.50	U	0.50	U
COBALT	16.4	B	18.3	B	43.7	B	7.4	B	132	
COPPER	44.4		7.0	B	0.90	U	2.0	B	34.4	
IRON	3720		15300		33600		36200		440	
LEAD	26.2		1.8	U	1.8	U	1.8	U	2.5	BJ
MAGNESIUM	5400		12900		11900		5860		7960	
MANGANESE	368		2930		2180		1520		2800	
MERCURY	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
NICKEL	2.0	B	3.9	B	4.4	B	0.90	U	18.9	B
POTASSIUM	2220	B	8310		8460		2120	B	3860	B
SELENIUM	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U
SILVER	0.70	U	0.70	U	0.70	U	0.70	U	0.70	U
SODIUM	14700		14400		11600		11900		17200	
THALLIUM	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U
VANADIUM	4.0	B	0.70	U	0.70	U	0.70	U	0.70	U
ZINC	28.6		16.0	B	9.2	B	10.6	B	26.6	
CYANIDE	N/A		N/A		N/A		N/A		N/A	

Analytical Results (Qualified Data)

Case #: 28192 SDG : MB02FT
Site : CAMDEN MUNICIPAL WELLS
Lab. : SENTIN
Reviewer :
Date :

Sample Number :	MB02P8		MB02P9		IDL					
Sampling Location :	6532-GW-M7		6532-GW-M8							
Matrix :	Water		Water		Water					
Units :	ug/L		ug/L		ug/L					
Date Sampled :	06/13/2000		06/13/2000							
Time Sampled :	10:00		09:30							
%Solids :	0.0		0.0							
Dilution Factor :	1.0		1.0		1.0					
ANALYTE	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	27.1	U	43.5	B	27.1					
ANTIMONY	2.6	U	2.6	U	2.6					
ARSENIC	2.0	B	1.9	U	1.9					
BARIUM	54.6	B	54.7	B	0.30					
BERYLLIUM	0.10	U	0.10	U	0.10					
CADMIUM	0.30	B	0.30	U	0.30					
CALCIUM	16900		21800		10.5					
CHROMIUM	0.50	B	0.60	B	0.50					
COBALT	42.8	B	34.2	B	0.80					
COPPER	12.6	B	6.0	B	0.90					
IRON	8980		5410		11.2					
LEAD	10.8	J	1.8	UJ	1.8					
MAGNESIUM	7150		12300		6.9					
MANGANESE	1350		1600		0.20					
MERCURY	0.10	U	0.10	U	0.10					
NICKEL	4.3	B	4.4	B	0.90					
POTASSIUM	3260	B	6070		14.1					
SELENIUM	2.2	U	2.2	U	2.2					
SILVER	0.70	U	0.70	U	0.70					
SODIUM	13900		13900		267					
THALLIUM	3.5	U	3.5	U	3.5					
VANADIUM	0.70	U	0.70	U	0.70					
ZINC	29.4		12.8	B	1.2					
CYANIDE	N/A		N/A		N/A					

CAMDEN. MUNICIPAL WELLS

CASE # 20192
SDG # MB02F

Evaluation of Metals Data for the Contract Laboratory Program (CLP)

based on

SOW. 3/90

(SOP Revision XI)

PREPARED BY: _____ DATE: 1-30-92
Hanif Sheikh, Quality Assurance Chemist
Toxic and Hazardous Waste Section

REVIEWED BY: _____ DATE: 1-30-92
Kevin Kubik, Chief
Toxic and Hazardous Waste Section

APPROVED BY: _____ DATE: 1/30/92
Robert Runyon, Chief
Monitoring Management Branch

2.1.5 Data Review Log: It is recommended that each data reviewer should maintain a log of the reviews completed to include: a. date of start of case review

b. date of completion of case review
c. site
d. case number
e. contract laboratory
f. number of samples
g. matrix
h. hours worked
i. reviewer's initials

2.1.6 Telephone Record Log - the data reviewer should enter the bare facts of inquiry, before initiating any phone conversation with CLP laboratory. After the case review has been completed, mail white copy of Telephone Record Log to the laboratory and pink copy to SMO. File yellow copy in the Telephone Record Log folder, and attach a xerox copy of the Telephone Record Log to the completed Data Assessment Narrative (Appendix A.2).

2.1.7 Forwarded Paperwork

2.1.7.1 Upon completion of review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:
a. data package
b. completed data assessment checklist (Appendix A.1,original)
c. SMO Contract Compliance Screening (CCS)
d. Record of Communication (copy)
e. CLP Reanalysis Request/Approval Record (original + 3 copies)
f. Appendix A.6 (original).

2.1.7.2 Forward 2 copies of completed Data Assessment Narrative (Appendix A.2) along with 2 copies of the Inorganic Data Assessment Form (Appendix A.6) and Telephone Record Log , if any,: one each for appropriate Regional TPO, and the other one to EPA EMSL office in Las Vegas. The addresses of TPOs and EPA office in Las Vegas are given in Appendix A-4.

2.1.8 Filed Paperwork - Upon completion of review, the following are to be filed within MMB files:
a. Two copies of completed Data Assessment Narrative (Appendix A.2) each carrying Appendix A.6.
b. Telephone Record Log (copy)
c. SMO Report (copy Appendix A-3)
d. CLP Reanalysis Request/Approval Record (copy)

3.0 Data Completeness
Each data package is checked by a Regional Sample Control Coordinator (RSSC) for completeness. A data package is assumed to be complete when all the deliverables required under the contract are present. If a data package is incomplete, the RSSC would call the laboratory for missing document(s). If the laboratory does not respond within a week, SMO and MMB coordinator of Region II will be notified.

4.0 Rejection of Data - All values determined to be unacceptable on the Inorganic Analysis Data Sheet (Form I) must be lined over with a red pencil. As soon as any review criteria causes data to be rejected, that data can be eliminated from any further review or consideration.

5.0 Acceptance Criteria - In order that reviews be consistent among reviewers, acceptance criteria as stated in Appendix A.1 (pages 4-25) should be used. Additional guidance can be found in the National Inorganic Functional Guidelines of October 1, 1989.

6.0 SMO Contract Compliance Screening (CCS) - This is intended to aid reviewer in locating any problems, both corrected and uncorrected. However, the validation should be carried out even if CCS is not present. Resubmittals received from laboratory in response to CCS must be used by the reviewer.

7.0 Request for Reanalysis - Data reviewers must note all items of contract non-compliance within Data Assessment Narrative. If holding times and sample storage times have not been exceeded, TPO may request reanalysis if items of non-compliance are critical to data assessment. Requests are to be made on "CLP Re-Analysis Request/Approval Record".

8.0 Record of Communication - Provided by the Regional Sample Control Center (RSCC) to indicate which data packages have been received and are ready to be reviewed.

9.0 Rounding off numbers - The data reviewer will follow the standard practice.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review)

Date: Jan. 1992
Number: HW-2
Revision: 11

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[✓]	—	—
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[✓]	—	—
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[✓]	—	—
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present?	[✓]	—	—
Legible?	[✓]	—	—
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]	—	—
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]	—	—
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[✓]	—	—
Do sample numbers on cover page agree with sample numbers on: (a) Traffic Report Sheet?	[✓]	—	—
(b) Form I's?	[✓]	—	—
ACTION: If no for any of the above, contact RSCC for clarification.			

		Yes	No	N/A
A.1.6	Form I to IX			
A.1.6.1	Are all the Form I through Form IX labeled with:			
	Laboratory name?	[✓]	—	—
	Case/SAS number?	[✓]	—	—
	EPA sample No.?	[✓]	—	—
	SDG No.?	[✓]	—	—
	Contract No.?	[✓]	—	—
	Correct units?	[✓]	—	—
	Matrix?	[✓]	—	—

ACTION: If no for any of the above, note under Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

A.1.6.2	Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
	(NOTE: Check all forms against raw data.)			
	(a) all analytes analyzed by ICP?	[✓]	—	—
	(b) all analytes analyzed by GFAA?	[ ]	—	✓
	(c) all analytes analyzed by AA Flame?	[ ]	—	✓
	(d) Mercury?	[✓]	—	—
	(e) Cyanide?	[ ]	—	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review)

Date: Jan. 1992
Number: HW-2
Revision: 11

		YES	NO	N/A
A.1.7	Raw Data			
A.1.7.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]		
	Digestion Log for furnace AA Form XIII present?	[ ]		✓
	Distillation Log for mercury Form XIII present?	[✓]		
	Distillation Log for cyanides Form XIII present?	[ ]		✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]		
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[✓]		
	Are preparation dates present on sample preparation logs/bench sheets?	[✓]		
A.1.7.2	Measurement read out record present? ICP	[✓]		
	Flame AA	[ ]		✓
	Furnace AA	[ ]		✓
	Mercury	[✓]		
	Cyanides	[ ]		✓
A.1.7.3	Are all raw data to support all sample analyses and QC operations present?	[✓]		
	Legible?	[✓]		
	Properly Labeled?	[✓]		

ACTION: If no for any of the above questions in sections A.1.7.1 through A.1.7.3, write Telephone Record Log and contact laboratory for resubmittals.

		YES	NO	N/A
A.1.8	**Holding Times** - (aqueous and soil samples)			
	(Examine sample traffic reports and digestion/distillation logs.)			
	Mercury analysis (28 days) . . . . . exceeded?	___	[✓]	___
	Cyanide distillation (14 days) . . . . . exceeded?	___	[ ]	✓
	Other Metals analysis (6 months) . . . . exceeded?	___	[✓]	___
	NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.			
	ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.			
A.1.8.2	Is pH of aqueous samples for: Metals Analysis >2?	___	[✓]	___
	Cyanides Analysis <12?	___	[ ]	✓
	Action: If yes, flag the associated metals and cyanides data as estimated.			
A.1.9	**Form I (Final Data)**			
A.1.9.1	Are all Form I's present and complete?	[✓]	___	___
	ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
A.1.9.2	Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	___	✓
	Are soil sample results for each parameter corrected for percent solids?	[✓]	___	✓
	Are all "less than IDL" values properly coded with "U"?	[✓]	___	___

		YES	NO	N/A
	Are the correct concentration qualifiers used with final data?	[✓]		
	ACTION: If no for any of the above, prepare Telephone Record Log, and contact laboratory for corrected data.			
A.1.9.3	Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]		
	Was a brief physical description of samples given on Form I's?	[✓]		
	Was the dilution of any sample diluted beyond the requirements of the contract noted on Form I or Form XIV?		[✓]	
	ACTION: If no for any of the above, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			
A.1.10	Calibration			
A.1.10.1	Is record of at least 2 point calibration present for ICP analysis?	[✓]		
	Is record of 5 point calibration present for Hg analysis?	[✓]		
	Is record of 4 point calibration present for:			
	Flame AA?	[ ]		✓
	Furnace AA?	[ ]		✓
	Cyanides?	[ ]		✓
	Is one calibration standard at the CRDL level for all AA (except Hg) and cyanides analyses?	[✓]		
	ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".			

		YES	NO	N/A
A.1.10.2	Is correlation coefficient less than 0.995 for:			
	Mercury Analysis?	___	[✓]	___
	Cyanide Analysis?	___	[___]	✓
	Atomic Absorption Analysis?	___	[___]	✓

ACTION: If yes, flag the associated data as estimated.

NOTE: The data validator shall calculate the correlation coefficient using concentrations of the standards and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.10.3	In the instance where less than 4 standards are measured in absorbance (or peak area, peak height, etc.) mode, are the remaining standards analyzed in concentration mode immediately after calibration within ±10% of the true values?	[___]	___	✓

ACTION: If no, flag the associated data as estimated if standards are not within ±10% of true values. Do not flag the data as estimated in linear range indicated by good recovery of standard(s).

A.1.11 Form II A (Initial and Continuing Calibration Verification):

A.1.11.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for AA and ICP when both are used for the same analyte?	[___]	___	✓

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.

A.1.11.2	Circle on each Form IIA all percent recoveries that are outside the contract windows. Are all calibration standards (initial and continuing) within control limits:			
	Metals- 90-110%R?	[✓]	___	___
	Hg - 80-120%R?	[✓]	___	___
	Cyanides- 85-115%R?	[___]	___	✓

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ) if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
A.1.11.3 Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	___	___
Was ICV for cyanides distilled?	[ ]	___	✓
ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			
A.1.12 Form II B (CRDL Standards for AA and ICP) -			
A.1.12.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	___	___
Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[ ]	___	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	___	___
ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are: AA Analysis - **True Value ± CRDL; ICP Analysis - **True Value ± 2CRDL; CN Analysis - **True Value ± 0.5 x True Value.			

**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL. Compute the concentration of the missing mid-range standard from the calibration range.

		YES	NO	N/A
A.1.12.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and twice every eight hours of ICP run?	✓		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.12.3	Circle on each Form IIB all the percent recoveries that are outside the acceptance windows.			
	Are CRA and CRI standards within control limits:			
	Metals 80 - 120%R?		✓	
	Is mid-range standard within control limits:			
	Cyanide 80 - 120%R?			✓
	ACTION: Flag as estimated all sample results within the affected range if the recovery of the standard is between 50-79%; flag only positive data within the affected range if the recovery is between 121-150%; reject all data within the affected range if the recovery is less than 50%; reject only positive data within the affected range if the recovery is greater than 150%. Qualify 50% of the samples on either side of CRI standard outside the control limits.			
	Note: Flag or reject the final results only when sample raw data are within the affected ranges and the CRDL standards are outside the acceptance windows.			
A.1.13	Form III (Initial and Continuing Calibration Blanks)			
A.1.13.1	Present and complete?	✓		
	For both AA and ICP when both are used for the same analyte?			✓
	Was an initial calibration blank analyzed?	✓		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (which ever is more frequent)?	✓		

		YES	NO	N/A
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the Contract-Problems/ Non-Compliance section of the "Data Assessment Narrative".			
A.1.13.2	Circle on each Form III all calibration blank values that are above CRDL (or 2 x IDL when IDL > CRDL).			
	Are all calibration blanks (when IDL<CRDL) less than or equal to the Contract Required Detection Limits (CRDLs)?	[✓]	___	___
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[___]	___	✓
	ACTION: If no for any of the above, flag as estimated (J) positive sample results when raw sample value is less than or equal to calibration blank value analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank outside the control limits.			
A.1.14	FORM III (Preparation Blank) - (Note: The preparation blank for mercury is the same as the calibration blank.)			
A.1.14.1	Was one prep. blank analyzed for:			
	each Sample Delivery Group (SDG)?	[✓]	___	___
	each batch of digested samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	both AA and ICP when both are used for the same analyte?	[___]	___	✓
	ACTION: If no for any of the above, flag as estimated (J) all the associated positive data <10 x IDLs for which prep. blank was not analyzed.			
	NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			

		YES	NO	N/A
A.1.14.2	Is concentration of prep. blank value greater than the CRDL when IDL is less than or equal to CRDL?		✓	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep.blank?			✓
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value.			
A.1.14.3	Is concentration of prep. blank value (Form III) less than two times IDL, when IDL is greater than CRDL?			✓
	ACTION: If no, reject (red-line) all positive sample results when sample raw data are less than 10 times the prep. blank value.			
A.1.14.4	Is concentration of prep. blank below the negative CRDL?		✓	
	ACTION: If yes, reject (red-line) all associated sample results less than 10xCRDL.			
A.1.15	Form IV (ICP Interference Check Sample)			
A.1.15.1	Present and complete?	✓		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	✓		
	ACTION: If no, flag as estimated (J) all the samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.15.2	Circle all values on each Form IV that are more than ± 20% of true or established mean value.			
	Are all Interference Check Sample results inside the control limits (± 20%)?	✓		
	If no, is concentration of Al, Ca, Fe, or Mg lower than the respective concentration in ICS?			✓

		YES	NO	N/A
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			
A.1.16	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.16.1	Present and complete for: each SDG?	[✓]	—	—
	each matrix type?	[✓]	—	—
	each conc. range (i.e. low, med., high)?	[✓]	—	—
	For both AA and ICP when both are used for the same analyte?	[ ]	—	✓
	ACTION: If no for any of the above, flag as estimated (J) all the positive data less than four times the spiking levels specified in SOW for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.16.2	Was field blank used for spiked sample?	—	[✓]	—
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
A.1.16.3	Circle on each Form VA all spike recoveries that are outside control limits (75% to 125%).			
	Are all recoveries within control limits?	[✓]	—	—
	If no, is sample concentration greater than or equal to four times spike concentration?	[ ]	—	✓

	YES	NO	N/A
ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[ ]		✓
ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".			
A.1.16.4 Aqueous Are any spike recoveries: (a) less than 30%?		✓	
(b) between 30-74%?		✓	
(c) between 126-150%?		✓	
(d) greater than 150%?		✓	
ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".			
A.1.16.5 Soil/Sediment Are any spike recoveries: (a) less than 10%?			✓
(b) between 10-74%?			✓
(c) between 126-200%?			✓
(d) greater than 200%?			✓

		YES	NO	N/A
	ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".			
A.1.17	Form VI (Lab Duplicates)			
A.1.17.1	Present and complete for: each SDG?	[✓]		
	each matrix type?	[✓]		
	each concentration range (i.e. low, med., high)?	[✓]		
	both AA and ICP when both are used for the same analyte?	[ ]		✓
	ACTION: If no for any the above, flag as estimated (J) all the data ≥CRDL* for which duplicate sample was not analyzed.			
	Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.			
	2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in ug/L on wet weight basis and calculate RPD or Difference for each analyte.			
A.1.17.2	Was field blank used for duplicate analysis?		✓	
	ACTION: If yes, flag all data ≥CRDL* as estimated (J) for which field blank was used as duplicate.			
A.1.17.3	Are all values within control limits (RPD 20% or difference ≤ ±CRDL)?	✓		
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[ ]		✓
	ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".			

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.
2. If the result of lab duplicate analyzed by GFAA is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria to metals analyzed by GFAA.

A.1.17.4 Aqueous

Circle on each Form VI all values that are:

RPD > 50%, or
Difference > CRDL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	✓	___
Is any difference** between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	✓	___

ACTION: If yes, flag the associated data as estimated.

A.1.17.5 Soil/Sediment

Circle on each Form VI all values that are:

RPD > 100%, or

Difference > 2 x CRDL*

Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	___	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	___	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.18	Field Duplicates			
A.1.18.1	Were field duplicates analyzed?	✓		

ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.

NOTE: 1. Do not calculate RPD when both values are less than IDL.
2. Flag all associated data only for field duplicate pair.

A.1.18.2 Aqueous

Circle all values on self prepared Form VI for field duplicates that are:

RPD > 50%, or
Difference > CRDL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		✓	
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	✓		

ACTION: If yes, flag the associated data as estimated.

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
A.1.18.3	Soil/Sediment			
	Circle all values on self prepared Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
	Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[___]	✓
	Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[___]	✓
	ACTION: If yes, flag the associated data as estimated.			
A.1.19	Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)			
A.1.19.1	Was one LCS prepared and analyzed for: each SDG?	[✓]	___	___
	each batch samples digested/distilled?	[✓]	___	___
	both AA and ICP when both are used for the same analyte?	[___]	___	✓

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all the data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
A.1.19.2	**Aqueous LCS**			
	Circle on each Form VII the LCS percent recoveries outside control limits (80 - 120%) except for aqueous Ag and Sb.			
	Is any LCS recovery: less than 50%?	___	[✓]	___
	between 50% and 79%?	___	[✓]	___
	between 121% and 150%?	___	[✓]	___
	greater than 150%?	___	[✓]	___
	ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.			
A.1.19.3	**Solid LCS**			
	NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J). 2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.			
	Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓
	ACTION: If yes, qualify all associated positive data as estimated.			
	Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓
	ACTION: If yes, qualify all associated data as estimated.			

		YES	NO	N/A
A.1.20	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.20.1	Was Serial Dilution analysis performed for: each SDG?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med.)?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated all the positive data ≥ 10xIDLs or ≥ CRDL when 10xIDL ≤ CRDL for which Serial Dilution Analysis was not performed.			
A.1.20.2	Was field blank(s) used for Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J). If 10xIDL ≤ CRDL, flag all data ≥ CRDL.			
A.1.20.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[ ]	___	[✓]
	ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			
A.1.20.4	Circle on each Form IX all percent difference that are outside the control limits for initial concentrations equal to or greater than 10 x IDLs only.			
	Are any % difference values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___

		YES	NO	N/A
	ACTION: Flag as estimated (J) all the associated sample data ≥ 10xIDLs (or ≥ CRDL when 10xIDL ≤ CRDL) for which percent difference is greater than 10% but less than 100%. Reject (red-line) all the associated sample results equal to or greater than 10xIDLs (or ≥ CRDL when 10xIDL ≤ CRDL) for which PD is greater than or equal to 100%.			
	Note: Flag or reject on Form I's only the sample results whose associated raw data are ≥ 10xIDL (or ≥ CRDL when 10xIDL≤ CRDL)			
A.1.21	Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.21.1	Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[ ]		✓
	ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.21.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[ ]		✓
	Was a dilution analyzed for sample with analytical spike recovery less than 40%?	[ ]		✓
	ACTION: If no for any of the above, flag all the associated data as estimated.			
A.1.21.3	Is *analytical spike recovery outside the control limits (85-115%) for any sample?		[ ]	✓
	ACTION: If yes, flag as estimated the affected sample results if the recovery is between 10-84%; if the recovery is between 115-200%, flag the associated positive sample results as estimated; reject the associated sample results if the recovery is less than 10%; reject positive sample results if the recovery is greater than 200%.			

* Analytical spike is not required on the pre-digestion spiked sample.

		YES	NO	N/A
	NOTE: Reject or flag the data only when the affected sample(s) was not subsequently analyzed by Method of Standard Addition.			
A.1.22	Form VIII (Method of Standard Addition Results)			
A.1.22.1	Present?	[ ]		✓
	If no, is any Form I result coded with "S" or a "+"?		[ ]	✓
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.22.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[ ]	✓
	ACTION: If yes, reject (red-line) the affected data.			
A.1.22.3	Was *MSA required for any sample but not performed?		[ ]	✓
	Is coefficient of correlation for MSA less than 0.995?		[ ]	✓
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[ ]	✓
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.22.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-23?	[ ]		✓
	ACTION: If no, note exception under Contract Problem/ Non-Compliance section of the "Data Assessment Narrative", and prepare a separate list.			

* MSA is not required on LCS and prep. blank.

		YES	NO	N/A
A.1.23	Dissolved/Total or Inorganic/Total Analytes -			
A.1.23.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s).	___	[✓]	___
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	___	[ ]	✓
	NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.23.2	Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[ ]	✓
A.1.23.3	Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[ ]	✓
	ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.			
A.1.24	Form I (Field Blank) -			
	(Note: Designate "Field Blank" as such on Form I.)			
A.1.24.1	Circle all field blank values on Form I that are greater than CRDL, (or 2 x IDL when IDL > CRDL).			
	Is field blank concentration less than CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[ ]	___	✓

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review)

Date: Jan. 1992
Number: HW-2
Revision: 11

	YES	NO	N/A
If no, was field blank value already rejected due to other QC criteria?	[ ]		✓

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value. Reject on Form I's the soil sample results that when converted to ug/L on wet basis are less than or equal to five times the field blank value in ug/L.

A.1.25 Form X, XI, XII (Verification of Instrumental Parameters).

	YES	NO	N/A
A.1.25.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		

ACTION: If no, contact TPO of the lab.

	YES	NO	N/A
A.1.25.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
A.1.25.2.1 Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for the same analyte?	[ ]		✓

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.

	YES	NO	N/A
A.1.25.2.2 Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL.	[ ]		✓

	YES	NO	N/A
Action : If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			
A.1.25.3 Form XI (Linear Ranges)			
A.1.25.3.1 Was any sample result higher than high linear range of ICP.		✓	
Was any sample result higher than the highest calibration standard for non-ICP parameters?		✓	
If yes for any of the above, was the sample diluted to obtain the result on Form I?			✓
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.26 Percent Solids of Sediments			
A.1.26.1 Are percent solids in sediment(s): < 50%?		✓	
< 10%?		✓	
ACTION: If yes, qualify as estimated all the results of a sample that has per cent solids between 10%-50% (i.e. moisture content between 50%-90%). Reject all the results of a sample that has per cent solids less than 10% (i.e. moisture content greater than 90%).			
NOTE: Reject or flag(J) only the sample results that were not previously rejected or flaged due to other QC criteria.			

JUN 27 2000

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

SOW No.: ILM04.1

EPA SAMPLE NO.	Lab Sample ID.
MB02FT	32516S
MB02FW	32517S
MB02FX	32518S
MB02FY	32519S
MB02P4	32530S
MB02P5	32520S
MB02P6	32521S
MB02P7	32522S
MB02P8	32523S
MB02P9	32524S
MB02PB	32525S
MB02PC	32526S
MB02PCD	32526S2
MB02PCS	32526MS
MB02PF	32527S
MB02PG	32528S
MB02PH	32529S

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:

Name: BORIS Spre Title: Date: 6/20/00

SDG NARRATIVE - INORGANIC ANALYSES DATA PACKAGE

Contract: 68-W-00-085

Lab Name: Sentinel, Inc.

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MBØ2FT

SOW No.: ILM04.1

SAMPLE RECEIPT: Temperature Blank: PRESENT X ABSENT ____
If Absent, a non-invasive laser measurement is taken using a sample.
Cooler temperature(s) recorded via laser measurement were: 6°C
Refer to Record of Communication regarding mislabeled EPA Sample numbers for samples:
MBØ2PB, MBØ2P9

Refer to Record of Communication regarding misidentified tag numbers for samples:

Refer to Record of Communication regarding sample preservation anomalies for samples:

ANALYSIS: The following analyte(s) were estimated due to possible matrix interferences:

In the ICP run, the wrong check table was used for the LCSW. all elements flagged are actually within range.

DOCUMENT CONTROL: The following invalid defects resulted due to CCS program anomalies:
Initial Assessment: Code 1ØØ8 - SOW Missing/ Invalid. Caused by new SOW (ILMØ4.1)

OTHER:

Signature: [signature]

Name & Title: BAILISONE QACOfcr

Date: 6/20/00

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02FT

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32516S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	47.1	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	15000			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	58.2			P
7440-50-8	Copper	2.1	B		P
7439-89-6	Iron	4140			P
7439-92-1	Lead	2.3	B	J	P
7439-95-4	Magnesium	5020			P
7439-96-5	Manganese	1180			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.4	B		P
7440-09-7	Potassium	2310	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	13900			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	B		P
7440-66-6	Zinc	8.3	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02FW

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32517S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	62.8	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	48300			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	8.8	B		P
7440-50-8	Copper	4.9	B		P
7439-89-6	Iron	3120			P
7439-92-1	Lead	2.3	B	J	P
7439-95-4	Magnesium	18600			P
7439-96-5	Manganese	922			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	6.0	B		P
7440-09-7	Potassium	6960			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	46800			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	2.1	B		P
7440-66-6	Zinc	12.0	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02FX

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32518S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	81.4	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	60.2	B		P
7440-41-7	Beryllium	0.20	B		P
7440-43-9	Cadmium	0.40	B		P
7440-70-2	Calcium	32800			P
7440-47-3	Chromium	0.60	B		P
7440-48-4	Cobalt	15.1	B		P
7440-50-8	Copper	18.8	B		P
7439-89-6	Iron	838			P
7439-92-1	Lead	2.2	B	J	P
7439-95-4	Magnesium	14300			P
7439-96-5	Manganese	204			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	18.8	B		P
7440-09-7	Potassium	7070			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	34300			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	31.9			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02FY

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32519S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	94.5	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	51.1	B		P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	33500			P
7440-47-3	Chromium	6.8	B		P
7440-48-4	Cobalt	8.4	B		P
7440-50-8	Copper	13.9	B		P
7439-89-6	Iron	446			P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	12900			P
7439-96-5	Manganese	251			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	8.5	B		P
7440-09-7	Potassium	6670			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	36200			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	2.0	B		P
7440-66-6	Zinc	22.7			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02P4

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32530S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	83.8	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	21300			P
7440-47-3	Chromium	0.50	B		P
7440-48-4	Cobalt	18.3	B		P
7440-50-8	Copper	7.0	B		P
7439-89-6	Iron	15300			P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	12900			P
7439-96-5	Manganese	2930			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3.9	B		P
7440-09-7	Potassium	8310			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	14400			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	16.0	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02P5

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32520S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	202			P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	23000			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	43.7	B		P
7440-50-8	Copper	0.90	U		P
7439-89-6	Iron	33600			P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	11900			P
7439-96-5	Manganese	2180			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.4	B		P
7440-09-7	Potassium	8460			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	11600			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	9.2	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02P6

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32521S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	61.0	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	14500			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	2.0	B		P
7439-89-6	Iron	36200			P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	5860			P
7439-96-5	Manganese	1520			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.90	U		P
7440-09-7	Potassium	2120	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	11900			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	10.6	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

a

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02P7

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32522S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	46.9	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	71.8	B		P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	16700			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	132			P
7440-50-8	Copper	34.4			P
7439-89-6	Iron	440			P
7439-92-1	Lead	2.5	B	J	P
7439-95-4	Magnesium	7960			P
7439-96-5	Manganese	2800			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	18.9	B		P
7440-09-7	Potassium	3860	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	17200			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	26.6			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP
1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02P8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32523S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	2.0	B		P
7440-39-3	Barium	54.6	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	B		P
7440-70-2	Calcium	16900			P
7440-47-3	Chromium	0.50	B		P
7440-48-4	Cobalt	42.8	B		P
7440-50-8	Copper	12.6	B		P
7439-89-6	Iron	8980			P
7439-92-1	Lead	10.8		J	P
7439-95-4	Magnesium	7150			P
7439-96-5	Manganese	1350			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.3	B		P
7440-09-7	Potassium	3260	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	13900			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	29.4			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02P9

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32524S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	43.5	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	54.7	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	21800			P
7440-47-3	Chromium	0.60	B		P
7440-48-4	Cobalt	34.2	B		P
7440-50-8	Copper	6.0	B		P
7439-89-6	Iron	5410			P
7439-92-1	Lead	1.8	U	J	P
7439-95-4	Magnesium	12300			P
7439-96-5	Manganese	1600			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.4	B		P
7440-09-7	Potassium	6070			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	13900			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	12.8	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02PB

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32525S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	46.5	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	54.8	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	21900			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	33.4	B		P
7440-50-8	Copper	5.6	B		P
7439-89-6	Iron	5520			P
7439-92-1	Lead	9.8		J	P
7439-95-4	Magnesium	12300			P
7439-96-5	Manganese	1590			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.1	B		P
7440-09-7	Potassium	6050			P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	13900			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	19.0	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02PC

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32526S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	33.5	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	58.8	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	14700			P
7440-47-3	Chromium	7.4	B		P
7440-48-4	Cobalt	19.8	B		P
7440-50-8	Copper	2.1	B		P
7439-89-6	Iron	21800			P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	8760			P
7439-96-5	Manganese	2390			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.5	B		P
7440-09-7	Potassium	3810	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	12000			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	7.6	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02PF

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32527S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	40.6	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	63.0	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	17000			P
7440-47-3	Chromium	1.0	B		P
7440-48-4	Cobalt	103			P
7440-50-8	Copper	3.8	B		P
7439-89-6	Iron	7440			P
7439-92-1	Lead	13.4			P
7439-95-4	Magnesium	6250			P
7439-96-5	Manganese	2480			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	7.6	B		P
7440-09-7	Potassium	2650	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	13900			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	28.0			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MB02PG

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32528S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	23.3	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	15000			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	13.8	B		P
7440-50-8	Copper	3.8	B		P
7439-89-6	Iron	3050			P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	5210			P
7439-96-5	Manganese	678			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.90	U		P
7440-09-7	Potassium	2100	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	14100			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	5.8	B		P
7440-66-6	Zinc	8.0	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP
1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MB02PH

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 28192 SAS No.: SDG No.: MB02FT

Matrix (soil/water): WATER Lab Sample ID: 32529S

Level (low/med): LOW Date Received: 06/14/00

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.1	U		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	1.9	U		P
7440-39-3	Barium	17.8	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.60	B		P
7440-70-2	Calcium	15800			P
7440-47-3	Chromium	0.50	U		P
7440-48-4	Cobalt	16.4	B		P
7440-50-8	Copper	44.4			P
7439-89-6	Iron	3720			P
7439-92-1	Lead	26.2			P
7439-95-4	Magnesium	5400			P
7439-96-5	Manganese	368			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.0	B		P
7440-09-7	Potassium	2220	B		P
7782-49-2	Selenium	2.2	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	14700			P
7440-28-0	Thallium	3.5	U		P
7440-62-2	Vanadium	4.0	B		P
7440-66-6	Zinc	28.6			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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SAMPLE DELIVERY GROUP (SDG)
TRAFFIC REPORT (TR) COVER SHEET

Lab Name: Sentinel, Inc. Contract No.: 68W00085

Lab Code: SENTIN Case No.: 28192

Full Sample Analysis Price in Contract: _____

SDG No./First Sample in SDG. MB02FT Sample Receipt Date: 06/14/00
(Lowest EPA Sample Number in first shipment of samples received under SDG.) (MM/DD/YY)

Last Sample in SDG: MB02PH Sample Receipt Date: 06/14/00
(Highest EPA Sample Number in last shipment of samples received under SDG.) (MM/DD/YY)

EPA Sample Numbers in the SDG (listed in alphanumeric order)

1	MB02FT	12	MB02PC
2	MB02FW	13	MB02PF
3	MB02FX	14	MB02PG
4	MB02FY	15	MB02PH
5	MB02P4	16	
6	MB02P5	17	
7	MB02P6	18	
8	MB02P7	19	
9	MB02P8	20	
10	MB02P9	21	
11	MB02PB	22	

Note: There are a maximum of 20 field samples in an SDG.

Attach Traffic Reports to this form in alphanumeric order
(i.e.. the order listed on this form).

Amanda B. Fossett
Signature

6/14/00
Date

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TELEPHONE MEMORANDUM

TO: Nicole

FROM: Amanda

DATE/TIME: 6/14/00

SUBJECT: Case: 28192 SDG: MBD2FT

DESCRIPTION:

I got your email regarding this case.
MBD2P9 & MBD2PB:
Just needed to note a discrepancy w/ the labels on bottles. Station locations on tags and bottles match, but the EPA sample #s ~~[illegible]~~ on the bottles do not. I used the sample # that matched the station location that appears on tag & bottle. 6/14

Sta. loc. (on tag & Bottle)	EPA # on Bottle	EPA# on Tag ⇒ EPA # used
6532-GW-M8	MBD2PB	MBD2P9 ⇒ MBD2P9
6532-GW-M15	MBD2P9	MBD2PB ⇒ MBD2PB

Any questions let me know.

Corrective Action Required: Notify DynCorp.

CorrectiveActionTaken:

Signature: Amanda B. Lorsett **Date:** 6/14/00

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REFERENCE 24

WESTON

Richard Flack
Originator

PHONE CONVERSATION RECORD

Conversation with:
Name Mike Stephens
Company Camden Water LLC
Address 8900 Zimmerman Road
Pennsauken, NJ 08110
Phone (856) 488-2042

Date 3 / 15 / 2001
Time 1030 AM/PM

☒ Originator Placed Call
☒ Originator Received Call
W.O. No. 20064 052 100 4044

Subject Status of Volatile Organic Compound Treatment at Morris-Delair and Parkside Treatment Plants

Notes: At the above date/time I spoke w/ Mike Stephens (Water Superintendent for Camden Water LLC) who stated that the Morris-Delair Treatment Plant did not have any type of treatment method in place to treat or rig ground water of volatile organic compounds. He also stated that the Parkside Treatment Plant did have a packed column for the treatment of volatile organic compounds

☐ File
☐ Tickle File / /
☐ Follow-Up By:
☐ Copy/Route To:

Follow-Up-Action:

Originator's Initials RF

RFW 110-4-83

1423-1823 4/16/93